CITY OF VISTA
CALIFORNIA

# INITIAL STUDY AND MITIGATED NEGATIVE DECLARATION P-21-0114

| | |
|---|---|
| **Project Name:** | Vista Grande Residential Project |
| **Project Location:** | 2277 Vista Grande Drive, Vista, California |
| **APN:** | 171-100-05 and 171-100-28 |
| **Project Applicant:** | Gregory Perrine<br>1151 Duryea Avenue<br>Irvine, California<br>(714) 600 - 8141 |
| **Lead Agency:** | City of Vista<br>Community Development Department, Planning Division<br>200 Civic Center Drive<br>Vista, California 92084<br>John Conley, Director of Community Development<br>(760) 643-5388 |
| **Public Review Period:** | OCTOBER 2, 2021, to NOVEMBER 1, 2021 |

---

This Initial Study/Mitigated Negative Declaration (IS/MND) has been prepared pursuant to the California Environmental Quality Act (CEQA) (California Public Resources Code, Section 21000, et seq.) and the CEQA Guidelines (California Code of Regulations, Section 15000, et seq.). It was available for a 30-day public review period as shown above.

Comments regarding this IS/MND should focus on the sufficiency of the document in identifying and analyzing the potential impacts on the environment that may result from the project and the ways in which any significant effects are avoided or mitigated. **All comments must be made in writing** and addressed to Mr. John Conley, Director of Community Development, City of Vista Community Development, Department Planning Division, 200 Civic Center Drive, Vista, California 92084. Comments may be sent by e-mail to: jconley@cityofvista.com. Comments must be received in the Planning Division office no later than 5 p.m. on the last day of the public review period noted above.

---

This page left intentionally blank.

# TABLE OF CONTENTS

**Chapter 1 Introduction ..... 1-1**
CEQA Overview ..... 1-1
Authority ..... 1-1
Scope ..... 1-1
**Chapter 2 Environmental Setting and Project Description ..... 2-1**
Project Overview ..... 2-1
Historical Uses of the Project Site ..... 2-1
Existing Environmental Setting ..... 2-1
Surrounding Land Uses ..... 2-2
Building Development and Site Amenities ..... 2-3
Landscaping ..... 2-3
Site Access ..... 2-3
Utilities ..... 2-4
Stormwater Features ..... 2-4
Construction ..... 2-4
Approvals ..... 2-5
Tribal Consultation ..... 2-5
**Chapter 3 Initial Study Environmental Checklist ..... 3-1**
Project Information ..... 3-1
Environmental Factors Potentially Affected ..... 3-2
Evaluation of Environmental Impacts ..... 3-2
I. Aesthetics ..... 3-4
II. Agriculture and Forest Resources ..... 3-6
III. Air Quality ..... 3-7
IV. Biological Resources ..... 3-12
V. Cultural and Tribal Cultural Resources ..... 3-16
VI. Energy ..... 3-20
VII. Geology and Soils ..... 3-22
VIII. Greenhouse Gas Emissions ..... 3-25
IX. Hazards and Hazardous Materials ..... 3-28
X. Hydrology and Water Quality ..... 3-32
XI. Land Use and Planning ..... 3-39
XII. Mineral Resources ..... 3-51
XIII. Noise ..... 3-51
XIV. Population and Housing ..... 3-56
XV. Public Services ..... 3-57
XVI. Recreation ..... 3-58
XVII. Transportation/Traffic ..... 3-59
XVIII. Utilities and Service Systems ..... 3-63
XIX. Wildfire ..... 3-65
XX. Mandatory Finding of Significance ..... 3-67
**Chapter 4 References and List of Preparers ..... 4-1**
References ..... 4-1
Individuals and Organizations Consulted ..... 4-2
Preparers ..... 4-2
**Attachment A – Figures**
**Attachment B – Cultural Resources Report and Addendum to the Cultural Resources Survey and Assessment**
**Attachment C – Geotechnical Investigation**

Attachment D – Biological Report

Attachment E – Air Quality and GHG Report

Attachment F – Local Transportation Assessment

Attachment G – Phase I Report

Attachment H – Hydrology Study and SWQMP

Attachment I – Acoustical Site Assessment

Attachment J – Water Supply Study and Sewer Flow Analysis

# Chapter 1

# INTRODUCTION

## CEQA Overview

The City of Vista's (city's) Planning Division has prepared this Initial Study/Mitigated Negative Declaration (IS/MND) to evaluate the potential environmental consequences associated with the proposed Vista Grande Residential (project). As part of the permitting process, the project is required to undergo an environmental review pursuant to the California Environmental Quality Act (CEQA). One of the main objectives of CEQA is to disclose to the public and decision makers the potential environmental effects of proposed activities. CEQA requires that the lead agency prepare an Initial Study (IS) to determine whether a Negative Declaration (ND), a Mitigated Negative Declaration, or an Environmental Impact Report (EIR) is needed. The city's Planning Division is the lead agency for the project under CEQA and, per CEQA Guidelines, Section 15070, has determined that an MND would be prepared. A description of the project is found in Chapter 2, Environmental Setting and Project Description, of this IS/MND.

## Authority

The preparation of this IS/MND is governed by two principal sets of documents: CEQA (California Public Resources Code, Section 21000 et seq.) and the CEQA Guidelines (CEQA Guidelines, Section 15000 et seq.). Specifically, the preparation of an IS and an ND is guided by the CEQA Guidelines; Section 15063 describes the requirements for an IS, and Sections 15070–15073 describe the process and requirements for the preparation of an ND. Where appropriate and supportive to an understanding of the issues, reference will be made either to the CEQA statutes or CEQA Guidelines. This IS/MND contains the contents required by CEQA, which include a project description, a description of the environmental setting, potential environmental impacts, mitigation measures for any significant effects, consistency with plans and policies, and names of preparers.

## Scope

This IS/ND evaluates the project's effects on the following resource topics:

- Aesthetics
- Agriculture and forestry resources
- Air quality
- Biological resources
- Cultural and tribal cultural resources
- Energy
- Geology and soils
- Greenhouse gas (GHG) emissions
- Hazards and hazardous materials
- Hydrology and water quality
- Land use and planning
- Mineral resources
- Noise
- Population and housing
- Public services
- Recreation
- Transportation
- Utilities and service systems
- Wildfire
- Mandatory findings of significance

This page left intentionally blank.

# Chapter 2

# ENVIRONMENTAL SETTING AND PROJECT DESCRIPTION

## Project Overview

The proposed Vista Grande Residential Project (project) involves the approval of a General Plan Amendment, zoning change, and Tentative Subdivision Map to construct 28 single-family detached lots, an access road, and associated utilities situated on two parcels in the northeastern part of the City of Vista (city). The site is currently designated Rural Residential (RR) in the Vista General Plan 2030 (City of Vista 2012), which allows up to one dwelling unit per acre (du/ac). The project proposes to change the General Plan land use designation to Low Density Residential (LD), which would allow up to two du/ac. The property is currently zoned Agricultural Zone (A-1). The project also proposes to rezone the property as Estates Residential (E-1).

## Historical Uses of the Project Site

Based on historical aerial photographs, the project site was used for agriculture as an active citrus grove from the late 1940s or early 1950s until the late 1980s. The existing residence on the project site was built between 1946 and 1953, based on historical aerial photographs and has been previously determined to not be of historical significance (Helix 2015a). The site was previously evaluated under CEQA for a Tentative Subdivision Map, zoning change, and annexation of 14 single-family lots to the city, which was approved in 2016.

## Existing Environmental Setting

### CITY OF VISTA

The city is a largely built-out, predominantly low-density residential community approximately seven miles inland from the Pacific Ocean in northern San Diego County. Clusters of urbanizing, higher-density areas are scattered throughout the central portion of the city and along arterial roads. The city is in the rolling topography of the western foothills of the San Marcos Mountains, with elevations ranging from approximately 200 feet (ft) to 750 ft above mean sea level. Pleasant views are found from various points throughout the city, with some higher elevations offering captivating vistas of the Pacific Ocean to the west. In addition to the pleasing topography of the mountains and hills, the city is lushly vegetated from the low-level creek beds to the steep slopes of the foothills, which contribute to the overall beauty of the community. The city also has two major creeks, Buena Vista Creek and Agua Hedionda Creek, that flow through its boundaries.

### PROJECT SITE

The 16.99-acre project site is in the northeastern part of the city on the border with unincorporated San Diego County at the northeastern terminus of Vista Grande Drive (Attachment A, Figures; Figure 1, Regional Location). The project site is composed of two parcels, Assessor's Parcel Numbers 171-100-05 and 171-100-28 (Figure 2, Project Site). An occupied single-family residence exists on the western parcel, and the remainder of the site is vacant. An existing road easement runs north to south along the western border of the site, and existing aboveground power lines run along the southern border of the project site. Other than the residence, the property supports mostly non-native vegetation (weed-dominated grassland), fuel management areas, and unpaved roads. The existing residence on the project site is more than 50 years old and has been previously determined to not be of historical significance (Attachment B, Cultural Resources Report and Addendum to the Cultural Resources Survey and Assessment).

The project site has moderately steep slopes and is on a south-facing slope of an east-to-west-trending ridge. Elevations range from 725 ft above mean sea level in the northern corner of the site on the ridge and 630 ft above mean seal level in the southwestern corner of the site at Vista Grande Drive, with a total elevation difference of approximately 95 ft. According to the Geotechnical Investigation (Attachment C), earth materials encountered on the site consist of colluvium/topsoil and Cretaceous-age granitic rock. The soil is stable and has a very low expansion potential. Additional information on this topic can be found in Section VII, Geology and Soils, in Chapter 3, Initial Study Environmental Checklist, of this document.

According to the Vista Grande Biological Report prepared for the project by Tierra Data (Attachment D), the project site supports five distinct vegetation communities/land covers: approximately 0.13 acre of Diegan coastal sage scrub, 0.01 acre of disturbed coastal sage scrub, 12.65 acres of non-native grassland, 2.85 acres of disturbed habitat, and 1.34 acres of developed areas. No special-status species were observed on site, and none have a high potential to occur on site. In addition, the Multiple Habitat Conservation Plan (MHCP) includes a list of Standard BMPs that are required to limit indirect impacts (SANDAG 2003: Volume II, Appendix B). These BMPs would be incorporated into the overall final project design as Conditions of Project Approval, subject to the review and approval of the city prior to the project obtaining a grading permit. Specifically, for this project, Measures 1–3, 6, 8, and 10–14 would apply. Further information on this topic can be found in Section IV, Biological Resources, in Chapter 3 of this document.

Hydrologically, the project is situated in the Mission Hydrological Subarea (903.11) of the Lower San Luis Rey Hydrologic Area (903.10) in the San Luis Rey Hydrological Unit (903.0). According to the Stormwater Quality Management Plan, in the existing condition, stormwater runoff flows over land to four main discharge points along the northern, eastern, southeastern, and southwestern boundaries. No underground storm drain system is in Vista Grande Drive near the project site. Stormwater that discharges from the project site along the eastern and northern borders flows north to the San Luis Rey River (Lower), which flows west. Stormwater that discharges from the project site along the southern and southwestern borders flows west to Guajome Lake, which flows to the San Luis Rey River (Lower), which flows west and ultimately discharges to the Pacific Ocean. Additional information on this topic can be found in Section X, Hydrology and Water Quality, in Chapter 3 of this document.

## Surrounding Land Uses

Immediately surrounding land uses include existing large-lot residential to the south, west, and east and agriculture to the north in the County of San Diego (Figure 2). In addition, large-lot residential uses (minimum 0.5 acre) are southwest of the project site in the city. Vista Grande Drive runs east to west along the southern border of the property in the city.

### Proposed Project Description

The applicant seeks approval of a General Plan Amendment, a zoning change, and a Tentative Subdivision Map for development of 28 single-family detached lots. Each lot would be a minimum of one-half acre and range in size from 21,789 square feet (sf) to 25,078 sf. The various approvals are briefly summarized below:

- **General Plan Amendment**: Per Chapter 18.48 in the Vista Development Code, this amendment is required for the land use designation change from Rural Residential (RR) (one du/acre) to Low Density Residential (LD) (two du/acre).
- **Zoning Change**: Per Chapter 18.04 in the Vista Development Code, the project requires a zoning designation change from Agricultural Zone (A-1) to Estate Residential (E-1).
- **Tentative Subdivision Map**: Per Chapter 17.12 in the Vista Development Code, this map is required for the division and development of 28 one-half-acre single-family detached residences.

## Building Development and Site Amenities

The project proposes to construct 28 residential lots. The proposed single-family detached residences would be a mix between single-story and two-story structures and range in size from approximately 3,200 sf to 4,200 sf (Figure 3, Site Plan). The architectural characteristics of the proposed residences would draw from elements of the surrounding area and maintain consistency with the existing semi-rural environment. In addition, the proposed project would include four open space areas that would contain decomposed granite trails and park benches (Figure 4, Conceptual Landscape Plan).

## Landscaping

A total of 4.6 acres of landscaping is proposed. The overall landscape concept plan for the proposed project would consist of a variety of native and non-native evergreen and deciduous trees, shrubs, and ground cover that would be planted on site (Figure 4). Plant selection would be based on the Water Efficient Landscaping Ordinance in Chapter 18.56 of the Vista Development Code. The proposed plant species would be drought tolerant and require low to moderate water use.

In addition, a five- to six-ft-tall black tubular fence would be constructed along the eastern and northern perimeter of the property.

## Site Access

The proposed project would improve the existing easterly Vista Grande Drive along the southern boundary of the project site. The proposed private road improvement would loop north to provide access to the proposed interior lots. This portion of the roadway would be 24 ft wide, providing two 12 ft travel lanes and may include curbs and gutters. The existing Vista Grande Drive would then exit west to the existing unnamed easement road on the western side of the project site. This portion of the road would be 24 ft wide, providing two 12 ft travel lanes (Figure 3). Emergency secondary access would be provided from the easterly Vista Grande Drive to Vista Grande Terrace. This access would be gated and used for emergency secondary access/egress purposes only. The project would also provide a five-foot sidewalk along the northern side of the private Vista Grande Drive and within the internal tract on the eastern side of Private Street “A” and southern and western sides of Private Street ”B.”

As a condition of approval, the project would provide the following improvements at the intersection of East Vista Way and Warmlands Avenue:

- Widen East Vista Way at Warmlands Avenue adjacent to 2131 East Vista Way to its ultimate street cross-section as designated in the city’s Circulation Element to a 4-Lane Major. The following improvements would be made:
    - New pavement, curb and gutter, sidewalk, and one streetlight in the widened section.
    - A full curb return with two directional curb ramps on the southeastern corner and a curb return with a curb ramp on the northeastern corner.
    - Relocating of an existing traffic signal/streetlight pole using new California Department of Transportation (Caltrans) standard pole.
    - Two new pedestrian push buttons and poles to allow for pedestrian travel on the southern and eastern legs of the intersection.

  - Grading as needed to accommodate the widening. Provision of minor grading modifications behind the existing AC curb to allow for transition from the new curb ramp to the dirt walking pathway along East Vista Way heading south.
  - Provision of striping as required for the widening as well as crosswalks on the southern and eastern legs of the intersection.
- Eliminate the existing pedestrian crossing on the north leg of the intersection. Include all needed signal modifications.
- Provide improvement design plans in accordance with city requirements prior to constructing the above improvements.

## Utilities

New sewer main lines would be constructed in the proposed improvement of Vista Grande Drive (Figure 3). A new eight-inch gravity sewer main line would be connected to the existing eight-inch gravity sewer main line in Prince Way and extended through an existing easement up to Vista Grande Drive and then east to the project site. New sewer laterals would be extended from the new on-site mains and stubbed to each residence. The project would connect to two existing water service pipelines and meters on the project site that extend from the existing water main line in Vista Grande Drive. The project would install privately owned booster pumps with backflows for areas on the project site above 702 ft. New fire hydrants would be installed on the project site. The Vista Fire Department (VFD) would verify the final locations of all hydrants during review of the precise grading plans. In addition, the existing power poles would be removed, and the proposed project would underground the existing overhead utilities.

## Stormwater Features

The project would consist of six drainage basins on site. (Figure 5, Drainage Plan). Stormwater runoff would be conveyed over land and in proposed storm drains to four Modular Wetlands Systems and four proposed underground storage facilities within the six drainage basins to meet the requirements for pollutant control and hydromodification management flow control. A proposed storm drain and curb outlet would be constructed along Vista Grande Drive in the southwestern corner of the site. In addition, tree wells would be installed in drainage basins 1 through 4 and 6. They would be designed with a uniform surface depth of six inches with a 48-inch layer of amended soil and a six-inch perforated subdrain.

## Construction

Site development is anticipated to take approximately six months beginning in April2022, with grading of the project site taking approximately 35 working days. The project would require demolition of the existing residence on the property. Development of the project would require approximately 70,000 cubic yards (cy) of earth movement on site, with an average depth of cut at 4.85 ft and an average depth of fill at 5.31 ft (see Figure 3). The cut and fill on site is anticipated to be balanced with no import or export off site when you take into consideration the soil subsidence and shrinkage. On-site phases assumed include demolition and clearing, grading, wet utilities, fencing, dry utilities, concrete flatwork and paving, and parkway landscaping. Off-site construction phases assumed include demolition and clearing, grading, wet utilities, dry utilities, concrete flatwork and paving, and parkway landscaping. The project is assumed to include no woodburning hearths and repainting of buildings with San Diego Air Pollution Control District (SDAPCD) Rule 67 ROG content compliant coatings. The entire project site would be developed at once, but construction of the residences would be phased. Work is anticipated to begin in April 2022. The land development construction schedule is anticipated to be approximately six months, with the grading of the project site taking approximately 35 working days. A Traffic Control Plan will be prepared.

In addition, remedial grading would be required to remove and re-compact the potentially compressible ground materials on site. While heavy grading equipment would appear to be able to achieve the desired grades over the majority of the site, there is a potential to encounter localized, dense bedrock zones, or corestones, which would make excavation more difficult. As a result, the potential for using rock breakers and/or blasting is anticipated locally. As a Condition of Project Approval, any potential blasting undertaken at the project site must meet the requirements set out in the city's Municipal Code, Chapter 16.40.100, Explosives and Fireworks. In addition, construction of the project would require compliance with the California Building Code (CBC) and the Building Department's review process, permit application, inspection, and recommendations in the Updated Geotechnical Investigation and Stormwater Infiltration Evaluation Report prepared by Geo Soils, Inc., for the proposed project (Attachment C).

## Approvals

Besides review under CEQA, the applicant and/or contractor of the proposed project would be required to obtain the following additional approvals and/or permits from the city: General Plan Amendment, zoning change, Tentative Subdivision Map, Right-Of-Way Permit, Grading Permit, Landscape Construction Plan, and Building and Occupancy Permits. These approvals require meeting certain conditions of approval before obtaining the required permits. In addition, before the Final Subdivision Map is recorded, it is understood that all conditions of approval tied to the recordation of the Final Map (which include the mitigation measures in this document) must be satisfactorily completed. Other public agency approvals are cited on page 3-1.

## Tribal Consultation

California Native American Tribes traditionally and culturally affiliated with the project site requested consultation pursuant to the California Public Resources Code, Section 21080.3.1. City staff conducted notification and consultation with these Tribes per the requirements of the California Public Resources Code, Section 21080.3.2. On June 10, 2021, a Tribal notification letter per Senate Bill 18 was sent out to the San Luis Rey Band of Mission Indians and the Rincon Band of Luiseño Indians. The city met with a representative of the San Luis Rey Band of Mission Indians on August 12, 2021, and September 16, 2021, and with representatives of the Rincon Band of Luiseño Indians on August 16, August 27, September 16, and September 21, 2021. The Rincon Band of Luiseño Indians also submitted written comments and additional information in correspondence dated August 20 and September 8, 2021. Written correspondence has not yet been received from the San Luis Rey Band of Mission Indians as of September 27, 2021.

This page left intentionally blank.

# Chapter 3

# INITIAL STUDY ENVIRONMENTAL CHECKLIST

## Project Information

| | |
|---|---|
| **PROJECT TITLE:** | Vista Grande Residential |
| **LEAD AGENCY NAME AND ADDRESS:** | City of Vista<br>Community Development Department<br>Planning Division<br>200 Civic Center Drive<br>Vista, California 92084 |
| **CONTACT PERSON:** | John Conley, Director of Community Development<br>(760) 643-5388<br>jconley@cityofvista.com |
| **PROJECT LOCATION:** | 2277 Vista Grande Drive, Vista, California |
| **PROJECT APPLICANT:** | Gregory Perrine<br>1151 Duryea Avenue<br>Irvine, California<br>(714) 600 - 8141 |
| **GENERAL PLAN DESIGNATION:** | Existing – Rural Residential (RR)<br>Proposed – Low Density Residential (LD) |
| **ZONING DESIGNATION:** | Existing – Agricultural (A-1)<br>Proposed – Estates Residential (E-1) |
| **DESCRIPTION OF PROJECT:** | See Chapter 2 of this IS/MND. |
| **SURROUNDING LAND USES AND SETTING:** | See Chapter 2 of this IS/MND. |
| **OTHER PUBLIC AGENCY APPROVALS:** | General Plan Amendment, Zoning Change, Tentative Subdivision Map. Stormwater Permit |

## Environmental Factors Potentially Affected

Based upon the initial evaluation presented in the following IS, it is concluded that the project would not result in significant adverse environmental impacts.

**ENVIRONMENTAL DETERMINATION**

On the basis of the initial evaluation of the attached Initial Study:

☐ I find the project COULD NOT have a significant effect on the environment and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the project could have a significant effect on the environment there will 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 will be prepared.

☐ I find that the project MAY have a significant effect on the environment and an ENVIRONMENTAL IMPACT REPORT (EIR) is required.

☐ I find that the project MAY have a "potentially 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 project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately 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 project, nothing further is required.

John Conley, Director of Community Development — 09/29/2021 Date

## 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, then 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: Less Than Significant with Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level.
5. Earlier analyses 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 ND. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
    a. Earlier Analyses 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 explanation of each issue should identify:
    a. the significance criteria or threshold, if any, used to evaluate each question; and
    b. the mitigation measure identified, if any, to reduce the impact to less than significance

### IMPACT TERMINOLOGY

The following terminology is used to describe the level of significance of impacts:

- A finding of *no impact* is appropriate if the analysis concludes that the project would not affect the particular topic area in any way.
- An impact is considered *less than significant* if the analysis concludes that it would not cause substantial adverse change to the environment and requires no mitigation.
- An impact is considered *less than significant with mitigation incorporated* if the analysis concludes that it would not cause substantial adverse change to the environment with the inclusion of environmental commitments that have been agreed to by the applicant.
- An impact is considered *potentially significant* if the analysis concludes that it could have a substantial adverse effect on the environment.

| I. Aesthetics<br>*Except as provided in Public Resources Code Section 21099, would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Have a substantial adverse effect on a scenic vista? | ☐ | ☐ | ☒ | ☐ |
| b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? | ☐ | ☐ | ☐ | ☒ |
| c. In non-urbanized areas, 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 a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality? | ☐ | ☐ | ☒ | ☐ |
| d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? | ☐ | ☐ | ☒ | ☐ |

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT IMPACT.** A scenic vista is generally defined as the view of an area that is visually or aesthetically pleasing. The Vista General Plan 2030 Program EIR (PEIR) (City of Vista 2011) identifies scenic resources in the city and its sphere of influence (SOI), such as the San Marcos Mountains to the east and northeast; various ridgelines, hills, and valleys; creeks and streams; distant mountains to the north; public and private open space with native vegetation; the city's public parks; a network of hiking and horseback riding trails; various private and public recreation facilities (such as the Guajome Regional Park, a 557-acre San Diego County-owned park); and buildings of historical and cultural significance (such as Rancho Minerva, Rancho Buena Vista Adobe, and the Guajome Ranch House—a National Historic Landmark). Further, the Vista General Plan 2030 PEIR (City of Vista 2011) identifies two main viewsheds that have been identified within the city and its SOI based on general viewing areas: (1) the San Marcos Mountains to the east and northeast of the city and (2) scenic canyons in the southwestern portions of the city. The project site is located approximately 1.7 miles to the west of the San Marcos Mountains.

Surrounding land uses to the project site include existing large-lot residential to the south, west, and east and agriculture to the north in the County of San Diego. Vista Grande Drive runs east to west along the southern border of the property with additional large-lot residential residences beyond that within the city.

The development of 28 single-family lots would not have a significant impact on scenic viewsheds of the San Marcos Mountains. At locations in close proximity to the project site, the anticipated one-story and two-story dwelling units may provide minor obstructions of views of the San Marcos Mountains depending on the vantage point of the viewer. However, the proposed project would be developed at a scale that would not adversely affect scenic views or vistas from the surrounding area. In addition, the Vista General Plan 2030

continues to allow development of existing land uses within vacant parcels throughout the city that are currently designated for residential development. Therefore, impacts would be less than significant.

**B. NO IMPACT.** There are no officially designated state scenic highways in the city. State Route 76, which parallels the city boundary approximately 1.6 miles to the north of the project site, is an eligible state scenic highway (Caltrans 2019). However, the portions of State Route 76 that run north of the city are located in the developed areas of San Diego County (including Bonsall) and the City of Oceanside. No impact would occur from the proposed project on scenic resources viewed from a state scenic highway.

**C. LESS THAN SIGNIFICANT IMPACT.** The proposed project would alter but would not substantially degrade the existing visual character or quality of the project site or surroundings. The visual character of the existing project site is characterized by vacant land and an occupied residence. The visual character of the surrounding area is a mixture of large-lot and estate residential, commercial, and agriculture uses. The project would enhance the visual quality of the project site by introducing an aesthetically cohesive development with associated landscaping on a currently underutilized piece of land. Existing site character would be improved by implementation of the proposed project because the functionality and visual quality of the site would increase. The architectural characteristics of the proposed residences would draw from elements of the surrounding area and maintain consistency with the existing semi-rural environment. The overall landscape concept plan for the proposed project would consist of a variety of native and non-native evergreen and deciduous trees, shrubs, and ground cover that would be planted on site. The project would include an open space area in the southwestern corner of the project site that would include decomposed granite trails and park benches. A five- to six-ft-tall black tubular fence would be constructed along the eastern and northern perimeter of the property. In addition, existing aboveground utility power poles on the project site would be undergrounded, further enhancing the visual aesthetic of the property. The proposed development would be consistent with nearby estate residential land uses with similar lot sizes, dwelling unit square footage, building heights, architectural design features, and landscaping. Therefore, given the visual character of the existing site, development of the proposed project would have a less than significant impact on the visual character of the site and its surroundings.

**D. LESS THAN SIGNIFICANT IMPACT.** Sensitive receptors that could be affected by lighting and glare include nearby residents, motorists, and pedestrians. Glare can emanate from many different sources, some of which include direct sunlight, sunlight reflecting from cars or buildings, and bright outdoor lighting. Potential sources of nighttime lighting and/or glare on the project site include lighting from the occupied residence and glare from existing windows.

Construction of the project would include the installation of new street lights along both the existing and proposed segments of Vista Grande Drive. However, new lights would be required to match city standards for streetlights in the Vista Development Code (e.g., approximate minimum height of 12 ft, shielded and directed away from residential property boundaries). As a result, the installation of the new street lights would not create a significant, substantial source of light or glare. In addition, architectural plans for the buildings would be reviewed by the city's Building Department and Planning Division prior to each lot owner obtaining building permits, including whether the exterior building materials or exterior lights would produce substantial glare. Conformance with the Vista Development Code, permit plan checks, and reviews by city staff would ensure that substantial lighting and glare impacts from future building and site development would not be created. Therefore, the proposed project would not create a substantial source of light or glare, and impacts would be less than significant.

| II. Agriculture and Forest Resources<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| 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? | ☐ | ☐ | ☒ | ☐ |
| b. Conflict with existing zoning for agricultural use, or a Williamson Act contract? | ☐ | ☐ | ☐ | ☒ |
| 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))? | ☐ | ☐ | ☐ | ☒ |
| d. Result in the loss of forest land or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ☒ |
| 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? | ☐ | ☐ | ☐ | ☒ |

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT IMPACT.** The project site is located in the northeastern corner of the city. The site was historically used for agriculture as an active citrus grove until the late 1980s and currently contains an occupied residence. Currently, lands in the outskirts of the city support agricultural uses related to small-scale horticulture and specialty crops with no large-scale, commercial agricultural cultivation. Based on farmland maps prepared by the California Department of Conservation (2020), the property is neither designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance nor currently under active agricultural use. Therefore, impacts would be less than significant.

**B-E. NO IMPACT.** According to the Department of Conservation's San Diego County Williamson Act Lands Map (2008), no Williamson Act lands occur in the city, including the project site. Further, the site is not located in an area designated as forest land or timberland and would not convert forest land to non-forest uses or involve other changes in the existing environment that would result in the conversion of farmland to non-agricultural use. Therefore, no impacts would occur.

| III. Air Quality<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Conflict with or obstruct implementation of the applicable air quality plan? | ☐ | ☐ | ☒ | ☐ |
| 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? | ☐ | ☐ | ☒ | ☐ |
| c. Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☐ | ☒ | ☐ |
| d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people? | ☐ | ☐ | ☒ | ☐ |

The discussion below is based on the findings contained within the Air Quality and Greenhouse Gas Assessment for the Vista Grande Project (Air Quality and GHG Report) (Attachment E) prepared for the proposed project and information taken from the Air Quality Assessment for the Vista Grande Tentative Subdivision Map Project prepared for the previously approved project (SRA 2015). This report is on file and available for review in the city's Planning Division office.

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT IMPACT.** The SDAPCD is required, pursuant to the Clean Air Act, to reduce emissions of criteria pollutants for which the San Diego Air Basin is in non-attainment. The project would be subject to the SDAPCD Attainment Plan for San Diego County (Attainment Plan). The Attainment Plan contains a comprehensive list of pollution control strategies directed at reducing emissions and achieving ambient air quality standards. These strategies are developed, in part, based on regional population, housing, and employment projections prepared by the San Diego Association of Governments (SANDAG).

SANDAG projects that population in the city will grow by 5,461 households between the years 2020 and 2035 (Attachment E). The proposed project's addition of 28 housing units would represent approximately one-half of one percent of the total housing growth projected for the city. Such levels of growth are consistent with the forecasts for the city as adopted by SANDAG. Because the SDAPCD has incorporated these same projections into the Attainment Plan, it can be concluded that the proposed project would be consistent with the projections in the Attainment Plan. Therefore, project development would not conflict with or obstruct implementation of the Attainment Plan, and impacts would be less than significant.

**B. LESS THAN SIGNIFICANT IMPACT.** Air quality impacts can result from the construction and operation of the project. Construction emissions are finite and include fugitive dust, equipment exhaust, and indirect mobile source emissions associated with construction workers commuting, material hauling, and deliveries. Operational impacts are primarily due to emissions from mobile sources associated with the vehicular travel along roadways and area sources, such as natural gas use for space and water heating.

The SDAPCD significance thresholds for air quality impacts are shown in Table AQ-1.

**TABLE AQ-1. SCREENING-LEVEL CRITERIA FOR AIR QUALITY IMPACTS**

| Pollutant | Total Emissions | | |
|---|---|---|---|
| **Construction Emissions** | | | |
| | **Lb. Per Day** | | |
| Coarse Particulate Matter ($PM_{10}$) | 100 | | |
| Fine Particulate Matter ($PM_{2.5}$)[1] | 55 | | |
| Oxides of Nitrogen ($NO_x$) | 250 | | |
| Oxides of Sulfur ($SO_x$) | 250 | | |
| Carbon Monoxide (CO) | 550 | | |
| Volatile Organic Compounds (VOC)[2] | 137 | | |
| **Operational Emissions** | | | |
| | **Lb. Per Hour** | **Lb. Per Day** | **Tons Per Year** |
| Coarse Particulate Matter ($PM_{10}$) | — | 100 | 15 |
| Fine Particulate Matter ($PM_{2.5}$)[1] | — | 55 | 10 |
| Oxides of Nitrogen ($NO_x$) | 25 | 250 | 40 |
| Oxides of Sulfur ($SO_x$) | 25 | — | — |
| Carbon Monoxide (CO) | 100 | 550 | 100 |
| Lead and Lead Compounds | — | 3.2 | 0.6 |
| Volatile Organic Compounds (VOC)[2] | — | 137 | 15 |

*Source: SDAPCD 2021.*

[1] *$PM_{2.5}$ is not currently regulated under SDAPCD Rule 20.2. $PM_{2.5}$ thresholds are based on the South Coast Air Quality Management District significance thresholds of 55 lbs./day for construction and operation and 10 tons/year for operation.*

[2] *VOC's are not regulated under SDAPCD Rule 20.2. VOC thresholds are based on City of San Diego's Significance Determination Thresholds.*

### CONSTRUCTION-RELATED EMISSIONS

Potential impacts associated with construction of the proposed project were evaluated in the Air Quality and GHG Report (Attachment E). Site development is anticipated to take approximately six months beginning in April 2022, with grading of the project site taking approximately 35 working days. Construction phasing and equipment assumptions were provided by the applicant. On-site phases assumed include demolition and clearing, grading, wet utilities, retaining walls, fencing, dry utilities, concrete flatwork and paving, and parkway landscaping. Off-site construction phases assumed include demolition and clearing, grading, wet utilities, dry utilities, concrete flatwork and paving, and parkway landscaping. Development of the project would require approximately 70,000 cy of earth movement on site. The cut and fill on site would be balanced with no import or export off site. The entire project site would be developed at once, but construction of the residences would be phased.

Emissions from construction of the proposed project were estimated using the California Emissions Estimator Model (CalEEMod) version 2016.3.1 (Attachment E). CalEEMod contains OFFROAD2011 emissions factors and EMFAC2014 emissions factors from the California Air Resources Board (CARB) models for off-road equipment and on-road vehicles, respectively. Emissions calculations assumed application of water during grading and a 15 mile-per-hour (mph) speed limit on unpaved surfaces in compliance with SDAPCD Rule 55 – Fugitive Dust.

Table AQ-2 provides a summary of the expected maximum daily emissions estimate for construction of the proposed project.

**TABLE AQ-2. EXPECTED MAXIMUM DAILY CONSTRUCTION EMISSIONS**

| Emission Source | ROG[1] | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| lbs./day | | | | | | |
| **On Site** | | | | | | |
| Demolition and Clearing | 0.87 | 9.96 | 4.35 | 0.02 | 0.74 | 0.39 |
| Grading | 5.16 | 56.80 | 35.00 | 0.09 | 7.50 | 3.85 |
| Wet Utilities | 0.68 | 6.49 | 7.22 | 0.02 | 0.34 | 0.27 |
| Retaining Walls | 0.15 | 1.36 | 1.47 | 0.00 | 0.17 | 0.09 |
| Fencing | **0.15** | **1.36** | **1.47** | **0.00** | **0.17** | **0.09** |
| Dry Utilities | 0.43 | 4.30 | 6.06 | 0.01 | 0.28 | 0.22 |
| Concrete Flatwork and Paving | 1.44 | 15.73 | 13.08 | 0.03 | 0.79 | 0.63 |
| Parkway Landscaping | 0.36 | 3.86 | 5.56 | 0.01 | 0.26 | 0.18 |
| **Off Site** | | | | | | |
| Demolition and Clearing | 0.97 | 10.91 | 7.12 | 0.02 | 0.48 | 0.38 |
| Grading | 0.97 | 10.91 | 7.12 | 0.02 | 0.48 | 0.38 |
| Wet Utilities | 0.68 | 6.49 | 7.22 | 0.02 | 0.34 | 0.27 |
| **Dry Utilities** | **0.43** | **4.30** | **6.06** | **0.01** | **0.28** | 0.22 |
| Concrete Flatwork and Paving | 1.66 | 17.83 | 16.01 | 0.03 | 0.90 | 0.72 |
| Parkway Landscaping | | 3.86 | 5.56 | 0.01 | 0.26 | 0.18 |
| **Maximum Daily Emissions** | **6.53** | **69.79** | **49.45** | **0.12** | **8.22** | **4.40** |
| *SDAPCD Significance Criteria* | *137* | *250* | *550* | *250* | *100* | *67* |
| Significant? | No | No | No | No | No | No |

*Source: Attachment E.*

As shown in Table AQ-2, emissions of criteria pollutants related to project construction would not exceed the SDAPCD thresholds. Therefore, direct and cumulative impacts from criteria pollutants generated during construction would be less than significant

#### OPERATIONS-RELATED EMISSIONS

According to the Air Quality and GHG Report (Attachment E), operational emissions associated with the proposed project would result from mobile, area, energy, water and wastewater, and solid waste sources. Operational emissions from mobile source emissions are associated with project-related vehicle trip generation and trip length. Vehicle trip rates were based on the Local Transportation Assessment (LTA) prepared for the project by LSA (Attachment F). Area source emissions include engine emissions from landscape maintenance equipment, ROG emissions from repainting of buildings, and woodburning hearths. Area source emissions were modeled assuming no woodburning hearths and repainting of buildings with SDAPCD Rule 67 ROG content compliant coatings. Operational emissions from energy sources include the on-site combustion of natural gas for heating and hot water and indirect GHG emissions from the generation of electricity at the power plant supplying the project. Energy source emissions were modeled assuming compliance with 2019 Title 24 standards.

Table AQ-3 presents the summary of estimated operational emissions for the project in comparison with the SDAPCD thresholds.

**TABLE AQ-3. OPERATIONAL EMISSIONS**

| Emission Source | ROG | $NO_X$ | CO | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| **Summer, lbs./day** | | | | | | |
| Area Sources | 43.41 | 0.76 | 48.89 | 0.08 | 6.40 | 6.40 |
| Energy Use | 0.02 | 0.16 | 0.07 | 0.00 | 0.01 | 0.01 |
| Vehicular Emissions | 0.43 | 1.58 | 5.12 | 0.02 | 1.71 | 0.47 |
| **Project Total** | **43.86** | **2.49** | **54.07** | **0.10** | **8.12** | **6.88** |
| *Significance Criteria* | *137* | *250* | *550* | *250* | *100* | *55* |
| **Significant?** | **No** | **No** | **No** | **No** | **No** | **No** |
| **Winter, lbs./day** | | | | | | |
| Area Sources | 43.41 | 0.76 | 48.89 | 0.08 | 6.40 | 6.40 |
| Energy Use | 0.02 | 0.16 | 0.07 | 0.00 | 0.01 | 0.01 |
| Vehicular Emissions | 0.42 | 1.62 | 5.00 | 0.02 | 1.71 | 0.47 |
| **Project Total** | **43.85** | **2.54** | **53.95** | **0.09** | **8.12** | **6.88** |
| *Significance Criteria* | *137* | *250* | *550* | *250* | *100* | *55* |
| **Significant?** | **No** | **No** | **No** | **No** | **No** | **No** |
| **Annual, tons/year** | | | | | | |
| Area Sources | 0.87 | 9.96 | 4.35 | 0.02 | 0.74 | 0.39 |
| Energy Use | 5.16 | 56.80 | 35.00 | 0.09 | 7.50 | 3.85 |
| Vehicular Emissions | 0.68 | 6.49 | 7.22 | 0.02 | 0.34 | 0.27 |
| Project TOTAL | **0.15** | **1.36** | **1.47** | **0.00** | **0.17** | **0.09** |
| *Significance Criteria* | *15* | *40* | *100* | *40* | *15* | *10* |
| **Significant?** | **No** | **No** | **No** | **No** | **No** | **No** |

*Source: Attachment E.*

As shown in Table AQ-3, emissions of criteria pollutants related to project operation would not exceed the SDAPCD thresholds. Therefore, direct and cumulative impacts from criteria pollutants generated during operation would be less than significant.

**c. Less than Significant Impact.** Impacts to sensitive receptors are typically analyzed for CO hotspots and exposure to toxic air contaminants (TACs). An analysis of the project's potential to expose sensitive receptors to these pollutants is provided below.

### CO Hotspots

Vehicle exhaust is the primary source of CO. In an urban setting, the highest CO concentrations are generally found within close proximity to congested intersections. Under typical meteorological conditions, CO concentrations tend to decrease as distance from the emissions source (i.e., congested intersection) increase. Project-generated traffic has the potential of contributing to localized hotspots of CO off site. A CO hotspot is a localized concentration of CO that is above the state or national one-hour or eight-hour CO ambient air standards.

To verify that the project would not cause or contribute to a violation of the one-hour and eight-hour CO standards either on a project or cumulative level, an evaluation of the potential for CO hotspots at nearby intersections was conducted. The LTA (Attachment F) evaluated whether or not there would be a decrease in the level of service (LOS) at the intersections affected by the proposed project. Per San Diego County criteria, a CO hotspot analysis would be required if the project would:

- Place sensitive receptors within 500 ft of a signalized intersection with a LOS of E or F, with peak-hour trips exceeding 3,000 vehicles; or
- Cause intersections to operate at LOS E or F, with peak-hour trips exceeding 3,000 vehicles.

According to the LTA (Attachment F), only one intersection would operate at a deficient LOS. East Vista Way at Osborne Street operates at LOS E during the existing AM and PM peak hours. The intersection would have a total of 1,881 PM peak-hour trips with the addition of project-generated traffic. This is less than the 3,000 peak-hour trip screening level. Therefore, impacts to sensitive receptors by CO hotspots would be less than significant.

**TOXIC AIR CONTAMINANTS**

*Construction*

Construction activities would result in short-term, project-generated emissions of diesel particulate matter (DPM) from the exhaust of off-road, heavy-duty diesel equipment. CARB identified DPM as a TAC in 1998. The dose to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer time period. According to the Office of Environmental Health Hazard Assessment, Health Risk Assessments (HRAs), which determine the exposure of sensitive receptors to TAC emissions, should be based on a 30-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project.

There would be relatively few pieces of off-road, heavy-duty diesel equipment used during construction, and the construction period would be relatively short, especially compared to 30 years. Combined with the highly dispersive properties of DPM and additional reductions in exhaust emissions from improved equipment, construction-related emissions would not expose sensitive receptors to substantial emissions of DPM. Therefore, impacts from construction emissions of TACs would be less than significant.

*Operation*

HRAs are typically conducted for substantial sources of diesel particulate emissions (e.g., truck stops, bus stations, and warehouse distribution facilities). In addition, typical sources of acutely and chronically hazardous TACs include industrial manufacturing processes, automotive repair facilities, and dry-cleaning facilities. Since the proposed project would not contain such uses, it does not warrant a health risk assessment. As such, the proposed residential uses would not generate substantial TACs, and impacts would be less than significant.

**D. LESS THAN SIGNIFICANT IMPACT.** The project could produce odors during proposed construction activities resulting from heavy diesel equipment exhaust; however, standard construction practices would minimize the odor emissions and their associated impacts. Furthermore, any odors emitted during construction would be temporary, short-term, and intermittent in nature and would cease upon the completion of the respective phase of construction. Therefore, odor impacts from construction of the project would be less than significant due to the duration of exposure.

CARB's Air Quality and Land Use Handbook includes a list of the most common sources of odor complaints received by local air districts. Typical sources of odor complaints include facilities such as sewage treatment plants, landfills, recycling facilities, petroleum refineries, and livestock operations. The proposed project, a residential development, would not include these uses. Therefore, operational odor impacts would be less than significant.

| IV. Biological Resources<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| 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, U.S. Fish and Wildlife Service, or NOAA Fisheries? | ☐ | ☒ | ☐ | ☐ |
| b. Have a substantial 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? | ☐ | ☒ | ☐ | ☐ |
| 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? | ☐ | ☐ | ☐ | ☒ |
| d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ☐ | ☐ | ☐ | ☒ |
| e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | ☐ | ☐ | ☐ | ☒ |
| f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☒ | ☐ | ☐ |

The discussion below is based on the Biological Resources Report – Vista Grande Tentative Subdivision Map (Biological Report), prepared by Tierra Data on February 12, 2021 (Attachment D). This report is on file and available for review in the city's Planning Division office.

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED.** The project site is located along the northeastern border of the city at the terminus of Vista Grande Drive. The survey area for the Biological Report included the entire 16.99 acres of the project site. The project site is currently occupied with a residence on the western side, and the remainder of the site is vacant and supports mostly non-native vegetation.

### VEGETATION COMMUNITIES

Vegetation communities (or habitats) are generally considered "sensitive" if: (1) they are recognized by the wildlife agencies as being generally depleted, (2) they are considered rare within the region by local experts, (3) if they are known to support sensitive wildlife or plant species, and/or (4) they are known to serve as important wildlife corridors or habitat linkages. These sensitive habitats are typically depleted throughout their known ranges or are highly localized and/or fragmented.

Based on a review of existing biological information for the site and site visits in November 2015 and January 2021, five distinct vegetation communities/land covers were identified on site (see Figure 6, Biological Resources). The approximate acreages of each vegetation community anticipated to be affected by the proposed project are provided in Table BR-1.

**TABLE BR-1. SUMMARY OF PROPOSED VEGETATION IMPACTS**

| Vegetation Community | Acreage On Site |
|---|---|
| Coastal Sage Scrub | 0.13 |
| Coastal Sage Scrub – Disturbed | 0.01 |
| Non-Native Grassland | 12.65 |
| Disturbed Habitat | 2.85 |
| Developed | 1.34 |
| **Total Biological Survey Area** | **16.99** |

Coastal sage scrub (CSS) and non-native grassland (NNG) vegetation on the subject property are considered sensitive biological resources by the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and the city. CSS is also a target for conservation under the National Community Conservation Planning (NCCP) Act that the city is enrolled in under the MHCP. CSS would be mitigated at a 1 to 1 ratio, and NNG would be mitigated at a 0.5 to 1 ratio. Direct impacts to NNG and CSS are discussed further in Section IV(b).

### SENSITIVE PLANTS

Sensitive or “special-status” plants are those listed as “Rare,” “Endangered,” “Threatened,” “of Special Concern,” or otherwise noteworthy by the CDFW, USFWS, the California Native Plant Society, or other conservation agencies, organizations, or local botanists.

No special-status plants (sensitive or special-status species in local or regional plans, policies, or regulations or by the USFWS or CDFW) were detected on site during the surveys in 2015 and 2021. In analyses done in 2015 and 2007, most special-status species had no or only a low potential to occur. None had a high potential to occur on site. The site has not appreciably changed; therefore, the assessment for special-status species remains the same.

### SENSITIVE WILDLIFE

Sensitive wildlife are those listed as “Rare,” “Endangered,” “Threatened,” “of Special Concern,” or otherwise noteworthy by the CDFW, USFWS, National Audubon Society, or other conservation agencies, organizations, or local zoologists.

No special-status wildlife species were observed on site. Sensitive wildlife with a low potential to occur include the Cooper's hawk. Those sensitive wildlife species with a moderate potential to occur are raptors (northern harrier, white-tailed kite) for which the site might provide some foraging habitat and open land generalists (California horned lark) that could nest and forage on site. All three species were detected on parcels north of the project site. The harrier and lark are California Species of Special Concern, and the kite is Fully Protected. The special-status species with a low to moderate potential to occur on site is the northwestern San Diego pocket mouse, a California Species of Special Concern. It is most likely to occur in the northern area of the site since it has been detected in the adjacent CSS off site (Attachment D).

#### MITIGATION MEASURES

The project has the potential to impact NNG, which has the potential to provide foraging habitat for some raptor species (red-shouldered hawk and Cooper's hawk) and nesting and foraging resources for the California horned lark. CSS on site could support the northwestern San Diego pocket mouse. Therefore, Mitigation Measure BIO-1 would be required to reduce impacts to less than significant.

**BIO-1.** All shrub trimming, thinning, or removal shall be performed prior to or after the bird breeding season, January 1 through September 15 (i.e., only between September 16 and December 31). If clearing is planned to occur during the breeding season, pre-construction nest surveys shall be conducted prior to any clearing. Work may proceed if no bird nests are observed. Regular brush management activities shall also occur outside of the bird breeding season. By avoiding clearing and brush management during the bird breeding season, the proposed project will ensure compliance with the Migratory Bird Treaty Act and pertinent sections of the California Fish and Game Code.

**B. LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED.** As discussed in Section IV(a), implementation of the proposed project would result in direct impacts on a total of 0.24 acre of CSS, including the disturbed. In addition, the project has the potential to impact 12.98 acres of NNG. Permanent impacts would occur to these vegetation communities from clearing, grading, and project construction. It is assumed that any borrow and staging areas will be on site. No sensitive habitats are likely to be affected by construction vehicles approach or leaving the site to access East Vista Way, the nearest major road. Mitigation Measure BIO-2 would reduce these impacts to less than significant. Purchase of these mitigation credits in these amounts in 2017 satisfied the mitigation requirements, and no further mitigation for habitat is required.

According to the Biological Report (Attachment D), the development of the proposed project would not result in impacts to any riparian habitat wetlands, and no mitigation is required.

#### INDIRECT IMPACTS

Indirect impacts to sensitive habitats or species can occur from errant grading impacts, construction or operation noise, changes in drainage patterns after grading that modify habitats, degraded surface water quality from runoff during construction, lighting onto habitat areas, introduction of invasive plant species, and brush management that leads to habitat degradation. To ensure all indirect effects are avoided or remain below a level of significance, the MHCP includes a list of Standard BMPs that are required to limit indirect impacts (SANDAG 2003: Volume II, Appendix B). These BMPs would be incorporated into the overall final project design as Conditions of Project Approval, subject to the review and approval of the city prior to the project obtaining a grading permit. Specifically, for this project, Measures 1–3, 6, 8, and 10–14 would apply.

In addition, to ensure all indirect effects are avoided:

- Any project landscaping shall not include species identified as an invasive non-native plant species as identified by the California Invasive Plant Council (CalIPC) at http://www.cal-ipc.org/paf/.
- Final building plans for the development adjacent to the northern boundary (Lots 6 through 12) shall identify shielded light fixtures and/or fencing/barriers to direct light away from the CSS habitat off site to the north.
- The project proponent shall work with the Vista Fire Protection District and/or VFD and/or the county to ensure that all fuel modification for Lots 6 through 12 shall remain on site. If fuel modification is required off site, mitigation, including credits, to offset any impacts will be required.

**MITIGATION MEASURES**

**BIO-2:** Per compliance with the Multiple Habitat Conservation Plan, the project shall mitigate the proposed impact to coastal sage scrub at a ratio of 1:1 with acquisition of a minimum of 0.24 acre of coastal sage scrub at an off-site location, acceptable to the city, California Department of Fish and Wildlife, and U.S. Fish and Wildlife Service. The project shall mitigate the proposed impact to non-native grassland at a 0.5:1 ratio with acquisition of a minimum of 6.49 acres of non-native grassland at an off-site location, acceptable to the city, California Department of Fish and Wildlife, and U.S. Fish and Wildlife Service.

**C. NO IMPACT.** According to the Biological Report (Attachment D), the project site does not contain any jurisdictional waters or wetlands. Because of the absence of these features on the project site, Clean Water Act Section 401 and 404 permit applications would not be required to be submitted to the Regional Water Quality Control Board (RWQCB) and U.S. Army Corps of Engineers (USACE), respectively. No impacts would occur.

**D. NO IMPACT.** As noted in the Biological Report (Attachment D), the project site does not contain any regional wildlife corridors or habitat linkages. Furthermore, the site is surrounded by semi-rural development on three sides, with agriculture uses to the north and development beyond on those sides for long distances that would limit wildlife movement. Thus, no impacts would occur.

**E. NO IMPACT.** The city does not have additional specific policies or ordinances that protect biological resources other than compliance with CEQA and the existing MHCP. As a result, no impacts would occur due to a conflict with local policies or ordinances.

**F. LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED.** As discussed above, the city participates in the MHCP (SANDAG 2003), a regional habitat conservation plan under the state's NCCP Program. Although the city does not have an approved Subarea Plan, it implements the provisions of the MHCP through the policies and goals in the Vista General Plan 2030. Further, with the implementation of Mitigation Measure BIO-2, potentially significant impacts to CSS and NNG (which are considered sensitive under the MHCP) from construction of the proposed project would be reduced to less than significant. This would result in compliance with the MHCP and reduce impacts to less than significant.

| V. Cultural and Tribal Cultural Resources<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Cause a substantial adverse change in the significance of a historical resource pursuant to in §15064.5? | ☐ | ☐ | ☒ | ☐ |
| b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? | ☐ | ☒ | ☐ | ☐ |
| c. Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code §21074? | ☐ | ☒ | ☐ | ☐ |
| d. Disturb any human remains, including those interred outside of formal cemeteries? | ☐ | ☒ | ☐ | ☐ |

The discussion below is based on the Vista Grande Project Cultural Resources Study Update prepared in January 2021 and the Addendum to the Cultural Resources Survey and Assessment prepared in September 2021 by Helix Environmental (Attachment B) and information from the Cultural Resources Survey and Assessment for the previously approved Vista Grande Subdivision (Helix 2015a). The three reports are referred to collectively as the Cultural Reports.

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT IMPACT.** The project site was used for agriculture as an active citrus grove until the late 1980s and currently contains an occupied residence with remainder of the site being vacant. A 2015 record search indicated that five historic structures have been recorded within one mile of the project site, none being on the project site. An updated records search was performed in 2021 and confirmed the same results of those found in 2015. The residence on the project site located at 2277 Vista Grande Drive was identified as being more than 50 years of age after review of historical aerial photographs of the property during the 2015 study. The structure was evaluated to assess its potential historic and architectural significance. The Cultural Reports (Helix 2015a and Attachment B) concluded that the house does not meet the historical resource significance criteria in that it is a very plain and unassuming example of its architectural style and is one of tens of thousands of buildings that represent the post-World War II building boom in Southern California. It is not associated with the pioneering phase of the city and lacks the historical associations or architectural distinction to qualify for listing on the California Register of Historical Resources. No other structures occur on site. Therefore, impacts to historical resources would be less than significant.

**B, C, AND D. LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED.**

**IMPACTS TO ARCHAEOLOGICAL RESOURCES**

According to the Cultural Reports (Helix 2015a and Attachment B), a records search and Sacred Lands File search and archaeological survey was conducted on site. The records searches in 2015 and 2021 indicated that two archaeological sites had been recorded within one mile of the project site, and none were located on the project site. In addition, one archaeological site (CA-SDI-21774) and one isolate (P-035276) were observed on site during the archaeological survey.

Site CA-SDI-21774 consists of a moderately dense lithic scatter within and adjacent to the dirt pathway in the north-central area of the project site. Surface artifacts were observed from that location to the northeast corner of the project site, and one artifact (a bifacial mano) was embedded within the dirt road. The surface collection totaled 54 items, including one mano, 10 flaked stone tools, one biface preform, 10 cores, 24 pieces of debitage, and eight manuports, including crystals.

The isolate (P-035276) was found embedded in the ground approximately 120 meters south of CA-SDI-21774. The isolate is a retouched/utilized obsidian flake. The isolate has very limited research potential. It was determined that this isolate does not meet the criteria for archaeological resources under CEQA and is not considered significant.

CA-SDI-21774 yielded a limited amount and variety of cultural material, and no subsurface artifacts were recovered. However, through government-to-government consultation with the Rincon Band of Luiseño Indians, the Tribe provided information that resulted in the reassessment of CA-SDI-21774. The amount of obsidian identified at the site is unusual for a site so far from an obsidian source. This fact, as well as the presence of quartz material, suggests that CA-SDI-21774 may be a nodal part and contribute to the historical and traditional cultural importance of a complex Luiseño path and trail system connected to the manufacture, trade, travel, and habitation meeting place of *Tómqav* approximately 12 miles northeast of the project site. *Tómqav* is recorded as an archaeological site but also refers to a much broader indeterminable geographical zone of historical and traditional religious and cultural significance for Rincon Luiseños. The Rincon Band of Luiseño Indians will be conducting a Tribally informed and directed concurrent compliance study documenting this ongoing importance, as well as how CA-SDI-21774 potentially connects to other places in the Rincon Luiseño ancestral traditional use area and traditional cultural landscape.

Because a wealth of informational potential exists concerning the site and its probable connections to a larger traditional use area, including *Tómqav* and the broader Luiseño ancestral landscape, documenting that connectivity would require additional efforts using Western disciplinary investigations and analyses informed and guided by the Luiseño System of Traditional Knowledge. Through consultation with the Rincon Band of Luiseño Indians, there is sufficient information to conclude that the site meets the criteria for a historical resource/significant Tribal Cultural Resource as defined in California Public Resources Code, Section 21074. However, outside of the already known and identified impacts, all of which do not rise to the level of a substantial adverse change under either California Public Resources Code, Sections 21084.1 or 21084.2, and as was confirmed in the government-to-government consultation process between the Rincon Band of Luiseño Indians and officials from the city, approval and construction of the project does not trigger a finding of a significant effect on a known historical or Tribal Cultural Resource. The Rincon Band of Luiseño Indians does not anticipate that the concurrent compliance study would identify any substantial adverse change, under California Public Resources Code, Sections 21084.1 or 21084.2, in the status of any historical resource/significant Tribal Cultural Resource that would result from approval and construction of the project.

Due to the presence of archaeological site CA-SDI-21774 on site and the presence of Native American archaeological/cultural resources in the area, the project would have the potential to impact unknown archaeological resources. The project could potentially damage or destroy these resources, resulting in potentially significant impacts under CEQA. Avoidance is the preferred choice in dealing with inadvertent discoveries. However, if avoidance cannot be achieved, then implementation of Mitigation Measures CUL-1 through CUL-7 would reduce these impacts to less than significant levels.

#### IMPACTS TO TRIBAL CULTURAL RESOURCES

All Native American archaeological resources in the area of the proposed project are of significance to the Luiseño Native American people. The Native American Heritage Commission (NAHC) conducted a check of its Sacred Lands File on October 8, 2015, and indicated that no Native American cultural resources are recorded.

A Native American monitor from Saving Sacred Sites was present during the fieldwork for the survey and testing program for the Cultural Report (Helix 2015a). On June 10, 2021, a Tribal notification letter per Senate Bill 18 was sent out to the San Luis Rey Band of Mission Indians and the Rincon Band of Luiseño Indians. The city met with a representative of the San Luis Rey Band of Mission Indians on August 12 and September 16, 2021, and with representatives of the Rincon Band of Luiseño Indians on August 16, August 27, September 16, and September 21, 2021. The Rincon Band of Luiseño Indians also submitted written comments and additional information in correspondence dated August 20 and September 8, 2021. Written correspondence has not yet been received from the San Luis Rey Band of Mission Indians as of September 27, 2021.

Pursuant to California Public Resources Code, Section 21080.3.1, the city initiated consultation with the Rincon Band of Luiseño Indians, who provided information that resulted in the reassessment of CA-SDI-21774, as described previously, and the conclusion that this site meets the criteria for inclusion in the California Register of Historical Resources and, thus, is a significant cultural resource. However, effects from project development would not rise to the level of a substantial adverse change to the significance of the resource.

Due to the presence of archaeological site CA-SDI-21774 on site and the presence of Native American archaeological/cultural resources in the area, impacts on unknown Tribal Cultural Resources would be considered potentially significant. The project could potentially damage or destroy these resources, resulting in potentially significant impacts under CEQA. Avoidance is the preferred choice in dealing with inadvertent discoveries. However, if avoidance cannot be achieved, then implementation of Mitigation Measures CUL-1 through CUL-7 would reduce these impacts to less than significant levels.

#### IMPACTS TO HUMAN REMAINS

The project site does not lie near any known cemeteries. It is possible that construction activities could unearth previously unknown vestiges, particularly given the cultural sensitivity of the area. This could result in a potentially significant impact. However, implementation of Mitigation Measures CUL-1 through CUL-7 would ensure that human remains are treated with dignity and as specified by law, which would reduce the impact to a less than significant level.

#### MITIGATION MEASURES

Mitigation Measures CUL-1 through CUL-7 would be implemented to reduce impacts to unknown archaeological resources, Tribal Cultural Resources, and human remains to a less than significant level.

**CUL-1:** For discoveries of Native American human remains, the procedures and processes required under California Public Resources Code, Section 5097.98, and California Health and Safety Code, Section 7050.5, shall be followed. If human remains are encountered, all ground-disturbing activities shall halt within 100 feet (buffer area) of the discovery, and orange construction fencing shall be installed to denote the buffer area. Work on the remainder of the project site could continue, but all work within the buffer area shall cease until the processes and procedures required under the aforementioned code sections are completed and the Tribal Representatives have authorized the removal of the fencing around the buffer area.

**CUL-2:** If, during ground-disturbing activities on the project site, Tribal Cultural Resources, as defined in California Public Resources Code, Section 21074, or unique cultural resources, as defined in California Public Resources Code, Section 21083.2, are discovered that were not assessed by the site-specific archaeological reports, all ground-disturbing activities shall halt within 50 feet (find area) of the discovery until the Tribal Representatives and project archaeologist (defined in Mitigation Measure CUL-4) can assess the discovery and recommend recovery, treatment, and reburial procedures. Work on the remainder of the project site could continue, but all work within the find area shall cease until the Tribal Representatives and project archaeologist have completed their assessments and the Tribal Representatives have made a reburial recommendation.

**CUL-3** At least 30 days prior to issuance of the first grading permit for the project, the developer/permit applicant shall enter into agreement(s) with the consulting Tribes for Native American monitors. In conjunction with the archaeological monitors, the Tribal Representatives/Native American monitors shall attend the pre-grading meeting with the contractors to provide cultural sensitivity training for all construction personnel. In addition, an adequate number of Tribal Representatives/Native American monitors shall be on site during all initial ground-disturbing activities, including clearing, grubbing, tree removal, grading, and trenching, and excavation of each portion of the project site. In conjunction with the archaeological monitors, the Tribal Representatives/Native American monitors have the authority to temporarily divert, redirect, and/or halt the ground-disturbing activities to allow appropriate identification, evaluation, and potential recovery of cultural resources. The developer/permit applicant shall submit a fully executed copy of the agreement(s) to the City of Vista to ensure compliance with this condition of approval. Upon verification, the project archaeologist shall clear this condition. This agreement(s) shall not modify any condition of approval or mitigation measure.

**CUL-4:** At least 30 days prior to issuance of the first grading permit for the project, the project applicant shall retain a project archaeologist who meets the minimum qualifications of the U.S. Secretary of the Interior's Standards and Guidelines (NPS 1983). The project archaeologist shall be present for all ground-disturbing and grading activities on the project site and shall be responsible for notifying and coordinating monitoring by the consulting Tribe(s).

**CUL-5** The project archaeologist and Tribal Representatives shall attend the pre-grading meeting with the project's construction manager and any contractors and shall conduct a cultural sensitivity training to provide an overview of the cultural sensitivity of the project site and surrounding areas, the requirements for the project archaeologist and Tribal Representatives, the protocols that apply in the event of inadvertent finds, and any other appropriate disclosures and discussions.

Any cultural and heritage material/artifacts identified and collected during construction grading activities shall not leave the project site and shall remain on site in a secure location until final disposition. Materials collected previously during survey and testing shall be returned to the site for reburial.

CUL-6 Upon completion of all ground-disturbing and grading activities on the project site, the Tribal Representatives shall rebury any resources recovered from the project site in an open space area that shall remain free from any active recreational uses or any further excavation or ground disturbance. Any reburial site shall be culturally appropriate and explicitly approved in writing by the consulting Tribes. The reburial location shall be covered first by a layer of geomat and then backfilled with clean fill dirt. Once reburial activities are completed, the site shall be protected via a restrictive covenant or similar deed restriction that prohibits future excavation or disturbance of the reburial location.

CUL-7 Prior to Grading Permit Final Inspection, a Phase IV Cultural Resources Monitoring Report shall be submitted that complies with the City of Vista Community Development Department's requirements for such reports for all ground-disturbing activities associated with this grading permit. The report shall follow the City of Vista's cultural resources standard procedures. The report shall include results of any feature relocation or residue analysis required and evidence of the required cultural sensitivity training for construction staff held during the required pre-grade meeting and evidence that any cultural and heritage material/artifacts have been treated in accordance to procedures stipulated in the Phase IV Cultural Resources Monitoring Report. The Phase IV Cultural Resources Monitoring Report shall be filed with the City of Vista under a confidential cover and shall not be subject to public records requests.

| **VI. Energy**<br>***Would the project:*** | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation? | ☐ | ☐ | ☒ | ☐ |
| b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency? | ☐ | ☐ | ☒ | ☐ |

## *DISCUSSION*

### A. LESS THAN SIGNIFICANT IMPACT.

#### CONSTRUCTION-RELATED ENERGY IMPACTS

The project, like all development, would be responsible for an incremental increase in the consumption of energy resources during construction due to on-site use of construction equipment and vehicle and truck trips. Construction activities that include the use of natural gas, petroleum, or electricity would be temporary and negligible and would not have an adverse effect. Construction equipment would be required to comply with CARB emissions requirements for construction equipment, which include measures to reduce fuel-

consumption, such as imposing limits on idling and requiring older engines and equipment to be retired, replaced, or repowered. The project would also be designed according to the most recent 2019 Title 24 or future, more stringent versions of Title 24 that are applicable as the project is built out. Therefore, impacts during construction would be less than significant.

#### OPERATION-RELATED ENERGY IMPACTS

The project would construct 28 single-family residences. Implementation of the project would increase the demand for electricity and natural gas at the project site relative to the existing single residence on the site. Operational emissions from energy sources would include the on-site combustion of natural gas for heating and hot water and indirect energy use from the generation of electricity at the power plant supplying the project. Energy source emissions were modeled using CalEEMod, as discussed in Section III, Air Quality, assuming compliance with 2019 Title 24 standards.

Although electricity consumption would increase due to the construction of the 28 single-family residences compared to one existing single-family residence, the project is anticipated to be highly energy efficient due to Title 24 requirements, including additional energy efficiencies that may be realized through implementation of the design measures within the homes, including the inclusion of solar energy and Energy Star appliances. Therefore, the project's electricity consumption would not be considered wasteful, unnecessary or inefficient. As a result, project impacts would be less than significant.

**B. LESS THAN SIGNIFICANT IMPACT.** Electricity and natural gas are supplied to the project site by San Diego Gas & Electric (SDG&E). The sources of power for SDG&E include 33 percent renewable energy sources (solar, wind, and hydroelectric). Although the project would result in a net increase in total square footage and in total electricity and natural gas consumption compared to the existing single residence, implementation of the project would provide energy efficient residential development that meets the 2019 Title 24 Standards, which include energy efficiency measures, sustainable design measures, incorporation of best practices for water conservation, and implementation of green construction methods. Furthermore, the project would not require new or expanded energy generation or infrastructure facilities. As a result, the project would not have an adverse effect on state or local plans for renewable energy or energy efficiency, and impacts would be less than significant.

| VII. Geology and Soils<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| 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? | ☐ | ☐ | ☒ | ☐ |
| b. Result in substantial soil erosion or the loss of topsoil? | ☐ | ☐ | ☒ | ☐ |
| 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- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | ☐ | ☐ | ☒ | ☐ |
| d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property? | ☐ | ☐ | ☒ | ☐ |
| e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater? | ☐ | ☐ | ☐ | ☒ |
| f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ☐ | ☐ | ☐ | ☒ |

The discussion below is based on the Geotechnical Investigation (Attachment C).

## *DISCUSSION*

**A1. NO IMPACT.** The purpose of the Alquist-Priolo Earthquake Fault Zoning Act is to mitigate the hazard of surface faulting by preventing the construction of buildings used for human occupancy over an area with known faults.

Unlike damage from ground shaking, which can occur at great distances from the fault, impacts from fault rupture are limited to the immediate area of the fault zone where the fault breaks along the grounds surface. As discussed in the Geotechnical Investigation (Attachment C), the project site does not contain and is not adjacent to an Alquist-Priolo Special Study Zone Area. Therefore, impacts from fault rupture would not be expected to occur on the project site, and no impacts would arise from implementation of the project.

**A2–4. LESS THAN SIGNIFICANT IMPACT.** The project site, like most of Southern California, is subject to strong ground shaking from seismic events. Consequently, when the project is occupied, it could expose people and/or structures to potential impacts associated with seismic ground shaking. The ground motion characteristics of any future earthquakes in the region would depend on the characteristics of the generating fault, the distance to the epicenter, the magnitude of the earthquake, and the site-specific geologic conditions. Major faults in the region could be a source of a strong seismic-related movement at the project site. According to the Geotechnical Investigation (Attachment C), the closest known active fault is the Newport Inglewood (offshore) fault located approximately 13.6 miles from the project site.

The 28 single-family residences proposed to be built on site would be constructed in compliance with the seismic safety standards set forth in the CBC, as amended.[1] Compliance with the CBC would include the incorporation of (1) seismic safety features to minimize the potential for significant effects as a result of earthquakes, (2) proper building footings and foundations, and (3) construction of the building structure so that it would withstand the effects of strong ground shaking. In addition, the city's Building Department would review the building plans through building plan checks, issuance of a building permit, and inspection of the residences during construction, which would ensure that all required CBC seismic safety measures are incorporated into all of the residences. Compliance with the CBC and the Building Department's review process, permit application, inspection, and recommendation in the Geotechnical Investigation (Attachment C) would result in a less than significant impact.

The proposed project would not expose people and structures to potential seismic-related ground failure, including liquefaction. Liquefaction is a phenomenon in which a saturated cohesionless soil causes a temporary transformation of the soil to a fluid mass, resulting in a loss of support. According to the Geotechnical Investigation (Attachment C), seeps, springs, or other indications of a high regional groundwater level were not noted on the site during the time of field investigation. The depth to groundwater is estimated to be greater than 50 ft. As a result, based on the review and analysis of site conditions, the potential for earthquake-induced liquefaction at the project site is considered to be very low. However, if the pads are not over-excavated, the potential for perched groundwater would increase, and homeowners would need to be notified of the potential increases of perched groundwater. Compliance with the CBC would include the incorporation of seismic safety features to minimize any potential for significant effects as a result of seismic-related ground failure. In addition, compliance with all the geotechnical recommendations in the Geotechnical Investigation (Attachment C) would result in less than significant impacts.

The project site is not located within a landslide hazard zone. According to the Geotechnical Investigation (Attachment C), evidence of landslides and slope instabilities was not observed on site and slopes greater than five ft are not planned on the site. Therefore, impacts related to landslides would be less than significant.

[1] The CBC incorporates relevant sections of the Uniform Building Code of the International Conference of Building Officials.

**B-D. LESS THAN SIGNIFICANT IMPACT.** According to the Geotechnical Investigation (Attachment C), the project site consists of colluvium/topsoil and Cretaceous-age granitic rock. The colluvium/topsoil encountered generally consists of various shades of brown, silty sands. These materials were dry to moist, loose, and porous. Granitic bedrock encountered on the site typically consists of a near-surface zone of decomposed granitic bedrock, which grades into unweathered bedrock. The decomposed bedrock consists of light brown very coarse sands and small pebbles. The materials generally were dry to moist and medium dense to very dense and were found at depths ranging from around 1.5 to nine ft. However, the upper portion (about one ft) was generally weathered, loose, and porous below the colluvium.

As stated in the Geotechnical Investigation (Attachment C), all colluvium/topsoil and any highly weathered granitic rock in areas proposed for settlement-sensitive improvements (e.g., residential foundations, concrete slab-on-grade floors, site walls, underground utilities, roadways, exterior hardscape) are considered potentially compressible and are unsuitable for support of these improvements. Therefore, remedial grading is required to remove and re-compact these materials. Based on available data, removal depths are anticipated to range between approximately two and five ft; however, deeper removals should be anticipated. In addition, the Geotechnical Investigation (Attachment C) noted that while heavy grading equipment would appear to be able achieve the desired grades over the majority of the site, there is a potential to encounter localized, dense bedrock zones, or corestones, which would make excavation more difficult. As a result, the potential for using rock breakers and/or blasting is anticipated locally. However, as a Condition of Project Approval, any potential blasting undertaken at the project site must meet the requirements set out in the city's Municipal Code, Chapter 16.40.100, Explosives and Fireworks. This section of the code updates and revises the California Uniform Fire Code sections that are applicable to city requirements, such as permit requirements and conditions, insurance requirements, blasting hours, and additional operational requirements (e.g., noticing of residents).

As stated in the Geotechnical Investigation (Attachment C), construction of the project would not increase the potential for on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. These hazards are considered negligible and/or avoided as a result of site location, soil characteristics, currently proposed site development areas, and typical site development procedures (e.g., remedial grading). In addition, colluvium/topsoil typically has a very low expansion potential. Therefore, given the remedial grading requirements and other geotechnical recommendations that are required to be followed in the Geotechnical Investigation (Attachment C) and the required implementation of standard erosion control measures and stormwater construction Best Management Practices (BMPs), less than significant impacts would occur regarding soil erosion or loss of topsoil, unstable soils and geology, and expansive soils.

**E. NO IMPACT.** The proposed project would tie into existing sewers, avoiding the need to use septic tanks or alternative wastewater disposal systems. Therefore, no impact would occur.

**F. NO IMPACT.** The probability of discovering paleontological resources depends on the geologic formation being excavated and the depth and volume of the excavation. Sedimentary rocks, such as those found in coastal areas, usually contain fossils. Granite rocks, such as those found in inland areas, usually will not contain fossils. According to the Geotechnical Investigation (Attachment C), on-site fieldwork revealed that the underlying geology of the project site is composed of bedrock consisting of Cretaceous-age granite rocks commonly referred to as granitics. According to the Vista General Plan 2030 PEIR (City of Vista 2011), granitic rock such as those found beneath the site have a low to zero sensitivity for paleontological resources. Further, the County of San Diego's online Zoning and Property Information Tool (2021) indicates that the subject property has no paleontological sensitivity and does not require paleontological monitoring. Therefore, no impacts to paleontological resources are anticipated to occur with project implementation.

| VIII. Greenhouse Gas Emissions<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | ☐ | ☐ | ☒ | ☐ |
| b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | ☐ | ☐ | ☒ | ☐ |

The discussion below is based on the findings contained within the Air Quality and GHG Report (Attachment E) prepared for the proposed project and information taken from the Greenhouse Gas Analysis for the Vista Grande Tentative Subdivision Map Project prepared for the previously approved project (SRA 2015). This report is on file and available for review in the city's Planning Division office.

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT IMPACT.** Global climate change refers to changes in average climatic conditions on Earth, including temperature, wind patterns, precipitation, and storms. Global temperatures are moderated by atmospheric gases. These gases are commonly referred to as GHGs because they function like a greenhouse by letting sunlight in but preventing heat from escaping, thus warming Earth's atmosphere. The GHGs defined under California's Assembly Bill 32 include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$).

Given the relatively small levels of emissions generated by a typical development in relationship to the total amount of GHG emissions generated on a national or global basis, individual development projects are not expected to result in significant, direct impacts with respect to climate change. However, given the magnitude of the impact of GHG emissions on the global climate, GHG emissions from new development could result in significant, cumulative impacts with respect to climate change. Thus, the potential for a significant GHG emissions impact is limited to cumulative impacts.

The city has not established a GHG significance threshold to date. Several lead agencies in California have adopted a screening threshold as recommended by the California Air Pollution Control Officers Association (CAPCOA) Report, CEQA and Climate Change – Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, which proposes a screening-level threshold of 900 metric tons of $CO_2e$ ($MTCO_2$) to evaluate whether a project must conduct further analysis. Therefore, the 900 $MTCO_2$ threshold adopted by CAPCOA is used in this analysis.

### CONSTRUCTION GREENHOUSE GAS EMISSIONS

Construction GHG emissions are generated by vehicle engine exhaust from construction equipment, on-road truck trips, and worker commuting trips. Construction GHG emissions were estimated using CalEEMod (2016). CalEEMod contains emissions factors from the OFFROAD2007 model for heavy construction equipment and from the EMFAC2014 model for on-road vehicles. Project-specific input was based on detailed information provided by the applicant and default model settings to estimate reasonably conservative conditions. Additional details of phasing, selection of construction equipment, and other input parameters, including CalEEMod data, are included in the updated Air Quality and GHG Report (Attachment E).

Table GHG-1 presents the construction-related emissions associated with construction of the proposed project.

**TABLE GHG-1. CONSTRUCTION GHG EMISSIONS**

| Construction Phase | $MTCO_2e$ |
|---|---|
| **On Site** | |
| Demolition and Clearing | 6.19 |
| Grading | 96.67 |
| Wet Utilities | 30.17 |
| Retaining Walls | 2.81 |
| Fencing | 2.81 |
| Dry Utilities | 5.91 |
| Concrete Flatwork and Paving | 31.37 |
| Parkway Landscaping | 3.76 |
| **Off Site** | |
| Demolition and Clearing | 4.17 |
| Grading | 5.83 |
| Wet Utilities | 26.81 |
| Dry Utilities | 9.85 |
| Concrete Flatwork and Paving | 36.74 |
| Parkway Landscaping | 3.76 |
| **Total Construction Emissions** | **266.85** |
| *Amortized Construction Emissions* | *8.90* |

*Source: Attachment E.*

GHG emissions generated from construction activities are finite and for a relatively short-term period. Unlike the numerous opportunities available to reduce a project's long-term GHG emissions through design features, operational restrictions, and use of green building materials, GHG emissions reduction measures for construction equipment are relatively limited. As such, construction emissions are amortized over a 30-year project lifetime. As shown in Table GHG-1, the 30-year amortized construction emissions would be 8.90 $MTCO_2e$ per year.

### OPERATIONAL GREENHOUSE GAS EMISSIONS

Operational sources of GHG emissions include energy use (electricity and natural gas), area sources (landscaping equipment), vehicle use, solid waste generation, and water conveyance and treatment. As illustrated in Table GHG-2, the total combined net operational and amortized construction emissions is approximately 446 $MTCO_2e$, which is below the screening threshold of 900 $MTCO_2e$ per year. As such, emissions are considered less than significant, and additional analysis is not required.

**TABLE GHG-2. ESTIMATED ANNUAL GHG EMISSIONS**

| Emissions Source | $MTCO_2e$ |
|---|---|
| Area | 36.42 |
| Energy | 73.16 |
| Mobile | 303.08 |
| Solid Waste | 12.37 |
| Water | 11.57 |
| Operational Subtotal | 436.60 |
| Construction Emissions | 8.90 |
| Total Proposed Project Emissions | 445.50 |
| *CAPCOA Screening Level* | 900 |
| Significant Impact? | No |

*Source: Attachment E.*

**B. LESS THAN SIGNIFICANT IMPACT.** There are numerous state plans, policies, and regulations adopted for the purpose of reducing GHG emissions. The principal overall state plan and policy is AB 32, the California Global Warming Solutions Act of 2006. The quantitative goal of AB 32 was to reduce GHG emissions to 1990 levels by 2020. Senate Bill 32 requires further reductions of 40 percent below 1990 levels by 2030. Statewide plans and regulations, such as GHG emissions standards for vehicles (AB 1493), the low carbon fuel standard, and regulations requiring an increasing fraction of electricity to be generated from renewable sources, are being implemented at the statewide level; as such, compliance at the project level is not addressed. Since 2012, the City of Vista has been implementing a Climate Action Plan (CAP) to address the threat of climate change to the local community (City of Vista 2012). The project's consistency with applicable policies is analyzed in Table GHG-3.

**TABLE GHG-3. VISTA 2013 CAP IMPLEMENTATION STRATEGIES**

| Measure | Project Consistency |
|---|---|
| E-1: Energy Efficient Buildings Standards | *Consistent*. All new construction will comply with the city's Municipal Code requirements and achieve the latest Title 24 energy efficiency standards. |
| E-4: Small-Scale Renewable Energy Installations | *Consistent*. The project would be constructed in compliance with all Title 24 standards for solar energy. |
| S-1: Expanded Recycling | *Consistent.* The project would be consistent with AB 341 requiring the diversion of 75 percent of solid waste from landfills. |
| S-2: Construction and Demolition Debris Diversion | *Consistent.* The project will redirect at least 50 percent of the total construction and demolition debris generated via reuse or recycling. |

In addition, the city has recently developed an update to their 2013 CAP. The city's 2019 CAP provides an update to the inventory, projections, and GHG reduction measures included in the city's 2013 CAP and is in compliance with applicable policies in the Vista General Plan 2030. The 2019 CAP is slated to be approved in fall 2021. Due to its anticipated approval, the project has also been analyzed for consistency with the 2019 CAP, as detailed below in Table GHG-4.

**TABLE GHG-4. VISTA 2019 CAP IMPLEMENTATION STRATEGIES**

| Measure | Project Consistency |
|---|---|
| T-7: Require Electric-Powered or Alternative Fuel Construction Equipment | *Consistent.* Project construction would include at least 30 percent of its construction equipment be electric-powered or alternatively fueled. |
| W-1: Reduce Solid Waste disposal and Increase Recycling | *Consistent.* The project would be consistent with the citywide reduction goal of diverting 85 percent of solid waste from landfills. |
| C-2: Increase Tree Planting at New Private Properties | *Consistent.* The project would include a series of trees, as outlined in the landscape plan (see Figure 4). |

As shown in Tables GHG-3 and GHG-4, implementation of the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Therefore, GHG impacts would be less than significant, and no mitigation measures would be required.

| IX. Hazards and Hazardous Materials<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ☐ | ☒ | ☐ | ☐ |
| b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? | ☐ | ☐ | ☒ | ☐ |
| c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ☐ | ☐ | ☒ | ☐ |
| 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? | ☐ | ☐ | ☐ | ☒ |
| 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? | ☐ | ☐ | ☐ | ☒ |
| f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☒ | ☐ |
| g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires? | ☐ | ☐ | ☒ | ☐ |

The discussion below is summarized and based on the findings contained within the Phase I Environmental Site Assessment Vista Grande Drive, Vista, CA (Phase I Report) prepared by Vinje & Middleton Engineering, Inc. (VME), on October 6, 2015, for the previously approved project. The report is on file and available for review in the city's Planning Division office.

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED.** Typically, residential uses do not generate, store, dispose of, or transport quantities of hazardous substances. Therefore, operation of the project would not expose on-site users or the surrounding community to any health hazards from hazardous materials. However, the existing 1,065 sf single-family residence located in the western portion of the property is slated to be demolished as part of site development. According to available records, the home was apparently constructed between 1946 and 1953, and the use of asbestos-containing materials and lead paint (which were used at that time) is unknown. The presence and demolition of these materials would have the potential to result in a significant impact. However, with the implementation of Mitigation Measure HAZ-1, potentially significant impacts would be reduced to a less than significant level.

**MITIGATION MEASURES**

HAZ- 1: Prior to obtaining a Demolition Permit for the removal of the on-site single-family residence located in the western portion of the project site, the applicant/owner shall have a survey conducted of the existing residence for asbestos-containing materials and lead paint, followed by the preparation of a written report. The report shall include, at minimum, the following components that are to be conducted during the survey:

- Locate and quantify readily accessible suspect asbestos-containing materials and lead paint throughout the structure, including exterior surfaces.
- Assess the condition of each suspect asbestos-containing materials and lead paint location identified.
- Collect bulk samples of homogeneous suspect asbestos-containing materials and lead paint location using an appropriate sampling protocol.
- Analyze each asbestos-containing materials and lead paint sample collected using standard techniques (e.g., Polarized Light Microscopy with Dispersion Staining) for asbestos-containing materials and lead paint.
- Recommend appropriate response actions for materials analyzed as containing asbestos-containing materials and lead paint.

If asbestos-containing materials and/or lead paint is found on or within the structure, it shall be removed by a licensed/certified abatement contractor and disposed of at a Class I Landfill facility in accordance and compliance with all federal, state, and local laws, regulations and guidelines. A copy of the above-noted report, as well as written documentation of the removal and legal disposal of any identified material, shall be sent to the City Engineer and City Planner for their records.

**B. LESS THAN SIGNIFICANT IMPACT.**

**CONSTRUCTION**

Construction equipment that would be used to build the proposed project has the potential to release relatively small amounts of oils, greases, solvents, and other finishing materials through accidental spills. Spill or upset of these materials could have the potential to significantly impact surrounding land uses; however, federal, state, and local controls have been enacted to reduce the effects of such potential hazardous materials spills. The VFD enforces city, state, and federal hazardous materials regulations for the city. City regulations include spill mitigation, and containment and securing of hazardous materials containers to prevent spills. In addition, the State Fire Marshal enforces oil and gas pipeline safety regulations, and the federal government enforces hazardous materials transport pursuant to its interstate

commerce regulation authority. Compliance with all of these requirements is mandatory as standard permitting conditions, and would minimize the potential for the accidental release or upset of hazardous materials, thus ensuring public safety. Therefore, compliance with the above referenced requirements would result in a less than significant impact with respect to the creation of significant hazards to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment during project construction.

**OPERATION**

Typically, residential uses do not generate, store, dispose of, or transport quantities of hazardous substances. However, according to the Phase I Report (Attachment G), the majority of the subject property appears to have been utilized for agricultural purposes (i.e., orchards) from the late 1940s or early 1950s until the late 1980s. The Phase I Report states that, during historical agricultural activities throughout the State of California, various pesticides and, more specifically, organochlorine phosphates were commonly applied during the normal course of agricultural operations. Such compounds have since been banned from production and use in the United States. Section 105215 of the California Health and Safety Code discusses the regulatory reporting of incidents that pertain to pesticide spills and accidental releases of pesticide products. Based on the regulatory and historical research completed during the preparation of the Phase I Report, no information has been revealed that would lead to the conclusion that an accidental spill or release of pesticide products has occurred at the subject property. In addition, neither stressed vegetation, nor evidence of the storage of pesticides was observed on the property during the site reconnaissance or based on regulatory and historical research reviews. As such, the historical agricultural use of the subject property is not considered to be a recognized environmental condition in connection with the development of the proposed project.

As discussed in the Phase I Report (Attachment G), soil samples from six locations on the property were gathered and analyzed for organochlorine pesticides (OCPs) by U.S. Environmental Protection Agency (USEPA) test method 8081A. Minor detections of OCPs were reported in three of the samples analyzed. Detected concentrations include dichlorodiphenyldichloroethylene (DDE) reported at 3. 29 micrograms per kilogram (ug/kg) (sample 133-0.5), dichlorodiphenyltrichloroethane (DDT) reported at 1.65 ug/kg (sample 135-0.5), and chlordane reported at 1.06 ug/kg (sample 131-0.5). The detected concentrations of DDE, DDT, and chlordane did not exceed their respective residential soil screening levels. Based on the negligible OCP concentrations detected in the soil, no additional subsurface assessment at the property was recommended.

The Phase I Report (Attachment G) included a review of standard regulatory record sources, including federal, state, and local environmental databases provided by Environmental Data Resources (EDR), for information pertaining to documented and/or suspected releases of regulated hazardous substances and/or petroleum products within specified search distances. The property is not listed on any of the databases reviewed by EDR. There are multiple properties within the project vicinity that appear on several of the regulatory databases; however, they are not considered to be environmental concerns to the project site. This determination is based on several factors, including distance of the properties from the site, orientation of the properties relative to the site, depth and flow of groundwater in the area and reported property conditions. Therefore, proposed project development would not require disposal or remediation of hazardous substances, resulting in less than significant impact during project operation.

**C. LESS THAN SIGNIFICANT IMPACT.** The closest existing public school to the project site is Alta Vista High School located approximately 0.87 mile to the south at 1575 Bonair Road. No schools are located within 0.25 mile of the project site. As stated above, neither construction nor operation of the proposed project would result in a release of any significant amounts of hazardous substances that could cause an off-site public health hazard at this local public school. As a result, no significant impacts to nearby schools would occur. Once constructed, the project would not support uses that would emit hazardous emissions or handle hazardous or acutely hazardous substances or waste. Therefore, impacts would be less than significant.

**D. NO IMPACT.** The Cortese List database identifies facilities designated by State Water Resources Control Board (SWRCB), the Integrated Waste Board, and the Department of Toxic Substances Control. According to the Phase I Report, the project site is not listed on a search of the Cortese List database www.envirostor.dtsc.ca.gov). A review of the EnviroStor database (2021) confirmed the Phase I Report's findings. Further, as stated above, multiple properties within the project vicinity appear on several of the regulatory databases; however, they do not pose an environmental concern to the project site. No impact would occur.

**E. NO IMPACT.** The nearest airport is the Oceanside Municipal Airport located approximately 7.66 miles west of the project site. The property is not located within the Airport Influence Area of the airport (Airport Land Use Commission San Diego County 2010). It is also sufficiently distanced from it so that it would not affect the safe operation of the airport, and the project would not be affected by noise created through airport operations. Consequently, construction of the project would not result in a significant impact. There are no private airstrips within the vicinity of the project site. Therefore, the development of the project would not result in a safety hazard for people residing or working on the project site. No impact would occur.

**F. LESS THAN SIGNIFICANT IMPACT.** The City of Vista is a participant in the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) for San Diego County, which identifies risks by natural and human-made disasters and ways to minimize the damage from those disasters. The proposed project would provide residential uses that would be permitted and approved in compliance with existing safety regulations, such as the CBC and Uniform Fire Code to ensure that it would not conflict with implementation of the MJHMP. Furthermore, prior to receipt of building permits, the project plans would be subject to plan check to ensure the project has been designed to incorporate all required VFD standards to ensure that its implementation would not result in evacuation interference and include proper emergency access. Therefore, impacts related to interference with an adopted emergency response plan or emergency evacuation plan would be less than significant.

**G. LESS THAN SIGNIFICANT IMPACT.** According to the California Fire Hazard Severity Zone Viewer (CAL FIRE 2021), the majority of the project site is located within a State Responsibility Area Moderate Fire Hazard Severity Zone with a small portion along the eastern project site boundary located in a Very High Fire Hazard Severity Zone (VHFHSZ). The project site is surrounded by existing development to the south, east, and west. However, undeveloped lands border the northern part of the project site, specifically proposed Lots 6 through 10. The project has been designed to meet all applicable development and fire codes, including landscaping and vegetation requirements. Once applications for building permits are submitted, the VFD would review all construction plans for adequate fire suppression, fire access, and emergency evacuation. In addition, the project would comply with all VFD fire mitigation requirements associated with the fire zones applicable to the subject property. Future homes would be required to comply with the 2019 California Fire Code and CBC, which includes minimum standards for ignition-resistant construction, methods, and design in these fire hazard zones. Compliance with the CBC would ensure the minimum standards for construction materials, methods, and design are incorporated into the proposed project. Thus, impacts would be less than significant.

| X. Hydrology and Water Quality<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality? | ☐ | ☐ | ☒ | ☐ |
| b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such the project may impede sustainable groundwater management of the basin? | ☐ | ☐ | ☒ | ☐ |
| 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 which would: | ☐ | ☐ | ☒ | ☐ |
| (i) result in substantial erosion or siltation on- or off-site; | ☐ | ☐ | ☒ | ☐ |
| (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; | ☐ | ☐ | ☒ | ☐ |
| (iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or | ☐ | ☐ | ☒ | ☐ |
| (iv) impede or redirect flood flows? | ☐ | ☐ | ☒ | ☐ |
| d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation? | ☐ | ☐ | ☐ | ☒ |
| e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan? | ☐ | ☐ | ☒ | ☐ |

The discussion below is based on the Hydrology Study prepared by Pasco, Laret, Suiter and Associates (Attachment H) and the Stormwater Quality Management Plan (SWQMP) prepared by Pasco, Laret, Suiter and Associates (Attachment H). These reports are on file and available for review in the city's Planning Division office.

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT IMPACT.** The project proposes development of a 28 single-family lots. Hydrologically, the site is situated in the Mission Hydrologic Subarea (903.11) within the San Luis Rey Hydrologic Unit (903.00).

In the existing condition, the site has one single-family residence and an asphalt paved driveway along the western boundary. The remainder of the project site is undeveloped land with moderately steep slopes facing north, east, south, and west. Elevations across the site range from a high of approximately 725 ft in the north-central portion of the property to a low of approximately 630 ft at the southwestern corner of the property.

In the existing condition, stormwater runoff flows over land to the north, east, south, and west. There are four main discharge points located along the northern, eastern, southeastern, and southwestern boundaries. Stormwater that discharges the project site along the eastern and northern borders flows northerly to the San Luis Rey River (Lower), which flows westerly. Stormwater that discharges from the project site along the southern and southwestern borders flows westerly to Guajome Lake, which flows to the San Luis Rey River (Lower), which flows westerly and ultimately discharges to the Pacific Ocean.

The pollutants of concern that could be generated by the development of the proposed project consist of pesticides, sediment, nutrients, heavy metals, organic compounds, trash and debris, oxygen-demanding substances, oil and grease, and bacteria and viruses.

To address potential water quality impacts due to project development, BMPs would be implemented during construction and operation, which would reduce pollutants, as further described below.

#### CONSTRUCTION IMPACTS

Construction of the proposed project would require grading and excavation of soils, which would loosen sediment and then have the potential to mix with surface water runoff and degrade water quality. Additionally, construction would require the use of heavy equipment and construction-related chemicals, such as concrete, cement, asphalt, fuels, oils, antifreeze, transmission fluid, grease, solvents, and paints. These potentially harmful materials could be accidentally spilled or improperly disposed of during construction and, if mixed with surface water runoff, could wash into and pollute receiving waters.

These types of water quality impacts during construction of the project would be prevented through implementation of a Grading and Erosion Control Plan that is required by the city's Grading Ordinance (Vista Development Code, Chapter 17.56) and the current State General Permit to Discharge Stormwater Associated with Construction Activities, which requires preparation of a Stormwater Pollution Prevention Plan (SWPPP) by a Qualified SWPPP Developer. The Grading and Erosion Control Plan and SWPPP are required for plan check and approval by the Land Development Engineer, as well as the Planning Division, prior to provision of permits for the project. The Grading and Erosion Control Plan would include construction BMPs such as the following:

- Silt fence, fiber roll, or gravel bag
- Street sweeping and vacuuming
- Storm drain inlet protection
- Stabilized construction entrance/exit
- Vehicle and equipment maintenance, cleaning, and fueling
- Hydroseeding
- Material delivery and storage

- Stockpile management
- Silt prevention and control
- Solid waste management
- Concrete waste management

In addition, in accordance with the requirements of the most recent National Pollutant Discharge Elimination System (NPDES) General Construction Activities Permit, a Notice of Intent filed with the SWRCB and preparation of a SWPPP would also be required before project construction commences. Adherence to the existing requirements and implementation of the appropriate BMPs per the permitting process would ensure that potential water quality degradation associated with construction activities would be minimized, and impacts would be less than significant.

#### OPERATIONAL IMPACTS

The proposed project would develop residential uses on the project site, which would introduce the potential for pollutants such as chemicals from household cleaners, pathogens from pet wastes, nutrients from fertilizer, pesticides and sediment from landscaping, trash and debris, and oil and grease from vehicles. These pollutants could potentially discharge into surface waters and result in degradation of water quality. Guajome Lake, San Luis Rey River (Lower), and the Pacific Ocean, to which the project site ultimately drains, are listed as impaired on the USEPA's 303(d) for eutrophic, bifenthrin, chloride, indicator bacteria, nitrogen, phosphorus, total dissolved solids, and toxicity. Therefore, operation of the proposed project could create new impairments or exacerbate existing impairments within the waterbodies, which could result in a water quality impact.

In accordance with the city's BMP Design Manual (2016), as detailed in the city's Stormwater Standards Manual (Municipal Code, Chapter 13.18, Stormwater Management and Discharge Control Program) and the requirements of the Municipal Separate Storm Sewer System (MS4) (San Diego RWQCB Order R9-2013-0001 as amended by R9-2015-001 and R9 2015-0100), all new and significant redevelopment projects that are categorized as "priority" development projects (PDP) are required to incorporate post-construction (or permanent) Low Impact Development (LID) Site Design, source control, treatment control (structural) BMPs, and hydromodification measures into the project's design. The proposed project meets three of the "priority project" categories: (1) redevelopment projects that create and/or replace 5,000 sf or more of impervious surface (collectively over the entire project site on an existing site of 10,000 sf or more of impervious surfaces), (2) new and redevelopment projects that create and/or replace 5,000 sf or more of impervious surface (collectively over the entire project site), and (3) new or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post-construction. This means any activity that moves soils or substantially alters the pre-existing vegetated or human-made cover of any land.

LID Site Design BMPs are intended to minimize impervious surfaces and promote infiltration and evaporation of runoff before it can leave the location of origination by mimicking the natural hydrologic function of the site. Integrated management practices would be used in conjunction with LID BMPs as they provide small-scale treatment, retention, and/or detention that are integrated into site layout, landscaping and drainage design. Source Control BMPs are intended to minimize, to the maximum extent practicable, the introduction of pollutants and conditions of concern that may result in significant impacts generated from site runoff to off-site drain systems. Treatment Control BMPs are intended to treat stormwater runoff before it discharges off site. According to the city's Stormwater Standards Manual (2015), specific localized Treatment Control BMPs are more effective at reducing or minimizing pollutants of concern than other types of BMPs. Each type of BMP that would be implemented is shown in Table HWQ-1.

**TABLE HWQ-1. PROPOSED PROJECT BMPS**

| Type of BMP | Description of BMP and Project Consistency |
|---|---|
| LID Site Design | **Maintain Natural Drainage Pathways and Hydrologic Features:** The project would maintain existing drainage discharge points. |
| | **Conserve Natural Areas, Soils and Vegetation:** The project would provide landscaping where feasible throughout the site and along the perimeter slopes. |
| | **Minimize Impervious Areas:** The project proposes decomposed granite sidewalks/trails within the subject project. The project would also provide a five-foot sidewalk along the northern side of the private Vista Grande Drive and within the internal tract on the eastern side of Private Street "A" and southern and western sides of Private Street "B." |
| | **Minimize Soil Compaction:** Soil compaction would be minimized in proposed landscape areas. |
| | **Impervious Area Dispersion:** Roof runoff would be designed to discharge to pervious areas. |
| | **Runoff Collection:** On-site runoff would be effectively collected, conveyed and discharged via proposed storm drain. |
| | **Landscaping with Native or Drought Tolerant Species:** The project site would be landscaped with native and non-native evergreen and deciduous trees, shrubs, and ground cover and drought tolerant plant species. |
| Source Control | **Landscape/Outdoor Pesticide Use:** Landscape/outdoor pesticides would be applied per local requirements. |
| | **Prevent Illicit Discharges into the MS4:** The project would provide effective irrigation and dispersion of non-stormwater discharges into landscape. |
| | **Storm Drain Stenciling or Signage:** The project would provide prohibitive dumping placards and/or signage and maintain legibility of placards and/or signage. Posted signage would be provided at public access points to deter prohibitive dumping. |
| | **Additional BMPs Based on Potential Sources of Runoff Pollutants:** Additional BMPs would be incorporated based on potential sources of runoff pollutants such as chemicals from household cleaners, pathogens from pet wastes, nutrients from fertilizer, pesticides and sediment from landscaping, trash and debris, and oil and grease from vehicles. |
| | **Landscape/Outdoor Pesticide Use:** Landscaping would be designed to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. |
| Treatment Control | **Modular Wetland Systems:** Linear biofiltration systems would be used to provide pollution control. |
| | **Underground storage vaults**: Proposed underground storage vaults would receive flows treated in the biofiltration system and release them slowly to the points of compliance. |

*Source: Attachment H.*

With implementation of the operational BMPs that would be required by the city pursuant to the city's Stormwater Standards and checked during the permitting and approval process of the proposed project, potential pollutants would be reduced to the maximum extent feasible. Development of the proposed project would not violate any water quality standards or waste discharge requirements, including but not limited to increasing pollutant discharges to receiving waters. Impacts would be less than significant.

**B. LESS THAN SIGNIFICANT IMPACT.** Groundwater was not encountered during subsurface investigations undertaken for the Geotechnical Investigation (Attachment C) and is expected to be more than 50 ft below the ground surface. Under post-development conditions, the impervious surface from the proposed project would consist of 4.25 acres of the site (or 185,130 sf), which would be due to the improvement of Vista Grande Drive, residential foundations, a sidewalk, and driveways. As a result, the project site would consist of approximately 25 percent of impervious surfaces. Consequently, significant impacts to groundwater resources are not anticipated with development of the project.

**C. LESS THAN SIGNIFICANT IMPACT.** The project's potential to substantially alter the existing drainage pattern of the site or area on or off site during construction and operation is discussed below. The site does not include and is not adjacent to a stream or river. Thus, impacts related to alteration of the course of a stream or river would not occur.

**CONSTRUCTION**

Construction of the proposed project would require grading and excavation of 70,000 cy of soil, which would loosen sediment and could result in erosion or siltation. However, construction of the proposed project requires a Grading and Erosion Control Plan, and a SWPPP is required in accordance with the city's Grading Ordinance (Vista Development Code, Chapter 17.56) and the current NPDES General Construction Activities Permit. Typical BMPs for erosion or siltation are discussed in Section IX(a). Adherence to the existing requirements and implementation of the required BMPs per the permitting process would ensure that erosion and siltation associated with construction activities would be minimized, and impacts would be less than significant.

**OPERATION**

Under the existing condition, there are four main discharge points located along the northern, eastern, southeastern, and southwestern boundaries of the project site. In the post-construction condition, the project site would consist of six drainage basins. Stormwater runoff would be conveyed over land and in proposed storm drains to four Modular Wetlands Systems and four proposed underground storage facilities (see Figure 5).

Drainage Basin 1 consists of the northwestern portion of the site. Runoff would flow westerly to a proposed Modular Wetlands System (BMP-1) and subsequently a proposed underground storage facility (BMP-A) located near the western boundary. BMP-A would discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 2 consists of the central western portion of the site. Runoff would flow westerly to a proposed Modular Wetlands System (BMP-2) and subsequently a proposed underground storage facility (BMP-B) located near the western boundary. BMP-B would discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 3 consists of a small area at the southwestern corner of the site. Runoff would flow southerly and westerly to a proposed Modular Wetlands System (BMP-3), which would discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 4 consists of the eastern portion of the site. Runoff would flow easterly and southerly to a proposed underground storage facility (BMP-D) located near the southeastern corner of the site. BMP-D would discharge to the surface of Vista Grande Drive at the southeastern corner of the site, flow westerly in the street, confluencing with flow from Drainage Basin 6, to a proposed curb inlet and storm drain that discharges to a proposed Modular Wetlands System (BMP-4) and subsequently another proposed underground storage facility (BMP-C) located near the southwestern corner of the site.

Drainage Basin 5 consists of the small area of perimeter landscape slopes along the northern and eastern boundaries. Runoff would flow off site northerly and easterly as in the existing condition.

Drainage Basin 6 consists of the southern portion of the site. Runoff would flow westerly, confluencing with discharge from BMP-D, to a proposed Modular Wetlands System (BMP-4) and subsequently a proposed underground storage facility (BMP-C) located near the southwestern corner of the site. BMP-C would discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

In addition, tree wells would be installed in Drainage Basins 1–4 and 6 to provide additional peak flow volume retention.

Table HWQ-2 shows the total calculated 100-year peak flow rate under the existing (pre-developed) and post-construction condition.

**TABLE HWQ-2. SUMMARY OF 100-YEAR PEAK DISCHARGE RATES**

| Existing Condition | | | Proposed Detained Condition | | |
|---|---|---|---|---|---|
| Discharge Point | Acres | Q100 (cfs) | Discharge Point | Acres | Q100 (cfs) |
| 110 | 2.45 | 4.76 | N/A | 0 | 0 |
| 120 | 3.1 | 5.36 | 503 | 0.91 | 1.17 |
| 135 | 1.1 | 2.18 | N/A | 0 | 0 |
| 145 | 0.85 | 1.35 | 301 | 16.16 | 9.92 |
| 155 | 8.97 | 14.28 | N/A | 0 | 0 |
| 165 | 0.53 | 0.84 | N/A | 0 | 0 |

*Source: Attachment H.*

As shown in Table HWQ-2, with the incorporation of the Modular Wetlands Systems and underground stormwater storage facilities, the peak flow rates post-construction would be less than the existing condition. In addition, the project site is not identified within a 100-year floodplain and would not place any habitable structures which would impede or redirect flood flows.

As a result, implementation of the proposed project would not substantially increase the rate or amount of surface runoff in a manner that would result in substantial erosion or flooding on or off site, exceed capacity of existing or planned stormwater drainage facilities, or impede or redirect flows. Impacts would be less than significant.

**D. NO IMPACT.** The project site is not at risk for seiche or tsunami from area lakes or the Pacific Ocean. The closest body of water is Squires Dam, which is downstream from the city and any seiche related to Squires Dam would not impact the project site (City of Vista 2011). In addition, the city is approximately seven miles from the Pacific Ocean with elevations ranging from 200 to 750 ft above mean sea level. As a result, the project site is not at risk for tsunami inundation, and impacts would not occur.

In addition, the project site does not have the potential to produce mudflows due to the relatively flat and moderately sloped topography of the site and surrounding area. Vista Development Code, Section 16.48, requires that developments within or near slopes apply slope stabilization measures, which include (but are not limited to): hydroseeding and use of erosion control blankets, silt fencing, fiber rolls, and gravel bags. As a result, impacts related to mudflows would not occur. In addition, the project site does not have the potential to produce mudflows due to the relatively flat to moderately sloped topography of the site, and it is not in proximity to the ocean or other water bodies to be affected by a tsunami or seiche. No impacts would occur.

**E. LESS THAN SIGNIFICANT IMPACT.** The project site is situated in the Mission Hydrologic Subarea (903.11) within the San Luis Rey Hydrologic Unit (903.00). The project site ultimately drains into the Lower San Luis Rey River and subsequently discharges directly into the Pacific Ocean. The proposed project is not located in the San Diego River Valley San Luis Rey Valley Groundwater Basin. Therefore, there is no sustainable groundwater management plan prepared for the project site.

The following are the designated beneficial uses for the San Luis Rey River identified in the Basin Plan: Agricultural Supply (AGR); Industrial Services Supply (IND); Municipal and Domestic Supply (MUN); Water Contact Recreation (REC1); Non-Contact Water Recreation (REC2); Biological Habitats of Special Significance (BIOL); Areas of Special Biological Significance (ASBS); Warm Freshwater Habitat (WARM); Wildlife Habitat (WILD); and Rare, Threatened, or Endangered Species (RARE).

As discussed in Section X(a), construction and operation activities associated with the proposed project could result in an increase in potential discharge of pollutants to receiving waters, including waters designated as impaired for certain contaminates of concern. Hydromodification could increase stormwater runoff and intensify erosion and the transport of sediments and other pollutants.

**CONSTRUCTION**

Construction of the proposed project would require grading and excavation of soils, which would loosen sediment and then have the potential to mix with surface water runoff and degrade water quality. Additionally, construction would require the use of heavy equipment and construction-related chemicals, such as concrete, cement, asphalt, fuels, oils, antifreeze, transmission fluid, grease, solvents, and paints. Construction could result in significant short-term impacts to water quality impacts from uncontrolled sediment and pollutants in stormwater runoff that could conflict with the policies of the Basin Plan.

In order to comply with the policies in the Basin Plan, all construction projects would be required to comply with the city's Grading Ordinance (Vista Development Code, Chapter 17.56) and the current State General Permit to Discharge Stormwater Associated with Construction Activities, which requires preparation of a SWPPP by a Qualified SWPPP Developer. The SWPPP must identify BMPs that the discharger would actively use to protect stormwater runoff from pollutants and the placement of those BMPs to ensure stormwater would not leave active construction sites. Construction-related BMPs are discussed in Section X(a).

Adherence to the existing requirements and implementation of the appropriate BMPs per the permitting process would ensure that any short-term water quality impacts during construction would be minimized and would not cause a conflict with or obstruct implementation of the San Diego Basin Plan. Therefore, potential impacts would be less than significant.

**OPERATION**

Implementation of the proposed project that would have the potential to generate pollutants that could degrade the surface water quality of downstream receiving waters. The proposed project would introduce new residential uses to the project site, which would introduce the potential for pollutants such as chemicals from household cleaners, pathogens from pet wastes, nutrients from fertilizer, pesticides and sediment from landscaping, trash and debris, and oil and grease from vehicles. Therefore, the proposed project could result in significant long-term water quality impacts from uncontrolled pollutants in stormwater runoff that could conflict with the policies of the Basin Plan.

As discussed in Section X(a), the proposed project requires the implementation of Site Design, Source Control, and Treatment Control BMPs to prevent pollutants from reaching receiving waters. Site Design BMPs, including LID measures, would reduce runoff or pollutants at the source. Source Control BMPs would eliminate post-project runoff and control sources of pollutants. Treatment Control BMPs would use treatment mechanisms with performance standards to remove targeted pollutants that have entered stormwater runoff.

With the incorporation of the proposed Site Design, Source Control and Treatment Control BMPs, water quality impacts associated with changes in stormwater runoff would be minimized and would not conflict with or obstruct implementation of the Basin Plan. Therefore, potential impacts would be less than significant.

| XI. Land Use and Planning<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Physically divide an established community? | ☐ | ☐ | ☐ | ☒ |
| b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect? | ☐ | ☐ | ☒ | ☐ |

## *DISCUSSION*

**A. NO IMPACT.** Development of the proposed project would not create any new land use barriers, preclude the development of surrounding parcels or otherwise divide or disrupt the physical arrangement of the surrounding community. Overall, the proposed project would result in a residential development that would be consistent with the established community. As a result, no impact would occur.

**B. LESS THAN SIGNIFICANT IMPACT.** The site is currently designated Rural Residential (RR) in the Vista General Plan 2030 (City of Vista 2012), which allows up to one du/ac. The project proposes to change the General Plan land use designation to Low Density Residential (LD), which would allow up to two du/ac. The property is currently zoned Agricultural Zone (A-1). The project also proposes to rezone the property as Estates Residential (E-1). In order to be consistent with the Vista General Plan 2030, a General Plan Amendment and a zoning change would be adopted as a part of this project.

The proposed project's consistency with Vista General Plan 2030, Zoning Code, and other land use plans and policies is discussed below.

### LAND USE AND COMMUNITY IDENTITY ELEMENT

The site is currently designated Rural Residential (RR) in the Vista General Plan 2030 (City of Vista 2012) which allows up to one du/ac. The project proposes to change the General Plan land use designation to Low Density Residential (LD), which would allow up to two du/ac.

The following policies under the Land Use and Community Identity (LUCI) Element would be applicable to the proposed project. Table LU-1 summarizes the project's consistency with the policies.

## TABLE LU-1. CONSISTENCY WITH GENERAL PLAN LUCI ELEMENT GOALS AND POLICIES

| LUCI Element Policies | Project Description | Consistent (Y/N)? |
|---|---|---|
| Policy 1.1: Require the application of the City of Vista Design Guidelines, including Site Design, architecture, lighting, and signage, when reviewing and approving new development and redevelopment. | As described in the Project Description the Site Design, lighting, landscape, and signage would meet or exceed all design guidelines and standards. | Y |
| Policy 1.3: Ensure that public and private gathering places and activity centers are designed to provide a safe, comfortable environment for users, and incorporate features such as shade trees, benches, tables, adequate lighting, and visible links to public streets for enhanced security. | The proposed project would include an open space lot and other open spaces areas with a decomposed granite trail. The open space areas would include benches and flowering ground cover. | Y |
| Policy 1.5: Require public and /or private landscaping along all arterial roadways to: minimize the visual dominance of paved surfaces; create more appropriately defined and human-scaled public places; help distinguish spaces designated for pedestrian and non-motorized use from those designated for vehicular travel and parking; and provide environmental benefits, such as absorbing carbon dioxide, helping manage stormwater, and shading to reduce heat island effects. Preference shall be given to native or drought tolerant landscape species. | Trees and landscaping would be provided along Vista Grande Drive, as shown on Figure 4. The landscaping is designed to provide scale with the surrounding community. All of the planned plantings would be moderate, low, or very low water use. The primary on-site paths of travel for automobiles and pedestrians would also be lined with trees and landscaping. | Y |
| Policy 1.6: Encourage undergrounding of utilities, and discourage new electric and communications lines to be added to existing aboveground utility systems. | All electric and communication utilities are currently aboveground and would be placed underground during construction. | Y |
| Policy 2.1: Maintain the existing residential character of Vista, characterized by large- lot single-family residential development, by encouraging land uses and intensities of development that are consistent with this image. | The project does not propose large-lot single-family residential development. However, the proposed project is consistent with the goal of providing denser housing near public transit corridors. | Y |
| Policy 2.2: Provide flexibility in development standards to accommodate and enhance neighborhood variations within the City while ensuring that site and building design, landscaping, and other amenities reflect neighborhood characteristics. | The project proposes to construct 28 single-family lots. Each lot would be a minimum of one-half acre ranging in size from 21,789 sf to 25,078 sf. The proposed setbacks would be consistent with city standards. | Y |
| Policy 2.4: Discourage subdivision design that disrupts the existing development pattern within established neighborhoods. | The project site is surrounded by residential uses to the south, east and west. The proposed project would improve the existing easterly Vista Grande Drive along the southern boundary of the project site. The newly constructed road would loop north to provide access to the new interior lots and would exit to the west to the easement road on the western side of the project site. The design of the project would not disrupt existing development. | Y |

## TABLE LU-1. CONSISTENCY WITH GENERAL PLAN LUCI ELEMENT GOALS AND POLICIES

| LUCI Element Policies | Project Description | Consistent (Y/N)? |
|---|---|---|
| Policy 2.5: Ensure that multiple-family residential development is sited and designed to enhance the residential character of Vista; includes amenities such as open space, landscaping, and architectural design that contributes to this character; and minimizes impacts on adjacent residential development that is of a lower density. | The proposed single-family development incorporates architectural design elements that would enhance the residential character of Vista. The on-site landscaping would include trees, shrubs, and ground cover. Existing residences to the south and east would be screened by the proposed landscape trees. | Y |
| Policy 2.8: Consider adoption of a slope protection ordinance as an amendment to the zoning ordinance to better define grading standards for hillside development and ensure the protection of natural landforms in the review of new development. | The project site contains sloping land. Proposed grading would maintain landscaped slopes within the proposed development. | Y |
| Policy 2.9: Prohibit mass grading to protect the visual continuity of the hillsides. | Grading of the site is proposed in a manner that creates a relatively flat building site, while creating landscaped slopes. Slopes would be landscaped with variety of native and non-native evergreen and deciduous trees, shrubs, and ground cover which would be layered in a natural way to provide scale and reduce visual impacts. | Y |
| Policy 2.10: Discourage development on skyline ridges visible from scenic roadways and gateway corridors. Skyline ridges are those which define the horizon. | The subject site is not defined as a skyline ridge. | Y |
| Policy 2.11: Preserve immediate ridges and hilltops in a natural state to the maximum extent possible. Intermediate ridges are those with visible land behind them that creates a backdrop to the ridge as viewed from the valley floor. Development should be sited such that buildings do not project above the natural landform. Development applications shall be designed so that site plans concentrate development in the subordinate or hidden locations, and grading plans minimize disruption of the natural landform and vegetation. | The project would preserve the immediate ridges and hilltops. At locations in close proximity to the project site, the anticipated one-story and two-story dwelling units may provide minor obstructions of views of the San Marcos Mountains depending on the vantage point of the viewer. However, the proposed project would be developed at a scale that would not adversely affect scenic views or vistas from the surrounding area. | Y |
| Policy 2.12: Restrict development of hillsides so that the natural appearance and landform of the site is preserved. Development projects on terrain with a slope greater than 3.5 percent shall | The majority of the project site has a slope greater than 3.5 percent. The project proposes to develop the project site into 28 single-family lots and would require approximately 70,000 cy of earth movement. The cut and fill would be balanced on site. The project site would be landscaped with a variety of native and non-native evergreen and deciduous trees, shrubs, and ground cover. All private yards slopes would be landscaped to stabilize slopes, reduce erosion and enhance the visual appearance of the development. | Y |

## TABLE LU-1. CONSISTENCY WITH GENERAL PLAN LUCI ELEMENT GOALS AND POLICIES

| LUCI Element Policies | Project Description | Consistent (Y/N)? |
|---|---|---|
| conform with the following standards: development shall be designed to minimize grading requirements by conforming to the natural contours of the site; the site shall be landscaped with existing trees and natural vegetation, as much as possible, to stabilize slopes, reduce erosion, and enhance the visual appearance of the development; and grading, terracing, padding, and cut-and-fill shall be minimized to protect the visual continuity of the hillsides. | | |
| Policy 3.1: Require all new development to be designed to minimize impacts on adjoining residential neighborhoods. | The proposed project would improve the existing easterly Vista Grande Drive along the southern boundary of the project site. The newly constructed road would loop north to provide access to the new interior lots and would exit to the west to the easement road on the western side of the project site. Vista Grande Drive would act as a divide between the proposed development and the existing residential units. In addition, a variety of native and non-native evergreen and deciduous trees would be planted along Vista Grande Drive. | Y |
| Policy 3.2: Mitigate unacceptable levels of noise, odors, pollution, dust, light, and glare upon residential areas and other sensitive receptors, such as schools and day care centers. | The project's MND provides avoidance or mitigation measures to ensure that all impacts are reduced to less than significant levels. | Y |
| Policy 3.3: Require visual and acoustic buffering between non–residential and residential land uses and other sensitive receptors by employing techniques such as landscaping, setbacks, sound walls, and sensitive siting of buildings. | The project is surrounded on residential uses on the south, east and west. The newly constructed Vista Grande Drive would serve as a boundary between the existing and proposed development. A variety of native and non-native evergreen and deciduous trees would line Vista Grande Drive. | Y |
| Policy 3.4: Require adequate off-street parking for all residential development. | No additional off-street parking is required. | Y |
| Policy 4.3: Ensure that new and redeveloped projects are designed to improve pedestrian and transit connections, and connections to trail and bicycle networks. | Bicycle lanes and sidewalks are provided along East Vista Way and Warmlands Avenue. The nearest bus stop to the project site is located to the southeast along East Vista Way and Barsby Street, approximately 0.6 mile from the project site. The bus stop is for North County Transit District's (NCTD) BREEZE Bus Line Route No. 306. | Y |

## TABLE LU-1. CONSISTENCY WITH GENERAL PLAN LUCI ELEMENT GOALS AND POLICIES

| LUCI Element Policies | Project Description | Consistent (Y/N)? |
|---|---|---|
| | There are no existing sidewalks or bicycle lanes along the existing portion of Vista Grande Drive near the project site. The proposed project would include decomposed granite sidewalks/trails within the project boundary. The project would also provide a five-foot sidewalk along the northern side of the private Vista Grande Drive and within the internal tract on the eastern side of Private Street "A" and southern and western sides of Private Street "B." | |
| Policy 4.4: Encourage new and redeveloped projects to incorporate facilities that support bicycle use, such as bike racks, lockers, and/or showers, to the extent possible and appropriate. | Future residents would have bicycle storage in their private garages. No bicycle parking spaces are required for single-family residential uses. | Y |
| Policy 4.9: Ensure that new development complies with the California Green Building Standards Code (the CALGreen Code) to promote sustainable design and construction practices and positive environmental impacts in planning and design, energy efficiency, water efficiency and conservation, and material conservation and resource efficiency. | The project would comply with all applicable building codes and standards in effect at the time of construction. | Y |
| Policy 5.2: Ensure that the entire right -of - way is designed to accommodate appropriate modes of transportation. | The proposed project would improve the existing easterly Vista Grande Drive along the southern boundary of the project site. The newly constructed road would loop north to provide access to the new interior lots. This portion of the roadway would be 24 ft wide, providing two 12 ft travel lanes. The newly constructed road would then exit to the west to the easement road on the western side of the project site. This portion of the road would be 28 ft wide, providing two 14 ft travel lanes. The provided rights-of-way would accommodate vehicle modes of transportation. | Y |
| Policy 5.3: Study and remove barriers, where feasible, to allow people of all abilities to access the mobility infrastructure serving the community. | No barriers would be placed that would prohibit people of all abilities to access the mobility infrastructure serving the community. | Y |
| Policy 5.4: Promote the provision of multi - modal access to activity centers such as public facilities, commercial centers and corridors, employment centers, transit stops, schools, parks, recreation areas, and tourist attractions. | The proposed project would incorporate adequately sized travel lanes to support the movement of automobiles, bicycles and pedestrians to and from the site. | Y |
| Policy 6.4: Employ a proactive code compliance effort to improve the appearance and safety of non-complying or neglected properties. | The project site is composed of two parcels, An occupied single-family residence exists on the western parcel, and the remainder of the site is vacant. The parcels are not considered non-complying or neglected properties. | Y |

**TABLE LU-1. CONSISTENCY WITH GENERAL PLAN LUCI ELEMENT GOALS AND POLICIES**

| LUCI Element Policies | Project Description | Consistent (Y/N)? |
|---|---|---|
| Policy 9.1: Provide land use designations that support semi-rural, suburban, and urban housing options. | The proposed development would be consistent with nearby estate residential land uses with the incorporation of similar lot sizes, anticipated dwelling unit square footage, building heights, architectural design features, and landscaping. | Y |
| Policy 11.1: Encourage community participation in planning and development of land use policies, plans, and programs through outreach efforts, workshops, community meetings, public hearings, newsletters, and electronic media. | Project comments will be considered during the public review period for the MND prepared for the project. | Y |
| Policy 11.2: Foster coordinated planning and cooperation with non-governmental organizations, particularly those involved in resource protection, in implementation of the City's land use planning policies. | Consultation with the California Native American Tribes would occur as part of the MND process to ensure the protection of cultural resources. | Y |
| Policy 11.3: Provide and support opportunities for diverse groups to participate in the planning process. | Through the CEQA process and public hearings, local residents are encouraged to participate in the planning process. | Y |

As shown in Table LU-1, the proposed project would be consistent with the applicable goals and policies in the LUCI Element of the Vista General Plan 2030 (City of Vista 2011). Therefore, impacts would be less than significant.

#### CIRCULATION ELEMENT

As described in Table LU-2, the proposed project would be consistent with the following goals and policies of the city's Circulation Element. Therefore, impacts related to consistency with Circulation Element would be less than significant.

TABLE LU-2. CONSISTENCY WITH GENERAL PLAN CIRCULATION ELEMENT GOALS AND POLICIES

| Circulation Element Goal/Policy | Project Description | Consistent (Y/N)? |
|---|---|---|
| CE Policy 1.2: Strive to maintain a vehicular Level of Service (LOS) D or better throughout the City except for within areas designated for mixed-use development. | As discussed in Section XVII, Transportation/Traffic, all study area intersections are anticipated to operate at an acceptable LOS (LOS D or better) in the AM and PM peak hours with implementation of the proposed project except for East Vista Way/Osborne Street (LOS E during both peak hours). However, the proposed project would not contribute more than five seconds of delay to East Vista Way/Osborne Street during the AM or PM peak hour. | Y |
| CE Policy 1.5: When a traffic analysis indicates that the LOS reaches "D" or below, the City will determine what improvements or operational changes are needed to maintain or improve the LOS. Such improvements will either be the responsibility of the project applicant or the City will identify potential funding and prioritization for the necessary improvements through the CIP process. | According to the LTA prepared for the project (Attachment F), all study area intersections are anticipated to operate at an LOS D or better in the AM and PM peak hours with implementation of the proposed project except for East Vista Way/Osborne Street (LOS E during both peak hours). However, because the proposed project would not contribute more than five seconds of delay to East Vista Way/Osborne Street during the AM or PM peak hour, the proposed project would not be required to implement an intersection improvement based on the county's improvement thresholds. | Y |
| CE Policy 1.6: Make all feasible transportation improvements in order to meet the threshold LOS identified in CE Policy 1.5 unless the City determines that the unacceptable LOS is a direct result of regional traffic or that the improvements necessary to achieve the threshold LOS: (1) exceed the available funding sources; (2) are not compatible with the surrounding land uses; (3) are the result of a design that is contrary to other established City policies; or (4) if added benefits are gained for other modes such as biking and walking. | As discussed in Section XVII, no additional intersection improvements are required as a result of the proposed project. However, the project would include a variety of improvements as a condition of approval at the intersection of Warmlands Avenue and East Vista Way. | Y |

TABLE LU-2. CONSISTENCY WITH GENERAL PLAN CIRCULATION ELEMENT GOALS AND POLICIES

| Circulation Element Goal/Policy | Project Description | Consistent (Y/N)? |
|---|---|---|
| CE Policy 1.10: Require necessary conditions of approval on development projects to achieve LOS standards prescribed in this Element. Develop a checklist for development and redevelopment project to ensure the inclusion of infrastructure that provides for safe travel for all users and enhances the project outcome and community impact. | According to the LTA prepared for the project (Attachment F), all study area intersections are anticipated to operate at an LOS D or better in the AM and PM peak hours with implementation of the proposed project except for East Vista Way/Osborne Street (LOS E during both peak hours). However, because the proposed project would not contribute more than five seconds of delay to East Vista Way/Osborne Street during the AM or PM peak hour, the proposed project would not be required to implement an intersection improvement based on the county's improvement thresholds. | Y |
| CE Policy 1.11: Require all new development projects to participate in the City's transportation fee programs. These programs will be designed to ensure that all new development projects fund their fair share of the necessary long-term transportation improvements identified in this Element. | The project would be required to participate in the city's transportation fee program. | Y |
| CE Policy 1.12: Require all new development projects to either fund or install their fair share of all required feasible transportation improvements necessary to achieve a multi-modal LOS identified in this Element as mitigation for the direct impacts on the circulation network from the proposed project. | The proposed project would improve the existing Vista Grande Drive along the southern boundary of the project site. The newly constructed road would loop north to provide access to the new interior lots and a sidewalk and would exit to the west to the easement road on the western side of the project site. No additional intersection or roadway improvements would be required as a result of the proposed project. However, the project would include a variety of improvements as a condition of approval at the intersection of Warmlands Avenue and East Vista Way. | Y |
| CE GOAL 2: Improve the safety and efficiency of existing transportation facilities by providing complete and safe connections on roadways, sidewalks, and bikeways.<br>Facilities should be accessible to all users, with appropriate and necessary amenities. | The proposed project would improve the existing Vista Grande Drive along the southern boundary of the project site. The newly constructed road would loop north to provide access to the new interior lots and a sidewalk and would exit to the west to the easement road on the western side of the project site. No additional intersection or roadway improvements would be required as a result of the proposed project. The project would also provide a five-foot sidewalk along the northern side of the private Vista Grande Drive and within the internal tract on the eastern side of Private Street "A" and southern and western sides of Private Street "B." | Y |

TABLE LU-2. CONSISTENCY WITH GENERAL PLAN CIRCULATION ELEMENT GOALS AND POLICIES

| Circulation Element Goal/Policy | Project Description | Consistent (Y/N)? |
|---|---|---|
| CE Goal 6 – Develop an efficient bicycle and pedestrian circulation system that improves access and linkages in a manner that is human-scaled, bicycle and pedestrian oriented, and transit accessible, encourages the use of these facilities for recreation and provides alternatives to the personal automobile. | There is no existing sidewalk along the existing portion of Vista Grande Drive near the project site. However, the project would include decomposed granite sidewalks/trails within the project boundary. The project would also provide a five-foot sidewalk along the northern side of the private Vista Grande Drive and within the internal tract on the eastern side of Private Street ”A” and southern and western sides of Private Street ”B.” | Y |
| CE Policy 6.4: Require proposed developments to install sidewalks and wheelchair ramps that comply with the Americans with Disabilities Act (ADA) standards adjacent to all roadways within each development. | There is no existing sidewalk along the existing portion of Vista Grande Drive near the project site. However, the project would include decomposed granite sidewalks/trails within the project boundary. The project would also provide a five-foot sidewalk along the northern side of the private Vista Grande Drive and within the internal tract on the eastern side of Private Street “A” and southern and western sides of Private Street “B.” | Y |
| CE Policy 6.7: Require developers to provide facilities for pedestrian travel such as sidewalks, design developments to provide pedestrian access to the development via sidewalks, and avoid requiring that pedestrians use driveways to access development. | There is no existing sidewalk along the existing portion of Vista Grande Drive near the project site. However, the project would include decomposed granite sidewalks/trails within the project boundary. The project would also provide a five-foot sidewalk along the northern side of the private Vista Grande Drive and within the internal tract on the eastern side of Private Street “A” and southern and western sides of Private Street ”B.” | Y |

*Source: City of Vista 2011.*

### HOUSING ELEMENT

The 2013–2021 Housing Element of the Vista General Plan 2030 includes a Housing Plan that outlines adopted goals and policies to achieve the city’s share of affordable housing goals, and its share of regional housing growth. The goals and policies that apply to the proposed project are as follows:

2. Housing Opportunities

Goal 2.0 – Encourage adequate provision of a wide range of housing by location, type of unit, and price to meet the existing and future needs of Vista residents.

> Policy 2.1: Seek to provide a variety of residential development opportunities to meet the city’s share of regional housing needs.

State law requires jurisdictions to provide for their fair share of regional housing needs through income categories to accommodate the forecasted growth in the number of households. The proposed project would provide new housing opportunities within the city, consistent with the General Plan and Zoning Code land use designations, and in accordance with the above-noted goal and policy of the Housing Element. Therefore, the proposed project would not conflict with the Housing Element of the Vista General Plan 2030, and impacts would be less than significant.

#### RESOURCE CONSERVATION AND SUSTAINABILITY ELEMENT

As described in Table LU-3, the proposed project would be consistent with the following goals and policies of the city's Resource Conservation and Sustainability Element. Therefore, impacts related to consistency with Resource Conservation and Sustainability Element would be less than significant.

**TABLE LU-3. CONSISTENCY WITH GENERAL PLAN RESOURCE CONSERVATION AND SUSTAINABILITY ELEMENT GOALS AND POLICIES**

| Resource Conservation and Sustainability Element Goal/Policy | Project Description | Consistent (Y/N)? |
|---|---|---|
| RCS Policy 2.7: Through the California Environmental Quality Act (CEQA) documents, evaluate and disclose the contribution new projects could have on climate change and require mitigation measures as appropriate. | Section of this MND evaluates and discloses the contribution the proposed project could have on climate change. | Y |
| RCS Goal 4: Preserve, protect, and enhance water quality in watersheds to which the City contributes stormwater and urban runoff. | As discussed in Section X, operation of the proposed project could create new impairments or exacerbate existing impairments within the waterbody, which could result in a water quality impact. Table HWQ-1 identifies the projects proposed BMPs including Site Design, source control and Treatment Control BMPs. Implementation would reduce potential pollutants to the maximum extent practicable to preserve, protect and enhance local watersheds. | Y |
| RCS Policy 4.6: Require the incorporation of Low Impact Development (LID) techniques in accordance with current stormwater regulations to manage stormwater and urban runoff, reduce runoff and pollution, reduce the footprint of development on each parcel, and assist in maintaining or restoring the natural hydrology of the site. | The project incorporates LID techniques into the proposed project including Modular Wetland Systems and underground storage facilities. | Y |
| RCS Goal 9: Continue to provide parkland to effectively serve the recreational needs of the community. | The proposed project would include an open space area in the southwestern corner of the project site that would include decomposed granite trails and park benches. | Y |

## TABLE LU-3. CONSISTENCY WITH GENERAL PLAN RESOURCE CONSERVATION AND SUSTAINABILITY ELEMENT GOALS AND POLICIES

| Resource Conservation and Sustainability Element Goal/Policy | Project Description | Consistent (Y/N)? |
|---|---|---|
| RCS Policy 9.8: Encourage and where appropriate, require the inclusion of recreational facilities, permanently dedicated open space and/or trails within new residential subdivisions, and multi-family, commercial, and industrial developments, and within the Opportunity Areas identified in the Land Use and Community Identity Element. | The proposed project would include an open space area in the southwestern corner of the project site that would include decomposed granite trails and park benches. | Y |
| RCS Goal 12: Acknowledge, preserve, and protect the City's Native American heritage. | As described in Section V, Cultural and Tribal Cultural Resources, the project would protect unknown resources in the event of discovery during construction activities which would help to preserve and protect the city's Native American heritage. | Y |
| RCS Policy 12.3: Ensure that the San Luis Rey Band of Mission Indians is notified of any proposed discretionary planning or grading applications affecting lands with potential archaeological resources. | As described in Section V, representatives of the San Luis Rey Band took part in on-site field surveys conducted as part of the preparation of the cultural resources report, and contributed to the procedures for protecting known and unknown significant archaeological features. | Y |
| RCS Policy 12.4: If significant Native American artifacts are discovered during pre-construction or construction phases of a discretionary project or during implementation of a grading permit, the first priority shall be: a) to avoid any further disturbance of those areas by re-designing the proposed development or project; and b) to have those areas placed into a protected open space via an open space easement of other protective measure. If avoidance is not feasible based on consultation with the Most Likely Descendant of the artifact, appropriate mitigation shall be required. Any discovered Native American artifacts shall be returned to their Most Likely Descendant and repatriated at the earliest opportunity. | As discussed in Section V, due to the presence of Native American archaeological and cultural resources in the area, a grading monitoring program shall be implemented for the project during construction. | Y |

**TABLE LU-3. CONSISTENCY WITH GENERAL PLAN RESOURCE CONSERVATION AND SUSTAINABILITY ELEMENT GOALS AND POLICIES**

| Resource Conservation and Sustainability Element Goal/Policy | Project Description | Consistent (Y/N)? |
|---|---|---|
| RCS Policy 12.5: If Native American human remains and/or associated grave goods found during any activities identified in RCS Policy 12.4, the first priority shall be: a) to avoid any further disturbance of those areas in which remains have been found, and b) to have the remains and/or associated goods preserved in place via an open easement or similar protective land use measure. The second priority shall be that the Most Likely Descendant of the remains and/or goods, as determined by the NAHC, must also have the opportunity to recommend other culturally appropriate treatment. | As discussed in Section V, it is possible, though, that construction activities could unearth previously unknown vestiges, particularly given the cultural sensitivity of the area. This could result in a potentially significant impact. The proposed grading monitoring plan would ensure that human remains are treated with dignity and as specified by law. | Y |

#### HABITAT CONSERVATION PLAN OR NATURAL COMMUNITY PRESERVATION PLAN

The city participates in the MHCP, a regional conservation plan under the state's NCCP Program that will also act as a Habitat Conservation Plan (HCP) under the Environmental Site Assessment. While the city's Subarea Plan has not been adopted, the city enforces the MHCP through its General Plan. With the implementation of mitigation measures for impacts to MHCP-sensitive habitats as described in Section IV, would ensure the proposed project would be consistent with the MHCP.

#### OTHER GENERAL PLAN ELEMENTS

The proposed project would be conditioned to comply with all applicable noise standards, would be adequately served by existing public services, and would require compliance with the city's building, and fire codes and with the city's Building Code. Consequently, no inconsistencies with the city's Noise Element and Public Safety, Facilities, and Services Element are anticipated as a result of project development; therefore, impacts would be less than significant.

#### ZONING CODE

*Consistency with Residential Zone Designation*

The project site is currently zoned Agricultural Zone (A-1). The project also proposes to rezone the property as Estates Residential (E-1). With approval of the zoning change and Tentative Subdivision Map and compliance of the residential development standards and design guidelines discussed below, the proposed project would be consistent with the residential zoning designation, and impacts would be less than significant.

| XII. Mineral Resources<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| 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? | ☐ | ☐ | ☐ | ☒ |

## *DISCUSSION*

**A-B. NO IMPACT.** The California Department of Conservation's Division of Mines and Geology (2019) does not identify the city as an area with high potential for aggregate or mineral resources. The Vista General Plan 2030 (City of Vista 2012) does not identify any specific mineral resources or locally important mineral resources recovery sites in the city. Compliance with the Vista General Plan 2030 policies and the Vista Development Code would be required. Chapter 15.16 of the Vista Development Code contains the city's implementation provisions, which recognize mineral extraction, including borrow of fill and construction materials, as essential to the city's economic well-being and the needs of society but also stress the need to protect public health and safety and support the Vista General Plan 2030 goals and objectives (City of Vista 2012). No impact to mineral resources would occur.

| XIII. Noise<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Generation of a substantial temporary or permanent increase in 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? | ☐ | ☐ | ☒ | ☐ |
| b. Generation of excessive groundborne vibration or groundborne noise levels? | ☐ | ☒ | ☐ | ☐ |
| 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? | ☐ | ☐ | ☒ | ☐ |

The discussion below is based on the findings contained within Vista Grande Project Acoustical Site Assessment Report prepared by Helix Environmental (Attachment I) for the proposed project with information taken from the Vista Grande Project Acoustical Site Assessment prepared for the previously approved project (Helix 2015b). These reports are on file and available for review in the city's Planning Division office.

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT IMPACT.** Impacts would be significant if the project would expose proposed residential uses to exterior noise levels exceeding 65 CNEL or interior noise levels exceeding 45 CNEL, as described in the city's Noise Element.

Per the Vista Noise Ordinance, impacts would be significant if the project would generate noise levels at a common property line with the adjacent single-family residential zone to the west that would exceed the following one-hour average exterior noise levels: 50 dBA from 7:00 a.m. to 10:00 p.m. and 45 dBA from 10:00 p.m. to 7:00 a.m. The adjacent single-family residential properties to the south of the project site are within unincorporated San Diego County. While the proposed project is not subject to the regulations of the County of San Diego, the same 50 dBA daytime limit and 45 dBA nighttime limit are considered at these property lines for analysis purposes.

For traffic-related noise, impacts are considered significant in areas where traffic noise at single-family residential uses exceeds 65 CNEL and implementation of the project would result in an increase of the noise level by three CNEL or more.

Construction activity would be considered significant for nearby residences if it exceeds an eight-hour average exterior noise level of 75 dBA, or a maximum impulsive noise level of 82 dBA on an occupied residential use. The ordinance prohibits construction and building work between the hours of 7:00 p.m. and 7:00 a.m. of the next day, on Sundays, or on a holiday.

#### CONSTRUCTION

Construction of the project would generate elevated noise levels that may disrupt nearby noise-sensitive land uses (NSLUs), such as nearby residences. The magnitude of the impact would depend on the type of construction activity, equipment, duration of each construction phase, distance between the noise source and receiver, and any intervening structures.

Construction would require the use of equipment throughout the site for the full term of construction. Construction activities would include grading, rock breaking, excavating, and road paving. Equipment used on site is assumed to include (but not be limited to) a dozer, excavator, loaders, dump trucks, breaker, and a rock driller. Blasting may be required at the site during initial grading activity. Blasting operations would be conducted through the use of drilling and blasting to fracture rocks.

The nearest residences to the proposed grading areas are adjacent to the project site. Construction equipment is mobile and would be moving across the site throughout the construction period. For modeling purposes, the construction equipment was assumed to operate at a reasonably conservative distance of 150 ft from the nearest residence. Over the course of a day, a dozer or excavator may be closer or farther than 150 ft from the nearest residence.

Construction noise impact analysis includes hard rock handling, which is typically significantly louder than other activities and has the greatest potential to create impacts to off-site NSLUs. For hard rock handling, the project would require material excavation and/or fill. Blasting may be performed to assist with grading given the underlying geology of the site. The necessity and extent of blasting would not be known until surface clearing is completed. The expected general construction equipment noise levels are shown in Table NO-1.

**TABLE NO-1. CONSTRUCTION EQUIPMENT NOISE LEVELS**

| Unit | Percent Time | LMAX at 150 Feet | dBA LEQ at 150 feet |
|---|---|---|---|
| Backhoe | 40 | 68 | 64 |
| Compactor | 20 | 73.7 | 66.7 |
| Compressor | 40 | 68.1 | 64.1 |
| Concrete Mixer Truck | 40 | 69.3 | 65.3 |
| Concrete Pump Truck | 20 | 71.9 | 64.9 |
| Dozer | 40 | 72.1 | 68.1 |
| Dump Truck | 50 | 66.9 | 62.9 |
| Drum Mixer | 40 | 75.5 | 71.5 |
| Excavator | 40 | 71.2 | 67.2 |
| Front End Loader | 40 | 69.6 | 65.6 |
| Generator | 50 | 71.1 | 68.1 |
| Paver | 50 | 67.7 | 64.7 |
| Roller | 20 | 70.5 | 63.5 |
| Scraper | 40 | 74 | 70.1 |
| Scraper/Dozer | 40 | 74 | 72.2 |

*Source: Attachment I.*
*Notes: LMAX = maximum noise level; dBA = A-weighted decibel; LEQ = equivalent sound level*

Construction equipment would not all operate at the same time or location and would not be in constant use during the eight-hour operating day. Further, not all the pieces of equipment included in Table NO-1 would be used within 150 ft of off-site residences. As shown, at 150 ft, construction equipment, including the combination of a scraper and dozer, would not exceed the 75 dBA LEQ (eight-hour) threshold.

*Grading and Hard Rock Handling*

The project's most prominent noise-generating construction activities are anticipated to include grading and hard rock handling, rock crushing, and blasting. Grading would occur across the project site and is anticipated to involve the simultaneous use of a scraper and dozer. At a distance of 150 ft, a scraper and dozer would together generate a noise level of 72.2 dBA LEQ. This does not exceed the 75 dBA LEQ construction noise level limit and impacts would be less than significant.

A hydraulically operated impact hammer attached to a tracked excavator is commonly called a breaker. These units are used to reduce large granitic materials and pavement to a size where they can either be transported off site, buried on site for fill, or used as riprap or landscaping materials. If blasting is to occur, leftover boulders may be large enough for a breaker to be used at the project site. The exact location(s) that a breaker would be used at the project site is unknown at this time. Therefore, it is assumed that a breaker would be used at the approximate center of the project site at a distance of 350 ft from off-site residences.

Breakers create impulsive noise that is subject to the eight-hour average noise level limit of 75 dBA LEQ and the maximum impulsive noise level limit of 82 dBA LMAX. A breaker generates an eight-hour average noise level of 80 dBA LEQ at a distance of 50 ft and a maximum noise level of 90 dBA LMAX at a distance of 350 ft. Assuming a noise attenuation rate of six dBA per doubling of distance, noise levels from the breaker would reduce to 75 dBA LEQ at a distance of 90 ft. The maximum noise level would be below 82 dBA LMAX at 125 ft. Therefore, construction noise from a breaker would be below the thresholds of 75 dBA LEQ and 82 dBA LMAX at 350 ft, or any distance over 125 ft. Impacts would be less than significant.

**OPERATION**

Anticipated project site operational noise sources include residential heating, ventilation, and air conditioning (HVAC) systems and vehicular traffic.

*Heating, Ventilation and Air Conditioning Systems*

Specific planning data for the future HVAC systems and exact building site locations are not available at this stage of project design; however, analysis using a typical to larger-sized residential condenser mounted on ground level pads provides a reasonable basis for analysis. Modeling assumed that the air conditioning condenser would be a Carrier 38HDR060 split system. This unit typically generates a noise level of 56 dBA at a distance of seven ft. Based on the site plan (Figure 3), residential pads would be located approximately 25 ft from the project boundary. For single-family homes, it is anticipated that the HVAC units would be installed adjacent to the house structure in the back yard. At 25 ft, a condenser would generate a noise level of 44.9 dBA, which does not exceed the city's nighttime allowable hourly limit of 45 dBA. Furthermore, the HVAC units are not likely to be located at the edge of the pad and are therefore likely be located beyond 25 ft from nearby residences. Impacts would be less than significant.

*Interior Noise Levels*

The nearest city roadways with traffic volumes substantial enough to affect the exterior noise levels at the project site are Warmlands Avenue to the south of the project, and East Vista Way to the west of the project site. East Vista Way is approximately 1,600 ft from the project site. Warmlands Avenue is approximately 550 ft away from the project site at its nearest point. Traffic data for roadways in the project vicinity (East Vista Way and Warmlands Avenue) and project trip generation for the current project are based on volumes from the project's traffic consultant (Attachment F). Table NO-2 summarizes the average daily trips (ADT) data for nearby roadways, both with and without the project.

**TABLE NO-2. ROADWAY SEGMENT ADT EXISTING PROJECT EXISTING + PROJECT**

| Roadway Segment | ADT Existing | Project | Existing Plus Project |
|---|---|---|---|
| **East Vista Way** | | | |
| North of Warmlands Avenue | 31,000 | 140 | 31,140 |
| South of Warmlands Avenue | 31,000 | 140 | 31,140 |
| **Warmlands Avenue** | | | |
| East of East Vista Way | 3,000 | 280 | 3,280 |

*Source: Attachment F.*

Modeling was based upon the posted speed limits of 50 mph for East Vista Way north of Warmlands Avenue and 40 mph south of Warmlands Avenue. Warmlands Avenue's posted speed limit is 30 mph. For a conservative analysis, the percentage breakdown of vehicles for modeling traffic noise was assumed to be 97 percent automobiles, two percent medium trucks, and one percent heavy trucks.

Anticipated exterior noise levels at the project site from traffic volumes (including project-added trips) on East Vista Way Avenue would be 46 CNEL, well below the any applicable exterior noise limits (65 CNEL). Traffic noise from Warmlands Avenue at 550 ft would be 42 CNEL, also below exterior noise limits. Therefore, impacts related to the exposure of proposed residential limits to exterior acceptable levels would be less than significant.

Traditional architectural materials are normally able to reduce exterior to interior noise by up to 15 dBA. Because the project building façade noise levels will not exceed 60 CNEL, traditional architectural materials would be expected to attenuate interior noise to a level of 45 CNEL. Therefore, impacts related to interior noise limits would be less than significant.

*Vehicular Traffic Noise*

A significant direct impact would occur if existing conditions approach or exceed city standards and the project more than doubles (increases by more than three CNEL) the existing noise level. As shown in Table NO-3, the project does not increase any of the noise levels by more than three CNEL. Therefore, exterior off-site direct transportation noise impacts would be less than significant.

**TABLE NO-3. OFF-SITE TRAFFIC NOISE LEVELS**

| Roadway Segment | Distance to Nearest NSLU | Existing CNEL | Existing Plus Project CNEL | Change from Existing | Direct Impact |
|---|---|---|---|---|---|
| **East Vista Way** | | | | | |
| North of Warmlands Avenue | 100 | 66.7 | 66.7 | 0 | No |
| South of Warmlands Avenue | 100 | 66.7 | 66.7 | 0 | No |
| **Warmlands Avenue** | | | | | |
| East of East Vista Way | 50 | 55.6 | 56.0 | 0.4 | No |

*Source: Attachment F.*
*Notes: NSLU = noise sensitive land use; CNEL = Community Noise Equivalent Level*

**B. LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED.** Excessive groundborne vibration would occur if construction-related groundborne vibration would exceed the "strongly perceptible" vibration annoyance potential criteria for human receptors of 0.1 inch per second peak particle velocity (PPV) or the damage potential criteria to relatively old residential structures 0.5 inch per second PPV for continuous/frequent intermittent construction sources (such as impact pile drivers, vibratory pile drivers, and vibratory compaction equipment), as specified by Caltrans (2020).

Potentially, blasting in limited areas may be required at the site during initial grading activity. Blasting operations would be conducted through the use of drilling and blasting to fracture rocks. Blasting operations would be conducted by a licensed blasting contractor in strict compliance with pertinent federal, state, and county requirements.

A full analysis cannot be done until after the site is cleared of all surface material (including any rippable material) to expose the underlying geological structure to determine the specific type of material that may not yield to heavy ripping. Single-family residences are located on adjacent lots. The highest elevation on the project site and, therefore, potentially the area where blasting may be necessary, is near the center of the site. From this location, the closest off-site homes would be located approximately 350 ft from this location. This analysis assumes that proper blast planning would be used, all flyrock would be controlled with blast mats or other flyrock control techniques, and proper stemming materials for the charge hole would be used.

An on-site source of vibration during project construction would be a vibratory roller (primarily used to achieve soil compaction as part of the foundation and paving construction), which is expected to be used within 40 ft of the nearest occupied residence. A vibratory roller creates approximately 0.210 in/sec PPV at a distance of 25 ft. Using the construction vibration damage criteria from the Vista General Plan 2030 PEIR (City of Vista 2011), a vibratory roller would fall below the 0.2 in/sec PPV threshold for non-engineered buildings at 40 ft. Therefore, although vibration may be perceptible by nearby residences, temporary impacts associated with the vibratory roller (and other potential equipment) would be less than significant.

Because project-specific details regarding blasting operations are not available at this time, impacts to off-site residences are conservatively assessed as significant. Implementation of Mitigation Measure NOI-1 would ensure that potential impacts are reduced to a less than significant level.

**NOI-1:** Prior to any blasting on the project site, the project applicant shall prepare a Blasting Management Plan that minimizes potential blasting effects on adjacent residences. All blast planning must be done by a City of Vista approved blasting contractor and submitted to the city with the appropriate blasting permits, and all other applicable local, state, and federal permits, licenses, and bonding. The blasting contractor or owner must conduct all notifications, inspections, monitoring, and major or minor blasting requirements planning with seismograph reports, as necessary.

**C. LESS THAN SIGNIFICANT IMPACT.** The project site is subject to some existing distant aircraft noise, though the site is not located near any active airports. The closest airport is Oceanside Municipal Airport, located approximately 7.66 miles to the west of the project site. Fallbrook Community Airpark is located 8.1 miles to the north, and Marine Corps Air Station Camp Pendleton, located 8.5 miles to the northwest. Furthermore, no private airstrips are located in the vicinity of the project site. At these distances, no effects related to airport noise would occur at the project site, and impacts would be less than significant.

| **XIV. Population and Housing** *Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| 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)? | ☐ | ☐ | ☒ | ☐ |
| b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☒ | ☐ |

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT IMPACT.** The site is currently designated Rural Residential (RR) in the Vista General Plan 2030 (City of Vista 2012), which allows up to one du/ac. The project proposes to change the General Plan land use designation to Low Density Residential (LD), which would allow up to two du/ac. The Vista General Plan 2030 and associated PEIR anticipated 14,775 additional people and up to an additional 4,532 residential units. The proposed project would involve the construction of 28 single-family lots. Based on the U.S. Census Bureau's City Quick Facts for the City of Vista, the average household size is 3.27 people (U.S. Census Bureau 2019). Applying this rate the project would result in approximately 92 residents. The addition of 92 residents would result in a small incremental increase in the city's population and would not result in substantial unplanned population growth in an area. Furthermore, the project would be constructed on a site and within an area of the city that has existing infrastructure and public services. As a result, development of the project would not result in potentially growth-inducing effects by extending utilities into an undeveloped area. Impacts would be less than significant.

**B. LESS THAN SIGNIFICANT IMPACT.** The project site contains one existing residential home, which would be demolished. The project would construct 28 new single-family residences. Therefore, the project would not

result in the displacement of a substantial number of existing people or housing, necessitating the construction of replacement housing elsewhere. Impacts would be less than significant.

| **XV. Public Services**<br>***a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental 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:*** | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| 1. Fire protection? | ☐ | ☐ | ☒ | ☐ |
| 2. Police protection? | ☐ | ☐ | ☒ | ☐ |
| 3. Schools? | ☐ | ☐ | ☒ | ☐ |
| 4. Parks? | ☐ | ☐ | ☒ | ☐ |
| 5. Other public facilities? | ☐ | ☐ | ☒ | ☐ |

## *DISCUSSION*

**A1. LESS THAN SIGNIFICANT IMPACT.** The proposed project would be constructed in accordance with all applicable fire codes set forth by the State Fire Marshal, the VFD, and the city's Building Code. Development of the proposed project may result in an incremental increase in the demand for emergency services; however the size and location of the project would not place an undue hardship on the fire department because it is presently servicing the area. Fire protection services would be available from Fire Station No. 3 located at 1070 Old Taylor Street, Vista, California 92084, less than one mile to the south.

In addition, the VFD has reviewed the Tentative Map and identified recommendations to reduce potential impacts to fire protective services. Also, development impact fees would help to ensure funding continues to be provided to the VFD. Therefore, development of the proposed project would not exceed the capacity of the VFD to serve the site or other areas with existing fire protection services and resources, and would result in less than significant impacts.

**A2. LESS THAN SIGNIFICANT IMPACT.** The San Diego County Sheriff's Department is contracted by the city to provide law enforcement to the city and the surrounding unincorporated areas. The Sheriff's Station (or the Vista Patrol Station) is located at 325 South Melrose Drive, Suite 210. There are also two neighborhood offices, one at 340 Townsite Drive and the other at 1477 Moon Road; one storefront office is located at 30 Main Street in Vista Village, which is located approximately 3.3 miles southwest of the project site. The Sheriff's Station on South Melrose Drive is approximately 4.7 miles northwest of the project site. The Sheriff's Department's services include general patrol, traffic enforcement, criminal investigation, juvenile services, communications and dispatch, and various management support services. Law enforcement services are available 24 hours per day, seven days per week, and include Community Service Officers, canine handlers, and narcotics and gang investigators.

The proposed project would result in additional on-site population that could create the need for police services. However, the development would occur within an area adjacent to existing residential uses that is regularly patrolled by the Sheriff's Department. In addition, the Sheriff's Department has reviewed the site and architectural plan submittals and provided recommendations to the applicant to reduce potential security impacts. Overall, it is anticipated that the proposed project would not result in the need for new or expanded police facilities. Therefore, the project would not exceed the capacity of the San Diego County Sheriff's Department to provide police protective services to the residents of the project, and impacts would be less than significant.

**A3. LESS THAN SIGNIFICANT IMPACT.** The proposed project would result in a small incremental increase in the city's population that could place cumulative demands on Vista Unified School District schools or school operations, which would require additional school facilities. However, with payment of the Residential Development School Fee as a condition of Building Permit approval, which is authorized by Section 17620 of the Education Code and based on $3.79 per sf of assessable space (as of June 2020), no significant impacts to school facilities would occur. Impacts would be less than significant.

**A4. LESS THAN SIGNIFICANT IMPACT.** The project would add 92 residents, which would introduce new residents to the area that would likely use parks. A small minor increase in demand on existing recreational resources may be expected with any new residential development within the city. In addition to residential backyards, the proposed project would include an open space area in the southwestern corner of the project site that would include decomposed granite trails and park benches. Impacts would be less than significant.

**A5. LESS THAN SIGNIFICANT IMPACT.** Due to the relatively small size of the proposed project (28 residences), no impacts on libraries, senior centers, or other public facilities are anticipated. Consequently, impacts would be less than significant.

| **XVI. Recreation** *Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☒ | ☐ |
| b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☒ | ☐ |

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT IMPACT.** There are currently no parks or recreational facilities located within two miles of the project site. When fully occupied, the residential units are anticipated to house approximately 92 residents, assuming an average of 3.27 people per household in the city (U.S. Census Bureau 2019). A minor increase in demand on existing recreational resources may be expected from the new residential development. However, this impact would not lead to a substantial physical deterioration of recreational facilities.

**B. LESS THAN SIGNIFICANT IMPACT.** The project does not propose the development of any public recreational facilities. As stated above, a small demand increase on existing recreational resources may be expected with any residential development within the city; however, this impact is anticipated to be minimal, and would not require the expansion of existing recreational facilities or the construction of new recreational facilities that might adversely affect the environment. As a result, a less than significant impact would occur.

| XVII. Transportation/Traffic<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities? | ☐ | ☐ | ☒ | ☐ |
| b. Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)? | ☐ | ☐ | ☒ | ☐ |
| c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ☐ | ☐ | ☒ | ☐ |
| d. Result in inadequate emergency access? | ☐ | ☐ | ☒ | ☐ |

The discussion below is based on the findings contained within the LTA for the Vista Grande Residential Project (Attachment F) prepared for the proposed project. The document is on file and available for review in the city's Planning Division office.

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT IMPACT.**

**THRESHOLD OF SIGNIFICANCE**

The city's threshold of significance relies upon peak-hour traffic operations at intersections rather than roadway segment analyses. Roadway segment LOS standards are generally used as long-range planning guidelines to determine the functional classification of roadways and are not always accurate indicators of roadway performance. Typically, the performance and LOS of a roadway segment is heavily influenced by the ability of intersections to accommodate peak-hour volumes.

LOS is the term used to denote the different operating conditions that occur under various traffic volume loads. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. The city considers LOS D or better during the AM and PM peak hours to be the threshold of significance for intersection LOS. This is consistent with the approach of other jurisdictions within San Diego County and past studies conducted within the city.

A significant traffic impact in the city would include the following: (1) the addition of project traffic results in a LOS dropping from LOS D or better to LOS E or F or (2) if an intersection is operating at LOS E or F under existing conditions and the project adds more than an additional two seconds of average vehicle delay. In

the longer-range cumulative (or build-out) condition, if the addition of project traffic results in a LOS dropping from LOS D or better to LOS E or F, or if an intersection is predicted to operate at LOS E or F without the project and the project contributes to the average vehicle delay (regardless of time), the project is determined to have a cumulatively significant impact and mitigation is required.

#### EXISTING TRANSIT SERVICE

The nearest bus stop to the project site is located to the southeast along East Vista Way and Barsby Street, approximately 0.6 mile from the project site. The bus stop is for North County Transit District's (NCTD) BREEZE Bus Line Route 306.

#### EXISTING PEDESTRIAN AND BICYCLE ACCESS

There is no existing sidewalk along the existing portion of Vista Grande Drive near the project site. In addition, there are no existing bicycle lanes on Vista Grande Drive.

#### PROPOSED PROJECT TRIP GENERATION

To determine the forecast of trips that would be generated by the proposed project, the trip generation rates from SANDAG's "(Not so) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region" were utilized. The proposed project is anticipated to generate a total of 280 ADT, including 22 trips (6 inbound and 16 outbound) in the AM peak hour and 28 trips (20 inbound and eight outbound) in the PM peak hour. The proposed project trip generation is shown in Table TRA-1.

**TABLE TRA-1. PROPOSED PROJECT TRIP GENERATION**

| Land Use | Residences (DU)[2] | Trip Rate | Daily Trips | AM Peak Hour Trips | PM Peak Hour Trips |
|---|---|---|---|---|---|
| Single Family Detached | 28 | 10 per DU | 280 | 22 (6-in/16-out) | 28 (20-in/8-out) |

*Construction*

The proposed project would require the demolition of the existing residence which is anticipated to take 10 days and would require 23 debris haul trips. The project would requires 70,000 cy of earth movement. No haul trips would be required due to the balanced cut and fill on site. As a project design features and Condition of Project Approval, the applicant and/or contractor would be required to prepare and implement a Traffic Control Plan to the satisfaction of the City Traffic Engineer. Therefore, with the Traffic Control Plan in place, short-term temporary impacts to traffic during the construction period would be less than significant.

*Operation*

Table TRA-2 summarizes the results of the Existing Plus Project AM and PM peak-hour LOS analysis for the four study area intersections.

**TABLE TRA-2. EXISTING PLUS PROJECT INTERSECTION LEVEL OF SERVICE SUMMARY**

| Study Area | Intersection | Existing Baselines | | | | Existing Plus Project | | | | Δ Peak Hour Delay | | Improvement Required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | | | |
| | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | AM | PM | |
| 1 | East Vista Way/Gopher Canyon Road | 25.5 | C | 47.8 | D | 25.5 | C | 42.8 | D | 0.00 | 0.40 | No |
| 2 | East Vista Way/Osborne Street | 67.7 | E | 75.4 | E | 69.1 | E | 75.6 | E | 1.40 | 0.20 | No |
| 3 | East Vista Way/Warmlands Avenue | 9.6 | A | 18.3 | B | 10.7 | B | 20.1 | C | 1.10 | 1.80 | No |
| 4 | East Vista Way/Taylor Street | 11.2 | B | 12.6 | B | 11.3 | B | 12.6 | B | 0.10 | 0.00 | No |

*Source: Attachment F.*

As shown in Table TRA-2, all study area intersections are anticipated to operate at an acceptable LOS (LOS D or better) in the AM and PM peak hours with implementation of the proposed project except for East Vista Way/Osborne Street (LOS E during both peak hours). However, because the proposed project would not contribute more than five seconds of delay to East Vista Way/Osborne Street during the AM or PM peak hour, a significant impact would not occur and the proposed project would not be required to implement any improvements at this intersection.

Table TRA-3 summarizes the Existing Plus Project daily traffic volumes for the five study area roadway segments with the addition of project traffic.

**TABLE TRA-3. EXISTING PLUS PROJECT ROADWAY SEGMENT LEVEL OF SERVICE SUMMARY**

| Study Area | Roadway | Segment | Capacity | Existing Baselines | | | Existing Plus Project | | | Δ V/C | Improvement Required |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ADT | V/C | LOS | ADT | V/C | LOS | | |
| 1 | East Vista Way | Gopher Canyon Road to Osborne Street | 15,000 | 27,200 | 1.81 | F | 27,298 | 1.82 | F | 0.01 | No |
| 2 | East Vista Way | Osborne Street to Warmlands Avenue | 15,000 | 31,000 | 2.07 | F | 31,140 | 2.08 | F | 0.01 | No |
| 3 | East Vista Way | Warmlands Avenue to Taylor Street | 15,000 | 31,000 | 2.07 | F | 31,140 | 2.08 | F | 0.01 | No |
| 4 | Warmlands Avenue | East of Vista Way | 7,900 | 3,000 | 0.38 | A | 3,280 | 0.42 | A | 0.04 | No |
| 5 | Vista Grande Drive | North of Warmlands Avenue | 7,900 | 500 | 0.06 | A | 780 | 0.10 | A | 0.04 | No |

*Source: Attachment F.*

As Table TRA-3 indicates, the study area roadway segments of Warmlands Avenue and Vista Grande Drive are anticipated to continue operating at an acceptable LOS (LOS A) with implementation of the proposed project. However, the three study area roadway segments along East Vista Way would continue to operate at an unacceptable LOS (LOS F). As previously described, intersection performance is a more accurate and realistic indicator of true traffic operations and is used as the city's basis for requiring improvements. Because the proposed project would not require intersection improvements based on the LTA (2021), the proposed project would not be required to implement any roadway improvements along East Vista Way. However, as a condition of approval, the project would implement a variety of improvements at the intersection of East Vista Way and Warmlands Avenue. Please refer to Chapter 2, Environmental Setting and Project Description, for a detailed description of the improvements. Impacts would be less than significant.

**B. LESS THAN SIGNIFICANT IMPACT.** According to the city's Transportation Impact Analysis Guidelines, a Vehicle Miles Traveled (VMT) analysis for CEQA purposes will be required if a project equals to or exceeds 1,000 ADT and is consistent with the adopted General Plan. If a project is inconsistent with the adopted General Plan, a VMT analysis will be required if the project would result in 500 or more ADT. The project requires a General Plan Amendment to change the Land Use designation from Rural Residential (RR) to Low Density Residential (LD). As discussed above, the project would generate 280 ADT, which is below the city's threshold for a VMT analysis. Therefore, the project would not conflict and would be consistent with CEQA Guidelines, Section 15064.3(b), and impacts would be less than significant.

**C. LESS THAN SIGNIFICANT IMPACT.** Implementation of the proposed project would not involve potentially dangerous traffic or transportation hazards or result in incompatible uses that could affect existing traffic or circulation on the project site. The proposed project would improve the existing Vista Grande Drive along the southern boundary of the project site. The newly constructed road would loop north to provide access to the new interior lots and would exit to the west to the easement road on the western side of the project site. The proposed roadway would be built according to city's design standards. In addition, new curve warning signs and 15 mph advisory speed placards would be installed in each direction for the curve along Vista Grande Drive just west of the project. Impacts would be less than significant.

**D. LESS THAN SIGNIFICANT IMPACT.** Access to the proposed development would be from the improvement of Vista Grande Drive. Emergency secondary access would be provided at Vista Grande Terrance to Vista Grande Drive. This access would be gated and used for emergency secondary access/egress purposes only. Furthermore, prior to receipt of building permits, the project plans would be subject to plan check to ensure the project has been designed to incorporate all required VFD standards to ensure that its implementation would not result in hazardous design features or inadequate emergency access to the site or areas surrounding the site. In addition, the VFD reviewed the project pre-submittal and the project would be required to make all roadways a minimum of 24 ft wide with no parking on the street throughout the development. Therefore, impacts related to inadequate emergency access would be less than significant.

| XVIII. Utilities and Service Systems<br>*Would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects? | ☐ | ☐ | ☒ | ☐ |
| b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years? | ☐ | ☐ | ☒ | ☐ |
| c. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | ☐ | ☐ | ☒ | ☐ |
| 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? | ☐ | ☐ | ☒ | ☐ |
| e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste? | ☐ | ☐ | ☒ | ☐ |

The discussion below is based in part on the findings contained within the 2277 Vista Grande Drive Water Supply Study prepared by the Vista Irrigation District (2021) and the Vista Grande Development Flow Analysis prepared by Buena Sanitation District (2021) (Attachment J).

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT IMPACT.** The proposed project would develop 28 single-family residential lots. All wet and dry public utilities, facilities, and infrastructure are in place and available to serve the project site without the need for relocated, new, or expanded facilities. While new utility and service connections would need to be extended to and from the project site (e.g., sewer, stormwater runoff, electrical), these new connections would not result in a need to modify the larger off-site infrastructure. As a result, implementation of the proposed project would not require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities. Impacts would be less than significant.

**B. LESS THAN SIGNIFICANT IMPACT.** Development proposed project would increase the demand for potable water to serve the proposed 28 single-family residences. Water service for the project would be provided by the Vista

Irrigation District (VID) from the water main in Vista Grande Drive. The project would connect to two existing water service pipelines and meters on the project site that extend from the existing water main line in Vista Grande Drive. The VID is a member agency of the San Diego County Water Authority (SDCWA). The VID imports approximately 70 percent of its potable water supply from SDCWA, who in turn buys it from the Metropolitan Water District of Southern California (MWD). The remaining 30 percent of the VID's supply is from Lake Henshaw, which is fed through precipitation from the San Luis Rey watershed. A looped public water system is proposed through the project; the water system would make connections to the VID's existing system within Vista Grande Drive along the southern end of the project. Based on a Water Supply Study prepared for the project (Attachment J), the projected average daily demand of potable water for the proposed project would be approximately 18,689 gallons per day (gpd). The Water Supply Study did not identify any existing system deficiencies within the project limits or in the vicinity of the development during a maximum day plus fire flow demand scenario. However, peak-hour pressures are below 40 psi for pipeline/pad elevation above 702 ft. The study recommended the project install privately owned booster pumps with backflows for these areas above 702 ft. Therefore, the VID would be able to adequately serve the project, and impacts would be less than significant.

**C. LESS THAN SIGNIFICANT IMPACT.** A Vista Grande Development Flow Analysis was prepared by City of Vista/Buena Vista Sanitation District in March 2021 (Attachment J) to evaluate whether the proposed project wastewater flow would impact downstream sewer pipeline. Based on the city's Sewer Master Plan 2017 Update (August 2018), the proposed project is anticipated to generate approximately 5,740 gpd of wastewater (205 gpd per 28 Equivalent Dwelling Units (gpd/EDU). A new eight-inch gravity sewer main line would be connected to the existing eight-inch gravity sewer main line in Prince Way and extended through an existing easement up to in Vista Grande Drive and then easterly to the project site. Based on the model, wastewater generation from the proposed project would not exceed the capacity of the existing gravity mains in the flow path downstream of the project site. Therefore, the project's contribution of wastewater would not require new water/wastewater facilities to be built or existing facilities to be expanded; as a result, impacts would be less than significant.

**D. LESS THAN SIGNIFICANT IMPACT.** Development of the proposed 28 single-family residences would result in a negligible increase in domestic municipal solid waste generation. Construction of the project would entail demolition and removal of one single-family residence. As a result, the construction of the proposed residential development and associated improvements would likely generate both green waste (e.g., vegetation) and construction and demolition debris. Once construction of the residential homes begins, it would generate various types of construction debris, including asphalt, metal, and wood. In compliance with AB 939 and the city's Municipal Code, Chapter 13.17, Construction and Demolition Debris Recycling, the city would require the diversion of at least 50 percent of the total construction and demolition debris generated by a project via reuse or recycling via a Waste Management Plan. To comply with this requirement, construction and demolition debris would typically be hauled to a Construction, Demolition, and Inert (CDI) Recycling Facility, such as the Escondido Disposal Corporation's (EDCO) CDI facility in San Marcos. Any remaining debris that is not recyclable would be disposed at a licensed landfill, such as the Sycamore Landfill in San Diego.

Once operational, the project is estimated to generate approximately 280 pounds per day or 3,650 pounds of solid waste per dwelling unit per year (City of Los Angeles 2006). Therefore, the project would generate a total of approximately 51 tons of solid waste per year. As discussed in the Vista General Plan 2030 PEIR (City of Vista 2011), EDCO is the current contracted solid waste hauler for the city and would serve the project. EDCO has several recycling programs, and the company processes over 1,000 tons of recyclables each day within its three material recovery facilities. Once all recyclables are recovered, the remaining solid waste would be taken to the Sycamore Landfill, which has a permitted capacity of 5,000 tons per day (tpd), and a remaining capacity of 113,972,637 cy (CalRecycle 2018). The average daily weight received at the Sycamore Landfill during September 2018 was 3,356 tons. Based on the project's projected daily generation of solid

waste, the Sycamore Landfill can adequately accommodate the anticipated solid waste from the proposed project. Therefore, development of the proposed project would generate solid waste that would be within the capacity of local landfills, resulting in a less than significant impact.

**E. LESS THAN SIGNIFICANT IMPACT.** The city complies with all federal, state, and local statutes and regulations related to solid waste, such as AB 939 and AB 341. EDCO also complies with all applicable federal and state solid waste regulations. The San Diego County Department of Environmental Health issues permits to all solid waste facilities in the county, including the Sycamore Landfill, which undergoes monthly inspections. As solid waste generated by the proposed project would be diverted to material recovery facilities, with the remaining waste hauled to the Sycamore Landfill (or any active, permitted landfill facility in the county), it would comply with existing regulations related to solid waste. Therefore, the project would comply with all applicable federal, state, and local management and reduction statues and regulations regarding solid waste, resulting in a less than significant impact.

| **XIX. Wildfire** *If located in or near state responsibility areas or lands classified as Very High Fire Hazard Severity zones, would the project:* | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| 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 exacerbate fire risk or 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? | ☐ | ☐ | ☒ | ☐ |

The proposed project is located in a State Responsibility Area Moderate Fire Hazard Severity Zone with a small portion along the eastern project site boundary located in a VHFHSZ. Therefore, this IS/MND includes an analysis of the project's wildfire impacts.

**A. LESS THAN SIGNIFICANT IMPACT.** The Vista Fire Protection District has adopted Emergency Evacuation Plans in its Community Wildfire Protection Plan to identify evacuation routes, emergency facilities, and available VFD personnel and equipment to effectively deal with emergency situations.

The proposed project would provide all required emergency access in accordance with the requirements of the VFD. In addition, the project has been designed to meet all applicable development and fire codes, including landscaping and vegetation requirements. Once applications for building permits are submitted, the VFD would review all construction plans for adequate fire suppression, fire access, and emergency evacuation. Therefore, implementation of the proposed project would not impair or physically interfere with an evacuation plan. As a result, impacts would be less than significant.

**B. LESS THAN SIGNIFICANT IMPACT.** As discussed in the Vista General Plan 2030 PEIR (City of Vista 2011), the combination of Southern California's Mediterranean climate (winter and spring rainfall and hot dry summers) and the frequency of high wind velocity from Santa Ana winds (which generally blow east to west) creates optimum conditions for wildfires. Steep terrain also contributes to the rapid spread of wildfires. Slopes affect the behavior of fire because they can change the proximity of separate burns. Many hillside areas within the city have slopes with a gradient greater than 30 percent, resulting in long, winding roads that terminate on the sides and tops of ridges leading to single-family residences.

The proposed project is located in a State Responsibility Area Moderate Fire Hazard Severity Zone with a small portion along the eastern project site boundary located in a VHFHSZ. The project site is surrounded by existing development to the south, east, and west. However, undeveloped lands border the northern part of the project site, specifically proposed Lots 6 through 10.

The VFD serves the Vista Fire Protection District and administers the Weed Abatement Program and Defensible Space requirements for new residential developments in the District, among other duties. The VFD and other city departments are active participants in the MJHMP for San Diego County (County of San Diego 2017), which identifies risks by natural and human-made disasters and ways to minimize the damage from these disasters. The city's portion of the MJHMP (2017) includes goals, objectives, and actions to reduce wildfire hazards within the city. The city is responsible for implementing these goals and actions, which includes such actions as "continue to promote cooperative vegetation management programs that encompass hazard mitigation in the city and unincorporated areas that threaten the city" (County of San Diego 2017).

The project has been designed to meet all applicable development and fire codes, including landscaping and vegetation requirements to inhibit prevailing winds and project slopes from exacerbating wildfires. Once applications for building permits are submitted, the VFD would review all construction plans for adequate fire suppression, fire access, and emergency evacuation. Future homes would be required to comply with the 2019 California Fire Code and CBC which includes minimum standards for ignition-resistant construction, methods, and design in these fire hazard zones. Compliance with the CBC would ensure the minimum standards for construction materials, methods and design are incorporated into the proposed project. In addition, slopes greater than five ft are not planned on the site. Thus, the project would not result in exacerbating wildfire risks, and impacts from wildfire pollution would be less than significant.

**C. LESS THAN SIGNIFICANT IMPACT.** As previously discussed, all proposed project components (including utilities, roadway, buildings, walls, and landscaping) would be located within the boundaries of the project site, and impacts associated with the development of the project are analyzed throughout this document. The project has been designed to meet all applicable development and fire codes, including landscaping and vegetation requirements. As a result, adherence to standard city policies in the installation or maintenance of associated infrastructure would not exacerbate fire risk, and potential impacts would be less than significant.

**D. LESS THAN SIGNIFICANT IMPACT.** Land-disturbing construction activities associated with the project, such as vegetation clearing and grading of project sites, could result in localized alteration of drainage patterns and temporarily increase in erosion and sedimentation in the construction area. Temporary flooding could also result from such activities from temporary alterations of the drainage system (reducing its capacity of carrying

runoff) or from the temporary creation of a sump condition due to grading. Alterations may temporarily result in increased erosion and siltation if flows were substantially increased or routed to facilities or channels without capacity to carry the additional flow. Construction-related activities would be required to comply with the city's Grading Ordinance (Vista Development Code, Chapter 17.56) and the current State General Permit to Discharge Stormwater Associated with Construction Activities, which requires preparation of a SWPPP by a Qualified SWPPP Developer.

Post-construction, the project site would consist of six drainage basins. Stormwater runoff would be conveyed over land and in proposed storm drain to four Modular Wetlands Systems and four proposed underground storage facilities. The proposed LID features designed to reduce stormwater runoff from by promoting infiltration and reducing the peak flow rates. In addition, the project site is not located within a landslide hazard zone. According to the Geotechnical Investigation (Attachment C), evidence of landslides and slope instabilities was not observed on site and slopes greater than five ft are not planned on the site. Therefore, the project would not expose people or structures to significant risk associated with post-fire landslides, mudflows, and flooding.

| XX. Mandatory Finding of Significance | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| 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 a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | ☐ | ☒ | ☐ | ☐ |
| 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 past projects, the effects of other current projects, and the effects of probable future projects)? | ☐ | ☐ | ☒ | ☐ |
| c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ☒ | ☐ | ☐ |

## *DISCUSSION*

**A. LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED.** With the incorporation of mitigation measures, the proposed project would not have the potential to degrade the quality of the environment, reduce the habitat of any sensitive plant or wildlife species, or eliminate important examples of California history or prehistory.

As discussed in Section IV, Biological Resources, in this chapter, based on the analysis in the Biological Report (Attachment D) it was determined that the project would have potentially significant impacts to nesting birds and to CSS and NNG. Construction of the proposed project could result in significant temporary (direct) impacts to active bird nests during the bird breeding season. However, if avoidance of the bird breeding season is not feasible, then Mitigation Measure BIO-1 would be undertaken, which would reduce this potentially significant temporary impact to a biological resource to a less than significant level. Mitigation Measure BR-2 would be implemented to mitigate CSS at a ratio of 1:1 and to mitigate NNG at a 0.5:1. With implementation of Mitigation Measure BIO-2, impacts on sensitive vegetation communities would be mitigated to less than significant levels, Further, implementation of Mitigation Measures BIO-1 and BIO-2 would ensure compliance with the MHCP, and impacts would be reduced to less than significant.

According to the Cultural Reports (Helix 2015a and Attachment B), one archaeological site and one isolate were observed on site during the archaeological survey. Through consultation with the Rincon Band of Luiseño Indians, the archaeological site CA-SDI-21774 was found to meet the criteria for inclusion in the California Register of Historical Resources. Due to the presence of CA-SDI-21774 on site and Native American archaeological and cultural resources in the area, Mitigation Measures CUL-1 through CUL-7 would be implemented, which would include proper procedures for inadvertent discoveries of human remains or archaeological resources, the addition of a Tribal Representatives, retaining a project archaeologist, holding a pre-construction meeting, on-site resource reburial, and a Phase IV Cultural Resources Monitoring Report. Implementation of Mitigation Measures CUL-1 through CUL-7 would reduce impacts to unknown archaeological resources, Tribal Cultural Resources, and human remains to a less than significant level.

**B. LESS THAN SIGNIFICANT IMPACT.** Implementation of the proposed project would not result in individually limited or cumulatively considerable significant impacts. All resource topics associated with the project have been analyzed in accordance with CEQA and the CEQA Guidelines and were found to pose no impacts, less than significant impacts, or less than significant impacts with mitigation. In addition, taken in sum with other projects in the area, the scale of the proposed project is small, and impacts to any environmental resource or issue areas would not be cumulatively considerable. Therefore, impacts would be less than significant.

**C. LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED.** There are several potentially hazardous conditions associated with the project site. Firstly, there is a residence currently on site that would need to be removed prior to building the proposed project. According to available records, the home was apparently constructed in 1953, and the use of asbestos-containing materials and lead paint (which were used at that time) is unknown. The presence and demolition of these housing materials would be considered a significant impact. However, with the implementation of Mitigation Measure HAZ-1, which requires a survey to remove any potential asbestos-containing materials, this potentially significant impact would be reduced to a less than significant level. In addition, blasting may be required at the site during initial grading activity. Blasting operations would be conducted through the use of drilling and blasting to fracture rocks. Blasting operations would be conducted by a licensed blasting contractor, in strict compliance with pertinent federal, state, and local requirements. Because project-specific details regarding blasting operations are not available at this time, impacts to off-site residences are conservatively assessed as significant. Mitigation Measure NOI-1 would be implemented to employ a blasting program, which would ensure that potential impacts are reduced to a less than significant level.

All resource topics associated with the proposed project have been analyzed in accordance with CEQA and the CEQA Guidelines and were found to pose no impacts, less than significant impacts, or less than significant impacts with mitigation. Consequently, with mitigation, the proposed project would not result in any environmental effects that would cause substantial adverse effects on human beings directly or indirectly.

# Chapter 4 References and List of Preparers

## References

Section 15150 of the CEQA Guidelines permits an environmental document to incorporate by reference other documents that provide relevant data. The documents listed below are hereby incorporated by reference. The pertinent material is summarized throughout this IS/ND where that information is relevant to the analysis of impacts of the project.

CAL FIRE (California Department of Forestry and Fire Protection). 2021. California Fire Hazard Severity Zone Viewer.

California Department of Conservation. 2019. "SMARA Mineral Land Classification." Division of Mines and Geology. Accessed September 2021. https://www.conservation.ca.gov/cgs/minerals/mineral-land-classification-smara#maps-and-reports.

California Department of Conservation. 2008. San Diego County Williamson Act Lands Map.

California Department of Conservation. 2020. San Diego County Important Farmland Map. Accessed September 2021. https://maps.conservation.ca.gov/DLRP/CIFF/.

CalRecycle. 2018. Sycamore Landfill SWIS Facility/Site Activity Details. Accessed September 2021. https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1798?siteID=2871.

Caltrans (California Department of Transportation). 2019. Scenic Highways System List Excel Spreadsheet. Accessed September 2021. https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways.

Caltrans. 2020. Transportation and Construction Vibration Guidance Manual. April.

City of Los Angeles. 2006. LA CEQA Thresholds Guidelines. Accessed September 2021. https://planning.lacity.org/eir/CrossroadsHwd/deir/files/references/A07.pdf.

City of Vista. 2011. General Plan 2030 Program Environmental Impact Report. December. Accessed September 2021. https://www.cityofvista.com/city-services/city-departments/community-development/building-planning-permits-applications/vista-general-plan-2030.

City of Vista. 2012. Vista General Plan 2030. Adopted February 28. Accessed September 2021. https://www.cityofvista.com/city-services/city-departments/community-development/building-planning-permits-applications/vista-general-plan-2030.

City of Vista. 2015. Stormwater Standards Manual.

City of Vista. 2016. BMP Design Manual.

County of San Diego. 2017. Multi-Jurisdictional Hazard Mitigation Plan.

County of San Diego. 2021. Zoning and Property Information Tool.

EnviroStor. 2021. EnviroStor Database.

Helix (Helix Environmental). 2015a. Cultural Report.

Helix. 2015b. Vista Grande Project Acoustical Site Assessment.

San Diego County Airport Land Use Commission. 2010. Airport Land Use Compatibility Plan for Oceanside Municipal Airport. January.

SANDAG (San Diego Association of Governments). 2003. Multiple Habitat Conservation Program.

SDAPCD (San Diego Air Pollution Control District). 2021. "Attainment Status." Accessed September 2021. http://www.sdapcd.org/content/sdc/apcd/en/air-quality-planning/attainment-status.html.

SRA. 2015. Air Quality Assessment for the Vista Grande Tentative Subdivision Map Project.

U.S. Census Bureau. 2019. Quick Facts City of Vista. Accessed September 2021. https://www.census.gov/quickfacts/vistacitycalifornia.

## Individuals and Organizations Consulted

City of Vista

- John Conley, AICP, Director of Community Development

Gregory Perrine

- Gregory Perrine, Chief Executive Officer

## Preparers

Harris & Associates

- Diane Sandman, AICP, Senior Director
- Esther Daigneault, Senior Environmental Analyst
- Kelsey Hawkins, Environmental Analyst
- Lindsey Messner, Technical Editor
- Randy Deodat, GIS Analyst

# Attachment A – Figures

This page left intentionally blank.

Source: ESRI 2020.

Harris & Associates

N

0 5 10

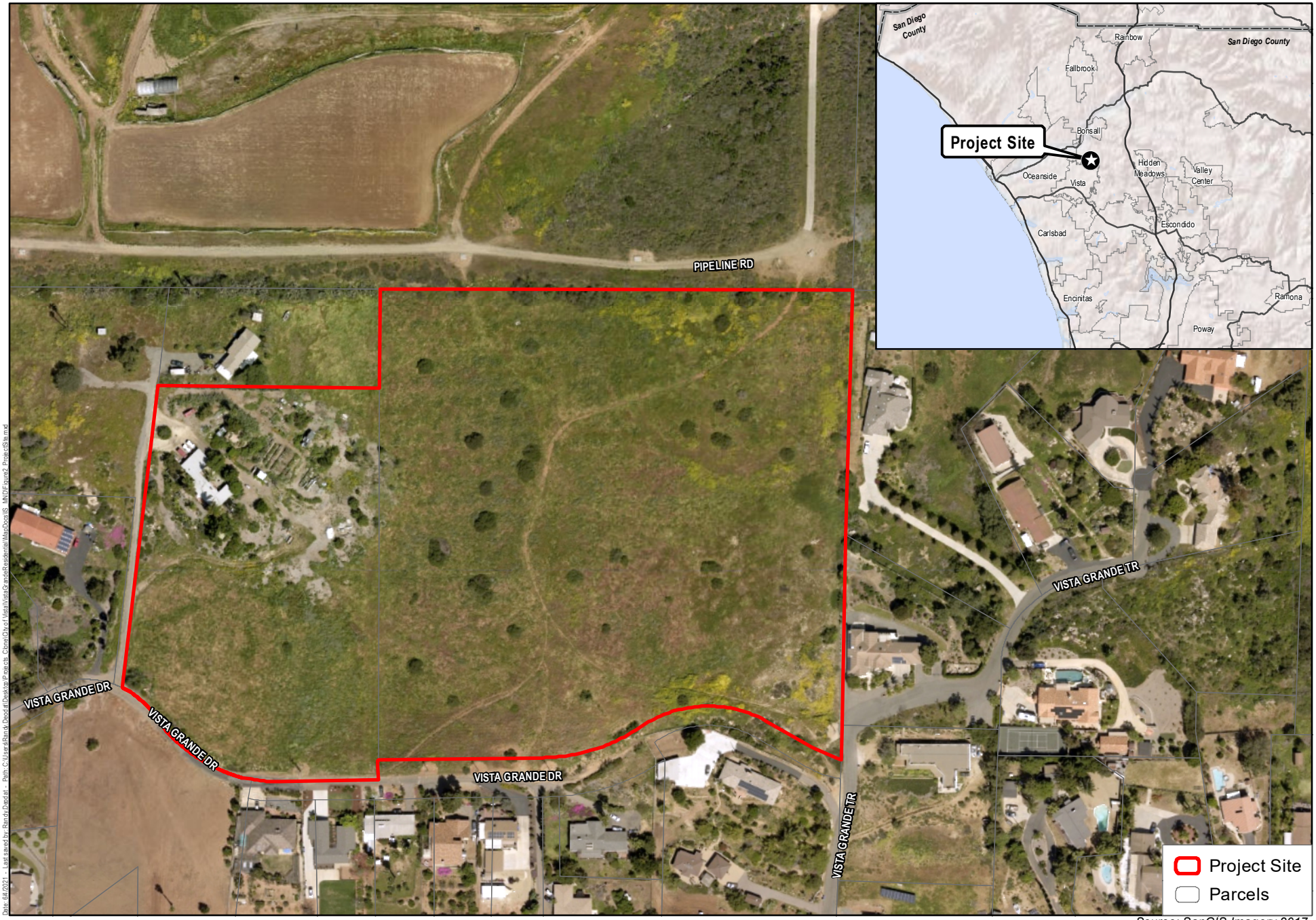
Miles

**Figure 1**

Regional Location

Vista Grande Residential

This page left intentionally blank.




Source: SanGIS Imagery 2017.

Harris & Associates

N

0 100 200

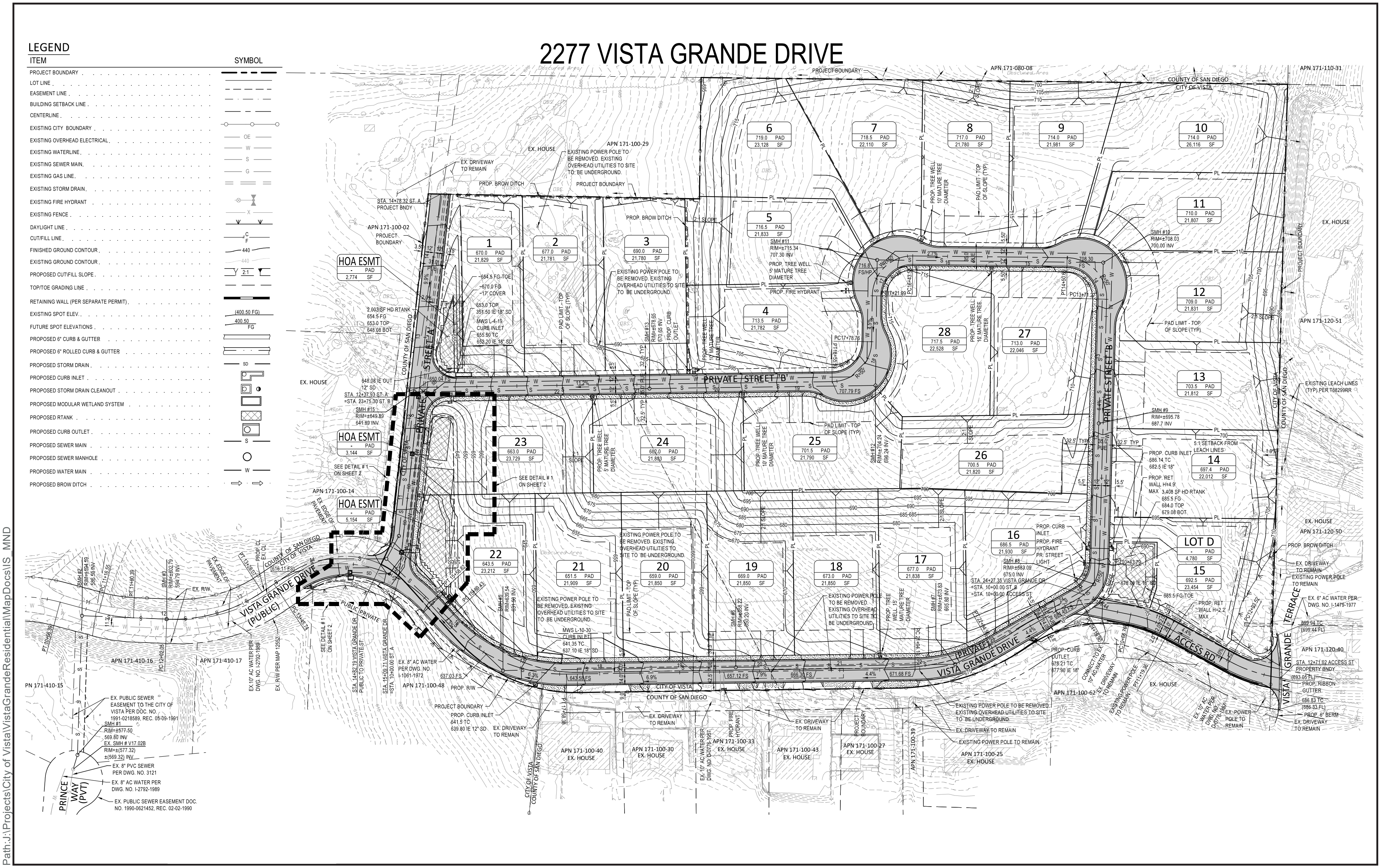
Feet

**Figure 2**

Project Site

Vista Grande Residential

This page left intentionally blank.




Source: Pasco Laret Suiter & Associates 2021.

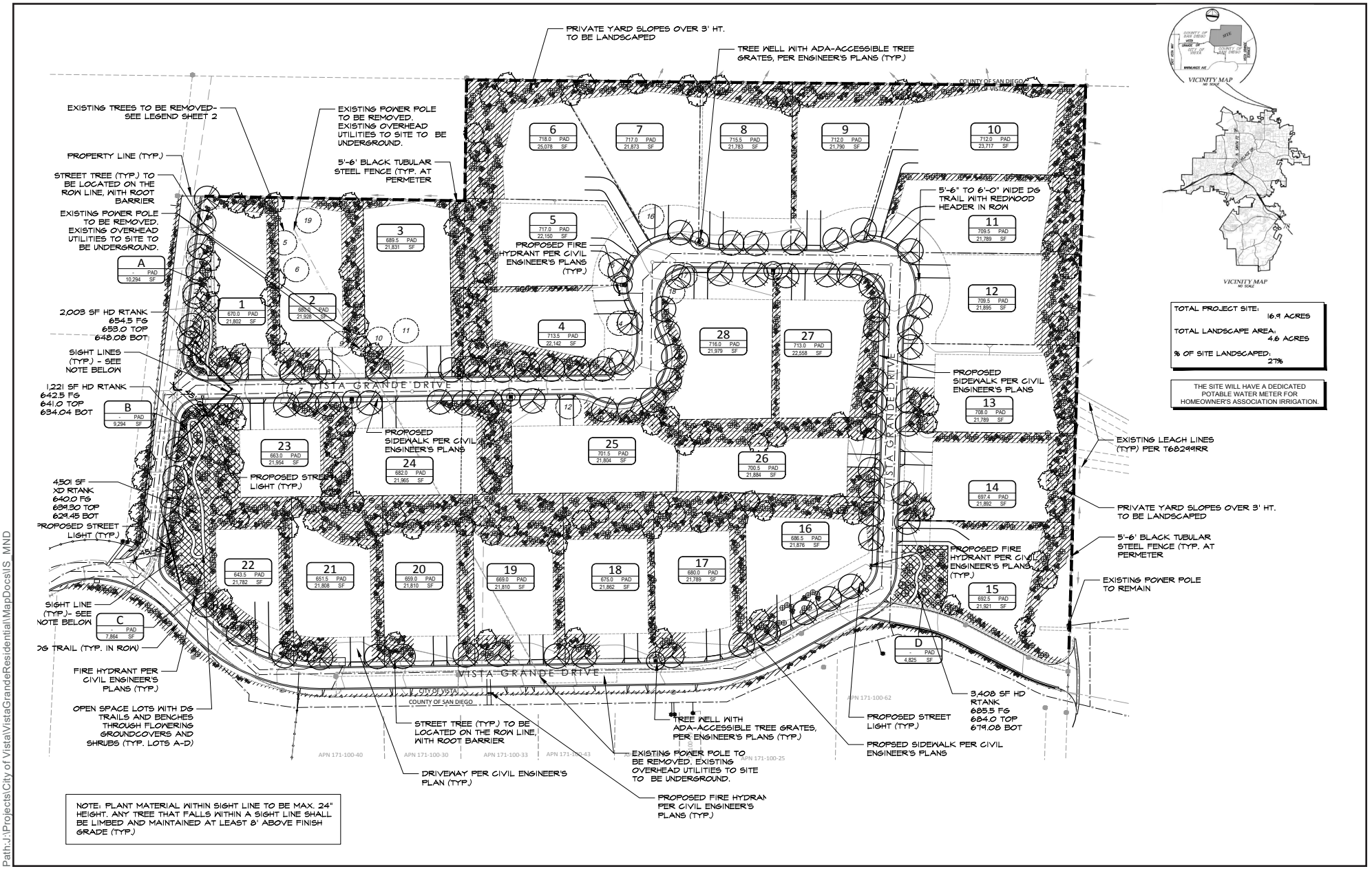
Harris & Associates

# Figure 3
## Site Plan

Vista Grande Residential

Path:J:\Projects\City of Vista\VistaGrandeResidential\MapDocs\IS_MND

This page left intentionally blank.




Path:J:\Projects\City of Vista\VistaGrandeResidential\MapDocs\IS_MND

*Source: Howard Associates Landscape Architecture 2021.*

Harris & Associates

N

0 75 150

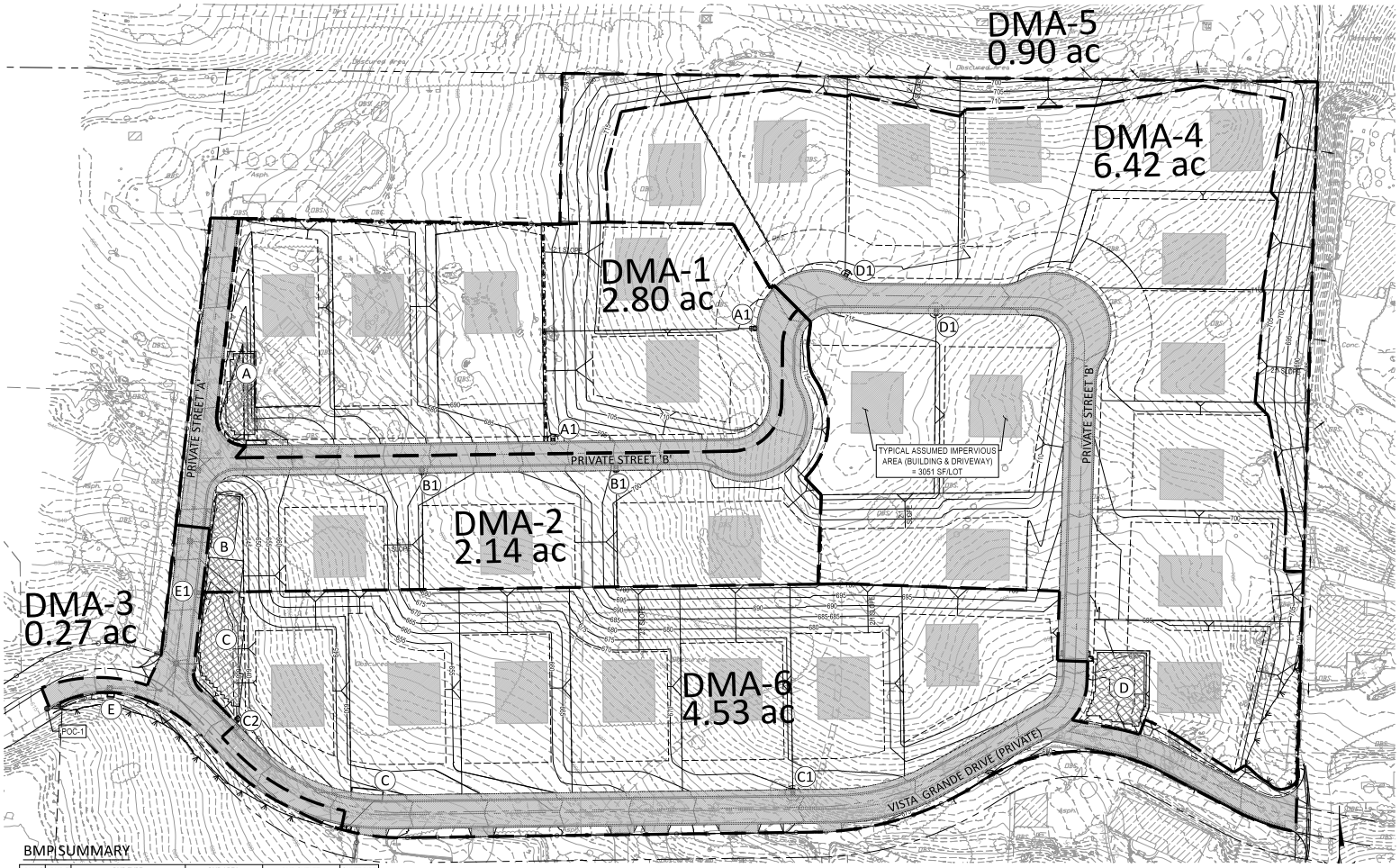
Feet

# Figure 4

## Conceptual Landscape Plan

Vista Grande Residential

This page left intentionally blank.




## BMP SUMMARY

| DMA # | BMP # | BMP TYPE | BMP AREA | BMP OUTLET | OULET PIPE |
|---|---|---|---|---|---|
| 1 | A | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT A | MWS L-4-19 / 2,000 SF, 5' HIGH R-TANK | 1.2-INCH ORIFICE / 6-FT WIDE WEIR @ 4.5-FT HIGH | 12" |
| | A1 | TREE WELL | 5 FT TREE AND 10 FT TREE | -- | -- |
| 2 | B | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT B | MWS L-4-19 / 1,200 SF, 7' HIGH R-TANK | 1.0-INCH ORIFICE / 8-FT WIDE WEIR @ 6.5-FT HIGH | 12" |
| | B1 | TREE WELL | 5 FT TREE AND 10 FT TREE | -- | -- |
| 3 | E | MODULAR WETLAND SYSTEM INLET | MWS L-4-6 | N/A | 12" |
| | E1 | TREE WELL | 10 FT TREE | -- | -- |
| 4 | D | DETENTION VAULT D | 3,400 SF, 5' HIGH R-TANK | 1.5-INCH ORIFICE / 12-FT WIDE WEIR @ 4.5-FT HIGH | 18" |
| | D1 | TREE WELL | 10 FT TREE AND 15 FT TREE | -- | -- |
| 5 | -- | SELF MITIGATING AREA | -- | -- | -- |
| 6 | C | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT C | MWS L-10-30 / 5,000 SF, 10' HIGH R-TANK | 1.9-INCH ORIFICE / 18-FT WIDE WEIR @ 9.5-FT HIGH | 18" |
| | C1 | TREE WELL | 15 FT TREE | -- | -- |
| | C2 | MODULAR WETLAND SYSTEM INLET | MWS L-4-4 | N/A | 12" |

## LEGEND

MAJOR BASIN BOUNDARY

HMP POINT OF COMPLIANCE — POC 1

IMPERVIOUS AREA 4.25 AC (184,989 SF)

PERVIOUS AREA 12.82 AC (558,506 SF)

**ASSUMED IMPERVIOUS AREA PER LOT 3,051 SF (BLDG + DWY)

## GENERAL INFORMATION

THE PROPOSED PROJECT IS LOCATED WITHIN THE SAN LUIS REY UNIT (HU) – LOWER SAN LUIS REY – MISSION, 903.11. STORM WATER THAT DISCHARGES THE PROJECT SITE ALONG THE EASTERN AND NORTHERN BORDERS FLOWS NORTHERLY TO THE SAN LUIS REY RIVER (LOWER) WHICH FLOWS WESTERLY. STORM WATER THAT DISCHARGES THE PROJECT SITE ALONG THE SOUTHERN AND SOUTHWESTERN BORDERS FLOWS WESTERLY TO GUAJOME LAKE WHICH FLOWS TO THE SAN LUIS REY RIVER (LOWER) WHICH FLOWS WESTERLY AND ULTIMATELY DISCHARGES TO THE PACIFIC OCEAN.

POLUTTANTS OF CONCERN - EUTROPHIC, BENTHIC COMMUNITY EFFECTS, BIFENTHRIN, CHLORIDE, NITROGEN, PHOSPHORUS, TOTAL DISSOLVED SOLIDS, TOXICITY AND INDICATOR BACTERIA

## LID SITE DESIGN BMP'S

1. MODULAR WETLAND SYSTEMS
2. DENTENTION VAULTS
3. ROOF DRAIN TO LANDSCAPING
4. MINIMIZE IMPERVIOUS SURFACES
5. PROTECT SLOPES AND CHANNELS
6. TREE WELLS

## SOURCE CONTROL BMP'S

1. STORM DRAIN STENCILING
2. EMPLOY INTEGRATED PEST MANAGEMENT PRACTICES
3. EMPLOY EFFICIENT IRRIGATION AND DROUGHT TOLERANT LANDSCAPE DESIGN

## SOIL INFORMATION

HYDROLOGIC SOIL GROUP: TYPE C

## GROUND WATER INFORMATION

GROUND WATER WAS NOT ENCOUNTERED AT THE SITE. SEE REPORT PREPARED BY: GEOSOILS, INC. DATED: W.O. 5053-A1-SC FEBRUARY 23, 2006

## COARSE SEDIMENT YIELD

REFER TO ATTACHEMENT 2B OF THIS REPORT FOR CRITICAL COARSE SEDIMENT YIELD AREAS WITHIN THIS PROJECT SITE.

## BMP NOTES

1. THESE BMPS AREA MANDATORY TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS OR THERE PLANS.
2. NO CHANGES TO THE PROPOSED BMPS ON THIS SHEET WITHOUT PRIOR APPROVAL FORM THE CITY ENGINEERING DEPARTMENT
3. NO SUBSTITUTIONS TO THE MATERIAL TYPES OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE LAND DEVELOPMENT ENGINEER
4. NO OCCUPANCY WILL BE GRANTED UNTIL THE CITY INSPECTOR STAFF HAS INSPECTED THIS PROJECT FOR APPROPRIATE BMP CONSTRUCTION AND INSTALLATION.

## WATER QUALITY TECHNICAL REPOT

TITLE - PRIORITY DEVELOPMENT PROJECT STORM WATER QUALITY MANAGEMENT REPORT FOR 2277 VISTA GRANDE DRIVE
DATE - MARCH 2021
PREPARED BY - PASCO LARET SUITER & ASSOCIATES

## MAINTENANCE AGREEMENT DOCUMENT

TITLE -
DATE -
PREPARED BY -

## OPERATIONS AND MAINTENANCE PLAN

TITLE - STORM WATER OPERATIONS & MAINTENANCE PLAN FOR 2277 VISTA GRANDE DRIVE
DATE - MARCH 2021
PREPARED BY - PASCO LARET SUITER & ASSOCIATES

## RESPONSIBLE PARTY INFORMATION

GREG PERRINE

1151 DURYEA AVENUE

IRVINE, CA 92614

Path:J:\Projects\City of Vista\VistaGrandeResidential\MapDocs\IS_MND

*Source: Howard Associates Landscape Architecture 2021.*

Harris & Associates

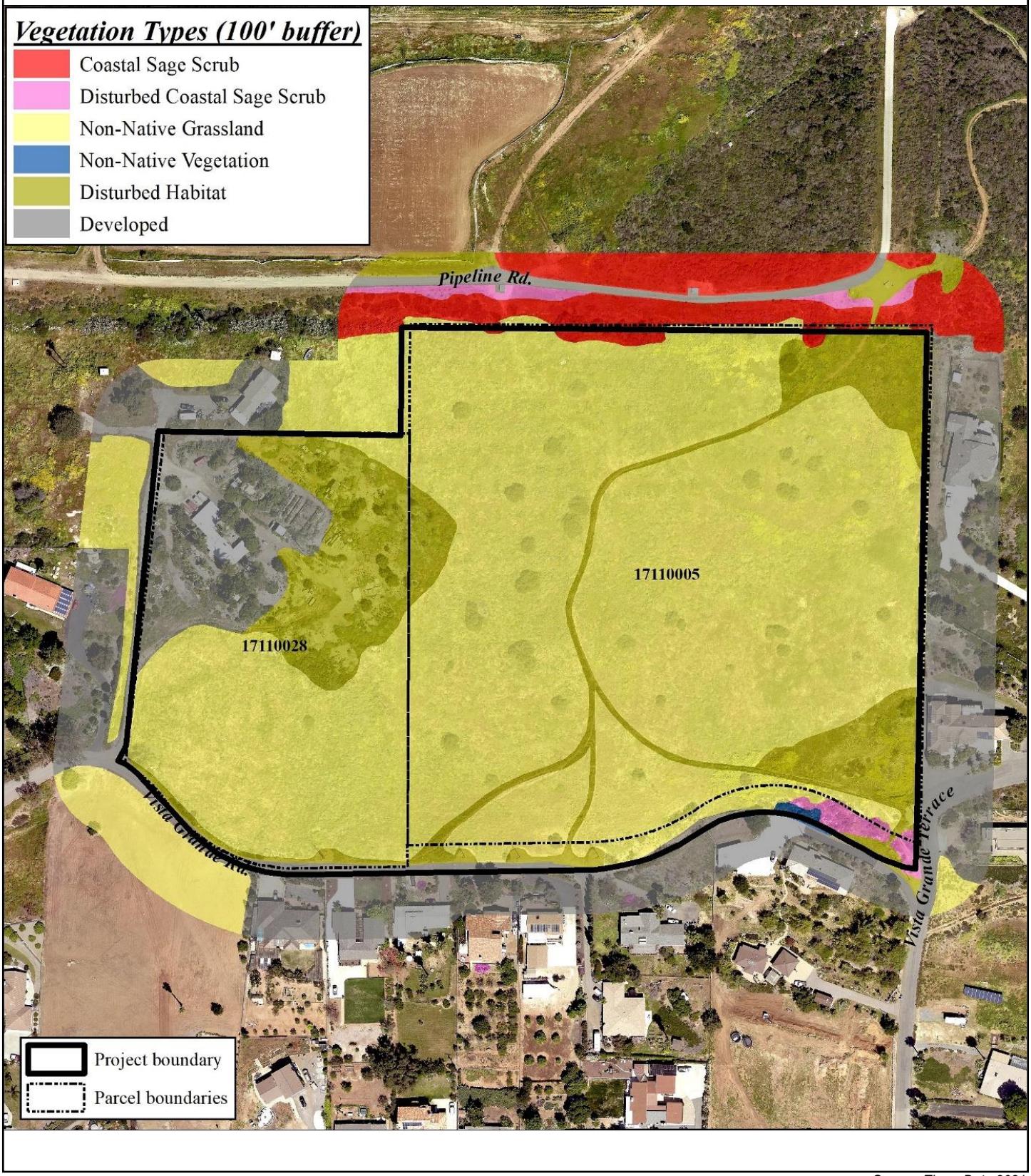
N

**Figure 5**

Drainage Plan

Vista Grande Residential

This page left intentionally blank.




Path: C:\Users\Randy.Deodat\Desktop\Projects_Clone\City of Corona\Corona_Recycled_Water\Map Docs\NOP

*Source: Tierra Data 2021.*

Harris & Associates

N

0 100 200

Feet

**Figure 6**

Biological Resources

Vista Grande Residential

This page left intentionally blank.

# Attachment B – Cultural Resources Report and Addendum to the Cultural Resources Survey and Assessment

This page left intentionally blank.

**HELIX Environmental Planning, Inc.**
7578 El Cajon Boulevard
La Mesa, CA 91942
619.462.1515 tel
619.462.0552 fax
www.helixepi.com

January 29, 2021 GPE-01

Greg Perrine
1151 Duryea Avenue
Irvine, CA 92614

**Subject: Vista Grande Project Cultural Resources Study Update**

Dear Mr. Perrine:

HELIX Environmental Planning, Inc. (HELIX) was contracted to conduct an updated cultural resources study for the Vista Grande Project (project), located in the City of Vista (City), in northwestern San Diego County. HELIX obtained a records search update from the South Coastal Information Center (SCIC) to supplement the cultural resources study conducted for the project site in 2015. This letter report details the methods and results of the cultural resources study update. In summary, of the three cultural resources identified within the project area, none is a historical resource/significant cultural resource. However, due to the presence of Native American archaeological/cultural resources within the project, a grading monitoring program should be implemented during construction. The conclusions and recommendations of the previous report remain valid for currently proposed project.

## PROJECT DESCRIPTION AND LOCATION

The Vista Grande subdivision project (project) area is located in the northern portion of the City of Vista, in northwestern San Diego County (Figure 1, *Regional Location Map)*. The property is a short distance south of the San Luis Rey River and State Route 76 (SR 76), southwest of Gopher Canyon and east of Rancho Guajome (Figure 2, *Project Location – USGS*). The property is north of SR 78 and just east of East Vista Way, at the northeastern terminus of Vista Grande Drive (Figure 3, *Project Location – Aerial*). The project area is in Township 11 South, Range 3 West, Section 8, on the U.S. Geological Survey (USGS) 7.5-minute San Marcos quadrangle (Figure 2). The approximately 17-acre project area is made up of two parcels: Assessor Parcel Numbers (APNs) 171 100 0500 (east) and 171 100 2800 (west).

As originally designed, the project proposed the development of the 16.9-acre property into 14 single-family lots. The project has since been redesigned to increase site density to 28 single-family lots.

## PREVIOUS RESEARCH

In 2015, HELIX was contracted by the City to conduct a cultural resources study as part of the proposed Vista Grande Subdivision Project – the report for the study is on file at the SCIC and is summarized here. HELIX conducted a records search and Sacred Lands File search, an archaeological survey, an

archaeological testing program, and evaluated a house within the project area that is older than 50 years (Robbins-Wade et al. 2016).

The 2015 records search indicated that two archaeological sites and five historic structures had been recorded within one mile of the Vista Grande subdivision project area, none of them within the project area.

HELIX conducted a field survey of the project area in October 2015, along with a Luiseño tribal cultural monitor from Saving Sacred Sites (San Luis Rey Band of Mission Indians). A prehistoric archaeological site (CA-SDI-21774) and an isolated artifact (P-37-035276) were identified during survey. No artifacts were collected at the time of the survey. The site and isolate were mapped on an aerial photograph. Archaeological testing of CA-SDI-21774 conducted by HELIX in December 2015 included surface collection of artifacts and the excavation of 16 shovel test pits. CA-SDI-21774 yielded a limited amount and variety of cultural material, and no subsurface artifacts were recovered. The site does not meet the criteria for a historical resource under the California Environmental Quality Act (CEQA), thus it was determined that impacts to it would not constitute significant effects. The isolate also is not a historical resource under CEQA, due to its very limited research potential. Because of this, HELIX determined that no significant impacts to cultural resources were anticipated but recommended a cultural resources monitoring program due to the possibility of subsurface cultural resources (Robbins-Wade et al. 2016).

The house located at 2277 Vista Grande Drive was identified as being more than 50 years of age after review of historic aerial photographs of the property during the 2015 study; HELIX evaluated the residence to assess its potential historic and architectural significance. The house does not meet the significance criteria in that it is a very plain and unassuming example of its architectural style and is one of tens of thousands of buildings that represent the post-World War II building boom in Southern California. It is not associated with the pioneering phase of Vista and lacks the historical associations or architectural distinction to qualify for listing on the California Register of Historical Resources (CRHR). Therefore, impacts to the house would not constitute significant effects.

## METHODS OF CURRENT STUDY

HELIX obtained an updated records search of the project area and immediate vicinity (quarter-mile radius) from the SCIC on January 22, 2021 and reviewed the previous HELIX report.

## RESULTS

The records search showed the only cultural resources recorded within the quarter-mile search radius since the 2015 records search were those recorded and evaluated by HELIX for the project in 2015 (Robbins-Wade et al. 2016). Likewise, no reports have been filed for the search radius since the 2016 HELIX report.

## CONCLUSIONS AND RECOMMENDATIONS

One Native American archaeological site (CA-SDI-21774), one isolate (P-37-035276), and one historic house (that is, a house over 50 years old) are present within the project area. The site was tested and found not to meet the criteria for a historical resource under CEQA, thus impacts to it would not constitute significant effects. The isolate also is not a historical resource under CEQA, due to its very limited research

potential. The house at 2277 Vista Grande Drive also does not meet the significance criteria for the CRHR. Therefore, impacts to the house would not constitute significant effects.

The 2016 HELIX cultural resources report stated that, while no significant historic or archaeological resources have been identified within the project area, "due to the presence of Native American archaeological/cultural resources, a grading monitoring program should be implemented for the project" (Robbins-Wade et al. 2016). At the time, HELIX recommended that a cultural resources monitoring program should be required – the results of the current records search update concur with this conclusion. Therefore, the conclusions and recommendations of the 2016 report remain valid for the project as currently proposed.

If you have any questions, please contact Mary Robbins-Wade at maryrw@helixepi.com or at (619) 462 1515 extension 276.

Catherine A. Wright
Cultural Resources Specialist

Mary Robbins-Wade, M.A., RPA
Cultural Resources Group Manager

**Attachments:**

Figure 1: Regional Location Map
Figure 2: Project Location - USGS
Figure 3: Project Location - Aerial

## REFERENCES

Robbins-Wade, Mary, Kristina Davison, and Nicole Falvey

2016 *Cultural Resources Survey and Assessment, Vista Grande Subdivision, Vista, San Diego County, California.* Report prepared for and submitted to the City of Vista Community Development Department. Report on file at South Coastal Information Center, San Diego State University.

I:\PROJECTS\CCOV\COV-05.04 VistaGrande\Map\Cultural\Fig1 Regional.mxd COV-05.04 10/07/15 -EV

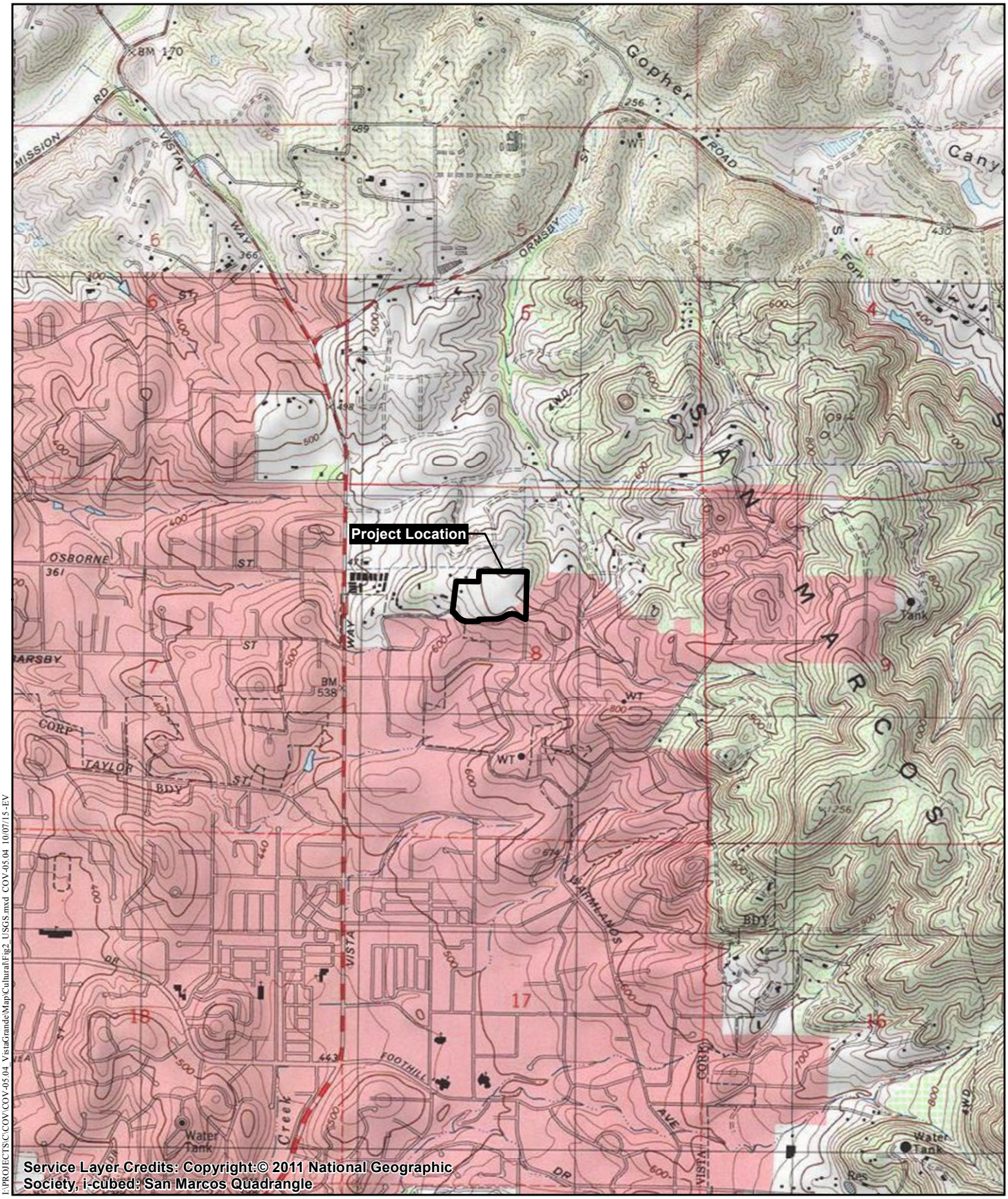
# Regional Location Map

VISTA GRANDE PROJECT

HELIX Environmental Planning

N 0 8 Miles

Figure 1




I:\PROJECTS\CCOV\COV-05.04_VistaGrande\Map\CulturalFig2_USGS.mxd COV-05.04 10/07/15 -EV

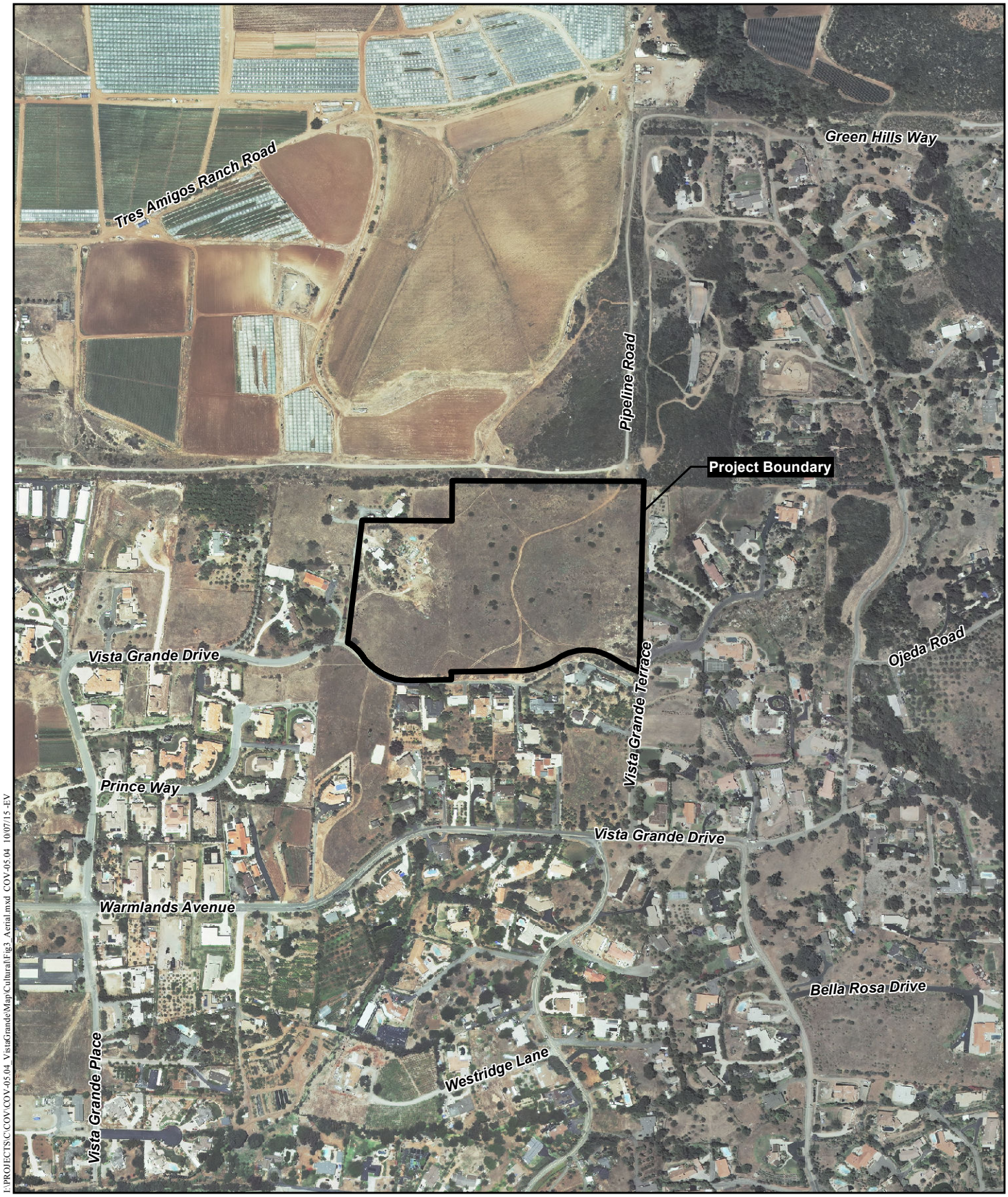
# Project Location - USGS

VISTA GRANDE PROJECT

HELIX Environmental Planning

N 0 2,000 Feet

Figure 2




L:\PROJECTS\CCOV\COV-05.04_VistaGrande\Map\Cultural\Fig3_Aerial.mxd COV-05.04 10/07/15 -EV

# Project Location - Aerial

VISTA GRANDE PROJECT

HELIX Environmental Planning

N 0 500 Feet

Figure 3

# Vista Grande Subdivision

## Addendum to
## Cultural Resources Survey and Assessment

*Submitted to:*
**City of Vista**
**Community Development Department**
200 Civic Center Drive
Vista, California 92084-6275

*Prepared for:*

**Greg Perrine**
1151 Duryea Avenue
Irvine, CA 92614

*Prepared by:*

**HELIX Environmental Planning, Inc.**
7578 El Cajon Boulevard
La Mesa, CA 91942

September 2021 | 04911.00001.001

# 1.0 INTRODUCTION/BACKGROUND

HELIX Environmental Planning, Inc. (HELIX) conducted a cultural resources study in 2015 as part of the proposed Vista Grande Subdivision Project (Robbins-Wade, et al. 2016). That study, which is addressed in more detail below, was performed under an as-needed contract for cultural resources consulting services with the City of Vista (City) Community Development Department. The study identified a previously unrecorded archaeological/cultural resource site, CA-SDI-21774 (P-37-035275); one isolate consisting of a retouched/utilized obsidian flake, P-37-035276; and one single-family residence over 50 years in age, all of which were assessed for the project. The 2016 report is on file at the South Coastal Information Center (SCIC).

In January 2021, HELIX conducted an update to the earlier study, obtaining an updated records search from SCIC. This updated information did not result in any changes to the conclusions of the 2016 study. However, in response to Government-to-Government consultation between the City and the Rincon Band of Luiseño Indians, conclusions regarding the significance of CA-SDI-21774 have been revised, as addressed in this addendum.

# 2.0 2016 STUDY

HELIX conducted a cultural resources study for the proposed project in 2015. A record search was conducted at SCIC for the project area and a one-mile radius around it. Historic maps and aerial photographs were also reviewed, and HELIX contacted the Native American Heritage Commission (NAHC) for a search of its Sacred Lands File. The field survey for cultural resources was conducted in October 2015 by a HELIX archaeologist and a Luiseño Native American monitor from Saving Sacred Sites. Upon encountering the archaeological site (CA-SDI-21774), the surrounding area was intensively surveyed until a site boundary could be determined for the surface artifact scatter.

An archaeological testing program was conducted in December 2015 to ascertain the site boundaries and depth of cultural material, as well as to assess site significance. Archaeological testing of site CA-SDI-21774 included surface collection of artifacts and excavation of 16 shovel test pits (STPs) to determine the horizontal and vertical extent of the site. The testing program yielded no subsurface artifacts. The surface collection totaled 54 items, including one mano, one biface preform, 10 flaked stone tools, 10 cores, 24 pieces of debitage, and four crystals and four manuports (chunks of obsidian and tourmaline). Lithic materials included obsidian, quartz, and fine-grained metavolcanic for the flaked stone artifacts; the mano is of granitic rock.

Site CA-SDI-21774 yielded a limited amount and variety of cultural material, and no subsurface artifacts were recovered. The report noted that the amount of obsidian at the site is unusual for a site so far from an obsidian source, but collection of the artifacts and documentation of the site were noted as fulfilling much of the research potential of the resource. The report concluded that the site does not meet the criteria for a historical resource/significant resource under the California Environmental Quality Act (CEQA); thus, impacts to it would not constitute significant effects. The isolate also is not a historical resource under CEQA, due to its very limited research potential, and the historic-age residential property was assessed as not a significant resource.

The 2016 report noted that all Native American archaeological resources are of significance to the Luiseño people, but no Traditional Cultural Resources (TCRs) were identified within or in the immediate vicinity of the project area.

# 3.0 2021 STUDY UPDATE

In January 2021, HELIX conducted an updated records search at SCIC for the project site and a quarter-mile radius. The records search showed the only cultural resources recorded within the quarter-mile search radius since the 2015 records search were those recorded and evaluated by HELIX for the project in 2015 (Robbins-Wade et al. 2016). Likewise, no reports have been filed for the search radius since the 2016 HELIX report.

# 4.0 TRIBAL CONSULTATION

California Native American Tribes traditionally and culturally affiliated with the project site requested consultation pursuant to the California Public Resources Code, Section 21080.3.1. City staff conducted notification and consultation with these Tribes per the requirements of the California Public Resources Code, Section 21080.3.2. On June 10, 2021, a tribal notification letter per Senate Bill 18 was sent out to the San Luis Rey Band of Mission Indians and the Rincon Band of Luiseño Indians. The City met with a representative of the San Luis Rey Band of Mission Indians on August 12th and September 16th, 2021, and with representatives of the Rincon Band of Luiseño Indians on August 16th, August 27th, September 16th, and September 21st, 2021. The Rincon Band of Luiseño Indians also submitted written comments and additional information in correspondence dated August 20th and September 8th, 2021. Written correspondence has not yet been received from the San Luis Rey Band of Mission Indians, as of September 27th, 2021.

## 4.1 CONSULTATION WITH THE RINCON BAND OF LUISEÑO INDIANS

Pursuant to California Public Resources Code, Section 21080.3.1, the City initiated consultation with the Rincon Band of Luiseño Indians, who provided information that resulted in the reassessment of CA-SDI-21774. The site has been determined to meet the criteria for inclusion in the California Register of Historical Resources and thus is a significant resource/historical resource as defined in CEQA, as detailed below.

Site CA-SDI-21774 has yielded a limited amount and variety of cultural material through archaeological analysis, and no subsurface artifacts were recovered. The amount of obsidian identified at the site, however, is unusual for a site so far from an obsidian source. This fact, as well as the presence of quartz material, suggests CA-SDI-21774 may be a nodal part—and contribute to the historical and traditional cultural importance—of a complex Luiseño path and trail system connected to the manufacture, trade, travel, and habitation meeting place of *Tómqav* approximately 12 miles to the northeast. *Tómqav* is recorded as an archaeological site but also refers to a much broader indeterminable geographical zone of historical and traditional religious and cultural significance for Rincon Luiseños. The Rincon Band of Luiseño Indians will be conducting a Tribally informed and directed concurrent compliance study documenting this ongoing importance, as well as how CA-SDI-21774 potentially connects to other places (such as *Waxámay* immediately to its west) in the Rincon Luiseño ancestral traditional use area and traditional cultural landscape. As there currently exists a wealth of information potential concerning the site and its probable connections to the larger project area, including without limitation *Tómqav* and the

broader Luiseño ancestral landscape, documenting that connectivity will require additional efforts using Western disciplinary investigations and analyses informed and guided by the Luiseño System of Traditional Knowledge. Through consultation with the Rincon Band of Luiseño Indians there is sufficient information to conclude that the site meets the criteria for a historic resource/significant tribal cultural resource as defined in California Public Resources Code Section 21074. However, outside of the already known and identified impacts, all of which do not rise to the level of a substantial adverse change under either California Public Resources Code Sections 21084.1 or 21084.2, and as was confirmed in the Government-to-Government consultation process between the Rincon Band of Luiseño Indians and officials from the City of Vista, approval and construction of the project does not trigger a finding of a significant effect on a known historic or tribal cultural resource. The Rincon Band of Luiseño Indians does not anticipate that the concurrent compliance study, as outlined herein, will identify any substantial adverse change, under either California Public Resources Code Sections 21084.1 or 21084.2, in the status of any historic resource/significant tribal cultural resource that would result from approval and construction of the project.

# 5.0 CONCLUSION

Government-to-Government consultation between the City and the Rincon Band of Luiseño Indians has prompted the reassessment of CA-SDI-21774 and the conclusion that this site meets the criteria for inclusion in the California Register of Historical Resources and thus is a significant resource/historical resource as defined in CEQA. However, effects from project development would not rise to the level of a substantial adverse change to the significance of the resource. Therefore, with the implementation of the concurrent compliance study, the project would not create a significant effect to cultural resources.

Monitoring requirements and mitigation measures to be implemented in the event of an inadvertent discovery of cultural resources during monitoring are detailed in the Initial Study/Mitigated Negative Declaration for the project.

# 6.0 REFERENCES

Robbins-Wade, Mary, Kristina Davison, and Nicole Falvey

2016 *Cultural Resources Survey and Assessment, Vista Grande Subdivision, Vista, San Diego County, California.* Report prepared for and submitted to the City of Vista Community Development Department. Report on file at South Coastal Information Center, San Diego State University.

# Attachment C – Geotechnical Investigation

This page left intentionally blank.

# UPDATE GEOTECHNICAL INVESTIGATION AND STORM WATER INFILTRATION EVALUATION REPORT, 2277 VISTA GRANDE DRIVE, 28-LOT SUBDIVISION VISTA, SAN DIEGO COUNTY, CALIFORNIA APNS 171-100-05 AND 171-100-28

FOR

GREG PERRINE
1151 DURYEA AVENUE
IRVINE, CALIFORNIA 92614

W.O. 8053-A-SC MARCH 19, 2021

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

5741 Palmer Way • Carlsbad, California 92010 • (760) 438-3155 • FAX (760) 931-0915 • www.geosoilsinc.com

March 19, 2021

W.O. 8053-A-SC

**Mr. Greg Perrine**
1151 Dureya Ave
Irvine, California 92614

Subject: Update Geotechnical Investigation and Rippability Assessment, Proposed 28-Lot Subdivision, 2277 Vista Grande Drive, Vista, San Diego County, California, APNs 171-100-05 and 171-100-28,

Dear Mr. Perrine:

In accordance with your request and authorization, GeoSoils, Inc. (GSI) has prepared the following update of our previous geotechnical work (GSI, 2006), with respect to the governing 2019 edition of the California Building Code ([CBC], California Building Standards Commission [CBSC], 2019a]) for this project. GSI's scope of services included a review of the referenced geotechnical and infiltration reports and documents (see Appendix A), engineering and geologic analyses, and preparation of this update report. This report supercedes the previous GSI preliminary investigation reports (GSI, 2006 & 2016). The additional conclusions and recommendations presented herein should be appropriately incorporated into project design and construction.

## EXECUTIVE SUMMARY

Based on our January 28, 2021 reconnaissance, previous and current field exploration, geologic, and geotechnical engineering analysis, the proposed development appears feasible from a soils engineering and geologic viewpoint, provided that the recommendations presented herein are properly incorporated into the design and construction of the project. The most significant elements of our study are summarized below:

- Earth materials encountered onsite consist predominantly of colluvium/topsoil underlain by Cretaceous-age granitic bedrock. In areas proposed for settlement-sensitive improvements, all colluvium/topsoil and highly weathered bedrock should be removed and recompacted. Removal depths are anticipated to generally range from about 2½ to 5 feet, although deeper removals should be anticipated. Actual removals should be evaluated during grading.

- Granitic bedrock in this area typically weathers to a range of materials consisting of sandy "DG" type soils and/or sandy clay, with potentially isolated, dense "corestones," which may vary up to very large boulders in size. Based on our

evaluation, heavy grading equipment (D9L or equivalent), would appear to be able to achieve the desired grades over the majority of the site. However, more difficult excavation and/or the potential for blasting in order to excavate hard rock will likely occur locally owing to dense zones, or "corestones" that may be encountered throughout the site. As such, the use of rock breakers and/or blasting to excavate is anticipated locally.

- Deeper excavations for street utilities will likely encounter non-trenchable conditions where cuts extend deeper than 3 to 7 feet below existing grades and/or require line-shooting or blasting to excavate. Consideration should be given to undercutting pad areas at least 3 to 4 feet below grade during grading in order to facilitate trenching for improvements, as well as mitigation for potential perched groundwater conditions after development. Consideration should also be given to undercutting street areas to at least 1 foot below lowest utility invert elevation, to facilitate trenching for street utility improvements. The latter is not a geotechnical requirement, however. Overexcavation to mitigate differential settlement, as detailed herein, is recommended. Should cut pads not be overexcavated, the potential for perched groundwater would increase, and homeowners would need to be notified of this increased potential and associated issues.

- Bedrock onsite appears to generally consist of weathered granitic rock. Excavations into bedrock material typically produces sand, sand with silt, and rock fragments, and should generally produce relatively good quality fill materials, to the depths explored. Some hard spots, producing oversize material, may not be precluded from occurring and should be anticipated locally, based on the available information.

- Oversize material may be generated, requiring specialized techniques for handling during grading, and should be anticipated. Recommendations for the handling and placement of oversize materials are presented in this report.

- Based on testing, soils are generally anticipated to be very low in expansion potential. The potential for low to medium expansive soils to be present may not be entirely precluded, however.

- A typical sample of site material was analyzed for corrosion/acidity potential. The testing included determination of soluble sulfates, pH, and saturated resistivity. Results indicate that site soils are neutral (pH=7.3) with respect to acidity. Resistivity test results of 3,000 ohm-cm indicate that exposed ferrous metals are moderately corrosive.

- Based upon the soluble sulfate results of not detected (ND) percent by weight in soil, the site soils have a negligible corrosion potential to concrete. Alternative methods and additional comments should be obtained from a qualified corrosion engineer, regarding foundations, piping, etc.

- Regional groundwater is not anticipated to significantly affect site development, provided our recommendations are properly implemented. In addition, perched groundwater conditions along fill/natural contacts, and along zones of contrasting permeabilities (discontinuities, fill/natural contacts, etc.), may not be precluded from occurring during grading, or in the future, after development due to rainfall, site irrigation, poor drainage conditions, or damaged utilities, and should be anticipated. This should be disclosed to all homeowners. The necessity for subdrains in additional areas cannot be precluded and should be anticipated within swale areas, as well as additional subdrains after site development, owing to irrigation and/or precipitation, as outlined above.

- The site generally has a low risk of being affected by seismic hazards. The seismicity acceleration values provided herein should be considered during the design of the proposed development. Final seismic shaking parameters will be provided at the completion of rough grading, when as-built fill depth below the foundation elements are known. On a preliminary basis, seismic distortions on the order of 1 inch vertical in 40 lateral feet should be anticipated on lots with the thickest fill and/or the largest fill thickness variation overlying bedrock materials.

- Our review and analysis of site conditions indicates that the areas of the site currently proposed for development have a very low potential for liquefaction. Therefore, no recommendations for mitigation are deemed necessary.

- Adverse geologic structures (active faults, fractures, significant landslides, etc.) that would preclude project feasability were not encountered.

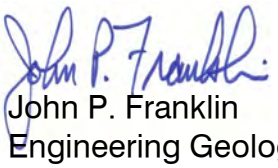
- A review of storm water infiltration and field infiltration test data indicates that a full or partial infiltration design is not recommended, per City BMP criteria and standards of practice.

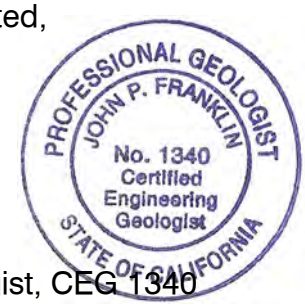
- The geotechnical design parameters provided herein should be considered during project planning design and construction by the project structural engineer and/or architects.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact our office.

Respectfully submitted,

**GeoSoils, Inc.**






John P. Franklin
Engineering Geologist, CEG 1340

David W. Skelly
Civil Engineer, RCE 47857

MK/JPF/DWS

Distribution: (2) Addressee (wet signed and PDF via email)

## TABLE OF CONTENTS


SCOPE OF SERVICES . . . . . 1

SITE DESCRIPTION AND PROPOSED DEVELOPMENT . . . . . 1

PREVIOUS WORK . . . . . 3

GEOLOGY . . . . . 3

EARTH MATERIALS . . . . . 4
- Colluvium/Topsoil (Not Mapped) . . . . . 4
- Granitics (Map Symbol - Kgr) . . . . . 4

FAULTING AND REGIONAL SEISMICITY . . . . . 5
- Regional Faults . . . . . 5
- Local Faulting . . . . . 5
- Seismicity . . . . . 5
- Seismic Shaking Parameters . . . . . 6

GROUNDWATER . . . . . 8

OTHER GEOLOGIC HAZARDS . . . . . 8

PREVIOUS LABORATORY TESTING . . . . . 9
- Classification . . . . . 9
- Laboratory Standard . . . . . 9
- Expansion Index (E.I.) Testing . . . . . 9
- Shear Testing . . . . . 9
- Resistance Value (R-value) Testing . . . . . 10
- Saturated Resistivity, pH, and Soluble Sulfates, and Chlorides . . . . . 10
  - Corrosion Summary . . . . . 10

STORM WATER TREATMENT AND HYDROMODIFICATION MANAGEMENT . . . . . 11
- USDA Study . . . . . 11

PREVIOUS FIELD INFILTRATION TESTING . . . . . 11
- Borehole Percolation/infiltration Test Procedure . . . . . 11

INFILTRATION DISCUSSION . . . . . 13

INFILTRATION FEASIBILITY EVALUATION . . . . . 13

STORM WATER BASIN DESIGN . . . . . 13

ROCK HARDNESS EVALUATION . . . . . 15
- General . . . . . 15

Surface Outcrops . . . . . 15
Seismic Refraction Survey . . . . . 15

PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS . . . . . 18

EARTHWORK CONSTRUCTION RECOMMENDATIONS . . . . . 20
General . . . . . 20
Demolition/Grubbing . . . . . 20
Treatment of Existing Ground . . . . . 21
Fill Placement . . . . . 21
Import Soils . . . . . 21
Transition Areas . . . . . 22
Graded Slope Construction . . . . . 22
Temporary Slopes . . . . . 22
Subdrains . . . . . 23

EARTHWORK FACTORS . . . . . 23

ROCK PLACEMENT GUIDELINES . . . . . 24
Materials ±8 Inches in Diameter or Less . . . . . 24
Materials Greater Than ±8 and Less Than 36 Inches in Diameter . . . . . 24
Materials Greater Than 36 Inches in Diameter . . . . . 25

PRELIMINARY SLOPE STABILITY EVALUATION . . . . . 26

PRELIMINARY RECOMMENDATIONS - FOUNDATIONS . . . . . 26
General . . . . . 26
Preliminary Foundation Design - Shallow Foundations . . . . . 26

PRELIMINARY FOUNDATION CONSTRUCTION RECOMMENDATIONS . . . . . 28
Post-Tensioned Slab Systems - Low Expansion (E.I. 21-50) and Plasticity >15, or Medium Expansion (E.I. 51-90) . . . . . 29
Slab Subgrade Pre-Soaking . . . . . 30
Perimeter Cut-Off Walls . . . . . 30
Post-Tensioned Foundation Design . . . . . 31
Soil Support Parameters . . . . . 31

MAT FOUNDATIONS . . . . . 32
Mat Foundation Design . . . . . 32
Confirmation Testing for Final Foundation Design . . . . . 33

SOIL MOISTURE TRANSMISSION CONSIDERATIONS . . . . . 33

PRELIMINARY WALL DESIGN PARAMETERS . . . . . 36
General . . . . . 36

Conventional Retaining Walls . . . . . 36
Retaining Wall Foundation Design . . . . . 36
Restrained Walls . . . . . 37
Cantilevered Walls . . . . . 37
Seismic Surcharge . . . . . 38
Retaining Wall Backfill and Drainage . . . . . 39
Wall/Retaining Wall Footing Transitions . . . . . 43

TOP-OF-SLOPE WALLS/FENCES/IMPROVEMENTS . . . . . 43
Slope Creep . . . . . 43
Top of Slope Walls/Fences . . . . . 44

PRELIMINARY PAVEMENT DESIGN . . . . . 45

PAVEMENT GRADING RECOMMENDATIONS . . . . . 45
General . . . . . 45
Subgrade . . . . . 45
Aggregate Base . . . . . 46
Paving . . . . . 46
Drainage . . . . . 46
PCC Cross Gutters . . . . . 47
Additional Considerations . . . . . 47

DRIVEWAY/PARKING, FLATWORK, AND OTHER IMPROVEMENTS . . . . . 47

DEVELOPMENT CRITERIA . . . . . 49
Slope Deformation . . . . . 49
Slope Maintenance and Planting . . . . . 50
Drainage . . . . . 50
Toe of Slope Drains/Toe Drains . . . . . 51
Erosion Control . . . . . 52
Landscape Maintenance . . . . . 52
Gutters and Downspouts . . . . . 55
Subsurface and Surface Water . . . . . 55
Site Improvements . . . . . 55
Tile Flooring . . . . . 55
Additional Grading . . . . . 56
Footing Trench Excavation . . . . . 56
Trenching/Temporary Construction Backcuts . . . . . 56
Utility Trench Backfill . . . . . 56

SUMMARY OF RECOMMENDATIONS REGARDING
GEOTECHNICAL OBSERVATION AND TESTING . . . . . 57

OTHER DESIGN PROFESSIONALS/CONSULTANTS . . . . . 58

PLAN REVIEW . . . . . 59

LIMITATIONS . . . . . 59
FIGURES:
Figure 1 - Site Location Map . . . . . 2
Detail 1 - Typical Retaining Wall Backfill and Drainage Detail . . . . . 31
Detail 2 - Retaining Wall Backfill and Subdrain Detail Geotextile Drain . . . . . 32
Detail 3 - Retaining Wall and Subdrain Detail Clean Sand Backfill . . . . . 33
Detail 4 - Schematic Toe Drain Detail . . . . . 40
Detail 5 - Subdrain Along Retaining Wall Detail . . . . . 41

ATTACHMENTS:
Appendix A - References . . . . . Rear of Text
Appendix B - Test Pit Logs . . . . . Rear of Text
Appendix C - Seismicity . . . . . Rear of Text
Appendix D - Laboratory Data . . . . . Rear of Text
Appendix E - Storm Water BMP Checklists/Forms . . . . . Rear of Text
Appendix F - Seismic Refraction and Rock Hardness . . . . . Rear of Text
Appendix G - General Earthwork and Grading Guidelines . . . . . Rear of Text
Plate 1- Geotechnical Map . . . . . Rear of Text

***UPDATE GEOTECHNICAL INVESTIGATION AND***
***STORM WATER INFILTRATION EVALUATION REPORT,***
***2277 VISTA GRANDE DRIVE, 28-LOT SUBDIVISION***
***VISTA, SAN DIEGO COUNTY, CALIFORNIA***
***APNS 171-100-05 AND 171-100-28***

## SCOPE OF SERVICES

The scope of our services has included the following:

1. Review available published literature, maps, and aerial photos of the vicinity for the site (see Appendix A), including our previous reports for the site.

2. Site geologic reconnaissance, and review of previous subsurface exploration (Appendix B).

3. An update evaluation of geologic hazards/site seismicity (Appendix C).

4. Review of previous laboratory testing of representative soil samples (Appendix D).

5. Review of soil survey maps available on the United States Department of Agriculture/Natural Resources Conservation Service's (USDA/NRCS's), and previous percolation test data to evaluate storm water infiltration feasibility. Calculations for the conversion of percolation rates to infiltration rates, and the completion of City of Vista (2016) Worksheets C.4-1 and D.5-1 are provided herein (see Appendix E).

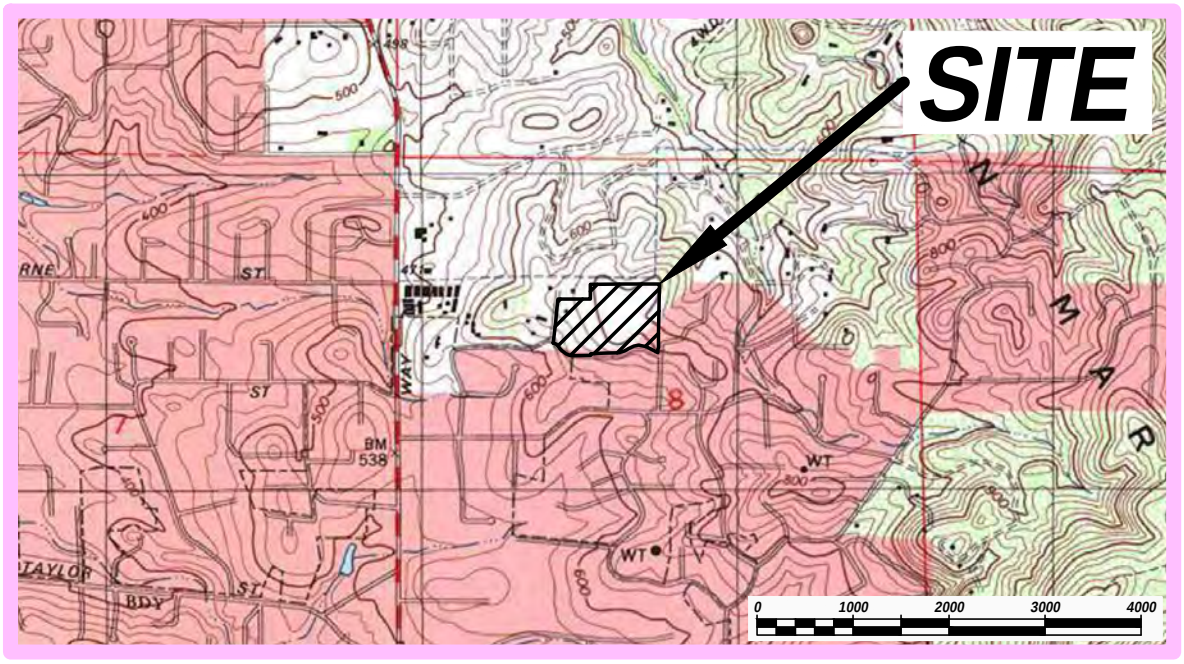
6. Review of previous seismic refraction data, and performance of an additional seismic refraction line to evaluate bedrock hardness, rippability, and trenchability (see Appendix F);

7. Engineering and geologic evaluations of data collected.

8. Preparation of this illustrated report and accompanying appendices.

## SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The project site is an irregularly shaped property, consisting of approximately 16.46 acres of hilly terrain located north of Vista Grande Drive, east of East Vista Way, and west of Vista Grande Terrace, in Vista, San Diego County, California (Site Location Map, Figure 1). Based upon the 50-scale tentative subdivision map for the site (PLS&A, 2020), elevations onsite range from approximately 630 feet Mean Sea Level (MSL) to about 725 feet MSL. Therefore, total relief across the property is approximately ±95 feet. Slope gradients across most of the site are generally less than 5:1 (horizontal:vertical [h:v]), or flatter. Surface drainage (sheetflow) varies and generally follows topography to the southwest.




*Base Map: TOPO!® ©2003 National Geographic, U.S.G.S. San Marcos Quadrangle, California -- San Diego Co., 7.5 Minute, dated 1996, current, 1999.*

*Base Map: Google Maps, Copyright 2021 Google, Map Data Copyright 2021 Google*

*This map is copyrighted by Google 2021. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission. All rights reserved.*

GeoSoils, Inc.

*W.O.* **8053-A-SC**

# SITE LOCATION MAP

***Figure 1***

N

It is our understanding that the proposed development will consist of preparing the site for the construction of 28 single-family residences and associated infrastructure (i.e., utilities and streets). Building loads are assumed to be typical for this type of relatively light construction (wood-frame and slabs-on-grade). Based on PLSA 2020 the need for import soils is not anticipated at this time.

## PREVIOUS WORK

A preliminary geotechnical evaluation (report) including findings, conclusions, and recommendations for a previous development concept for the site was issued on February 23, 2006 (GSI, 2006). That evaluation included the excavation of 15 backhoe-excavated test pits, and nine seismic refraction traverses for evaluation of near-surface soil geologic conditions and rock hardness/rippability, as well as associated laboratory testing of samples collected. All excavations were logged by a geologist from our firm, who collected a representative bulk sample from the excavations for appropriate laboratory testing. The logs of the previous test pits are presented in Appendix B. The approximate location of the test pits and seismic refraction traverses are presented on Plate 1 (Seismic Traverse and Test Pit Location Map), which uses the tentative subdivision map for the site (PLS&A, 2020), as a base map. Velocity and depth interval results of seismic refraction lines are summarized in the rock hardness and rippability section in Appendix F.

In 2016, GSI performed another study for storm water infiltration feasibility (GSI, 2016), and characterized infiltration conditions for BMP desgn. As part of the Infiltration study, six (6) borehole percolation tests were conducted within the selected then-proposed basins. The approximate elevations for the infiltration tests within Infiltration Borings IB-1, IB-2, IB-3, IB-4, IB-5, and IB-6 were ±641½, ±641½, ±672, ±673½, 714, and 716 feet NGVD29, respectively. Infiltration testing was performed in general accordance with the City of Vista BMP Guidelines (COVBMPDM, 2016), by staff from our firm. The field infiltration test data is provided in Appendix E.

## GEOLOGY

The subject property is located within a prominent natural geomorphic province in southwestern California known as the Peninsular Ranges. It is characterized by steep, elongated mountain ranges and valleys that trend northwesterly. The mountain ranges are generally underlain by basement rocks consisting of pre-Cretaceous metasedimentary rocks, Jurassic metavolcanic rocks, and Cretaceous plutonic rocks of the southern California batholith.

In the San Diego County region, deposition occurred during the Cretaceous Period and Cenozoic Era in the continental margin of a forearc basin. Sediments, derived from

Cretaceous-age plutonic rocks and Jurassic-age volcanic rocks, were deposited into the narrow, steep, coastal plain, and continental margin of the basin. These rocks have been uplifted, eroded, and deeply incised. During early Pleistocene time, a broad coastal plain was developed from the deposition of marine terrace deposits. During mid- to late-Pleistocene time, this plain was uplifted, eroded, and incised. Alluvial deposits have since filled the lower valleys, and young marine sediments are currently being deposited/eroded within coastal and beach areas.

## EARTH MATERIALS

Earth materials encountered on the site consist of colluvium/topsoil and Cretaceous-age granitic rock. Site geologic conditions are indicated on the Geotechnical Map, (see Plate 1).

### Colluvium/Topsoil (Not Mapped)

Surficial deposits of colluvium (topsoil) were encountered in entire site in preparation of GSI (2006) and GSI (2016). The colluvium/topsoil encountered onsite generally consist of various shades of brown, silty sands. These materials were dry to moist, loose, and porous. These soils were observed to be on the order of about 1½ to 4 feet thick. Colluvium/topsoil typically has a very low expansion potential, is considered potentially compressible and unsuitable for support of settlement-sensitive improvements in its existing state.

### Granitics (Map Symbol - Kgr)

The site is predominantly underlain by bedrock consisting of Cretaceous-age plutonic rocks, commonly referred to as “granitics.” These plutonic rocks are considered the basement rock of the region. Tan and Kennedy (2005) have mapped the site as being underlain by undivided gabbro (granitics).

Granitic bedrock encountered onsite typically consists of a near-surface zone of decomposed granitic bedrock, which grades into unweathered bedrock. The decomposed bedrock consists of light brown, very coarse sands and small pebbles. Residual soils developed on the bedrock may be clayey. The materials generally were dry to moist and medium dense to very dense. However, the upper portion (about 1 foot) was generally weathered, loose, and porous, below the colluvium.

Underlying the decomposed granitic materials, lies granitic bedrock. The bedrock is gray and very dense. Excavation by the 420D rubber tire backhoe was very difficult in the bottom of our test pits.

Boulders and outcrops were observed on the site. Structural elements within the granitic rocks in the study area appear to be massive or weakly developed, high angle features. Adverse fracture or joint systems were not noted during our field investigation. Based on the available data, adverse geologic structures are generally not anticipated to adversely affect the proposed development. Geologic structure should be further evaluated during the 40-scale review, and actual site earthwork to assess bedrock structure relative to actual slope locations and configurations, if proposed.

## FAULTING AND REGIONAL SEISMICITY

### Regional Faults

Our review indicates that there are no known active faults crossing the project, and the site is not within an Alquist-Priolo Earthquake Fault Zone (California Geological Survey [CGS], 2018). However, the site is situated in a region of active faulting. The Newport-Inglewood (offshore) fault is the closest known active fault to the site (located at a distance of approximately 13.6 miles [21.9 kilometers]) and should have the greatest effect on the site in the form of strong ground shaking, should the design earthquake occur. The location of the Newport-Inglewood fault and other major faults relative to the site are shown on the "California Fault Map" in Appendix C. The possibility of ground acceleration, or shaking at the site, may be considered as approximately similar to the southern California region as a whole.

### Local Faulting

No local faulting was observed to transect the site during the field investigation. Additionally, a review of regional geologic maps does not indicate the presence of local faults crossing the site.

### Seismicity

The acceleration-attenuation relation of Bozorgnia, Campbell, and Niazi (1999) has been incorporated into EQFAULT (Blake, 2000a). EQFAULT is a computer program developed by Thomas F. Blake (2000a), which performs deterministic seismic hazard analyses using digitized California faults as earthquake sources.

The program estimates the closest distance between each fault and a given site. If a fault is found to be within a user-selected radius, the program estimates peak horizontal ground acceleration that may occur at the site from an upper-bound (formerly "maximum credible earthquake") event on that fault. Upper bound refers to the maximum expected ground acceleration produced from a given fault. Site acceleration (g) was computed by one user-selected acceleration-attenuation relationship that is contained in EQFAULT. Based on the EQFAULT program, a peak horizontal ground acceleration from an upper-

bound event on the Newport-Inglewood (Offshore) fault may be on the order of 0.33 g. The computer printouts of pertinent portions of the EQFAULT program are included within Appendix C.

Historical site seismicity was evaluated with the acceleration-attenuation relation of Bozorgnia, Campbell, and Niazi (1999), and the computer program EQSEARCH (Blake, 2000b, updated to August 15, 2018). This program performs a search of the historical earthquake records for magnitude 5.0 to 9.0 seismic events within a 100-kilometer radius, between the years 1800 through August 15, 2018. Based on the selected acceleration-attenuation relationship, a peak horizontal ground acceleration is estimated, which may have affected the site during the specific time frame. Based on the available data and the attenuation relationship used, the estimated maximum (peak) site acceleration during the period 1800 through August 15, 2018 was about 0.258 g. A historic earthquake epicenter map and a seismic recurrence curve are also estimated/generated from the historical data. Computer printouts of the EQSEARCH program are presented in Appendix C.

## Seismic Shaking Parameters

The following table summarizes the site-specific seismic design criteria obtained from the 2019 California Building Code (CBC), Chapter 16 Structural Design, Section 1613, Earthquake Loads (California Building Standards Commission [CBSC], 2019a). The computer program Seismic Design Maps, provided by the California Office of Statewide Health Planning and Development (OSHPD) and the Structural Engineers Association of California (SEAOC) has been utilized to aid in design (https://seismicmaps.org). The short spectral response utilizes a period of 0.2 seconds. Based on the findings from our onsite subsurface exploration and our experience with other similar sites, it is our opinion that Site Class "C" conditions are applicable to the proposed development.

| 2019 CBC SEISMIC DESIGN PARAMETERS | | |
|---|---|---|
| **PARAMETER** | **VALUE** | **2019 CBC or REFERENCE** |
| Site Class | C | Table 1604.5 |
| Spectral Response - (0.2 sec), $S_s$ | 0.936 g | Section 1613.2.2/Chap. 20 ASCE 7-16 (p. 203-204) |
| Spectral Response - (1 sec), $S_1$ | 0.344 g | Section 1613.2.1 Figure 1613.2.1(1) |
| Site Coefficient, $F_a$ | 1.2 | Section 1613.2.1 Figure 1613.2.1(2) |
| Site Coefficient, $F_v$ | 1.5 | Table 1613.2.3(1) |
| Maximum Considered Earthquake Spectral Response Acceleration (0.2 sec), $S_{MS}$ | 1.124 g | Table 1613.2.3(2) |

| 2019 CBC SEISMIC DESIGN PARAMETERS | | |
|---|---|---|
| **PARAMETER** | **VALUE** | **2019 CBC or REFERENCE** |
| Maximum Considered Earthquake Spectral Response Acceleration (1 sec), $S_{M1}$ | 0.517 g | Section 1613.2.3 (Eqn 16-36) |
| 5% Damped Design Spectral Response Acceleration (0.2 sec), $S_{DS}$ | 0.749 g | Section 1613.2.3 (Eqn 16-37) |
| 5% Damped Design Spectral Response Acceleration (1 sec), $S_{D1}$ | 0.344 g | Section 1613.2.4 (Eqn 16-38) |
| $PGA_M$ | 0.485 g | Section 1613.2.4 (Eqn 16-39) |
| Seismic Design Category | D | ASCE 7-16 (Eqn 11.8.1) |

| GENERAL SEISMIC DESIGN PARAMETERS | |
|---|---|
| **PARAMETER** | **VALUE** |
| Distance to Seismic Source (Newport Inglewood (Offshore)) "A" fault [1] | 13.4 mi (21.5 km)[2] |
| Upper Bound Earthquake | $M_W$ = 7.1[1] |
| [1] - Cao, et al. (2003)<br>[2] From Blake (2000a)<br>[3] - USGS | |

Conformance to the criteria above for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a large earthquake. The primary goal of seismic design is to protect life, not to eliminate all damage, since such design may be economically prohibitive. Cumulative effects of seismic events are not addressed in the 2019 CBC (CBSC, 2019) and regular maintenance and repair following locally significant seismic events (i.e., $M_w$5.5) will likely be necessary.

It is important to keep in perspective that in the event of an upper-bound or maximum credible earthquake event occurring on any of the nearby major fault strands, strong ground shaking would occur in the subject site's general area. Potential damage to any structure(s) would likely be greatest from the vibrations and impelling force caused by the inertia of a structure's mass than from those induced by the hazards considered above. Following implementation of remedial earthwork and design of foundations described herein, this potential would be no greater than that for other existing structures and improvements in the immediate vicinity that comply with current and adopted building standards.

## GROUNDWATER

Seeps, springs, or other indications of a high regional groundwater level were not noted on the site during the time of our field investigation, and the depth to groundwater is estimated to be greater than 50 feet. However, seepage may occur locally (due to heavy precipitation or irrigation) in areas where relatively permeable soils overlie relatively impermeable soils or bedrock. Such materials may be encountered in the earth units that exist onsite. Thus, this potential is significant on the subject site and should be disclosed to all interested parties.

Perched groundwater conditions along fill/bedrock contacts, and along zones of contrasting permeabilities, may not be precluded from occurring in the future due to site irrigation, poor drainage conditions, or damaged utilities, and should be anticipated. Should perched groundwater conditions develop, this office could assess the affected area(s) and provide the appropriate recommendations to mitigate the observed groundwater conditions. Homeowners and any homeowners association should be notified of this potential.

## OTHER GEOLOGIC HAZARDS

The following list includes other seismic related hazards that have been considered during our evaluation of the site. The hazards listed are considered negligible and/or completely mitigated as a result of site location, soil characteristics, currently proposed site development areas, and typical site development procedures:

- Liquefaction
- Dynamic Settlement
- Surface Fault Rupture
- Ground Lurching or Shallow Ground Rupture
- Mass Wasting
- Tsunami
- Seiche

It is important to keep in perspective that in the event of a maximum probable or credible earthquake occurring on any of the nearby major faults, strong ground shaking would occur in the subject site's general area. Potential damage to any structure(s) would likely be greatest from the vibrations and impelling force caused by the inertia of a structure's mass than from those induced by the hazards considered above. This potential would be no greater than that for other existing structures and improvements in the immediate vicinity.

## PREVIOUS LABORATORY TESTING

Laboratory tests were previously performed in preparation of GSI (2006) on representative samples of representative site earth materials in order to evaluate their physical characteristics. Test procedures used and results obtained are presented below.

### Classification

Soils were classified visually according to the Unified Soils Classification System. The soil classifications are shown on the Exploration Logs in Appendix B.

### Laboratory Standard

The maximum density and optimum moisture content was evaluated for the major soil type encountered in the test pits. The laboratory standard used was ASTM D-1557. The moisture-density relationships obtained for these soils are shown on the following table:

| LOCATION | SOIL TYPE | MAXIMUM DENSITY (PCF) | OPTIMUM MOISTURE CONTENT (%) |
|---|---|---|---|
| TP-2 @ 0-3' | Silty Sand, Reddish Brown | 130.0 | 10.5 |

### Expansion Index (E.I.) Testing

A representative sample of the onsite soils was tested to evaluate expansion potential. The Expansion index (E.I.) test and expansion potential classification were performed in general accordance with ASTM Standard D 4829. The laboratory test result is presented in the following table.

| LOCATION | SOIL TYPE | EXPANSION INDEX | EXPANSION POTENTIAL |
|---|---|---|---|
| TP-2 @ 0-3' | Silty Sand, Reddish Brown | <20 | Very Low |

### Shear Testing

Shear testing was performed on a representative, natural sample and a representative, remolded sample of site soil in general accordance with ASTM test method D-3080 in a direct shear machine of the strain control type. Shear test results are presented as follows:

| SAMPLE LOCATION | PRIMARY | | RESIDUAL | |
|---|---|---|---|---|
| | COHESION (PSF) | FRICTION ANGLE (DEGREES) | COHESION (PSF) | FRICTION ANGLE (DEGREES) |
| TP-2 @ 0-3' Remolded | 414 | 33 | 307 | 34 |
| TP-4 @ 2-3' Undisturbed | 364 | 39 | 364 | 30 |

## Resistance Value (R-value) Testing

Resistence (R-value) testing of a composite of representative sample of site soil was performed in general accordance with California Test Method 201. The results of these tests are presented below:

| SAMPLE LOCATION | R-VALUE AT EQUILIBRIUM |
|---|---|
| TP-4 @ 2-3' | 6 |

## Saturated Resistivity, pH, and Soluble Sulfates, and Chlorides

Testing was performed on a representative sample of the onsite earth materials for general soil corrosivity and soluble sulfates, and chlorides testing. The testing included evaluation of soil pH, soluble sulfates, soluble chlorides, and saturated resistivity. Test results are presented in Appendix D and the following table:

| SAMPLE LOCATION AND DEPTH (ft) | pH | SATURATED RESISTIVITY (ohm-cm) | SOLUBLE SULFATES (% by wt) | SOLUBLE CHLORIDES (ppm) |
|---|---|---|---|---|
| TP-2 @ 0-3 | 7.3 | 3,000 | ND* | 45 |
| * - Non-detectable concentration | | | | |

## Corrosion Summary

Laboratory testing indicates that the tested sample of the onsite soils is neutral to slightly alkaline with respect to soil acidity/alkalinity; is moderately corrosive to exposed, buried metals when saturated; presents negligible sulfate and chloride exposure to concrete (i.e., Exposure Class S0, per Table 19.3.1.1 of American Concrete Institute [ACI] 318-14); It should be noted that GSI does not consult in the field of corrosion engineering. Therefore, additional comments and recommendations may be obtained from a qualified corrosion

engineer based on the level of corrosion protection required for the project, as determined by the Project Architect, and/or the Project Structural Engineer.

## STORM WATER TREATMENT AND HYDROMODIFICATION MANAGEMENT

### USDA Study

A review of the United States Department of Agriculture database ([USDA]; 1973, 2020) indicates that site soils are classified as Las Posas fine sandy loam (9 to 15 percent slopes [LpD2]) and Las Posas fine sandy loam (15 to 30 percent slopes [LpE2]). The USDA study further indicates that the onsite soils are classified as belonging to Hydrologic Soil Group "C," which generally means partial infiltration conditions.

## PREVIOUS FIELD INFILTRATION TESTING

Six (6) borehole percolation tests were previously conducted as part of infiltration study in 2016. The approximate elevations for the infiltration tests within Infiltration Borings IB-1, IB-2, IB-3, IB-4, IB-5, and IB-6 were ±641½, ±641½, ±672, ±673½, 714, and 716 feet NGVD29, respectively. Infiltration testing was performed in general accordance with the City of Vista BMP Guidelines (COVBMPDM, 2016), by staff from our firm. The field infiltration test data is provided in Appendix E. Procedures for testing are outlined briefly below:

### Borehole Percolation/infiltration Test Procedure

1. GSI excavated approximately ±15, ±5, ±12, ±3½, ±10½, and ±3 feet below existing grade, where the selected proposed onsite infiltration basins are located and tested 10 feet beyond the then-proposed basin elevation and at/near to the basin elevation.

2. Water was poured to an approximate height of five times the radius from the top of the proposed basin elevation, and left overnight (24-hour period).

3. The following day, testing began and water level was recorded at a ¼-inch accuracy.

4. The final test is used as the infiltration rate.

**Test Holes:**

1. Two test locations were performed within each of the selected basins at approximate proposed improvement elevations between ±1 and ±10 feet.

2. Percolation hole diameter - 6 inches.

3. After the removal of all loose material, approximately 2 inches of gravel was placed on the bottom of the excavation.

4. A perforated pipe was then installed within the percolation hole to facilitate accurate field measurements and prevent caving during testing and the pre-soak period.

**Pre-Soaking:** Water filled each test hole as mentioned above, where the pre-soak period continued overnight.

**Testing:** The following day (after pre-soak), readings were recorded at intervals of 10 minutes and 30 minutes depending on the Sandy Soil Criteria Test (per COVBMPDM). Due to the observed high infiltration rates, testing within Infiltration Borings IB-1 through IB-6 were concluded after 60 minutes at 10-minute intervals, and after repeatable rates were acquired.

**Locations:** The location of the infiltrometer tests were site specific and chosen to give a general representation of the anticipated infiltration rate of the earth materials in relation to the selected proposed infiltration basins at their respective locations.

**Accuracy:** All measurements within the infiltration borings were read to the nearest ¼ inch.

**Test Results:** The results of the infiltration testing is summarized in the following table and in Appendix E. It is our opinion that the relatively high infiltration rates acquired from the testing are due to the nature and consistency of onsite soils that lie above the unweathered granitic bedrock.

| LOCATION | INFILTRATION RATE (in/hr) | INFILTRATION RATE w/FOS = 2.0 (in/hr) | LOCATION | INFILTRATION RATE (in/hr) | INFILTRATION RATE w/FOS = 2.0 (in/hr) |
|---|---|---|---|---|---|
| IB-1 | 9.36 | 4.68 | IB-4 | 6.00 | 3.00 |
| IB-2 | 5.29 | 2.64 | IB-5 | 7.20 | 3.60 |
| IB-3 | 4.50 | 4.25 | IB-6 | 7.20 | 3.60 |

## INFILTRATION DISCUSSION

The above infiltration rates indicates that total infiltration of storm water runoff into the onsite earth materials is potentially feasible in some basins owing to the fast draining nature of the underlying soil weathered granitics, occurring at a depth. The colluvial deposits and weathered granitics within the upper soil column, consistent with the infiltration surface in the then-planned basins, has an infiltration rate greater than 0.5 inches per hour for cut basins. Thus, infiltration may be potentially feasible, based solely on field testing results. Our data generally corroborates the Hydrologic Soil Group (HSG) "C" classification assigned by the USDA-NRCS for the onsite soil units (GSI, this study).

## INFILTRATION FEASIBILITY EVALUATION

In general accordance with the City BMP design manual (City, 2016), the infiltration feasibility for this site was evaluated. An evaluation of the soils infiltration characteristics and potential impact on site development was performed for this evaluation, using a "desk top" analysis and field infiltration test data. As per current grading plans and projected cut/fill transitions, any basins constructed upon natural ground are susceptible to hydro-consolidation, groundwater mounding, etc., and have the potential to adversely affect proposed and existing improvements. Therefore, infiltration is deemed to be infeasible (denoted as "NO" below). The results of our City of Vista Worksheet C.4-1 (Appendix E) is feasibility screening category "No Infiltration".

## STORM WATER BASIN DESIGN

Storm water basins, if required by the City, should consider:

- Storm water infiltration is not recommended because of the potential geotechnical issues discussed in Worksheet C.4-1.

- Since storm water infiltration is not recommended, any City-required storm water basins should either receive an impermeable liner and subdrains or consist of a proprietary system with underground storage galleries. Impermeable liners used in conjunction with storm water basins should consist of a 30-mil polyvinyl chloride (PVC) membrane that is covered by a minimum of 12 inches of clean soil, free from rocks and debris, with a maximum 4:1 (horizontal:vertical [h:v]) slope inclination, or flatter, and meets the following minimum specifications:

  Specific Gravity (ASTM D792): 1.2 (g/cc, min.); Tensile (ASTM D882): 73 (lb/in-width, min); Elongation at Break (ASTM D882): 380 (%, min); Modulus (ASTM D882): 30 (lb/in-width, min.); and Tear Strength (ASTM D1004): 8 (lb/in, min); Seam Shear Strength (ASTM D882) 58.4 (lb/in, min); Seam Peel Strength (ASTM D882) 15 (lb/in, min).

- Subdrains should consist of at least a 4-inch diameter Schedule 40 or SDR 35 drain pipe with perforations oriented down. The drain pipe should be sleeved with a filter sock.

- Areas adjacent to, or within, the storm water infiltration basins that are subject to inundation should be properly protected against scouring, undermining, and erosion, in accordance with the recommendations of the design engineer.

- Stability of the basin slopes will require them to be constructed at gradients no steeper than 4:1 (h:v). Alternatively, the sides of the basin may be supported by retaining structures/walls. Footings for retaining walls should extend at least 2 feet below the bottom of the basin into earth materials deemed suitable bearing materials by the project geotechnical consultant.

- Basins will require regular and periodic maintenance, which may include rehabilitation and/or complete replacement of any filter media (e.g., sand, gravel, filter fabrics, topsoils, mulch, etc.) or other components utilized in construction, so that the design life exceeds 15 years.

- Due to the potential for piping and adverse seepage conditions, a burrowing rodent control program should also be implemented onsite.

- All or portions of these systems may be considered attractive nuisances. Thus, consideration of the effects of, or potential for, vandalism should be addressed.

- The potential for surface flooding, in the case of system blockage, should be evaluated by the design engineer.

- Any proposed utility backfill materials (i.e., inlet/outlet piping and/or other subsurface utilities) located within or near the planned basins may become saturated and induce backfill settlement. This is due to the potential for piping, water migration, and/or seepage along the utility trench line backfill. Underground utility trenches adjacent to and within basins, should be slurried with a 2-sack mix. Alternatively, cut-off walls may be used.

- Planned or existing utilities may also be subject to piping of fines into open-graded gravel backfill layers unless separated from overlying and adjacent soils by geotextiles and/or slurry backfill.

- The use of storm water basins above or near existing or planned underground utilities that might degrade/corrode with the introduction of water/seepage should be avoided. Alternatively, a corrosion consultant may provide recommendations for corrosion protection.

- A vector control program may be necessary as stagnant water contained in storm water treatment BMPs may attract mammals, birds, and insects that carry pathogens.

## ROCK HARDNESS EVALUATION

### General

It is anticipated that the excavations proposed to achieve design grades may require difficult to very difficult ripping, and blasting is anticipated locally. Oversize rock is expected to be generated during utility construction, as well as locally during deeper (i.e., 5 feet or greater) onsite improvements (i.e., utilities or pools) for some of the lots. The recommendations presented herein should be incorporated into the design, grading, and construction phases of site development.

### Surface Outcrops

Hard surface outcrops of granitic bedrock were observed on the northwest and northeast portions of the site. The presence of concealed masses of hard rock, located at relatively shallow depths below or at the surface, requiring blasting or rock breakers to excavate, may not be precluded. However, the potential for rock fall is considered low.

### Seismic Refraction Survey

A seismic refraction survey, consisting of nine (9) previous and one (1) current seismic refraction lines were conducted using a Geometrics SmartSeis 12-channel exploration seismograph, with a hammer and plate energy source. The approximate seismic line locations are shown on the enclosed Plate 1, and the velocity and depth interval results are graphically shown in Appendix F. An example of the raw seismic data is included as Plate F-1, and illustrates a forward and split spread shot from the same line.

The first arrival information, shot point locations, geophone locations, and line geometry from each survey are utilized in the computer programs SIPIK, SIPT2, and SIPLOT and/or SIPwin (Rimrock Geophysics, 1995a, 1995b, 1995c, 1997, and 2002) which produces time-distance plots for each of the survey lines (see example, Plate F-2). The graphic curves reflect the actual time-distance plots generated by the program, showing the shot points and phone locations. The first curve, from left to right shows the forward spread from the first shot. The second, or split spread shot point creates two curves in opposite directions from the shot in the middle of the spread. The third curve represent the reverse shot from the distant end of the spread.

The data for the surveys performed generally show a three-layer case. The uppermost layer is generally thin as would be expected, reflecting the surficial materials (i.e., topsoil/colluvium). Undulations in time-distance curves can be attributed to a lack of

elevation corrections to the raw data, possible minor disturbances from noise (e.g., wind or traffic), decreased energy at distant geophones, and discontinuities in the subsurface.

The velocity-depth models, or cross-sections, generated are included as Plates F-3 through F-12 for SL-1 through SL-9 and SL-101, respectively. As can be seen on these plates, the boundaries between various seismic velocity layers appear to be somewhat undulatory, typical of fractured and weathered crystalline (i.e., granitic) rocks where there is a access to the subsurface for air and water. Fracture density/frequency also contributes to the variation in depth of weathering and therefore differences in seismic velocities.

Layer boundaries tend to mimic the surface topography, although variations are common depending upon the depth of weathering, fracturing, etc. Thickness of the surficial layer (i.e., colluvium/topsoil and/or weathered older alluvium, or weathered bedrock) averages about ±3 to ±4 feet, but generally varies from ±2½ to ±7 feet. Average velocity of Layer 1 materials is about ±1,217 fps. This is typical for such material. The average thickness of Layer 2 (alluvium and/or generally weathered bedrock) is about ±24 feet, but ranges from ±12 to ±38 feet. Average velocity of Layer 2 is about ±4,849 fps, with some variability. Average velocity in Layer 3 (unweathered bedrock), is about ±9,283 fps, with seismic velocities ranging from ±6,645 to 15,974 fps. At depths where velocities are greater than about 5,000 to 6,000 fps, rippability is ambiguous and blasting usually is required.

An evaluation has been made of the seismic refraction line data to estimate the approximate depth to non-rippable trenching (i.e., utility excavation) and to non-rippable bedrock. Approximate cut-off velocities of ±3,800 and ±6,000 fps were used as a basis for non-rippable trenching (assuming a Cat 235 Hoe [a large trackhoe], or equivalent), and non-rippable bedrock (assuming a D9L, or equivalent), respectively. A conventional rubber-tired backhoe will experience non-productive trenching at seismic velocities much less than ±2,000 to 2,500 fps.

Bedrock excavatability with respect to trenching shallower than the approximate ±3,800 fps cut-off depth is expected to vary from easy to very difficult and the necessity for localized areas requiring blasting should be anticipated. Similarly, bedrock rippability shallower than the approximate ±6,000 fps cut-off depth is expected to vary from easy to very difficult, and the necessity for localized areas requiring blasting cannot be entirely precluded.

Variations should be expected. As such, bedrock excavations from the surface downward may generate oversize rock. Isolated “floaters or corestones may also be encountered. The bulk of the materials derived from the weathered portion of the bedrock (up to and including the ±3,800 to 6,000 fps cut-off) are anticipated to disintegrate to approximately 12 to 24 inches and smaller constituents. Any oversize materials (≥12 inches) generated would require special handling for use in fills, and may not be placed within 5 feet of finish grade or used as backfill in utility trenches.

Based upon our experience in this area, and the seismic refraction data obtained, the following table reflects our estimates of the rippability at the various seismic refraction survey lines; other interpretations are possible:

| SEISMIC LINE NO. | GENERAL RIPPABILITY (ASSUMING A D9L DOZER OR CAT 235 HOE, OR EQUIVALENT) |
|---|---|
| SL-1 | Rippable to a depth of 30 feet on the north, and 33 feet on the south. Trenchable to a depth of 30 feet on the north, and 33 feet on the south. |
| SL-2 | Rippable to a depth of 32 feet on the north, and 35 feet on the south. Non-trenchable below 3 feet on the north, and 3½ feet on the south. |
| SL-3 | Rippable with difficulty to a depth of 22 to 30 feet on the south, and 23 to 26 feet on the north. Non-trenchable below 3 to 5 feet on the south, and 3 to 5 feet on the north. |
| SL-4 | Marginal rippability to possible blasting to a depth of 27 feet on the south, and 19 to 23 feet on the north. Non-trenchable below 3 feet on the south, and 3 to 6 feet on the north. |
| SL-5 | Marginal rippability to possible blasting to a depth of 24 feet on the south, and 22 feet on the north. Non-trenchable below 3 feet on the south, and 3 to 6 feet on the north. |
| SL-6 | Rippable to a depth of 16 feet on the north, and 43 feet on the south. Trenchable with difficulty to 16 feet on the north, and 43 feet on the south. |
| SL-7 | Rippable to a depth of 29 feet on the south, and 29 feet on the north. Non-trenchable below ±2½ feet on the south, and ±3 feet on the north. |
| SL-8 | Rippable to a depth of 3 to 4 feet on the south, and 3 to 4 feet on the north. Non-trenchable below 3 to 4 feet on the south, and 3 to 4 feet on the north. |
| SL-9 | Rippable to a depth of 3 to 4 feet on the south, and 3 to 4 feet on the north. Non-trenchable below 3 to 4 feet on the south, and 3 to 4 feet on the north. |
| SL-101 | Rippable to a depth of ±16 feet on the east, and ±17 feet on the west. Non-trenchable below ±5½ feet on the east, and ±3 feet on the west. |

Due to the nature of the surficially discontinuous and/or relatively near-surface granitic terrain in the northern part of the site, localized blasting should be anticipated in those areas to achieve proposed cut depths as well as street/roadway undercuts for utility construction in the future, or for foundations.

Using the 3,800 fps cut-off for non-rippable trenching (in lieu of street overexcavation), it is likely that very difficult ripping to possible blasting (e.g., “line-shooting”) may be necessary for trenching of utilities along the proposed roadway alignments in the northern portion of the site. As an alternative to blasting for utilities, overexcavation of street areas during mass grading to 1 foot below the depth of the lowest utility should be considered. This is not a geotechnical requirement; however, it may be mandated by the governing agency.

In general, utilizing the seismic data in conjunction with relevant boring information, it appears the majority of the site may be characterized as being mantled by a relatively thin

layer of topsoil/colluvium to depths generally ranging from about ±3, up to about ±7 feet in thickness. Below that horizon, weathered and/or relatively fresh granitic bedrock occurs. Based on all of the above, it is anticipated that the need for overexcavation of streets for utility construction and/or line shooting may be necessary in some portions of the site. Depending upon the locations and depths of proposed cuts, there is a likely need for blasting in some areas. Generally, a conventional rubber-tired backhoe will experience non-productive trenching at seismic velocities much less than ±2,000 to 2,500 fps. The seismic refraction data presented herein should be further reviewed in conjunction with future grading plans (when available).

## PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Based on our field exploration, laboratory testing, and geotechnical engineering analysis, it is our opinion that the site appears suitable for the proposed development from a geotechnical engineering and geologic viewpoint, provided that the recommendations presented in the following sections are incorporated into the design and construction phases of site development. The primary geotechnical concerns with respect to the proposed development are:

- Depth to competent material.
- Differential settlement of compacted fills.
- Potential for blasting and to encounter oversize material and resultant special placement techniques during grading, even at shallow depths or at the surface.
- Overexcavation potential of streets and pads.
- Potential for perched groundwater to occur after development.
- Expansion and corrosion potential of site soils over the life of the project.
- Slope stability.
- Regional seismic activity.

The recommendations presented herein consider these as well as other aspects of the site. The engineering analyses performed concerning site preparation and the recommendations presented herein have been completed using the information provided and obtained during our field work.

In the event that any significant changes are made to proposed site development, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the recommendations of this report verified or modified in writing by this office. Foundation design parameters are considered preliminary until the foundation design, layout, and structural loads are provided to this office for review.

1. Soil engineering, observation, and testing services should be provided during grading to aid the contractor in removing unsuitable soils and in his effort to compact the fill.

2. Geologic observations should be performed during grading to verify and/or further evaluate geologic conditions. Although unlikely, if adverse geologic structures are encountered, supplemental recommendations and earthwork may be warranted.

3. Existing topsoil/colluvium and upper portion of decomposed granitic materials to depths generally ranging from approximately 2½ to 5 feet are considered unsuitable for the support of settlement-sensitive structures in their present condition, based on current industry standards. These materials are potentially compressible in their present condition, and may be subject to differential settlement. Mitigation in the form of removal and recompaction is recommended.

4. In general and based upon the available data to date, regional groundwater is not expected to be a major factor during development of the site.

5. Due to the nature of the site materials, seepage may be encountered throughout the site along with seasonal perched water within any other drainage areas. In addition, seepage may be encountered in "daylighted" joint systems within the bedrock. Thus, subdrainage systems for the control of localized groundwater seepage should be anticipated. The proposed locations of such drains can be delineated at the grading plan review stage of planning. Owing to the nature of site materials, seepage may occur after the site is developed, and should be anticipated. Should this occur, this office could provide mitigative recommendations at that time. Homeowners and any homeowners association should be notified of the above.

6. Due to the non-cohesive nature of some of the onsite materials, some caving and sloughing may be anticipated to be a factor in subsurface excavations and trenching. Therefore, current local and state/federal safety ordinances for subsurface trenching should be enforced.

7. Based on the available data, gross stability should not pose a significant constraint to development; however, proposed cut slopes should be further evaluated when site development plans are available, and during site grading, so that recommendations for mitigation can be provided, as warranted. Such recommendations may include stabilization fills/buttresses, etc. Fill slope construction with onsite soils at a 2:1 (h:v) inclination should be considered erosive, and will require surficial, biotechnical slope protection erosion and maintenance plans, similar to typical development projects within these earth materials elsewhere in southern California.

8. General Earthwork and Grading Guidelines are provided at the end of this report as Appendix G. Specific recommendations are provided below.

9. Our laboratory test results and experience on nearby sites related to expansion potential indicate that soils generally with very low to low expansion indices (locally) underlie the site. This should be considered during project design. Foundation

design and construction recommendations are provided herein for very low to medium expansion potential classifications.

10. The seismicity-acceleration values provided herein should be considered during the design of the proposed development. Final seismic shaking parameters will be provided at the conclusion of rough grading when as-built fill depths are known.

11. Some oversize materials and associated excavation and placement difficulty may be anticipated during grading and utility trenching.

## EARTHWORK CONSTRUCTION RECOMMENDATIONS

### General

All grading should conform to the guidelines presented in the 2019 CBC (CBSC, 2019a), the City, and as recommended herein. When Code references are not in agreement, the more stringent code should be followed. During earthwork construction, all site preparation and the general grading procedures of the contractor should be observed and the fill selectively tested by a representative(s) of GSI. If unusual or unexpected conditions are exposed in the field, they should be reviewed by this office and, if warranted, modified and/or additional recommendations will be offered. All applicable requirements of local and national construction and general industry safety orders, the Occupational Safety and Health Act (OSHA), and the Construction Safety Act should be met. It is the onsite general contractor's and individual subcontractors' responsibility to provide a safe working environment for our field staff who are onsite. GSI does not consult in the area of safety engineering.

### Demolition/Grubbing

1. Vegetation and any miscellaneous debris should be removed from the areas of proposed grading.

2. Any existing subsurface structures uncovered during the recommended removal should be observed by GSI so that appropriate remedial recommendations can be provided.

3. Cavities or loose soils remaining after demolition and site clearance should be cleaned out and observed by the soil engineer. The cavities should be replaced with fill materials that have been moisture conditioned to *at least* optimum moisture content and compacted to at least 90 percent of the laboratory standard.

4. Onsite septic systems (if encountered) should be removed in accordance with San Diego County Department of Environmental Health (DEH) standards/guidelines.

## Treatment of Existing Ground

1. All undocumented fill (including test pits), topsoil/colluvium, highly weathered bedrock and/or decomposed granitics should be removed, cleaned of deleterious materials, as recommended, moisturized, and recompacted if not removed by proposed excavation within areas proposed for settlement-sensitive improvements. Thicknesses of these materials are discussed in earlier sections of this report. Variations from these thicknesses should be anticipated. Anticipated removal depths will be on the order of about 2½ to 5 feet below existing grade; however, deeper removals cannot be precluded. Actual depths of removals will be evaluated in the field during grading by the soil engineer.

2. Subsequent to the above removals, the upper 12 inches of the exposed subsoils/bedrock should be scarified, brought to at least optimum moisture content, and recompacted to a minimum relative compaction of 90 percent of the laboratory standard.

3. Existing topsoil/colluvium, highly weathered granitic bedrock, and decomposed granitics may be reused as compacted fill provided that major concentrations of vegetation and miscellaneous debris are removed prior to or during fill placement.

4. Localized deeper removals may be recommended due to buried drainage channel meanders or dry porous materials. The project soils engineer/geologist should observe all removal areas during the grading.

5. Cut portions of any fill-over-cut slopes should be excavated first, so that an evaluation of the suitability of the cut portions for its intended use can be made by the geotechnical consultant.

## Fill Placement

Following scarification of the bottom of the remedial grading excavations, the reused onsite soils and import (if necessary) should be placed in ±6- to ±8-inch lifts, cleaned of vegetation and debris, moisture conditioned to at least the soil's optimum moisture content for granular soils or 2 to 3 percent above the soil's optimum moisture content for silty or clayey soils, and compacted to achieve a minimum relative compaction of 90 percent of the laboratory standard (ASTM D 1557). Fill materials should not contain rock constituents greater than 12 inches in any dimension.

## Import Soils

If import fill is necessary, a sample of the soil import should be evaluated by this office prior to importing, in order to assure compatibility with the onsite soils and the recommendations presented in this report. If non-manufactured materials are used, environmental documentation for the export site should be provided for GSI review. At

least five business days of lead time should be allowed by builders or contractors for proposed import submittals. This lead time will allow for environmental document review, particle size analysis, laboratory standard, expansion testing, and blended import/native characteristics as deemed necessary. If earthwork mitigation of expansive soils is not incorporated into the grading of the site import soils may have an expansion index of 90 or less. Import for the use of expansive soil mitigation should be non-detrimentally expansive (i.e., E.I. less than 21 and P.I. less than 15). The use of subdrains at the bottom of the fill cap may be necessary, and may be subsequently recommended based on compatibility with onsite soils. Import soils for use behind retaining walls should conform to the criteria presented in the retaining wall sections of this report.

**Transition Areas**

In order to reduce the potential for differential settlements between cut and fill materials, materials of differing expansion potentials, or dense bedrock (cut lots), the entire cut portion of cut/fill transitions within proposed residential lots should be overexcavated to a minimum depth of 3 to 4 feet below finish grade and/or a maximum ratio of fill thickness on the lots of 3:1 (maximum to minimum) and replaced with compacted fill, whichever is deeper. The intent of these recommendations are to have a minimum 2 feet of fill beneath all footings, and have the lot subgrade slope to the streets.

**Graded Slope Construction**

Graded cut slopes should be observed by a representative of this firm during grading to evaluate the presence of adverse geologic conditions (i.e., exposures of undocumented fill, colluvium or highly weathered/fractured granitic bedrock and/or structures (i.e., daylighted weak bedding, joint, and/or fracture planes). Should adverse conditions be exposed, mitigation measures such as the construction of stability fills would be recommended. Such mitigation measures may include but not necessarily be limited to: inclining cut slopes to flatter gradients, stabilization fills, etc. A detail showing recommended stabilization fills is provided in Appendix G.

Graded fill slopes should be properly keyed and benched, and be compacted to at least 90 percent relative compaction throughout, including the slope face. Compaction at the slope face may be achieved by either overbuilding and trimming back fill slopes or back-rolling fill slopes with compaction equipment every 4 vertical feet.

Graded slopes should receive vegetative covering immediately following construction. In the interim between construction and the establishment of landscape cover, the graded slopes should receive City approved erosion control devices.

**Temporary Slopes**

Temporary slopes for excavations greater than 4 feet, but less than 20 feet in overall height should conform to CAL-OSHA and/or OSHA requirements for Type “B” soils. Temporary

slopes, up to a maximum height of ±20 feet, may be excavated at a 1:1 (h:v) gradient, or flatter, provided groundwater and/or running sands are not exposed. Construction materials or soil stockpiles should not be placed within 'H' of any temporary slope where 'H' equals the height of the temporary slope. All temporary slopes should be observed by a licensed engineering geologist and/or geotechnical engineer prior to worker entry into the excavation.

**Subdrains**

If perched groundwater or seeps are observed within the remedial excavations, or buried drainages exist, subdrains may be recommended. Subdrains should consist of a 4-inch diameter perforated drain pipe (SDR 35 or approved equivalent) that is encased in at least 1 cubic foot of gravel, and wrapped in filter fabric (Mirafi 140N or approved equivalent). The subdrain should gravity flow (minimum 1 percent grade) to an approved drainage facility.

## EARTHWORK FACTORS

Preliminary earthwork factors (shrinkage and bulking) for the subject property have been estimated based upon a review of work performed onsite to date. It is apparent that shrinkage would vary with depth and with areal extent over the site based on existing conditions, previous site use, and the distribution of earth materials. The various factors associated with these conditions are generally difficult to define, with any great detail, in a three-dimensional fashion. Therefore, the information presented below represents average shrinkage/bulking values of the materials that are anticipated to be encountered during grading. The estimated average thickness of each material type is indicated next to the type of earth material:

| EARTH MATERIAL | SHRINKAGE/BULKING (PERCENT) |
|---|---|
| Colluvium/Topsoil | 10 to 15% shrinkage |
| Bedrock (Granitics) | 5% shrinkage to 12% bulking |

Colluvium/topsoil is generally considered to occur across the majority of the site. The general distribution of other earth materials is presented on the Test Pit Location Map (Plate 1). The above factors indicate that earthwork balance of the site would be difficult to define and flexibility in design is essential to achieve a balanced end product. It should be noted that the degree of compaction obtained by the grading contractor may affect shrinkage or bulking values by as much as 5 percent.

## ROCK PLACEMENT GUIDELINES

The need for rock disposal may be recommended during grading operations on the site. Generally for the purpose of this report, the materials may be described as either about 8 inches or less, greater than about 8 and less than 36 inches, and greater than 36 inches. These three categories set the basic dimensions for where and how the materials are to be placed. Overexcavation may be considered with respect to rock hardness and excavation difficulty during trenching, but is not a geotechnical requirement.

### Materials ±8 Inches in Diameter or Less

Since rock fragments, along with the overburden materials, are anticipated to be a part of the materials used in the grading of the site, a criteria is needed to facilitate the placement of these materials within guidelines which would be workable during the rough grading, post-grading improvements, and serve as acceptable compacted fill.

1. Fines and rock fragments about 8 inches or less in diameter may be placed as compacted fill cap materials within the building pads, slopes, and street areas as described below. The rock fragments and fines should be brought to at least optimum moisture content and compacted to a minimum relative compaction of 90 percent of the laboratory standard.

2. The purpose for the 8-inch-diameter limits is to allow reasonable sized rock fragments into the fill under selected conditions (optimum moisture or above) surrounded with compacted fines. The 8-inch-diameter size also allows a greater volume of the rock fragments to be handled during grading, while staying in reasonable limits for later onsite excavation equipment (backhoes and trenchers) to excavate footings and utility lines.

3. Fill materials about 8 inches or less in diameter should be placed, but not limited to, within the upper 5 feet of proposed fill pads, the upper 3 feet of overexcavated cut areas of cut fill transition pads, and the entire street right-of-way width, including the proposed overexcavated areas and replacement fill areas, from the depth of the lowest utility to subgrade. Overexcavation is discussed previously in this report.

### Materials Greater Than ±8 and Less Than 36 Inches in Diameter

1. During the process of bedrock excavation, a significant amount of rock fragments, or constituents, larger than about 8 inches in diameter may be generated. These significant amounts of oversized materials between greater than about 8 and less than 36 inches in diameter may be incorporated into the fills utilizing a series of rock blankets.

2. Each rock blanket should consist of rock fragments of approximately greater than about 8 and less than 36 inches in diameter along with fines generated from the

proposed cuts and overburden materials from removal areas. The blankets should be limited to 24 to 36 inches in thickness and should be placed with granular fines which are flooded into and around the rock fragments.

3. Rock blankets should be restricted to areas which are at least 1 foot below the lowest utility invert within the street right-of-way, 5 feet below finish grade on the proposed fill lots, and a minimum of 10 horizontal feet from any fill slope surface.

4. Compaction may be achieved by utilizing wheel rolling methods with scrapers and water trucks, track-walking by bulldozers, and sheepsfoot tampers.

5. Each rock blanket should be completed with its surface compacted prior to placement of any subsequent rock blanket or rock windrow.

**Materials Greater Than 36 Inches in Diameter**

1. Oversize rock greater than 36 inches in diameter should be placed in single rock windrows. The windrows should be at least 15 feet or an equipment width apart, whichever is greatest.

2. The void spaces between rocks in windrows should be filled with the more granular soils by flooding them into place.

3. A minimum vertical distance of 3 feet between soil fill and rock lift should be maintained. Also, the windrows should be staggered from lift to lift. Rock windrows should not be placed closer than 15 feet from the face of fill slopes.

4. Larger rocks too difficult to be placed into windrows may be individually placed into a dozer trench. Each trench should be excavated into the compacted fill, or dense natural ground, a minimum of 1 foot deeper than the size of the rock to be buried. After the rocks are placed in the trench (not immediately adjacent to each other), granular fill material should be flooded into the trench to fill the voids.

5. The oversize rock trenches should be no closer together than 15 feet at a particular elevation and at least 15 feet from any slope face. Trenches at higher elevations should be staggered and there should be 4 feet of compacted fill between the top of one trench and the bottom of the next higher trench. Placement of rock into these trenches should be under the full-time observation of the soils engineer.

6. Consideration should be given to using oversize materials in open space "green belt" areas that would be designated as non-structural fills.

## PRELIMINARY SLOPE STABILITY EVALUATION

It is our understanding that slopes greater than 5 feet are not planned at the site. If developments are changed to include slopes greater than 5 feet, the slopes should be evaluated by GSI prior to grading.

## PRELIMINARY RECOMMENDATIONS - FOUNDATIONS

### General

Preliminary recommendations for foundation design and construction are provided in the following sections. These preliminary recommendations have been developed from our understanding of the currently planned site development, site observations, subsurface exploration, laboratory testing, and engineering analyses. Foundation design should be re-evaluated at the conclusion of site grading/remedial earthwork for the as-graded soil conditions. Although not anticipated, revisions to these recommendations may be necessary. In the event that the information concerning the proposed development plan is not correct, or any changes in the design, lot layouts, or loading conditions of the proposed buildings are made, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report are modified or approved in writing by this office.

The information and recommendations presented in this section are not meant to supersede design by the project structural engineer or civil engineer specializing in structural design. Upon request, GSI could provide additional input/consultation regarding soil parameters, as related to foundation design.

In the following subsections, GSI provides preliminary design and construction recommendations for conventional foundation and slab-on-grade floor systems underlain and laterally juxtaposed by non-detrimentally expansive soils (E.I. $\leq$ 20 and P.I. < 15) and post-tensioned, and mat foundation systems within the influence of detrimentally expansive soils (E.I. > 20 and P.I. > 14). GSI's recommended earthwork mitigation for the treatment of expansive soils will be necessary for the use of conventional foundation and slab-on-grade floor systems.

### Preliminary Foundation Design - Shallow Foundations

1. The foundation systems should be designed and constructed in accordance with guidelines presented in the 2019 CBC.

2. An allowable bearing value of 2,000 pounds per square foot (psf) may be used in the design of continuous spread footings that maintain a minimum width of 12 inches and a minimum depth of 12 inches below the lowest adjacent grade. This value may also be used for the design of isolated spread footings that maintain a

minimum dimension of 24 square inches and a minimum depth of 24 inches below the lowest adjacent grade. Foundation embedment depth excludes concrete slabs-on-grade, and/or slab underlayment. The allowable bearing value may be increased by 20 percent for each additional 12 inches in footing depth to a maximum value of 2,500 psf. The allowable bearing value may be increased by one-third when considering short duration seismic or wind loads. The above values may be used provided that the footings are founded into engineered fill approved by the geotechnical consultant.

3. For foundations deriving passive resistance from approved non-detrimentally expansive engineered fill, a passive earth pressure may be computed as an equivalent fluid having a density of 250 pcf, with a maximum earth pressure of 2,500 psf. The upper 6 inches of passive pressure should be neglected if not confined by slabs or pavement. Where foundations are laterally supported by expansive soils (E.I. of 21 or greater and plasticity index of 15 or greater), the passive earth pressure should be reduced to 125 pcf with a maximum earth pressure of 1,250 psf.

4. For lateral sliding resistance, a 0.30 coefficient of friction may be utilized for a concrete to soil contact when multiplied by the dead load. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

5. All footing setbacks from slopes should comply with Figure 1808.7.1 of the 2019 CBC. GSI recommends a minimum horizontal setback distance of 7 feet as measured from the bottom, outboard edge of the footing to the slope face. Foundations should also extend below a 1:1 (h:v) projection up from the bottom outside edge of remedial grading excavations.

6. Footings for structures adjacent to retaining walls should be deepened so as to extend below a 1:1 (h:v) projection up from the heel of the wall footing. Otherwise, the retaining wall should be designed for the appropriate surcharge.

7. Provided that the earthwork and foundation recommendations in this report are adhered, foundations bearing on approved non-detrimentally expansive, engineered fil overlying dense formational materials should be minimally designed to accommodate a total static settlement of 1 inch and a differential static settlement of 1-inch over a 40-foot horizontal span (angular distortion = 1/480), and up to ½ inch of seismic differential settlement over a 40-foot horizontal span (seismic angular distortion = 1/960).

## PRELIMINARY FOUNDATION CONSTRUCTION RECOMMENDATIONS

Current laboratory testing indicates that onsite soils do not meet the criteria of detrimentally expansive soils as defined in Section 1803.5.2 of the 2019 CBC. The following foundation construction recommendations are presented as a minimum criteria from a soils engineering viewpoint. The following foundation construction recommendations are intended to support planned improvements underlain by at least 7 feet of non-detrimentally expansive soils (i.e., E.I.<21 and P.I. <15). Should foundations be underlain by expansive soils at depths of less than 7 feet, they will require specific design to mitigate expansive soil effects as required in Sections 1808.6.1 or 1808.6.2 of the 2019 CBC (CBSC, 2019).

1. Exterior and interior footings should be founded into engineered fill or bedrock at a minimum depth of 12 inches to18 inches below the lowest adjacent grade, for planned, one- or two-story floor loads, respectively, with footing width per Code. Isolated, exterior column and panel pads, or wall footings, should be at least 24 inches, square, and founded at a minimum depth of 24 inches into properly engineered fill or bedrock. Footings constructed when using grading option 2 will be deeper. All footings should be minimally reinforced with four No. 4 reinforcing bars, two placed near the top and two placed near the bottom of the footing. Reinforcement of pad footing should be provided by the projects structural engineer.

2. All interior and exterior column footings, and perimeter wall footings, should be tied together via grade beams in at least one direction. The grade beam should be at least 12 inches square in cross section, and should be provided with a minimum of one No.4 reinforcing bar at the top, and one No.4 reinforcing bar at the bottom of the grade beam. The base of the reinforced grade beam should be at the same elevation as the adjoining footings.

3. A grade beam, reinforced as previously recommended and at least 12 inches square, should be provided across large (garage) entrances. The base of the reinforced grade beam should be at the same elevation as the adjoining footings.

4. A minimum concrete slab-on-grade thickness of 5 inches is recommended. Recommendations for floor slab underlayment are presented in a later section of this report.

5. Concrete slabs should be reinforced with a minimum of No. 3 reinforcement bars placed at 18-inch on centers, in two horizontally perpendicular directions (i.e., long axis and short axis).

6. All slab reinforcement should be supported to ensure proper mid-slab height positioning during placement of the concrete. "Hooking" of reinforcement is not an acceptable method of positioning.

7. Specific slab subgrade pre-soaking is recommended for these soil conditions. Prior to the placement of underlayment sand and vapor retarder, GSI recommends that the slab subgrade materials be moisture conditioned to at least optimum moisture content to a minimum depth of 12 inches. Slab subgrade pre-soaking should be evaluated by the geotechnical consultant within 72 hours of the placement of the underlayment sand and vapor retarder.

8. Soils generated from footing excavations to be used onsite should be compacted to a minimum relative compaction of 90 percent of the laboratory standard (ASTM D 1557), whether the soils are to be placed inside the foundation perimeter or in the yard/right-of-way areas. This material must not alter positive drainage patterns that direct drainage away from the structural areas and toward the street.

9. Reinforced concrete mix design should conform to "Exposure Class S0, W0, and C1" in Table 19.3.2.1 of ACI 318R

**Post-Tensioned Slab Systems - Low Expansion (E.I. 21-50) and Plasticity >15, or Medium Expansion (E.I. 51-90)**

Post-tension foundations may be used to mitigate the damaging shrink/swell effects of expansive soils on the planned foundations and slab-on-grade floors. The post-tension foundation designer may elect to exceed the minimal recommendations, provided herein, to increase slab stiffness performance. Post-tension (PT) design may be either ribbed or mat-type. The latter is also referred to as uniform thickness foundation (UTF). The use of a UTF is an alternative to the traditional ribbed-type. The UTF offers a reduction in grade beams. That is to say a UTE typically uses a single perimeter grade beam and possible "shovel" footings, but has a thicker slab than the ribbed-type.

The information and recommendations presented in this section are not meant to supercede design by a registered structural engineer or civil engineer qualified to perform post-tensioned design. Post-tensioned foundations should be designed using sound engineering practice and be in accordance with local and 2019 CBC requirements. Upon request, GSI can provide additional data/consultation regarding soil parameters as related to post-tensioned foundation design.

From a soil expansion/shrinkage standpoint, a common contributing factor to distress of structures using post-tensioned slabs is a "dishing" or "arching" of the slabs. This is caused by the fluctuation of moisture content in the soils below the perimeter of the slab primarily due to onsite and offsite irrigation practices, climatic and seasonal changes, and the presence of expansive soils. When the soil environment surrounding the exterior of the slab has a higher moisture content than the area beneath the slab, moisture tends to migrate inward, underneath the slab edges to a distance beyond the slab edges referred to as the moisture variation distance. When this migration of water occurs, the volume of the soils beneath the slab edges expands and causes the slab edges to lift in response.

This is referred to as an edge-lift condition. Conversely, when the outside soil environment is drier, the moisture transmission regime is reversed and the soils underneath the slab edges lose their moisture and shrink. This process leads to dropping of the slab at the edges, which leads to what is commonly referred to as the center lift condition. A well-designed, post-tensioned slab having sufficient stiffness and rigidity provides a resistance to excessive bending that results from non-uniform swelling and shrinking slab subgrade soils, particularly within the moisture variation distance, near the slab edges. Other mitigation techniques typically used in conjunction with post-tensioned slabs consist of a combination of specific soil pre-saturation and the construction of a perimeter "cut-off" wall grade beam. Soil pre-saturation consists of moisture conditioning the slab subgrade soils prior to the post-tension slab construction. This effectively reduces soil moisture migration from the area located outside the building toward the soils underlying the post-tension slab. Perimeter cut-off walls are thickened edges of the concrete slab that impedes both outward and inward soil moisture migration.

## Slab Subgrade Pre-Soaking

Pre-moistening of the slab subgrade soil is recommended for detrimentally expansive soil conditions. The moisture content of the subgrade soils should be equal to or greater than optimum moisture to a depth equivalent to the perimeter grade beam or cut-off wall depth in the slab areas (typically 12, 18, 24, and 36 inches) for low, medium, high, and very high expansive soil conditions.

Pre-moistening and/or pre-soaking should be evaluated by the soils engineer 72 hours prior to vapor retarder placement. In summary:

| EXPANSION POTENTIAL | PAD SOIL MOISTURE | CONSTRUCTION METHOD | SOIL MOISTURE RETENTION |
|---|---|---|---|
| Low (E.I. = 21-50) | Upper 12 inches of pad soil moisture 2 percent over optimum (or 1.2 times) | Wetting and/or reprocessing | Periodically wet or cover with plastic after trenching. Evaluation 72 hours prior to placement of concrete. |
| Medium (E.I. = 51-90) | Upper 18 inches of pad soil moisture 2 percent over optimum (or 1.2 times) | Berm and flood or wetting and reprocessing | Periodically wet or cover with plastic after trenching. Evaluation 72 hours prior to placement of concrete. |

## Perimeter Cut-Off Walls

Perimeter cut-off walls should be at least 12, 18, 24, and 36 inches deep for low, medium, high, and very high expansive soil conditions, respectively. The cut-off walls may be integrated into the slab design or independent of the slab. The cut-off walls should be a

minimum of 6 inches thick (wide). The bottom of the perimeter cut-off wall should be designed to resist tension, using cable or reinforcement per the structural engineer.

## Post-Tensioned Foundation Design

The following recommendations for design of post-tensioned slabs have been prepared in general compliance with the requirements of the recent Post Tensioning Institute's (PTI's) publication titled "Standard Requirements for Design and Analysis of Shallow Post-tensioned Concrete Foundations on Expansive Soils" (PTI, 2012), together with its subsequent errata (PTI, 2013 and 2014).

## Soil Support Parameters

The recommendations for soil support parameters have been provided based on the typical soil index properties for soils that are very low to very high in expansion potential. The soil index properties are typically the upper bound values based on our experience and practice in the southern California area. Additional testing is recommended either during or following grading, and prior to foundation construction to further evaluate the soil conditions within the upper 7 to 15 feet of pad grade. The following table presents suggested minimum coefficients to be used in the Post-Tensioning Institute design method.

| | |
|---|---|
| Thornthwaite Moisture Index | -20 inches/year |
| Correction Factor for Irrigation | 20 inches/year |
| Depth to Constant Soil Suction | 7 feet or overexcavation depth to bedrock |
| Constant soil Suction (pf) | 3.6 |
| Moisture Velocity | 0.7 inches/month |
| Effective Plasticity Index (P.I.)* | 15-45 |
| * - The effective plasticity index should be evaluated for the upper 7 to 15 feet of foundation soils either during or following grading. | |

Based on the above, the recommended soil support parameters are tabulated below:

| DESIGN PARAMETERS | VERY LOW TO LOW EXPANSION (E.I. = 0-50) | MEDIUM EXPANSION(E.I. = 51-90) |
|---|---|---|
| $e_m$ center lift | 9.0 feet | 8.7 feet |
| $e_m$ edge lift | 5.2 feet | 4.5 feet |
| $y_m$ center lift | 0.4 inches | 0.5 inches |

| DESIGN PARAMETERS | VERY LOW TO LOW EXPANSION (E.I. = 0-50) | MEDIUM EXPANSION(E.I. = 51-90) |
|---|---|---|
| $y_m$ edge lift | 0.7 inch | 1.3 inch |
| Bearing Value [1] | 1,000 psf | 1,000 psf |
| Lateral Pressure | 250 psf | 175 psf |
| Subgrade Modulus (k) | 100 pci/inch | 85 pci/inch |
| Minimum Perimeter Footing Embedment [2] | 12 inches | 18 inches |

[1] Internal bearing values within the perimeter of the post-tension slab may be increased to 2,000 psf for a minimum embedment of 12 inches, then by 20 percent for each additional foot of embedment to a maximum of 2,500 psf.
[2] As measured below the lowest adjacent compacted subgrade surface without landscape layer or sand underlayment.
Note: The use of open bottomed raised planters adjacent to foundations will require more onerous design parameters.

The parameters are considered minimums and may not be adequate to represent all expansive soils and site conditions such as adverse drainage and/or improper landscaping and maintenance. The above parameters are applicable provided the structure has positive drainage that is maintained away from the structure. In addition, no trees with significant root systems are to be planted within 15 feet of the perimeter of foundations. Therefore, it is important that information regarding drainage, site maintenance, trees, settlements, and effects of expansive soils be passed on to future all interested/affected parties. The values tabulated above may not be appropriate to account for possible differential settlement of the slab due to other factors, such as excessive settlements. If a stiffer slab is desired, alternative Post-Tensioning Institute ([PTI] third edition) parameters may be recommended. All exterior columns not supported by the post-tensioned foundation should be supported by 24 square inch isolated footings extending at least 24 inches into approved engineered fill. Exterior column footings should be tied to the post-tensioned foundation with 12 square inch, reinforced grade beams in at least two directions.

## MAT FOUNDATIONS

In lieu of using a post-tensioned foundation to resist expansive soil effects, the Client may consider a mat foundation which uses steel bar reinforcement instead of post-tensioned cables. The structural engineer may supercede the following recommendations based on the planned building loads and use. WRI (Wire Reinforcement Institute) methodologies for design may be used. Mat foundations may be incorporate exterior and interior stiffening beams or a uniform thickness slab. Minimum mat embedment should be 12 inches below the lowest adjacent grade.

### Mat Foundation Design

The design of mat foundations should incorporate the vertical modulus of subgrade reaction. This value is a unit value for a 1-foot square footing and should be reduced in

accordance with the following equation when used with the design of larger foundations. This is assumes that the bearing soils will consist of engineered fills with an average relative compaction of 90 percent of the laboratory (ASTM D 1557), overlying dense formational earth materials.

$$K_R = K_S\left[\frac{B+1}{2B}\right]^2$$

where: $K_S$ = unit subgrade modulus
$K_R$ = reduced subgrade modulus
B = foundation width (in feet)

The modulus of subgrade reaction ($K_S$) and effective plasticity index (P.I.) to be used in mat foundation design for various expansive soil conditions are presented in the following table. The effective plasticity index for the upper 7 to 15 feet of the foundation soils should be performed during or following grading. Lateral pressures for mat foundation design should conform to those previously provided in the "Post-Tensioned Foundation Systems" section of this report.

| VERY LOW TO LOW EXPANSION (E.I. = 0-50) | MEDIUM EXPANSION(E.I. = 51-90) |
|---|---|
| $K_s$ =100 pci/inch, PI <15 | $K_s$ =85 pci/inch, PI = 25 |

All exterior columns not supported by the mat foundation should be supported by 24 square inch isolated footings extending at least 24 inches into approved engineered fill. Exterior column footings should be tied to the mat foundation with 12 square inch, reinforced grade beams in at least 2 directions.

**Confirmation Testing for Final Foundation Design**

Following the completion of site grading, the expansion index, and corrosion potential of soils exposed near finish grade should be re-evaluated. The results of the recommended testing would supercede these preliminary recommendations.

## SOIL MOISTURE TRANSMISSION CONSIDERATIONS

GSI has evaluated the potential for vapor or water transmission through the concrete floor slab, in light of typical floor coverings and improvements. Please note that slab moisture emission rates range from about 2 to 27 lbs/24 hours/1,000 square feet from a typical slab (Kanare, 2005), while floor covering manufacturers generally recommend about 3 lbs/24 hours as an upper limit. The recommendations in this section are not

intended to preclude the transmission of water or vapor through the foundation or slabs. Foundation systems and slabs shall not allow water or water vapor to enter into the structure so as to cause damage to another building component or to limit the installation of the type of flooring materials typically used for the particular application (State of California, 2020). These recommendations may be exceeded or supplemented by a water "proofing" specialist, project architect, or structural consultant. Thus, the client will need to evaluate the following in light of a cost vs. benefit analysis (owner expectations and repairs/replacement), along with disclosure to all interested/affected parties. It should also be noted that vapor transmission will occur in new slab-on-grade floors as a result of chemical reactions taking place within the curing concrete. Vapor transmission through concrete floor slabs as a result of concrete curing has the potential to adversely affect sensitive floor coverings depending on the thickness of the concrete floor slab and the duration of time between the placement of concrete, and the floor covering. It is possible that a slab moisture sealant may be needed prior to the placement of sensitive floor coverings if a thick slab-on-grade floor is used and the time frame between concrete and floor covering placement is relatively short.

Considering the E.I. test results presented herein, and known soil conditions in the region, the anticipated typical water vapor transmission rates, floor coverings, and improvements (to be chosen by the Client and/or project architect) that can tolerate vapor transmission rates without significant distress, the following alternatives are provided:

- Concrete slabs should be increased in thickness.

- Concrete slab underlayment should consist of a 15-mil vapor retarder, or equivalent, with all laps sealed per the 2019 CBC and the manufacturer's recommendation. The vapor retarder should comply with the ASTM E 1745 - Class A criteria, and be installed in accordance with ACI 302.1R-04 and ASTM E 1643.

- The 15-mil vapor retarder (ASTM E 1745 - Class A) shall be installed per the recommendations of the manufacturer, including all penetrations (i.e., pipe, ducting, rebar, etc.).

- Concrete slabs, including the garage areas, shall be underlain by 2 inches of clean, washed sand (SE $\geq$ 30) above a 15-mil vapor retarder (ASTM E-1745 - Class A, per Engineering Bulletin 119 [Kanare, 2005]) installed per the recommendations of the manufacturer, including all penetrations (i.e., pipe, ducting, rebar, etc.). The manufacturer shall provide instructions for lap sealing, including minimum width of lap, method of sealing, and either supply or specify suitable products for lap sealing (ASTM E 1745), and per Code.

  ACI 302.1R-04 (2004) states "If a cushion or sand layer is desired between the vapor retarder and the slab, care must be taken to protect the sand layer from taking on additional water from a source such as rain, curing, cutting, or cleaning.

Wet cushion or sand layer has been directly linked in the past to significant lengthening of time required for a slab to reach an acceptable level of dryness for floor covering applications." Therefore, additional observation and/or testing will be necessary for the cushion or sand layer for moisture content, and relatively uniform thicknesses, prior to the placement of concrete.

- The vapor retarder shall be underlain by 2 inches of sand (SE $\geq$ 30) placed directly on the prepared, moisture conditioned, subgrade and should be sealed to provide a continuous retarder under the entire slab, as discussed above. As discussed previously, GSI indicated this layer of import sand may be eliminated below the vapor retarder, if laboratory testing indicates that the slab subgrade soil have a sand equivalent (SE) of 30 or greater.

- Concrete should have a maximum water/cement ratio of 0.50. This does not supercede Table 19.3.2.1 of ACI (2014) for corrosion or other corrosive requirements. Additional concrete mix design recommendations should be provided by the structural consultant and/or waterproofing specialist. Concrete finishing and workablity should be addressed by the structural consultant and a waterproofing specialist.

- Where slab water/cement ratios are as indicated herein, and/or admixtures used, the structural consultant should also make changes to the concrete in the grade beams and footings in kind, so that the concrete used in the foundation and slabs are designed and/or treated for more uniform moisture protection.

- The owner(s) should be specifically advised which areas are suitable for tile flooring, vinyl flooring, or other types of water/vapor-sensitive flooring and which are not suitable. In all planned floor areas, flooring shall be installed per the manufactures recommendations.

- Additional recommendations regarding water or vapor transmission should be provided by the architect/structural engineer/slab or foundation designer and should be consistent with the specified floor coverings indicated by the architect.

Regardless of the mitigation, some limited moisture/moisture vapor transmission through the slab should be anticipated. Construction crews may require special training for installation of certain product(s), as well as concrete finishing techniques. The use of specialized product(s) should be approved by the slab designer and water-proofing consultant. A technical representative of the flooring contractor should review the slab and moisture retarder plans and provide comment prior to the construction of the foundations or improvements. The vapor retarder contractor should have representatives onsite during the initial installation.

## PRELIMINARY WALL DESIGN PARAMETERS

### General

Based on our review (see Appendix A), the majority of onsite earth materials (disturbed soils and alluvial fan deposits) are derived from weathering of plutonic and sedimentary rocks which exhibit a very low expansion potential (E.I. 0 - 20). These materials appear to predominantly consist of silty sands with minor amounts of clay content. Due to the variability of silt and clay content within earth materials at the site, the native soil parameters may be non-uniform and therefore the recommendations provided herein consider these effects. Recommendations for the design and construction of conventional masonry retaining walls are provided herein. Recommendations for specialty walls (i.e., crib, earthstone, geogrid, etc.) can be provided upon request, and would be based on site specific conditions. If walls allow water to accumulate in the backfill or at their toe via a stormwater chamber, the water should be conveyed via a non-erosive device to an appropriate inlet, per the recommendations of the design civil engineer.

### Conventional Retaining Walls

The design parameters provided below assume that *either* very low expansive soils (typically Class 2 permeable filter material or Class 3 aggregate base) *or* native onsite materials with an expansion index up to a maximum E.I. of 50 are used to backfill any retaining wall. The type of backfill (i.e., select or native), should be specified by the wall designer, and clearly shown on the plans. Building walls, below grade, should be water-proofed. Waterproofing should also be provided for site retaining walls in order to reduce the potential for efflorescence staining.

### Retaining Wall Foundation Design

Foundation design for retaining walls should incorporate the following recommendations:

**Minimum Footing Embedment** - 24 inches below the lowest adjacent grade (excluding landscape layer [upper 6 inches]).

**Minimum Footing Width -** 24 inches

**Allowable Vertical Bearing Pressure** - An allowable vertical bearing pressure of 2,500 pcf may be used in the preliminary design of retaining wall foundations provided that the footing maintains a minimum width of 24 inches and extends at least 18 inches into approved engineered fill overlying suitable native soils. This pressure may be increased by one-third for short-term wind and/or seismic loads.

**Passive Earth Pressure** - A passive earth pressure of 275 pcf with a maximum earth pressure of 2,750 psf may be used in the preliminary design of retaining wall

foundations provided the foundation is embedded into properly compacted silty to clayey sand fill.

**Lateral Sliding Resistance** - A 0.35 coefficient of friction may be utilized for a concrete to soil contact when multiplied by the dead load. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

**Backfill Soil Density** - A soil density of 120 to 125 pcf may be used in the design of retaining wall foundations. This assumes an average engineered fill compaction of at least 90 percent of the laboratory standard (ASTM D 1557).

**Settlement -** Provided that the earthwork and foundation recommendations in this report are adhered, foundations bearing on approved non-detrimentally expansive, engineered fill should be minimally designed to accommodate a differential static settlement of 1 inch over a 40-foot horizontal span (angular distortion = 1/480).

Any retaining wall footings near the perimeter of the site, or not within areas of placed compacted fills will likely need to be deepened into relatively dense soils at depth for adequate vertical and lateral bearing support. All retaining wall footing setbacks from slopes should comply with Figure 1808.7.1 of the 2019 CBC. GSI recommends a minimum horizontal setback distance of 7 feet as measured from the bottom, outboard edge of the footing to the 2:1 (h:v) slope face.

**Restrained Walls**

Any retaining walls that will be restrained prior to placing and compacting backfill material or that have re-entrant or male corners, should be designed for an at-rest equivalent fluid pressure (EFP) of 55 pcf and 65 pcf for select and very low expansive (E.I. $\leq$ 50, P.I. $<$ 15) native (onsite) backfill, respectively. The design should include any applicable surcharge loading. For areas of male or re-entrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall (2H) laterally from the corner.

**Cantilevered Walls**

The recommendations presented below are for cantilevered retaining walls up to 10 feet high. Design parameters for walls less than 3 feet in height may be superceded by Los Angeles County regional standard design. 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 due to traffic, structures, seismic events or adverse geologic conditions. When wall configurations are finalized, the appropriate loading conditions for superimposed loads can be provided upon request.

For preliminary planning purposes, the structural consultant/wall designer should incorporate the surcharge of traffic loads on the back of retaining walls where vehicular traffic could occur within horizontal distance "H" from the back of the retaining wall (where "H" equals the wall height). The traffic surcharge may be taken as 100 psf/ft in the upper 5 feet of backfill for light truck and cars traffic. This does not include the surcharge of parked vehicles which should be evaluated at a higher surcharge to account for the effects of seismic loading. Equivalent fluid pressures for the design of cantilevered retaining walls are provided in the following table:

| SURFACE SLOPE OF RETAINED MATERIAL (HORIZONTAL:VERTICAL) | EQUIVALENT FLUID WEIGHT P.C.F. (SELECT BACKFILL)[2] | EQUIVALENT FLUID WEIGHT P.C.F. (NATIVE BACKFILL)[3] |
|---|---|---|
| Level[1] | 38 | 50 |
| 2 to 1 | 55 | 65 |

[1] Level backfill behind a retaining wall is defined as compacted earth materials, properly drained, without a slope for a distance of 2H behind the wall, where H is the height of the wall.
[2] SE $\geq$ 30, P.I. < 15, E.I. < 21, and $\leq$ 10% passing No. 200 sieve.
[3] E.I. = 0 to 50, SE $\geq$ 30, P.I. < 15, E.I. < 21, and $\leq$ 15% passing No. 200 sieve. Assumes 1 to 2 feet of gravel drain backfill be incorporated (see Details herein).

## Seismic Surcharge

For engineered retaining walls that may pose ingress or egress constraints within 6 feet of a structure, GSI recommends that such walls be evaluated for a seismic surcharge (in general accordance with 2019 CBC requirements). The site walls in this category should maintain an overturning Factor-of-Safety (FOS) of approximately 1.25 when the seismic surcharge (increment), is applied. For restrained walls, the seismic surcharge should be applied as a uniform surcharge load from the bottom of the footing (excluding shear keys) to the top of the backfill at the heel of the wall footing. This seismic surcharge pressure (seismic increment) may be taken as 15H where "H" for retained walls is the dimension previously noted as the height of the backfill to the bottom of the footing. The resultant force should be applied at a distance 0.6 H up from the bottom of the footing. For the evaluation of the seismic surcharge, the bearing pressure may exceed the static value by one-third, considering the transient nature of this surcharge. For cantilevered walls the pressure should be an inverted triangular distribution using 15H. Reference for the seismic surcharge is Section 1802.2 of the 2019 CBC. Please note this is for local wall stability only.

The 15H is derived from a Mononobe-Okabe solution for both restrained cantilever walls. This accounts for the increased lateral pressure due to shakedown or movement of the sand fill soil in the zone of influence from the wall or roughly a $45^{\circ} - \phi/2$ plane away from the back of the wall. The 15H seismic surcharge is derived from the formula:

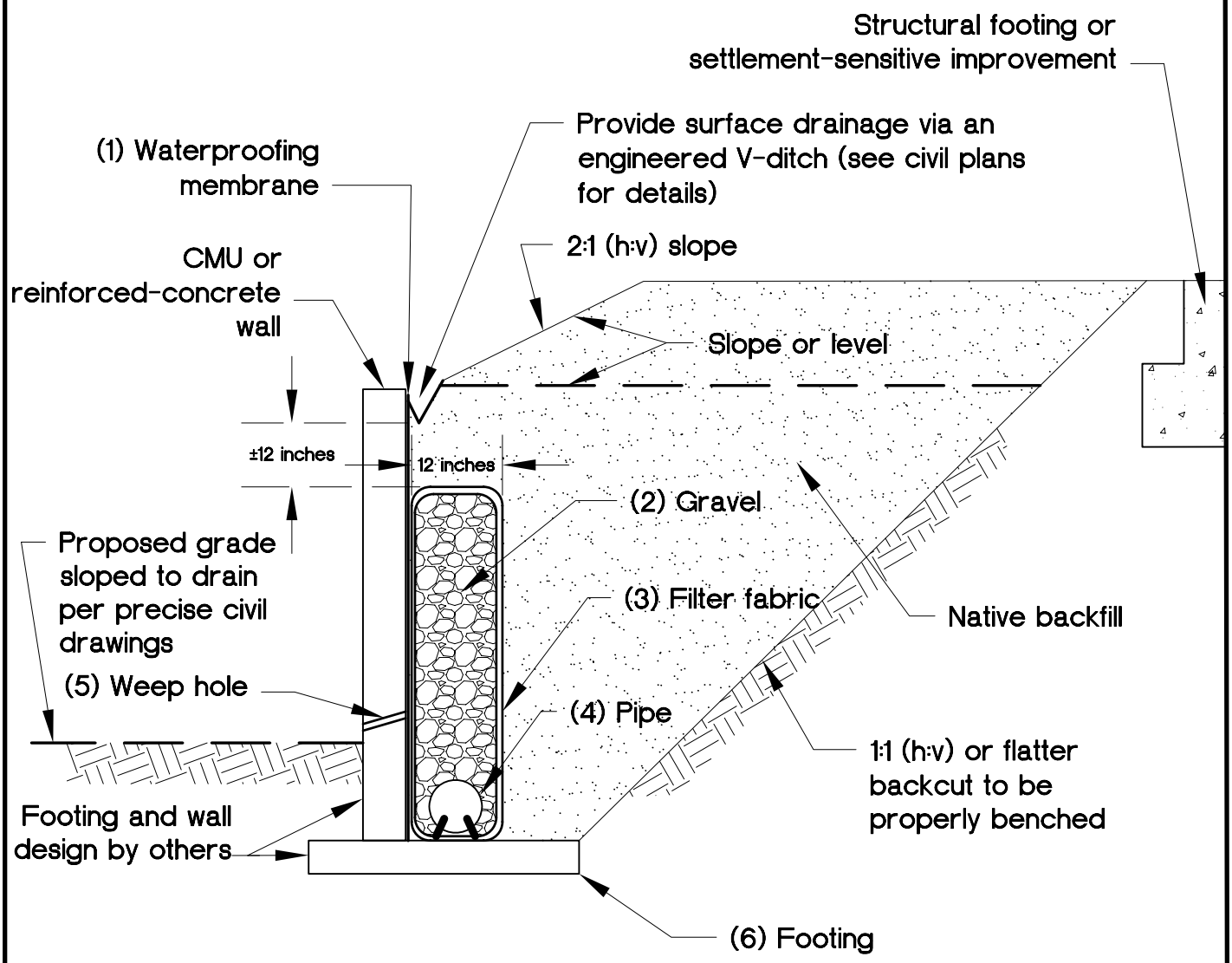
$P_h = \frac{3}{8} \bullet a_h \bullet \gamma_t H$

Where: $P_h$ = Seismic increment
$a_h$ = Probabilistic horizontal site acceleration with a percentage of "g"
$\gamma_t$ = total unit weight (120 to 125 pcf for site soils @ 90% relative compaction).
$H$ = Height of the wall from the bottom of the footing or point of pile fixity.

**Retaining Wall Backfill and Drainage**

Positive drainage must be provided behind all retaining walls in the form of gravel wrapped in geofabric and outlets. A backdrain system is considered necessary for retaining walls that are 2 feet or greater in height. Details 1, 2, and 3, present the backdrainage options discussed below. Backdrains should consist of a 4-inch diameter perforated PVC or ABS pipe encased in either Class 2 permeable filter material or ¾-inch to 1½-inch gravel wrapped in approved filter fabric (Mirafi 140N or equivalent). The drain should flow via gravity to an approved drainage facility. For select backfill, the filter material should extend a minimum of 1 horizontal foot behind the base of the walls and upward at least 1 foot. For native backfill that has up to E.I. = 20, continuous Class 2 permeable drain materials should be used behind the wall. This material should be continuous (i.e., full height) behind the wall, and it should be constructed in accordance with the enclosed Detail 1 (Typical Retaining Wall Backfill and Drainage Detail). For limited access and confined areas, (panel) drainage behind the wall may be constructed in accordance with Detail 2 (Retaining Wall Backfill and Subdrain Detail Geotextile Drain). Materials with an expansion index (E.I.) potential of greater than 20 should not be used as backfill for retaining walls. For more onerous expansive situations, backfill and drainage behind the retaining wall should conform with Detail 3 (Retaining Wall And Subdrain Detail Clean Sand Backfill). Retaining wall backfill should be moisture conditioned to 1.1 times the soil's optimum moisture content, placed in relatively thin lifts, and compacted to at least 90 percent of the laboratory standard (ASTM D 1557).

Outlets should consist of a 4-inch diameter solid PVC or ABS pipe spaced no greater than ±100 feet apart, with a minimum of two outlets, one on each end. The use of weep holes, only, in walls higher than 2 feet, is not recommended. The surface of the backfill should be sealed by pavement or the top 18 inches compacted with native soil (E.I. ≤ 50). Proper surface drainage should also be provided. For additional mitigation, consideration should be given to applying a water-proof membrane to the back of all retaining structures. The use of a waterstop should be considered for all concrete and masonry joints.




(1) Waterproofing membrane.

(2) Gravel: Clean, crushed, ¾ to 1½ inch.

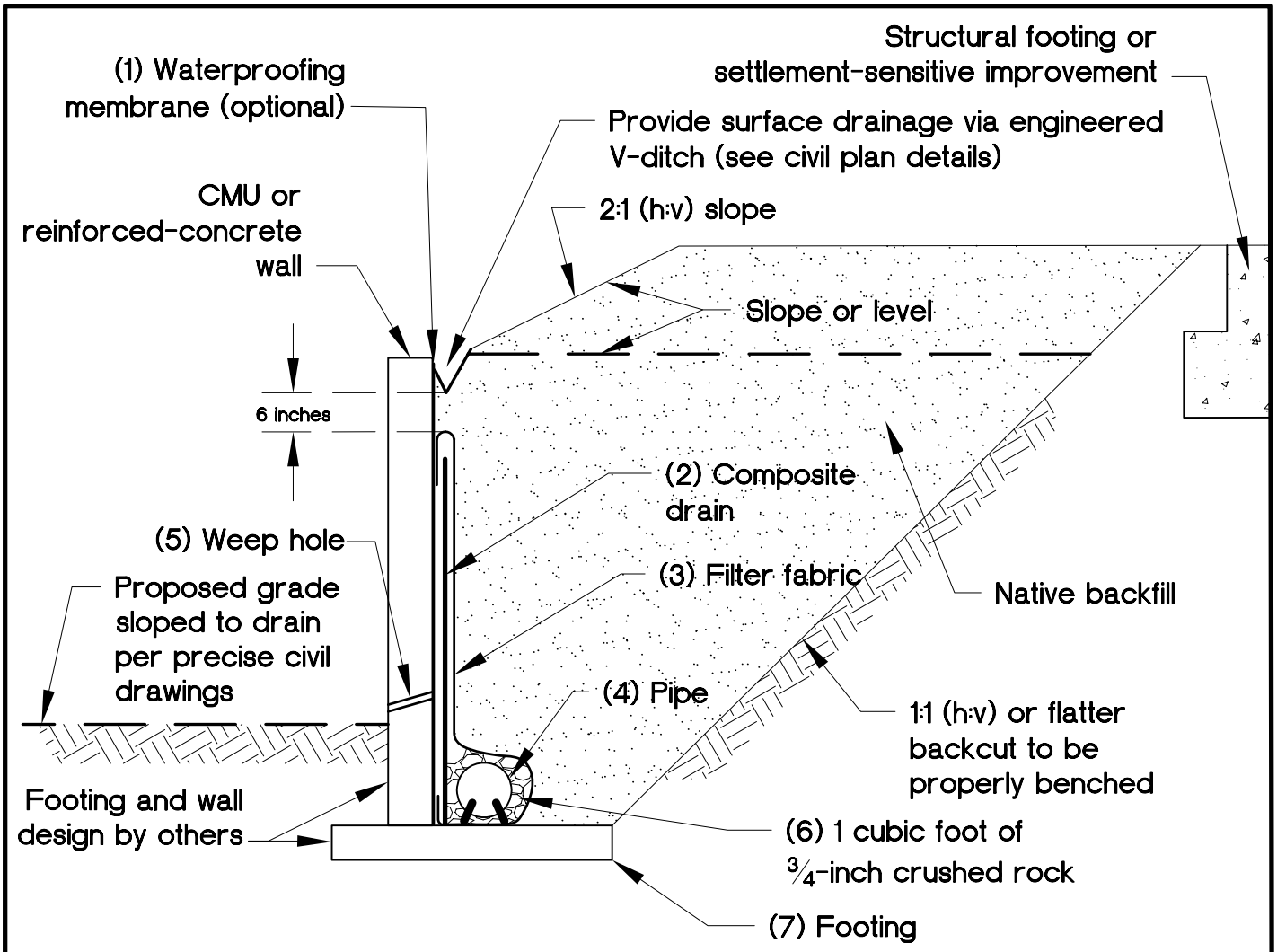
(3) Filter fabric: Mirafi 140N or approved equivalent.

(4) Pipe: 4-inch-diameter perforated PVC, Schedule 40, or approved alternative with minimum of 1 percent gradient sloped to suitable, approved outlet point (perforations down).

(5) Weep hole: Minimum 2-inch diameter placed at 20-foot centers along the wall and placed 3 inches above finished surface. Design civil engineer to provide drainage at toe of wall. No weep holes for below-grade walls.

(6) Footing: If bench is created behind the footing greater than the footing width, use level fill or cut natural earth materials. An additional "heel" drain will likely be required by geotechnical consultant.

| GeoSoils, Inc. | RETAINING WALL DETAIL – ALTERNATIVE A | Detail 1 |
|---|---|---|




(1) Waterproofing membrane (optional): Liquid boot or approved mastic equivalent.

(2) Drain: Miradrain 6000 or J-drain 200 or equivalent for non-waterproofed walls; Miradrain 6200 or J-drain 200 or equivalent for waterproofed walls (all perforations down).

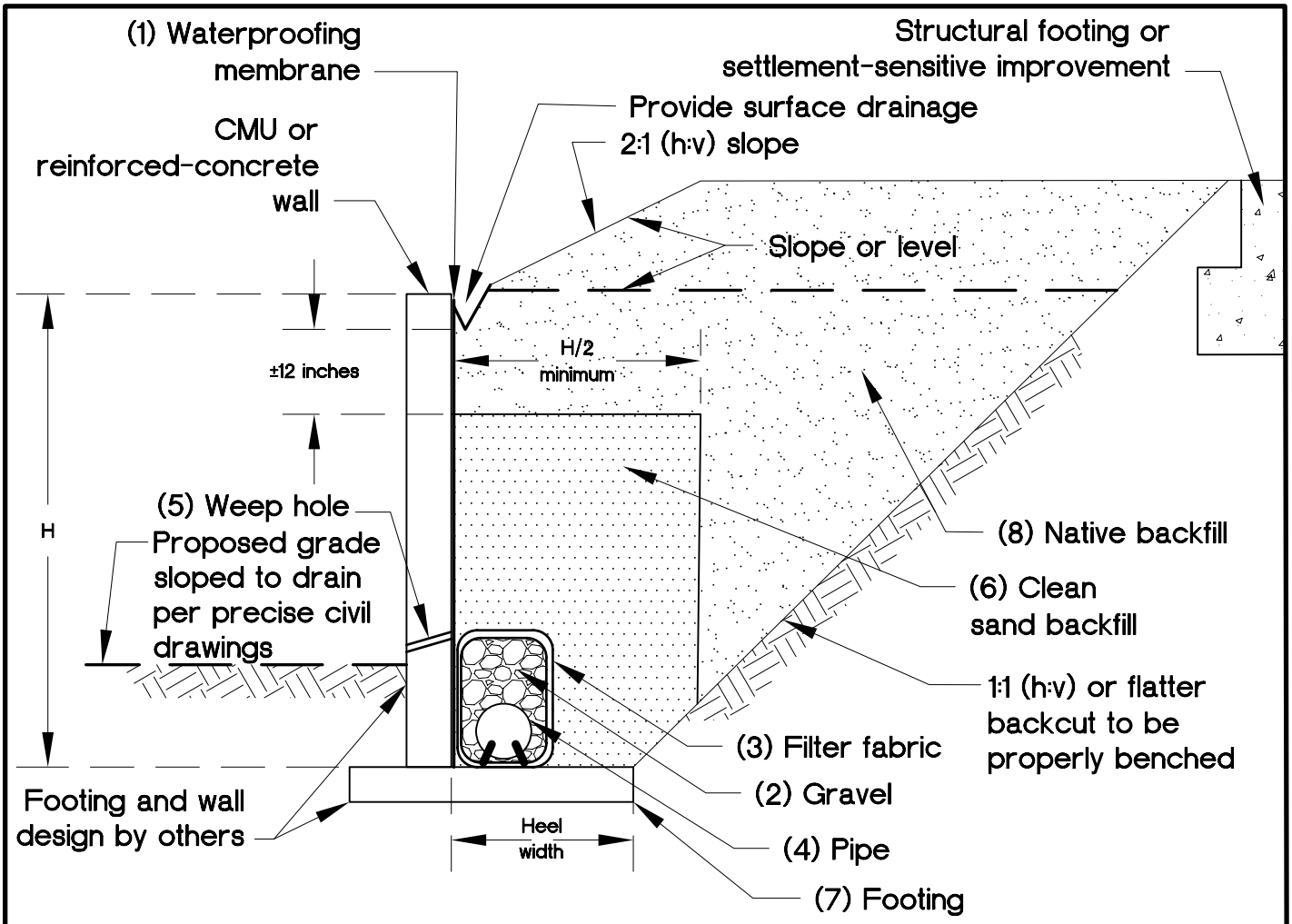
(3) Filter fabric: Mirafi 140N or approved equivalent; place fabric flap behind core.

(4) Pipe: 4-inch-diameter perforated PVC, Schedule 40, or approved alternative with minimum of 1 percent gradient to proper outlet point (perforations down).

(5) Weep hole: Minimum 2-inch diameter placed at 20-foot centers along the wall and placed 3 inches above finished surface. Design civil engineer to provide drainage at toe of wall. No weep holes for below-grade walls.

(6) Gravel: Clean, crushed, ¾ to 1½ inch.

(7) Footing: If bench is created behind the footing greater than the footing width, use level fill or cut natural earth materials. An additional "heel" drain will likely be required by geotechnical consultant.




(1) Waterproofing membrane: Liquid boot or approved masticequivalent.

(2) Gravel: Clean, crushed, ¾ to 1½ inch.

(3) Filter fabric: Mirafi 140N or approved equivalent.

(4) Pipe: 4-inch-diameter perforated PVC, Schedule 40, or approved alternative with minimum of 1 percent gradient to proper outlet point (perforations down).

(5) Weep hole: Minimum 2-inch diameter placed at 20-foot centers along the wall and placed 3 inches above finished surface. Design civil engineer to provide drainage at toe of wall. No weep holes for below-grade walls.

(6) Clean sand backfill: Must have sand equivalent value (S.E.) of 35 or greater; can be densified by water jetting upon approval by geotechnical engineer.

(7) Footing: If bench is created behind the footing greater than the footing width, use level fill or cut natural earth materials. An additional "heel" drain will likely be required by geotechnical consultant.

(8) Native backfill: If E.I. $<21$ and S.E. $\geq 35$ then all sand requirements also may not be required and will be reviewed by the geotechnical consultant.

## Wall/Retaining Wall Footing Transitions

Site walls are anticipated to be founded on footings designed in accordance with the recommendations in this report. Should wall footings transition from cut to fill, the civil designer may specify either:

a) A minimum of a 2-foot overexcavation and recompaction of cut materials for a distance of 2H, from the point of transition.

b) Increase of the amount of reinforcing steel and wall detailing (i.e., expansion joints or crack control joints) such that a angular distortion of 1/360 for a distance of 2H on either side of the transition may be accommodated. Expansion joints should be placed no greater than 20 feet on-center, in accordance with the structural engineer's/wall designer's recommendations, regardless of whether or not transition conditions exist. Expansion joints should be sealed with a flexible, non-shrink grout.

c) Embed the footings entirely into native formational material (i.e., deepened footings).

If transitions from cut to fill transect the wall footing alignment at an angle of less than 45 degrees (plan view), then the designer should follow recommendation "a" (above) and until such transition is between 45 and 90 degrees to the wall alignment.

# TOP-OF-SLOPE WALLS/FENCES/IMPROVEMENTS

## Slope Creep

Soils at the site may be expansive and therefore, may become desiccated when allowed to dry. Such soils are susceptible to surficial slope creep, especially with seasonal changes in moisture content. Typically in southern California, during the hot and dry summer period, these soils become desiccated and shrink, thereby developing surface cracks. The extent and depth of these shrinkage cracks depend on many factors such as the nature and expansivity of the soils, temperature and humidity, and extraction of moisture from surface soils by plants and roots. When seasonal rains occur, water percolates into the cracks and fissures, causing slope surfaces to expand, with a corresponding loss in soil density and shear strength near the slope surface. With the passage of time and several moisture cycles, the outer 3 to 5 feet of slope materials experience a very slow, but progressive, outward and downward movement, known as slope creep. For slope heights greater than 10 feet, this creep related soil movement will typically impact all rear yard flatwork and other secondary improvements that are located within about 15 feet from the top of slopes, such as swimming pools, concrete flatwork, etc., and in particular top of slope fences/walls. This influence is normally in the form of detrimental settlement, and tilting of the proposed improvements. The dessication/swelling

and creep discussed above continues over the life of the improvements, and generally becomes progressively worse. Accordingly, the developer should provide this information to any homeowners and homeowners association.

**Top of Slope Walls/Fences**

Due to the potential for slope creep for slopes higher than about 10 feet, some settlement and tilting of the walls/fence with the corresponding distresses, should be expected. To mitigate the tilting of top of slope walls/fences, we recommend that the walls/fences be constructed on deepened foundations without any consideration for creep forces, where the expansion index of the materials comprising the outer 15 feet of the slope is less than 50, or a combination of grade beam and caisson foundations, for expansion indices greater than 50 comprising the slope, with creep forces taken into account. The grade beam should be at a minimum of 12 inches by 12 inches in cross section, supported by drilled caissons, 12 inches minimum in diameter, placed at a maximum spacing of 6 feet on center, and with a minimum embedment length of 7 feet below the bottom of the grade beam. The strength of the concrete and grout should be evaluated by the structural engineer of record. The proper ASTM tests for the concrete and mortar should be provided along with the slump quantities. The concrete used should be appropriate to mitigate sulfate corrosion, as warranted. The design of the grade beam and caissons should be in accordance with the recommendations of the project structural engineer, and include the utilization of the following geotechnical parameters:

**Creep Zone:** 5-foot vertical zone below the slope face and projected upward parallel to the slope face.

**Creep Load:** The creep load projected on the area of the grade beam should be taken as an equivalent fluid approach, having a density of 60 pcf. For the caisson, it should be taken as a uniform 900 pounds per linear foot of caisson's depth, located above the creep zone.

**Point of Fixity:** Located a distance of 1.5 times the caisson's diameter, below the creep zone.

**Passive Resistance**: Passive earth pressure of 300 psf per foot of depth per foot of caisson diameter, to a maximum value of 4,500 psf may be used to determine caisson depth and spacing, provided that they meet or exceed the minimum requirements stated above. To determine the total lateral resistance, the contribution of the creep prone zone above the point of fixity, to passive resistance, should be disregarded.

**Allowable Axial Capacity**:

Shaft capacity : 350 psf applied below the point of fixity over the surface area of the shaft.

Tip capacity: 4,500 psf.

## PRELIMINARY PAVEMENT DESIGN

For planning purposes, a representative R-value test was performed. Based on the test result of 6 and the City pavement criteria, a pavement section consisting of 4 inches asphaltic concrete (AC) over 7.5 inches of Class 2 aggregate base may be used. However, R-values may vary up to 40 or higher; thus, some areas may be suitable for the City minimums of 3 inches of AC over 6 inches of Class 2 aggregate base. Specific pavement section design should be based on R-value test data obtained at the completion of grading.

Subgrade preparation and aggregate base preparation should be performed in accordance with the recommendations presented below, and the minimum subgrade (upper 12 inches) and Class 2 aggregate base compaction should be 95 percent of the maximum dry density (ASTM D-1557). If adverse conditions (i.e., saturated ground, etc.) are encountered during preparation of subgrade, special construction methods may need to be employed.

These recommendations should be considered preliminary. Further R-value testing and pavement design analysis should be performed upon completion of grading for the site

## PAVEMENT GRADING RECOMMENDATIONS

### General

All section changes should be properly transitioned. If adverse conditions are encountered during the preparation of subgrade materials, special construction methods may need to be employed. A GSI representative should be present for the preparation of subgrade, aggregate base, and asphaltic concrete.

### Subgrade

Within driveway aisle and parking areas, all surficial deposits of loose soil material should be removed and recompacted as recommended. After the loose soils are removed, the bottom is to be scarified to a depth of at least 6 inches, moisture conditioned as necessary and compacted to 95 percent of the maximum laboratory density, as determined by ASTM D 1557.

Deleterious material, excessively wet or dry pockets, concentrated zones of oversized rock fragments, and any other unsuitable materials encountered during grading should be removed. The compacted fill material should then be brought to the elevation of the proposed subgrade for the pavement. The subgrade should be proof-rolled in order to promote a uniform firm and unyielding surface. All grading and fill placement should be observed by the project geotechnical consultant.

## Aggregate Base

Compaction tests are required for the recommended aggregate base section. Minimum relative compaction required will be 95 percent of the laboratory maximum density as determined by ASTM D 1557. Base aggregate should be in accordance to the "Greenbook" crushed aggregate base rock (minimum R-value=78).

## Paving

Prime coat may be omitted if all of the following conditions are met:

1. The asphalt pavement layer is placed within two weeks of completion of aggregate base and/or subbase course.

2. Traffic is not routed over completed base before paving

3. Construction is completed during the dry season of May through October.

4. The aggregate base is kept free of debris prior to placement of asphaltic concrete.

If construction is performed during the wet season of November through April, prime coat may be omitted if no rain occurs between completion of the aggregate base course and paving and the time between completion of aggregate base and paving is reduced to three days, provided the aggregate base is free of loose soil or debris. Where prime coat has been omitted and rain occurs, traffic is routed over the aggregate base course, or paving is delayed, measures shall be taken to restore the aggregate base course, and subgrade to conditions that will meet specifications as directed by the geotechnical consultant.

## Drainage

Positive drainage should be provided for all surface water to drain towards the area swale, curb and gutter, or to an approved drainage channel. Positive site drainage should be maintained at all times. Water should not be allowed to pond or seep into the ground, such as from behind unprotected curbs, both during and after grading. If planters or landscaping are adjacent to paved areas, measures should be taken to minimize the potential for water to enter the pavement section, such as thickened edges, enclosed planters, etc. Also, best management construction practices should be strictly adhered to

at all times to minimize the potential for distress during construction and roadway improvements.

**PCC Cross Gutters**

PCC cross gutters should be designed in accordance with San Diego Regional Standard Drawing (SDRSD) G-12.

**Additional Considerations**

To mitigate perched groundwater, consideration should be given to installation of subgrade separators (cut-offs) between pavement subgrade and landscape areas, although this is not a requirement from a geotechnical standpoint. Cut-offs, if used, should be 6 inches wide and at least 12 inches below the pavement subgrade contact or 12 inches below the crushed aggregate base rock, if utilized.

## DRIVEWAY/PARKING, FLATWORK, AND OTHER IMPROVEMENTS

Some of the onsite soil materials exhibit expansive characteristics. The effects of expansive soils are cumulative, and typically occur over the lifetime of any improvement. On relatively level areas, when the soils are allowed to dry, the desiccation and swelling process tends to cause heaving and distress to flatwork and other improvements. The resulting potential for distress to improvements may be reduced, but not totally eliminated. To that end, it is recommended that the developer notify any interested/affected parties of this long-term potential for distress. To reduce the likelihood of distress, the following recommendations are presented for all exterior flatwork:

1. Exterior concrete slabs should be cast entirely on properly compacted fill overlying dense, unweathered bedrock. The subgrade area for concrete slabs should be compacted to achieve a minimum 90 percent relative compaction (sidewalks, patios), and 95 percent relative compaction (traffic pavements), and then be presoaked to 120 percent of the soils' optimum moisture content, to a depth of 18 inches below subgrade elevation. This moisture content should be maintained in the subgrade soils during concrete placement to promote uniform curing of the concrete and minimize the development of unsightly shrinkage cracks. If very low expansive soils (E.I. $\leq$ 20 or P.I. $\leq$ 14) are present, only optimum moisture content, or greater, is required and specific presoaking is not warranted. The moisture content of the subgrade should be proof tested within 72 hours prior to pouring concrete.

2. Concrete slabs should be cast over a non-yielding surface, consisting of a 4-inch layer of crushed rock, compacted aggregate base, gravel, or clean sand, that should be compacted and level prior to placing concrete. If very low expansive

soils are present, the concrete may be cast directly upon properly prepared subgrade. The base layer or subgrade should be moisturized completely prior to placing concrete, to reduce loss of concrete moisture to the surrounding earth materials.

3. Exterior concrete slabs supporting pedestrian traffic only should be a minimum of 4 inches thick. Please refer to the "Preliminary Pavement Design/Construction."

4. In order to reduce unsightly cracking, the outer edges of flatwork to be bordered by landscaping should be provided with an 8-inch wide concrete cutoff shoulder (thickened edge) extending to a depth of at least 12 inches below the bottoms of the slabs to mitigate excessive infiltration of water under the flatwork. These thickened edges should be reinforced with two No. 4 bars, one at the top and one at the bottom.

5. The use of transverse and longitudinal control joints are recommended to help control slab cracking due to concrete shrinkage or expansion. Two ways to mitigate such cracking are: a) add a sufficient amount of reinforcing steel, increasing tensile strength of the slab; and, b) provide an adequate amount of control and/or expansion joints to accommodate anticipated concrete shrinkage and expansion.

   In order to reduce the potential for unsightly cracks, slabs should be reinforced at mid-height with a minimum of No. 3 bars placed at 18 inches on center, in each direction. The exterior slabs should be scored or saw cut, ½ to ⅜ inches deep, often enough so that no section is greater than 10 feet by 10 feet. For sidewalks or narrow slabs, control joints should be provided at intervals of every 6 feet. The slabs should be separated from the foundations and sidewalks with expansion joint filler material.

6. Surface and shrinkage cracking of the finish slabs may be reduced if a low slump and water-cement ratio are maintained during concrete placement. Excessive water added to concrete prior to placement is likely to cause shrinkage cracking, and should be avoided. Some concrete shrinkage cracking, however, is unavoidable.

7. No traffic should be allowed upon the newly placed concrete slabs until they have been properly cured to within 75 percent of design strength. Concrete compression strength should be a minimum of 2,500 psi.

8. Driveways, sidewalks, and patio slabs adjacent to the building should be separated from the building with thick expansion joint filler material. In areas directly adjacent to a continuous source of moisture (i.e., irrigation, planters, etc.), all joints should be additionally sealed with flexible mastic.

9. Planters and walls should not be tied to the building(s).

10. Overhang structures should be supported on the slabs, or structurally designed with continuous footings tied in at least two directions.

11. Any masonry landscape walls that are to be constructed throughout the property should be grouted and articulated in segments no more than 20 feet long. These segments should be keyed or doweled together.

12. Utilities should be enclosed within a closed utilidor (vault) or designed with flexible connections to accommodate differential settlement and expansive soil conditions.

13. Positive site drainage should be maintained at all times. Finish grades should be provided with a minimum of 1 to 2 percent fall to the street, or other approved area, as indicated herein. It should be kept in mind that drainage reversals could occur, including post-construction settlement, if relatively flat yard drainage gradients are not periodically maintained by the homeowner.

14. Air conditioning (A/C) units should be supported by slabs that are incorporated into the building foundation or constructed on a rigid slab with flexible couplings for plumbing and electrical lines. A/C waste water lines should be drained to a suitable non-erosive outlet.

15. Shrinkage cracks could become excessive if proper finishing and curing practices are not followed. Finishing and curing practices should be performed per the Portland Cement Association Guidelines. Mix design should incorporate rate of curing for imate and time of year, sulfate content of soils, corrosion potential of soils, and fertilizers used on site.

16. If perimeter, top of slope walls are to be considered, design and construction recommendations could be provided on request.

## DEVELOPMENT CRITERIA

### Slope Deformation

Compacted fill slopes designed using customary factors of safety for gross or surficial stability and constructed in general accordance with the design specifications should be expected to undergo some differential vertical heave or settlement in combination with differential lateral movement in the out-of-slope direction, after grading. This post-construction movement occurs in two forms: slope creep, and lateral fill extension (LFE). Slope creep is caused by alternate wetting and drying of the fill soils which results in slow downslope movement. This type of movement is expected to occur throughout the

life of the slope, and is anticipated to potentially affect improvements or structures (e.g., separations and/or cracking), placed near the top-of-slope, up to a maximum distance of approximately 15 feet from the top-of-slope, depending on the slope height. This movement generally results in rotation and differential settlement of improvements located within the creep zone. LFE occurs due to deep wetting from irrigation and rainfall on slopes comprised of expansive materials. Although some movement should be expected, long-term movement from this source may be minimized, but not eliminated, by placing the fill throughout the slope region, wet of the fill's optimum moisture content.

It is generally not practical to attempt to eliminate the effects of either slope creep or LFE. Suitable mitigative measures to reduce the potential of lateral deformation typically include: setback of improvements from the slope faces (per the adopted California Building Code), positive structural separations (i.e., joints) between improvements, and stiffening and deepening of foundations. Expansion joints in walls should be placed no greater than 20 feet on-center, and in accordance with the structural engineer's recommendations. All of these measures are recommended for design of structures and improvements. The ramifications of the above conditions, and recommendations for mitigation, should be provided to all interested/affected parties.

**Slope Maintenance and Planting**

Water has been shown to weaken the inherent strength of all earth materials. Slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Over-watering should be avoided as it adversely affects site improvements, and causes perched groundwater conditions. Graded slopes constructed utilizing onsite materials would be erosive. Eroded debris may be minimized and surficial slope stability enhanced by establishing and maintaining a suitable vegetation cover soon after construction. Compaction to the face of fill slopes would tend to minimize short-term erosion until vegetation is established. Plants selected for landscaping should be light weight, deep rooted types that require little water and are capable of surviving the prevailing climate. Jute-type matting or other fibrous covers may aid in allowing the establishment of a sparse plant cover. Utilizing plants other than those recommended above will increase the potential for perched water, staining, mold, etc., to develop. A rodent control program to prevent burrowing should be implemented. Irrigation of natural (ungraded) slope areas is generally not recommended. These recommendations regarding plant type, irrigation practices, and rodent control should be provided to each homeowner. Over-steepening of slopes should be avoided during building construction activities and landscaping.

**Drainage**

Adequate surface drainage is a very important factor in reducing the likelihood of adverse performance of foundations, hardscape, and slopes. Surface drainage should be sufficient

to mitigate ponding of water anywhere on the property, and especially near structures and tops of slopes. Surface drainage should be carefully taken into consideration during fine grading, landscaping, and building construction. Therefore, care should be taken that future landscaping or construction activities do not create adverse drainage conditions. Positive site drainage within the property should be provided and maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and tops of slopes, and not allowed to pond and/or seep into the ground. In general, site drainage should conform to Section 1804.4 of the 2019 CBC. Consideration should be given to avoiding construction of planters adjacent to structures (buildings, pools, spas, etc.). Building pad drainage should be directed toward the street or other approved area(s). Although not a geotechnical requirement, roof gutters, down spouts, or other appropriate means may be utilized to control roof drainage. Down spouts, or drainage devices should outlet a minimum of 5 feet from structures or into a subsurface drainage system. Areas of seepage may develop due to irrigation or heavy rainfall, and should be anticipated. Minimizing irrigation will lessen this potential. If areas of seepage develop, recommendations for minimizing this effect could be provided upon request.

**Toe of Slope Drains/Toe Drains**

Where significant slopes intersect pad areas, surface drainage down the slope allows for some seepage into the subsurface materials, sometimes creating conditions causing or contributing to perched and/or ponded water. Toe of slope/toe drains may be beneficial in the mitigation of this condition due to surface drainage. The general criteria to be utilized by the design engineer for evaluating the need for this type of drain is as follows:

- Is there a source of irrigation above or on the slope that could contribute to saturation of soil at the base of the slope?

- Are the slopes hard rock and/or impermeable, or relatively permeable, or; do the slopes already have or are they proposed to have subdrains (i.e., stabilization fills, etc.)?

- Are there cut-fill transitions (i.e., fill over bedrock), within the slope?

- Was the lot at the base of the slope overexcavated or is it proposed to be overexcavated? Overexcavated lots located at the base of a slope could accumulate subsurface water along the base of the fill cap.

- Are the slopes north facing? North facing slopes tend to receive less sunlight (less evaporation) relative to south facing slopes and are more exposed to the currently prevailing seasonal storm tracks.

- What is the slope height? It has been our experience that slopes with heights in excess of approximately 10 feet tend to have more problems due to storm runoff and irrigation than slopes of a lesser height.

- Do the slopes "toe out" into a residential lot or a lot where perched or ponded water may adversely impact its proposed use?

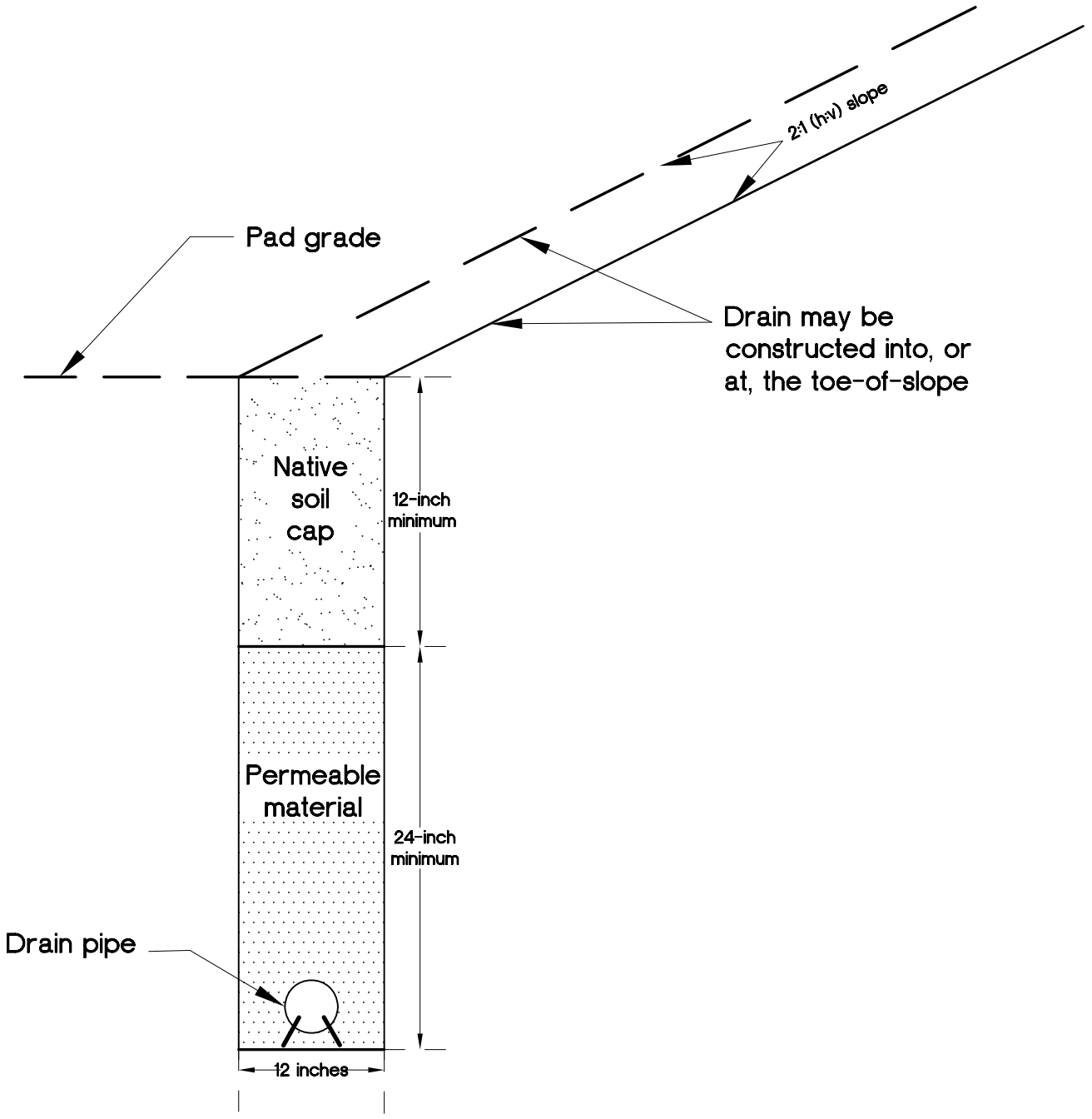
Based on these general criteria, the construction of toe drains may be considered by the design engineer along the toe of slopes, or at retaining walls in slopes, descending to the rear of such lots. Following are Detail 4 (Schematic Toe Drain Detail) and Detail 5 (Subdrain Along Retaining Wall Detail). Other drains may be warranted due to unforeseen conditions, homeowner irrigation, or other circumstances. Where drains are constructed during grading, including subdrains, the locations/elevations of such drains should be surveyed, and recorded on the final as-built grading plans by the design engineer. It is recommended that the above be disclosed to all interested parties, including homeowners and any homeowners association.

## Erosion Control

Onsite earth materials have a moderate to high erosion potential. Consideration should be given to providing hay bales and silt fences for the temporary control of surface water, from a geotechnical viewpoint.

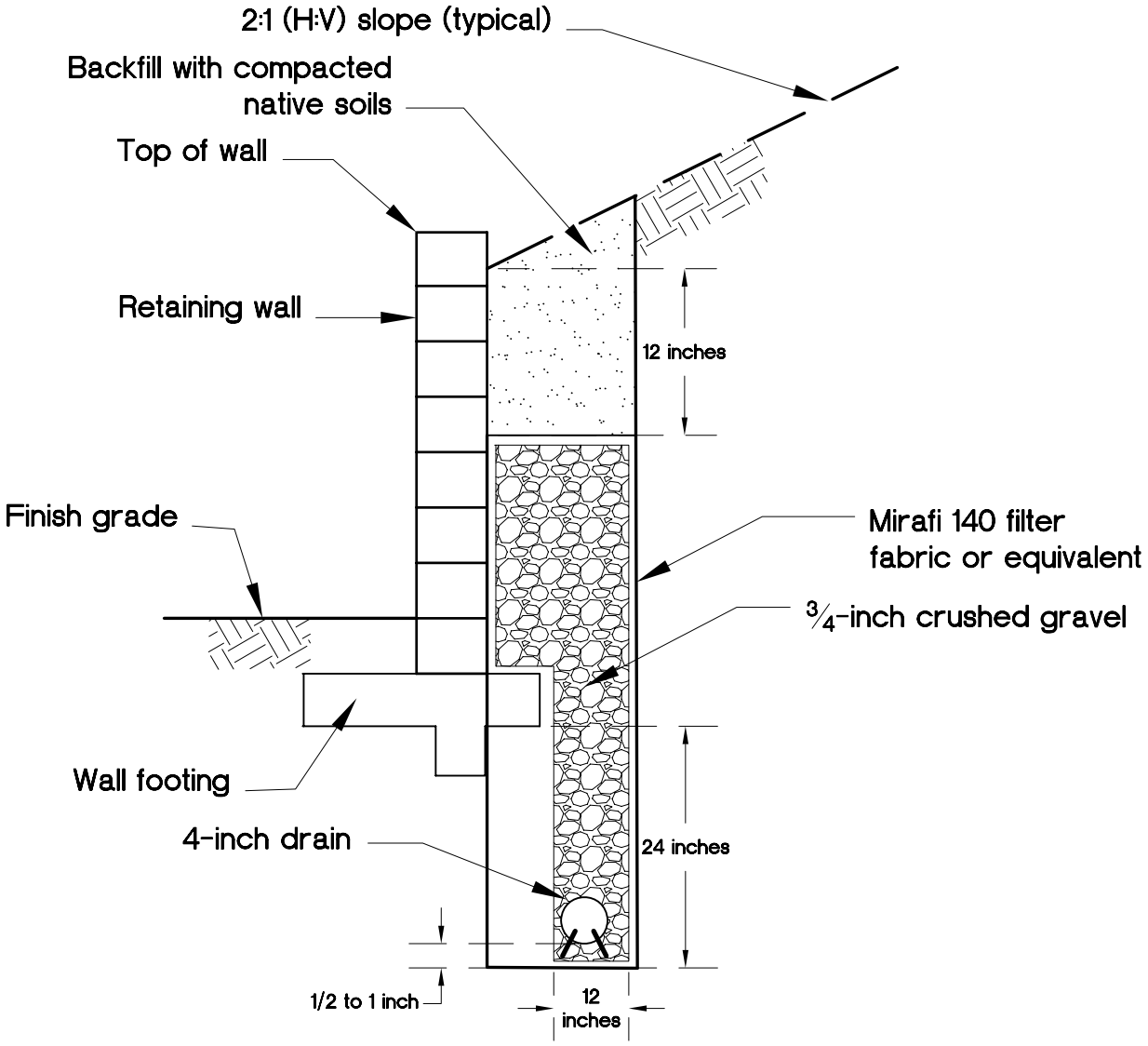
## Landscape Maintenance

Only the amount of irrigation necessary to sustain plant life should be provided. Over-watering the landscape areas will adversely affect proposed site improvements. We would recommend that any proposed open-bottom planters adjacent to proposed structures be eliminated for a minimum distance of 10 feet. As an alternative, closed-bottom type planters could be utilized. An outlet placed in the bottom of the planter, could be installed to direct drainage away from structures or any exterior concrete flatwork. If planters are constructed adjacent to structures, the sides and bottom of the planter should be provided with a moisture barrier to prevent penetration of irrigation water into the subgrade. Provisions should be made to drain the excess irrigation water from the planters without saturating the subgrade below or adjacent to the planters. Graded slope areas should be planted with drought resistant vegetation. Consideration should be given to the type of vegetation chosen and their potential effect upon surface improvements (i.e., some trees will have an effect on concrete flatwork with their extensive root systems). From a geotechnical standpoint leaching is not recommended for establishing landscaping. If the surface soils are processed for the purpose of adding amendments, they should be recompacted to 90 percent minimum relative compaction.




1. Soil cap compacted to 90 percent relative compaction.
2. Permeable material may be gravel wrapped in filter fabric (Mirafi 140N or equivalent).
3. 4-inch-diameter, perforated pipe (SDR-35 or equivalent) with perforations down.
4. Pipe to maintain a minimum 1 percent fall.
5. Concrete cut-off wall to be provided at transition to solid outlet pipe.
6. Solid outlet pipe to drain to approved area.
7. Cleanouts are recommended at each property line.

| GeoSoils, Inc. | SCHEMATIC TOE DRAIN DETAIL | Detail 4 |
|---|---|---|




NOTES:

1. Soil cap compacted to 90 percent relative compaction.
2. Permeable material may be gravel wrapped in filter fabric (Mirafi 140N or equivalent).
3. 4-inch-diameter, perforated pipe (SDR-35 or equivalent) with perforations down.
4. Pipe to maintain a minimum 1 percent fall.
5. Concrete cut-off wall to be provided at transition to solid outlet pipe.
6. Solid outlet pipe to drain to approved area.
7. Cleanouts are recommended at each property line.
8. Effort to compact should be applied to drain rock.

## Gutters and Downspouts

As previously discussed in the drainage section, the installation of gutters and downspouts should be considered to collect roof water that may otherwise infiltrate the soils adjacent to the structures. If utilized, the downspouts should be drained into PVC collector pipes or other non-erosive devices (e.g., paved swales or ditches; below grade, solid tight-lined PVC pipes; etc.), that will carry the water away from the house, to an appropriate outlet, in accordance with the recommendations of the design civil engineer. Downspouts and gutters are not a requirement; however, from a geotechnical viewpoint, provided that positive drainage is incorporated into project design (as discussed previously).

## Subsurface and Surface Water

Subsurface and surface water are not anticipated to affect site development, provided that the recommendations contained in this report are incorporated into final design and construction and that prudent surface and subsurface drainage practices are incorporated into the construction plans. Perched groundwater conditions along zones of contrasting permeabilities may not be precluded from occurring in the future due to site irrigation, poor drainage conditions, or damaged utilities, and should be anticipated. Should perched groundwater conditions develop, this office could assess the affected area(s) and provide the appropriate recommendations to mitigate the observed groundwater conditions. Groundwater conditions may change with the introduction of irrigation, rainfall, or other factors.

## Site Improvements

If in the future, any additional improvements (e.g., pools, spas, etc.) are planned for the site, recommendations concerning the geological or geotechnical aspects of design and construction of said improvements could be provided upon request. Pools and/or spas should not be constructed without specific design and construction recommendations from GSI, and this construction recommendation should be provided to all interested/affected parties. This office should be notified in advance of any fill placement, grading of the site, or trench backfilling after rough grading has been completed. This includes any grading, utility trench and retaining wall backfills, flatwork, etc.

## Tile Flooring

Tile flooring can crack, reflecting cracks in the concrete slab below the tile, although small cracks in a conventional slab may not be significant. Therefore, the designer should consider additional steel reinforcement for concrete slabs-on-grade where tile will be placed. The tile installer should consider installation methods that reduce possible cracking of the tile such as slipsheets. Slipsheets or a vinyl crack isolation membrane (approved by the Tile Council of America/Ceramic Tile Institute) are recommended between tile and concrete slabs on grade.

## Additional Grading

This office should be notified in advance of any fill placement, supplemental regrading of the site, or trench backfilling after rough grading has been completed. This includes completion of grading in the street, driveway approaches, driveways, parking areas, and utility trench and retaining wall backfills.

## Footing Trench Excavation

All footing excavations should be observed by a representative of this firm subsequent to trenching and prior to concrete form and reinforcement placement. The purpose of the observations is to evaluate that the excavations have been made into the recommended bearing material and to the minimum widths and depths recommended for construction. If loose or compressible materials are exposed within the footing excavation, a deeper footing or removal and recompaction of the subgrade materials would be recommended at that time. Footing trench spoil and any excess soils generated from utility trench excavations should be compacted to a minimum relative compaction of 90 percent, if not removed from the site.

## Trenching/Temporary Construction Backcuts

Considering the nature of the onsite earth materials, it should be anticipated that caving or sloughing could be a factor in subsurface excavations and trenching. Shoring or excavating the trench walls/backcuts at the angle of repose (typically 25 to 45 degrees [except as specifically superceded within the text of this report]), should be anticipated. All excavations should be observed by an engineering geologist or soil engineer from GSI, prior to workers entering the excavation or trench, and minimally conform to CAL-OSHA, state, and local safety codes. Should adverse conditions exist, appropriate recommendations would be offered at that time. The above recommendations should be provided to any contractors and/or subcontractors, or homeowners, etc., that may perform such work.

## Utility Trench Backfill

1. All interior utility trench backfill should be brought to at least 2 percent above optimum moisture content and then compacted to obtain a minimum relative compaction of 90 percent of the laboratory standard. As an alternative for shallow (12-inch to 18-inch) under-slab trenches, sand having a sand equivalent value of 30 or greater may be utilized and jetted or flooded into place. Observation, probing and testing should be provided to evaluate the desired results.

2. Exterior trenches adjacent to, and within areas extending below a 1:1 plane projected from the outside bottom edge of the footing, and all trenches beneath hardscape features and in slopes, should be compacted to at least 90 percent of

the laboratory standard. Sand backfill, unless excavated from the trench, should not be used in these backfill areas. Compaction testing and observations, along with probing, should be accomplished to evaluate the desired results.

3. All trench excavations should conform to CAL-OSHA, state, and local safety codes.

4. Utilities crossing grade beams, perimeter beams, or footings should either pass below the footing or grade beam utilizing a hardened collar or foam spacer, or pass through the footing or grade beam in accordance with the recommendations of the structural engineer.

## SUMMARY OF RECOMMENDATIONS REGARDING GEOTECHNICAL OBSERVATION AND TESTING

We recommend that observation and/or testing be performed by GSI at each of the following construction stages:

- During grading/recertification.
- During excavation.
- During placement of subdrains, toe drains, or other subdrainage devices, prior to placing fill and/or backfill.
- After excavation of building footings, retaining wall footings, and free standing walls footings, prior to the placement of reinforcing steel or concrete.
- Prior to pouring any slabs or flatwork, after presoaking/presaturation of building pads and other flatwork subgrade, before the placement of concrete, reinforcing steel, capillary break (i.e., sand, pea-gravel, etc.), or vapor barriers (i.e., visqueen, etc.).
- During retaining wall subdrain installation, prior to backfill placement.
- During placement of backfill for area drain, interior plumbing, utility line trenches, and retaining wall backfill.
- During slope construction/repair.
- When any unusual soil conditions are encountered during any construction operations, subsequent to the issuance of this report.
- When any developer or homeowner improvements, such as flatwork, spas, pools, walls, etc., are constructed, prior to construction. GSI should review and approve such plans prior to construction.

- A report of geotechnical observation and testing should be provided at the conclusion of each of the above stages, in order to provide concise and clear documentation of site work, and/or to comply with code requirements.

- GSI should review project sales documents to homeowners/homeowners associations for geotechnical aspects, including irrigation practices, the conditions outlined above, etc., prior to any sales. At that stage, GSI will provide homeowners maintenance guidelines which should be incorporated into such documents.

## OTHER DESIGN PROFESSIONALS/CONSULTANTS

The design civil engineer, structural engineer, post-tension designer, architect, landscape architect, wall designer, etc., should review the recommendations provided herein, incorporate those recommendations into all their respective plans, and by explicit reference, make this report part of their project plans. This report presents minimum design criteria for the design of slabs, foundations and other elements possibly applicable to the project. These criteria should not be considered as substitutes for actual designs by the structural engineer/designer. Please note that the recommendations contained herein are not intended to preclude the transmission of water or vapor through the slab or foundation. The structural engineer/foundation and/or slab designer should provide recommendations to not allow water or vapor to enter into the structure so as to cause damage to another building component, or so as to limit the installation of the type of flooring materials typically used for the particular application.

The structural engineer/designer should analyze actual soil-structure interaction and consider, as needed, bearing, expansive soil influence, and strength, stiffness and deflections in the various slab, foundation, and other elements in order to develop appropriate, design-specific details. As conditions dictate, it is possible that other influences will also have to be considered. The structural engineer/designer should consider all applicable codes and authoritative sources where needed. If analyses by the structural engineer/designer result in less critical details than are provided herein as minimums, the minimums presented herein should be adopted. It is considered likely that some, more restrictive details will be recommended.

If the structural engineer/designer has any questions or requires further assistance, they should not hesitate to call or otherwise transmit their requests to GSI. In order to mitigate potential distress, the foundation and/or improvement's designer should confirm to GSI and the governing agency, in writing, that the proposed foundations and/or improvements can tolerate the amount of differential settlement and/or expansion characteristics and other design criteria specified herein.

## PLAN REVIEW

Final project plans (grading, precise grading, foundation, retaining wall, landscaping, etc.), should be reviewed by this office prior to construction, so that construction is in accordance with the conclusions and recommendations of this report. Based on our review, supplemental recommendations and/or further geotechnical studies may be warranted.

## LIMITATIONS

The materials encountered on the project site and utilized for our analysis are believed representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during mass grading. Site conditions may vary due to seasonal changes or other factors.

Inasmuch as our study is based upon our review and engineering analyses and laboratory data, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty, either express or implied, is given. Standards of practice are subject to change with time. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction; or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities. Thus, this report brings to completion our scope of services for this portion of the project. All samples will be disposed of after 30 days, unless specifically requested by the client, in writing.

# APPENDIX A

# REFERENCES

## APPENDIX A

## REFERENCES


Allen, V., Connerton, A., and Carlson, C., 2011, Introduction to infiltration best management practices (BMP), Contech Construction Products, Inc., professional development series, dated December.

American Concrete Institute, 2014a, Building code requirements for structural concrete (ACI 318-14), and commentary (ACI 318R-14): reported by ACI Committee 318, dated September.

_____, 2014b, Building code requirements for concrete thin shells (ACI 318.2-14), and commentary (ACI 318.2R-14), dated September.

_____, 2011, Building code requirements for structural concrete (ACI 318-14), an ACI standard and commentary: reported by ACI Committee 318; dated May 24.

_____, 2004, Guide for concrete floor and slab construction: reported by ACI Committee 302; Designation ACI 302.1R-04, dated March 23.

American Society of Civil Engineers, 2018a, Supplement 1 to Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-16), first printing, dated December 13.

_____, 2018b, Errata for Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-16), by ASCE, dated July 9.

Blake, T.F., 2000a, EQFAULT, A computer program for the estimation of peak horizontal acceleration from 3-D fault sources; Windows 95/98 version.

_____, 2000b, EQSEARCH, A computer program for the estimation of peak horizontal acceleration from California historical earthquake catalogs; Updated through August 15, 2018, Windows 95/98 version.

Bozorgnia, Y., Campbell, K.W., and Niazi, M., 1999, Vertical ground motion: Characteristics, relationship with horizontal component, and building-code implications; Proceedings of the SMIP99 seminar on utilization of strong-motion data, September, 15, Oakland, pp. 23-49.

Bozorgnia, Y., Campbell K.W., and Niazi, M., 1999, Vertical ground motion: Characteristics, relationship with horizontal component, and building-code implications; Proceedings of the SMIP99 seminar on utilization of strong-motion data, September 15, Oakland, pp. 23-49.

California Building Standards Commission, 2019a, California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, based on the 2018 International Building Code, effective January 1, 2020.

_____, 2019b, California Building Code, California Code of Regulations, Title 24, Part 2, Volume 1 of 2, Based on the 2018 International Building Code, effective January 1, 2020.

California Department of Conservation, California Geological Survey (CGS), 2018, Earthquake fault zones, a guide for government agencies, property owners/developers, and geoscience practitioners for assessing fault rupture hazards in California: California Geological Survey Special Publication 42 (revised 2018), 93 p.

California Department of Water Resources, 2020, Water Data Library, interactive website, http://wdl.water.ca.gov/waterdatalibrary/.

California Office of Statewide Health Planning and Development (OSHPD), 2021, Seismic design maps, https://seismicmaps.org/.

California Stormwater Quality Association (CASQA), 2003, Stormwater best management practice handbook, new development and redevelopment, dated January.

Caterpillar Tractor Company, 1983, Seismic velocity versus rippability.

City of Vista Department of Public Works, 2016, City of Vista BMP design manual for permanent site design, storm water treatment, and hydromodification management, storm water requirements for development applications, dated June.

Das, B. M., 1993, Principals of soil dynamics, Southern Illinois University at Carbondale, PWS-Kent Publishing Company, Boston.

GeoSoils, Inc., 2016, Infiltration Testing Results, Tentative Subdivision Map PC 6-061,APN's 171-100-05 & -28, Vista Grande, Vista Area, San Diego County, California, W.O. 7149-A-SC, dated October 18.

_____, 2006, Preliminary geotechnical evaluation and rippability assessment, APNs 171-100-05 and 171-100-28, Vista Grande Drive Project, proposed 14-lot subdivision, Vista, San Diego County, California, W.O. 5053-A1-SC, dated February 23.

Griffiths, D. H. and King, R. F., 1965, Applied geophysics for engineers and geologists, Pergamon Press, reprinted 1976.

Hunt, R. E., 1986, Geotechnical engineering analysis and evaluation, McGraw-Hill Book Company.

Jennings, C.W., and Bryant, W.A., 2010, Fault activity map of California, scale 1:750,000, California Geological Survey, Geologic Data Map No. 6.

Kanare, H.M., 2005, Concrete floors and moisture, Engineering Bulletin 119, Portland Cement Association.

Kennedy, M.P., and Tan, SS., 2007, Geologic map of the Oceanside 30' by 60' quadrangle, California, regional map series, 1:100,000-scale, California Geologic Survey and United States Geological Survey.

Post-Tensioning Institute, 2014, Errata to standard requirements for design and analysis of shallow post-tensioned concrete foundations on expansive soils, PTI DC10.5-12, dated April 16.

_____, 2013, Errata to standard requirements for design and analysis of shallow post-tensioned concrete foundations on expansive soils, PTI DC10.5-12, dated November 12.

_____, 2012, Standard requirements for design and analysis of shallow post-tensioned concrete foundations on expansive soils, PTI DC10.5-12, dated December.

PSL&A, Inc., 2020, Tentative Subdivision Map for 2277 Vista Grande Drive, Vista, County of San Diego, 1 sheet, 50-scale, dated December 23.

Rimrock Geophysics, 2002, SIPwin, BV-2.7, A personal computer program for interpreting seismic refraction data using modeling and iterative ray tracing techniques.

_____, 1997, SIPLOT, V-4.1, personal computer program for reading OUT files created by SIPT2 and plotting depth cross sections and time-distance graphs on a variety of printers and plotters, and writing graphic files to disk in various raster, vector and spreadsheet formats.

_____, 1995a, SIPIK, V-4.1, A personal computer program for picking first breaks on Geometrics SmartSeis, StrataView, ES-2401 and SeisView Seismic waveform data files.

_____, 1995b, SIPIN, V-4.1, personal computer program for creating data files for input to the seismic refraction interpretation programs SIPT2 and SIPLUS.

_____, 1995c, SIPT2, V-4.1, A personal computer program for interpreting seismic refraction data using modeling and iterative ray tracing techniques.

_____, 1993, SIPQC, V-4.0, Quality control programs for quick interpretation of seismic refraction data on Geometrics seismographs.

Seed, R. B., 2005, Evaluation and mitigation of soil liquefaction hazard “evaluation of field data and procedures for evaluating the risk of triggering (or inception) of

liquefaction," in Geotechnical earthquake engineering; short course, San Diego, California, April 8-9.

Sowers and Sowers, 1970, Unified soil classification system (After U. S. Waterways Experiment Station and ASTM 02487-667) in Introductory Soil Mechanics, New York.

_____, 1967, Department of Water Resources, Bulletin 106-2, Groundwater occurrence and quality: San Diego Region, Vol. II: plates, dated June.

Tan, Saing S. and Giffen, Desmond G., 1995, Landslide hazards in the northern part of the San Diego Metropolitan area, San Diego County, California, San Marcos plate, State of California, Department of Mines and Geology, DMG Open-File Report 95-04.

# APPENDIX B

# TEST PIT LOGS

## UNIFIED SOIL CLASSIFICATION SYSTEM

| Major Divisions | | | Group Symbols | Typical Names |
|---|---|---|---|---|
| Coarse-Grained Soils More than 50% retained on No. 200 sieve | Gravels 50% or more of coarse fraction retained on No. 4 sieve | Clean Gravels | GW | Well-graded gravels and gravel-sand mixtures, little or no fines |
| | | | GP | Poorly graded gravels and gravel-sand mixtures, little or no fines |
| | | Gravel with | GM | Silty gravels gravel-sand-silt mixtures |
| | | | GC | Clayey gravels, gravel-sand-clay mixtures |
| | Sands more than 50% of coarse fraction passes No. 4 sieve | Clean Sands | SW | Well-graded sands and gravelly sands, little or no fines |
| | | | SP | Poorly graded sands and gravelly sands, little or no fines |
| | | Sands with Fines | SM | Silty sands, sand-silt mixtures |
| | | | SC | Clayey sands, sand-clay mixtures |
| Fine-Grained Soils 50% or more passes No. 200 sieve | Silts and Clays Liquid limit 50% or less | | ML | Inorganic silts, very fine sands, rock flour, silty or clayey fine sands |
| | | | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays |
| | | | OL | Organic silts and organic silty clays of low plasticity |
| | Silts and Clays Liquid limit greater than 50% | | MH | Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts |
| | | | CH | Inorganic clays of high plasticity, fat clays |
| | | | OH | Organic clays of medium to high plasticity |
| Highly Organic Soils | | | PT | Peat, mucic, and other highly organic soils |

## CONSISTENCY OR RELATIVE DENSITY

### CRITERIA

**Standard Penetration Test**

| Penetration Resistance N (blows/ft) | Relative Density |
|---|---|
| 0 - 4 | Very loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium |
| 30 - 50 | Dense |
| > 50 | Very dense |

**Standard Penetration Test**

| Penetration Resistance N (blows/ft) | Consistency | Unconfined Compressive Strength (tons/ft$^2$) |
|---|---|---|
| <2 | Very Soft | <0.25 |
| 2 - 4 | Soft | 0.25 - .050 |
| 4 - 8 | Medium | 0.50 - 1.00 |
| 8 - 15 | Stiff | 1.00 - 2.00 |
| 15 - 30 | Very Stiff | 2.00 - 4.00 |
| >30 | Hard | >4.00 |

3" 3/4" #4 #10 #40 #200 U.S. Standard Sieve

| Unified Soil Classification | Cobbles | Gravel | | Sand | | | Silt or Clay |
|---|---|---|---|---|---|---|---|
| | | coarse | fine | coarse | medium | fine | |

**MOISTURE CONDITIONS**

| | |
|---|---|
| Dry | Absence of moisture: dusty, dry to the touch |
| Slightly Moist | Below optimum moisture content for compaction |
| Moist | Near optimum moisture content |
| Very Moist | Above optimum moisture content |
| Wet | Visible free water; below water table |

**MATERIAL QUANTITY**

| | |
|---|---|
| trace | 0 - 5 % |
| few | 5 - 10 % |
| little | 10 - 25 % |
| some | 25 - 45 % |

**OTHER SYMBOLS**

C Core Sample
S SPT Sample
B Bulk Sample
▼ Groundwater
Qp Pocket Penetrometer

**BASIC LOG FORMAT:**
Group name, Group symbol, (grain size), color, moisture, consistency or relative density. Additional comments: odor, presence of roots, mica, gypsum, coarse grained particles, etc.

**EXAMPLE:**
Sand (SP), fine to medium grained, brown, moist, loose, trace silt, little fine gravel, few cobbles up to 4" in size, some hair roots and rootlets.

File:Mgr: c;\SoilClassif.wpd

**PLATE B-1**

GeoSoils, Inc.

W.O. 5053-A-SC
CVOLS, LLC
Vista Grande
January 31, 2006

## LOG OF EXPLORATORY TEST PITS

| TEST PIT NO. | DEPTH (ft.) | GROUP SYMBOL | SAMPLE DEPTH (ft.) | MOISTURE (%) | FIELD DRY DENSITY (pcf) | DESCRIPTION |
|---|---|---|---|---|---|---|
| TP-1 | 0-2 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, light brown, dry to damp, loose; roots and rootlets, porous. |
| | 2-3 | | | | | **GRANITICS:** GRANITIC ROCK, light brown, dry, dense; highly fractured. |
| | | | | | | Practical Refusal @ 3' w/420D Backhoe<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |
| TP-2 | 0-3 | SM | Bulk @ 0-3 | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, reddish brown, moist, loose; roots and rootlets, porous. |
| | 3-8 | | Ring @ 3 | 10.0 | 114.2 | **GRANITICS:** Decomposed GRANITE, reddish brown to light brown, moist, medium dense; dense @ 7', very dense @ 8'. |
| | | | | | | Total Depth = 8'<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |

GeoSoils, Inc.

W.O. 5053-A-SC
CVOLS, LLC
Vista Grande
January 31, 2006

## LOG OF EXPLORATORY TEST PITS

| TEST PIT NO. | DEPTH (ft.) | GROUP SYMBOL | SAMPLE DEPTH (ft.) | MOISTURE (%) | FIELD DRY DENSITY (pcf) | DESCRIPTION |
|---|---|---|---|---|---|---|
| TP-3 | 0-3 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, orange brown to reddish brown, damp to moist, loose; roots and rootlets, porous. |
| | 3-8 | | | | | **GRANITICS:** Decomposed GRANITE, light brown, damp to moist, medium dense; dense @ 5', very dense @ 8'. |
| | | | | | | Total Depth = 8'<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |
| TP-4 | 0-2 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, reddish brown to orange brown, damp to moist, loose; rootlets, porous. |
| | 2-3 | SC | Bulk @ 2-3 | | | CLAYEY SAND, reddish brown, moist, soft to medium stiff; porous. |
| | 3-5 | SM | Ring @ 3 | 10.8 | 114.2 | **GRANITICS:** Decomposed GRANITE, light brown, moist, dense. |
| | | | | | | Practical Refusal @ 5' w/420D Backhoe<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |

GeoSoils, Inc.

W.O. 5053-A-SC
CVOLS, LLC
Vista Grande
January 31, 2006

## LOG OF EXPLORATORY TEST PITS

| TEST PIT NO. | DEPTH (ft.) | GROUP SYMBOL | SAMPLE DEPTH (ft.) | MOISTURE (%) | FIELD DRY DENSITY (pcf) | DESCRIPTION |
|---|---|---|---|---|---|---|
| TP-5 | 0-3 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, light brown, damp to moist, loose; roots and rootlets, porous. |
| | 3-5 | SM | | | | **GRANITICS:** Decomposed GRANITE, damp, dense, very dense @ 4'. |
| | | | | | | Practical Refusal @ 5' w/420D Backhoe<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |
| TP-6 | 0-3 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, reddish brown, moist to damp, loose; roots and rootlets, porous. |
| | 3-4 | | | | | **GRANITICS:** GRANITIC ROCK, light brown, dry, very dense; highly fractured rock. |
| | | | | | | Practical Refusal @ 4' w/420D Backhoe<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |

GeoSoils, Inc.

W.O. 5053-A-SC
CVOLS, LLC
Vista Grande
January 31, 2006

## LOG OF EXPLORATORY TEST PITS

| TEST PIT NO. | DEPTH (ft.) | GROUP SYMBOL | SAMPLE DEPTH (ft.) | MOISTURE (%) | FIELD DRY DENSITY (pcf) | DESCRIPTION |
|---|---|---|---|---|---|---|
| TP-7 | 0-3 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, reddish brown to orange brown, damp to moist, loose; roots and rootlets, porous. |
| | 3-5 | SM | Ring @ 3 | 1.8 | D | **GRANITICS:** Decomposed GRANITE, light brown, dry to damp, dense to very dense. |
| | | | | | | Practical Refusal @ 5' w/420D Backhoe<br>No Groundwater Encountered<br>Backfilled 1-31-2006<br>D = Disturbed |
| TP-8 | 0-4 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, reddish brown, damp to moist, loose; roots and rootlets, porous. |
| | 4-9 | SM | | | | **GRANITICS:** Decomposed GRANITE, light brown, dry to damp, dense, very dense @ 7'. |
| | | | | | | Total Depth = 9'<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |

GeoSoils, Inc.

W.O. 5053-A-SC
CVOLS, LLC
Vista Grande
January 31, 2006

## LOG OF EXPLORATORY TEST PITS

| TEST PIT NO. | DEPTH (ft.) | GROUP SYMBOL | SAMPLE DEPTH (ft.) | MOISTURE (%) | FIELD DRY DENSITY (pcf) | DESCRIPTION |
|---|---|---|---|---|---|---|
| TP-9 | 0-2 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, reddish brown, damp to moist, loose; roots and rootlets, porous. |
| | 2-5 | SM | | | | **GRANITICS:** Decomposed GRANITE, light brown, damp, dense, very dense @ 5'. |
| | | | | | | Total Depth = 5'<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |
| TP-10 | 0-3 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, reddish brown, damp to moist, loose; roots and rootlets, porous. |
| | 3-5 | SM | | | | **GRANITICS:** Decomposed GRANITE, light brown, dry, dense, very dense @ 4'. |
| | | | | | | Practical Refusal @ 5' w/420D Backhoe<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |

PLATE B-6

GeoSoils, Inc.

W.O. 5053-A-SC
CVOLS, LLC
Vista Grande
January 31, 2006

## LOG OF EXPLORATORY TEST PITS

| TEST PIT NO. | DEPTH (ft.) | GROUP SYMBOL | SAMPLE DEPTH (ft.) | MOISTURE (%) | FIELD DRY DENSITY (pcf) | DESCRIPTION |
|---|---|---|---|---|---|---|
| TP-11 | 0-2 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, brown to reddish brown, damp to moist, loose; roots and rootlets, porous. |
| | 2-5 | SM | Ring @ 2 | 10.2 | 105.8 | **GRANITICS:** Decomposed GRANITE, light brown, moist, dense, very dense @ 4'. |
| | | | | | | Practical Refusal @ 5' w/420D Backhoe.<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |
| TP-12 | 0-2 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, light brown, dry to damp, loose; roots and rootlets, porous. |
| | 2-3 | | | | | **GRANITICS:** GRANITIC ROCK, light brown, dry, very dense; highly fractured rock. |
| | | | | | | Practical Refusal @ 3' w/240D Backhoe<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |

GeoSoils, Inc.

W.O. 5053-A-SC
CVOLS, LLC
Vista Grande
January 31, 2006

## LOG OF EXPLORATORY TEST PITS

| TEST PIT NO. | DEPTH (ft.) | GROUP SYMBOL | SAMPLE DEPTH (ft.) | MOISTURE (%) | FIELD DRY DENSITY (pcf) | DESCRIPTION |
|---|---|---|---|---|---|---|
| TP-13 | 0-1½ | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, light brown, dry to damp, loose; roots and rootlets, porous. |
| | 1½-2½ | | | | | **GRANITICS:** GRANITIC ROCK, light brown, dry, very dense; highly fractured rock. |
| | | | | | | Practical Refusal @ 2½' w/240D Backhoe<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |
| TP-14 | 0-2 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, reddish brown, dry, loose; roots and rootlets, porous. |
| | 2-3 | | | | | **GRANITICS:** GRANITIC ROCK, light brown, dry, very dense; highly fractured. |
| | | | | | | Practical Refusal @ 3' w/420D Backhoe<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |

GeoSoils, Inc.

W.O. 5053-A-SC
CVOLS, LLC
Vista Grande
January 31, 2006

## LOG OF EXPLORATORY TEST PITS

| TEST PIT NO. | DEPTH (ft.) | GROUP SYMBOL | SAMPLE DEPTH (ft.) | MOISTURE (%) | FIELD DRY DENSITY (pcf) | DESCRIPTION |
|---|---|---|---|---|---|---|
| TP-15 | 0-3 | SM | | | | **TOPSOIL/COLLUVIUM:** SILTY SAND, reddish brown, moist, loose; roots and rootlets, porous. |
| | 3-7 | SM | | | | **GRANITICS:** Decomposed GRANITE, light brown, damp, dense, very dense @ 7'. |
| | | | | | | Total Depth = 7'<br>No Groundwater Encountered<br>Backfilled 1-31-2006 |

# APPENDIX C

# SEISMICITY

```
**********************
*                    *
*    E Q F A U L T   *
*                    *
*    Version 3.00    *
*                    *
**********************
```

DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 8053-A-SC

DATE: 03-01-2021

JOB NAME: Vista Grande

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\CGSFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 33.2366
SITE LONGITUDE: 117.2169

SEARCH RADIUS: 62.4 mi

ATTENUATION RELATION: 10) Bozorgnia Campbell Niazi (1999) Hor.-Holocene Soil-Cor.
UNCERTAINTY (M=Median, S=Sigma): S Number of Sigmas: 1.0
DISTANCE MEASURE: cdist
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: 0 Campbell SHR: 0
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\CGSFLTE.DAT

MINIMUM DEPTH VALUE (km): 3.0

TEST.OUT

---

EQFAULT SUMMARY

---

---

DETERMINISTIC SITE PARAMETERS

---

Page 1

| ABBREVIATED FAULT NAME | APPROXIMATE DISTANCE mi (km) | ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw) | PEAK SITE ACCEL. g | EST. SITE INTENSITY MOD.MERC. |
|---|---|---|---|---|
| NEWPORT-INGLEWOOD (Offshore) | 13.6( 21.9) | 7.1 | 0.330 | IX |
| ROSE CANYON | 14.0( 22.6) | 7.2 | 0.340 | IX |
| ELSINORE (TEMECULA) | 15.3( 24.6) | 6.8 | 0.247 | IX |
| ELSINORE (JULIAN) | 15.3( 24.7) | 7.1 | 0.296 | IX |
| ELSINORE (GLEN IVY) | 29.1( 46.9) | 6.8 | 0.130 | VIII |
| CORONADO BANK | 30.1( 48.4) | 7.6 | 0.217 | VIII |
| SAN JOAQUIN HILLS | 36.4( 58.6) | 6.6 | 0.128 | VIII |
| EARTHQUAKE VALLEY | 37.0( 59.5) | 6.5 | 0.083 | VII |
| SAN JACINTO-ANZA | 37.9( 61.0) | 7.2 | 0.130 | VIII |
| SAN JACINTO-SAN JACINTO VALLEY | 38.9( 62.6) | 6.9 | 0.103 | VII |
| PALOS VERDES | 41.9( 67.5) | 7.3 | 0.126 | VIII |
| SAN JACINTO-COYOTE CREEK | 43.7( 70.4) | 6.6 | 0.074 | VII |
| CHINO-CENTRAL AVE. (Elsinore) | 45.5( 73.2) | 6.7 | 0.108 | VII |
| NEWPORT-INGLEWOOD (L.A.Basin) | 48.3( 77.7) | 7.1 | 0.094 | VII |
| WHITTIER | 49.4( 79.5) | 6.8 | 0.075 | VII |
| ELSINORE (COYOTE MOUNTAIN) | 52.9( 85.1) | 6.8 | 0.070 | VI |
| SAN JACINTO-SAN BERNARDINO | 53.9( 86.8) | 6.7 | 0.064 | VI |
| SAN ANDREAS - Whole M-1a | 57.8( 93.0) | 8.0 | 0.151 | VIII |
| SAN ANDREAS - San Bernardino M-1 | 57.8( 93.0) | 7.5 | 0.104 | VII |
| SAN ANDREAS - SB-Coach. M-1b-2 | 57.8( 93.0) | 7.7 | 0.121 | VII |
| SAN ANDREAS - SB-Coach. M-2b | 57.8( 93.0) | 7.7 | 0.121 | VII |
| SAN JACINTO - BORREGO | 59.2( 95.3) | 6.6 | 0.054 | VI |
| PUENTE HILLS BLIND THRUST | 60.8( 97.9) | 7.1 | 0.105 | VII |

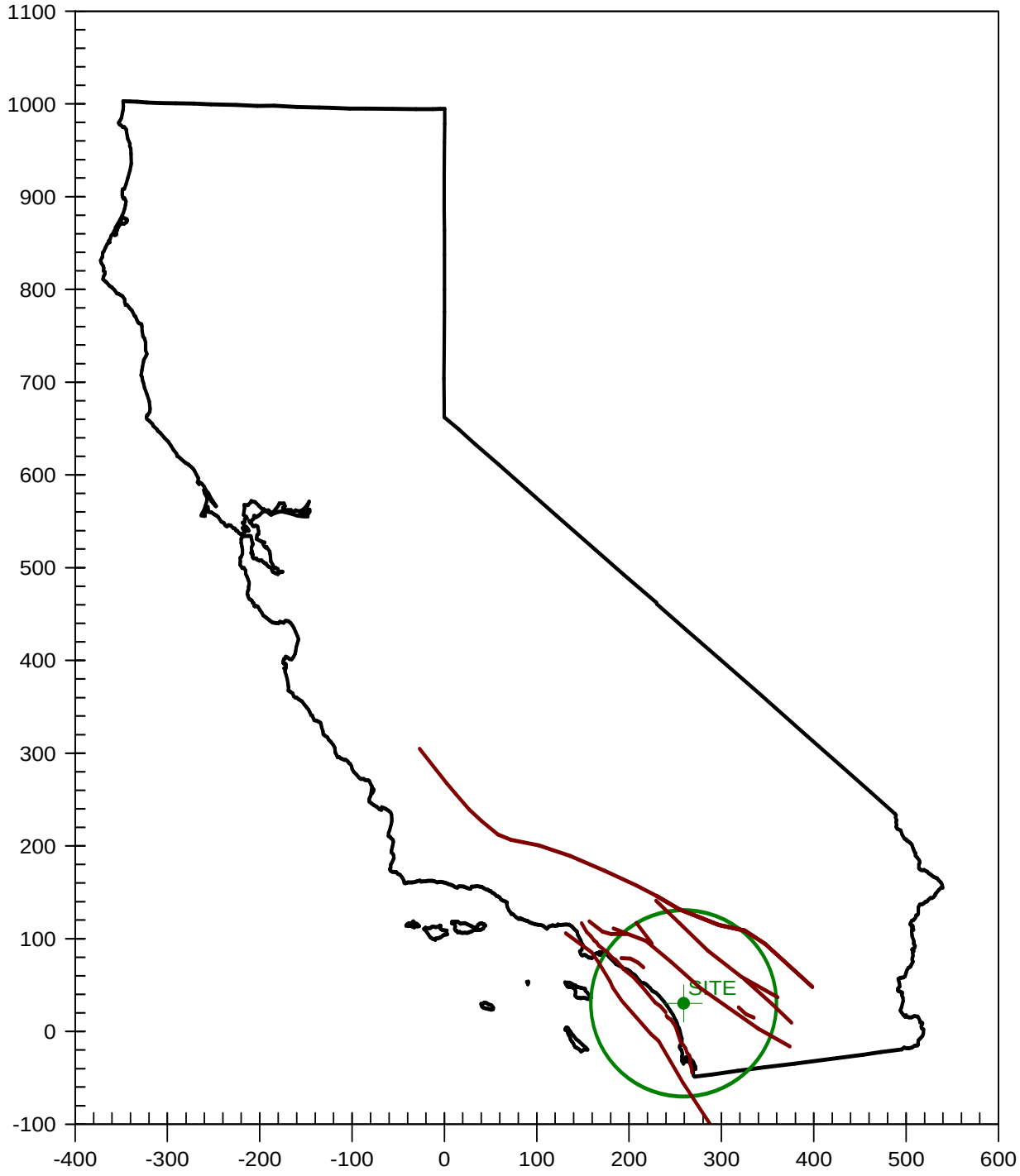
-END OF SEARCH- 23 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE NEWPORT-INGLEWOOD (Offshore) FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 13.6 MILES (21.9 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.3403 g

# CALIFORNIA FAULT MAP

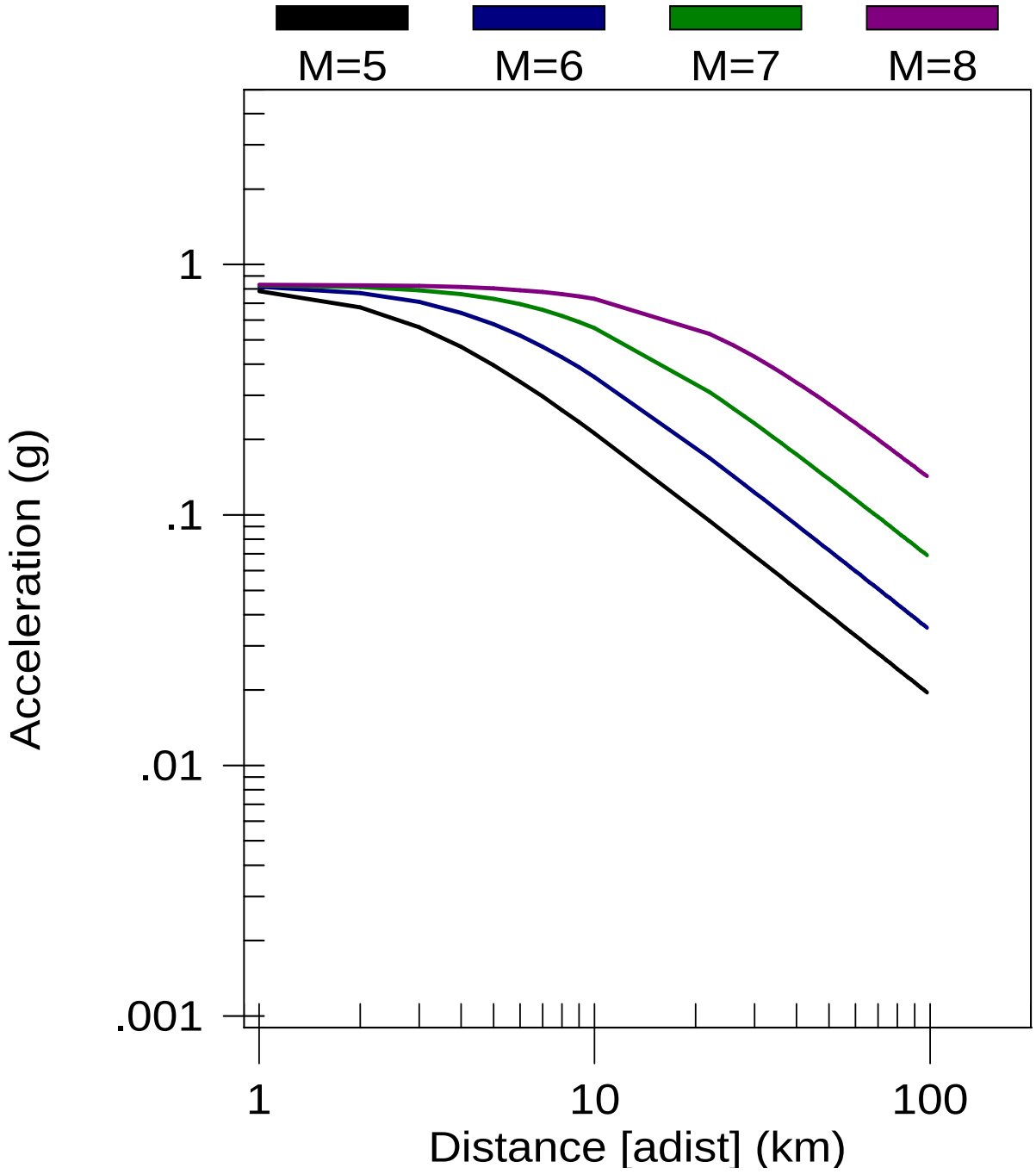
Vista Grande




W.O. 8053-A-SC
PLATE C-3

# STRIKE-SLIP FAULTS

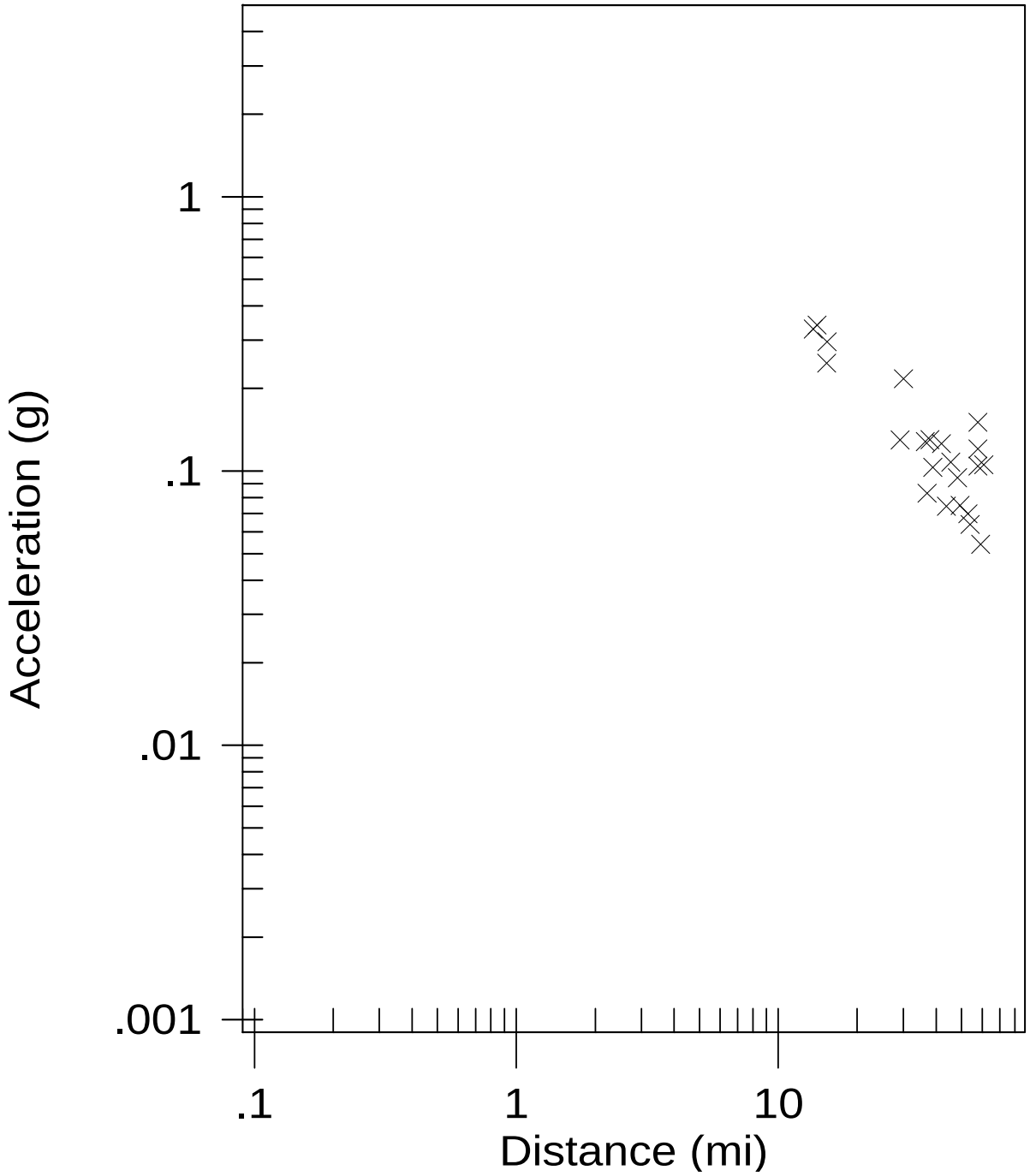
10) Bozorgnia Campbell Niazi (1999) Hor.-Holocene Soil-Cor.




W.O. 8053-A-SC
PLATE C-4

# MAXIMUM EARTHQUAKES

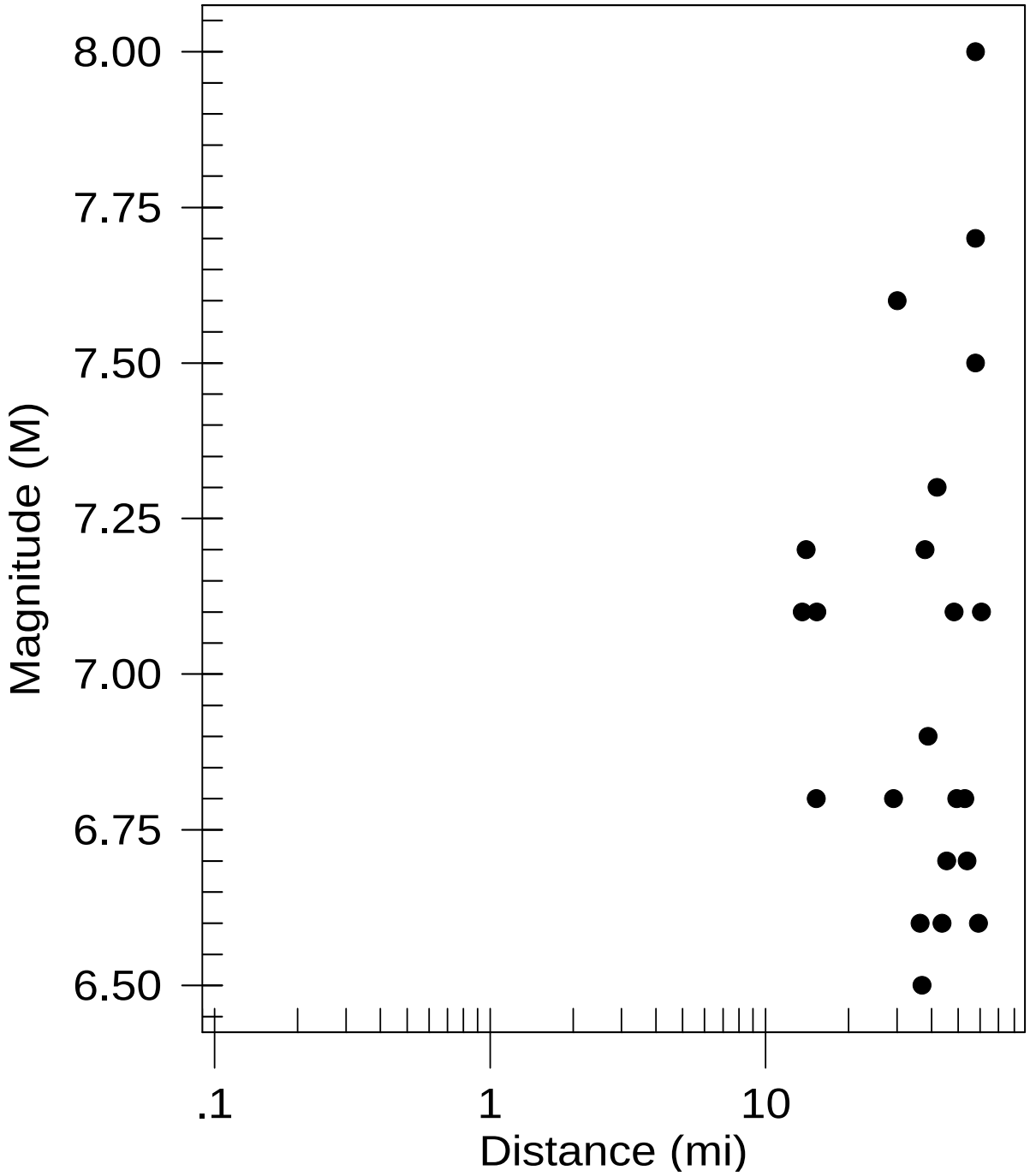
Vista Grande




W.O. 8053-A-SC
PLATE C-5

# EARTHQUAKE MAGNITUDES & DISTANCES

Vista Grande




W.O. 8053-A-SC
PLATE C-6

TEST.OUT

```
**************************
*                        *
*    E Q S E A R C H     *
*                        *
*     Version 3.00       *
*                        *
**************************
```

ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 8053-A-SC

DATE: 03-01-2021

JOB NAME: Vista Grande

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  4.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  33.2366
   SITE LONGITUDE:  117.2169

SEARCH DATES:
            START DATE:   1800
            END DATE:   2020

SEARCH RADIUS:
            62.4 mi
            100.4 km

ATTENUATION RELATION:  10) Bozorgnia Campbell Niazi (1999) Hor.-Holocene Soil-Cor.
   UNCERTAINTY (M=Median, S=Sigma): S       Number of Sigmas:  1.0
   ASSUMED SOURCE TYPE:  DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   0  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:  0     Campbell SHR:  0
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km):  3.0

TEST.OUT

EARTHQUAKE SEARCH RESULTS

Page 1

| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 33.2670 | 117.0170 | 06/07/1935 | 1633 0.0 | 0.0 | 4.00 | 0.087 | VII | 11.7( 18.9) |
| MGI | 33.2000 | 117.0000 | 07/20/1923 | 7 0 0.0 | 0.0 | 4.00 | 0.080 | VII | 12.8( 20.6) |
| DMG | 33.0000 | 117.3000 | 11/22/1800 | 2130 0.0 | 0.0 | 6.50 | 0.258 | IX | 17.0( 27.4) |
| T-A | 33.5000 | 117.0700 | 12/29/1880 | 7 0 0.0 | 0.0 | 4.30 | 0.060 | VI | 20.1( 32.3) |
| DMG | 33.0000 | 117.0000 | 03/03/1906 | 2025 0.0 | 0.0 | 4.50 | 0.065 | VI | 20.6( 33.1) |
| MGI | 33.0000 | 117.0000 | 12/29/1914 | 10 0 0.0 | 0.0 | 4.00 | 0.050 | VI | 20.6( 33.1) |
| MGI | 33.0000 | 117.0000 | 09/21/1856 | 730 0.0 | 0.0 | 5.00 | 0.085 | VII | 20.6( 33.1) |
| DMG | 33.5000 | 117.0000 | 08/08/1925 | 1013 0.0 | 0.0 | 4.50 | 0.060 | VI | 22.1( 35.5) |
| DMG | 33.4540 | 116.8980 | 07/29/1936 | 142252.8 | 10.0 | 4.00 | 0.044 | VI | 23.7( 38.2) |
| DMG | 33.4560 | 116.8960 | 06/16/1938 | 55916.9 | 10.0 | 4.00 | 0.043 | VI | 23.9( 38.5) |
| DMG | 33.5000 | 116.9170 | 11/04/1935 | 355 0.0 | 0.0 | 4.50 | 0.053 | VI | 25.1( 40.4) |
| MGI | 33.1000 | 116.8000 | 06/22/1918 | 557 0.0 | 0.0 | 4.00 | 0.040 | V | 25.9( 41.6) |
| GSP | 33.0700 | 116.8000 | 12/04/1991 | 071057.5 | 15.0 | 4.20 | 0.043 | VI | 26.7( 43.0) |
| DMG | 33.2000 | 116.7200 | 05/12/1930 | 172548.5 | 0.0 | 4.20 | 0.039 | V | 28.8( 46.4) |
| DMG | 33.2000 | 116.7000 | 01/01/1920 | 235 0.0 | 0.0 | 5.00 | 0.058 | VI | 30.0( 48.2) |
| MGI | 33.5000 | 116.8000 | 11/26/1916 | 17 5 0.0 | 0.0 | 4.00 | 0.034 | V | 30.1( 48.5) |
| MGI | 33.5000 | 116.8000 | 06/02/1917 | 435 0.0 | 0.0 | 4.00 | 0.034 | V | 30.1( 48.5) |
| MGI | 33.5000 | 116.8000 | 05/31/1917 | 435 0.0 | 0.0 | 4.00 | 0.034 | V | 30.1( 48.5) |
| MGI | 33.5000 | 116.8000 | 03/30/1918 | 16 5 0.0 | 0.0 | 4.60 | 0.046 | VI | 30.1( 48.5) |
| DMG | 33.4880 | 116.7770 | 06/12/1959 | 11 313.0 | 5.7 | 4.00 | 0.033 | V | 30.7( 49.5) |
| DMG | 32.8500 | 117.4830 | 02/23/1943 | 92112.0 | 0.0 | 4.00 | 0.033 | V | 30.8( 49.6) |
| MGI | 32.8000 | 117.1000 | 05/25/1803 | 0 0 0.0 | 0.0 | 5.00 | 0.056 | VI | 30.9( 49.7) |
| PAS | 33.4200 | 116.6980 | 06/05/1978 | 16 3 3.9 | 11.9 | 4.40 | 0.039 | V | 32.5( 52.3) |
| DMG | 33.7000 | 117.1000 | 06/11/1902 | 245 0.0 | 0.0 | 4.50 | 0.040 | V | 32.7( 52.6) |
| DMG | 33.7000 | 117.4000 | 04/11/1910 | 757 0.0 | 0.0 | 5.00 | 0.051 | VI | 33.7( 54.2) |
| DMG | 33.7000 | 117.4000 | 05/15/1910 | 1547 0.0 | 0.0 | 6.00 | 0.093 | VII | 33.7( 54.2) |
| DMG | 33.7000 | 117.4000 | 05/13/1910 | 620 0.0 | 0.0 | 5.00 | 0.051 | VI | 33.7( 54.2) |
| DMG | 33.4500 | 116.6830 | 04/25/1955 | 25515.0 | 0.0 | 4.00 | 0.030 | V | 34.1( 54.9) |
| DMG | 33.4830 | 116.7000 | 12/28/1948 | 125341.0 | 0.0 | 4.00 | 0.030 | V | 34.3( 55.2) |
| DMG | 33.7380 | 117.1870 | 04/27/1962 | 91232.1 | 5.7 | 4.10 | 0.031 | V | 34.7( 55.8) |
| DMG | 33.1000 | 116.6330 | 02/08/1952 | 174028.0 | 0.0 | 4.00 | 0.029 | V | 35.0( 56.4) |
| MGI | 33.2000 | 116.6000 | 10/12/1920 | 1748 0.0 | 0.0 | 5.30 | 0.057 | VI | 35.7( 57.5) |
| PAS | 32.9470 | 117.7360 | 01/15/1989 | 153955.2 | 6.0 | 4.20 | 0.031 | V | 36.1( 58.0) |
| DMG | 33.6990 | 117.5110 | 05/31/1938 | 83455.4 | 10.0 | 5.50 | 0.064 | VI | 36.1( 58.2) |
| DMG | 33.6820 | 117.5530 | 07/05/1938 | 18 655.7 | 10.0 | 4.50 | 0.036 | V | 36.3( 58.5) |
| DMG | 33.7100 | 116.9250 | 09/23/1963 | 144152.6 | 16.5 | 5.00 | 0.047 | VI | 36.8( 59.1) |
| MGI | 33.1000 | 116.6000 | 08/10/1921 | 19 6 0.0 | 0.0 | 4.00 | 0.028 | V | 36.9( 59.3) |
| MGI | 33.1000 | 116.6000 | 02/09/1920 | 220 0.0 | 0.0 | 4.00 | 0.028 | V | 36.9( 59.3) |
| MGI | 33.1000 | 116.6000 | 02/05/1922 | 1915 0.0 | 0.0 | 4.00 | 0.028 | V | 36.9( 59.3) |
| MGI | 33.1000 | 116.6000 | 05/28/1917 | 1017 0.0 | 0.0 | 4.00 | 0.028 | V | 36.9( 59.3) |
| MGI | 33.1000 | 116.6000 | 05/11/1915 | 1145 0.0 | 0.0 | 4.00 | 0.028 | V | 36.9( 59.3) |
| MGI | 33.1000 | 116.6000 | 03/04/1915 | 1250 0.0 | 0.0 | 4.00 | 0.028 | V | 36.9( 59.3) |
| MGI | 33.1000 | 116.6000 | 02/16/1915 | 1330 0.0 | 0.0 | 4.00 | 0.028 | V | 36.9( 59.3) |

Page 2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MGI | 33.1000 | 116.6000 | 08/10/1921 | 2151 0.0 | 0.0 | 4.00 | 0.028 | V | 36.9( 59.3) |
| MGI | 33.1000 | 116.6000 | 08/19/1917 | 710 0.0 | 0.0 | 4.00 | 0.028 | V | 36.9( 59.3) |
| MGI | 32.7000 | 117.2000 | 04/19/1906 | 028 0.0 | 0.0 | 4.30 | 0.032 | V | 37.1( 59.6) |
| MGI | 32.7000 | 117.2000 | 09/08/1915 | 742 0.0 | 0.0 | 4.00 | 0.027 | V | 37.1( 59.6) |
| DMG | 32.7000 | 117.2000 | 05/27/1862 | 20 0 0.0 | 0.0 | 5.90 | 0.079 | VII | 37.1( 59.6) |
| MGI | 32.7000 | 117.2000 | 05/20/1920 | 1330 0.0 | 0.0 | 4.00 | 0.027 | V | 37.1( 59.6) |
| DMG | 33.1500 | 116.5830 | 12/02/1935 | 319 0.0 | 0.0 | 4.00 | 0.027 | V | 37.1( 59.7) |
| DMG | 33.7170 | 117.5070 | 08/06/1938 | 22 056.0 | 10.0 | 4.00 | 0.027 | V | 37.1( 59.8) |
| DMG | 33.7330 | 117.4670 | 10/26/1954 | 162226.0 | 0.0 | 4.10 | 0.029 | V | 37.2( 59.8) |
| DMG | 33.4670 | 116.6330 | 02/20/1934 | 1035 0.0 | 0.0 | 4.00 | 0.027 | V | 37.2( 59.9) |

## EARTHQUAKE SEARCH RESULTS



| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 33.7170 | 117.5170 | 06/19/1935 | 1117 0.0 | 0.0 | 4.00 | 0.027 | V | 37.4( 60.2) |
| DMG | 33.7250 | 117.4980 | 01/03/1956 | 02548.9 | 13.7 | 4.70 | 0.039 | V | 37.4( 60.2) |
| DMG | 33.7500 | 117.0000 | 04/21/1918 | 223225.0 | 0.0 | 6.80 | 0.140 | VIII | 37.6( 60.5) |
| DMG | 33.7500 | 117.0000 | 06/06/1918 | 2232 0.0 | 0.0 | 5.00 | 0.046 | VI | 37.6( 60.5) |
| USG | 33.0170 | 117.8170 | 07/16/1986 | 1247 3.7 | 10.0 | 4.11 | 0.028 | V | 37.9( 60.9) |
| USG | 33.0170 | 117.8170 | 07/14/1986 | 11112.6 | 10.0 | 4.12 | 0.029 | V | 37.9( 60.9) |
| DMG | 33.7480 | 117.4790 | 06/22/1971 | 104119.0 | 8.0 | 4.20 | 0.029 | V | 38.4( 61.8) |
| PAS | 32.9700 | 117.8030 | 07/14/1986 | 03246.2 | 10.0 | 4.00 | 0.026 | V | 38.6( 62.1) |
| DMG | 32.8000 | 116.8000 | 10/23/1894 | 23 3 0.0 | 0.0 | 5.70 | 0.067 | VI | 38.6( 62.1) |
| MGI | 32.8000 | 116.8000 | 08/14/1927 | 1448 0.0 | 0.0 | 4.60 | 0.036 | V | 38.6( 62.1) |
| DMG | 33.5080 | 116.6310 | 08/11/1967 | 05711.4 | 10.7 | 4.10 | 0.028 | V | 38.6( 62.2) |
| PAS | 32.6790 | 117.1510 | 06/18/1985 | 32228.7 | 5.7 | 4.00 | 0.026 | V | 38.7( 62.3) |
| PAS | 33.5580 | 116.6670 | 06/15/1982 | 234921.3 | 12.2 | 4.80 | 0.040 | V | 38.7( 62.3) |
| PAS | 33.7010 | 116.8370 | 08/22/1979 | 2 136.3 | 5.0 | 4.10 | 0.028 | V | 38.8( 62.5) |
| GSP | 32.9850 | 117.8180 | 06/21/1995 | 211736.2 | 6.0 | 4.30 | 0.030 | V | 38.9( 62.5) |
| GSP | 32.9700 | 117.8100 | 04/04/1990 | 085439.3 | 6.0 | 4.00 | 0.026 | V | 38.9( 62.6) |
| DMG | 33.4000 | 116.5670 | 02/04/1953 | 43616.0 | 0.0 | 4.30 | 0.030 | V | 39.2( 63.0) |
| T-A | 32.6700 | 117.1700 | 12/00/1856 | 0 0 0.0 | 0.0 | 5.00 | 0.044 | VI | 39.2( 63.1) |
| T-A | 32.6700 | 117.1700 | 04/15/1865 | 840 0.0 | 0.0 | 4.30 | 0.030 | V | 39.2( 63.1) |
| T-A | 32.6700 | 117.1700 | 01/25/1863 | 1020 0.0 | 0.0 | 4.30 | 0.030 | V | 39.2( 63.1) |
| T-A | 32.6700 | 117.1700 | 10/21/1862 | 0 0 0.0 | 0.0 | 5.00 | 0.044 | VI | 39.2( 63.1) |
| T-A | 32.6700 | 117.1700 | 05/24/1865 | 0 0 0.0 | 0.0 | 5.00 | 0.044 | VI | 39.2( 63.1) |
| DMG | 33.6500 | 116.7500 | 09/05/1950 | 191956.0 | 0.0 | 4.80 | 0.039 | V | 39.2( 63.1) |
| MGI | 33.0000 | 116.6000 | 06/11/1917 | 354 0.0 | 0.0 | 4.00 | 0.026 | V | 39.2( 63.1) |
| DMG | 33.5330 | 116.6330 | 09/21/1942 | 7 754.0 | 0.0 | 4.00 | 0.026 | V | 39.4( 63.4) |
| DMG | 33.4170 | 116.5670 | 12/22/1950 | 2 536.0 | 0.0 | 4.00 | 0.026 | V | 39.5( 63.6) |
| PAS | 32.9450 | 117.8060 | 09/07/1984 | 11 313.4 | 6.0 | 4.30 | 0.030 | V | 39.6( 63.7) |
| GSP | 33.6320 | 116.7190 | 07/19/1999 | 220927.5 | 14.0 | 4.20 | 0.028 | V | 39.6( 63.7) |
| GSP | 33.6500 | 116.7400 | 12/02/1989 | 231647.8 | 14.0 | 4.20 | 0.028 | V | 39.6( 63.7) |
| DMG | 33.4670 | 116.5830 | 03/26/1937 | 2124 0.0 | 0.0 | 4.00 | 0.025 | V | 39.9( 64.2) |
| DMG | 33.4670 | 116.5830 | 01/04/1938 | 029 0.0 | 0.0 | 4.50 | 0.033 | V | 39.9( 64.2) |
| DMG | 33.4670 | 116.5830 | 03/27/1937 | 742 0.0 | 0.0 | 4.50 | 0.033 | V | 39.9( 64.2) |
| DMG | 33.4670 | 116.5830 | 03/27/1937 | 528 0.0 | 0.0 | 4.00 | 0.025 | V | 39.9( 64.2) |
| DMG | 33.5450 | 117.8070 | 10/27/1969 | 1316 2.3 | 6.5 | 4.50 | 0.033 | V | 40.1( 64.6) |
| PAS | 32.9860 | 117.8440 | 10/01/1986 | 201218.6 | 6.0 | 4.00 | 0.025 | V | 40.2( 64.7) |
| PAS | 32.9900 | 117.8490 | 07/13/1986 | 14 133.0 | 12.0 | 4.60 | 0.034 | V | 40.3( 64.9) |
| PAS | 32.9450 | 117.8310 | 07/29/1986 | 81741.8 | 10.0 | 4.10 | 0.026 | V | 40.8( 65.7) |
| DMG | 33.8000 | 117.0000 | 12/25/1899 | 1225 0.0 | 0.0 | 6.40 | 0.099 | VII | 40.9( 65.7) |
| DMG | 33.5060 | 116.5850 | 05/21/1967 | 144234.4 | 19.4 | 4.70 | 0.035 | V | 40.9( 65.8) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 33.1100 | 116.5230 | 01/24/1957 | 205449.9 | 3.9 | 4.60 | 0.034 | V | 41.0( 66.0) |
| DMG | 33.1670 | 116.5000 | 06/23/1932 | 22552.7 | 0.0 | 4.00 | 0.024 | V | 41.7( 67.1) |
| DMG | 33.1670 | 116.5000 | 06/23/1932 | 23037.1 | 0.0 | 4.00 | 0.024 | V | 41.7( 67.1) |
| PAS | 32.9330 | 117.8410 | 07/29/1986 | 81741.6 | 10.0 | 4.30 | 0.028 | V | 41.7( 67.2) |
| PAS | 33.1380 | 116.5010 | 10/10/1984 | 212258.9 | 11.6 | 4.50 | 0.031 | V | 41.9( 67.5) |
| PAS | 32.9710 | 117.8700 | 07/13/1986 | 1347 8.2 | 6.0 | 5.30 | 0.048 | VI | 42.0( 67.6) |
| DMG | 33.8330 | 117.4000 | 06/05/1940 | 82727.0 | 0.0 | 4.00 | 0.024 | IV | 42.5( 68.4) |
| PAS | 33.5200 | 116.5580 | 08/02/1975 | 014 7.7 | 13.4 | 4.70 | 0.034 | V | 42.7( 68.8) |
| DMG | 33.4000 | 116.5000 | 10/11/1918 | 4 0 0.0 | 0.0 | 4.00 | 0.024 | IV | 42.9( 69.0) |
| MGI | 33.8000 | 116.9000 | 06/14/1918 | 1024 0.0 | 0.0 | 4.00 | 0.024 | IV | 43.0( 69.1) |
| MGI | 33.8000 | 116.9000 | 04/23/1918 | 1415 0.0 | 0.0 | 4.00 | 0.024 | IV | 43.0( 69.1) |
| MGI | 33.8000 | 116.9000 | 04/29/1918 | 2 0 0.0 | 0.0 | 4.00 | 0.024 | IV | 43.0( 69.1) |
| MGI | 33.8000 | 116.9000 | 12/18/1920 | 1726 0.0 | 0.0 | 4.00 | 0.024 | IV | 43.0( 69.1) |
| DMG | 33.5340 | 116.5610 | 09/23/1956 | 112441.9 | 12.2 | 4.30 | 0.027 | V | 43.0( 69.2) |

## EARTHQUAKE SEARCH RESULTS



| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| PAS | 32.6150 | 117.1520 | 10/29/1986 | 23815.3 | 14.6 | 4.10 | 0.025 | V | 43.1( 69.3) |
| PAS | 32.6270 | 117.3770 | 06/29/1983 | 8 836.4 | 5.0 | 4.60 | 0.032 | V | 43.1( 69.4) |
| DMG | 33.1670 | 116.4670 | 08/01/1960 | 193930.0 | 0.0 | 4.20 | 0.026 | V | 43.6( 70.1) |
| DMG | 33.4200 | 116.4900 | 03/29/1937 | 17 316.8 | 10.0 | 4.00 | 0.023 | IV | 43.8( 70.5) |
| PAS | 33.4840 | 116.5130 | 08/11/1976 | 152455.5 | 15.4 | 4.30 | 0.027 | V | 44.0( 70.9) |
| PAS | 33.0330 | 117.9440 | 02/22/1983 | 21830.4 | 10.0 | 4.30 | 0.026 | V | 44.3( 71.3) |
| PAS | 33.5010 | 116.5130 | 02/25/1980 | 104738.5 | 13.6 | 5.50 | 0.051 | VI | 44.5( 71.6) |
| PDP | 33.5080 | 116.5140 | 10/31/2001 | 075616.6 | 15.0 | 5.10 | 0.040 | V | 44.6( 71.8) |
| DMG | 33.4830 | 116.5000 | 02/15/1951 | 104957.0 | 0.0 | 4.80 | 0.034 | V | 44.7( 71.9) |
| DMG | 33.4830 | 116.5000 | 02/15/1951 | 104759.0 | 0.0 | 4.80 | 0.034 | V | 44.7( 71.9) |
| DMG | 33.8000 | 117.6000 | 09/16/1903 | 1210 0.0 | 0.0 | 4.00 | 0.023 | IV | 44.7( 72.0) |
| MGI | 33.8000 | 117.6000 | 04/22/1918 | 2115 0.0 | 0.0 | 5.00 | 0.038 | V | 44.7( 72.0) |
| DMG | 33.5000 | 116.5000 | 09/30/1916 | 211 0.0 | 0.0 | 5.00 | 0.038 | V | 45.2( 72.7) |
| DMG | 33.1000 | 116.4500 | 11/23/1953 | 1339 7.0 | 0.0 | 4.30 | 0.026 | V | 45.3( 72.9) |
| DMG | 33.3680 | 116.4440 | 03/25/1937 | 232026.7 | 10.0 | 4.00 | 0.022 | IV | 45.5( 73.2) |
| DMG | 33.0970 | 116.4440 | 08/18/1959 | 215221.3 | 17.3 | 4.30 | 0.026 | V | 45.7( 73.5) |
| DMG | 33.3330 | 116.4330 | 02/12/1954 | 94428.0 | 0.0 | 4.50 | 0.028 | V | 45.7( 73.6) |
| DMG | 33.9000 | 117.2000 | 12/19/1880 | 0 0 0.0 | 0.0 | 6.00 | 0.068 | VI | 45.8( 73.7) |
| DMG | 33.5000 | 116.4830 | 02/23/1941 | 183614.0 | 0.0 | 4.50 | 0.028 | V | 46.1( 74.1) |
| DMG | 33.1670 | 116.4170 | 12/05/1939 | 173352.0 | 0.0 | 4.00 | 0.022 | IV | 46.5( 74.8) |
| DMG | 33.1670 | 116.4170 | 10/14/1935 | 1550 0.0 | 0.0 | 4.00 | 0.022 | IV | 46.5( 74.8) |
| DMG | 33.1670 | 116.4170 | 07/10/1938 | 18 6 0.0 | 0.0 | 4.00 | 0.022 | IV | 46.5( 74.8) |
| DMG | 32.8000 | 117.8330 | 01/24/1942 | 214148.0 | 0.0 | 4.00 | 0.022 | IV | 46.7( 75.1) |
| DMG | 33.1170 | 116.4170 | 06/04/1940 | 103656.0 | 0.0 | 4.00 | 0.021 | IV | 47.0( 75.6) |
| DMG | 33.1170 | 116.4170 | 10/21/1940 | 64933.0 | 0.0 | 4.50 | 0.028 | V | 47.0( 75.6) |
| DMG | 33.2670 | 116.4000 | 06/06/1940 | 2321 4.0 | 0.0 | 4.00 | 0.021 | IV | 47.2( 76.0) |
| GSP | 33.6200 | 117.9000 | 04/07/1989 | 200730.2 | 13.0 | 4.50 | 0.027 | V | 47.4( 76.3) |
| MGI | 32.7000 | 116.7000 | 03/21/1918 | 2325 0.0 | 0.0 | 4.00 | 0.021 | IV | 47.6( 76.7) |
| PAS | 33.4580 | 116.4340 | 02/12/1979 | 44842.3 | 3.9 | 4.20 | 0.023 | IV | 47.7( 76.7) |
| DMG | 33.4260 | 116.4210 | 03/25/1937 | 20 4 8.3 | 10.0 | 4.00 | 0.021 | IV | 47.7( 76.8) |
| DMG | 33.4170 | 116.4170 | 01/02/1943 | 141118.0 | 0.0 | 4.50 | 0.027 | V | 47.8( 76.9) |
| DMG | 33.4670 | 116.4330 | 05/12/1939 | 1925 2.2 | 0.0 | 4.50 | 0.027 | V | 47.9( 77.1) |
| DMG | 33.0020 | 116.4360 | 07/02/1957 | 65638.5 | 12.8 | 4.10 | 0.022 | IV | 48.0( 77.2) |
| GSP | 33.1100 | 116.4000 | 04/01/1984 | 071702.3 | 11.0 | 4.00 | 0.021 | IV | 48.0( 77.3) |
| PAS | 33.4830 | 116.4380 | 07/02/1988 | 02658.2 | 12.6 | 4.00 | 0.021 | IV | 48.0( 77.3) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| GSP | 33.5100 | 116.4500 | 02/18/1990 | 155259.9 | 9.0 | 4.10 | 0.022 | IV | 48.1( 77.4) |
| DMG | 33.0000 | 116.4330 | 06/04/1940 | 1035 8.3 | 0.0 | 5.10 | 0.037 | V | 48.2( 77.5) |
| DMG | 33.1830 | 116.3830 | 10/14/1949 | 02925.0 | 0.0 | 4.10 | 0.022 | IV | 48.3( 77.7) |
| GDP | 33.8060 | 117.7150 | 03/07/2000 | 002028.2 | 11.0 | 4.00 | 0.021 | IV | 48.7( 78.3) |
| DMG | 33.9330 | 117.3670 | 10/24/1943 | 02921.0 | 0.0 | 4.00 | 0.021 | IV | 48.8( 78.6) |
| DMG | 33.5010 | 116.4290 | 02/23/1971 | 0 739.2 | 8.0 | 4.20 | 0.023 | IV | 49.0( 78.8) |
| DMG | 33.8000 | 116.7000 | 08/11/1911 | 2340 0.0 | 0.0 | 4.50 | 0.026 | V | 49.0( 78.8) |
| DMG | 33.8000 | 116.7000 | 08/11/1911 | 1820 0.0 | 0.0 | 4.00 | 0.021 | IV | 49.0( 78.8) |
| DMG | 33.5670 | 117.9830 | 07/07/1937 | 1112 0.0 | 0.0 | 4.00 | 0.020 | IV | 49.7( 80.0) |
| DMG | 33.5670 | 117.9830 | 04/17/1934 | 1833 0.0 | 0.0 | 4.00 | 0.020 | IV | 49.7( 80.0) |
| DMG | 33.5750 | 117.9830 | 03/11/1933 | 518 4.0 | 0.0 | 5.20 | 0.038 | V | 50.0( 80.4) |
| DMG | 33.2830 | 116.3500 | 04/13/1949 | 75336.0 | 0.0 | 4.10 | 0.021 | IV | 50.1( 80.7) |
| DMG | 33.7670 | 117.8170 | 08/22/1936 | 521 0.0 | 0.0 | 4.00 | 0.020 | IV | 50.3( 81.0) |
| DMG | 33.6170 | 117.9670 | 03/11/1933 | 154 7.8 | 0.0 | 6.30 | 0.074 | VII | 50.6( 81.4) |
| DMG | 32.7170 | 117.8330 | 11/06/1950 | 205546.0 | 0.0 | 4.40 | 0.024 | V | 50.6( 81.4) |
| MGI | 33.7000 | 117.9000 | 07/08/1902 | 945 0.0 | 0.0 | 4.00 | 0.020 | IV | 50.7( 81.6) |
| DMG | 33.1210 | 116.3490 | 05/25/1971 | 10 252.9 | 8.0 | 4.10 | 0.021 | IV | 50.8( 81.7) |
| DMG | 33.3430 | 116.3460 | 04/28/1969 | 232042.9 | 20.0 | 5.80 | 0.053 | VI | 50.8( 81.7) |

---

EARTHQUAKE SEARCH RESULTS

---



| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| GSP | 33.3990 | 116.3540 | 07/26/1997 | 031456.0 | 11.0 | 4.80 | 0.030 | V | 51.0( 82.1) |
| PAS | 33.4600 | 116.3700 | 09/07/1984 | 175730.3 | 15.2 | 4.10 | 0.021 | IV | 51.2( 82.4) |
| PAS | 33.4710 | 118.0610 | 02/27/1984 | 101815.0 | 6.0 | 4.00 | 0.020 | IV | 51.3( 82.6) |
| DMG | 33.0380 | 116.3610 | 02/26/1957 | 211652.2 | 0.0 | 4.10 | 0.021 | IV | 51.3( 82.6) |
| MGI | 33.8000 | 117.8000 | 05/20/1917 | 945 0.0 | 0.0 | 4.00 | 0.020 | IV | 51.4( 82.7) |
| MGI | 33.8000 | 117.8000 | 05/19/1917 | 635 0.0 | 0.0 | 4.00 | 0.020 | IV | 51.4( 82.7) |
| MGI | 33.8000 | 117.8000 | 05/19/1917 | 719 0.0 | 0.0 | 4.00 | 0.020 | IV | 51.4( 82.7) |
| MGI | 33.8000 | 117.8000 | 11/09/1926 | 1535 0.0 | 0.0 | 4.60 | 0.026 | V | 51.4( 82.7) |
| MGI | 33.8000 | 117.8000 | 11/10/1926 | 1723 0.0 | 0.0 | 4.60 | 0.026 | V | 51.4( 82.7) |
| MGI | 33.8000 | 117.8000 | 11/04/1926 | 2238 0.0 | 0.0 | 4.60 | 0.026 | V | 51.4( 82.7) |
| MGI | 33.8000 | 117.8000 | 11/07/1926 | 1948 0.0 | 0.0 | 4.60 | 0.026 | V | 51.4( 82.7) |
| DMG | 33.6000 | 118.0000 | 03/11/1933 | 217 0.0 | 0.0 | 4.50 | 0.025 | V | 51.6( 83.1) |
| DMG | 33.6000 | 118.0000 | 03/11/1933 | 231 0.0 | 0.0 | 4.40 | 0.024 | IV | 51.6( 83.1) |
| DMG | 32.9670 | 116.3830 | 10/31/1942 | 15 758.0 | 0.0 | 4.00 | 0.019 | IV | 51.7( 83.2) |
| PAS | 32.7590 | 117.9060 | 10/18/1976 | 172753.1 | 13.8 | 4.20 | 0.021 | IV | 51.8( 83.3) |
| DMG | 33.2910 | 116.3170 | 03/19/1966 | 142156.0 | 10.9 | 4.00 | 0.019 | IV | 52.1( 83.8) |
| DMG | 33.6000 | 118.0170 | 12/25/1935 | 1715 0.0 | 0.0 | 4.50 | 0.025 | V | 52.5( 84.5) |
| DMG | 33.9960 | 117.2700 | 02/17/1952 | 123658.3 | 16.0 | 4.50 | 0.025 | V | 52.5( 84.5) |
| DMG | 33.8540 | 117.7520 | 10/04/1961 | 22131.6 | 4.3 | 4.10 | 0.020 | IV | 52.6( 84.6) |
| DMG | 33.8000 | 116.6000 | 09/10/1931 | 436 0.0 | 0.0 | 4.00 | 0.019 | IV | 52.7( 84.8) |
| PAS | 33.5080 | 118.0710 | 11/20/1988 | 53928.7 | 6.0 | 4.50 | 0.024 | V | 52.7( 84.8) |
| DMG | 34.0000 | 117.2500 | 07/23/1923 | 73026.0 | 0.0 | 6.25 | 0.068 | VI | 52.7( 84.9) |
| DMG | 34.0000 | 117.2500 | 11/01/1932 | 445 0.0 | 0.0 | 4.00 | 0.019 | IV | 52.7( 84.9) |
| DMG | 33.6590 | 117.9810 | 10/20/1961 | 20 714.5 | 6.1 | 4.00 | 0.019 | IV | 52.8( 85.0) |
| DMG | 34.0000 | 117.2830 | 11/07/1939 | 1852 8.4 | 0.0 | 4.70 | 0.027 | V | 52.8( 85.0) |
| DMG | 33.3150 | 116.3050 | 04/09/1968 | 1831 3.8 | 12.6 | 4.70 | 0.027 | V | 52.9( 85.1) |
| DMG | 33.6650 | 117.9790 | 10/20/1961 | 214240.7 | 7.2 | 4.00 | 0.019 | IV | 52.9( 85.2) |
| DMG | 33.2000 | 116.3000 | 05/12/1930 | 414 0.0 | 0.0 | 4.00 | 0.019 | IV | 53.0( 85.3) |
| DMG | 33.6170 | 118.0170 | 03/15/1933 | 111332.0 | 0.0 | 4.90 | 0.030 | V | 53.1( 85.4) |
| DMG | 33.6170 | 118.0170 | 10/02/1933 | 1326 1.0 | 0.0 | 4.00 | 0.019 | IV | 53.1( 85.4) |
| DMG | 33.6170 | 118.0170 | 03/14/1933 | 19 150.0 | 0.0 | 5.10 | 0.034 | V | 53.1( 85.4) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 33.3000 | 116.3000 | 01/04/1940 | 8 711.0 | 0.0 | 4.00 | 0.019 | IV | 53.1( 85.5) |
| DMG | 33.6540 | 117.9940 | 10/20/1961 | 194950.5 | 4.6 | 4.30 | 0.022 | IV | 53.2( 85.7) |
| DMG | 33.3330 | 116.3000 | 08/06/1933 | 332 0.0 | 0.0 | 4.70 | 0.027 | V | 53.3( 85.8) |
| DMG | 33.3330 | 116.3000 | 08/05/1933 | 2331 0.0 | 0.0 | 4.40 | 0.023 | IV | 53.3( 85.8) |
| DMG | 33.5610 | 118.0580 | 01/15/1937 | 183547.0 | 10.0 | 4.00 | 0.019 | IV | 53.4( 85.9) |
| DMG | 33.9500 | 117.5830 | 04/11/1941 | 12024.0 | 0.0 | 4.00 | 0.019 | IV | 53.6( 86.2) |
| DMG | 33.9500 | 116.8500 | 09/28/1946 | 719 9.0 | 0.0 | 5.00 | 0.032 | V | 53.6( 86.2) |
| MGI | 34.0000 | 117.4000 | 05/22/1907 | 652 0.0 | 0.0 | 4.60 | 0.025 | V | 53.7( 86.5) |
| DMG | 33.6170 | 118.0330 | 05/21/1938 | 944 0.0 | 0.0 | 4.00 | 0.019 | IV | 53.9( 86.7) |
| PAS | 32.7140 | 117.9100 | 10/18/1976 | 172652.6 | 15.1 | 4.20 | 0.020 | IV | 54.0( 86.9) |
| T-A | 34.0000 | 117.4200 | 04/12/1888 | 1315 0.0 | 0.0 | 4.30 | 0.022 | IV | 54.0( 86.9) |
| T-A | 34.0000 | 117.4200 | 09/10/1920 | 1415 0.0 | 0.0 | 4.30 | 0.022 | IV | 54.0( 86.9) |
| DMG | 33.9680 | 116.8820 | 06/27/1959 | 162211.1 | 13.8 | 4.00 | 0.019 | IV | 54.0( 87.0) |
| DMG | 33.4000 | 116.3000 | 02/09/1890 | 12 6 0.0 | 0.0 | 6.30 | 0.069 | VI | 54.1( 87.0) |
| DMG | 33.9170 | 116.7500 | 01/25/1933 | 1444 0.0 | 0.0 | 4.00 | 0.018 | IV | 54.1( 87.1) |
| DMG | 33.0530 | 116.3060 | 04/02/1967 | 201538.6 | 1.0 | 4.30 | 0.021 | IV | 54.2( 87.2) |
| DMG | 34.0000 | 117.0000 | 06/30/1923 | 022 0.0 | 0.0 | 4.50 | 0.024 | IV | 54.2( 87.2) |
| DMG | 33.6800 | 117.9930 | 11/20/1961 | 85334.7 | 4.4 | 4.00 | 0.018 | IV | 54.2( 87.2) |
| PAS | 34.0230 | 117.2450 | 10/02/1985 | 234412.4 | 15.2 | 4.80 | 0.028 | V | 54.3( 87.4) |
| GSP | 34.0240 | 117.2300 | 03/11/1998 | 121851.8 | 14.0 | 4.50 | 0.024 | IV | 54.4( 87.5) |
| DMG | 33.5170 | 118.1000 | 03/22/1941 | 82240.0 | 0.0 | 4.00 | 0.018 | IV | 54.5( 87.7) |
| DMG | 33.3670 | 118.1500 | 04/16/1942 | 72833.0 | 0.0 | 4.00 | 0.018 | IV | 54.6( 87.8) |

---

## EARTHQUAKE SEARCH RESULTS

---



| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 34.0170 | 117.0500 | 02/19/1940 | 12 655.7 | 0.0 | 4.60 | 0.025 | V | 54.7( 88.1) |
| DMG | 33.6710 | 118.0120 | 10/20/1961 | 223534.2 | 5.6 | 4.10 | 0.019 | IV | 54.7( 88.1) |
| DMG | 33.2350 | 116.2660 | 04/09/1968 | 93833.0 | 5.2 | 4.00 | 0.018 | IV | 54.9( 88.4) |
| DMG | 33.9330 | 116.7500 | 08/06/1938 | 228 0.0 | 0.0 | 4.00 | 0.018 | IV | 55.1( 88.6) |
| DMG | 33.9330 | 116.7500 | 10/28/1944 | 183016.0 | 0.0 | 4.40 | 0.022 | IV | 55.1( 88.6) |
| MGI | 34.0000 | 117.5000 | 12/16/1858 | 10 0 0.0 | 0.0 | 7.00 | 0.108 | VII | 55.2( 88.8) |
| DMG | 34.0000 | 117.5000 | 07/03/1908 | 1255 0.0 | 0.0 | 4.00 | 0.018 | IV | 55.2( 88.8) |
| DMG | 34.0330 | 117.3170 | 09/03/1935 | 647 0.0 | 0.0 | 4.50 | 0.023 | IV | 55.3( 89.0) |
| MGI | 33.8000 | 117.9000 | 05/22/1902 | 740 0.0 | 0.0 | 4.30 | 0.021 | IV | 55.3( 89.0) |
| DMG | 34.0330 | 117.3500 | 04/18/1940 | 184343.9 | 0.0 | 4.40 | 0.022 | IV | 55.5( 89.3) |
| DMG | 33.9170 | 116.7000 | 11/17/1943 | 112841.0 | 0.0 | 4.50 | 0.023 | IV | 55.6( 89.5) |
| PAS | 32.7560 | 117.9880 | 01/12/1975 | 212214.8 | 15.3 | 4.80 | 0.027 | V | 55.6( 89.5) |
| DMG | 34.0430 | 117.2280 | 04/03/1939 | 25044.7 | 10.0 | 4.00 | 0.018 | IV | 55.7( 89.6) |
| DMG | 33.9670 | 116.8000 | 09/07/1945 | 153424.0 | 0.0 | 4.30 | 0.021 | IV | 55.8( 89.9) |
| DMG | 33.2790 | 116.2490 | 01/07/1966 | 191023.0 | -1.7 | 4.00 | 0.018 | IV | 56.0( 90.0) |
| GDP | 34.0470 | 117.2550 | 02/21/2000 | 134943.1 | 15.0 | 4.50 | 0.023 | IV | 56.0( 90.1) |
| DMG | 32.5830 | 117.8000 | 04/19/1939 | 741 0.0 | 0.0 | 4.50 | 0.023 | IV | 56.4( 90.7) |
| DMG | 33.4080 | 116.2610 | 03/25/1937 | 1649 1.8 | 10.0 | 6.00 | 0.054 | VI | 56.4( 90.8) |
| DMG | 33.9500 | 116.7330 | 04/26/1942 | 151023.0 | 0.0 | 4.00 | 0.018 | IV | 56.6( 91.0) |
| GSP | 33.9510 | 117.7090 | 01/05/1998 | 181406.5 | 11.0 | 4.30 | 0.020 | IV | 56.9( 91.5) |
| DMG | 33.2000 | 116.2330 | 04/05/1942 | 92039.0 | 0.0 | 4.00 | 0.018 | IV | 56.9( 91.5) |
| DMG | 32.9610 | 116.2900 | 08/25/1971 | 23 033.0 | 8.0 | 4.00 | 0.018 | IV | 56.9( 91.5) |
| DMG | 33.0430 | 116.2600 | 08/22/1961 | 231933.6 | 12.1 | 4.40 | 0.021 | IV | 56.9( 91.6) |
| DMG | 33.9730 | 116.7690 | 06/10/1944 | 111531.9 | 10.0 | 4.00 | 0.017 | IV | 57.0( 91.7) |
| DMG | 33.3330 | 116.2360 | 10/05/1962 | 1529 2.6 | 13.9 | 4.10 | 0.018 | IV | 57.0( 91.7) |
| DMG | 33.9760 | 116.7750 | 10/17/1965 | 94519.0 | 17.0 | 4.90 | 0.028 | V | 57.0( 91.8) |
| DMG | 33.6830 | 118.0500 | 03/11/1933 | 658 3.0 | 0.0 | 5.50 | 0.039 | V | 57.0( 91.8) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 33.6830 | 118.0500 | 03/11/1933 | 1250 0.0 | 0.0 | 4.40 | 0.021 | IV | 57.0( 91.8) |
| DMG | 33.3330 | 116.2330 | 06/09/1942 | 5 633.0 | 0.0 | 4.00 | 0.017 | IV | 57.2( 92.0) |
| DMG | 33.7500 | 118.0000 | 11/16/1934 | 2126 0.0 | 0.0 | 4.00 | 0.017 | IV | 57.4( 92.3) |
| DMG | 32.9900 | 116.2680 | 11/08/1958 | 132044.1 | 2.4 | 4.10 | 0.018 | IV | 57.5( 92.5) |
| DMG | 33.3100 | 116.2240 | 05/22/1968 | 132655.4 | 7.5 | 4.40 | 0.021 | IV | 57.5( 92.6) |
| DMG | 32.9520 | 116.2790 | 09/13/1973 | 173039.8 | 8.0 | 4.80 | 0.026 | V | 57.7( 92.8) |
| DMG | 33.0500 | 116.2380 | 08/23/1961 | 1 047.8 | 11.9 | 4.70 | 0.025 | V | 58.0( 93.4) |
| DMG | 33.6170 | 118.1170 | 01/20/1934 | 2117 0.0 | 0.0 | 4.50 | 0.022 | IV | 58.1( 93.6) |
| PDP | 33.9550 | 117.7460 | 12/14/2001 | 120135.5 | 13.0 | 4.00 | 0.017 | IV | 58.2( 93.6) |
| T-A | 34.0800 | 117.2500 | 10/07/1869 | 0 0 0.0 | 0.0 | 4.30 | 0.020 | IV | 58.3( 93.8) |
| DMG | 33.9760 | 116.7210 | 06/12/1944 | 104534.7 | 10.0 | 5.10 | 0.030 | V | 58.5( 94.1) |
| DMG | 33.7000 | 118.0670 | 03/11/1933 | 51022.0 | 0.0 | 5.10 | 0.030 | V | 58.5( 94.1) |
| DMG | 33.7000 | 118.0670 | 07/20/1940 | 4 113.0 | 0.0 | 4.00 | 0.017 | IV | 58.5( 94.1) |
| DMG | 33.7000 | 118.0670 | 02/08/1940 | 165617.0 | 0.0 | 4.00 | 0.017 | IV | 58.5( 94.1) |
| DMG | 33.7000 | 118.0670 | 03/11/1933 | 85457.0 | 0.0 | 5.10 | 0.030 | V | 58.5( 94.1) |
| DMG | 33.0330 | 116.2330 | 09/20/1961 | 5 410.0 | 0.0 | 4.00 | 0.017 | IV | 58.6( 94.3) |
| PAS | 33.9760 | 116.7130 | 08/06/1984 | 81436.6 | 14.2 | 4.30 | 0.020 | IV | 58.7( 94.5) |
| DMG | 33.2000 | 116.2000 | 05/28/1892 | 1115 0.0 | 0.0 | 6.30 | 0.063 | VI | 58.8( 94.6) |
| DMG | 32.9230 | 116.2720 | 10/14/1969 | 131842.7 | 10.0 | 4.50 | 0.022 | IV | 58.8( 94.6) |
| DMG | 33.8980 | 116.5690 | 11/17/1964 | 145228.2 | 10.3 | 4.00 | 0.017 | IV | 58.9( 94.9) |
| DMG | 33.0190 | 116.2250 | 08/20/1969 | 152957.2 | 0.6 | 4.00 | 0.017 | IV | 59.3( 95.4) |
| DMG | 33.2370 | 116.1900 | 04/14/1968 | 125558.7 | 10.8 | 4.30 | 0.019 | IV | 59.3( 95.4) |
| DMG | 33.9810 | 116.7020 | 06/12/1944 | 222119.5 | 10.0 | 4.20 | 0.019 | IV | 59.3( 95.4) |
| DMG | 32.9500 | 116.2500 | 11/14/1951 | 2355 3.0 | 0.0 | 4.10 | 0.018 | IV | 59.3( 95.5) |
| DMG | 33.0210 | 116.2230 | 01/13/1963 | 23938.9 | 13.0 | 4.20 | 0.019 | IV | 59.4( 95.5) |
| PAS | 33.0580 | 116.2110 | 03/22/1982 | 85328.6 | 4.6 | 4.50 | 0.022 | IV | 59.4( 95.7) |

## EARTHQUAKE SEARCH RESULTS



| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 34.0140 | 116.7710 | 06/10/1944 | 111150.5 | 10.0 | 4.50 | 0.022 | IV | 59.5( 95.7) |
| DMG | 33.8000 | 118.0000 | 10/21/1913 | 938 0.0 | 0.0 | 4.00 | 0.017 | IV | 59.5( 95.8) |
| DMG | 33.9590 | 116.6510 | 09/23/1949 | 214440.1 | 12.2 | 4.00 | 0.017 | IV | 59.6( 95.8) |
| MGI | 34.0000 | 117.7000 | 12/03/1929 | 9 5 0.0 | 0.0 | 4.00 | 0.017 | IV | 59.6( 95.9) |
| MGI | 34.1000 | 117.2000 | 04/23/1923 | 2113 0.0 | 0.0 | 4.00 | 0.017 | IV | 59.6( 95.9) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 95556.0 | 0.0 | 5.00 | 0.028 | V | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 95429.0 | 0.0 | 6.20 | 0.058 | VI | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 102610.0 | 0.0 | 4.00 | 0.017 | IV | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 101957.0 | 0.0 | 4.50 | 0.021 | IV | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/23/1954 | 41450.0 | 0.0 | 5.10 | 0.030 | V | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 14 057.0 | 0.0 | 4.10 | 0.017 | IV | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 957 7.0 | 0.0 | 4.60 | 0.023 | IV | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 143750.0 | 0.0 | 4.00 | 0.017 | IV | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 102117.0 | 0.0 | 5.50 | 0.038 | V | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/20/1954 | 41919.0 | 0.0 | 4.90 | 0.027 | V | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/20/1954 | 6 353.0 | 0.0 | 4.30 | 0.019 | IV | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 13 8 4.0 | 0.0 | 4.30 | 0.019 | IV | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 101522.0 | 0.0 | 4.50 | 0.021 | IV | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 95748.0 | 0.0 | 4.00 | 0.017 | IV | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 03/19/1954 | 10 139.0 | 0.0 | 4.20 | 0.018 | IV | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 10/26/1944 | 225410.0 | 0.0 | 4.20 | 0.018 | IV | 59.8( 96.2) |
| DMG | 33.2830 | 116.1830 | 04/04/1954 | 42920.0 | 0.0 | 4.10 | 0.017 | IV | 59.8( 96.2) |
| MGI | 34.1000 | 117.3000 | 11/22/1911 | 257 0.0 | 0.0 | 4.00 | 0.017 | IV | 59.8( 96.2) |

| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| MGI | 34.1000 | 117.3000 | 12/27/1901 | 11 0 0.0 | 0.0 | 4.60 | 0.023 | IV | 59.8( 96.2) |
| MGI | 34.1000 | 117.3000 | 07/15/1905 | 2041 0.0 | 0.0 | 5.30 | 0.033 | V | 59.8( 96.2) |
| DMG | 34.1000 | 117.3000 | 02/16/1931 | 1327 0.0 | 0.0 | 4.00 | 0.017 | IV | 59.8( 96.2) |
| PAS | 33.9790 | 116.6810 | 12/16/1988 | 553 5.0 | 8.1 | 4.80 | 0.025 | V | 59.8( 96.2) |
| DMG | 33.9940 | 116.7120 | 06/12/1944 | 111636.0 | 10.0 | 5.30 | 0.033 | V | 59.8( 96.2) |
| PAS | 32.9050 | 116.2610 | 12/25/1975 | 71852.3 | 3.6 | 4.00 | 0.017 | IV | 59.9( 96.3) |
| DMG | 33.3490 | 116.1880 | 05/19/1969 | 144033.0 | 8.6 | 4.50 | 0.021 | IV | 59.9( 96.4) |
| GSP | 34.0850 | 116.9890 | 06/30/1992 | 214900.3 | 3.0 | 4.40 | 0.020 | IV | 60.0( 96.6) |
| DMG | 34.0290 | 116.7870 | 04/30/1954 | 03623.9 | 11.1 | 4.20 | 0.018 | IV | 60.0( 96.6) |
| MGI | 32.6000 | 116.5000 | 05/03/1918 | 425 0.0 | 0.0 | 4.00 | 0.016 | IV | 60.5( 97.3) |
| DMG | 34.0000 | 116.7000 | 08/25/1944 | 73025.0 | 0.0 | 4.20 | 0.018 | IV | 60.5( 97.4) |
| GSP | 32.7260 | 118.0680 | 12/27/2000 | 002714.1 | 6.0 | 4.10 | 0.017 | IV | 60.6( 97.5) |
| GSP | 34.0970 | 116.9960 | 12/05/1997 | 170438.9 | 4.0 | 4.10 | 0.017 | IV | 60.7( 97.8) |
| PAS | 33.5380 | 118.2070 | 05/25/1982 | 134430.3 | 13.7 | 4.10 | 0.017 | IV | 60.8( 97.8) |
| DMG | 33.1670 | 116.1670 | 11/16/1937 | 1057 0.0 | 0.0 | 4.00 | 0.016 | IV | 60.8( 97.9) |
| PAS | 34.0060 | 117.7390 | 02/18/1989 | 717 4.8 | 3.3 | 4.30 | 0.019 | IV | 61.0( 98.2) |
| PAS | 33.9670 | 116.6170 | 07/08/1986 | 102240.6 | 6.0 | 4.40 | 0.020 | IV | 61.1( 98.3) |
| PAS | 33.9670 | 116.6170 | 07/08/1986 | 155526.2 | 6.0 | 4.00 | 0.016 | IV | 61.1( 98.3) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 027 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/15/1933 | 540 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 2 4 0.0 | 0.0 | 4.90 | 0.026 | V | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/25/1933 | 1346 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 347 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 1738 0.0 | 0.0 | 4.50 | 0.021 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/15/1933 | 2 8 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 259 0.0 | 0.0 | 4.60 | 0.022 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 3 5 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 211 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 216 0.0 | 0.0 | 4.80 | 0.025 | V | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 323 0.0 | 0.0 | 5.00 | 0.027 | V | 61.2( 98.5) |

---

EARTHQUAKE SEARCH RESULTS

---



| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 336 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 339 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 740 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 436 0.0 | 0.0 | 4.60 | 0.022 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 311 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 440 0.0 | 0.0 | 4.70 | 0.023 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 1141 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 513 0.0 | 0.0 | 4.70 | 0.023 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 515 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 2 9 0.0 | 0.0 | 5.00 | 0.027 | V | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 210 0.0 | 0.0 | 4.60 | 0.022 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 524 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 553 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 555 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 611 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 618 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 635 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 439 0.0 | 0.0 | 4.90 | 0.026 | V | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 751 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 759 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 8 8 0.0 | 0.0 | 4.50 | 0.021 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 832 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 837 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 521 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 910 0.0 | 0.0 | 5.10 | 0.029 | V | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 911 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 926 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 1025 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 1045 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 11 0 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 1129 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 1138 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/23/1933 | 840 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 1147 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 2 5 0.0 | 0.0 | 4.30 | 0.019 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/30/1933 | 1225 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 1357 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 04/01/1933 | 642 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 04/02/1933 | 8 0 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 1547 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 1653 0.0 | 0.0 | 4.80 | 0.025 | V | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 1944 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 1956 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/14/1933 | 1219 0.0 | 0.0 | 4.50 | 0.021 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 2231 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 2232 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 2240 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 23 5 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 2354 0.0 | 0.0 | 4.50 | 0.021 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 3 9 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 448 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 546 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 6 1 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |

EARTHQUAKE SEARCH RESULTS



| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 616 0.0 | 0.0 | 4.60 | 0.022 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/18/1933 | 2052 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 835 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 15 2 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 1651 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/14/1933 | 2242 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 1825 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 2128 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/13/1933 | 1929 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/13/1933 | 343 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/13/1933 | 432 0.0 | 0.0 | 4.70 | 0.023 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/13/1933 | 617 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/13/1933 | 131828.0 | 0.0 | 5.30 | 0.033 | V | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/13/1933 | 1532 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/15/1933 | 432 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 33.7500 | 118.0830 | 03/14/1933 | 036 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 22 0 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 252 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 257 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 258 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/17/1933 | 1651 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 227 0.0 | 0.0 | 4.60 | 0.022 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/12/1933 | 034 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/16/1933 | 1456 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/16/1933 | 1529 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/16/1933 | 1530 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/23/1933 | 1831 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 222 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/19/1933 | 2123 0.0 | 0.0 | 4.20 | 0.018 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/20/1933 | 1358 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/21/1933 | 326 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 04/02/1933 | 1536 0.0 | 0.0 | 4.00 | 0.016 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/31/1933 | 1049 0.0 | 0.0 | 4.10 | 0.017 | IV | 61.2( 98.5) |
| DMG | 33.7500 | 118.0830 | 03/11/1933 | 230 0.0 | 0.0 | 5.10 | 0.029 | V | 61.2( 98.5) |
| DMG | 34.1180 | 117.3410 | 09/22/1951 | 82239.1 | 11.9 | 4.30 | 0.019 | IV | 61.3( 98.6) |
| DMG | 33.7330 | 118.1000 | 03/11/1933 | 15 9 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.3( 98.7) |
| DMG | 33.7330 | 118.1000 | 03/11/1933 | 1447 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.3( 98.7) |
| DMG | 33.7330 | 118.1000 | 03/11/1933 | 1350 0.0 | 0.0 | 4.40 | 0.020 | IV | 61.3( 98.7) |
| PAS | 33.9890 | 116.6490 | 07/17/1986 | 203515.0 | 6.2 | 4.00 | 0.016 | IV | 61.4( 98.7) |
| PAS | 33.9910 | 116.6490 | 07/17/1986 | 215445.2 | 7.4 | 4.40 | 0.020 | IV | 61.5( 98.9) |
| DMG | 34.1120 | 117.4260 | 03/19/1937 | 12338.4 | 10.0 | 4.00 | 0.016 | IV | 61.6( 99.2) |
| PAS | 33.9530 | 116.5720 | 10/15/1986 | 22847.8 | 8.7 | 4.70 | 0.023 | IV | 61.8( 99.5) |
| DMG | 34.1270 | 117.3380 | 02/23/1936 | 222042.7 | 10.0 | 4.50 | 0.021 | IV | 61.9( 99.6) |
| GSP | 34.1200 | 116.9980 | 06/29/1992 | 144126.0 | 4.0 | 4.40 | 0.019 | IV | 62.3(100.2) |
| DMG | 33.5000 | 118.2500 | 06/18/1920 | 10 8 0.0 | 0.0 | 4.50 | 0.021 | IV | 62.3(100.2) |
| PAS | 32.6250 | 118.0090 | 07/11/1981 | 215029.4 | 5.0 | 4.30 | 0.018 | IV | 62.4(100.4) |

**********

-END OF SEARCH- 417 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2020

LENGTH OF SEARCH TIME: 221 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 11.7 MILES (18.9 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.0

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.258 g

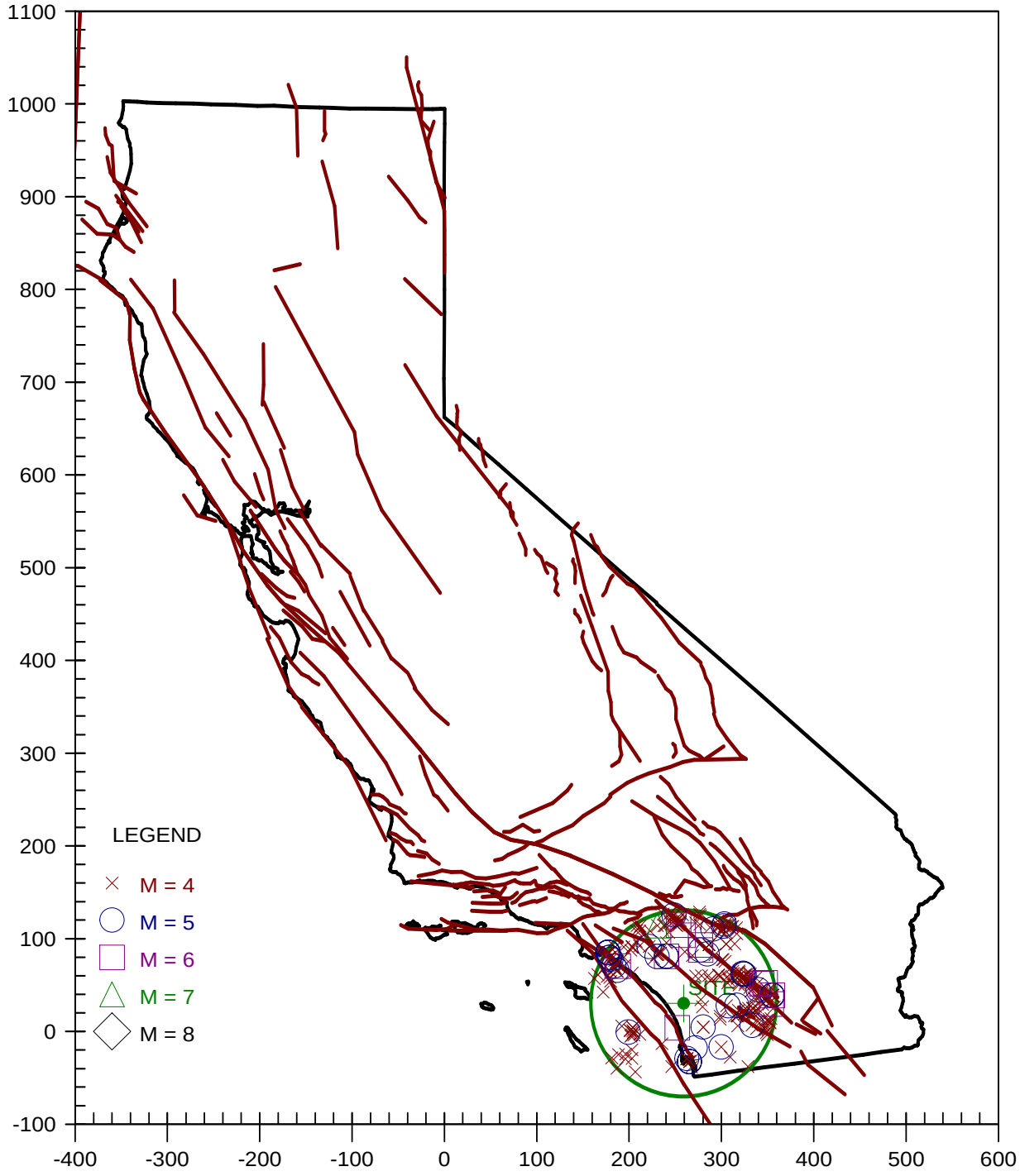
COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
  a-value= 3.347
  b-value= 0.786
  beta-value= 1.810

---
TABLE OF MAGNITUDES AND EXCEEDANCES:
---

| Earthquake Magnitude | Number of Times Exceeded | Cumulative No. / Year |
|---|---|---|
| 4.0 | 417 | 1.88688 |
| 4.5 | 134 | 0.60633 |
| 5.0 | 50 | 0.22624 |
| 5.5 | 19 | 0.08597 |
| 6.0 | 12 | 0.05430 |
| 6.5 | 3 | 0.01357 |
| 7.0 | 1 | 0.00452 |

# EARTHQUAKE EPICENTER MAP

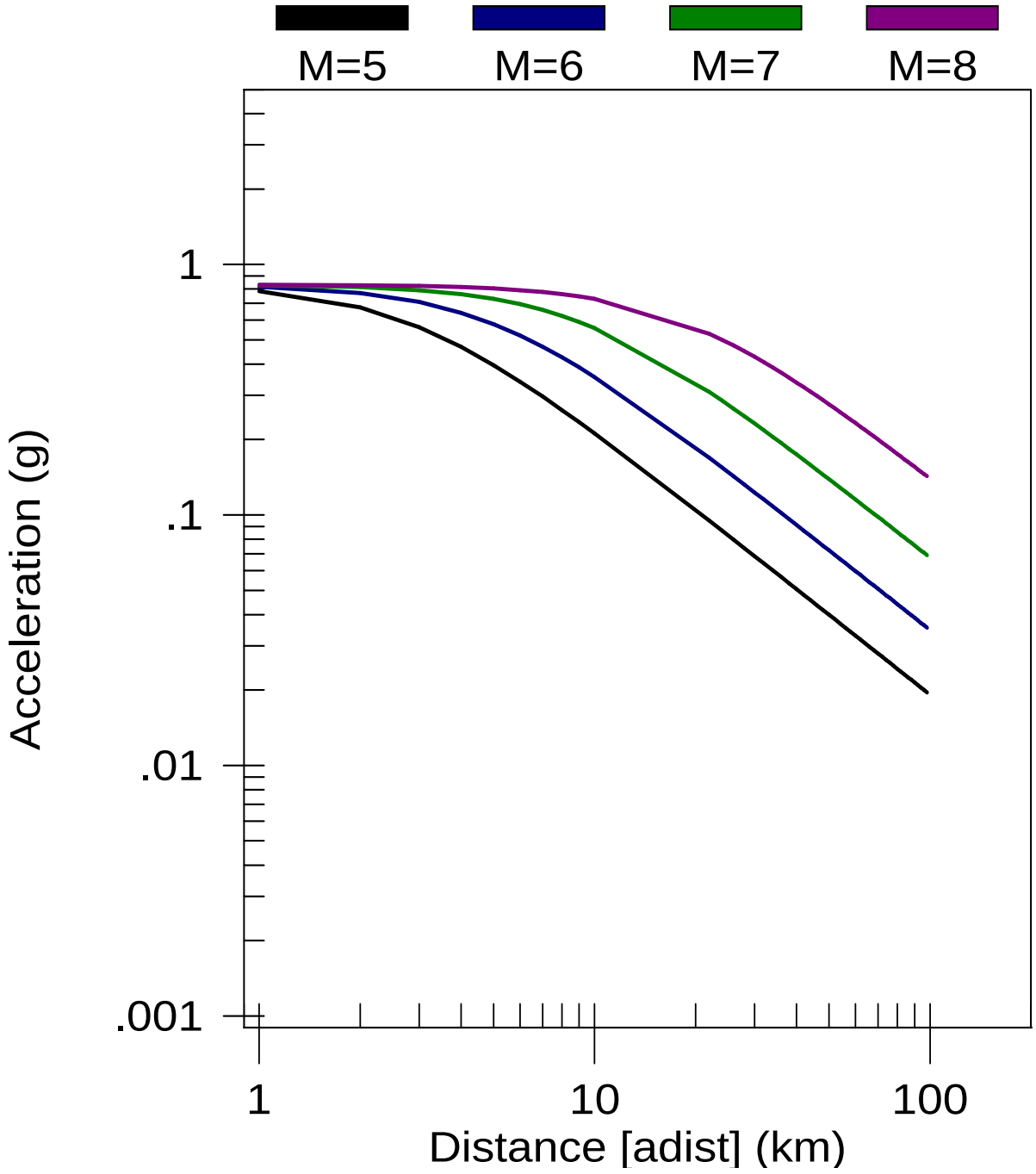
Vista Grande




W.O. 8053-A-SC
PLATE C-18

# STRIKE-SLIP FAULTS

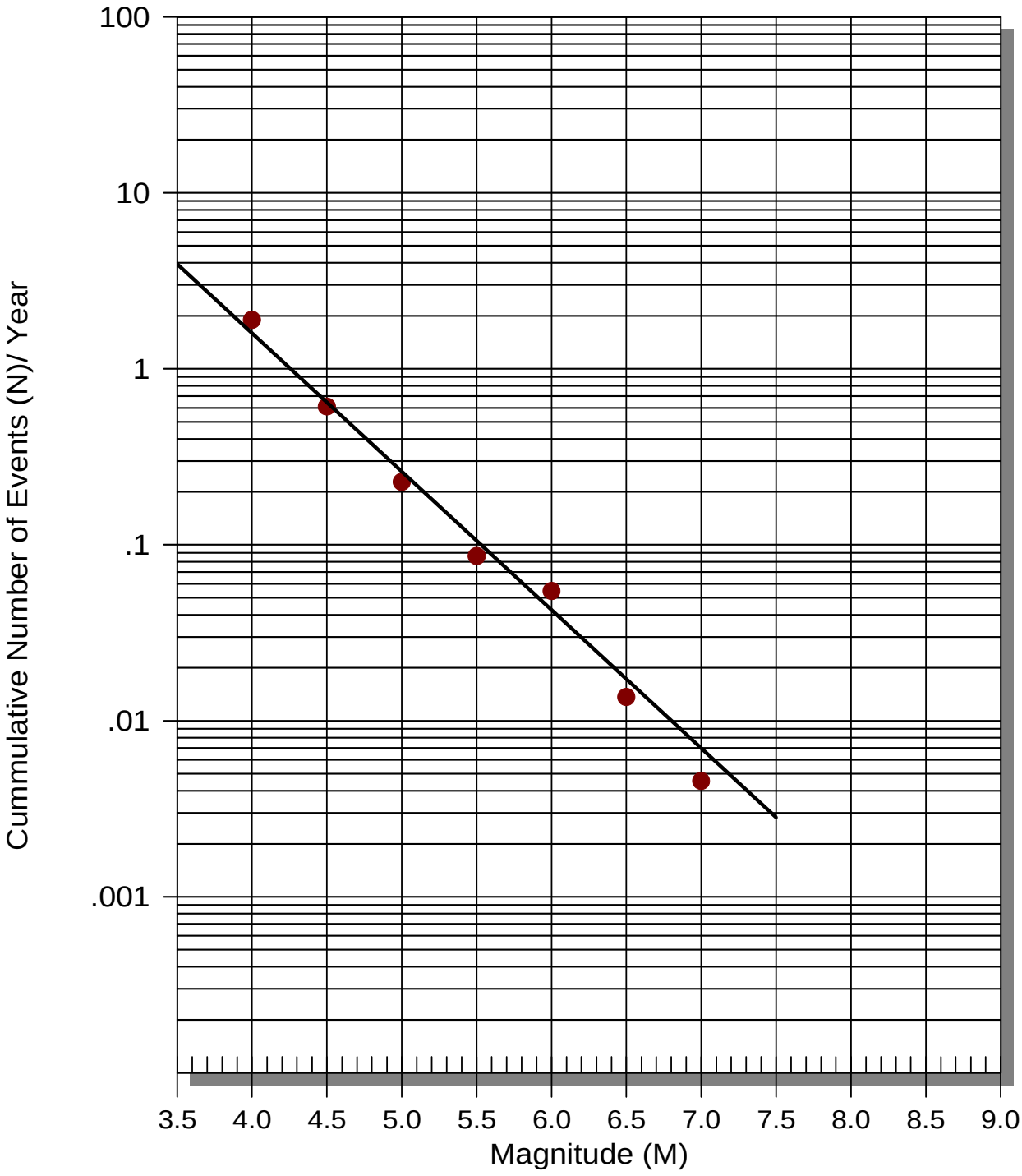
10) Bozorgnia Campbell Niazi (1999) Hor.-Holocene Soil-Cor.




W.O. 8053-A-SC
PLATE C-19

# EARTHQUAKE RECURRENCE CURVE

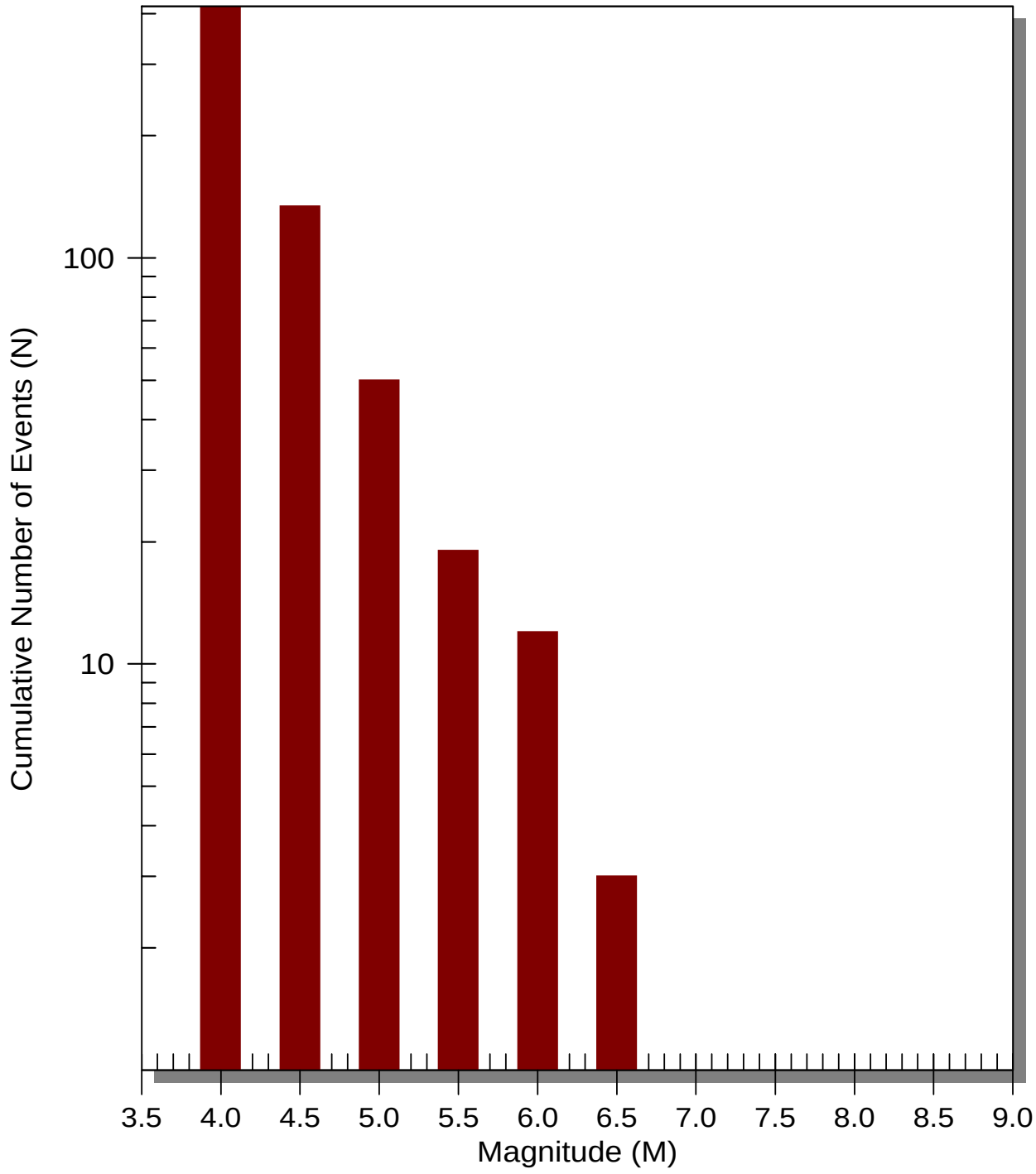
Vista Grande




W.O. 8053-A-SC
PLATE C-20

# Number of Earthquakes (N) Above Magnitude (M)

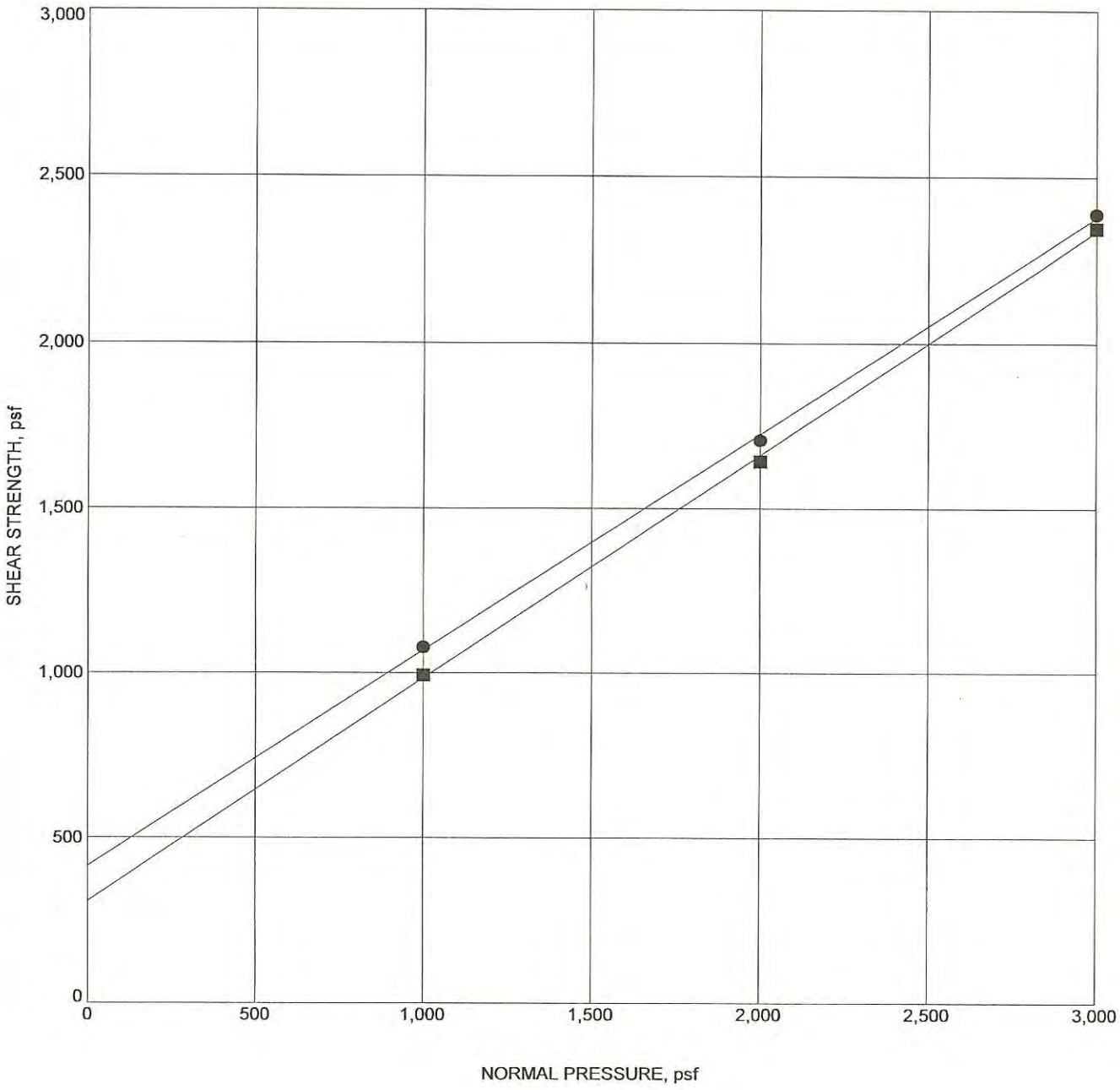
Vista Grande




W.O. 8053-A-SC
PLATE C-21

# APPENDIX D

# LABORATORY DATA




| | Sample | Depth/El. | Range | Classification | Primary/Residual | Sample Type | $\gamma_d$ | MC% | $c$ | $\phi$ |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | TP- 2 | 0.0 | 0-3 | Silty Sand | Primary Shear | Remolded | 117.0 | 10.5 | 414 | 33 |
| ■ | TP- 2 | 0.0 | | | Residual Shear | Remolded | 117.0 | 10.5 | 307 | 34 |
| | | | | | | | | | | |
| | | | | | | | | | | |

Note: Sample Innundated prior to testing

GeoSoils, Inc.
5741 Palmer Way
Carlsbad, CA 92008
Telephone: (760) 438-3155
Fax: (760) 931-0915

## DIRECT SHEAR TEST

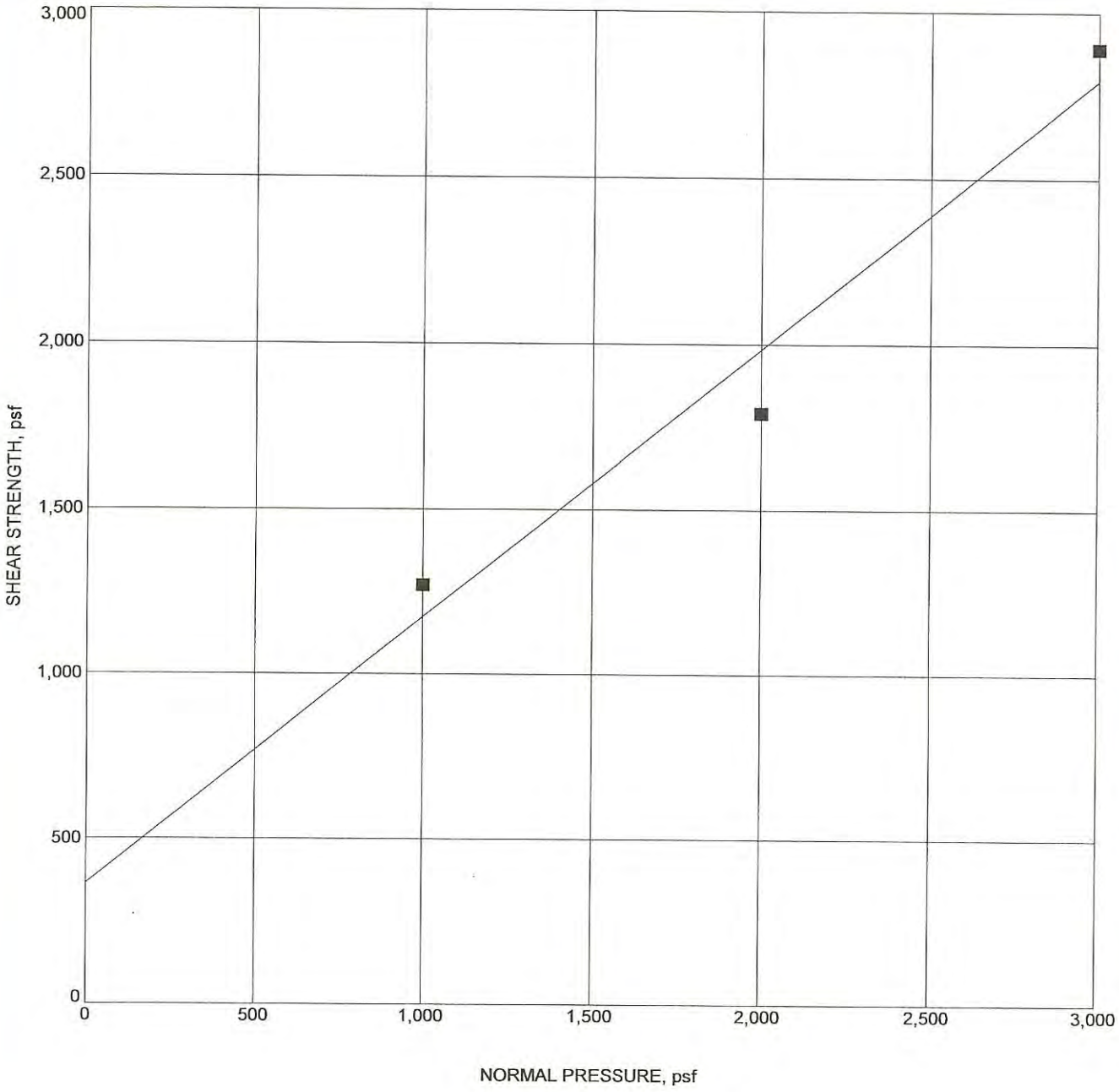
Project: CVOLS, LLC

Number: 5053-A-SC

Date: February 2006

Plate: D - 1

US DIRECT SHEAR 5053.GPJ US LAB.GDT 2/23/06




| | Sample | Depth/El. | Range | Classification | Primary/Residual | Sample Type | $\gamma_d$ | MC% | c | $\phi$ |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | TP- 4 | 3.0 | | Sandy Clay | Primary Shear | Undisturbed | 110.3 | 10.8 | 364 | 39 |
| ■ | TP- 4 | 3.0 | | | Residual Shear | Undisturbed | 110.3 | 10.8 | 364 | 39 |
| | | | | | | | | | | |
| | | | | | | | | | | |

Note: Sample Innundated prior to testing

GeoSoils, Inc.
5741 Palmer Way
Carlsbad, CA 92008
Telephone: (760) 438-3155
Fax: (760) 931-0915

## DIRECT SHEAR TEST

Project: CVOLS, LLC

Number: 5053-A-SC

Date: February 2006

Plate: D - 2

US_DIRECT_SHEAR_5053.GPJ US_LAB.GDT 2/23/06

# Table 1 - Laboratory Tests on Soil Samples

*GeoSoils, Inc.*
*CVOLS*
*Your# 5053-A, MJS&A #06-0237LSD*
*14-Feb-06*

| Sample ID | | | TP-2 @ 0-3' |
|---|---|---|---|
| **Resistivity** | | **Units** | |
| as-received | | ohm-cm | 88,000 |
| saturated | | ohm-cm | 3,000 |
| **pH** | | | 7.3 |
| **Electrical Conductivity** | | mS/cm | 0.15 |
| **Chemical Analyses** | | | |
| **Cations** | | | |
| calcium | $Ca^{2+}$ | mg/kg | 104 |
| magnesium | $Mg^{2+}$ | mg/kg | 107 |
| sodium | $Na^{1+}$ | mg/kg | ND |
| **Anions** | | | |
| carbonate | $CO_3^{2-}$ | mg/kg | ND |
| bicarbonate | $HCO_3^{1-}$ | mg/kg | 131 |
| chloride | $Cl^{1-}$ | mg/kg | 45 |
| sulfate | $SO_4^{2-}$ | mg/kg | ND |
| **Other Tests** | | | |
| ammonium | $NH_4^{1+}$ | mg/kg | na |
| nitrate | $NO_3^{1-}$ | mg/kg | na |
| sulfide | $S^{2-}$ | qual | na |
| Redox | | mV | na |

Electrical conductivity in millisiemens/cm and chemical analysis were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

# APPENDIX E

# STORM WATER BMP CHECKLISTS/FORMS

# Infiltration Data Sheet

| | | | |
|---|---|---|---|
| Project: | Park Row Properties | W.O. Number: | 7149-A-SC |
| Test Hole No.: | IB-1 | Date Excavated: | 10/20/16 |
| Test Hole Depth (ft.): | 15 Hole Radius(in.): 3 | Soil Classification | SP/SM/DG |
| Check for Sandy Soil Criteria Tested by: | ATS | Date:10/21/2016 | Presoak: 10/20/16 |
| Actual Percolation Tested by: | ATS | Date: | 10/21/16 |

## Sandy Soil Criteria Test

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level | Greater than or equal to 6" |
|---|---|---|---|---|---|---|
| **1** | 9:41<br>9:45 | 4 | 7 | 16 1/2 | 9 1/2 | YES |
| **2** | 9:46<br>9:52 | 6 | 18 | 26 | 8 | YES |

## Use: ~~Normal~~ Sandy (Circle One) Soil Criteria

| Time | Time Interval (min) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level (Inches) | Infiltration Rate (inch/hour) |
|---|---|---|---|---|---|---|
| 9:53<br>10:03 | 10 | 10 | 27 | 33 1/2 | 6 1/2 | 12.32 |
| 10:03<br>10:13 | 10 | 20 | 33 1/2 | 38 1/2 | 5 | 11.25 |
| 10:15<br>10:25 | 10 | 30 | 39 1/4 | 35 | 4 1/4 | 10.55 |
| 10:25<br>10:35 | 10 | 40 | 35 | 31 | 4 | 10.29 |
| 10:35<br>10:45 | 10 | 50 | 31 | 27 1/4 | 3 3/4 | 10.00 |
| 10:45<br>10:55 | 10 | 60 | 27 1/4 | 24 | 3 1/4 | 9.36 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# Infiltration Data Sheet

| | | | |
|---|---|---|---|
| Project: | Park Row Properties | W.O. Number: | 7149-A-SC |
| Test Hole No.: | IB-2 | Date Excavated: | 10/20/16 |
| Test Hole Depth (ft.): | 5 Hole Radius(in.): 3 | Soil Classification: | SP/SM |
| Check for Sandy Soil Criteria Tested by: | ATS | Date: 10/21/2016 | Presoak: 10/20/16 |
| Actual Percolation Tested by: | ATS | Date: | 10/21/16 |

## Sandy Soil Criteria Test

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level | Greater than or equal to 6" |
|---|---|---|---|---|---|---|
| **1** | 9:43<br>9:57 | 14 | 5 3/4 | 12 | 6 1/4 | YES |
| **2** | 10:24<br>10:46 | 22 | 8 | 14 1/2 | 6 1/2 | YES |

## Use: ~~Normal~~ Sandy (Circle One) Soil Criteria

| Time | Time Interval (min) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level (Inches) | Infiltration Rate (inch/hour) |
|---|---|---|---|---|---|---|
| 10:49<br>10:59 | 10 | 10 | 14 1/2 | 16 | 1 1/2 | 6.00 |
| 11:00<br>11:10 | 10 | 20 | 5 | 9 1/4 | 4 1/4 | 10.55 |
| 11:10<br>11:20 | 10 | 30 | 9 1/4 | 11 1/2 | 2 1/4 | 7.71 |
| 11:20<br>11:30 | 10 | 40 | 11 1/2 | 13 1/2 | 2 | 7.20 |
| 11:33<br>11:43 | 10 | 50 | 10 | 12 1/4 | 2 1/4 | 7.71 |
| 11:43<br>11:53 | 10 | 60 | 12 1/4 | 13 1/2 | 1 1/4 | 5.29 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# Infiltration Data Sheet

| | | | |
|---|---|---|---|
| Project: | Park Row Properties | W.O. Number: | 7149-A-SC |
| Test Hole No.: | IB-3 | Date Excavated: | 10/20/16 |
| Test Hole Depth (ft.): | 12 Hole Radius(in.): 3 | Soil Classification | SM/SC/DG |
| Check for Sandy Soil Criteria Tested by: | ATS | Date: 10/21/2016 | Presoak: 10/20/16 |
| Actual Percolation Tested by: | ATS | Date: | 10/21/16 |

## Sandy Soil Criteria Test

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level | Greater than or equal to 6" |
|---|---|---|---|---|---|---|
| **1** | 12:30<br>12:41 | 11 | 20 1/2 | 27 | 6 1/2 | YES |
| **2** | 12:41<br>12:58 | 17 | 27 | 33 1/4 | 6 1/4 | YES |

## Use: ~~Normal~~ Sandy (Circle One) Soil Criteria

| Time | Time Interval (min) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level (Inches) | Infiltration Rate (inch/hour) |
|---|---|---|---|---|---|---|
| 12:58<br>13:08 | 10 | 10 | 33 1/4 | 36 3/4 | 3 1/2 | 9.69 |
| 13:10<br>13:20 | 10 | 20 | 19 | 20 | 1 | 4.50 |
| 13:20<br>13:30 | 10 | 30 | 20 | 21 1/4 | 1 1/4 | 5.29 |
| 13:30<br>13:40 | 10 | 40 | 21 1/4 | 22 | 3/4 | 3.60 |
| 13:42<br>13:52 | 10 | 50 | 8 | 15 | 7 | 12.60 |
| 13:52<br>14:02 | 10 | 60 | 15 | 18 | 3 | 9.00 |
| 14:02<br>14:12 | 10 | 70 | 18 | 19 | 1 | 4.50 |
| 14:12<br>14:22 | 10 | 80 | 19 | 20 | 1 | 4.50 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# Infiltration Data Sheet

| | | | |
|---|---|---|---|
| Project: | Park Row Properties | W.O. Number: | 7149-A-SC |
| Test Hole No.: | IB-4 | Date Excavated: | 10/20/16 |
| Test Hole Depth (ft.): | 3.5 Hole Radius(in.): 3 | Soil Classification | SM/SC |
| Check for Sandy Soil Criteria Tested by: | ATS | Date: 10/21/2016 | Presoak: 10/20/16 |
| Actual Percolation Tested by: | ATS | Date: | 10/21/16 |

## Sandy Soil Criteria Test

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level | Greater than or equal to 6" |
|---|---|---|---|---|---|---|
| **1** | 12:31<br>12:49 | 18 | 7 1/2 | 13 1/2 | 6 | YES |
| **2** | 12:49<br>13:14 | 25 | 13 1/2 | 19 1/2 | 6 | YES |

## Use: ~~Normal~~ Sandy (Circle One) Soil Criteria

| Time | Time Interval (min) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level (Inches) | Infiltration Rate (inch/hour) |
|---|---|---|---|---|---|---|
| 13:17<br>13:27 | 10 | 10 | 5 1/2 | 8 3/4 | 3 1/4 | 9.36 |
| 13:27<br>13:37 | 10 | 20 | 8 3/4 | 10 1/2 | 1 3/4 | 6.63 |
| 13:37<br>13:47 | 10 | 30 | 10 1/2 | 12 1/2 | 2 | 7.20 |
| 13:47<br>13:57 | 10 | 40 | 12 1/2 | 14 1/2 | 2 | 7.20 |
| 13:57<br>14:07 | 10 | 50 | 14 1/2 | 16 1/2 | 2 | 7.20 |
| 14:07<br>14:17 | 10 | 60 | 16 1/2 | 18 | 1 1/2 | 6.00 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# Infiltration Data Sheet

| | | | |
|---|---|---|---|
| Project: | Park Row Properties | W.O. Number: | 7149-A-SC |
| Test Hole No.: | IB-5 | Date Excavated: | 10/20/16 |
| Test Hole Depth (ft.): | 10.5 Hole Radius(in.): 3 | Soil Classification | Granitics |
| Check for Sandy Soil Criteria Tested by: | ATS | Date: 10/21/2016 | Presoak: 10/20/16 |
| Actual Percolation Tested by: | ATS | Date: | 10/21/16 |

## Sandy Soil Criteria Test

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level | Greater than or equal to 6" |
|---|---|---|---|---|---|---|
| **1** | 15:06<br>15:16 | 10 | 17 | 23 3/4 | 6 3/4 | YES |
| **2** | 15:16<br>15:26 | 10 | 23 3/4 | 29 3/4 | 6 | YES |

## Use: ~~Normal~~ Sandy (Circle One) Soil Criteria

| Time | Time Interval (min) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level (Inches) | Infiltration Rate (inch/hour) |
|---|---|---|---|---|---|---|
| 15:26<br>15:36 | 10 | 10 | 7 | 12 | 5 | 11.25 |
| 15:36<br>15:46 | 10 | 20 | 12 | 14 | 2 | 7.20 |
| 15:46<br>15:56 | 10 | 30 | 14 | 16 1/2 | 2 1/2 | 8.18 |
| 15:56<br>16:06 | 10 | 40 | 16 1/2 | 18 1/2 | 2 | 7.11 |
| 16:06<br>16:16 | 10 | 50 | 18 1/2 | 20 | 1 1/2 | 6.00 |
| 16:16<br>16:26 | 10 | 60 | 20 | 22 | 2 | 7.20 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# Infiltration Data Sheet

| | | | |
|---|---|---|---|
| Project: | Park Row Properties | W.O. Number: | 7149-A-SC |
| Test Hole No.: | IB-6 | Date Excavated: | 10/20/16 |
| Test Hole Depth (ft.): | 3 Hole Radius(in.): 3 | Soil Classification | Granitics |
| Check for Sandy Soil Criteria Tested by: | ATS | Date: 10/21/2016 | Presoak: 10/20/16 |
| Actual Percolation Tested by: | ATS | Date: | 10/21/16 |

## Sandy Soil Criteria Test

| Trial No. | Time | Time Interval (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level | Greater than or equal to 6" |
|---|---|---|---|---|---|---|
| **1** | 15:07<br>15:24 | 17 | 8 | 14 3/4 | 6 3/4 | YES |
| **2** | 15:24<br>15:49 | 25 | 14 3/4 | 20 3/4 | 6 | YES |

## Use: ~~Normal~~ Sandy (Circle One) Soil Criteria

| Time | Time Interval (min) | Total Elapsed Time (Min.) | Initial Water Level (Inches) | Final Water Level (Inches) | Δ in Water Level (Inches) | Infiltration Rate (inch/hour) |
|---|---|---|---|---|---|---|
| 15:52<br>16:02 | 10 | 10 | 9 3/4 | 13 | 3 1/4 | 9.36 |
| 16:02<br>16:12 | 10 | 20 | 13 | 15 1/2 | 2 1/2 | 8.18 |
| 16:12<br>16:22 | 10 | 30 | 15 1/2 | 16 1/2 | 1 | 4.50 |
| 16:24<br>16:34 | 10 | 40 | 9 1/2 | 12 | 2 1/2 | 8.18 |
| 16:34<br>16:44 | 10 | 50 | 12 | 14 1/2 | 2 1/2 | 8.18 |
| 16:44<br>16:54 | 10 | 60 | 14 1/2 | 16 1/2 | 2 | 7.20 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Plate No. C-6

Pertaining to Basins: 1, 4, 8, 10, 11, 12, 13, and 14 (Transition and Fill Basins)

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

| Categorization of Infiltration Condition | | | Worksheet C.4-1 |
|---|---|---|---|
| **Part 1 - Full Infiltration Feasibility Screening Criteria**<br><br>**Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?** | | | |
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 1 | **Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D. | X | |
| Provide basis:<br><br>Yes. GSI (this study) has evaluated the infiltration rate of natural surface soils as close to 4.50 to 9.36 in/hr,(Hydrologic Soil Group C). The areas for development for the basins listed above will result in partial removal of surface soils, yielding medium dense to dense granitics, and/or fill, at the infiltration surface. Site soils where the proposed basins are to be constructed in cut have relatively moderate to high permeability at depth below basin surface grade. However, the infiltration rates for fill materials is expected to be about 0.5 in/hr., or similar to the parent material.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 2 | **Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2. | | X |
| Provide basis:<br><br>No. The moderate to high permeability at depth suggests that surficial manifestations due to infiltration should not be a problem. There is an increased potential for the creation of perched groundwater (mounding) conditions along zones of contrasting permeabilities, including shallow cut/fill contacts, and transitions between colluvial earth materials, fill materials, and the granitic bedrock. Due to the strong permeability contrast between bedrock and colluvial and fill deposits or within fill lifts, utility trenches can potentially act as french drains and provide conduits for the movement of excessive moisture beneath the structure(s), further exacerbating slope instability, as well as potentially causing settlement in onsite and offsite trench backfill. Future perched groundwater conditions may develop along granitic bedrock contacts, and should be anticipated. The limited permeability of granitic bedrock will tend to result in the lateral migration of water and saturated conditions at, or near the surface, increasing the potential for distress to foundations, floor slabs, and slope instability, etc. Superjacent basins proposed next to subjacent pads may cause local slope stability, water intrusion, and distress to retaining walls below basin elevation. See text of GSI (2006) for other related discussions and references.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |

Pertaining to Basins: 1, 4, 8, 10, 11, 12, 13, and 14 (Transition and Fill Basins)

| Worksheet C.4.1 Page 2 of 4 | | | |
|---|---|---|---|
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 3 | **Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensible evaluation of the factors presented in Appendix C.3. | | X |
| Provide basis:<br>While the GSI (2013) study did not include an environmental assessment, visual observation did not indicate the presence of potential contaminants. While the regional groundwater table is not considered a factor in the development of this site, the creation of a shallow "perched" water table would likely occur through infiltration.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 4 | **Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as a change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br>Yes. The site currently drains offsite and no runoff appears to be retained onsite. The regional groundwater table is not considered a factor in the development of this site.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| **Part 1 Result*** | In the answers to rows 1-4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration**<br><br>If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design.<br>Proceed to Part 2 | | **No** |

* To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by [City Engineer] to substantiate findings.

Pertaining to Basins: 1, 4, 8, 10, 11, 12, 13, and 14 (Transition and Fill Basins)

**Worksheet C.4-1 Page 3 of 4**

**Part 2 - Partial Infiltration vs. No Infiltration Feasibility Screening Criteria**

**Would infiltration of water in an appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?**

| Criteria | Screening Question | Yes | No |
|---|---|---|---|
| 5 | **Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D. | X | |

Provide basis:

Yes. The Ksat of natural surface soils is greater than 0.5 in./hr., and the lowest infiltration rate recorded was 4.50, which is 9 times the limit (0.5 in./hr.) for feasible infiltration. Infiltration rates of fill material is not known.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

| | | | |
|---|---|---|---|
| 6 | **Can infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2. | | X |

Provide basis:

No. The limited permeability of granitic bedrock will tend to result in the lateral migration of water and saturated conditions at, or near the surface, increasing the potential for distress to foundations, floor slabs, and slope instability, etc. There is an increased potential for the creation of perched groundwater (mounding) conditions along zones of contrasting permeabilities, including shallow cut/fill contacts, and transitions between colluvial earth materials within the granitic bedrock. Due to the strong permeability contrast between bedrock and backfill, utility trenches can potentially act as french drains and provide conduits for the movement of excessive moisture beneath the structure(s) further exacerbating slope instability, as well as potentially causing settlement in onsite and offsite trench backfill. Superjacent basins proposed next to subjacent pads may cause local slope stability, water intrusion, and distress to retaining walls below basin elevation. See text of GSI (2006) for other related discussions and references.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Pertaining to Basins: 1, 4, 8, 10, 11, 12, 13, and 14 (Transition and Fill Basins)

| Worksheet C.4-1 Page 4 of 4 | | | |
|---|---|---|---|
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 7 | **Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | | X |
| Provide basis:<br>While the regional groundwater table is not considered a factor in the development of this site, the creation of a shallow "perched" water table can occur and increase the potential for distress to the structure(s) due to water vapor transmission through foundations, slabs, and any resultant corrosive effects on metal conduit in trenches, as well as settlement in onsite and offsite trench backfill.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 8 | **Can infiltration be allowed without violating downstream water rights?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br>The site currently drains offsite and no runoff appears to be retained onsite. The regional groundwater table is not considered a factor in the development of this site.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| Part 2 Result* | If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.**<br>If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.** | | **No Infiltration** |

* To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings.

Pertaining to Basins: 2, 3, 5, 6, 7, 9, and 15 (Cut Basins)

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

| Categorization of Infiltration Condition | | | Worksheet C.4-1 |
|---|---|---|---|
| **Part 1 - Full Infiltration Feasibility Screening Criteria**<br><br>**Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?** | | | |
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 1 | **Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D. | X | |
| Provide basis:<br><br>Yes. GSI (this study) has evaluated the infiltration rate of natural surface soils as close to 4.50 to 9.36 in/hr (Hydrologic Soil Group C). Areas for development will also result in the removal of natural surface soils, exposing medium dense to dense granitics. The resultant infiltration rates for these much denser materials are expected to be close to 4.5 in/hr. Site soils where the proposed basins are to be constructed have relatively moderate to high permeability at depth below basin surface grade.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 2 | **Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2. | | X |
| Provide basis:<br><br>No. The moderate to high permeability at depth suggests that surficial manifestations due to infiltration should not be a problem. There is an increased potential for the creation of perched groundwater (mounding) conditions along zones of contrasting permeabilities, including shallow cut/fill contacts, and transitions between colluvial earth materials and the granitic bedrock. Due to the strong permeability contrast between bedrock and colluvial deposits, utility trenches can potentially act as french drains and provide conduits for the movement of excessive moisture beneath the structure(s), further exacerbating slope instability, as well as potentially causing settlement in onsite and offsite trench backfill. Future perched groundwater conditions may develop along granitic bedrock contacts. The limited permeability of granitic bedrock will tend to result in the lateral migration of water and saturated conditions at, or near the surface, increasing the potential for distress to foundations, floor slabs, and slope instability, etc. Superjacent basins proposed next to subjacent pads may cause local slope stability, water intrusion, and distress to retaining walls below basin elevation. See text of GSI (2006) for other related discussions and references.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |

Pertaining to Basins: 2, 3, 5, 6, 7, 9, and 15 (Cut Basins)

| Worksheet C.4-1 Page 2 of 4 | | | |
|---|---|---|---|
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 3 | **Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensible evaluation of the factors presented in Appendix C.3. | | X |
| Provide basis:<br>No. While the GSI (2013) study did not include an environmental assessment, visual observation did not indicate the presence of potential contaminants. While the regional groundwater table is not considered a factor in the development of this site, the creation of a shallow "perched" water table would likely occur through infiltration.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 4 | **Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as a change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br>Yes. The site currently drains offsite and no runoff appears to be retained onsite. The regional groundwater table is not considered a factor in the development of this site.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| **Part 1 Result*** | In the answers to rows 1-4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration**<br><br>If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design.<br>Proceed to Part 2 | | **No** |

* To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by [City Engineer] to substantiate findings.

Pertaining to Basins: 2, 3, 5, 6, 7, 9, and 15 (Cut Basins)

**Worksheet C.4-1 Page 3 of 4**

**Part 2 - Partial Infiltration vs. No Infiltration Feasibility Screening Criteria**

**Would infiltration of water in an appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?**

| Criteria | Screening Question | Yes | No |
|---|---|---|---|
| 5 | **Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D. | X | |

Provide basis:

Yes. The $K_{sat}$ of natural surface soils is greater than 0.5 in./hr., and the lowest infiltration rate recorded was 4.50, which is 9 times the limit (0.5 in./hr.) for feasible infiltration.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

| Criteria | Screening Question | Yes | No |
|---|---|---|---|
| 6 | **Can infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2. | | X |

Provide basis:

No. The limited permeability of granitic bedrock will tend to result in the lateral migration of water and saturated conditions at, or near the surface, increasing the potential for distress to foundations, floor slabs, and slope instability, etc. There is an increased potential for the creation of perched groundwater (mounding) conditions along zones of contrasting permeabilities, including shallow cut/fill contacts, and transitions between colluvial earth materials within the granitic bedrock. Due to the strong permeability contrast between bedrock and backfill, utility trenches can potentially act as french drains and provide conduits for the movement of excessive moisture beneath the structure(s) further exacerbating slope instability, as well as potentially causing settlement in onsite and offsite trench backfill. Superjacent basins proposed next to subjacent pads may cause local slope stability, water intrusion, and distress to retaining walls below basin elevation. See text of GSI (2006) for other related discussions and references.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Pertaining to Basins: 2, 3, 5, 6, 7, 9, and 15 (Cut Basins)

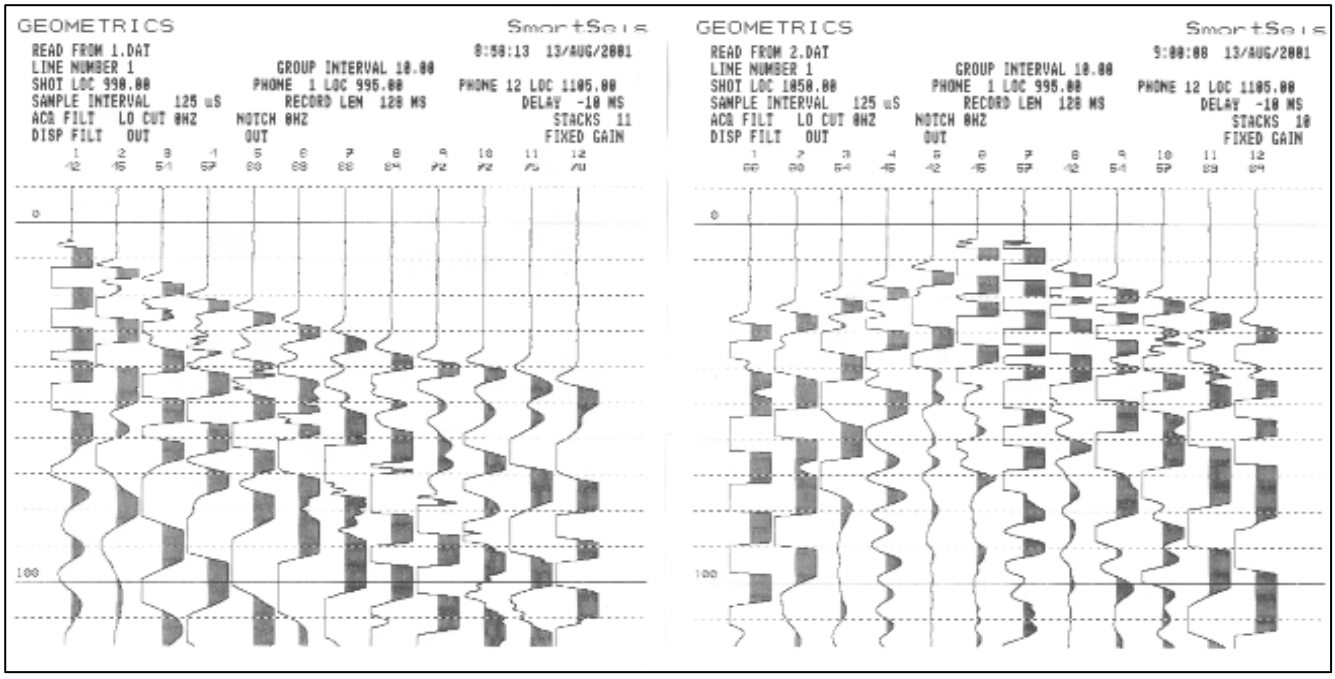
| Worksheet C.4-1 Page 4 of 4 | | | |
|---|---|---|---|
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 7 | **Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | | X |
| Provide basis:<br>While the regional groundwater table is not considered a factor in the development of this site, the creation of a shallow "perched" water table can occur and increase the potential for distress to the structure(s) due to water vapor transmission through foundations, slabs, and any resultant corrosive effects on metal conduit in trenches, as well as settlement in onsite and offsite trench backfill.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 8 | **Can infiltration be allowed without violating downstream water rights?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br>The site currently drains offsite and no runoff appears to be retained onsite. The regional groundwater table is not considered a factor in the development of this site.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| Part 2 Result* | If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.**<br>If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.** | | **No Infiltration** |

* To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings.

# APPENDIX F

# SEISMIC REFRACTION AND ROCK HARDNESS

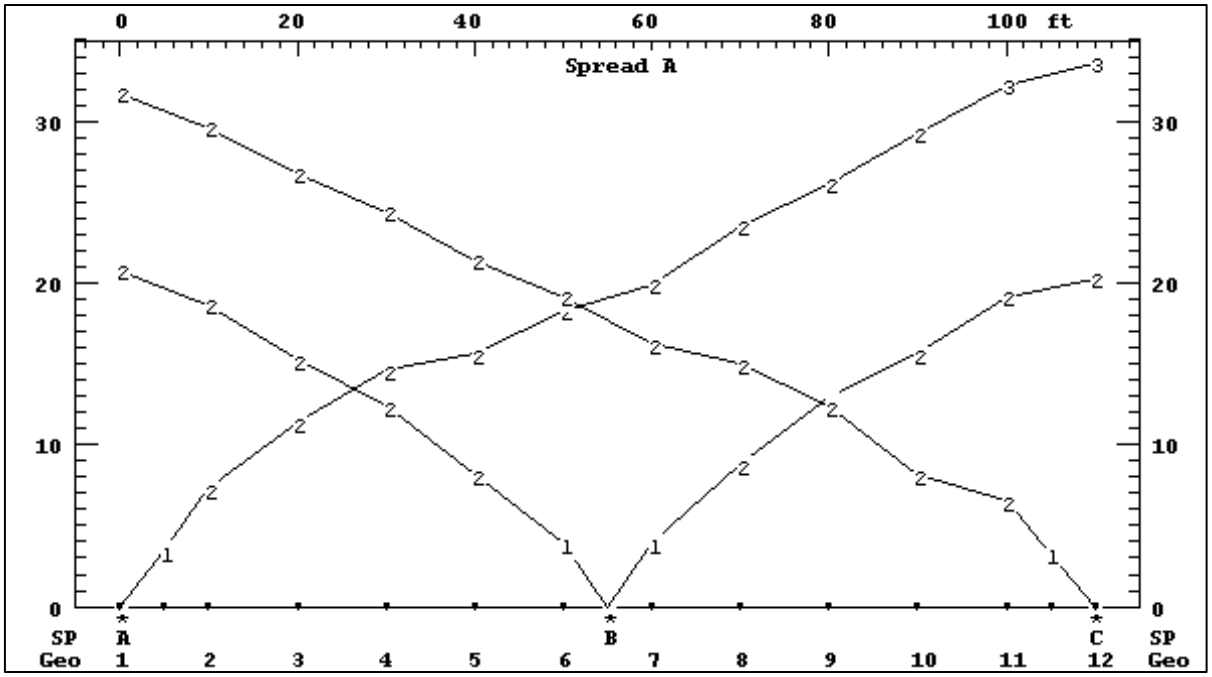
## Example
## Raw Seismic Data



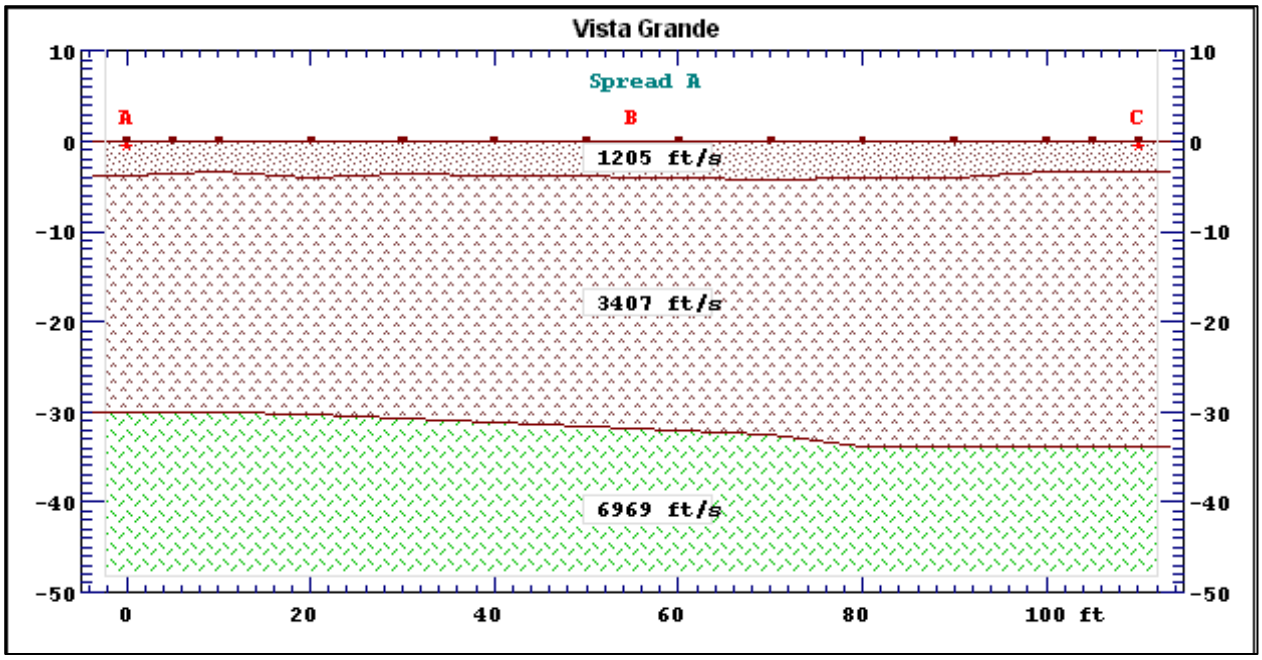
**Example**

**Seismic Line**

**Time Distance Curves**

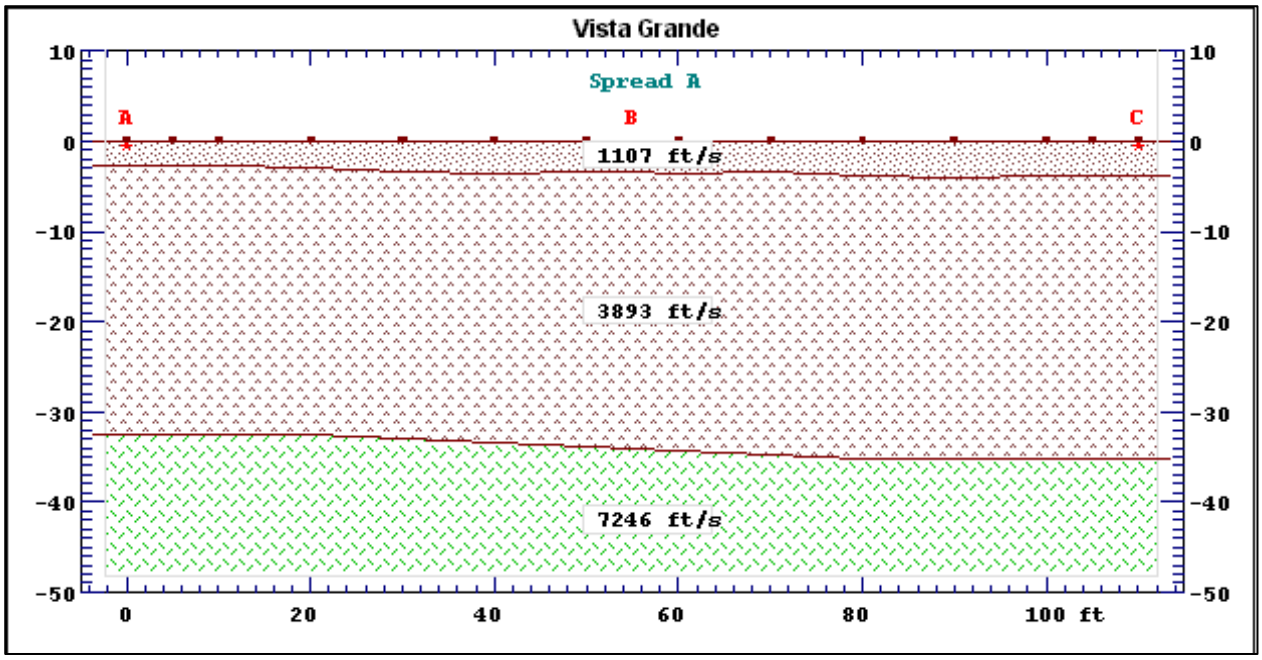


## Seismic Line
## SL-1



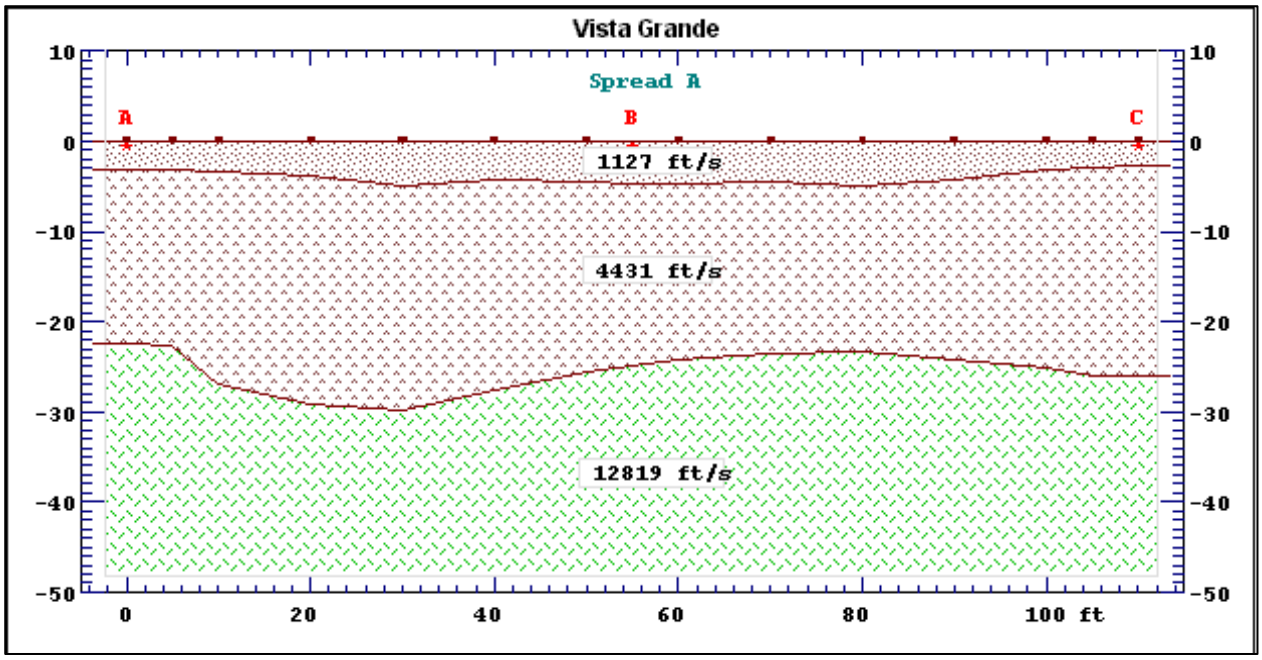

North South

## Seismic Line
## SL-2



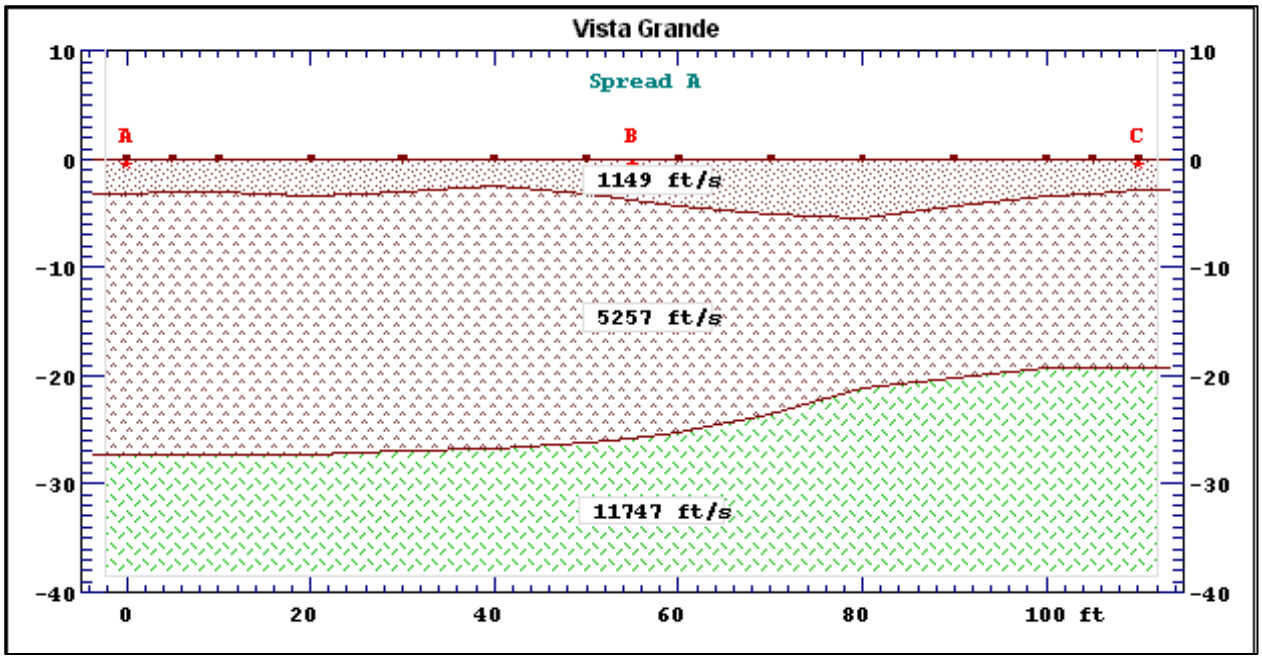

North South

## Seismic Line
## SL-3



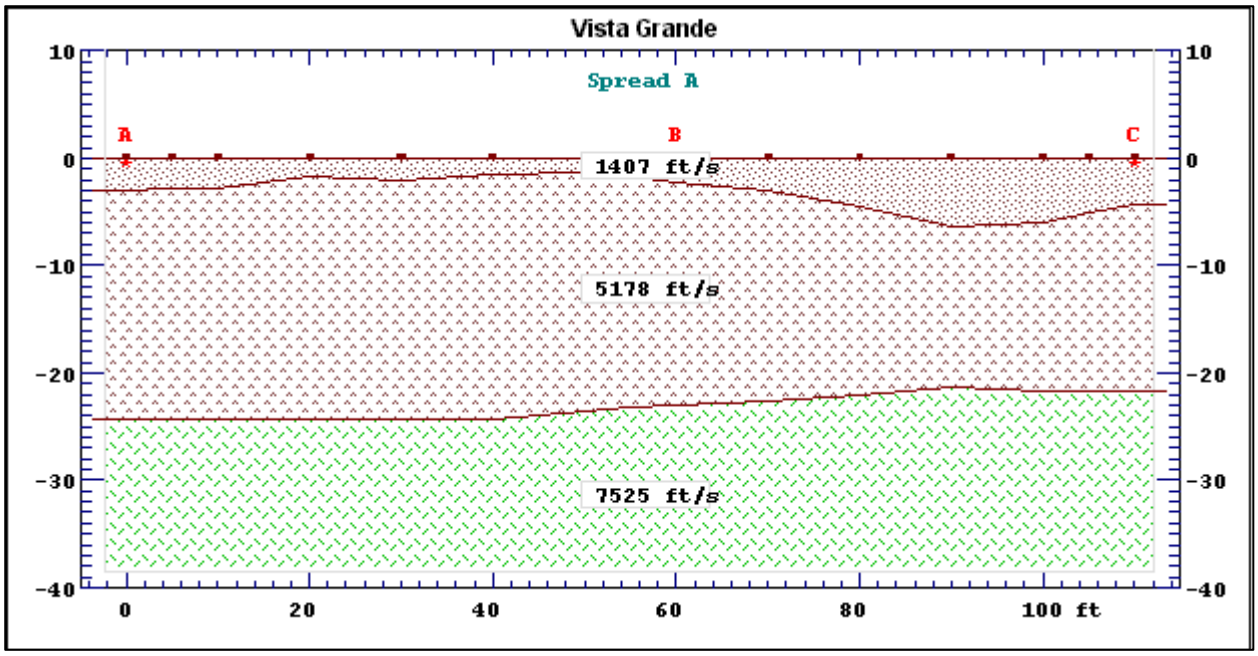

South North

## Seismic Line
## SL-4



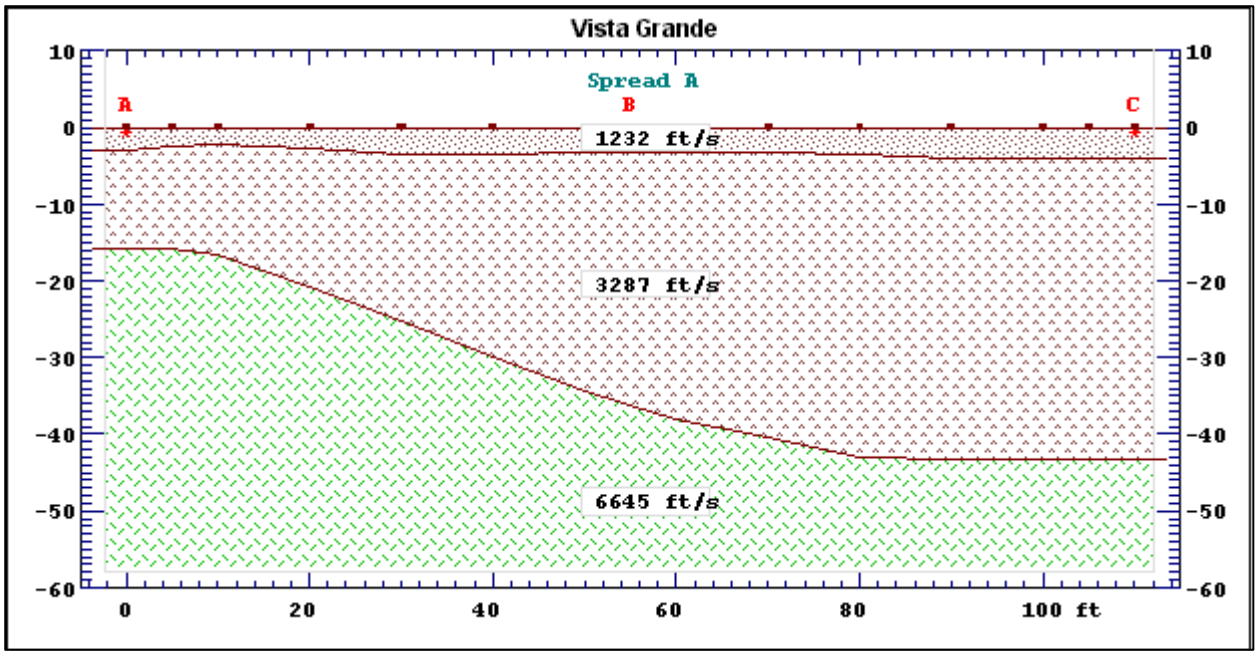

South North

## Seismic Line
## SL-5



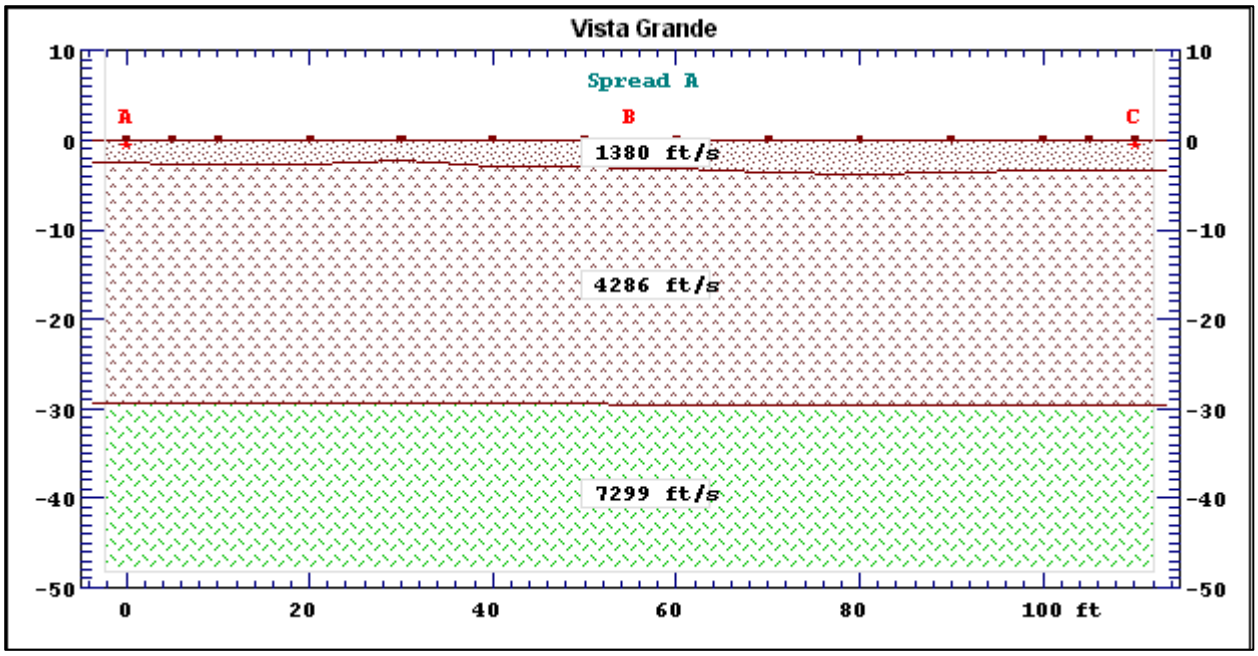

South North

## Seismic Line
## SL-6



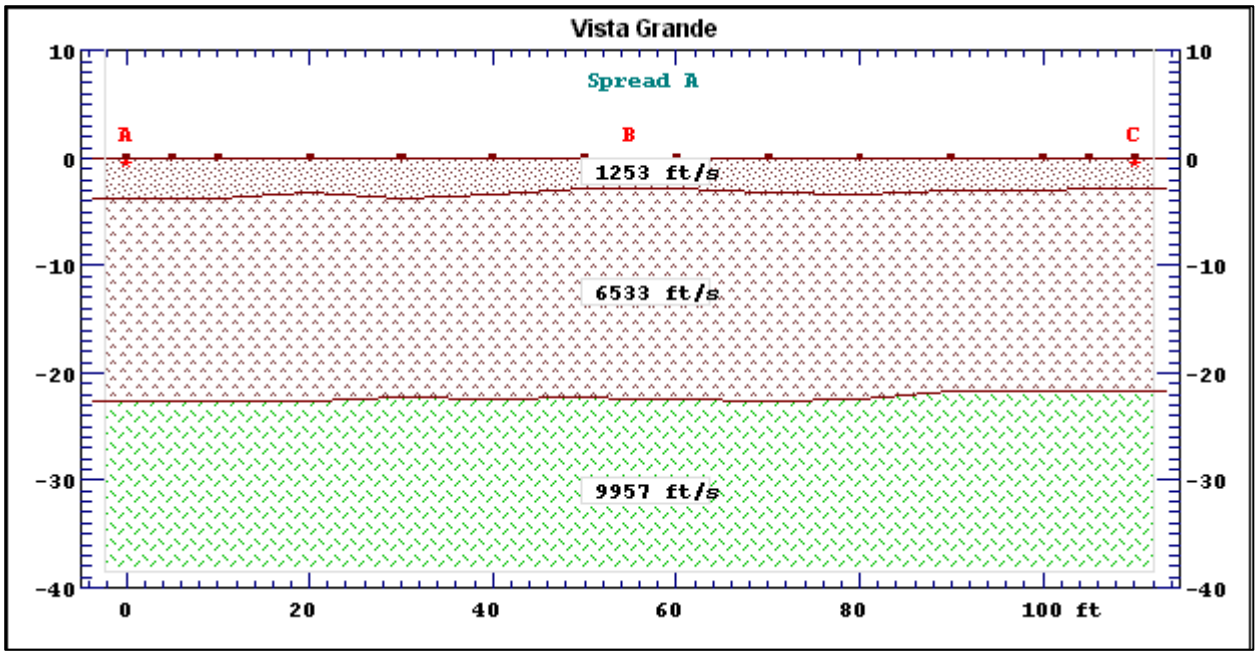

North South

## Seismic Line
## SL-7



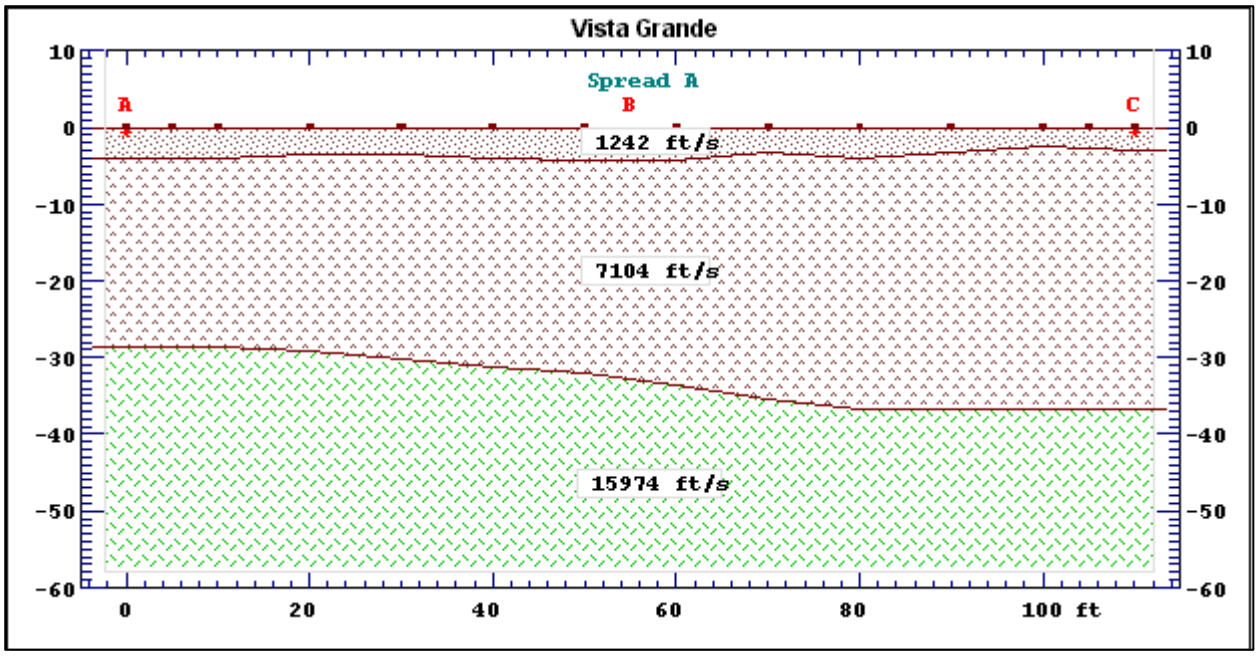

South North

## Seismic Line
## SL-8



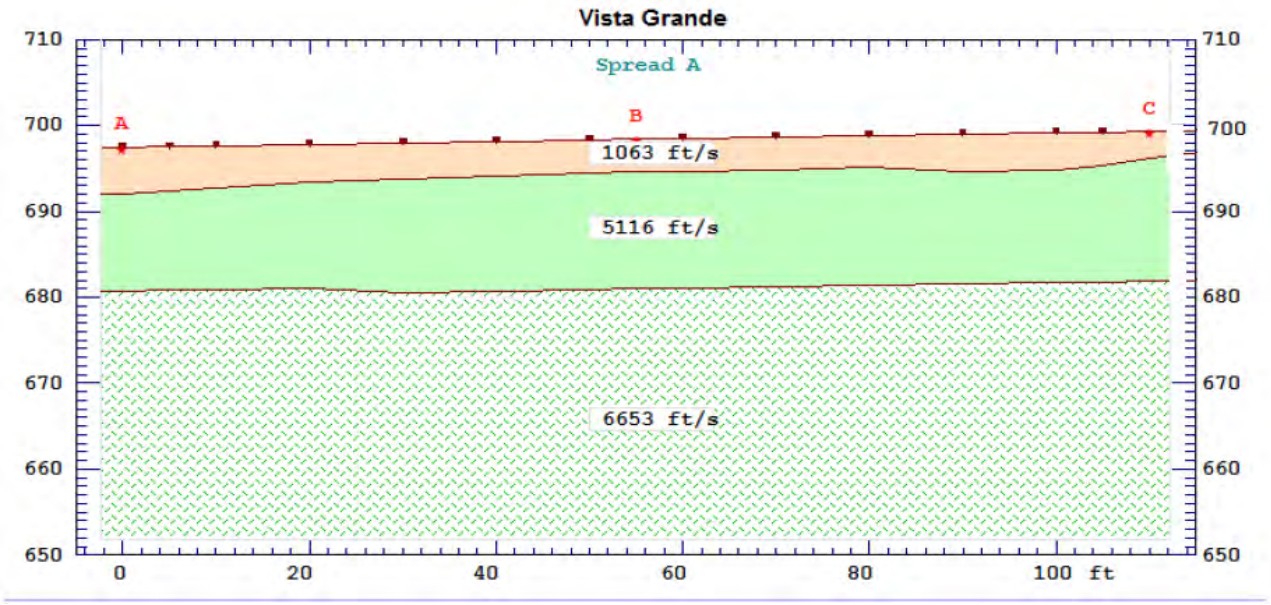

South North

## Seismic Line
## SL-9




South North

**Seismic Line**
**SL-101**
**N32W→**
**8053-A-SC**




East West

# APPENDIX G

# GENERAL EARTHWORK AND GRADING GUIDELINES

# GENERAL EARTHWORK AND GRADING GUIDELINES

## General

These guidelines present general procedures and requirements for earthwork and grading as shown on the approved grading plans, including preparation of areas to be filled, placement of fill, installation of subdrains, excavations, and appurtenant structures or flatwork. The recommendations contained in the geotechnical report are part of these earthwork and grading guidelines and would supercede the provisions contained hereafter in the case of conflict. Evaluations performed by the consultant during the course of grading may result in new or revised recommendations which could supercede these guidelines or the recommendations contained in the geotechnical report. Generalized details follow this text.

The contractor is responsible for the satisfactory completion of all earthwork in accordance with provisions of the project plans and specifications and latest adopted code. In the case of conflict, the most onerous provisions shall prevail. The project geotechnical engineer and engineering geologist (geotechnical consultant), and/or their representatives, should provide observation and testing services, and geotechnical consultation during the duration of the project.

# EARTHWORK OBSERVATIONS AND TESTING

m

## Geotechnical Consultant

Prior to the commencement of grading, a qualified geotechnical consultant (soil engineer and engineering geologist) should be employed for the purpose of observing earthwork procedures and testing the fills for general conformance with the recommendations of the geotechnical report(s), the approved grading plans, and applicable grading codes and ordinances.

The geotechnical consultant should provide testing and observation so that an evaluation may be made that the work is being accomplished as specified. It is the responsibility of the contractor to assist the consultants and keep them apprized of anticipated work schedules and changes, so that they may schedule their personnel accordingly.

All remedial removals, clean-outs, prepared ground to receive fill, key excavations, and subdrain installation should be observed and documented by the geotechnical consultant prior to placing any fill. It is the contractor's responsibility to notify the geotechnical consultant when such areas are ready for observation.

## Laboratory and Field Tests

Maximum dry density tests to determine the degree of compaction should be performed in accordance with American Standard Testing Materials test method ASTM designation D 1557. Random or representative field compaction tests should be performed in

accordance with test methods ASTM designation D-1556, D-2937 or D-2922, and D-3017, at intervals of approximately ±2 feet of fill height or approximately every 1,000 cubic yards placed. These criteria would vary depending on the soil conditions and the size of the project. The location and frequency of testing would be at the discretion of the geotechnical consultant.

**Contractor's Responsibility**

All clearing, site preparation, and earthwork performed on the project should be conducted by the contractor, with observation by a geotechnical consultant, and staged approval by the governing agencies, as applicable. It is the contractor's responsibility to prepare the ground surface to receive the fill, to the satisfaction of the geotechnical consultant, and to place, spread, moisture condition, mix, and compact the fill in accordance with the recommendations of the geotechnical consultant. The contractor should also remove all non-earth material considered unsatisfactory by the geotechnical consultant.

Notwithstanding the services provided by the geotechnical consultant, it is the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the earthwork in strict accordance with applicable grading guidelines, latest adopted codes or agency ordinances, geotechnical report(s), and approved grading plans. Sufficient watering apparatus and compaction equipment should be provided by the contractor with due consideration for the fill material, rate of placement, and climatic conditions. If, in the opinion of the geotechnical consultant, unsatisfactory conditions such as questionable weather, excessive oversized rock or deleterious material, insufficient support equipment, etc., are resulting in a quality of work that is not acceptable, the consultant will inform the contractor, and the contractor is expected to rectify the conditions, and if necessary, stop work until conditions are satisfactory.

During construction, the contractor shall properly grade all surfaces to maintain good drainage and prevent ponding of water. The contractor shall take remedial measures to control surface water and to prevent erosion of graded areas until such time as permanent drainage and erosion control measures have been installed.

## SITE PREPARATION

All major vegetation, including brush, trees, thick grasses, organic debris, and other deleterious material, should be removed and disposed of off-site. These removals must be concluded prior to placing fill. In-place existing fill, soil, alluvium, colluvium, or rock materials, as evaluated by the geotechnical consultant as being unsuitable, should be removed prior to any fill placement. Depending upon the soil conditions, these materials may be reused as compacted fills. Any materials incorporated as part of the compacted fills should be approved by the geotechnical consultant.

Any underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipelines, or other structures not located prior to grading, are to be removed or treated in a manner recommended by the geotechnical consultant. Soft, dry, spongy, highly fractured, or otherwise unsuitable ground, extending to such a depth that surface processing cannot adequately improve the condition, should be overexcavated down to firm ground and approved by the geotechnical consultant before compaction and filling operations continue. Overexcavated and processed soils, which have been properly mixed and moisture conditioned, should be re-compacted to the minimum relative compaction as specified in these guidelines.

Existing ground, which is determined to be satisfactory for support of the fills, should be scarified (ripped) to a minimum depth of 6 to 8 inches, or as directed by the geotechnical consultant. After the scarified ground is brought to optimum moisture content, or greater and mixed, the materials should be compacted as specified herein. If the scarified zone is greater than 6 to 8 inches in depth, it may be necessary to remove the excess and place the material in lifts restricted to about 6 to 8 inches in compacted thickness.

Existing ground which is not satisfactory to support compacted fill should be overexcavated as required in the geotechnical report, or by the on-site geotechnical consultant. Scarification, disc harrowing, or other acceptable forms of mixing should continue until the soils are broken down and free of large lumps or clods, until the working surface is reasonably uniform and free from ruts, hollows, hummocks, mounds, or other uneven features, which would inhibit compaction as described previously.

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical [h:v]), the ground should be stepped or benched. The lowest bench, which will act as a key, should be a minimum of 15 feet wide and should be at least 2 feet deep into firm material, and approved by the geotechnical consultant. In fill-over-cut slope conditions, the recommended minimum width of the lowest bench or key is also 15 feet, with the key founded on firm material, as designated by the geotechnical consultant. As a general rule, unless specifically recommended otherwise by the geotechnical consultant, the minimum width of fill keys should be equal to ½ the height of the slope.

Standard benching is generally 4 feet (minimum) vertically, exposing firm, acceptable material. Benching may be used to remove unsuitable materials, although it is understood that the vertical height of the bench may exceed 4 feet. Pre-stripping may be considered for unsuitable materials in excess of 4 feet in thickness.

All areas to receive fill, including processed areas, removal areas, and the toes of fill benches, should be observed and approved by the geotechnical consultant prior to placement of fill. Fills may then be properly placed and compacted until design grades (elevations) are attained.

## COMPACTED FILLS

Any earth materials imported or excavated on the property may be utilized in the fill provided that each material has been evaluated to be suitable by the geotechnical consultant. These materials should be free of roots, tree branches, other organic matter, or other deleterious materials. All unsuitable materials should be removed from the fill as directed by the geotechnical consultant. Soils of poor gradation, undesirable expansion potential, or substandard strength characteristics may be designated by the consultant as unsuitable and may require blending with other soils to serve as a satisfactory fill material.

Fill materials derived from benching operations should be dispersed throughout the fill area and blended with other approved material. Benching operations should not result in the benched material being placed only within a single equipment width away from the fill/bedrock contact.

Oversized materials defined as rock, or other irreducible materials, with a maximum dimension greater than 12 inches, should not be buried or placed in fills unless the location of materials and disposal methods are specifically approved by the geotechnical consultant. Oversized material should be taken offsite, or placed in accordance with recommendations of the geotechnical consultant in areas designated as suitable for rock disposal. GSI anticipates that soils to be utilized as fill material for the subject project may contain some rock. Appropriately, the need for rock disposal may be necessary during grading operations on the site. From a geotechnical standpoint, the depth of any rocks, rock fills, or rock blankets, should be a sufficient distance from finish grade. This depth is generally the same as any overexcavation due to cut-fill transitions in hard rock areas, and generally facilitates the excavation of structural footings and substructures. Should deeper excavations be proposed (i.e., deepened footings, utility trenching, swimming pools, spas, etc.), the developer may consider increasing the hold-down depth of any rocky fills to be placed, as appropriate. In addition, some agencies/jurisdictions mandate a specific hold-down depth for oversize materials placed in fills. The hold-down depth, and potential to encounter oversize rock, both within fills, and occurring in cut or natural areas, would need to be disclosed to all interested/affected parties. Once approved by the governing agency, the hold-down depth for oversized rock (i.e., greater than 12 inches) in fills on this project is provided as 10 feet, unless specified differently in the text of this report. The governing agency may require that these materials need to be deeper, crushed, or reduced to less than 12 inches in maximum dimension, at their discretion.

To facilitate future trenching, rock (or oversized material), should not be placed within the hold-down depth feet from finish grade, the range of foundation excavations, future utilities, or underground construction unless specifically approved by the governing agency, the geotechnical consultant, and/or the developer's representative.

If import material is required for grading, representative samples of the materials to be utilized as compacted fill should be analyzed in the laboratory by the geotechnical consultant to evaluate it's physical properties and suitability for use onsite. Such testing

should be performed three (3) days prior to importation. If any material other than that previously tested is encountered during grading, an appropriate analysis of this material should be conducted by the geotechnical consultant as soon as possible.Approved fill material should be placed in areas prepared to receive fill in near horizontal layers, that when compacted, should not exceed about 6 to 8 inches in thickness. The geotechnical consultant may approve thick lifts if testing indicates the grading procedures are such that adequate compaction is being achieved with lifts of greater thickness. Each layer should be spread evenly and blended to attain uniformity of material and moisture suitable for compaction.

Fill layers at a moisture content less than optimum should be watered and mixed, and wet fill layers should be aerated by scarification, or should be blended with drier material. Moisture conditioning, blending, and mixing of the fill layer should continue until the fill materials have a uniform moisture content at, or above, optimum moisture.

After each layer has been evenly spread, moisture conditioned, and mixed, it should be uniformly compacted to a minimum of 90 percent of the maximum density as evaluated by ASTM test designation D-1557, or as otherwise recommended by the geotechnical consultant. Compaction equipment should be adequately sized and should be specifically designed for soil compaction, or of proven reliability to efficiently achieve the specified degree of compaction.

Where tests indicate that the density of any layer of fill, or portion thereof, is below the required relative compaction, or improper moisture is in evidence, the particular layer or portion shall be re-worked until the required density and/or moisture content has been attained. No additional fill shall be placed in an area until the last placed lift of fill has been tested and found to meet the density and moisture requirements, and is approved by the geotechnical consultant.

In general, per the latest adopted version of the California Building Code (CBC), fill slopes should be designed and constructed at a gradient of 2:1 (h:v), or flatter. Compaction of slopes should be accomplished by over-building a minimum of 3 feet horizontally, and subsequently trimming back to the design slope configuration. Testing shall be performed as the fill is elevated to evaluate compaction as the fill core is being developed. Special efforts may be necessary to attain the specified compaction in the fill slope zone. Final slope shaping should be performed by trimming and removing loose materials with appropriate equipment. A final evaluation of fill slope compaction should be based on observation and/or testing of the finished slope face. Where compacted fill slopes are designed steeper than 2:1 (h:v), prior approval from the governing agency, specific material types, a higher minimum relative compaction, special reinforcement, and special grading procedures will be recommended.

If an alternative to over-building and cutting back the compacted fill slopes is selected, then special effort should be made to achieve the required compaction in the outer 10 feet of each lift of fill by undertaking the following:

1. An extra piece of equipment consisting of a heavy, short-shanked sheepsfoot should be used to roll (horizontal) parallel to the slopes continuously as fill is placed. The sheepsfoot roller should also be used to roll perpendicular to the slopes, and extend out over the slope to provide adequate compaction to the face of the slope.

2. Loose fill should not be spilled out over the face of the slope as each lift is compacted. Any loose fill spilled over a previously completed slope face should be trimmed off or be subject to re-rolling.

3. Field compaction tests will be made in the outer (horizontal) ±2 to ±8 feet of the slope at appropriate vertical intervals, subsequent to compaction operations.

4. After completion of the slope, the slope face should be shaped with a small tractor and then re-rolled with a sheepsfoot to achieve compaction to near the slope face. Subsequent to testing to evaluate compaction, the slopes should be grid-rolled to achieve compaction to the slope face. Final testing should be used to evaluate compaction after grid rolling.

5. Where testing indicates less than adequate compaction, the contractor will be responsible to rip, water, mix, and recompact the slope material as necessary to achieve compaction. Additional testing should be performed to evaluate compaction.

## SUBDRAIN INSTALLATION

Subdrains should be installed in approved ground in accordance with the approximate alignment and details indicated by the geotechnical consultant. Subdrain locations or materials should not be changed or modified without approval of the geotechnical consultant. The geotechnical consultant may recommend and direct changes in subdrain line, grade, and drain material in the field, pending exposed conditions. The location of constructed subdrains, especially the outlets, should be recorded/surveyed by the project civil engineer. Drainage at the subdrain outlets should be provided by the project civil engineer.

## EXCAVATIONS

Excavations and cut slopes should be examined during grading by the geotechnical consultant. If directed by the geotechnical consultant, further excavations or overexcavation and refilling of cut areas should be performed, and/or remedial grading of cut slopes should be performed. When fill-over-cut slopes are to be graded, unless otherwise approved, the cut portion of the slope should be observed by the geotechnical consultant prior to placement of materials for construction of the fill portion of the slope.

The geotechnical consultant should observe all cut slopes, and should be notified by the contractor when excavation of cut slopes commence.

If, during the course of grading, unforeseen adverse or potentially adverse geologic conditions are encountered, the geotechnical consultant should investigate, evaluate, and make appropriate recommendations for mitigation of these conditions. The need for cut slope buttressing or stabilizing should be based on in-grading evaluation by the geotechnical consultant, whether anticipated or not.

Unless otherwise specified in geotechnical and geological report(s), no cut slopes should be excavated higher or steeper than that allowed by the ordinances of controlling governmental agencies. Additionally, short-term stability of temporary cut slopes is the contractor's responsibility.

Erosion control and drainage devices should be designed by the project civil engineer and should be constructed in compliance with the ordinances of the controlling governmental agencies, and/or in accordance with the recommendations of the geotechnical consultant.

## COMPLETION

Observation, testing, and consultation by the geotechnical consultant should be conducted during the grading operations in order to state an opinion that all cut and fill areas are graded in accordance with the approved project specifications. After completion of grading, and after the geotechnical consultant has finished observations of the work, final reports should be submitted, and may be subject to review by the controlling governmental agencies. No further excavation or filling should be undertaken without prior notification of the geotechnical consultant or approved plans.

All finished cut and fill slopes should be protected from erosion and/or be planted in accordance with the project specifications and/or as recommended by a landscape architect. Such protection and/or planning should be undertaken as soon as practical after completion of grading.

## JOB SAFETY

### General

At GSI, getting the job done safely is of primary concern. The following is the company's safety considerations for use by all employees on multi-employer construction sites. On-ground personnel are at highest risk of injury, and possible fatality, on grading and construction projects. GSI recognizes that construction activities will vary on each site, and that site safety is the prime responsibility of the contractor; however, everyone must be safety conscious and responsible at all times. To achieve our goal of avoiding accidents,

cooperation between the client, the contractor, and GSI personnel must be maintained. In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of field personnel on grading and construction projects:

**Safety Meetings:** GSI field personnel are directed to attend contractor's regularly scheduled and documented safety meetings.

**Safety Vests:** Safety vests are provided for, and are to be worn by GSI personnel, at all times, when they are working in the field.

**Safety Flags:** Two safety flags are provided to GSI 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.

**Flashing Lights:** All vehicles stationary in the grading area shall use rotating or flashing amber beacons, or strobe lights, on the vehicle during all field testing. While operating a vehicle in the grading area, the emergency flasher on the vehicle shall be activated.

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. A primary concern should be the technician's safety. Efforts will be made to coordinate locations with the grading contractor's authorized representative, and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractor's authorized representative (supervisor, grade checker, dump man, operator, etc.) should direct excavation of the pit and safety during the test period. Of paramount concern should be the soil technician's safety, and obtaining enough tests to represent the fill.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic, whenever possible. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates the fill be maintained in a driveable condition. Alternatively, the contractor may wish to park a piece of equipment in front of the test holes, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits. No grading equipment should enter this zone during the testing procedure. The zone should extend approximately 50 feet outward from the center of the test pit. This zone is established for safety and to avoid excessive ground vibration, which typically decreases test results.

When taking slope tests, the technician should park the vehicle directly above or below the test location. If this is not possible, a prominent flag should be placed at the top of the

slope. The contractor's representative should effectively keep all equipment at a safe operational distance (e.g., 50 feet) away from the slope during this 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, well away from the equipment traffic pattern. The contractor should inform our personnel of all changes to haul roads, cut and fill areas or other factors that may affect site access and site safety.

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 required, by company policy, to immediately withdraw and notify his/her supervisor. The grading contractor's representative will be contacted in an effort to affect a solution. However, in the interim, no further testing will be performed until the situation is rectified. Any fill placed 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 the technician's attention and notify this office. Effective communication and coordination between the contractor's representative and the soil technician is strongly encouraged in order to implement the above safety plan.

**Trench and Vertical Excavation**

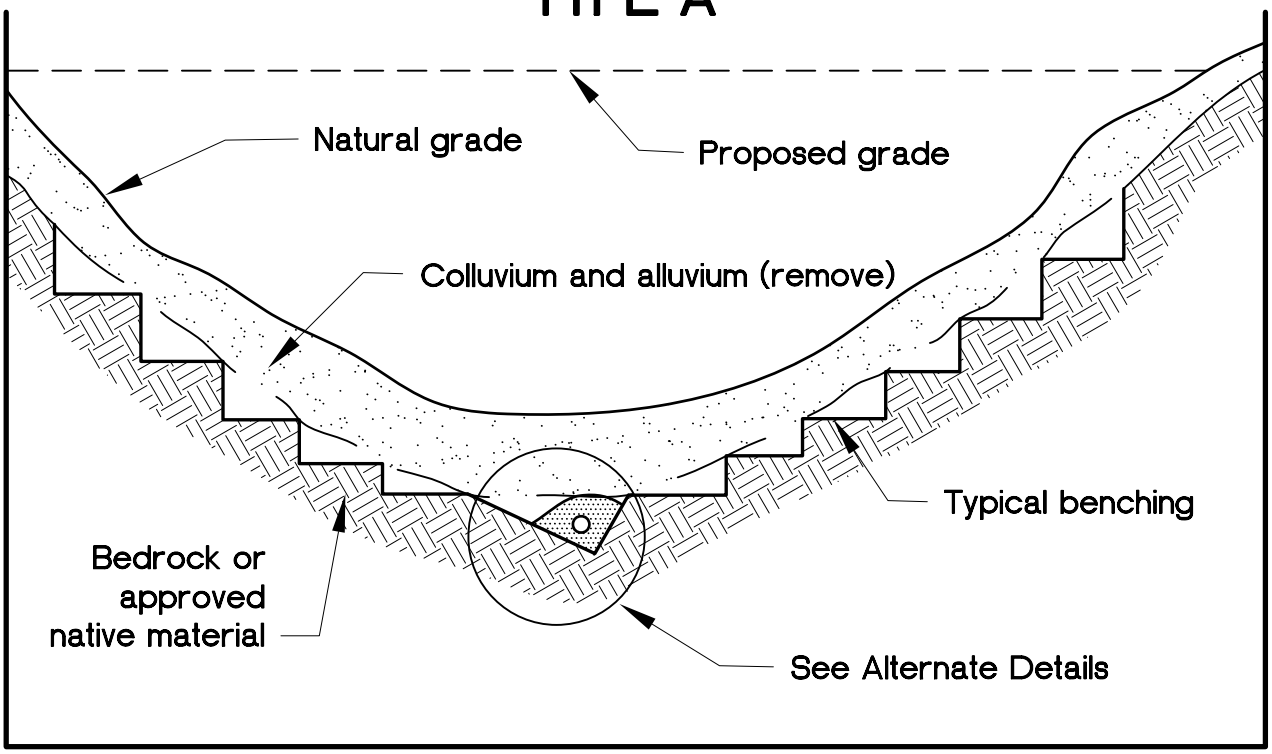
It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Our personnel are directed not to enter any excavation or vertical cut which: 1) is 5 feet or deeper unless shored or laid back; 2) displays any evidence of instability, has any loose rock or other debris which could fall into the trench; or 3) displays any other evidence of any unsafe conditions regardless of depth.

All trench excavations or vertical cuts in excess of 5 feet deep, which any person enters, should be shored or laid back. Trench access should be provided in accordance with Cal/OSHA and/or state and local standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

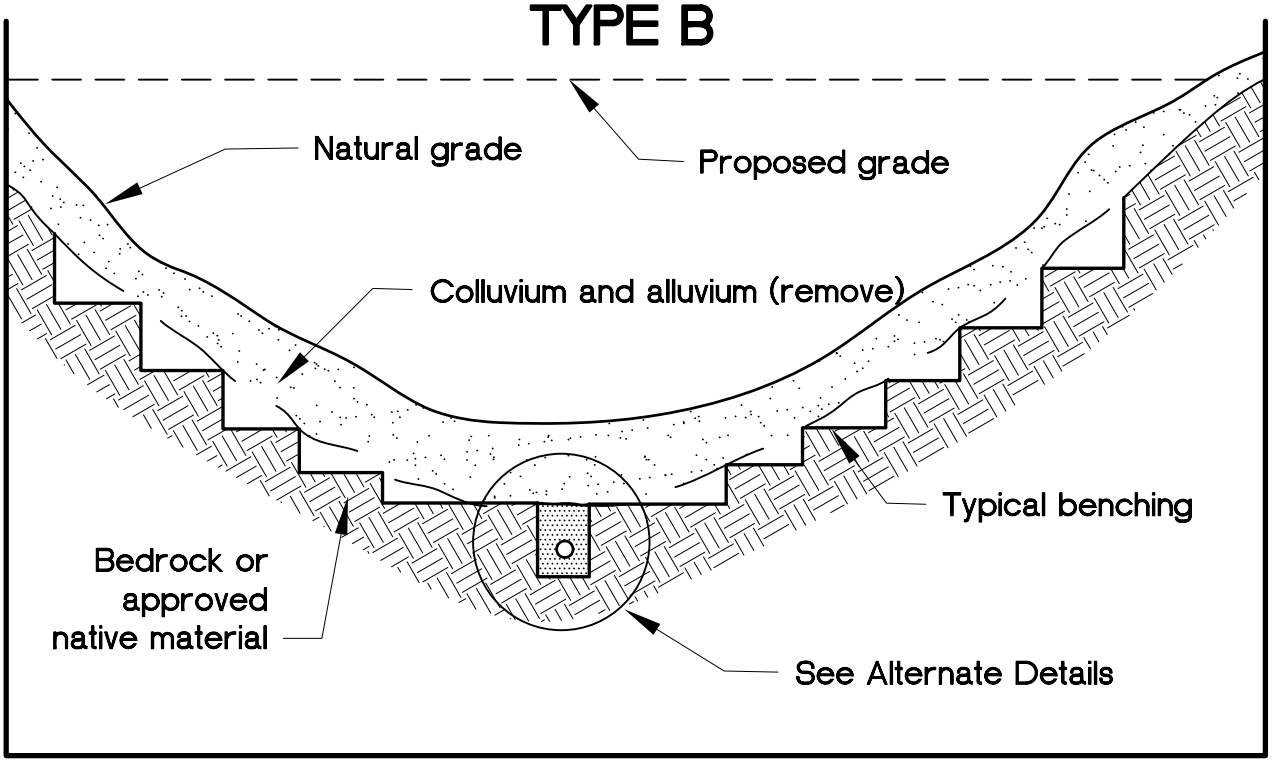
If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraw and notify his/her supervisor. The contractor's representative will be contacted in an effort to affect a solution. All backfill not tested due to safety concerns or other reasons could be subject to reprocessing and/or removal.

If GSI personnel become aware of anyone working beneath an unsafe trench wall or vertical excavation, we have a legal obligation to put the contractor and owner/developer on notice to immediately correct the situation. If corrective steps are not taken, GSI then has an obligation to notify Cal/OSHA and/or the proper controlling authorities.

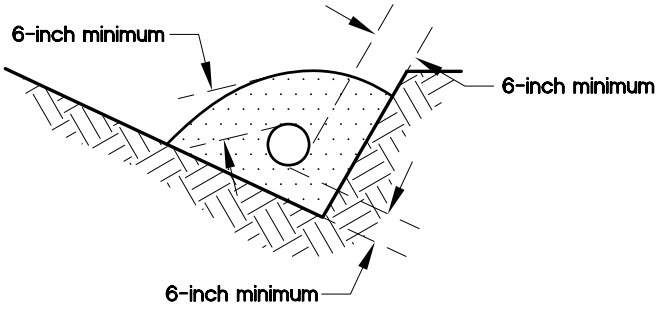
# TYPE A



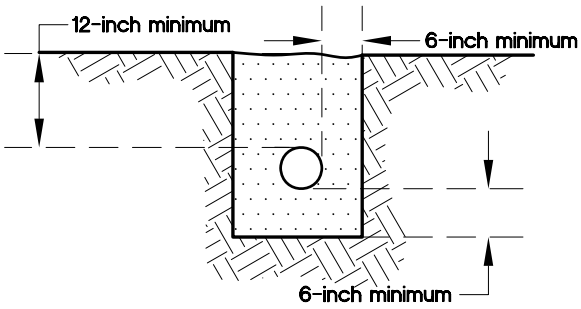

# TYPE B




Selection of alternate subdrain details, location, and extent of subdrains should be evaluated by the geotechnical consultant during grading.




A-1




B-1

Filter material: Minimum volume of 9 cubic feet per lineal foot of pipe.

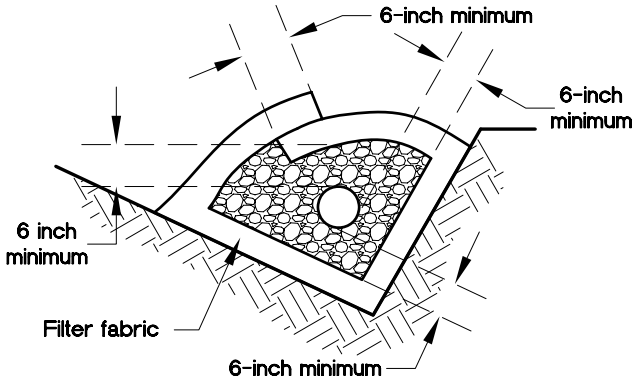
Perforated pipe: 6-inch-diameter ABS or PVC pipe or approved substitute with minimum 8 perforations (¼-inch diameter) per lineal foot in bottom half of pipe (ASTM D-2751, SDR-35, or ASTM D-1527, Schd. 40).

For continuous run in excess of 500 feet, use 8-inch-diameter pipe (ASTM D-3034, SDR-35, or ASTM D-1785, Schd. 40).

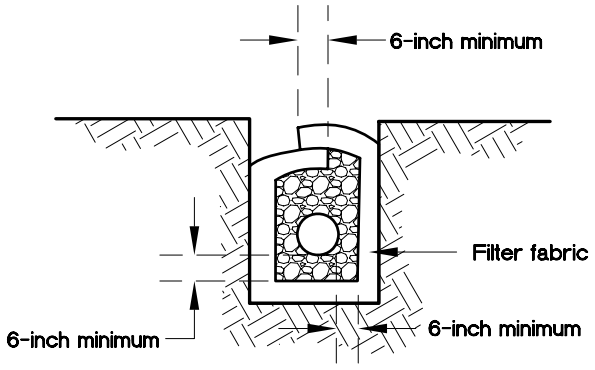
FILTER MATERIAL

| Sieve Size | Percent Passing |
|---|---|
| 1 inch | 100 |
| ¾ inch | 90-100 |
| ⅜ inch | 40-100 |
| No. 4 | 25-40 |
| No. 8 | 18-33 |
| No. 30 | 5-15 |
| No. 50 | 0-7 |
| No. 200 | 0-3 |

## ALTERNATE 1: PERFORATED PIPE AND FILTER MATERIAL



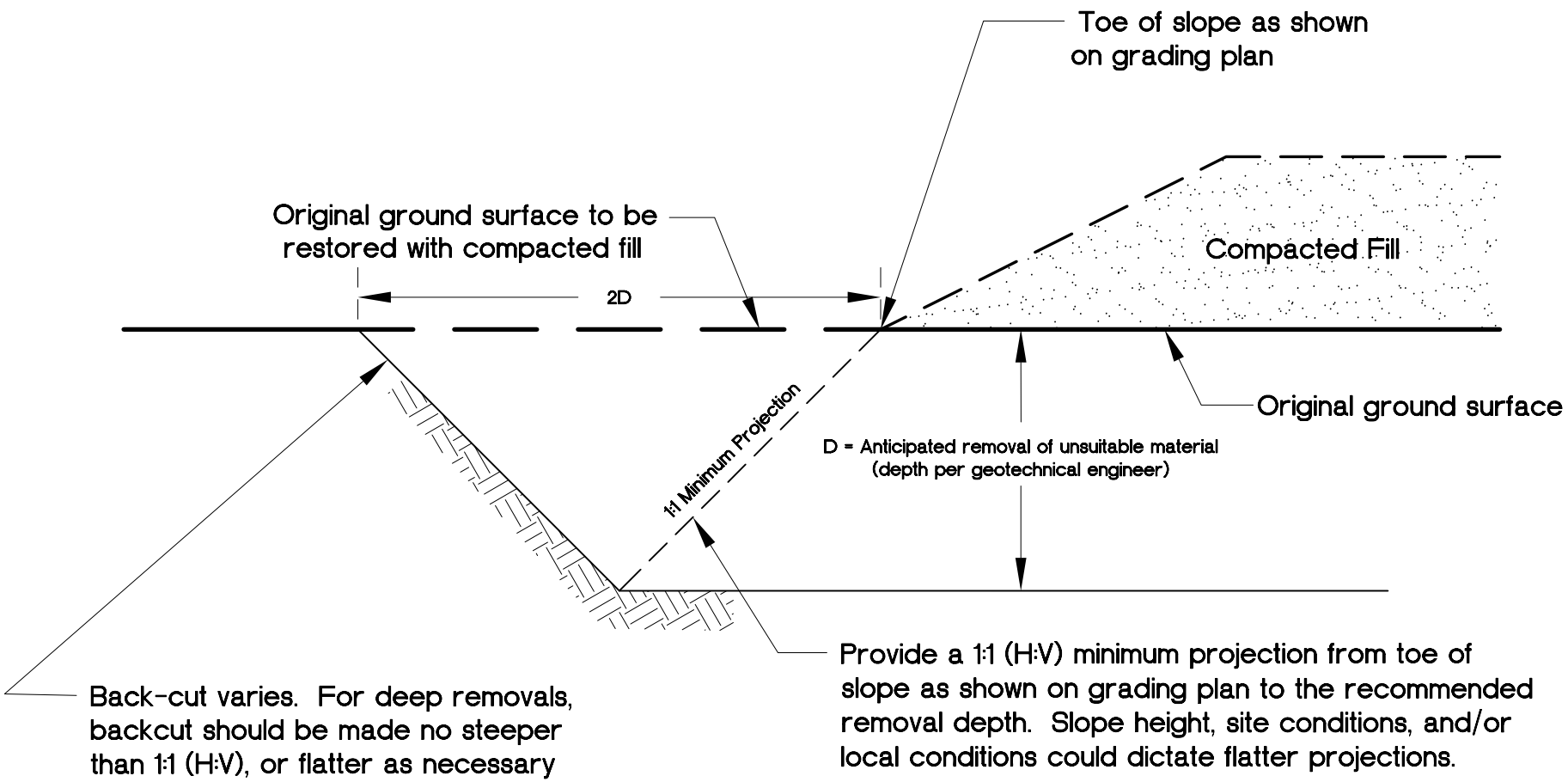

A-2




B-2

Gravel Material: 9 cubic feet per lineal foot.
Perforated Pipe: See Alternate 1
Gravel: Clean ¾-inch rock or approved substitute.
Filter Fabric: Mirafi 140 or approved substitute.

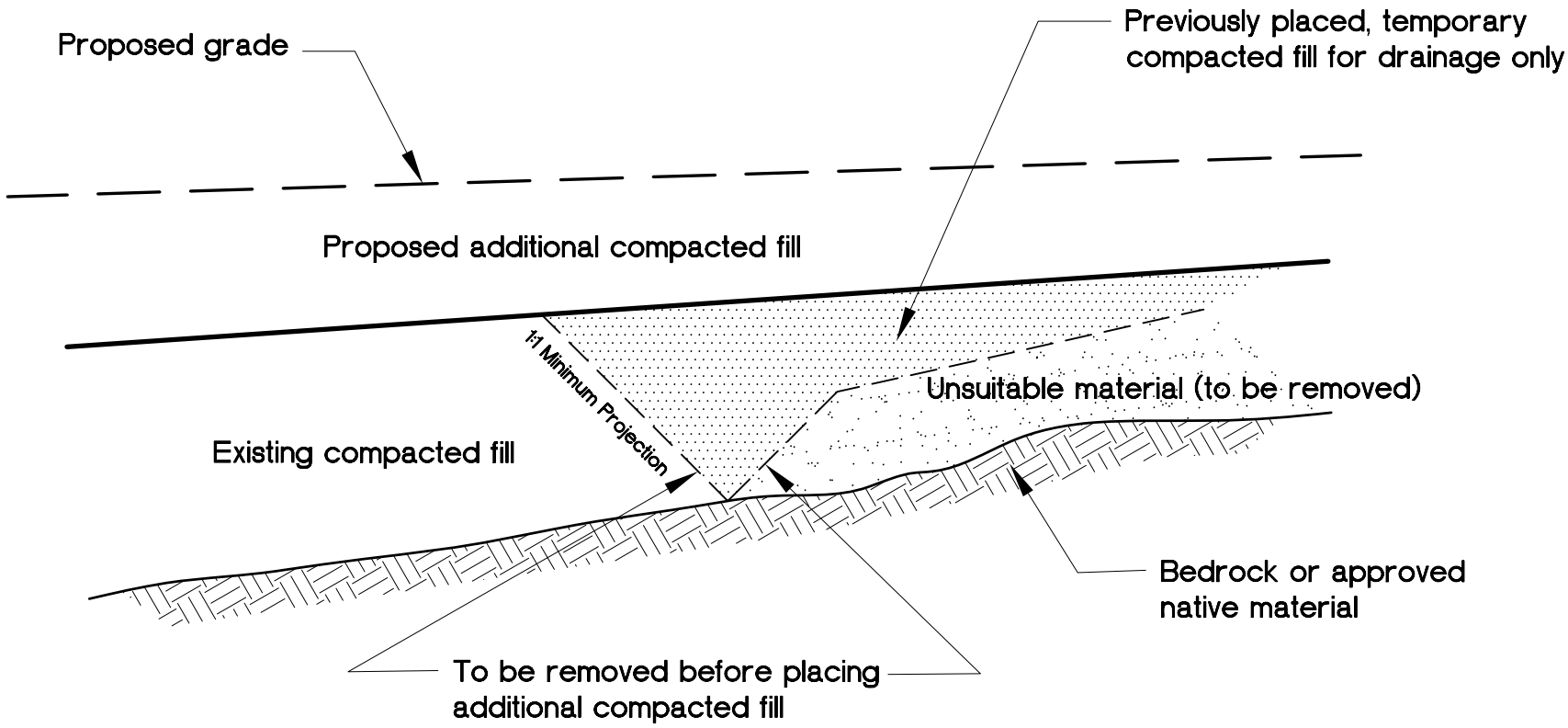
## ALTERNATE 2: PERFORATED PIPE, GRAVEL, AND FILTER FABRIC




GeoSoils, Inc.

FILL SLOPE TOEING OUT ON FLAT ALLUVIATED CANYON DETAIL

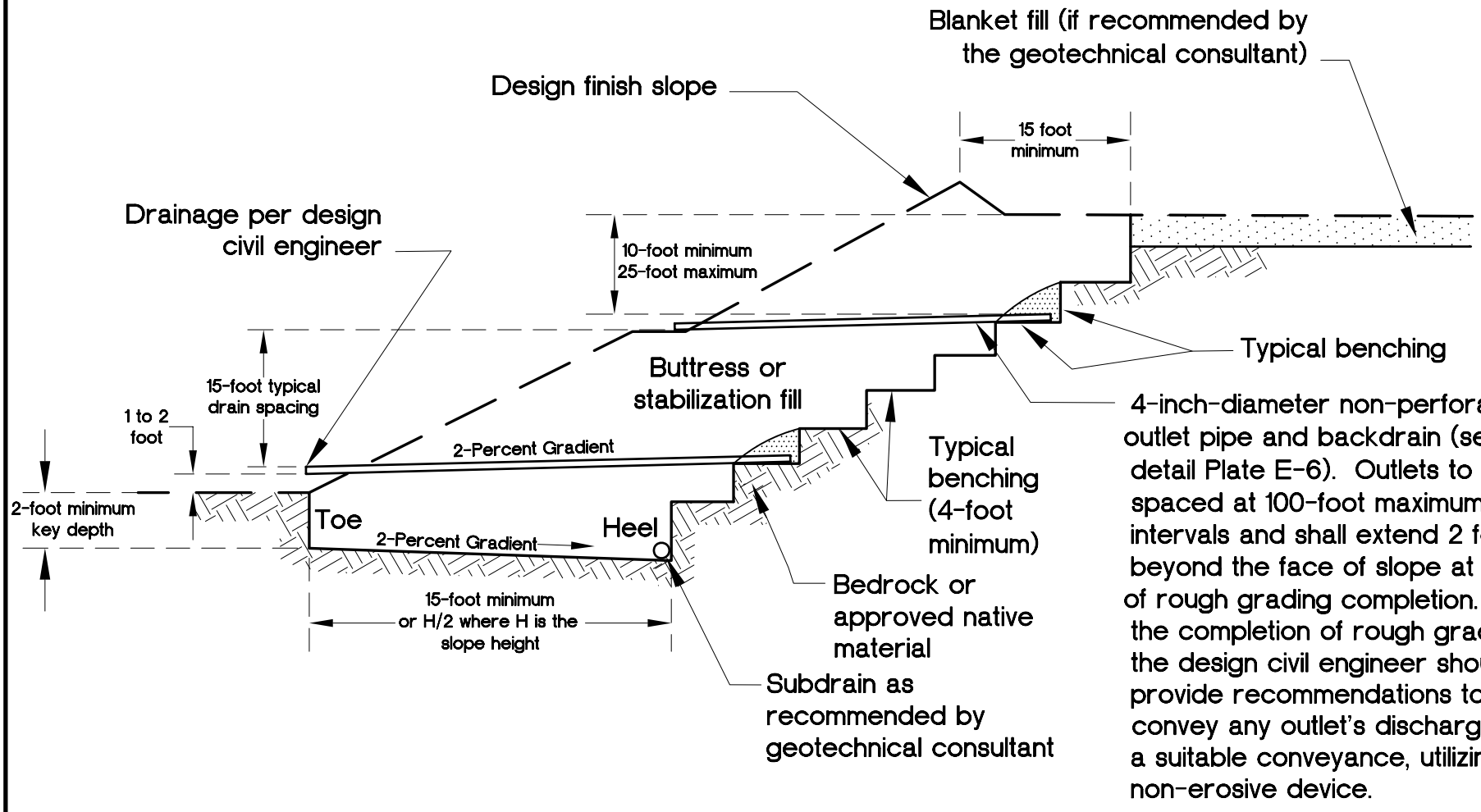
Plate G-3




GeoSoils, Inc.

REMOVAL ADJACENT TO EXISTING FILL ADJOINING CANYON FILL DETAIL

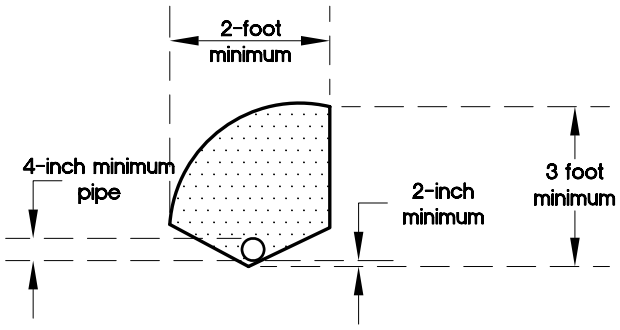
Plate G-4

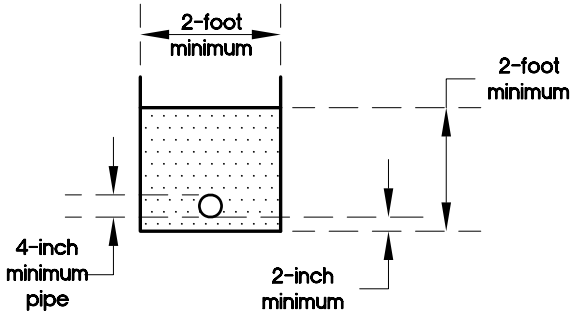



GeoSoils, Inc.

TYPICAL STABILIZATION / BUTTRESS FILL DETAIL

Plate G-5




Filter Material: Minimum of 5 cubic feet per lineal foot of pipe or 4 cubic feet per lineal feet of pipe when placed in square cut trench.

Alternative in Lieu of Filter Material: Gravel may be encased in approved filter fabric. Filter fabric shall be Mirafi 140 or equivalent. Filter fabric shall be lapped a minimum of 12 inches in all joints.

Minimum 4-Inch-Diameter Pipe: ABS-ASTM D-2751, SDR 35; or ASTM D-1527 Schedule 40, PVC-ASTM D-3034, SDR 35; or ASTM D-1785 Schedule 40 with a crushing strength of 1,000 pounds minimum, and a minimum of 8 uniformly-spa per foot of pipe. Must be installed with perforations down at bottom of pipe. Provide cap at upstream end of pipe. Slope at 2 percent to outlet pipe. Outlet pipe to be connected to subdrain pipe with tee or elbow.

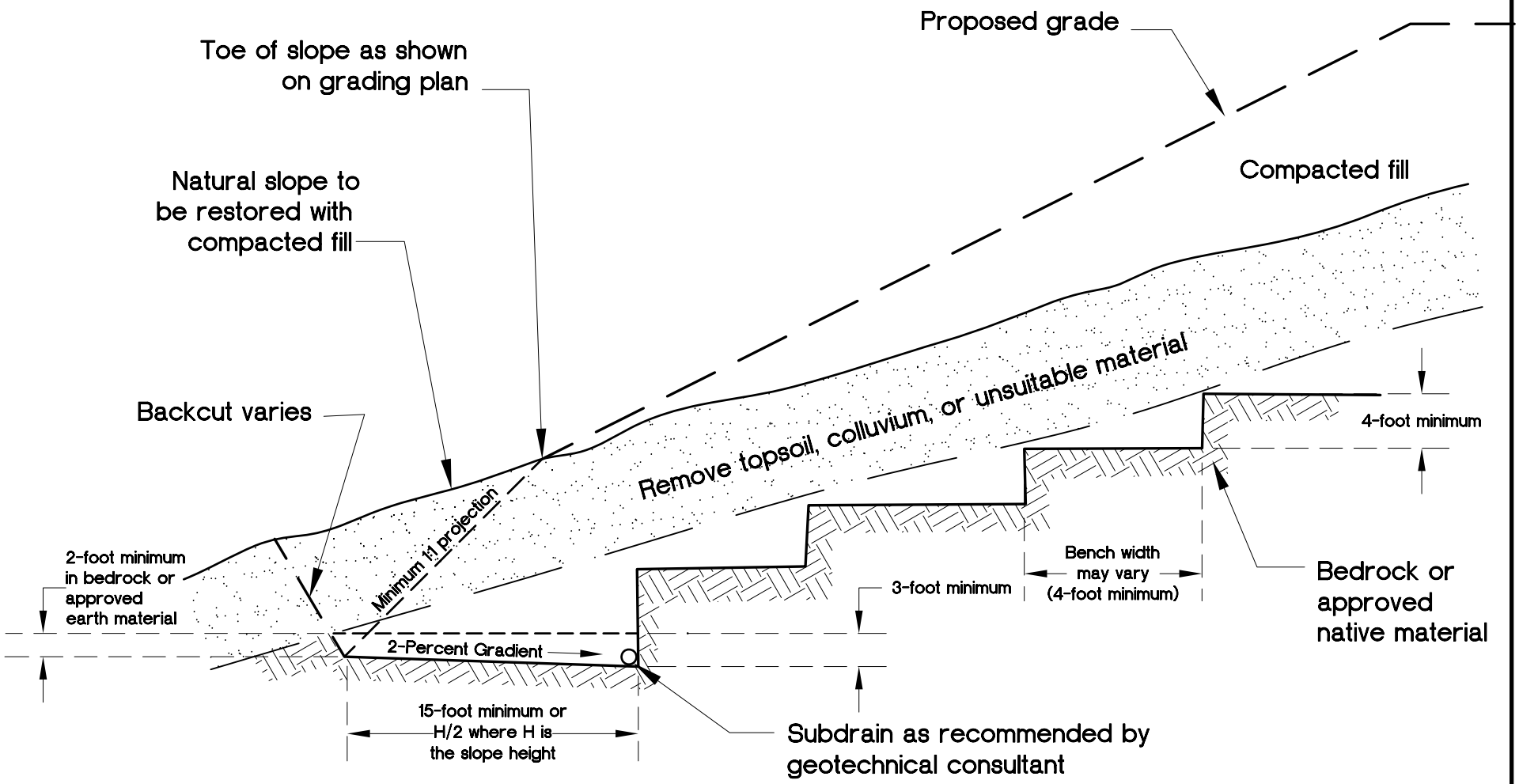
Notes:
1. Trench for outlet pipes to be backfilled and compacted with onsite soil.
2. Backdrains and lateral drains shall be located at elevation of every bench drain. First drain located at elevation just above lower lot grade. Additional drains may be required at the discretion of the geotechnical consultant.

Filter Material shall be of the following specification or an approved equivalent.

| Sieve Size | Percent Passing |
|---|---|
| 1 inch | 100 |
| ¾ inch | 90-100 |
| ⅜ inch | 40-100 |
| No. 4 | 25-40 |
| No. 8 | 18-33 |
| No. 30 | 5-15 |
| No. 50 | 0-7 |
| No. 200 | 0-3 |

Gravel shall be of the following specification or an approved equivalent.

| Sieve Size | Percent Passing |
|---|---|
| 1½ inch | 100 |
| No. 4 | 50 |
| No. 200 | 8 |




NOTES:

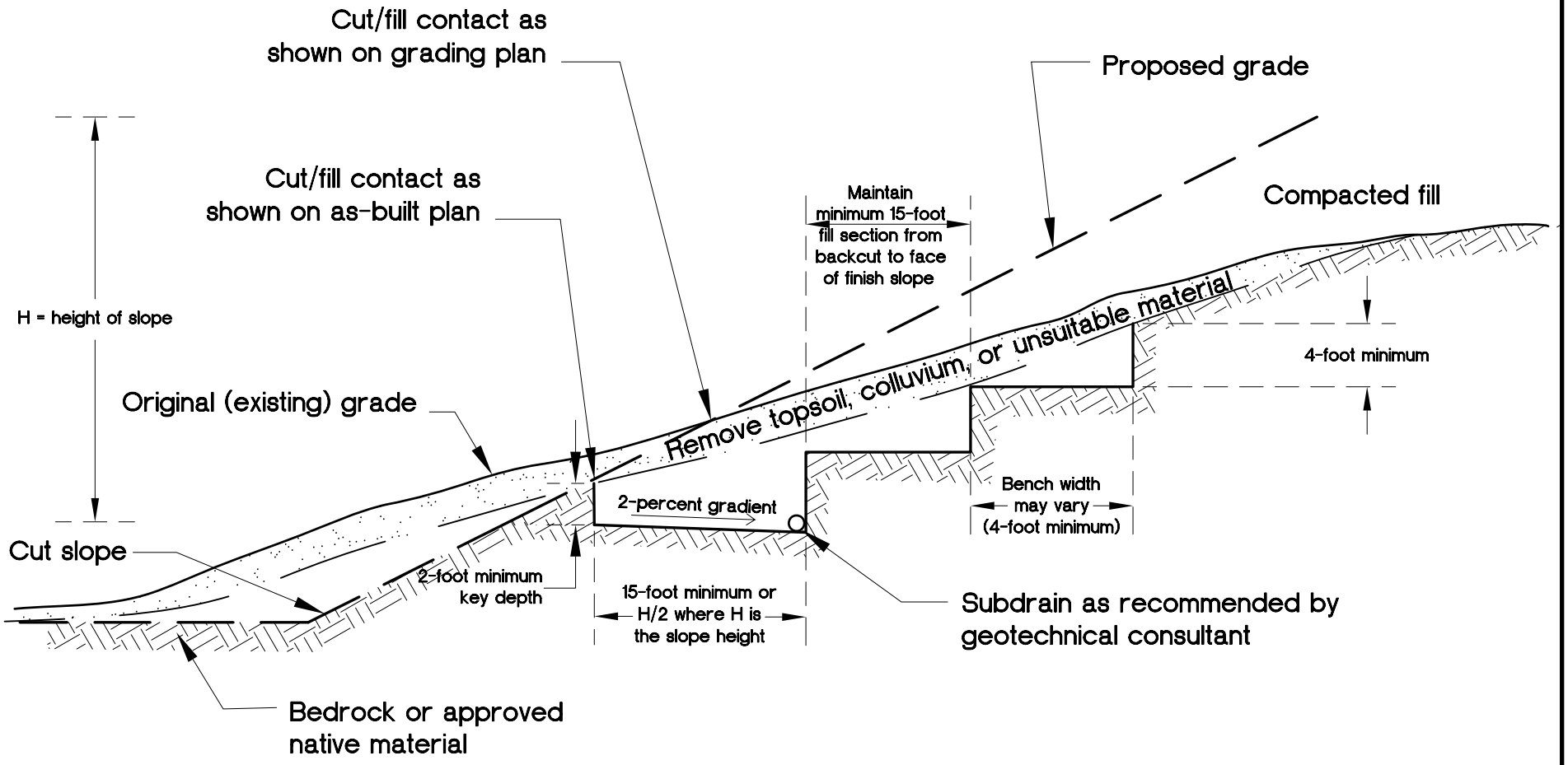
1. Where the natural slope approaches or exceeds the design slope ratio, special recommendations would be provided by the geotechnical consultant.

2. The need for and disposition of drains should be evaluated by the geotechnical consultant, based upon exposed conditions.

GeoSoils, Inc.

FILL OVER NATURAL (SIDEHILL FILL) DETAIL

Plate G-7

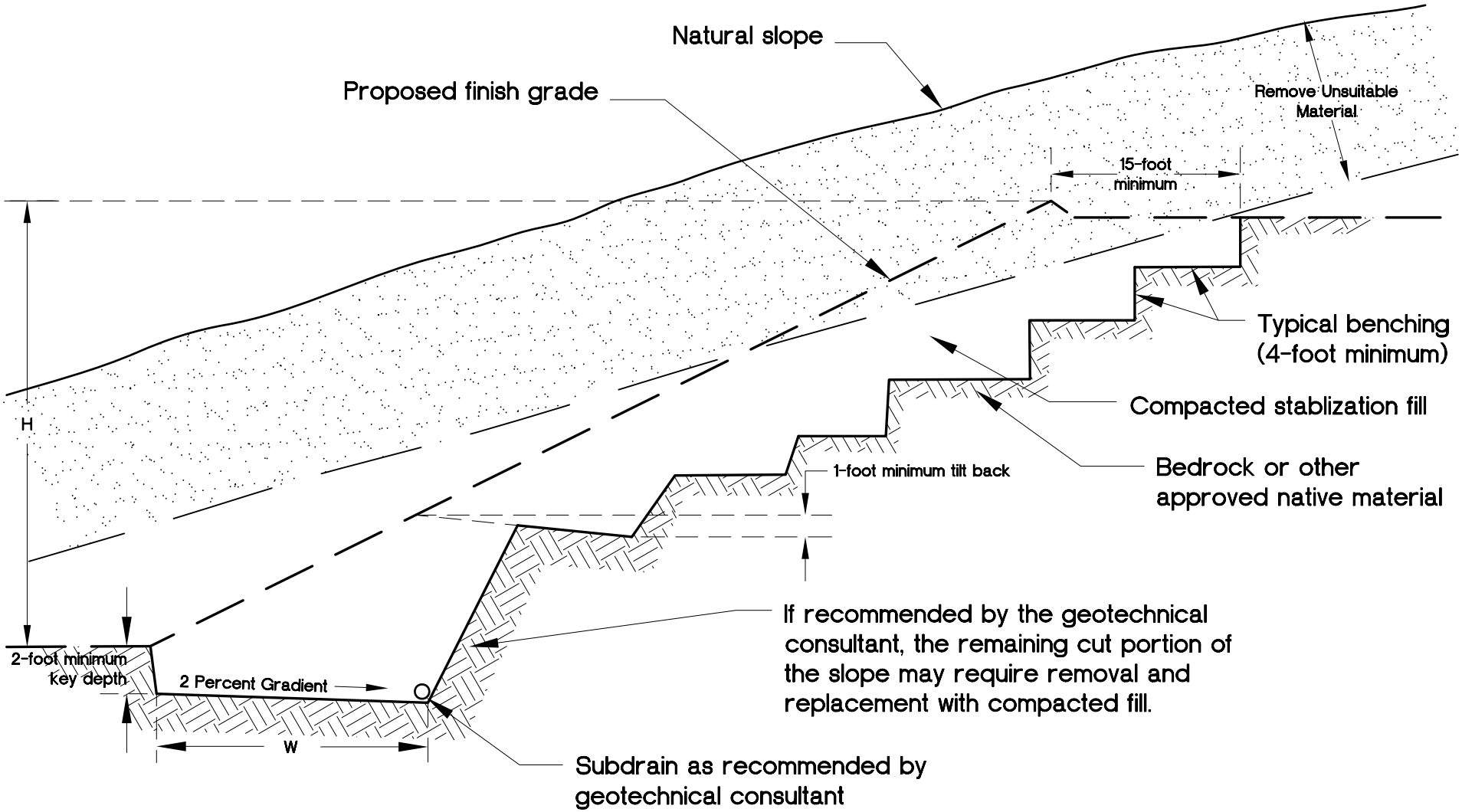



NOTE: The cut portion of the slope should be excavated and evaluated by the geotechnical consultant prior to construction of the fill portion.

GeoSoils, Inc.

FILL OVER CUT DETAIL

Plate G-8

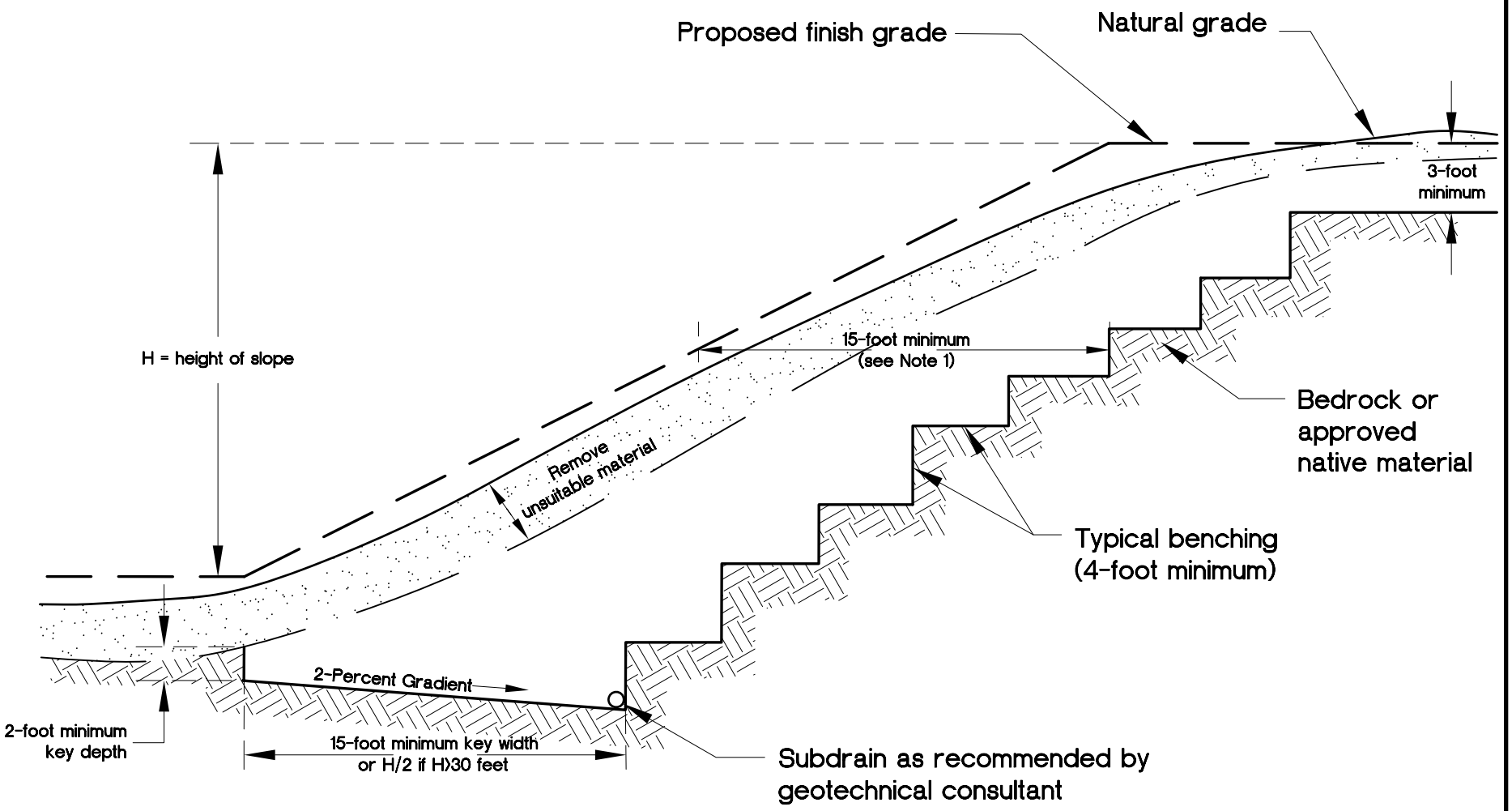



NOTES:

1. Subdrains may be required as specified by the geotechnical consultant.

2. W shall be equipment width (15 feet) for slope heights less than 25 feet. For slopes greater than 25 feet, W shall be evaluated by the geotechnical consultant. At no time, shall W be less than H/2, where H is the height of the slope.

| GeoSoils, Inc. | STABLIZATION FILL FOR UNSTABLE MATERIAL EXPOSED IN CUT SLOPE DETAIL | Plate G-9 |
|---|---|---|



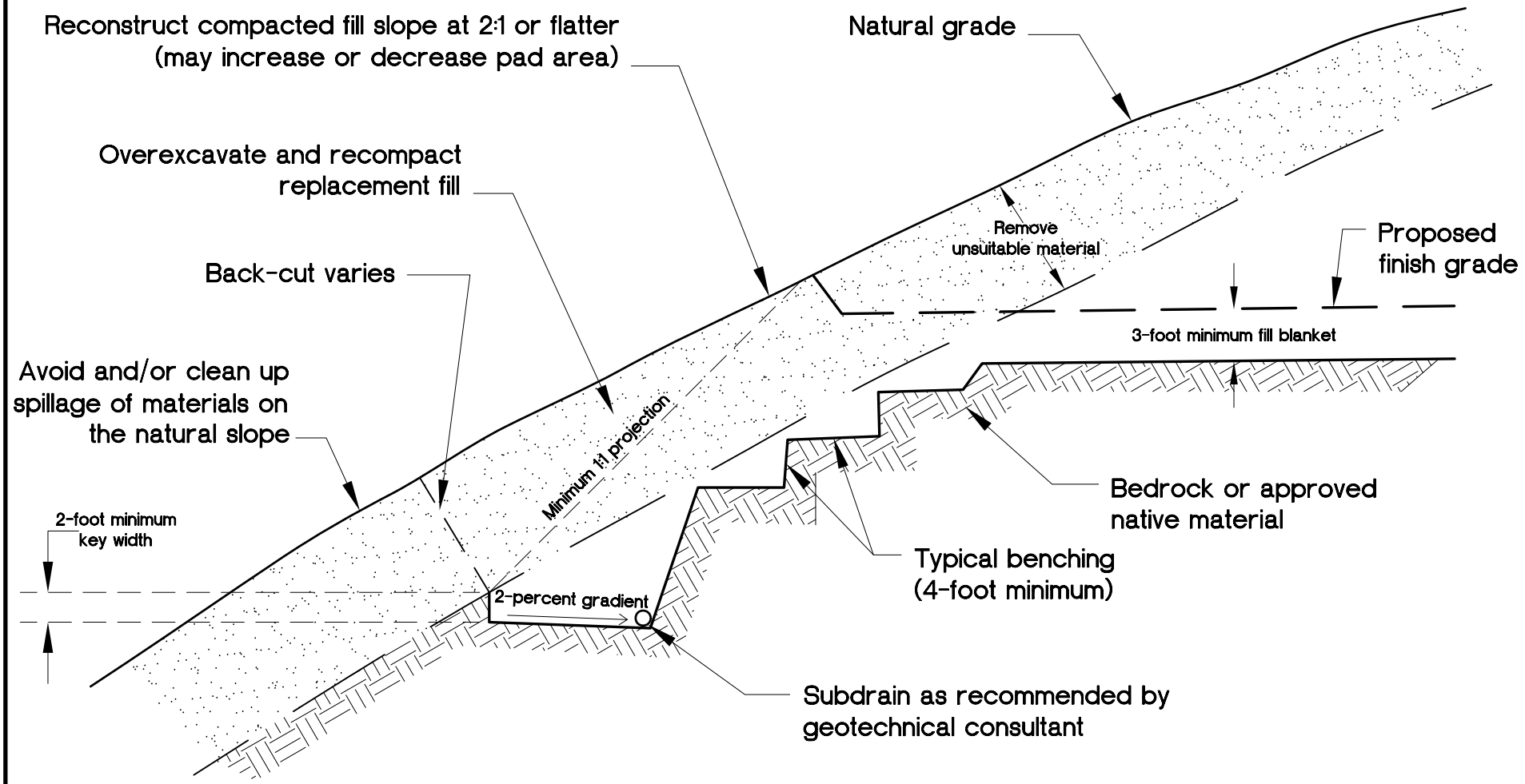

NOTES:

1. 15-foot minimum to be maintained from proposed finish slope face to backcut.
2. The need and disposition of drains will be evaluated by the geotechnical consultant based on field conditions.
3. Pad overexcavation and recompaction should be performed if evaluated to be necessary by the geotechnical consultant.

GeoSoils, Inc.

SKIN FILL OF NATURAL GROUND DETAIL

Plate G-10




NOTES:

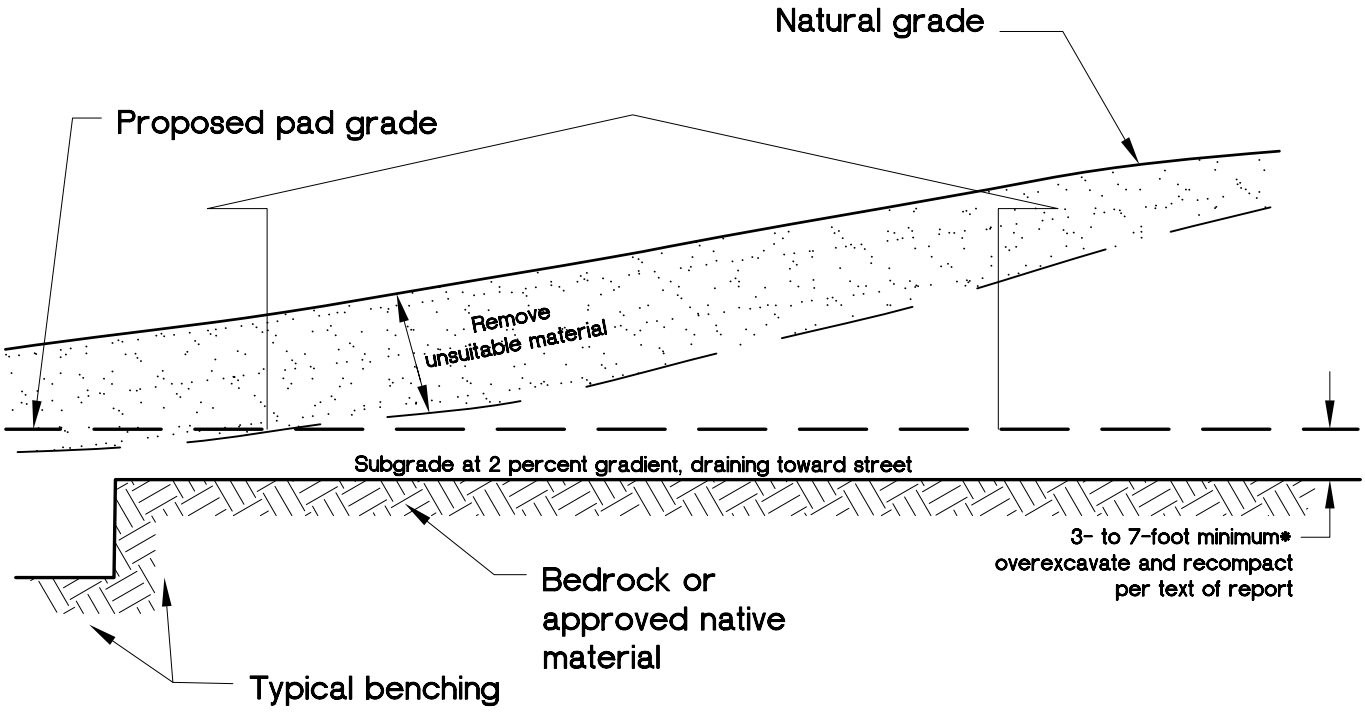
1. Subdrain and key width requirements will be evaluated based on exposed subsurface conditions and thickness of overburden.

2. Pad overexcavation and recompaction should be performed if evaluated necessary by the geotechnical consultant.

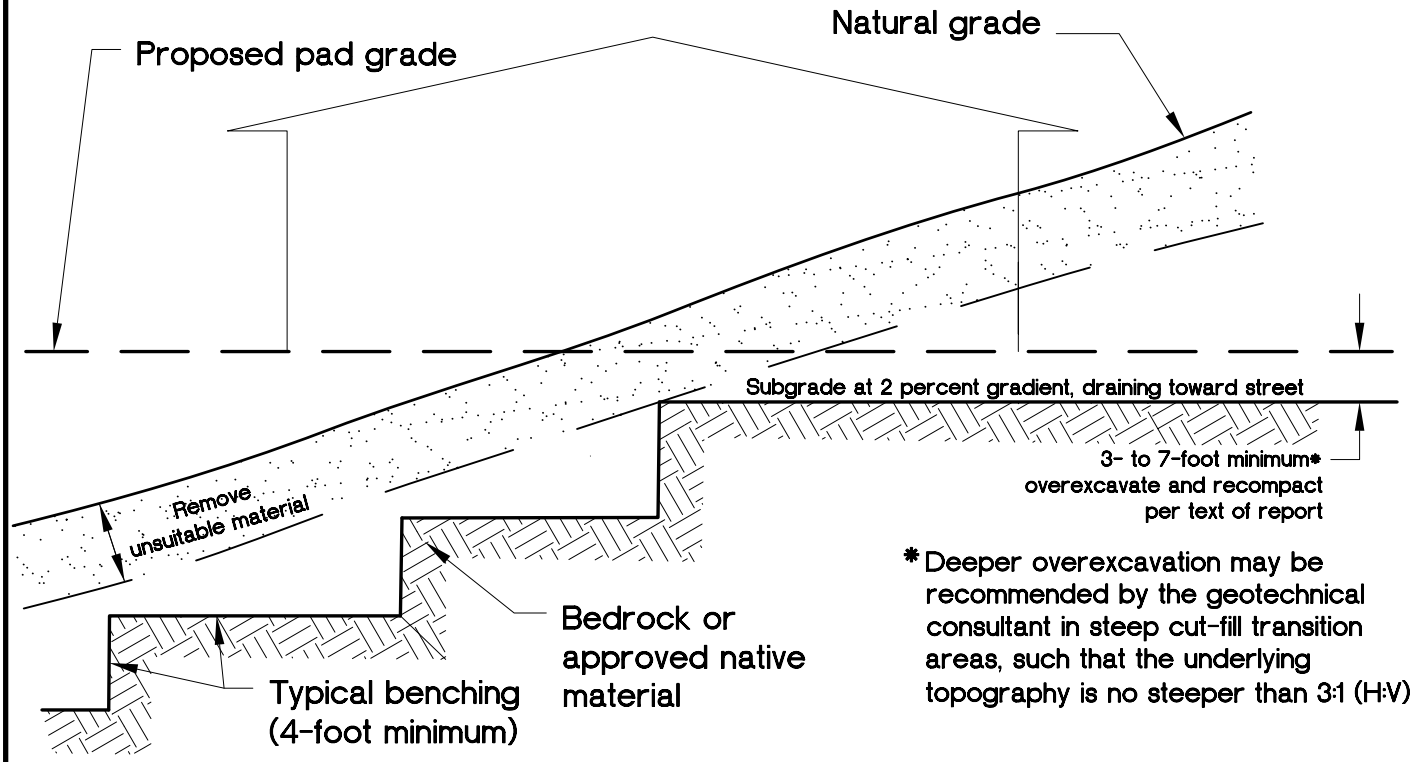
GeoSoils, Inc.

DAYLIGHT CUT LOT DETAIL

Plate G-11



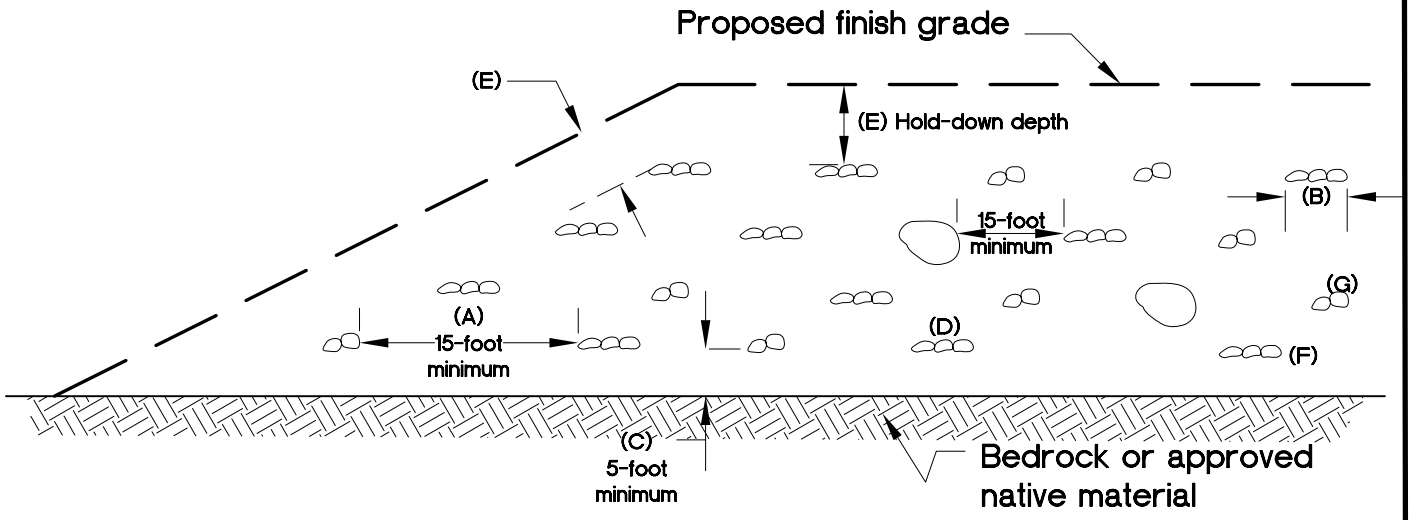

# CUT LOT OR MATERIAL-TYPE TRANSITION



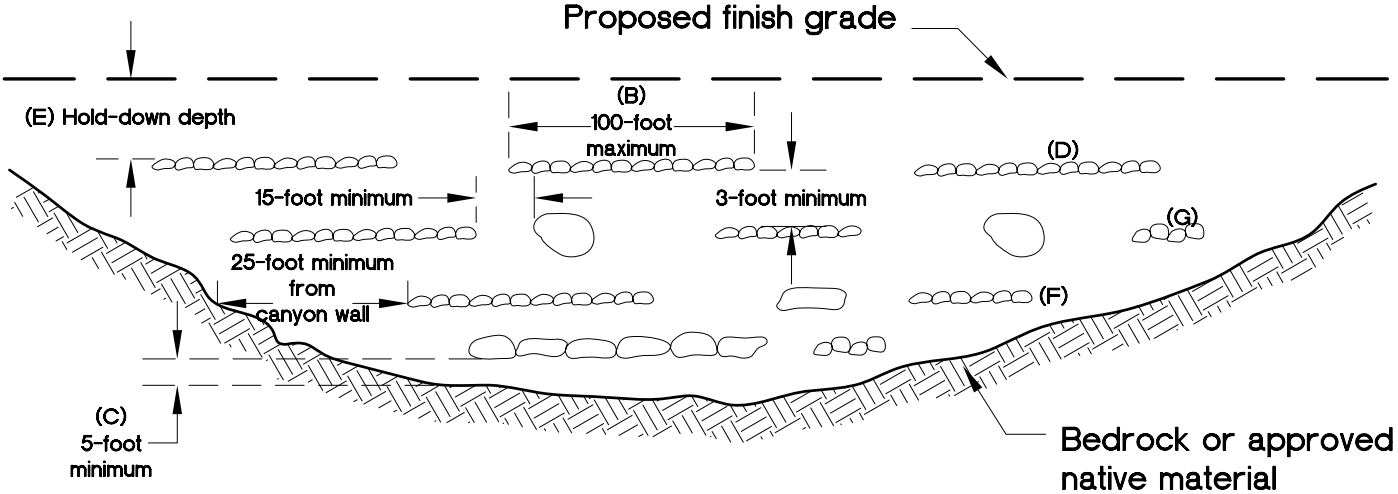

# CUT-FILL LOT (DAYLIGHT TRANSITION)

| GeoSoils, Inc. | TRANSITION LOT DETAILS | Plate G-12 |
|---|---|---|

# VIEW NORMAL TO SLOPE FACE




# VIEW PARALLEL TO SLOPE FACE



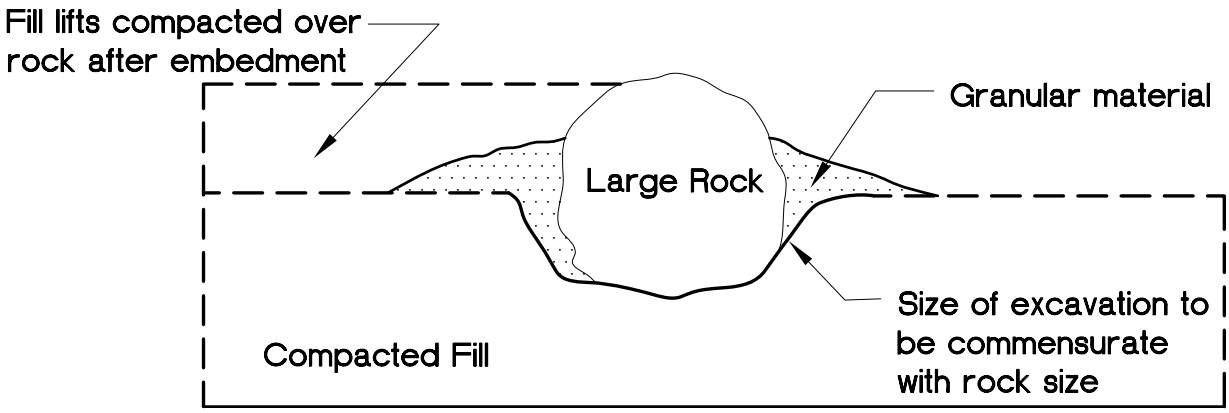

NOTES:

A. One equipment width or a minimum of 15 feet between rows (or windrows).
B. Height and width may vary depending on rock size and type of equipment. Length of windrow shall be no greater than 100 feet.
C. If approved by the geotechnical consultant, windrows may be placed direclty on competent material or bedrock, provided adequate space is available for compaction.
D. Orientation of windrows may vary but should be as recommended by the geotechnical engineer and/or engineering geologist. Staggering of windrows is not necessary unless recommended.
E. Clear area for utility trenches, foundations, and swimming pools; Hold-down depth as specified in text of report, subject to governing agency approval.
F. All fill over and around rock windrow shall be compacted to at leas ompaction or as recommended.
G. After fill between windrows is placed and compacted, with the lift of fill covering windrow, windrow should be proof rolled with a D-9 dozer or equivalent.

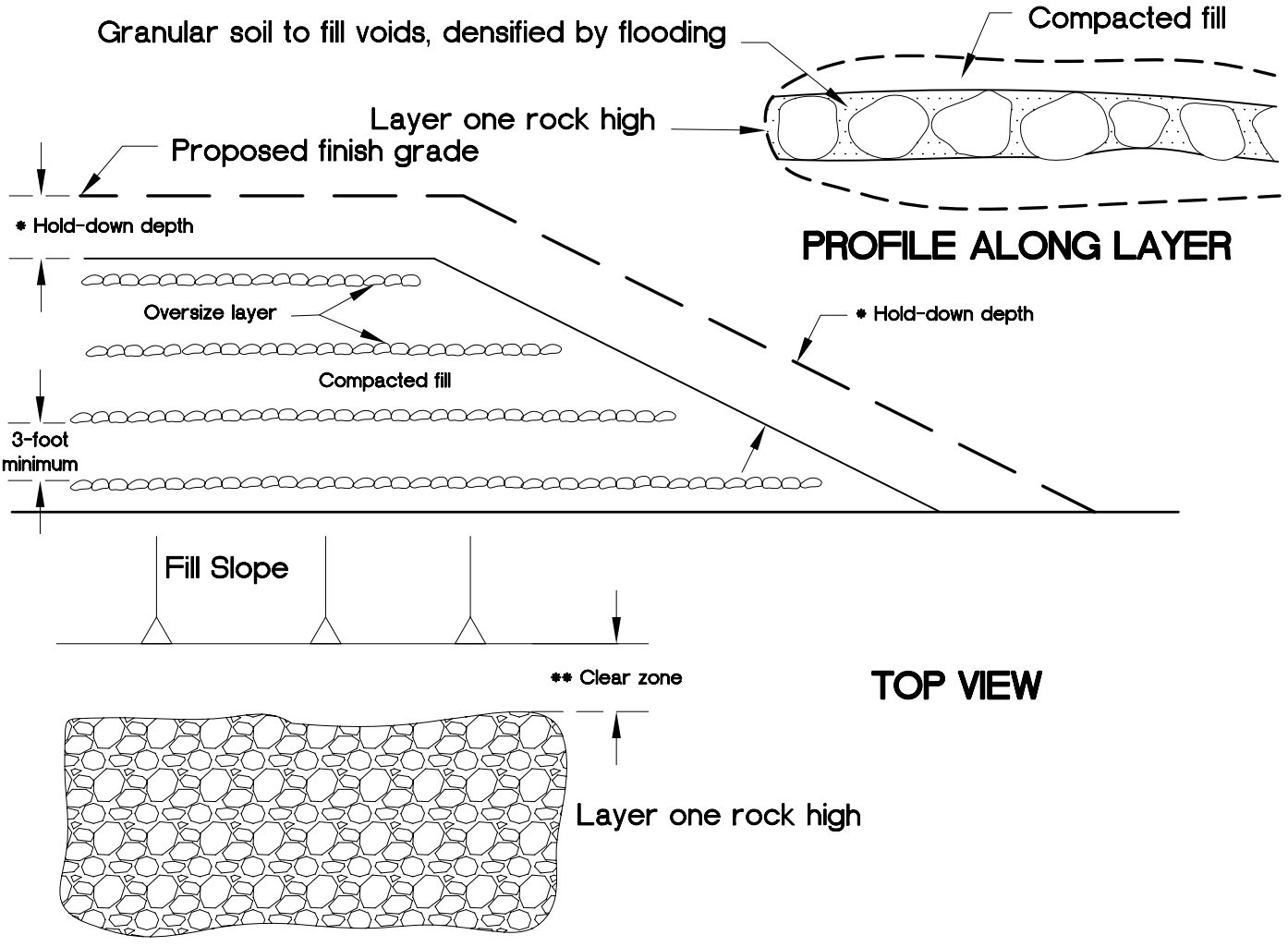
VIEWS ARE DIAGRAMMATIC ONLY AND MAY BE SUPERSEDED BY REPORT RECOMMENDATIONS OR CODE
ROCK SHOULD NOT TOUCH AND VOIDS SHOULD BE COMPLETELY FILLED

| GeoSoils, Inc. | OVERSIZE ROCK DISPOSAL DETAIL | Plate G-13 |
|---|---|---|

# ROCK DISPOSAL PITS




# ROCK DISPOSAL LAYERS



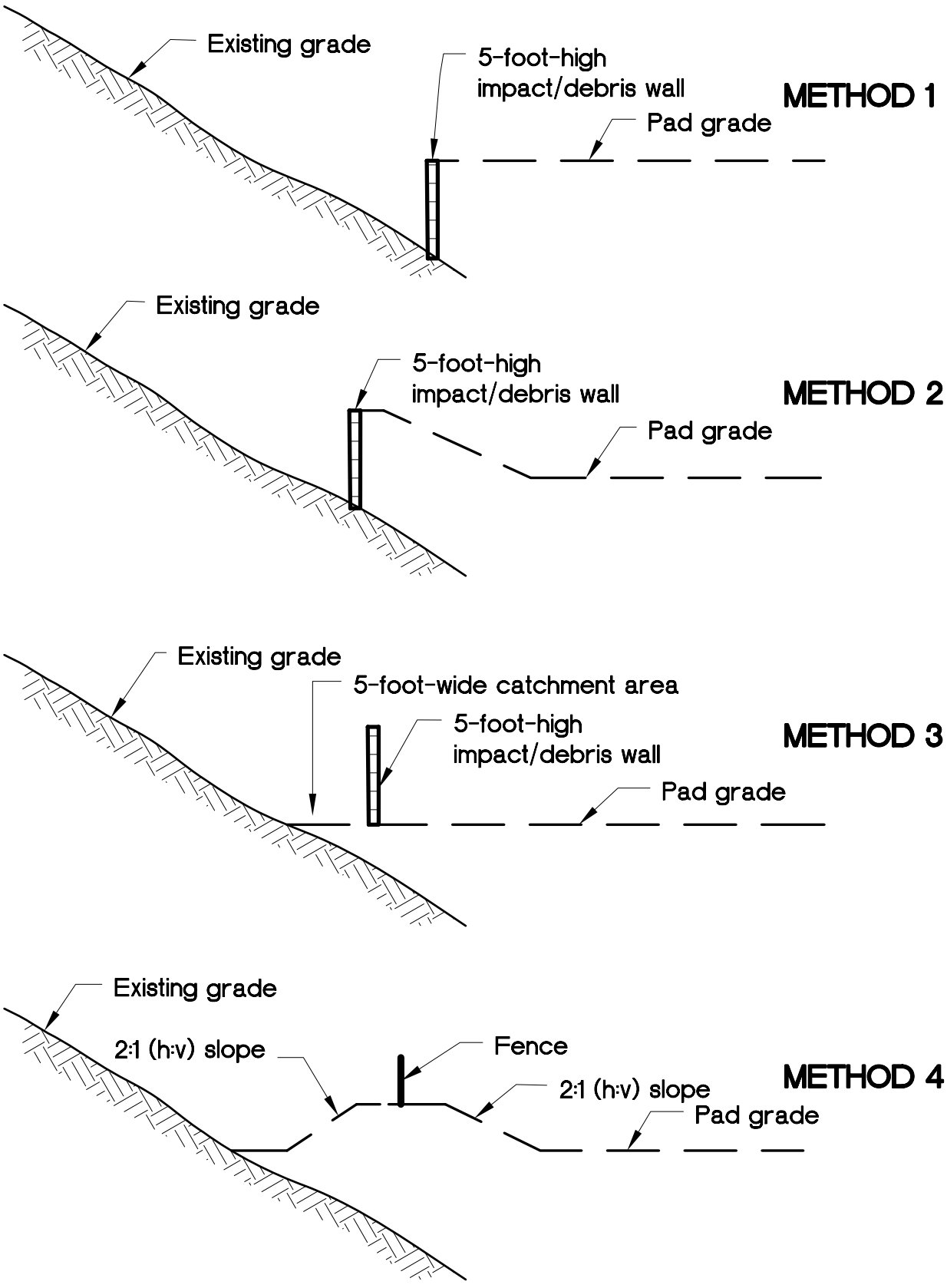

* Hold-down depth or below lowest utility as specified in text of report, subject to governing agency approval.

** Clear zone for utility trenches, foundations, and swimming pools, as specified in text of report.

VIEWS ARE DIAGRAMMATIC ONLY AND MAY BE SUPERSEDED BY REPORT RECOMMENDATIONS OR CODE

ROCK SHOULD NOT TOUCH AND VOIDS SHOULD BE COMPLETELY FILLED IN

| GeoSoils, Inc. | ROCK DISPOSAL DETAIL | Plate G-14 |
|---|---|---|

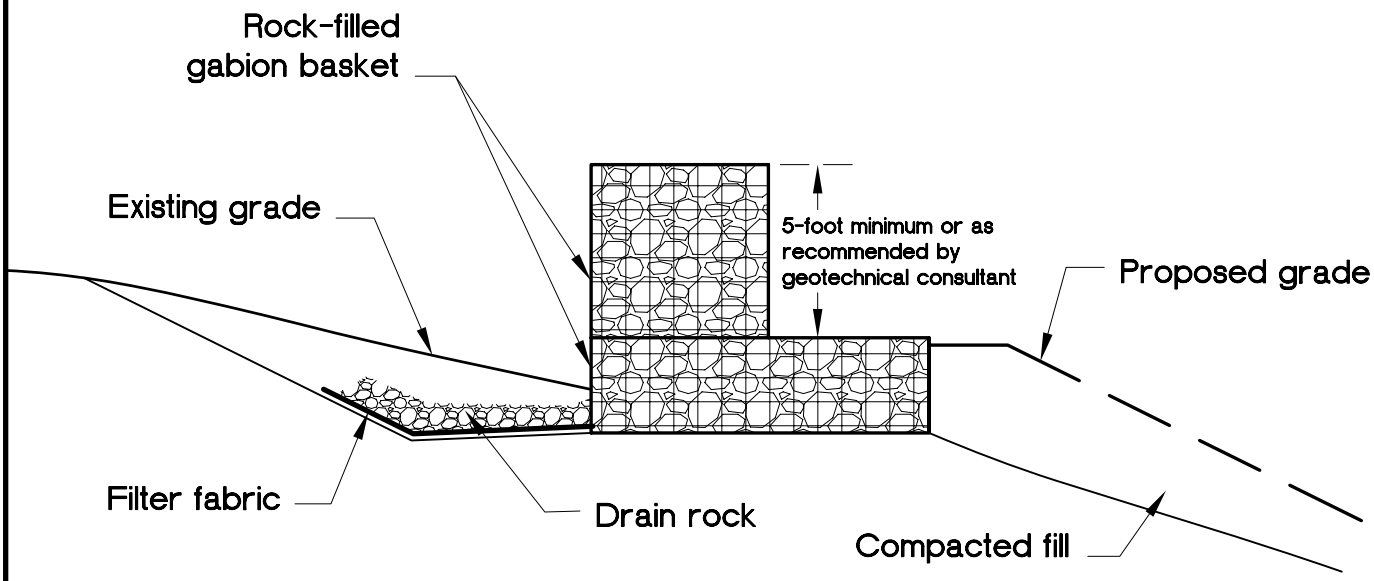



NOT TO SCALE

GeoSoils, Inc.

DEBRIS DEVICE CONTROL METHODS DETAIL

Plate G–15




Gabion impact or diversion wall should be constructed at the base of the ascending slope subject to rock fall. Walls need to be constructed with high segments that sustain impact and mitigate potential for overtopping, and low segment that provides channelization of sediments and debris to desired depositional area for subsequent clean-out. Additional subdrain may be recommended by geotechnical consultant.

From GSA, 1987

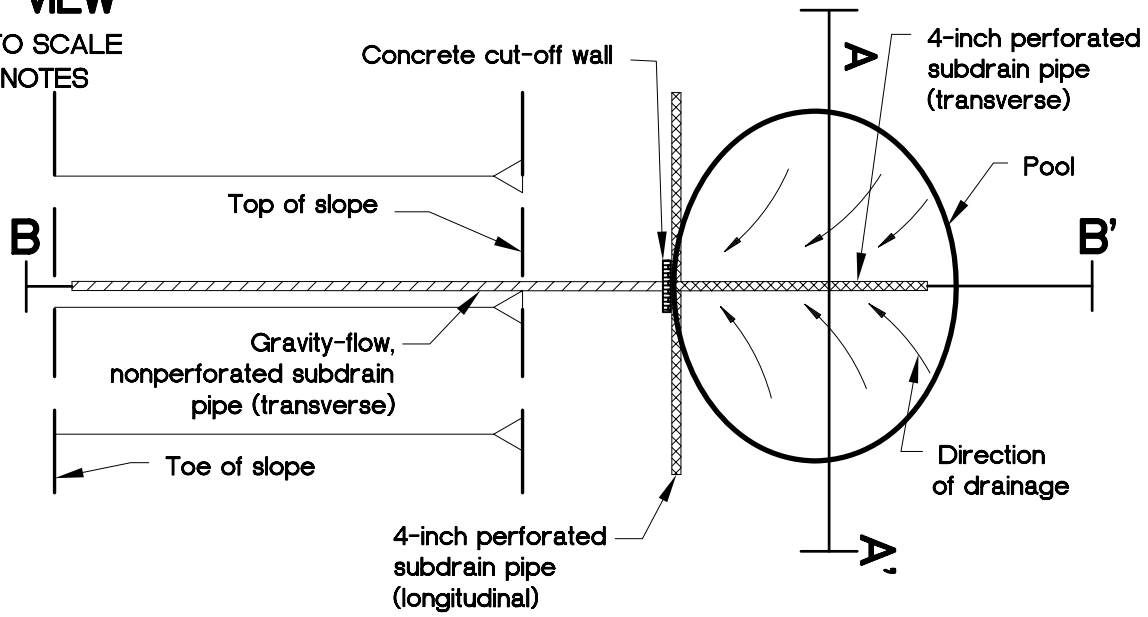
GeoSoils, Inc.

ROCK FALL MITIGATION DETAIL

Plate G-16

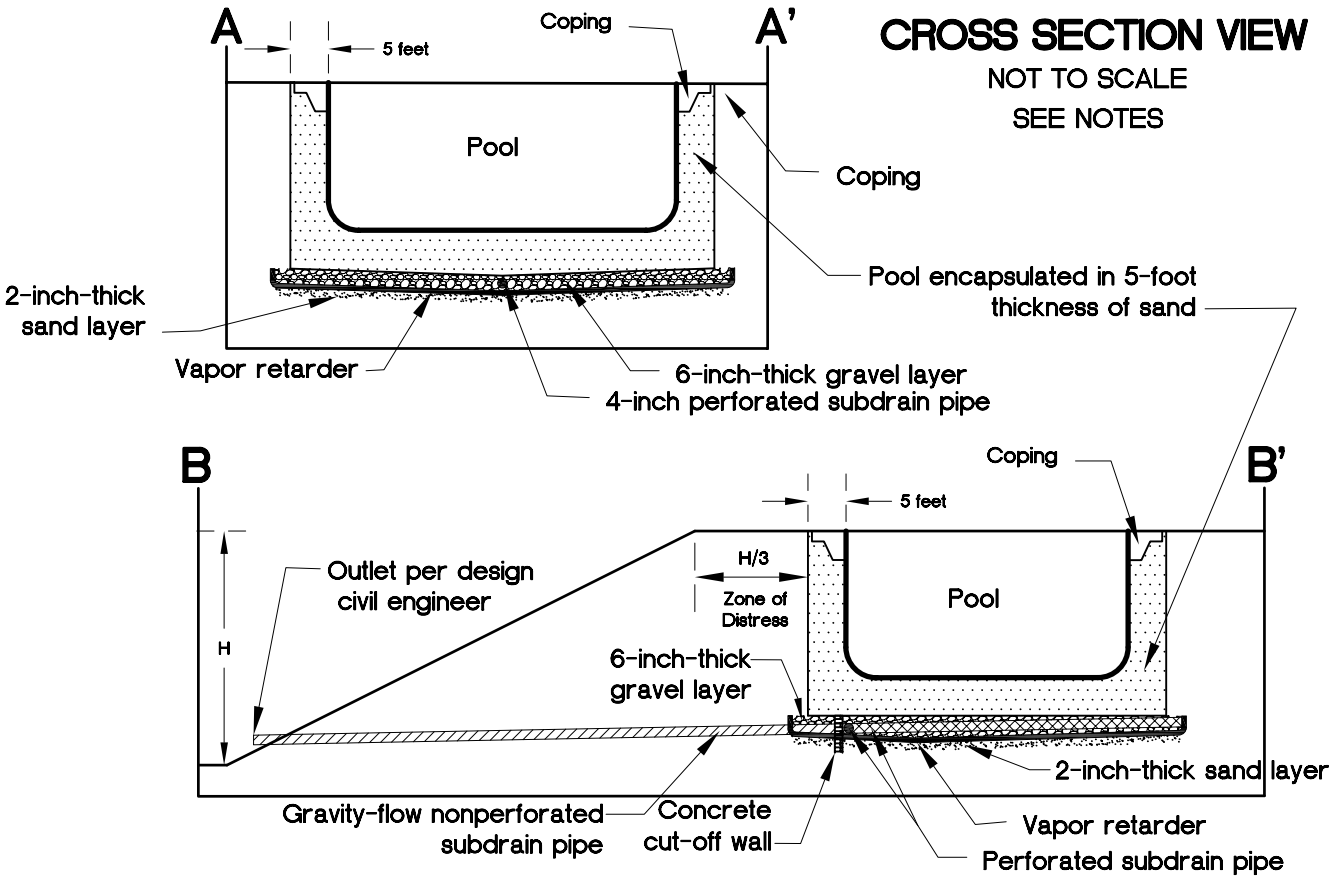
## MAP VIEW

NOT TO SCALE
SEE NOTES




## CROSS SECTION VIEW

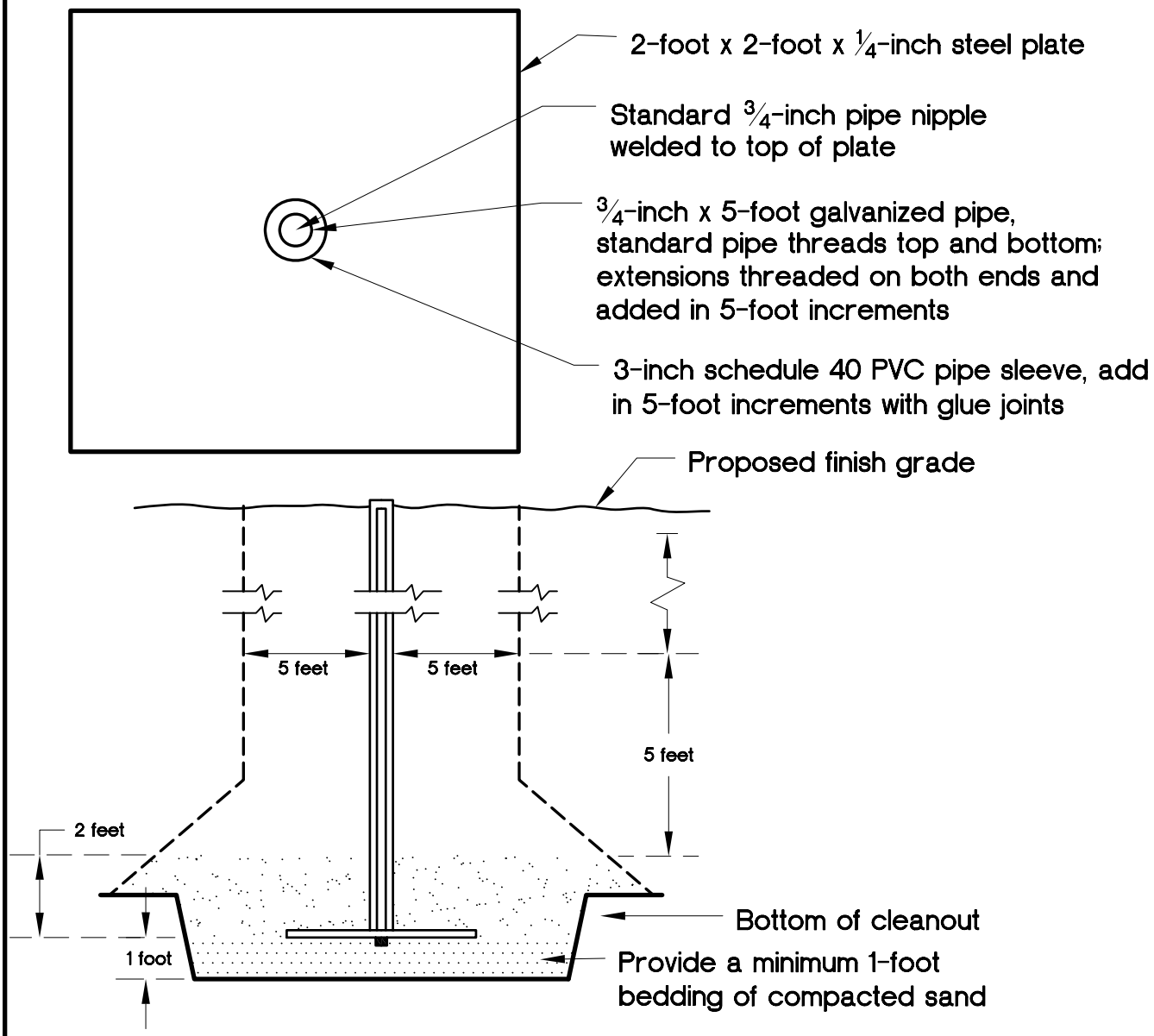
NOT TO SCALE
SEE NOTES




NOTES:

1. 6-inch-thick, clean gravel (¾ to 1½ inch) sub-base encapsulated in Mirafi 140N or equivalent, underlain by a 15-mil vapor retarder, with 4-inch-diameter perforated pipe longitudinal connected to 4-inch-diameter perforated pipe transverse. Connect transverse pipe to 4-inch-diameter nonperforated pipe at low point and outlet or to sump pump area.
2. Pools on fills thicker than 20 feet should be constructed on deep foundations; otherwise, distress (tilting, cracking, etc.) should be expected.
3. Design does not apply to infinity-edge pools/spas.

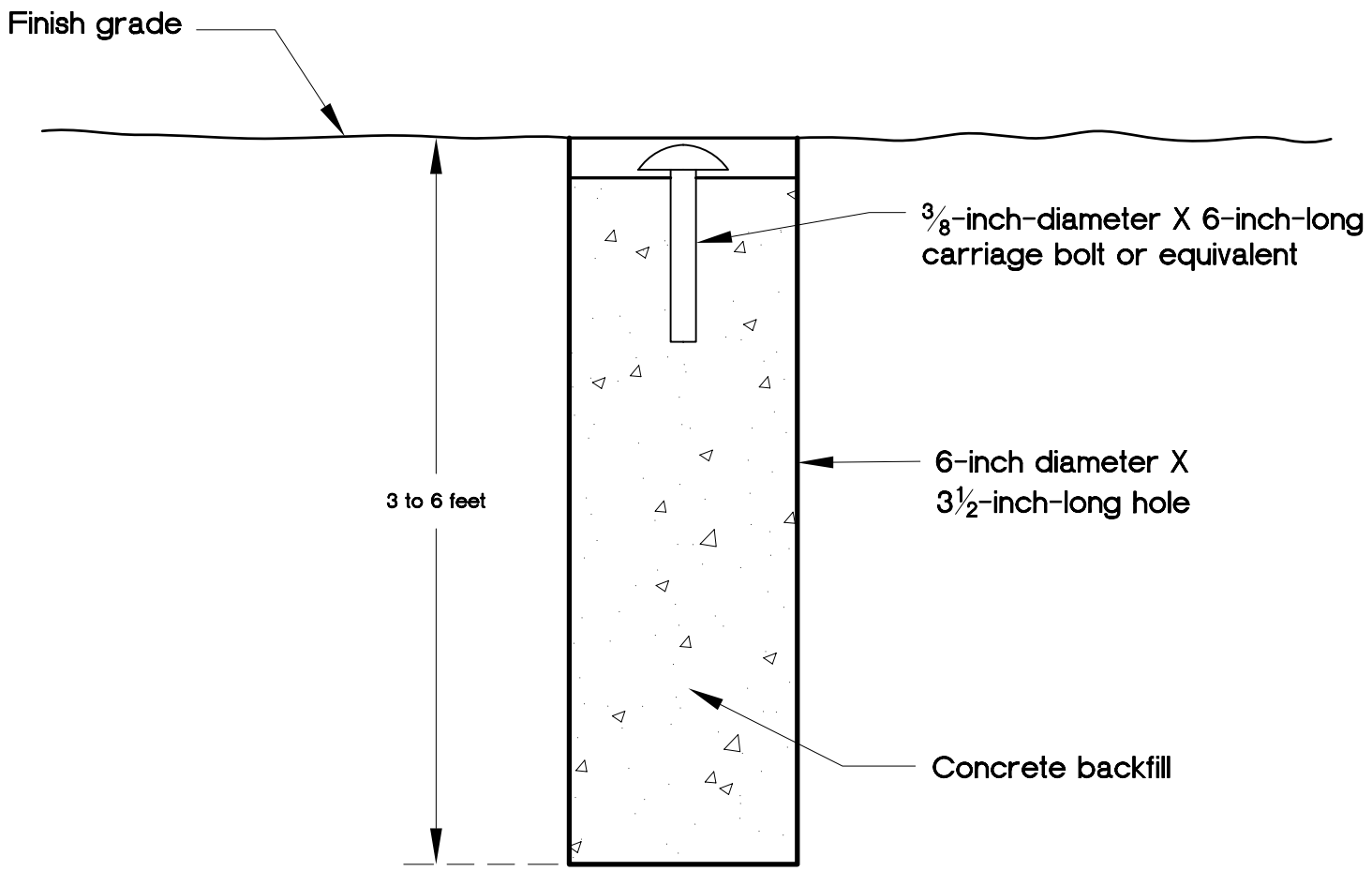
| GeoSoils, Inc. | TYPICAL POOL/SPA DETAIL | Plate G–17 |
|---|---|---|




NOTES:

1. Locations of settlement plates should be clearly marked and readily visible (red flagged) to equipment operators.
2. Contractor should maintain clearance of a 5-foot radius of plate base and withiin 5 feet (vertical) for heavy equipment. Fill within clearance area should be hand compacted to project specifications or compacted by alternative approved method by the geotechnical consultant (in writing, prior to construction).
3. After 5 feet (vertical) of fill is in place, contractor should maintain a 5-foot radius equipment clearance from riser.
4. Place and mechanically hand compact initial 2 feet of fill prior to establishing the initial reading.
5. In the event of damage to the settlement plate or extension resulting from equipment operating within the specified clearance area, contractor should immediately notify the geotechnical consultant and should be responsible for restoring the settlement plates to working order.
6. An alternate design and method of installation may be provided at the discretion of the geotechnical consultant.

| GeoSoils, Inc. | SETTLEMENT PLATE AND RISER DETAIL | Plate G–18 |
|---|---|---|

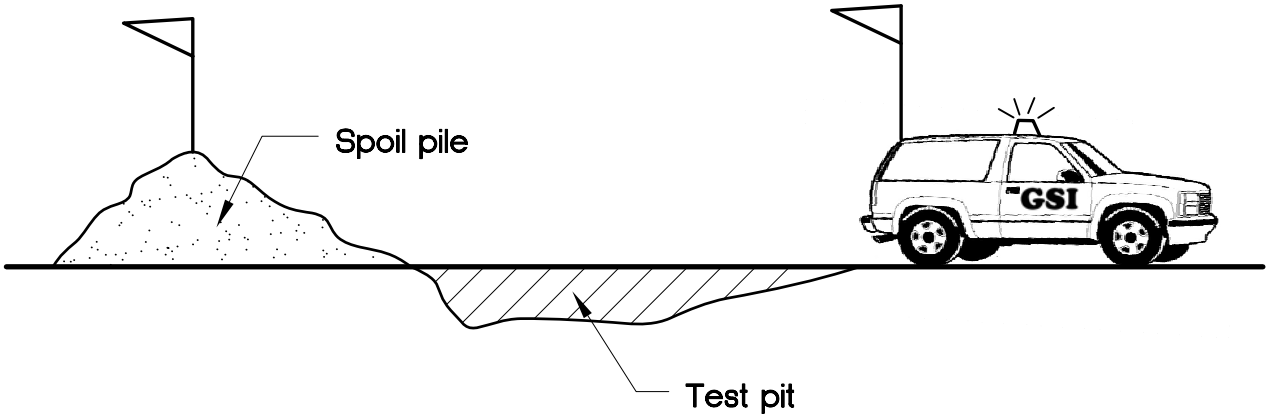



GeoSoils, Inc.

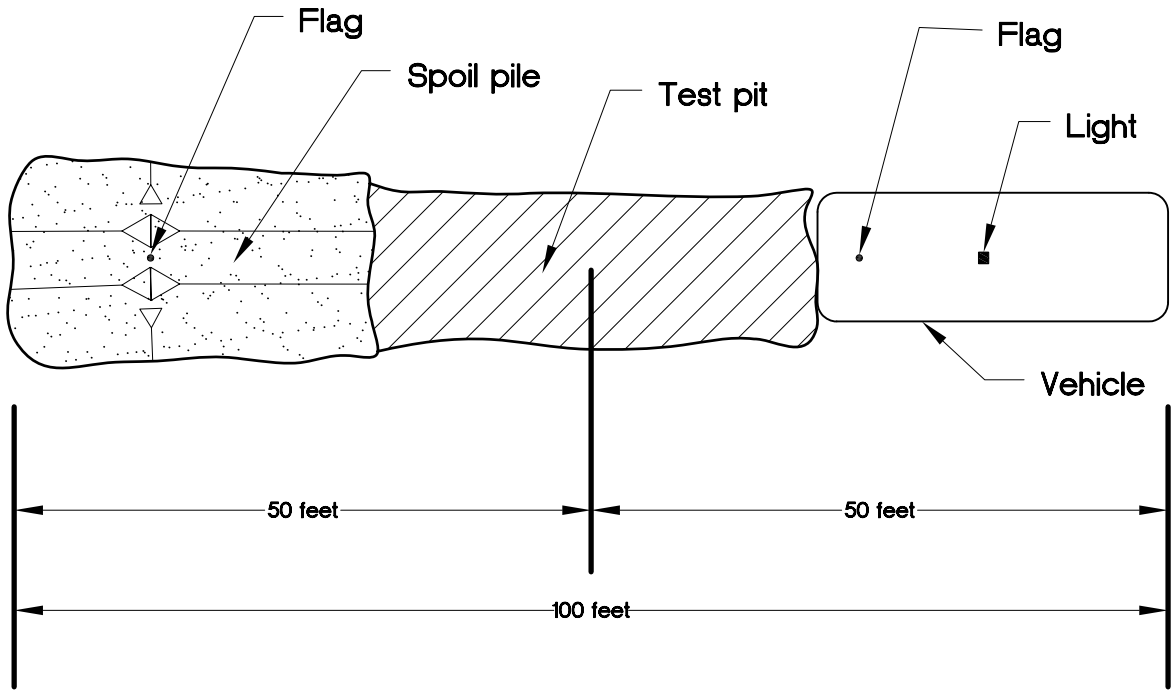
TYPICAL SURFACE SETTLEMENT MONUMENT

Plate G–19

# SIDE VIEW



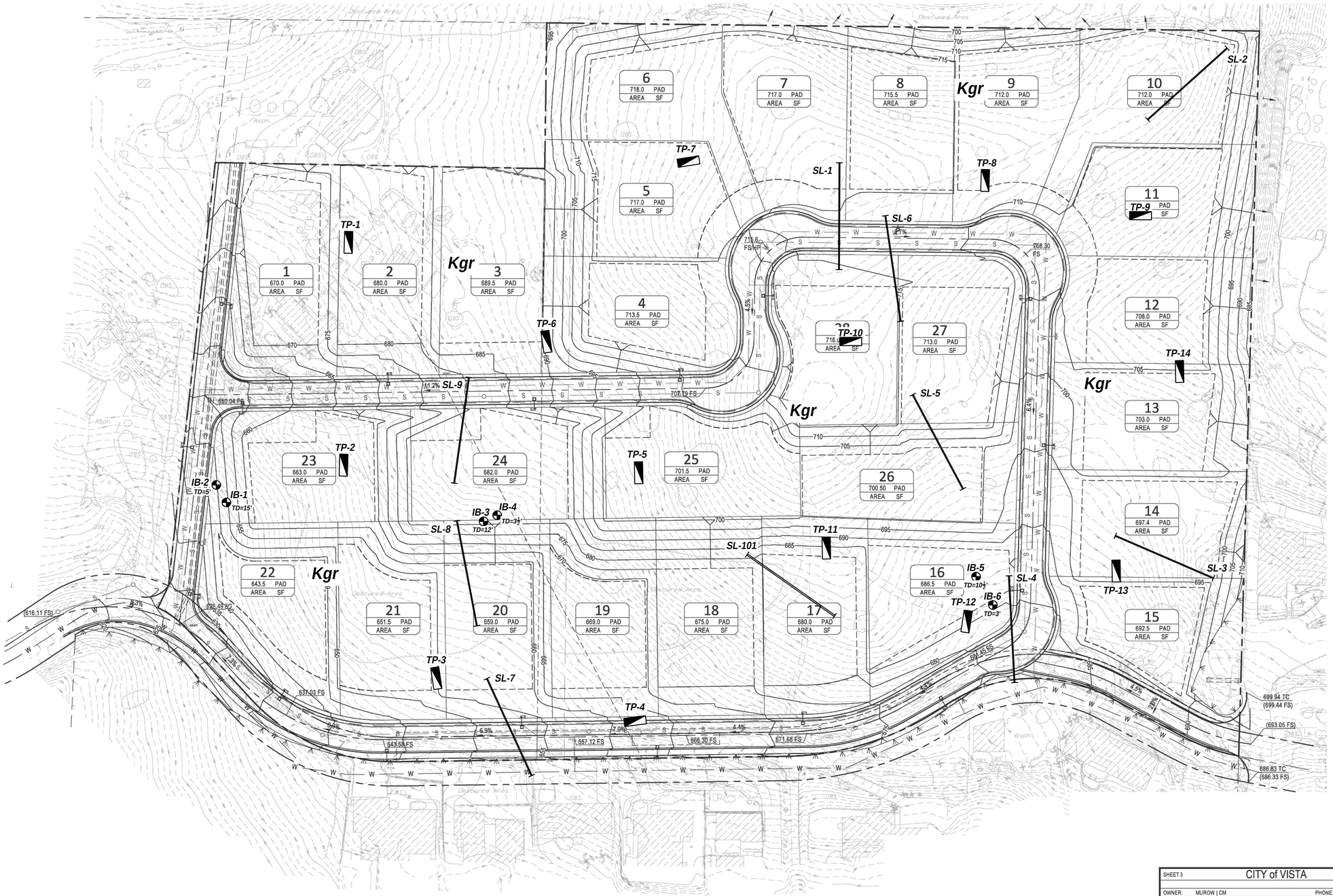

# TOP VIEW




GeoSoils, Inc. | TEST PIT SAFETY DIAGRAM | Plate G-20

## GSI LEGEND

- **Kgr** — CRETACEOUS GRANITIC BEDROCK
- **IB-6 TD=15'** — APPROXIMATE LOCATION OF INFILTRATION BORING TEST, WITH TOTAL DEPTH IN FEET (GSI, 2016)
- **TP-15** — APPROXIMATE LOCATION OF EXPLORATORY TEST PIT (GSI, 2006)
- **SL-9** — APPROXIMATE LOCATION OF SEISMIC SURVEY LINE (GSI, 2006)
- **SL-101** — APPROXIMATE LOCATION OF SEISMIC SURVEY LINE (THIS STUDY)




**ALL LOCATIONS ARE APPROXIMATE**

*This document or efile is not a part of the Construction Documents and should not be relied upon as being an accurate depiction of design.*

**BASE MAP FROM:**

**PASCO LARET SUITER & ASSOCIATES**
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SIGNATURES CONSTITUTE THAT ALL PLANS, SPECIFICATIONS, GUARANTEES, AND OTHER REQUIREMENTS NECESSARY FOR ISSUANCE OF A BUILDING PERMIT CONFORMING TO THIS SITE DEVELOPMENT PLAN HAVE BEEN COMPLETED AND APPROVED BY THE APPROPRIATE DEPARTMENT.

| | |
|---|---|
| PLANNING DEPARTMENT | DATE |
| ENGINEERING DEPARTMENT | DATE |
| FIRE DEPARTMENT | DATE |
| PUBLIC WORKS DEPARTMENT | DATE |

SHEET 3 — CITY of VISTA — OF 4

OWNER: MUROW | CM — PHONE: (949) 988-3270
ADDRESS: 1151 DURYEA AVENUE, IRVINE, CA 92614
ARCHITECT, ENGINEER OR DESIGNER: PASCO LARET SUITER & ASSOCIATES, INC. — PHONE: 949-661-6695
ADDRESS: 27127 CALLE ARROYO, SUITE 1904 SAN JUAN CAPISTRANO, CA 92675
TYPE OF DEVELOPMENT: 28 LOTS
APN(S): 171-100-05, 171-100-28

| SITE DATA AREA (SQ. FT.) | | COVERAGE % | DWELLING UNITS | | COMMON OPEN SPACE | |
|---|---|---|---|---|---|---|
| | | | | | PROVIDED | REQUIRED |
| LOT: | | 100% | 2 BDRM | - | | |
| BLDG: | | | 3 BDRM | | PRIVATE OPEN SPACE | |
| PARKING/PVMT: | | | 4 BDRM | | PROVIDED | REQUIRED |
| LANDSCAPE: | | | TOTAL UNITS | | | |

| PARKING | ORD. REQ. | | | DRIVEWAY (SIZE & SLOPE) | SETBACKS |
|---|---|---|---|---|---|
| GARAGE | LOADING | - | REC. VEH. STORAGE SPACES | 1 WAY | |
| GUEST | HANDICAP | - | | 2 WAY | SPECIAL N/A |
| OPEN | TOTAL | | N/A | SLOPE VARIES | ACCES. BLDG N/A |

**GeoSoils, Inc.**

# GEOTECHNICAL MAP

**Plate 1**

W.O. 8053-A-SC | DATE: 03/21 | SCALE: 1" = 50'

# Attachment D – Biological Report

This page left intentionally blank.

February 12, 2021

Mr. Greg Perrine
1151 Duryea Ave
Irvine, CA 92614

**Subject: Biological Resources Report - Vista Grande Tentative Subdivision Map**

Dear Mr. Perrine,

# INTRODUCTION

Tierra Data Inc. (TDI) is pleased to provide you with this Biological Resources Report for the Vista Grande Tentative Subdivision Map (Project) in the northeast portion of the City of Vista (City). This report was prepared to provide you, the project applicant, City, resource agencies, and the public with updated biological data and analysis of the proposed Project's effects on biological resources. The report is intended to satisfy review of the proposed Project under the California Environmental Quality Act (CEQA) and to demonstrate compliance with federal and state regulations. This report describes the project site's current biological conditions, vegetation communities, plant and wildlife species observed or detected during the surveys, identifies extant resources that are sensitive, as well as sensitive species with potential to occur within the project site. In addition, project effects are assessed, and mitigation measures are proposed to offset the proposed Project's unavoidable significant impacts to sensitive biological resources. Off-site mitigation has already been purchased for a previous project on the site, and that mitigation is compared to the mitigation needs for current conditions.

## Project Location

The approximately 17-acre property generally lies east of East Vista Way, north of Warmlands Avenue, and west of Green Hills Way in the northeast of the City bordering the unincorporated San Diego County to the north and east (Figure 1). The property is comprised of two parcels, Assessor's Parcel numbers (APNs) 171-100-05 and -28 at 12.12 acres and 4.93 acres respectively, immediately north of Vista Grande Drive, northwest of Vista Grande Terrace, south of the San Diego County Water Authority pipeline maintenance road (identified as Pipeline Road), east of an unnamed easement road, and west of a private development, all on the south-facing slope of an east-west trending ridge (Figure 2). The site is shown on the U.S. Geological Survey 7.5 minute San Marcos Quadrangle in Township 11 South, Range 3 West in Section 8, San Bernardino Meridian.

**Figure 1: Regional Location and Project Vicinity**

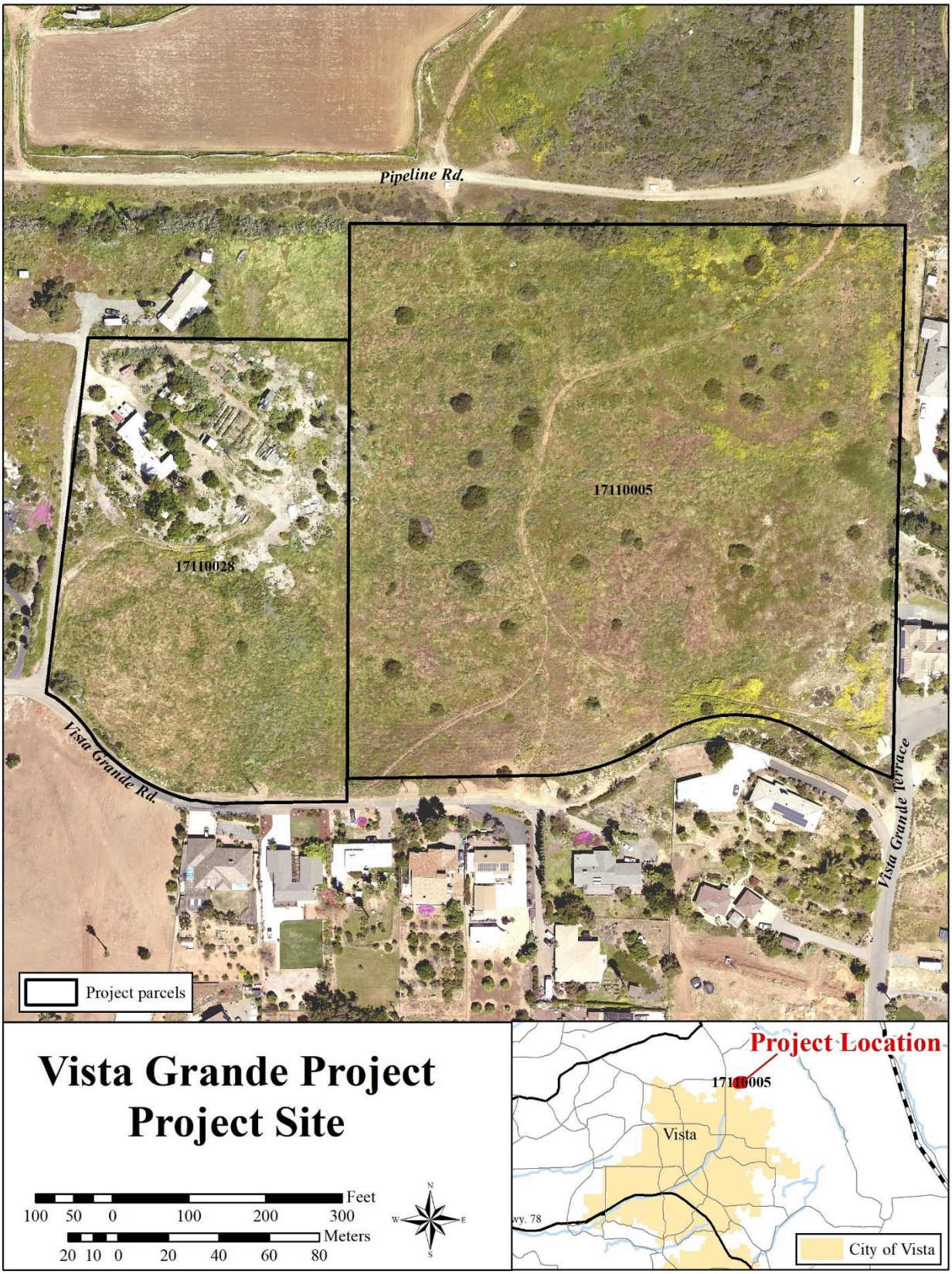



**Figure 2: Aerial Image of Site**

### Proposed Project

The Proposed Project is a subdivision of the two parcels into 28 residential lots, each approximately a half-acre, with associated grading, access roads, and utilities. Water would be supplied by the Vista Irrigation District, and sewer and fire services by the City. Access and utilities would be from Vista Grande Drive to the west, which would be extended east along the southern boundary of the eastern parcel and would loop north into the Project from Vista Grande Drive to provide access to the new interior lots and would exit to the west to the easement road on the west side of the project. Access from Vista Grande Drive to Vista Grande Terrace to the east would be gated and used for emergency secondary access/egress purposes only. The Project proposes 70,075 cubic yards of balanced cut and fill. The homes are likely to be built as a singular development by one builder.

## METHODS

Prior to performing the field surveys, existing biological information for the site (Affinis 2006, Merkel & Associates 2007, TDI 2015) was reviewed, and California Natural Diversity Database (CNDDB) search was conducted to identify sensitive plant and wildlife species historically noted in the vicinity of the Project site (1-mile radius).

TDI Biologists Derek Langsford and Ben Van Allen visited the property on January 22, 2021 and spent approximately four hours (8:00 AM – 12:00 PM) conducting wandering transects throughout the entire property, updating observations on plants and wildlife present including under remnant logs and trash, and the vegetation communities across the site made during a previous visit to the site on November 2, 2015 by TDI Biologists Derek Langsford and Harry Smead. The weather conditions were partly cloudy, windy and cool (mid 50s to low 60s degree Fahrenheit).

### Survey Limitations

The survey was performed early in the season/winter when mostly only perennial or late/very early season annual plants were identifiable, and only a few animals were using the site, which limited the potential for observing spring annuals and migratory bird species. Conditions on the day of the visit were partly cloudy, cool and windy with rain clearly moving in, which was fairly conducive for wildlife activity. No focused surveys were performed during this site visit.

Complete inventories of the biological resources present on a site often require many hours of survey at different times of day, during different seasons of the year, over more than one year. Some animal species are active only at night, around sunrise, or around sundown. Bird activity is highest just after sunrise. Other species could be on site in such low numbers that they could have been missed; however, through literature review, study of existing databases of species distribution, and knowledge of habitat requirements and distribution, the probability of a particular species being present on a site can often be predicted with a high level of confidence. This report, combined with the result of surveys by Affinis (2006), Merkel & Associates (2007) and TDI (2015) represents TDI's best effort to identify potential biological constraints to development.

## RESULTS

### Existing Conditions and Surrounding Land Uses

A residence exists on the western parcel and previously supported a landscaping business while the remainder of the site is vacant (Figure 1). Other than the home and associated landscaping/use, the property supports mostly non-native vegetation (weed-dominated grassland) and fuel management crossed by

unpaved roads with some areas heavily disturbed and supporting little vegetation (Figure 2). Review of historical aerial imagery (Historic Aerials 2021) shows the site supported native vegetation until after 1938, was cleared by 1946, and the residence was built and all but the southeast corner was in grove agriculture by 1953. The groves were removed during the 1980s and since, most of the site has been kept free of native vegetation. Little change has occurred since 2015. No drainages or creeks are evident on the site.

Elevations range from approximately 700 feet (ft) above mean sea level (amsl) in the north of the site on the ridge, and 620 ft amsl in the southwestern corner of the site at Vista Grande Drive (TopoQuest 2015). The vast majority of the site has Las Posas fine sandy loam soil on 15-30% slopes (LpE2), though a sliver of Las Posas fine sandy loam on 9-15% slopes (LpD2) occurs in the very southwest of the site at Vista Grande Drive (NRCS 2015). Both soils are Gabbro soils, known to support sensitive plant species (SANDAG 2014), though the site's history makes it highly unlikely that rare plants would now occur.

The site mostly has large-lot residential development to the west, south, and east, extensive agriculture to the north, and native habitat to the northeast (Figures 1 and 2).

## Regulatory Environment

This section describes the regulatory requirements for the Project and the Project's regional resource planning status. The Project is subject to CEQA, and applicable state and federal regulations. While previously within the unincorporated and subject to the County of San Diego's regulations, the Project site is now located within the City of Vista after annexation from the unincorporated area in 2017 (SDLAFCO 2017). Vista is a participant in the Multiple Habitat Conservation Program (MHCP) that covers the North County cities; however, an MHCP Subarea Plan for Vista has not been adopted or approved.

To varying degrees, biological resources on a site can be subject to regulatory control by the federal government, State of California, and local jurisdiction. The federal government administers non-marine plant and wildlife related regulations through the U.S. Fish and Wildlife Service (USFWS), while Waters of the U.S. (wetlands and non-wetlands) are administered by the U.S. Army Corps of Engineers (Corps). California law regarding wetland, water-related, and wildlife issues is administered by the California Department of Fish and Wildlife (CDFW).

### *California Environmental Quality Act*

The City is the Lead Agency for the proposed Project for the CEQA environmental review process in accordance with state law and local ordinances because of the proposed annexation from the unincorporated area into the City.

### *Federal and State Regulations*

Regulations that apply or potentially apply to future development of the Project site include the federal and California Endangered Species Acts (ESA and CESA, respectively), Migratory Bird Treaty Act (MTBA), California Fish and Game (CFG) Code, federal Clean Water Act (CWA), and CEQA. Impacts to any jurisdictional drainage features would require a Corps CWA Section 404 Permit, a Regional Water Quality Control Board (RWQCB) CWA Section 401 Certification, and CFG Code Section 1602 Lake and Streambed Alteration Agreement (LSAA). As no drainages or wetlands occur on site no Corps, RWQCB, or CDFW wetland approvals are required.

#### Federal Government

The ESA provides the legal framework for the listing and protection of species (and their habitats) identified as being endangered or threatened with extinction. Actions that result in harm or death to endangered or threatened species, including habitat modification that substantially impairs feeding, breeding, or sheltering activities constitutes "take" under the ESA. Section 9(a) of the ESA defines take as "to harass, harm, pursue,

hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." "Harm" and "harass" are further defined in federal regulations and case law to include actions that adversely impair or disrupt a listed species' behavioral patterns.

Sections 7 and 10(a) of the ESA regulate actions that could jeopardize endangered or threatened species. Section 7 describes a process of federal interagency consultation for use when federal actions may adversely affect listed species. A biological assessment is required for any major construction activity if it may affect listed species. A Section 7 consultation (formal or informal) is required when there is a nexus between endangered or threatened species' use of a site and impacts to Corps jurisdictional areas. As no such drainages exist on site, a Section 7 Consultation is not required. Section 10(a) requires a Habitat Conservation Plan (HCP) if a federal listed species would be impacted but no federal nexus for a Section 7 consultation exists. The Natural Community Conservation Planning (NCCP) Programs (see below) in the County (NCMSCP) and City (MHCP) operate in lieu of the federal ESA for covered species once adopted.

The USFWS designates areas of Critical Habitat for endangered or threatened species. Critical Habitat is defined as areas of land that are considered necessary for the endangered or threatened species to recover. The ultimate goal is to restore healthy populations of listed species within their native habitat so they can be removed from the list of threatened or endangered species. Once an area is designated as Critical Habitat all federal agencies must consult with USFWS to ensure that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of the critical habitat. No Critical Habitat has been designated on site and the nearest land under the designation is for the federal-listed as threatened coastal California gnatcatcher (CAGN; *Polioptila californica californica*) approximately 0.3 mile to the north and northeast of the northeastern corner of the Project site (USFWS 2021).

The MBTA prohibits taking any migratory bird, part, nest, or eggs and is implemented using Section 10.12 of the USFWS MBTA regulations which defines "take" as to: pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities. A take does not include habitat destruction or alteration, as long as there is not a direct taking of birds, active nests, eggs, or parts thereof.

The MBTA is generally protective of migratory birds but does not actually stipulate the type of protection required. In common practice, USFWS places restrictions on disturbances allowed near active bird nests during the bird breeding season (January 1- September 15).

**State of California**

The CESA is similar to the ESA in that it contains a process for listing species and regulating potential impacts to listed species. Section 2081 of the CESA authorizes CDFW to enter into a memorandum of agreement for take of listed species for scientific, educational, or management purposes.

Pursuant to Section 3503, 3503.5, 3505, and 3513 of the CFG Code, it is unlawful to take, possess, or needlessly destroy the active nest or eggs of any bird. The CFG Code defines "take" as to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.

The Native Plant Protection Act (NPPA) enacted a process by which plants are listed as rare or endangered. The NPPA regulates collection, transport, and commerce in listed plants. The CESA followed the NPPA and covers both plants and animals determined to be endangered or threatened with extinction. Plants listed as rare under NPPA were also designated rare under the CESA.

CEQA and its implementing guidelines (CEQA Guidelines) require discretionary projects with potentially significant effects (or impacts) on the environment to be submitted for environmental review. Mitigation for significant impacts to the environment is determined through the environmental review process, in accordance with existing laws and regulations.

**City of Vista**

The NCCP Act (Section 2835) allows CDFW to authorize take of species covered by plans in agreement with NCCP guidelines. An NCCP initiated by the State of California under Section 4(d) of the federal ESA focuses on conserving coastal sage scrub to avoid the need for future federal and state listing of coastal sage scrub-dependent species. The CAGN is presently listed as threatened under the ESA, while several additional species inhabiting coastal sage scrub are candidates for federal and/or state listing. The MHCP and Draft Subarea Plan are intended to be completed subarea plans under the NCCP and HCP processes.

The MHCP Subregional Plan was adopted and certified by the San Diego Association of Governments (SANDAG) Board of Directors on March 28, 2003. Each of the seven jurisdictions within the MHCP planning area (including Vista) is required to implement their respective portion of the MHCP via citywide subarea plans. To date the City's Subarea Plan is still in process, and in lieu of the Subarea Plan, is meeting the NCCP requirements through its General Plan.

The City has no specific ordinances that regulate biological resources resulting in reliance on its existing planning regulations, NCCP Guidelines, and CEQA for determining the significance of impacts and mitigation.

### *Wetland Regulation*

If any wetlands were on site, the following would apply:

**U.S. Army Corps of Engineers**

The regulatory authority of the Corps comes from Section 404 of the CWA (33 U.S.C. §1251 et seq.). The Act requires Corps authorization for work involving intentional or unintentional placement of fill or discharge of dredge materials into any of the Waters of the U.S. Corps jurisdiction extends to the high water mark for non-tidal waters and includes ephemeral drainages that are typical of the Southern California hills and mountains and which show a distinct bed and bank. Authorization for such activity is through a CWA Section 404 Permit (404 Permit) from the Corps.

**CDFW**

CDFW requires a CFG Code 1602 LSAA for projects that will divert or obstruct the natural flow of water, change the bed, channel, or bank of any stream, remove riparian vegetation, or use any material from a streambed. The LSAA is a contract between a project proponent and CDFW stating what activities are permissible and what compensation is required for those activities.

**RWQCB**

A federal CWA Section 401 Water Quality Certification (401 Certification) is required from the State Water Resources Control Board if a proposed project may result in a discharge into any Waters of the U.S. The program is administered by the RWQCB district in which the project is proposed. If a 404 Permit is required from the Corps, a 401 Certification is required from the RWQCB. The RWQCB also administers the State's Porter-Cologne Act which regulates discharge into Waters of the State.

## Biological Resources

### *Vegetation Communities*

Five distinct vegetation communities/land covers, as described by Holland (1986) and Oberbauer et al (2008), were identified at the site (Figure 3, Table 1); Diegan coastal sage scrub (CSS), disturbed CSS (CSS-D), non-native grassland (NNG), non-native vegetation (NNV) disturbed habitat (DH), in addition to the developed areas (DEV). The MHCP categorizes vegetation communities by Groups A through F with Group A being the most sensitive and Group F the least (SANDAG 2003).

**Table 1: Vegetation Communities on Site**

| Vegetation Community (Holland Code) | On site (acres) |
|---|---|
| ***Group C*** | |
| Coastal sage scrub (32500) | 0.13 |
| Coastal sage scrub – disturbed (32500) | 0.01 |
| ***Group E*** | |
| Non-native grassland (42200) | 12.65 |
| ***Group F*** | |
| Disturbed Habitat (11300) | 2.85 |
| Developed (12000) | 1.34 |
| **Total** | **16.99** |

**Diegan Coastal Sage Scrub (including disturbed)**

Although it has been greatly reduced from its historical distribution, CSS is one of the major shrub types occurring in southern California, occupying xeric sites with shallow soils. Dominated by drought-deciduous shrub species with relatively shallow root systems and open canopies, CSS communities often contain a substantial herbaceous component. CSS occurs along the coast from Los Angeles to Baja California, Mexico (Holland 1986), where it supports a number of endangered, threatened, and rare vascular plants as well as several bird and reptile species that are candidates for federal listing.

The Project site supports a small patch of CSS-D in the southeast corner as well as small areas of CSS that spills onto the property from an approximately 60-foot wide band of CSS immediately to the north of the Project site between the property line and Pipeline Road (Figure 3). The patch of CSS-D in the southeast is dominated by typical sage scrub species such as California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), and California sagebrush (*Artemisia californica*), but includes bare ground and invasive species such as fountain grass (*Pennisetum setaceum*), nettle leaf goosefoot (*Chenopodiastrum murale*), hottentot fig (*Carpobtous edulis*), and Russian thistle (*Salsola tragus*). The CSS on site in the north mainly consists of laurel sumac that have survived weed abatement and are connected to a more diverse assemblage of CSS species, including buckwheat, California sagebrush, and prickly pear (*Opuntia littoralis* and *O. ficus indica*), that forms the band of CSS off site. Surveys for the federal listed as threatened CAGN on the property to the north (HELIX 2010, 2014a) showed no usage by CAGN of the band of habit bordering the two sites and is likely too narrow to support the species. The patch of CSS in the southeast corner of the site is too small, disturbed, and isolated from other habitat to support the species.

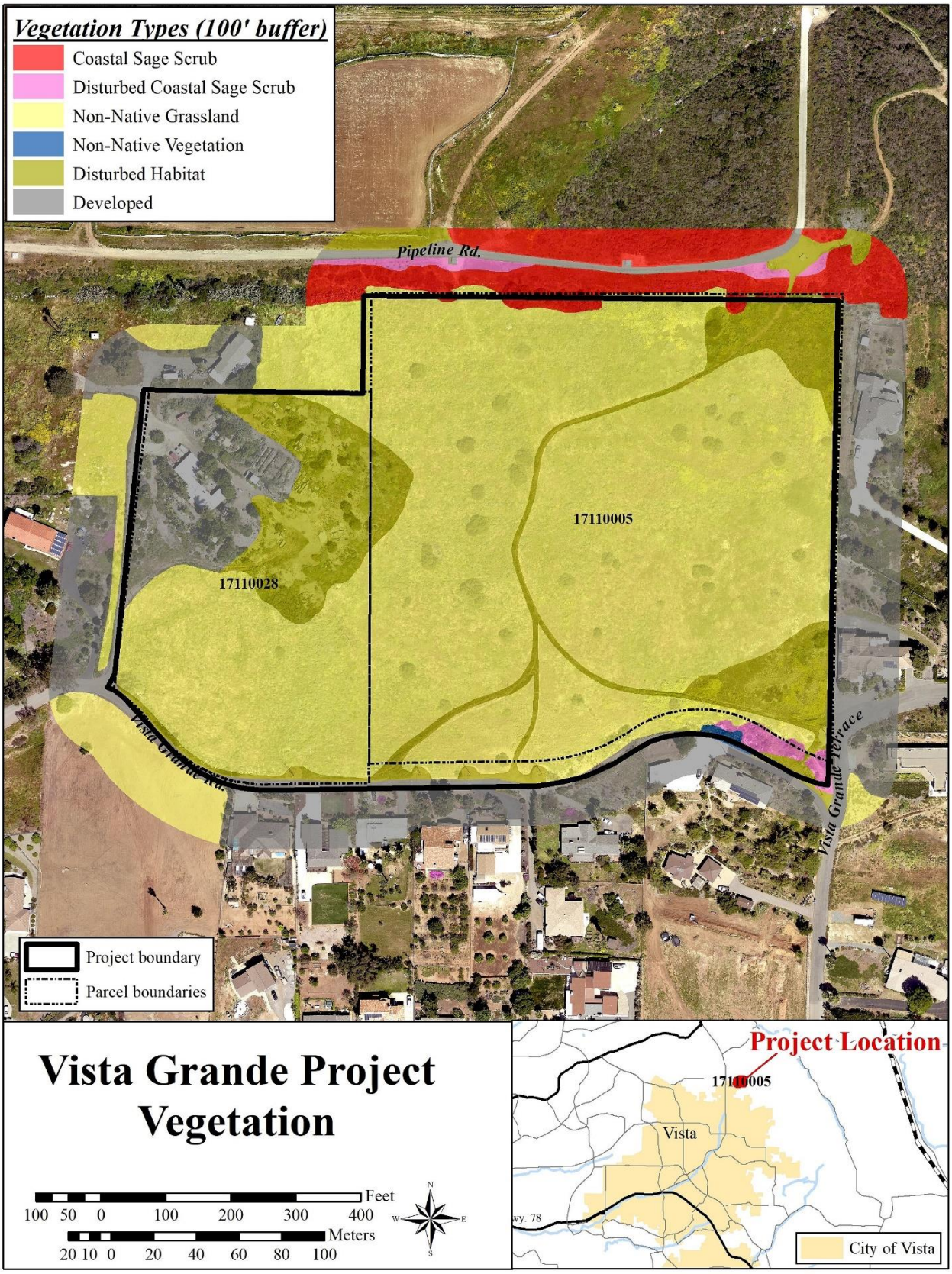



**Figure 3: Biological Resources**

**Non-Native Grassland**

NNG can consist of a dense to sparse cover of annual grasses and is often associated with numerous species of showy-flowered native annual forbs or weed species. Characteristic species within this vegetation community include non-native grasses such as oats (*Avena* spp.) and bromes (*Bromus* spp.), ryegrass and weeds such as mustards (*Brassica* spp., *Hirschfeldia* sp.). Most of the species common in this vegetation community came from the Mediterranean region.

The MHCP defines NNG as follows:

> Annual grassland is a mixture of annual grasses and broad-leaved, herbaceous species. Annual species comprise from 50 percent to more than 90 percent of the vegetative cover, and most annuals are nonnative species. Nonnative grasses typically comprise at least 30 percent of the vegetation, although this number can be much higher in some years and lower in others, depending on land use and climatic conditions. Usually, the annual grasses are less than 1 meter (3 ft) in height, and form a continuous or open cover. Emergent shrubs and trees may be present, but do not comprise more than 15 percent of the total vegetative cover. Characteristic annual grassland species include foxtail chess (*Bromus madritensis* ssp. *rubens*), ripgut grass (*Bromus diandrus*), wild oats (*Avena* spp.), fescues (*Vulpia* spp.), red-stem filaree (*Erodium cicutarium*), mustards (*Brassica* spp.), lupines (*Lupinus* spp.), and goldfields (*Lasthenia* spp.), among others.

While not as sensitive, NNGs can support many of the same plant and animal species as native grasslands and can serve as valuable habitat for native rodents that provides prey for sensitive raptor species.

The site at the time of the visit was dominated by emerging grasses and weed species after rains in December and January, many of which were too small to identify to species. Between the non-native grasses were weeds such as Russian thistle and wild radish (*Raphanus sativus*). The most common grass in 2015 was ripgut grass although some oats were scattered on the site. Weed species included nettle leaf goosefoot, pigweed (*Amaranthus albus*), cheeseweed (*Malva parviflora*), tree tobacco (*Nicotiana glauca*), and sowthistle (*Sonchus asper*). An invasive species present in broad swaths in the NNG was hottentot fig. Within the NNG, large, isolated laurel sumac have grown and provide some shelter for birds. A small coast live oak (*Quercus agrifolia*) was identified next to a laurel sumac in the east of the site.

The site has a significant pocket gopher (*Thomomys bottae*) population that has resulted in the soil being loose and friable over large portions of the site. The preponderance of western subterranean termite (*Reticulitermes hesperus*) sign that was seen during the 2015 survey has vanished, and there is no longer any sign of subterranean termites visible at the site.

**Non-Native Vegetation**

NNV is comprised of naturalized non-native shrub and tree species that are not tended or artificially maintained yet dominates an area that does not fall within the definition of any other vegetation community. Such communities can be dominated by such species as castor bean (*Ricninus communis*), olive (*Olea europea*), Peruvian pepper (*Schinus molle*), giant reed (*Arundo donax*), and scotch broom (*Cytisus scoparius*). NNV occurs in the southeast of the adjacent to the residential parcel (Figure 3) to the south and consists of non-native agave (*Agave attenuata*), ice plant, jade plant (*Crassula ovata*), and non-native prickly pear (*Opuntia ficus-indica*).

**Disturbed Habitat**

DH consists of land legally cleared of vegetation or where the soil has been repeated used and compacted, greatly reducing its habitat value.

The MHCP defines disturbed habitat as follows:

> Disturbed land includes areas in which the vegetative cover comprises less than 10 percent of the surface area (disregarding natural rock outcrops) and where there is evidence of soil surface disturbance and compaction (e.g., grading); or where the vegetative cover is greater than 10 percent, there is soil surface disturbance and compaction, and the presence of building foundations and debris (e.g., irrigation piping, fencing, old wells, abandoned farming or mining equipment) resulting from legal activities (as opposed to illegal dumping). Vegetation on disturbed land (if present) will have a high predominance of nonnative, weedy species that are indicators of surface disturbance and soil compaction, such as Russian thistle (*Salsola tragus*), telegraph weed (*Heterotheca grandiflora*), horehound (*Marrubium vulgare*), and sow-thistle (*Sonchus oleraceus*). Although nonnative grasses may be present on disturbed land, they do not dominate the vegetative cover. Examples of disturbed land include recently graded firebreaks, graded construction pads, construction staging areas, off-road vehicle trails, and old homesites.

DH on site consists of the unpaved roads across the parcels, a cleared area in the northeast corner, an area in the southeast that appears previously impacted and supports little vegetation other than Cal-IPC weeds such as crown daisy (*Glebionis coronaria*) and stinkwort (*Dittrichia graveolens*), and the area to the west of the house on the western parcel that was previously covered with landscaping equipment, materiel, and debris (Figure 3).

**Developed**

DEV occurs where permanent structures and/or pavement have been placed, or where landscaping is clearly tended and maintained, preventing the growth of native vegetation.

Developed land on site consists of the home on the western parcel plus the cleared areas and tended landscaping around it (Figure 3).

### *Jurisdictional Wetlands*

The site was assessed for signs of areas that could be jurisdictional to Corps, CDFW, or San Diego RWQCB.

There are no areas where water concentrates to create Corps or CDFW jurisdictional wetland/riparian, Waters of the U.S., Waters of the State, vernal pools or streambed areas on site.

## Rare, Endangered, or Sensitive Species and Habitats

### *Sensitive Habitats*

CSS and NNG are considered sensitive by the USFWS, CDFW, and City. CSS is also a target for conservation under the NCCP Act in which the City is enrolled under the MHCP.

## Listed and Sensitive Species

The site has had a history of cultivation and weed abatement reducing the biodiversity of the site and providing little habitat for most sensitive species. None were observed on site.

### *Sensitive Species with Potential to occur*

Sensitive species that occur in the immediate vicinity according to database records but were not observed and which may have some potential to occur on site are assessed below (Tables 2 and 3).

**Table 2: Special status plant species with potential to occur**

| SPECIAL STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR | | |
|---|---|---|
| **SPECIES** | **STATUS*** | **POTENTIAL TO OCCUR** |
| San Diego thorn-mint (*Acanthomintha ilicifolia*) | FT/SE<br>CRPR List 1B.1<br>MHCP NE | None. Occurs on cracked clay soils in sage scrub or chaparral openings. Soils on site not suitable. Would likely have been detected if present. |
| Thread-leaved brodiaea (*Brodiaea filifolia*) | FT/SE<br>CRPR List 1B.1<br>MHCP NE | Very Low. Prefers clay lens soils in annual grasslands and vernal pools of the interior valley regions in Riverside and San Diego counties. While mapped as NNG, site has been subject to agriculture and repeated disturbance for decades. |
| Orcutt's brodiaea (*Brodiaea orcuttii*) | --/--<br>CRPR List 1B.1 | Low. Found in vernally moist grasslands and along vernal pool periphery. No vernal pools occur on site, and grassland on site is not suitable. |
| Robinson peppergrass (*Lepidium virginicum robinsonii*) | --/--<br>CRPR List 1B.2 | Low. Occurs in dry, exposed openings within coastal sage scrub and chaparral. Typically found on volcanic soils like those found on site. Not reported in the project vicinity and would likely have been observed if present |

**Status:**

**City:**

MHCP NE = Multiple-Habitat Conservation Plan Narrow Endemic

**Federal:**

FE = Federal Endangered

FT = Federal Threatened

**State:**

SE = State Endangered

ST = State Threatened

**California Rare Plant Rank (CRPR)**

List 1A = Plants Presumed Extinct in California

List 1B = Plants Rare, Threatened or Endangered in California and Elsewhere

List 2 = Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

List 3 = Plants About Which We Need More Information, A Review List

List 4 = Plants of Limited Distribution, A Watch List

State Rank and CRPR is followed by threat code (e.g., State Rank S2.2 or CRPR 1B.2)

.1 = Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2 = Fairly endangered in California (20-80% occurrences threatened)

.3 = Not very endangered in California (<20% of occurrences threatened)

**Table 3: Special Status Animal Species with Potential to Occur**

| LISTED OR SENSITIVE ANIMAL SPECIES WITH POTENTIAL TO OCCUR | | |
|---|---|---|
| **VERTEBRATES** | | |
| **Amphibians** | | |
| Western spadefoot toad (*Scaphiopus hammondii*) | --/SSC | Very low. Occurs in open coastal sage scrub, chaparral, and grassland, along sandy or gravelly washes, floodplains, alluvial fans, or playas; requires temporary pools for breeding and friable soils for burrowing. Site is sloped and cannot support ponding. Surrounding land mostly developed or in agriculture without ponding water areas. |
| **Reptiles** | | |
| Silvery legless lizard (*Anniella pulchra pulchra*) | --/SSC | Low. Occurs in areas with loose soil, particularly in sand dunes and or otherwise sandy soil. Generally found in leaf litter, under rocks, logs, or driftwood in oak woodland, chaparral, and desert scrub. Past disturbance, lack of native species, and suburban setting reduces likelihood of presence. |
| Orange-throated whiptail (*Aspidoscelis hyperythra beldingi*) | --/SSC | Low. Typically occurs in semi-arid, brushy areas typically with loose soil and rocks, including washes, stream sides, rocky hillsides, and coastal sage or chaparral. Habitat on site is disturbed and has been in agriculture in past, though presence of abundant subterranean termites would provide ample food source. |
| San Diego ringneck snake (*Diadophis punctatus similis*) | --/-- | Low. Generally occurs in moist habitats such as oak woodlands and canyon bottoms, but is also sometimes encountered in grassland, chaparral, and coastal sage scrub. Site is on slope and has no areas where moisture or mesic habitats occur. |
| Coronado Island skink (*Eumeces skiltonianus interparietalis*) | --/SSC | Low. Occurs in grassland, scrublands, and cismontane woodlands with abundant leaf litter. Past disturbance and suburban setting reduces likelihood of presence. |
| Coast horned lizard (*Phrynosoma coronatum blainvillei*) | --/SSC | None. Inhabits open sage scrub where it preys upon carpenter ants. Past disturbance, agriculture, and suburban setting has likely eliminated species from site. |
| **Birds** | | |
| Cooper's hawk (*Accipiter cooperii*) | --/WL | Low. Nests in oak groves, mature riparian woodlands, and eucalyptus stands or other mature forests. No suitable nesting habitat on site but may forage. |

## **Table 3** (Cont.)

| LISTED OR SENSITIVE ANIMAL SPECIES WITH POTENTIAL TO OCCUR | | |
|---|---|---|
| **SPECIES** | **STATUS*** | **POTENTIAL TO OCCUR** |
| **VERTEBRATES** (cont.) | | |
| **Birds (cont.)** | | |
| Golden eagle (*Aquila chrysaetos*) | BCC/FP BGEPA | None. Forages over grassy, open, shrubby habitats, generally nesting on cliffs and occasionally in trees. Tends to require habitat at a distance from humans. Area too developed for this species. |
| Burrowing owl (*Athene cunicularia*) | --/SSC | Very low. Restricted to flattish, open habitat with suitable burrows or rocky areas for nesting. Burrows most often acquired from ground squirrels. Few ground squirrels burrows detected on site. Only detection in area is near Melrose Dr. and West Bobier Dr. |
| Coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*) | --/SSC MHCP NE | None. Occurs in coastal sage scrub with large cacti for nesting. While come cactus detected on site and immediately off site, patches are too small and species is not known outside of Lake Hodges/San Pasqual Valley, and Batiquitos Lagoon in North County. |
| Northern harrier (*Circus cyaneus*) | --/SSC | Moderate. In San Diego County, distribution is primarily scattered throughout lowlands but can also be observed in foothills, mountains, and desert foraging in grasslands and marshes. Detected on site to north (HELIX 2014b) and could forage over this site. |
| White-tailed kite (*Elanus leucurus*) | --/FP | Moderate. Typically found along riparian woodlands and oak or sycamore groves adjacent to grassland. Was detected on parcels to north along Little Gopher Canyon (HELIX 2014b). May forage on site. |
| California horned lark (*Eremophila alpestris actia*) | --/WL | Moderate. Species prefers sandy beaches, agricultural fields, grasslands, and open areas for breeding and foraging. Species has been detected on site to north in open tilled fields (HELIX 2014b). Species may occur on site. |
| Prairie falcon (*Falco mexicanus*) | BCC/WL | Low. Species prefers alpine meadows, perennial grasslands, savannahs, rangelands, desert scrub, or agricultural fields. Site likely too suburban for it to be used for foraging. |

## **Table 3** (Cont.)

| LISTED OR SENSITIVE ANIMAL SPECIES WITH POTENTIAL TO OCCUR | | |
|---|---|---|
| **SPECIES** | **STATUS*** | **POTENTIAL TO OCCUR** |
| **VERTEBRATES** (cont.) | | |
| **Birds (cont.)** | | |
| Loggerhead shrike (*Lanius ludovicianus*) | BCC/SSC | Low to moderate. Habitat includes a combination of open habitats and adequate perching locations. Species would have likely been detected if present. |
| Coastal California gnatcatcher (*Polioptila californica californica*) | FT/SSC | Very low. Found in open coastal sage scrub. Limited range on California coast from Ventura to San Diego counties, and south into Baja California found only in coastal sage scrub. Habitat patch on site is too small, isolated, and of low quality to support species. Surveys in 2010 to 2014 (HELIX 2010, 2014a) in habitat immediately to north of site were negative. |
| **Mammals** | | |
| Pallid bat (*Antrozous pallidus*) | --/SSC | Low. Roosts colonially in caves, mines, crevices, and abandoned buildings that do not occur on site but could forage in area. |
| Dulzura pocket mouse (*Chaetodipus californicus femoralis*) | --/SSC | Low. Occurs in Habitats of the San Diego pocket mouse include coastal scrub, chamise-redshank chaparral, mixed chaparral, sagebrush, desert wash, desert scrub, desert succulent shrub, pinyon-juniper, and annual grassland habitats up to 7,900 feet. Level of disturbance on site and absence from trapping just off site to the north (HELIX 2014b) suggests unlikely to be on site. |
| Northwestern San Diego Pocket Mouse (*Chaetodipus fallax fallax*) | --/SSC | Low to moderate. Primary habitat includes arid habitats with a scrub component (such as coastal sage scrub, chaparral, oak woodlands, and annual grasslands) and sandy herbaceous areas in association with rocks or coarse gravel. Was detected on parcels to the north in shrub habitats but little suitable habitat occurs on site. |
| Stephens' kangaroo rat (*Dipodomuys stephensi*) | FE/ST | None. Prefers areas of disturbed or patchy grasslands and open coastal sage scrub. Project site is outside species' known range in San Diego County. Site too disturbed to support species. Nearest extant location is at Naval Weapons Station Fallbrook, but was last seen within the MHCP area at Guajome Regional Park and Pilgrim, Creek in Oceanside in 1990 (MHCP 2003). |

## **Table 3** (Cont.)

| LISTED OR SENSITIVE ANIMAL SPECIES WITH POTENTIAL TO OCCUR | | |
|---|---|---|
| **SPECIES** | **STATUS*** | **POTENTIAL TO OCCUR** |
| **VERTEBRATES** (cont.) | | |
| **Mammals (cont.)** | | |
| Western mastiff bat (*Eumops perotis californicus*) | --SSC | None to Low. Roosts in crevices in cliff faces, which are not found on site. Strongly tied to presence of large (100 feet long or more) ponds for drinking that are not on site or in vicinity. |
| San Diego black-tailed jackrabbit (*Lepus californicus bennettii*) | --/SSC | None to Low. Found in areas of open vegetation, grasslands, and agriculture fields but where cover (shrubs, trees) are nearby. While the site is open, limited cover exists on site. Would likely have been detected if present. |
| Pocketed free-tailed bat (*Nyctinimops femorosaccus*) | --/SSC | None. Prefers desert habitats with high cliffs or rock outcrops. Out of species range. Suitable high rocks not found on site. |
| Big free-tailed bat (*Nyctinimops macrotis*) | --/SSC | None. Occurs in low, rugged canyons, which are not found on site. Forages over open water. |
| Southern grasshopper mouse (*Onychomys torridus ramona*) | --/SSC | Low. Generally found in desert habitats with loose, friable soils. Less common in coastal scrub and chaparral. Habitat on site is not suitable. No records in project vicinity. |
| American badger (*Taxidea taxus*) | --/SSC | Low. Occurs in a variety of scrub habitats, particularly in open areas with friable soils. Require fossorial rodents upon which they prey. Habitat on site is not suitable and burrows would have been detected if present. |

**Status:**

**City:**
MHCP NE = Multiple-Habitat Conservation Plan Narrow Endemic

**Federal:**
FE = Federal Endangered
FT = Federal Threatened
BCC = Bird of Conservation Concern
BGEPA = Bald and Golden Eagle Protection Act

**State:**
SE = State Endangered
ST = State Threatened
FP = Fully Protected
SSC = California Species of Special Concern
WL = CDFW Watch list

## WILDLIFE CORRIDORS

Wildlife movement corridors are areas that connect suitable wildlife habitat areas in a region otherwise fragmented by rugged terrain, changes in vegetation, or human disturbance. Natural features such as canyon drainages, ridgelines, or areas with vegetative cover provide corridors for wildlife movement. Wildlife movement corridors are important because they provide access to mates, food, and water; allow the dispersal

of individuals away from high population density areas; and facilitate the exchange of genetic traits between populations.

The site supports degraded or low-quality habitat and is bordered on three sides by large-lot residential development pocketed with some vacant parcels, and on the fourth by a narrow band of CSS beyond which is an extensive area of agriculture. Some habitat occurs to the northeast but that block of habitat is surrounded by residential development or agriculture that is only conducive to limited animal movement. Without much in the way of resources on site, and limited resources off site, the Project site is not part of any functional local or regional corridor. The site is not identified as a corridor in either the NCMSCP (County 2015) or MHCP (SANDAG 2003), nor or is it in proximity to the MHCP Focused Planning Area (FPA) within the City.

# IMPACTS

Impacts are categorized as either direct, indirect, or cumulative.

*Direct Impacts*
A direct impact occurs when the primary effect is loss of a biological resource through direct mortality during clearing and grading and removal of existing habitat, often replacing it with development and landscaping.

*Indirect Impacts*
An indirect impact consists of secondary effects of a project (such as noise, changes in drainage patterns, water quality, lighting, invasive plant species, and barriers to wildlife movement) that leads to habitat degradation and loss of species or habitat. The magnitude of an indirect impact may be the same as a direct impact; however, the effect usually takes a longer time to become apparent.

*Cumulative Impacts*

Although impacts to sensitive biological resources may not be significant when considered independently, when multiple impacts such as from several development projects within an area are combined, they may be cumulatively significant.

The significance of impacts to biological resources present or to those with potential to occur was determined based upon the sensitivity of the resource and the extent of the anticipated impacts.

## Thresholds of Significance

Pursuant to Appendix G Section IV of the CEQA Guidelines, a proposed project would result in a significant impact if it would:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the USFWS or CDFW;
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by USFWS or CDFW;
c) Have a substantial adverse effect on federally protected wetlands as defined by CWA Section 404;
d) Interfere substantially with movement of any native resident, migratory fish or wildlife species, or established native resident or migratory wildlife corridors; or impede use of native wildlife nursery sites;

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
f) Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state conservation plan.

## Direct Impacts

Impacts will occur from transformation of the site from an open undeveloped, previously farmed site dominated by weed species (Russian thistle, wild radish, tree tobacco) and non-native grasses with some large laurel sumacs, and a few small patches of coastal sage scrub to a large-lot estate residential development, with associated road and utility improvements. It is assumed that the whole Project site will be impacted with no areas remaining for biological open space.

Impacts would occur to the following acreages of vegetation communities/land cover types (Figure 4):

**Table 4: Vegetation Communities - Impacts**

| Vegetation Community (Holland Code) | On site (acres) | Impacts (acres) | | | Mitigation Ratio | Required Mitigation |
|---|---|---|---|---|---|---|
| | | On site | Off site | Total | | |
| ***Group C*** | | | | | | |
| Coastal sage scrub (32500) | 0.13 | 0.13 | | 0.13 | 1:1 | 0.13 |
| Coastal sage scrub – disturbed (32500) | 0.01 | 0.01 | 0.09 | 0.11 | 1:1 | 0.11 |
| ***Group E*** | | | | | | |
| Non-native grassland (42200) | 12.65 | 12.65 | 0.33 | 12.98 | 0.5:1 | 6.49 |
| ***Group F*** | | | | | | |
| Disturbed Habitat (11300) | 2.85 | 2.85 | 0.10 | 2.96 | - | - |
| Developed (12000) | 1.34 | 1.34 | 0.05 | 1.39 | - | - |
| **Total[1]** | **16.99** | **16.99** | **0.57** | **17.56** | | **6.72** |

[1] Totals may not add due to rounding.

### *Impacts to Special Status Species*

No special status species (sensitive, or special status species in local or regional plans, policies, or regulations or by the USFWS or CDFW) were detected on site during surveys by TDI (2021 and 2015), Merkel & Associates (2007), or Affinis (2006). In analyses by TDI (2015), and Merkel & Associates (2007) most special status species had no or only a low potential to occur. None had a high potential to occur on site. The site has not appreciably changed and so the assessment for special status species remains the same.

Those sensitive species with a moderate potential to occur are raptors (Northern Harrier, White-tailed Kite) for which the site might provide some foraging habitat, and open land generalists (California Horned Lark) that could nest and forage on site. All three species were detected on the parcels to the north (Helix 2014b). The harrier and lark are California Species of Special Concern, the kite is Fully Protected.

The special status species with a low to moderate potential to occur on site is the northwestern San Diego pocket mouse, a California Species of Special Concern. The most likely location for it being on site is in the very north where they have been detected in the adjacent coastal sage scrub off site (HELIX 2014b).

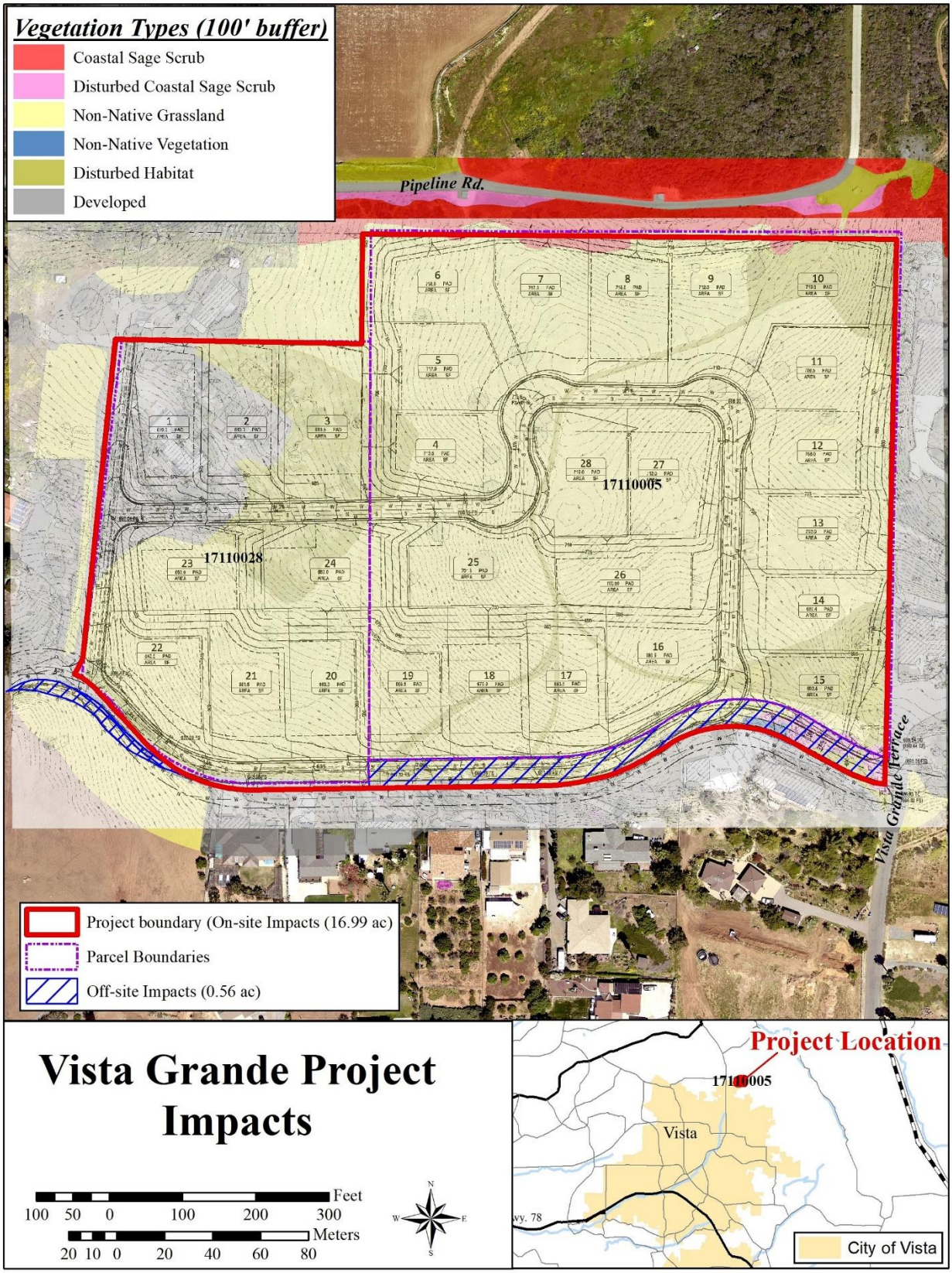



**Figure 4: Project Impacts to Biological Resources**

The proposed Project would result in direct, permanent loss of most on-site resources. While currently of limited biological value, the site will likely be less usable by these species after development. Suburban development can provide foraging for some raptors species (Red-shouldered Hawk [*Buteo lineatus*] and Cooper's Hawk [*Accipter cooperii*]) though Northern Harrier and White-tailed Kite prefer to forage away from development. These species were detected on the larger property to the north (HELIX 2014b), which is over a ridge from the developed area of the City and supports a mixture of open agriculture, shrublands, and riparian forest, bordering a large area of shrubland to the east that provides habitat for these species. Use of this site would not expect to be regular when the site to the north, and undeveloped and rural lands further to the north and east, provide much higher foraging and nesting opportunities for the species. Any loss of foraging habitat would be offset by mitigation for non-native grassland impacts.

The California Horned Lark was likewise detected in groups on the site to the north (HELIX 2014b, TDI 2015). The site may provide some nesting and foraging resources for this species but again, the land to the north, in the San Luis Rey River Valley and on Camp Pendleton offer higher quality and extensive areas for both nesting and foraging such that the loss of this site would not be significant after being offset by mitigation for non-native grassland habitat and compliance with the MBTA and CFG Code protecting nesting birds.

Direct impacts to the CSS in the north that could support the northwestern San Diego pocket mouse are limited (0.13 acre) and not significant compared to the extent of potentially suitable habitat to the north and northeast. Impacts will be offset by habitat mitigation for the loss of CSS and CSS-D.

### *Impacts to Sensitive Vegetation Communities*

Coastal sage scrub and non-native grassland are considered sensitive by at least the City, CDFW, and USFWS. As a result, impacts to these vegetation communities would be significant under CEQA if not mitigated.

Permanent impacts would occur to these vegetation communities from clearing, grading, and project construction. It is assumed that any borrow and staging areas will be on site. No sensitive habitats are likely to be affected by construction vehicles approach or leaving the site to access East Vista Way, the nearest major road.

Impacts to 0.24 acre of coastal sage scrub and 12.98 acres of non-native grassland will require mitigation per the standards set by the MHCP (SANDAG 2003) to be less than significant.

### *Impacts to Federally Protected Wetlands*

No wetlands occur on site as defined by the Corps or CDFW, and as a result, no impacts will occur and no mitigation is required.

### *Impacts to Wildlife Movement or Nursery Sites*

The site is not identified as part of any regional or MHCP-designated wildlife corridor or is within the MHCP's FPA (SANDAG 2003). And it is not contiguous with any County core area or corridor (County 2015). The site is bordered by residential development on three sides with development beyond on those sides for long distances that limit wildlife movement. On the fourth side is a narrow band of CSS with mostly agriculture beyond. The only connection to habitat off site is in the northeast but that habitat dead-ends 500-1000 ft into residential development. The site does not act as part of a corridor and development would not impede wildlife movement.

The site does not provide the resources to be a nursery site for any species that are of conservation concern and none are in close proximity to the site meaning the Project would not impede the use of any wildlife nursery sites.

### *Conflicts with Any Local Policies or Ordinances*

The City has no specific policies that control biological resources other than compliance with CEQA and the MHCP. As a result no impacts would occur because of a conflict with local policies or ordinances.

### *Conflicts with the Provisions of an Adopted Habitat Conservation Plan*

The City participates in the MHCP, a regional conservation plan under the states NCCP Program that will also act as an HCP under the ESA. While the City's Subarea Plan has not been adopted, the City enforces the MHCP through its General Plan. With mitigation for impacts to MHCP-sensitive habitats and with the General Plan the Project would be in compliance with the MHCP (SANDAG 2003).

### *Conflicts with Any Federal Policy or Treaty*

All actively nesting birds and their nests, with a few exceptions, are protected under the MBTA and CFG Code. Direct impacts may occur to birds nesting in the vegetation on site if clearing occurs during the bird breeding season (January 1 through September 15). No raptors have potential to nest on site because of the lack of suitable nesting locations but some birds might next in the laurel sumac bushes or in the grassland.

To eliminate the potential violation of the MBTA and CFG Code, clearing will need to occur without impacting any active bird nests.

## Indirect Impacts

Indirect impacts to sensitive habitats or species can occur from errant grading impacts, construction or operation noise, changes in drainage patterns after grading that modify habitats, degraded surface water quality from runoff during construction, lighting onto habitat areas, introduction of invasive plant species, and brush management that leads to habitat degradation.

The only sensitive species that could be affected is the northwestern San Diego pocket mouse which may inhabit the CSS along the northern boundary of the site which represents the only sensitive habitat that could be affected by indirect impacts. Other sensitive species with the potential to occur on site are bird species for which the site does not provide more than potential foraging.

### *Errant Grading*

Impacts beyond the limits of work can occur for numerous and could potentially impact sensitive habitat to the north of the Project site. Any impacts to sensitive habitat beyond the approved limits of work would be significant and require mitigation.

### *Noise*

Noise from machinery during grubbing, earthwork, and construction would be a temporary impact to local wildlife. Noise-related impacts, when construction noise exceeds 60 $dBA_{Leq}$, would be considered significant if listed species or raptors were displaced and failed to breed.

Impacts would not be significant because: the site is not being proposed for mass grading which is usually when noise thresholds are exceeded; no raptors or listed species are expected to breed on site, in the CSS habitat immediately north, or in trees immediately off site, and because the northwestern San Diego pocket

mouse is not considered sensitive to noise being nocturnal and being shielded from noise during daytime in underground burrows.

### *Drainage*

Only the CSS to the north is of concern. Storm water drainage requirements ensure the amount of water leaving a site is not changed by installation of a project. Newly graded areas and hardscaping will drain into either vegetated swales, consolidated storage, or other mechanism to prevent drainage off site into new areas or modify the drainage patterns off site. No impacts from drainage are expected.

### *Surface Water Quality*

Surface water can be contaminated by sediment during grubbing, grading, and construction, from fuels, oils, and lubricants from construction vehicles, and post-construction by run off from rooftops, hardscaping and landscaping. Decreased water quality may adversely affect native vegetation, aquatic animals, and terrestrial wildlife that depend upon these resources.

Best Management Practices (BMPs) would be used to control erosion, sedimentation, and pollution that could impact surface water quality during construction. Post-construction, detention of runoff from landscaping and hardscaping into on-site detention basins filters surface water and prevents run off into surrounding areas. Effects would not be significant.

### *Lighting*

Exterior night lighting has the potential to illuminate native habitats off site, which could interfere with wildlife movement and could unbalance predator/prey relationships and provide nocturnal predators with an added advantage over their prey. This could adversely affect native wildlife, especially if listed species would be affected.

No listed species are expected in the CSS to the north, though northwestern San Diego Pocket mouse, was detected just off site. All outdoor lighting installed on Lots 6 through 10 shall be shielded to prevent light from illuminating habitat to the north using fixtures that physically direct light away from the outer edges of the property or fences, or other barriers on that edge of development that prevent light overspill. Final building plans for the development adjacent to the northern boundary shall identify the shielded light fixtures and/or fencing/barriers. These measures, if implemented, would reduce potential nigh-lighting effects to below a level of a significance.

### *Invasive Plant Species*

Invasive weed species could colonize areas disturbed by grading, construction, and development that could spread into adjacent native habitats and degrade habitat quality for native wildlife.

The site is already highly disturbed and supports a predominance of invasive plant species (e.g. tumbleweeds, non-native grasses, non-native forbs). Rather than introduce invasive species to the CSS, implementation of the Project would reduce the potential for the site to act as a seed source for invasive plant species.

To avoid additional impacts, any public landscaping would involve only appropriate native or non-invasive ornamental plant species.

### *Brush Management*

CSS and NNG habitat off site border Lots 6 through 12. Placement of habitable structures on portions of these proposed Lots could be in conflict with fire regulations that might ultimately result in off-site brush management of the CSS and NNG.

The Project proponent shall avoid this indirect project effect through consultation with the Vista Fire Protection District, and/or Vista Fire Department, and/or the County on regulatory avenues that provide for fire protection once homes are built on the Project site. Measures may include one or more of the following measures:

- Placement of habitable structures far enough away from a fuel source such that modification of the off-site habitat is not required;
- requiring fire-resistive construction of the residences that would be built on the Project site that would reduce fuel modification zones;
- modifying the fuel modification set-back based on an analysis of the risks associated with the adjacent habitat; and/or,
- requiring the owner of the property to the north to establish fuel modification zones on their boundary with the Proposed project.

Provided no fuel modification is required off site, this indirect impact would not be significant. If off-site fuel modification is required, the impact would need to be mitigated to reduce it to below a level of significance.

### Cumulative Impacts

The MHCP was designed to compensate for the loss of regional biological functionality that would otherwise occur on a project-by-project basis under CEQA. Compliance with the requirements of the MHCP would not result in cumulatively considerable impacts for those resources covered by the plan. As no sensitive resources other than the coastal sage scrub and non-native grassland occur on site, and mitigation for these habitats will be at MHCP–required ratios, implementation of the mitigation measures will ensure that no significant cumulative impacts occur.

## MITIGATION MEASURES

Pursuant to CEQA requirements and the MHCP (SANDAG 2003) the following Mitigation measures are proposed to reduce potentially significant impacts to below a level of significance or to avoid them altogether. These Mitigation Measures constitutes the Mitigation, Monitoring, and Reporting Program (MMRP) for the Project.

### Direct Impacts

*Impact BIO 1:* The Project would impact 0.24 acre of coastal sage scrub (including disturbed) and 12.98 acres of non-native grassland outside the FPA.

*Mitigation Measure BIO 1:* Per compliance with the MHCP (SANDAG 2003) the Project shall mitigate the proposed impact to CSS at a ratio of 1:1 with acquisition of a minimum of 0.24 acre of CSS and for impacts to NNG at a 0.5:1 ratio with acquisition of 6.49 acres of non-native grassland at an off-site location, acceptable to the City, CDFW, and USFWS. Satisfaction of this measure would fully mitigate the loss of habitat at the site.

Mitigation Credits for 0.24 of CSS and 6.49 acres of NNG were acquired in 2017 to satisfy MM Bio 1 for direct impacts to CSS and NNG (Appendix D). As a result, no additional mitigation for habitat impacts is required.

*Impact BIO 2*: Impacts to an active bird nests, during clearing, grubbing, or construction would be a violation of the MBTA and CFG Code. This is most likely during the bird breading season which starts as early as January 1 for raptors and can end as late as September 15 for certain riparian songbirds.

*Mitigation Measure BIO 2*: All shrub trimming, thinning, or removal will be performed prior to or after the bird breeding season, January 1 through September 15 (i.e., only between September 16 and December 31. If clearing is planned to occur during the breeding season, pre-construction nest surveys shall be conducted prior to any clearing. Work may proceed if no bird nests are observed. Regular brush management activities shall also occur outside of the bird breeding season. By avoiding clearing and brush management during the bird breeding season, the proposed Project will ensure compliance with the MBTA and pertinent sections of the CFG Code.

## Indirect Impacts

To ensure all indirect effects are avoided or remain below a level of significance, the MCHP includes a list of Standard BMPs that re required to limit indirect impacts (SANDAG 2003: Volume II, Appendix B). Specifically, for this project, Measures 1-3, 6, 8, and 10-14 would apply:

1. A qualified biologist shall conduct a training session for all project personnel prior to proposed activities. At a minimum, the training shall include a description of the target species of concern and its habitats, the general provisions of the ESA and the MHCP, the need to adhere to the provisions of the Act and the MHCP, the penalties associated with violating the provisions of the Act, the general measures that are being implemented to conserve the target species of concern as they relate to the project, and the access routes to and project site boundaries within which the project activities must be accomplished.

2. A water pollution and erosion control plan shall be developed that describes sediment and hazardous materials control, dewatering or diversion structures, fueling and equipment management practices, and other factors deemed necessary by reviewing agencies. Erosion control measures shall be monitored on a regularly scheduled basis, particularly during times of heavy rainfall. Corrective measures will be implemented in the event erosion control strategies are inadequate. Sediment/erosion control measures will be continued at the project site until such time as the revegetation efforts are successful at soil stabilization.

3. The footprint of disturbance shall be minimized to the maximum extent feasible. Access to sites shall be via pre-existing access routes to the greatest extent possible.

6. Projects that cannot be conducted without placing equipment or personnel in sensitive habitats should be timed to avoid the breeding season of the target species of concern.

8. Equipment storage, fueling, and staging areas shall be located on upland sites with minimal risks of direct drainage into riparian areas or other sensitive habitats. These designated areas shall be located in such a manner as to prevent any runoff from entering sensitive habitat. All necessary precautions shall be taken to prevent the release of cement or other toxic substances into surface waters. All project related spills of hazardous materials shall be reported to appropriate entities including but not limited to applicable jurisdictional city, USFWS, and CDFW, RWQCB and shall be cleaned up immediately and contaminated soils removed to approved disposal areas.

10. The qualified project biologist shall monitor construction activities throughout the duration of the project to ensure that all practicable measures are being employed to avoid incidental disturbance of habitat and any target species of concern outside the project footprint. Construction monitoring reports shall be completed and provided to the jurisdictional City, USFWS, and the CDFW summarizing how the project is in compliance with applicable conditions. The project biologist should be empowered to halt work activity if necessary and to confer with staff from the applicable city, UFWS, and CDFW to ensure the proper implementation of species and habitat protection measures.

11. The removal of native vegetation shall be avoided and minimized to the maximum extent practicable. Temporary impacts shall be returned to pre-existing contours and revegetated with appropriate native species. All revegetation plans shall be prepared and implemented consistent with (MHCP) Appendix C (Revegetation Guidelines) and shall require written concurrence of the USFWS and CDFW.

12. Exotic species that prey upon or displace target species of concern should be permanently removed from the site.

13. To avoid attracting predators of the target species of concern, the project site shall be kept as clean of debris as possible. All food related trash items shall be enclosed in sealed containers and regularly removed from the site(s). Pets of project personnel shall not be allowed on-site where they may come into contact with any listed species.

14. Construction employees shall strictly limit their activities, vehicles, equipment, and construction materials to the proposed project footprint and designated staging areas and routes of travel. The construction area(s) shall be the minimal area necessary to complete the project and shall be specified in the construction plans. Construction limits will be fenced with orange snow screen. Exclusion fencing should be maintained until the completion of all construction activities. All employees shall be instructed that their activities are restricted to the construction areas.

In addition, to ensure all potential indirect effects are avoided:

Any project landscaping shall not include species identified as an invasive non-native plant species as identified by the California Invasive Plant Council (CaIPC) at http://www.cal-ipc.org/paf/.

Final building plans for the development adjacent to the northern boundary (Lots 6 through 12) shall identify the shielded light fixtures and/or fencing/barriers to direct light away from the CSS habitat off site to the north.

The project proponent shall work with the Vista Fire Protection District, and/or Vista Fire Department, and/or the County to ensure that all fuel modification for Lots 6 through 12 shall remain on site. If fuel modification is required off site, mitigation to offset any impacts will be required.

# CONCLUSION

Direct impacts to 0.24 acre of CSS and 12.98 acres of NNG would require mitigation at 1:1 and 0.5:1 ratios respectively with acquisition of a minimum of 0.24 acre of CSS and 6.49 of NNG in a location to be approved by the City, CDFW, and USFWS. Purchase of mitigation credits in these amounts in 2017 satisfied the mitigation requirements and no further mitigation for habitat is required.

Impacts to nesting birds will be avoided though clearing outside the bird-breeding season (January 1 through September 15) unless a preconstruction survey demonstrates no active nests would be affected.

Application of MHCP Standard BMPs plus the additional measures for invasive species, and lighting, and avoidance of off-site brush management as identified above would ensure the proposed Project would be in compliance with CEQA, MHCP, MBTA, and CFG Code.

After application of the MMRP, no significant direct or indirect impacts to sensitive or special status, riparian or sensitive vegetation communities, species, wetlands, wildlife corridors or nursery sites, local policies or ordinances, or be in conflict with the MHCP or any state or federal codes or treaties. As a result of the project design, purchased mitigation credits, and the MMRP, the proposed Project would have a less than significant effect on biological resources.

If you have any questions please contact Derek Langsford at derek.langsford@tierradata.com or by phone at (760) 749-2247

Sincerely,

Derek H. Langsford, PhD, CSE
Biology Practice Manager
Certified Senior Ecologist
County of San Diego Approved Biologist

## REFERENCES

Affinis. 2006. Biological Reconnaissance, Vista Grande Property (Affinis Job No. 2082). January 18.

Calflora. 2021. http://www.calflora.org/ accessed January.

California Department of Fish and Wildlife (CDFW). 2021. California Natural Diversity Data Base (CNDDB). https://www.dfg.ca.gov/biogeodata/cnddb/. Accessed November 2021.

City of Vista. 2021. GeoVista Web Site. http://gis.cityofvista.com/geovista/. Accessed February 2021.

County of San Diego. 2015. North County Multiple Species Conservation Plan. http://www.sandiegocounty.gov/pds/mscp/nc.html. Accessed November 2015.

HELIX Environmental Planning. 2014a. 2014 Coastal California Gnatcatcher Survey Report for the Rancho Lomas Verdes Project. July 28.

2014b. Rancho Lomas Verdes Project: Biological Technical Report. June 16.

2010. Year 2010 Coastal California Gnatcatcher Survey Report for the Kawano Vista Property. July 1.

Historical Aerials. 2021. www.historicaerials.com. Accessed February.

Holland R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Nongame-Heritage Program, State of California, Department of Fish and Game, Sacramento. 156 pp.

Merkel & Associates, Inc. 2007. Vista Grande Subdivision Project. Biological Impact Analysis report. (City of Vista Case Number PC6-053. March 9.

Natural Resource Conservation Service. 2015. Web Soil Survey – San Diego County Area. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Accessed November 2015.

Oberbauer, T., Meghan, K., and J. Buegge. March 2008. Draft Vegetation Communities of San Diego County. Based on "Preliminary Descriptions of the Terrestrial Natural Communities of California", Robert F. Holland, Ph.D., October 1986.

San Diego Association of Governments (SANDAG). 2003. Multiple Habitat Conservation Plan (MHCP) March. http://www.sandag.org/programs/environment/habitat_preservation/mhcp_vol1.pdf. Accessed February 2021.

2014. SanGIS/SANDAG Parcel Lookup. http://sdgis.sandag.org/. Accessed February 2021.

San Diego Local Area Formation Agency (SDLAFCO). 2017. Item 6. Proposed "Vista Grande Drive Reorganization" (City of Vista) (RO17-02). July 10. https://www.sdlafco.org/home/showdocument?id=556.

Tierra Data Inc. (TDI). 2015. Third Party Peer Review of Biological Studies and Reports–Rancho Lomas Verdes Project. March 3.

Tierra Data Inc. (TDI). 2015. Biological Resources Report - Vista Grande Tentative Subdivision Map & Annexation - PC6-061. December 10.

TopoQuest. 2015. USGS Topography. San Marcos Quadrangle. https://www.topoquest.com. Accessed November 2015.

U.S. Fish and Wildlife Service (USFWS). 2021. USFWS Critical Habitat Map. http://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77. Accessed February 2021.

**This Page Intentionally Blank**

# APPENDIX A

## Plant Species Observed or Detected

| PLANT SPECIES OBSERVED ON SITE | | | | |
|---|---|---|---|---|
| **FAMILY/** | **SCIENTIFIC NAME** | **COMMON NAME** | **HABITAT(S)‡** | |
| | | | **TDI 2021** | **TDI 2015** |
| **FERNS AND MOSSES** | | | | |
| Polypodiaceae | *Pentagramma triangularis* | goldenback fern | | NNG |
| **ANGIOSPERMS – MONOCOTS** | | | | |
| Agavaceae | *Agave attenuata.** | foxtail agave | CSS-D | CSS-D |
| Arecaceae | *Washingtonia robusta** | Mexican fan palm | DEV | |
| Poaceae | *Avena barbata** | slender wild oat | NNG | NNG |
| | *Bromus diandrus ** | ripgut grass | NNG, DH | NNG |
| | *Cyanodon dactylon** | Bermuda grass | NNG | NNG |
| | *Festuca myuros** | rattail grass | | CSS-D |
| | *Pennisetum setaceum** | fountain grass | CSS-D | CSS-D |
| | *Stipa* sp. | needle grass | CSS-D | CSS-D |
| **ANGIOSPERMS – DICOTS** | | | | |
| Aizoaceae | *Carprobrotus edulis** | hottentot-fig | CSS-D, NNG, DH | CSS-D, NNG, DH |
| Amaranthaceae | *Amaranthus albus** | pigweed | DH | CSS-D |
| Anacardiaceae | *Malosma laurina* | laurel sumac | CSS, CSS-D, NNG | CSS, CSS-D, NNG |
| | *Rhus integrafolia* | lemonadeberry | DH | |
| Apiaceae | *Foeniculum vulgare** | fennel | NNG | NNG |
| Asteraceae | *Ambrosia psilostachya* | western ragweed | | NNG |
| | *Artemisia californica* | California sagebrush | CSS, CSS-D | CSS |
| | *Baccharis pilularis* | broom baccharis | DH | |
| | *Crocanthemum scoparium** | peak rush-rose | DH | |
| | *Dittrichea graveolens** | | DH | |
| | *Erigeron canadensis* | horseweed | DH | CSS-D |
| | *Glebionis coronaria** | garland daisy | DH | |
| | *Helminthotheca echioides** | bristly ox-tongue | NNG | |
| | *Heterotheca grandiflora* | telegraph weed | DH | |
| | *Isocoma menziesii* | Menzies' goldenbush | NNG | |
| | *Lactuca seriola** | prickly lettuce | NNG | |
| | *Sonchus asper** | sowthistle | NNG | NNG |
| | *Pseudognaphalium bioletti* | two-color rabbit-tobacco | DH | |
| | *Stephanomeria diegensis* | San Diego wreathplant | DH | |
| Brassicaceae | *Brassica nigra** | black mustard | NNG, DH | |
| | *Hirschfeldia incana** | short-podded mustard | CSS-D, DH | CSS-D |
| | *Raphanus sativus** | wild radish | NNG | NNG |

| PLANT SPECIES OBSERVED ON SITE (Cont.) | | | | |
|---|---|---|---|---|
| **FAMILY/** | **SCIENTIFIC NAME** | **COMMON NAME** | **HABITAT(S)‡** | |
| | | | **TDI 2021** | **TDI 2015** |
| **ANGIOSPERMS – DICOTS (Cont.)** | | | | |
| Cactaceae | *Opuntia ficus-indica** | tuna | CSS-D, NNV | CSS-D, NNV |
| | *Opunita littoralis* | prickly pear | CSS, NNG | |
| Caprifoliaceae | *Lonicera subspicata* var. *denudata* | honeysuckle | NNV | |
| Chenopodiaceae | *Atriplex semibaccata** | Australian saltbush | | NNG |
| | *Chenopodiastrum murale** | nettle leaf goosefoot | NNG | |
| | *Salsola tragus** | Russian thistle | CSS-D, NNG, DH | CSS-D, NNG |
| Convolvulaceae | *Calystegia macrostegia* | morning glory | NNG | NNG |
| Crassulaceae | *Crassula ovata** | jade plant | CSS-D, NNV | CSS-D, NNV |
| Cucurbitaceae | *Marah macrocarpa* | chilicothe | CSS-D | |
| Ericaceae | *Xylococcus bicolor* | mission manzanita | CSS | |
| Euphorbiaceae | *Croton setiger* | turkey-mullein | DH | |
| | *Euphorbia maculata** | spotted spurge | | CSS-D, DH |
| | *Ricinus communis** | castor bean | NNG, DH | NNG |
| Fabaceae | *Acmispon glaber* | deerweed | NNG | |
| | *Medicago polymorpha** | bur clover | DH | |
| Fagaceae | *Quercus agrifolia* | coast live oak | NNG | NNG |
| Geraniaceae | *Erodium botrys** | filaree | DH | CSS-D, DH |
| Lamiaceae | *Malva Parviflora** | cheeseweed | NNG | CSS-D, NNG |
| | *Marrubium vulgare** | horehound | DH | |
| | *Salvia mellifera* | black sage | DH | |
| | *Stachys byzantina** | woolly hedgenettle | CSS-D | |
| Oxalidae | *Oxalis pes-caprae** | Bermuda buttercup | NNG | |
| Phytolaccaeae | *Phytolacca Americana** | American pokeweed | NNG | |
| Plantaginaceae | *Antirrhinum nuttallianum* | Nuttall's snapdragon | CSS-D | |
| Plumbaginaceae | *Limonium* sinuatum* | statice | NNG | NNG |
| Polygonaceae | *Eriogonum fasciculatum* | California buckwheat | CSS, CSS-D | CSS, CSS-D |
| | *Rumex crispus** | curly dock | NNG | |
| Rosaceae | *Adenostoma fasciculatum* | chamise | CSS, CSS-D | |
| | *Rubus armeniacus** | Himalayan blackberry | NNG | |
| Rutaceae | *Cneridium dumosum* | bushrue | CSS-D | |
| | *Datura wrightii* | jimsonweed | CSS | |
| Solanaceae | *Nocotiana glauca** | tree tobacco | NNG, DH | NNG |
| | *Solanum americanum* | Common nightshade | | NNG |

‡Habitat acronyms: CSS = Coastal Sage Scrub, CSS-D = Disturbed CSS, DH = Disturbed Habitat, DEV=Developed, NNV = Non-native Vegetion

*non-native species

# APPENDIX B

## Animal Species Observed or Detected

| SCIENTIFIC NAME | COMMON NAME | HABITAT(S)‡ | |
|---|---|---|---|
| | | TDI | Year |
| **INVERTEBRATES** | | | |
| | | | |
| *Argiope argentata* | silver argiope spider | CSS | 2021 |
| *Eleodes* sp. | darkling beetle | NNG (under logs) | 2015,2021 |
| *Foficula auricularia* | European earwig | NNG (under logs) | 2015, 2021 |
| *Lactrodectus* sp. | black widow spider | NNG (under logs) | 2015 |
| *Reticulitermes hesperus* | western subterranean termite | NNG | 2015 |
| *Scolopendra polymorpha* | common desert centipede | NNG (under logs) | 2015, 2021 |
| | | | |
| **VERTEBRATES** | | | |
| | | | |
| **Reptiles** | | | |
| *Sceloporus occidentalis* | western fence lizard | NNG | 2015 |
| *Uta stansburiana* | Side-blotched lizard | NNG | 2015 |
| **Birds** | | | |
| *Aphelecoma californica* | California scrub jay | CSS | 2021 |
| *Buteo jamaicensis* | red-tailed hawk | NNG | 2021 |
| *Calypte anna* | Anna's hummingbird | NNG | 2021 |
| *Cathartes aura* | turkey vulture | flyover | 2021 |
| *Colaptes auratus* | northern flicker | NNG, CSS | 2021 |
| *Corvus brachyrhyncos* | American crow | Flyover | 2015, 2021 |
| *Cathartes aura* | turkey vulture | Flyover | 2021 |
| *Falco sparverius* | American kestrel | NNG | 2015, 2021 |
| *Haemorhous mexicanus* | house finch | NNG | 2021 |
| *Mimus polyglottos* | northern mockingbird | NNG | 2015, 2021 |
| *Phainopepla nitens* | phainopepla | NNV | 2021 |
| *Sayornis saya* | Say's phoebe | NNG | 2021 |
| *Selasphorus sasin* | Allen's hummingbird | CSS, NNV | 2021 |
| *Setophaga coronate* | yellow-rumped warbler | all | 2021 |
| *Sturnella neglecta* | western meadowlark | NNG | 2015 |
| *Toxostoma redivivum* | California thrasher | CSS | 2021 |
| *Tyrannus vociferans* | Cassin's kingbird | NNG | 2021 |
| *Zenaida macroura* | Mourning dove | NNG | 2021 |
| | | | |
| **Mammals** | | | |
| *Neotoma sp.* | woodrat | (*Malosma* in) NNG | 2021 |
| *Odocoileus hemionus fuliginata* | mule deer | CSS-D (bones) | 2015, 2021 |
| *Peromyscus sp.* | deer mouse | NNG | 2021 |
| *Spermophilus beecheyi* | California ground squirrel | CSS-D | 2015, 2021 |
| *Sylvilagus auduboni* | desert cottontail | NNG, CSS | 2015, 2021 |
| *Thomomys bottae* | Botta's pocket gopher | NNG | 2015, 2021 |

‡Habitat acronyms: CSS = Coastal Sage Scrub, CSS-D = Disturbed Coastal sage Scrub, DH = Disturbed Habitat, NNV = Non-Native Negetation

**This Page Intentionally Blank**

# APPENDIX C

## Site Photos (January 22, 2021)

**Photo 1**: Disturbed coastal sage scrub in the southeast corner of the site (left) looking from Vista Grande Terrace.

**Photo 2**: Looking across disturbed coastal sage scrub across southern portion of site.

**Photo 3**: Looking backk to SE corner. CSS-D is on the right.

**Photo 4**: NNG in southwest portion of the site with gopher mounds, wild rash, and Russian thistle. Vista Grande Drive is on left.

**Photo 5**: NNG in SW corner of site looking east.

**Photo 6**: DH dominated by stinkwort on the east of the project site.

**Photo 7**: Looking south along the eastern boundary of the site.

**Photo 8**: CSS edged with black mustard in the NE corner of the site.

**Photo 9**: Looking along northern boundary of the site with the CSS strip and Pipeline Rd off site. .

**Photo 10**: Looking west from the eastern parcel off site.

**Photo 11**: Central portion of the site; NNG with tree tobacco.

**Photo 12**: Central portion of the site; looking west into the developed portion of the site.

**Photo 13**: Himalayan blackberry in NNG in southern position of site.

**Photo 14**: Common desert centipede (4-5” long) under a decaying log on site.

**Photo 15**: Seed at end of pipe a clue to likely deer mouse living in the iron pipe

**Photo 15:** A singular curly dock in NNG in the middle of the site.

# APPENDIX D

## Habitat Mitigation Acquisition Receipts

**This Page Intentionally Blank**

ESCONDIDO
City of Choice

**Bill Martin, AICP**
**Director of Community Development**
**Planning Division**
**201 North Broadway, Escondido, CA 92025**
**Phone: 760-839-4671 Fax: 760-839-4313**

May 15, 2017

Omni Financial, LLC, a California Limited Liability Company
Mr. Martin Boone and Ms. Kimberley Kay
1260 41st Avenue, Suite O
Capitola, CA 9501

RE: Daley Ranch Conservation Bank Credit Purchase Agreement and Acknowledgement for (Case file No: P-178 & P-180)

Dear: Mr. Boone

This letter confirms the purchase 0.24-acres of Chaparral/Coastal Sage Scrub Credits from the Daley Ranch Conservation Bank, intended as mitigation for the proposed subdivision (Project# PC6-061) of fourteen (14) residential lots, on 1+/- acre lots, on approximately 16.99 acres (APN# 171-110-05 and 171-110-28) in the City of Vista.

Enclosed for your records is your copy of the purchase agreement. A summary of the Daley Ranch Conservation Bank – Credit ledger of the Transaction is also attached, which provides an accounting status of the Daley Ranch Conservation Bank credits.

A conservation Easement and a Conservation Bank Implementation Agreement for the Daley Ranch Conservation Bank were recorded on the Daley Ranch property on January 31, 1997. Pursuant to the Conservation Bank Implementation Agreement dated January 23, 1997 (Section 5(a), as approved by the U.S. Fish and Wildlife Service and the California Department of Fish and Game, the City of Escondido is responsible for all maintenance and management of the Daley Ranch Conservation Bank in perpetuity.

If you have any questions, please call me at (760) 839-4553

Sincerely,

Darren Parker
Assistant Planner II

**Sam Abed, Mayor** **John Masson, Deputy Mayor** **Olga Diaz** **Ed Gallo** **Michael Morasco**

ESCONDIDO
City of Choice

# CITY OF ESCONDIDO
# DALEY RANCH CONSERVATION BANK
# CREDIT PURCHASE AGREEMENT AND ACKNOWLEDGEMENT

This Daley Ranch Conservation Bank Credit Purchase Agreement and Acknowledgement ("Agreement") is made this 20th day of April, 2021.

Between: CITY OF ESCONDIDO
A Municipal Corporation
201 N. Broadway
Escondido, California 92025
Attn: Bill Martin, Director of Community Development
760-839-4671
("City")

And: Omni Financial, LLC, a California Limited Liability Company
Mr. Martin Boone
1260 41st Avenue, Suite O
Capitola, CA 95010
*(831-464-5021)*
("Purchaser")

The purpose of this Agreement is to establish the terms and conditions for the sale and transfer of Conservation Bank credits from the Daley Ranch Conservation Bank. The City and Purchaser are to be referred to jointly as "Parties."

## RECITALS

A. The CITY entered into a Conservation Bank Implementation Agreement for the Daley Ranch Conservation Bank ("Conservation Bank Agreement") in January 1997 with the California Department of Fish and Game ("CDFG") and the U. S. Fish and Wildlife Service ("USFWS"). The purpose of the Conservation Bank Agreement was to establish terms and conditions for establishing a conservation bank on property owned by the City to be known as the Daley Ranch Conservation Bank.

B. The Conservation Bank Agreement provides for conservation in perpetuity of certain portions of the Daley Ranch property, the use of such land as mitigation under specified circumstances, and the sale of Conservation Bank credits to third parties ("Credit Purchasers") in need of such mitigation.

C. The City has exclusive right to independently determine the price for any and all of its Credits offered for sale or conveyance to a Credit Purchaser. Credit Purchasers are entitled to sell Credits to other Credit Purchasers and have the exclusive right

to independently determine the price for any and all of its credits subsequently offered for sale or conveyance.

D. The Conservation Bank Agreement requires each Credit purchaser to execute a Conservation Credit Purchase Agreement and Acknowledgement which shall evidence the transfer of the applicable credits and the development project to which the credits apply, and shall recite that any subsequent transactions shall be reported by the Credit Purchaser to the City.

E. Credit Purchaser has requested to purchase 0.24-acres of Chaparral/Coastal Sage Scrub Credits from the Daley Ranch Conservation Bank, intended as mitigation for the proposed subdivision (Project# PC6-061) of fourteen (14) residential lots, on 1+/- acre lots, on approximately 16.99 acres (APN# 171-110-05 and 171-110-28) in the City of Vista.

F. On November 16, 2006, the City Council authorized the administrative approval of the full price purchase of credits from the Daley Ranch Conservation Bank at a price per credit of $15,000 for Chaparral/Coastal Sage Scrub Credits. The total purchase price of 0.24-acres of Chaparral/Coastal Sage Scrub Credits is $3,600.

G. The City Council further authorized the execution of all purchase agreements on behalf of the City.

H. Credit Purchaser and City desire to enter into this Agreement to set forth the terms and conditions pursuant to which the Credit purchase will be implemented.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties hereby agree as follows:

1. Compensation. It has been determined to be in the City's best interest to sell 0.24-acres of Chaparral/Coastal Sage Scrub Credits from the Daley Ranch Conservation Bank to Purchaser, at a purchase price of $15,000 per credit of Chaparral/Coastal Sage Scrub for a total purchase price of $3,600. Credit Purchaser shall pay said amount upon execution of this Agreement.

2. Effective Date. The effective date of the credit transaction shall be the date upon which this Agreement is fully executed and payment to City is made.

3. Ledger. City will maintain a database for purposes of tracking the conveyance of credits to Credit Purchasers and the application of credits to development projects ("Ledger"). City will report all credit transactions within its knowledge to CDFG and USFWS as required by the Conservation Bank Implementation Agreement for the Daley Ranch Conservation Bank.

4. Credit Purchaser Responsibility. Credit Purchaser agrees to comply with all terms of the Conservation Bank Implementation Agreement for the Daley Ranch Conservation Bank, including registration of the Credit acquisition with the City, which registration shall consist of providing City with a notarized statement of the Credit transaction parties indicating: (i) the name of the person/entity receiving the

credits; (ii) the number of credits sold; (iii) the effective date of the transfer; (iv) the name of the development project to which the credits have been or will be applied; and (v) the date of the application of the credits to the project.

5. Credit Verification. Purchaser shall be solely responsible for verifying both the ownership of the credits it is purchasing and the status of the credits with respect to the application to a development project.

6. Transfer of Credits. Purchaser agrees to execute a Conservation Credit and Purchase Agreement and Acknowledgement identical to this document with any successor Credit Purchasers (i) which shall evidence the transfer of the applicable credits and the development project to which the credits apply, if any is then known, and (ii) which shall recite that the subject transaction and that any subsequent transaction shall be reported by the Credit Purchaser to City in the form set forth in Section 4 above within 10 days of the transaction, so that City may enter the transaction in the Ledger. Credit Purchaser hereby indemnifies and agrees to hold harmless from any damage which may occur to City as a direct result of Credit Purchaser's failure to notify the City of and subsequent transfers of which Credit Purchaser is aware.

7. Costs and Attorney's Fees. In the event that legal action is required to enforce the terms and conditions of this Agreement, the prevailing party will be entitled to reasonable attorneys' fees and costs.

8. Severability. The invalidity in whole or in part of any provision of this Agreement will not void or affect the validity of any other provisions of this Agreement.

9. Provisions Cumulative. The foregoing provisions are cumulative and in addition to and not in limitation of any other rights or remedies available to the City.

10. Notices to Parties. Any statements, communications or notices to be provided pursuant to this Agreement must be sent to the attention of the persons indicated below. Each party agrees to promptly send notice of any changes of this information to the other party, at the address first above written.

IN WITNESS WHEREOF, the parties below are authorized to act on behalf of their organizations, and have executed this Agreement as of the date set forth below.

Date: 5/11/17

CITY OF ESCONDIDO:

Signature

Bill Martin, Director of Community Development
Department or Division Head Name & Title

Date: 4-20-17

PURCHASER:

By: Omni Financial, LLC, a California Limited Liability Company
Mr. Martin Boone
1260 41st Avenue, Suite O
Capitola, CA 95010

(The above signature must be notarized)

APPROVED AS TO FORM:
OFFICE OF THE CITY ATTORNEY
~~JEFFREY R. EPP~~, City Attorney
Michael R. McGuinness

By: _____

GREAT FUTURES START HERE.

BOYS & GIRLS CLUBS
OF EAST COUNTY FOUNDATION

# RECEIPT

March 27, 2017

Received - Non Refundable Deposit in the amount of $20,000 from Omni Financial, LLC toward the purchase of 6.49 NNG Tier III credit from the San Vicente Conservation Bank.

The balance of $77,350.00 is due by September 8, 2017 to complete the transaction.

Jerry Fazio

Jerry Fazio
Administrator
Boys & Girls Clubs of East County Foundation

**Exhibit A**

## ACKNOWLEDGMENT OF SALE OF CONSERVATION CREDITS

The undersigned seller hereby acknowledges that it has sold and conveyed to Omni/Orbis Financial, 6.49. acres of Non-native Grassland Conservation Credits from the San Vicente Conservation Bank. All terms of this conveyance shall be governed by the provisions of the Conservation Credit Purchase Agreement and Acknowledgment between Purchaser and the undersigned dated February 7th, 2017.

**SELLER**: Boys and Girls Clubs of East County,
a California nonprofit corporation

Signature
By: Forrest Higgins, CEO
8820 Tamberly Way
Santee, CA 92071
(619) 440-1600
FAX 440-2331

Dated: 8/31/17

This page left intentionally blank.

# Attachment E – Air Quality and GHG Report

This page left intentionally blank.

**HELIX Environmental Planning, Inc.**
7578 El Cajon Boulevard
La Mesa, CA 91942
619.462.1515 tel
619.462.0552 fax
www.helixepi.com

March 3, 2021 GPE-02

Greg Perrine
1151 Duryea Avenue
Irvine, CA 92614

**Subject: Air Quality and Greenhouse Gas Assessment for the Vista Grande Project**

Dear Mr. Perrine:

HELIX Environmental Planning, Inc. (HELIX) was contracted to conduct an updated air quality and greenhouse gas (GHG) assessment for the Vista Grande Project (project), located in the City of Vista (City), in northwestern San Diego County (County). Subsequent to the completion of the *Air Quality Assessment for the Vista Grande TSM Project* and *Greenhouse Gas Analysis for the Vista Grande TSM Project* prepared by Scientific Resources Associated (SRA), dated October 8, 2015, the project has been redesigned. HELIX has conducted a review of the reports completed by SRA and assessed air quality and GHG impacts associated with the construction and operation of the revised project. This letter summarizes the findings of the air quality and GHG emissions assessment.

## PROJECT DESCRIPTION AND LOCATION

The Vista Grande subdivision project (project) is located in the northern portion of the City of Vista, in northwestern San Diego County (Figure 1, *Regional Location*). The property is north of State Route (SR) 78 and just east of East Vista Way, at the northeastern terminus of Vista Grande Drive (Figure 2, *Project Location*). The 16.9-acre project area is made up of two parcels: Assessor Parcel Numbers (APNs) 171 100 0500 (east) and 171 100 2800 (west).

As originally designed, the project proposed the development of the 16.9-acre property into 14 single-family lots. The project has since been redesigned to increase site density to 28 single-family lots (Figure 3, *Site Plan*).

## PREVIOUS REPORTS

### Air Quality

The *Air Quality Assessment for the Vista Grande TSM Project* evaluated emissions associated with both the construction and operation of the previous project. Emissions associated with construction and operation were compared with significance thresholds, which provide a conservative means of

evaluating whether project emissions would cause a significant impact on the ambient air quality or whether further evaluation is warranted. Emissions associated with construction and operation were found to be below the significance thresholds for all phases and pollutants. It was concluded that emissions associated with construction and operation of the previously proposed project would not result in a significant impact on the ambient air quality (SRA 2015a).

### Greenhouse Gases

The *Greenhouse Gas Analysis for the Vista Grande TSM Project* quantified both construction and operational period GHG emissions. The project's emissions were found to be below the California Air Pollution Control Officers Association (CAPCOA) screening threshold of 900 metric tons (MT) of carbon dioxide equivalents ($CO_2e$). It was concluded that the previously proposed project would not result in a cumulatively considerable global climate change impact (SRA 2015b).

## REVISED METHODS AND ASSUMPTIONS

Criteria pollutant and GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2. CalEEMod is a computer model used to estimate criteria air pollutant and GHG emissions resulting from construction and operation of land use development projects throughout the state of California. CalEEMod was developed by BREEZE Software under the direction of CAPCOA. The input data and subsequent construction and operation emission estimates for the proposed project are discussed below. CalEEMod output files are included in Attachment A.

### Construction Emissions

As described above, construction emissions are assessed using CalEEMod. CalEEMod contains OFFROAD2011 emission factors and EMFAC2014 emission factors from the California Air Resources Board (CARB) models for off-road equipment and on-road vehicles, respectively. The construction analysis included modeling of the projected construction equipment that would be used during each construction activity and quantities of earth and debris to be moved. The model calculates emissions of carbon monoxide (CO), coarse particulate matter ($PM_{10}$; particles 10 microns or less), fine particulate matter ($PM_{2.5}$; particles 2.5 microns or less), sulfur dioxide ($SO_2$), the ozone precursors reactive organic gases (ROG) and nitrogen oxides ($NO_X$), and the GHGs carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$) expressed as $CO_2e$.

Construction input data for CalEEMod include, but are not limited to, (1) the anticipated start and finish dates of construction activity; (2) inventories of construction equipment to be used; (3) areas to be excavated and graded; and (4) volumes of materials to be exported from and imported to the project area. The analysis assessed maximum daily emissions from individual construction activities, including site preparation, demolition, grading, building construction, and paving. Construction would require the use of heavy equipment during most of these activities. Table 1, *Construction Assumptions*, presents a summary of the assumed schedule and equipment for each phase of construction.

**Table 1**
**CONSTRUCTION ASSUMPTIONS**

| Land Development | Start Date | End Date | Heavy Equipment Used |
|---|---|---|---|
| **ONSITE** | | | |
| Demolition & Clearing | 6/1/2022 | 6/10/2022 | Rubber tired loader, dumper/tender, crawler tractor |
| Grading | 6/13/2022 | 7/15/2022 | Skid steer loader, crawler tractor, rubber-tired dozer, grader, 4 scrapers |
| Wet Utilities | 7/13/2022 | 9/13/2022 | Tractor/loader/backhoe, rubber-tired loader, excavator |
| Retaining Walls | 8/4/2022 | 8/31/2022 | Forklift |
| Fencing | 9/1/2022 | 9/28/2022 | Forklift |
| Dry Utilities | 9/12/2022 | 9/30/2022 | 2 tractor/loader/backhoe, skid steer loader |
| Concrete Flatwork & Paving | 10/3/2022 | 11/4/2022 | 2 skid steer loaders, grader, rubber-tired loader, paver, 2 rollers |
| Parkway Landscaping | 11/7/2022 | 11/18/2022 | Forklift, 3 skid steer loaders |
| **OFFSITE** | | | |
| Demolition & Clearing | 6/1/2022 | 6/7/2022 | Rubber-tired loader, grader, skid steer loader, tractor/loader/backhoe |
| Grading | 6/16/2022 | 6/24/2022 | Rubber-tired loader, skid steer loader, grader, tractor/loader/backhoe |
| Wet Utilities | 6/27/2022 | 8/19/2022 | Tractor/loader/backhoe, rubber-tired loader, excavator |
| Dry Utilities | 8/15/2022 | 9/16/2022 | 2 tractor/loader/backhoe, skid steer loader |
| Concrete Flatwork & Paving | 9/19/2022 | 10/21/2022 | 2 Skid steer loaders, grader, rubber-tired loader, 2 pavers, 2 rollers |
| Parkway Landscaping | 10/24/2022 | 11/4/2022 | Forklift, 3 skid steer loaders |

Source: G. Perrine 2021
CalEEMod output provided in Attachment A.

The quantity, duration, and the intensity of construction activity influence the amount of construction emissions and their related pollutant concentrations that occur at any one time. As such, the emission forecasts provided herein reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction is occurring in a relatively intensive manner. Because of this conservative assumption, actual emissions could be less than those forecasted. If construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix than incorporated in the CalEEMod; and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval). A complete listing of the assumptions used in the analysis and model output is provided in Attachment A of this letter.

CalEEMod has the capability to calculate reductions in construction emissions from the effects of dust control, diesel-engine classifications, and other selected emissions reduction measures. Emissions calculations assume application of water during grading and a 15 mile-per-hour speed limit on unpaved surfaces in compliance with San Diego Air Pollution Control District (SDAPCD) Rule 55 – Fugitive Dust.

Based on CalEEMod, Version 2016.3.2, the control efficiency for watering two times per day is 55 percent.

## Operational Emissions

Operational emissions were estimated using CalEEMod. Operational sources of emissions include mobile, area, energy, water and wastewater, and solid waste sources. Operational emissions from mobile source emissions are associated with project-related vehicle trip generation and trip length. Vehicle trips rates were based on the Local Transportation Assessment (LTA) prepared for the project by LSA (LSA 2021). Area source emissions include engine emissions from landscape maintenance equipment, ROG emissions from repainting of buildings, and woodburning hearths. Area source emissions were modeled assuming no woodburning hearths and repainting of buildings with SDAPCD Rule 67 ROG content compliant coatings. Operational emissions from energy sources include the onsite combustion of natural gas for heating and hot water and indirect GHG emissions from the generation of electricity at the of the power plant supplying the project. Energy source emissions were modeled assuming compliance with 2019 Title 24 standards. The amount of water used, and wastewater generated, by a project has indirect GHG emissions associated with it as a result of the energy used to supply, distribute, and treat the water and wastewater. Water source emissions were modeled assuming compliance with 2019 California Green Builders Code. The disposal of solid waste produces GHG emissions from anaerobic decomposition in landfills, incineration, and transportation of waste. Solid waste emissions were modeled assuming compliance with Assembly Bill (AB) 341.

# PROJECT AIR QUALITY ANALYSIS

## Significance Criteria

The following significance thresholds are based on the 2019 amendments to Appendix G of the state CEQA Guidelines. A significant impact is identified if the project would result in any of the following:

(1) Conflict with or obstruct implementation of the applicable air quality plan;

(2) 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;

(3) Expose sensitive receptors to substantial pollutant concentrations; or

(4) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Appendix G of the State CEQA Guidelines states that the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. To determine whether a project would result in a cumulatively considerable net increase of $PM_{10,}$ $PM_{2.5}$, or ozone precursors ($NO_X$ and ROGs) or have an adverse effect on human health, project emissions may be evaluated based on the quantitative screening level thresholds (SLTs) established by the SDAPCD. As part of its air quality permitting process, the SDAPCD has established SLTs in Rule 20.2 for the preparation of Air Quality Impact Assessments (AQIAs). SDAPCD has not established

SLTs for emissions of ROG, therefore, this analysis utilizes the ROG threshold from the City of San Diego's Significance Thresholds (City of San Diego 2016).

The SLTs were developed by SDAPCD and SCAQMD with the purpose of attaining the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS). The NAAQS and CAAQS identify concentrations of pollutants in the ambient air below which no adverse effects on the public health and welfare are anticipated. Therefore, for CEQA purposes, these screening criteria can be used as numeric methods to demonstrate that a project's total emissions would not result in a significant impact to air quality or an adverse effect on human health. The screening thresholds are included in Table 2, *Screening-Level Thresholds for Air Quality Impact Analysis*.

**Table 2**
**SCREENING-LEVEL THRESHOLDS FOR AIR QUALITY IMPACT ANALYSIS**

| Pollutant | Total Emissions | | |
|---|---|---|---|
| **Construction Emissions (Pounds per Day)** | | | |
| Respirable Particulate Matter ($PM_{10}$) | 100 | | |
| Fine Particulate Matter ($PM_{2.5}$) | 67 | | |
| Oxides of Nitrogen ($NO_X$) | 250 | | |
| Oxides of Sulfur ($SO_X$) | 250 | | |
| Carbon Monoxide (CO) | 550 | | |
| Reactive Organic Gases (ROG)[1] | 137 | | |
| **Operational Emissions** | | | |
| | **Pounds per Hour** | **Pounds per Day** | **Tons per Year** |
| Respirable Particulate Matter ($PM_{10}$) | -- | 100 | 15 |
| Fine Particulate Matter ($PM_{2.5}$) | -- | 67 | 10 |
| Oxides of Nitrogen ($NO_X$) | 25 | 250 | 40 |
| Oxides of Sulfur ($SO_X$) | 25 | 250 | 40 |
| Carbon Monoxide (CO) | 100 | 550 | 100 |
| Lead and Lead Compounds | -- | 3.2 | 0.6 |
| Reactive Organic Gases (ROG)[1] | -- | 137 | 15 |

Source: SDAPCD Rule 20.2 and Rule 1210

[1] ROG is not regulated under SDACPD Rule 20.2. ROG thresholds based on City of San Diego's Significance Determination Thresholds (City of San Diego 2016).

The State of California Health and Safety Code Sections 41700 and 41705, and SDAPCD Rule 51, commonly referred to as public nuisance law, prohibit emissions from any source whatsoever in such quantities of air contaminants or other material, which cause injury, detriment, nuisance, or annoyance to the public health or damage to property. It is generally accepted that the considerable number of persons requirement in Rule 51 is normally satisfied when 10 different individuals/households have made separate complaints within 90 days. Odor complaints from a "considerable" number of persons or businesses in the area will be considered to be a significant, adverse odor impact.

## Project Analysis

### Consistency with Air Quality Plans

The SDAPCD is required, pursuant to the Clean Air Act, to reduce emissions of criteria pollutants for which the San Diego Air Basin (SDAB) is in nonattainment. The project would be subject to the SDACPD

Attainment Plan for San Diego County (Attainment Plan). The Attainment Plan contains a comprehensive list of pollution control strategies directed at reducing emissions and achieving ambient air quality standards. These strategies are developed, in part, based on regional population, housing, and employment projections prepared by San Diego Association of Governments (SANDAG).

SANDAG projects that population in the City of Vista will grow by 5,461 households between the years of 2020 and 2035 (SANDAG 2013). The proposed project's addition of 28 housing units would represent approximately one-half of one percent of the total housing growth projected for the City. Such levels of growth are consistent with the forecasts for the City as adopted by SANDAG. Because the SDAPCD has incorporated these same projections into the Attainment Plan, it can be concluded that the proposed project would be consistent with the projections in the Attainment Plan. In summary, project development would not conflict with or obstruct implementation of the Attainment Plan.

### Result in a Cumulatively Considerable Net Increase in Emissions

The project would generate criteria pollutants in the short-term during construction and the long term during operation. To determine whether a project would result in emissions that would violate an air quality standard or contribute substantially to an existing or projected air quality violation, a project's emissions are evaluated based on the SDAPCD SLTs (as shown in Table 2).

### Construction Emissions

The project's construction emissions were estimated using CalEEMod, as described previously. Project-specific input was based on detailed information provided in Table 1 and default model settings to estimate reasonably conservative conditions. Additional details of phasing, selection of construction equipment, and other input parameters, including CalEEMod data, are included in Attachment A.

The results of the calculations for project construction are shown in Table 3, *Maximum Daily Construction Emissions*. The data are presented as the maximum anticipated daily emissions for comparison with the emissions reported in SRA's 2015 report for the previously approved project and the SDAPCD SLTs.

**Table 3**
**MAXIMUM DAILY CONSTRUCTION EMISSIONS**

| Phase | Pollutant Emissions (pounds per day) | | | | | |
|---|---|---|---|---|---|---|
| | ROG | $NO_X$ | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ |
| **ONSITE** | | | | | | |
| Demolition & Clearing | 0.87 | 9.96 | 4.35 | 0.02 | 0.74 | 0.39 |
| Grading | 5.16 | 56.80 | 35.00 | 0.09 | 7.50 | 3.85 |
| Wet Utilities | 0.68 | 6.49 | 7.22 | 0.02 | 0.34 | 0.27 |
| Retaining Walls | 0.15 | 1.36 | 1.47 | 0.00 | 0.17 | 0.09 |
| Fencing | 0.15 | 1.36 | 1.47 | 0.00 | 0.17 | 0.09 |
| Dry Utilities | 0.43 | 4.30 | 6.06 | 0.01 | 0.28 | 0.22 |
| Concrete Flatwork & Paving | 1.44 | 15.73 | 13.08 | 0.03 | 0.79 | 0.63 |
| Parkway Landscaping | 0.36 | 3.86 | 5.56 | 0.01 | 0.26 | 0.18 |

**Table 3 (cont.)**
**MAXIMUM DAILY CONSTRUCTION EMISSIONS**

| Phase | Pollutant Emissions (pounds per day) | | | | | |
|---|---|---|---|---|---|---|
| | ROG | $NO_X$ | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ |
| **OFFSITE** | | | | | | |
| Demolition & Clearing | 0.97 | 10.91 | 7.12 | 0.02 | 0.48 | 0.38 |
| Grading | 0.97 | 10.91 | 7.12 | 0.02 | 0.48 | 0.38 |
| Wet Utilities | 0.68 | 6.49 | 7.22 | 0.02 | 0.34 | 0.27 |
| Dry Utilities | 0.43 | 4.30 | 6.06 | 0.01 | 0.28 | 0.22 |
| Concrete Flatwork & Paving | 1.66 | 17.83 | 16.01 | 0.03 | 0.90 | 0.72 |
| Parkway Landscaping | 0.36 | 3.86 | 5.56 | 0.01 | 0.26 | 0.18 |
| **Maximum Daily Emissions** | **6.53** | **69.79** | **49.45** | **0.12** | **8.22** | **4.40** |
| *Previously Approved Project*[1] | *6.16* | *69.67* | *47.61* | *0.06* | *5.87* | *4.39* |
| *SDAPCD Screening Level Thresholds* | *137* | *250* | *550* | *250* | *100* | *67* |
| ***Significant Impact?*** | ***No*** | ***No*** | ***No*** | ***No*** | ***No*** | ***No*** |

[1] SRA2015a
CalEEMod output data provided in Attachment A.

As shown in Table 3, emissions of criteria pollutants related to project construction would be similar to what was previously disclosed for the previously approved project and would not exceed the SDAPCD SLTs. Therefore, direct and cumulative impacts from criteria pollutants generated during construction would be less than significant and no mitigation would be required.

## Operational Emissions

The project's operational emissions were estimated using CalEEMod, as described previously. Operational emission calculations and model outputs are provided in Attachment A. Table 4, *Operational Emissions*, presents the summary of operational emissions for the project for comparison with the emissions reported in SRA's 2015 report for the previously approved project and the SDAPCD SLTs.

As shown in Table 4, emissions of criteria pollutants related to project operation would be similar to what was previously disclosed for the previously approved project and would not exceed the SDAPCD SLTs. Therefore, direct and cumulative impacts from criteria pollutants generated during operation would be less than significant and no mitigation would be required.

**Table 4**
**OPERATIONAL EMISSIONS**

| Emission Source | ROG | $NO_X$ | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| **Summer (pounds per day)** | | | | | | |
| Area Sources | 43.41 | 0.76 | 48.89 | 0.08 | 6.40 | 6.40 |
| Energy Use | 0.02 | 0.16 | 0.07 | 0.00 | 0.01 | 0.01 |
| Mobile Sources | 0.43 | 1.58 | 5.12 | 0.02 | 1.71 | 0.47 |
| **Project Total** | **43.86** | **2.49** | **54.07** | **0.10** | **8.12** | **6.88** |
| *Previously Approved Project*[1] | *83.56* | *2.18* | *97.15* | *0.01* | *13.31* | *12.69* |
| *SDAPCD Screening Level Thresholds* | *137* | *250* | *550* | *250* | *100* | *67* |
| ***Significant Impact?*** | ***No*** | ***No*** | ***No*** | ***No*** | ***No*** | ***No*** |
| **Winter (pounds per day)** | | | | | | |
| Area Sources | 43.41 | 0.76 | 48.89 | 0.08 | 6.40 | 6.40 |
| Energy Use | 0.02 | 0.16 | 0.07 | 0.00 | 0.01 | 0.01 |
| Mobile Sources | 0.42 | 1.62 | 5.00 | 0.02 | 1.71 | 0.47 |
| **Project Total** | 43.85 | 2.54 | 53.95 | 0.09 | 8.12 | 6.88 |
| *Previously Approved Project*[1] | 1.00 | 1.31 | 6.17 | 0.01 | 0.88 | 0.26 |
| *SDAPCD Screening Level Thresholds* | 137 | 250 | 550 | 250 | 100 | 67 |
| ***Significant Impact?*** | **6.53** | **69.79** | **49.45** | **0.12** | **8.22** | **4.40** |
| **Annual (tons per year)** | | | | | | |
| Area Sources | 0.87 | 9.96 | 4.35 | 0.02 | 0.74 | 0.39 |
| Energy Use | 5.16 | 56.80 | 35.00 | 0.09 | 7.50 | 3.85 |
| Mobile Sources | 0.68 | 6.49 | 7.22 | 0.02 | 0.34 | 0.27 |
| **Project Total** | **0.15** | **1.36** | **1.47** | **0.00** | **0.17** | **0.09** |
| *Previously Approved Project*[1] | *1.47* | *0.25* | *2.44* | *0.00* | *0.34* | *0.23* |
| *SDAPCD Screening Level Thresholds* | *15* | *40* | *100* | *40* | *15* | *10* |
| ***Significant Impact?*** | ***No*** | ***No*** | ***No*** | ***No*** | ***No*** | ***No*** |

[1] SRA2015a
CalEEMod output data provided in Attachment A.

## Impacts to Sensitive Receptors

Impacts to sensitive receptors are typically analyzed for CO hotspots and exposure to toxic air contaminants (TACs). An analysis of the project's potential to expose sensitive receptors to these pollutants is provided below.

## Carbon Monoxide Hotspots

Vehicle exhaust is the primary source of CO. In an urban setting, the highest CO concentrations are generally found within close proximity to congested intersections. Under typical meteorological conditions, CO concentrations tend to decrease as distance from the emissions source (i.e., congested intersection) increase. Project-generated traffic has the potential of contributing to localized hotspots of CO off site. A CO hotspot is a localized concentration of CO that is above the state or national 1-hour or 8-hour CO ambient air standards.

To verify that the project would not cause or contribute to a violation of the 1-hour and 8 hour CO standards either on a project or cumulative level, an evaluation of the potential for CO hotspots at nearby intersections was conducted. The LTA (LSA 2021) evaluated whether or not there would be a

decrease in the LOS at the intersections affected by the proposed project. Per San Diego County criteria, a CO hotspot analysis would be required if the project would:

- place sensitive receptors within 500 feet of a signalized intersection with a LOS of E or F, with peak-hour trips exceeding 3,000 vehicles; or

- cause intersections to operate at LOS E or F, with peak-hour trips exceeding 3,000 vehicles.

According to the LTA (LSA 2021), only one intersection would operate at a deficient LOS. East Vista Way at Osborne Street operates at LOS E during the existing AM and PM peak hours. The intersection would have a total of 1,881 PM peak hour trips with the addition of project generated traffic. This is less than the 3,000 peak-hour trip screening level. Therefore, impacts sensitive receptors by CO hotspots would be less than significant.

## Exposure to Toxic Air Contaminants

### *Construction*

Construction activities would result in short-term, project-generated emissions of diesel particulate matter (DPM) from the exhaust of off-road, heavy-duty diesel equipment. CARB identified DPM as a TAC in 1998. The dose to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Thus, the risks estimated for a maximally exposed individual (MEI) are higher if a fixed exposure occurs over a longer time period. According to the Office of Environmental Health Hazard Assessment, Health Risk Assessments (HRAs), which determine the exposure of sensitive receptors to TAC emissions, should be based on a 30 year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project.

There would be relatively few pieces of off-road, heavy-duty diesel equipment used during construction, and the construction period would be relatively short, especially when compared to 30 years. Combined with the highly dispersive properties of DPM and additional reductions in exhaust emissions from improved equipment, construction-related emissions would not expose sensitive receptors to substantial emissions of DPM. In summary, impacts from construction emissions of TACs would be less than significant.

### *Operation*

Health risk assessments are typically conducted for substantial sources of diesel particulate emissions (e.g., truck stops, bus stations, and warehouse distribution facilities). In addition, typical sources of acutely and chronically hazardous toxic air contaminants include industrial manufacturing processes, automotive repair facilities, and dry-cleaning facilities. Since the proposed project would not contain such uses, the proposed project does not warrant a health risk assessment. As such, in terms of long-term operations, the proposed residential uses would not generate substantial TACs.

### Odors

The project could produce odors during proposed construction activities resulting from heavy diesel equipment exhaust; however, standard construction practices would minimize the odor emissions and their associated impacts. Furthermore, any odors emitted during construction would be temporary, short-term, and intermittent in nature, and would cease upon the completion of the respective phase of construction. Therefore, odor impacts from construction of the project would be less than significant due to the duration of exposure.

The CARB's *Air Quality and Land Use Handbook* includes a list of the most common sources of odor complaints received by local air districts. Typical sources of odor complaints include facilities such as sewage treatment plants, landfills, recycling facilities, petroleum refineries, and livestock operations. The proposed project, a residential development, would not include these uses. Therefore, operational odor impacts would be less than significant.

## PROJECT GREENHOUSE GAS ANALYSIS

### Significance Criteria

Given the relatively small levels of emissions generated by a typical development in relationship to the total amount of GHG emissions generated on a national or global basis, individual development projects are not expected to result in significant, direct impacts with respect to climate change. However, given the magnitude of the impact of GHG emissions on the global climate, GHG emissions from new development could result in significant, cumulative impacts with respect to climate change. Thus, the potential for a significant GHG emissions impact is limited to cumulative impacts.

According to the 2019 amendments to the Appendix G of the CEQA Guidelines, a project would have a significant environmental impact if it would:

(1) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

(2) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

The City of Vista has not established a GHG significance threshold to date. Several lead agencies in California have adopted a screening threshold as recommended by the CAPCOA report *CEQA and Climate Change – Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act*, which proposes a screening-level threshold of 900 MT $CO_2e$ to evaluate whether a project must conduct further analysis.

## Project Analysis

### Greenhouse Gas Emissions

#### Construction Emissions

Construction GHG emissions are generated by vehicle engine exhaust from construction equipment, on-road truck trips, and worker commuting trips. Construction GHG emissions were estimated using CalEEMod, as described previously. Project-specific input was based on detailed information provided in Table 1 and default model settings to estimate reasonably conservative conditions. Additional details of phasing, selection of construction equipment, and other input parameters, including CalEEMod data, are included in Attachment A. The estimated construction GHG emissions for the project are shown in Table 5, *Construction GHG Emissions*.

**Table 5**
**CONSTRUCTION GHG EMISSIONS**

| Phase | MT $CO_2e$ |
|---|---|
| **ONSITE** | |
| Demolition & Clearing | 6.19 |
| Grading | 96.67 |
| Wet Utilities | 30.17 |
| Retaining Walls | 2.81 |
| Fencing | 2.81 |
| Dry Utilities | 5.91 |
| Concrete Flatwork & Paving | 31.37 |
| Parkway Landscaping | 3.76 |
| **OFFSITE** | |
| Demolition & Clearing | 4.17 |
| Grading | 5.83 |
| Wet Utilities | 26.81 |
| Dry Utilities | 9.85 |
| Concrete Flatwork & Paving | 36.74 |
| Parkway Landscaping | 3.76 |
| **Total Project Emissions** | **266.85** |
| *Amortized Construction Emissions* | *8.90* |

CalEEMod output data provided in Attachment A.

GHG emissions generated from construction activities are finite and for a relatively short-term period. Unlike the numerous opportunities available to reduce a project's long-term GHG emissions through design features, operational restrictions, use of green-building materials, etc., GHG emissions-reduction measures for construction equipment are relatively limited. As such, construction emissions are amortized over a 30-year project lifetime. As shown in Table 5, the 30-year amortized construction emissions would be 8.90 MT $CO_2e$ per year.

## Operational Emissions

Operational sources of GHG emissions include energy use (electricity and natural gas); area sources (landscaping equipment); vehicle use; solid waste generation; and water conveyance and treatment. As illustrated in Table 6, *Estimated Annual GHG Emissions*, the total combined net operational and amortized construction emissions is approximately 446 MT $CO_2e$, which is greater than what was previously disclosed for the previously approved project, but would still be below the screening threshold of 900 MT $CO_2e$ per year. As such, emissions are considered less than significant and additional analysis is not required.

**Table 6**
**ESTIMATED ANNUAL GHG EMISSIONS**

| Emission Source | MT $CO_2e$ |
|---|---|
| Area | 36.42 |
| Energy | 73.16 |
| Mobile | 303.08 |
| Solid Waste | 12.37 |
| Water | 11.57 |
| Operational Subtotal | 436.60 |
| Construction (Table 5) | 8.90 |
| **Total Project Emissions** | **445.50** |
| *Previously Approved Project*[1] | *270* |
| *CAPCOA Screening Level* | *900* |
| ***Significant Impact?*** | ***No*** |

CalEEMod output data provided in Attachment A.

## Consistency with Applicable Plans

There are numerous State plans, policies, and regulations adopted for the purpose of reducing GHG emissions. The principal overall State plan and policy is AB 32, the California Global Warming Solutions Act of 2006. The quantitative goal of AB 32 was to reduce GHG emissions to 1990 levels by 2020. Senate Bill (SB) 32 requires further reductions of 40 percent below 1990 levels by 2030. Statewide plans and regulations such as GHG emissions standards for vehicles (AB 1493), the low carbon fuel standard, and regulations requiring an increasing fraction of electricity to be generated from renewable sources are being implemented at the statewide level; as such, compliance at the project level is not addressed.

Since 2012, the City of Vista has been implementing a Climate Action Plan (CAP) to address the threat of climate change to the local community (City of Vista 2012). The project's consistency with applicable policies is analyzed in Table 7, *City CAP Implementation Strategies*.

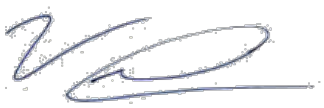
**Table 7**
**CITY CAP IMPLEMENTATION STRATEGIES**

| Measure | Project Consistency |
|---|---|
| E-1: Energy Efficient Buildings Standards | *Consistent*. All new construction will comply with the Municipal Code requirements and achieve the latest Title 24 energy efficiency standards. |
| E-4: Small-Scale Renewable Energy Installations | *Consistent*. The project would be constructed in compliance with all Title 24 standards for solar energy. |
| S-1: Expanded Recycling | *Consistent.* The project would be consistent with AB 341 requiring the diversion of 75 percent of solid waste from landfills. |
| S-2: Construction and Demolition Debris Diversion | *Consistent.* The project will redirect at least 50 percent of the total construction and demolition debris generated via reuse or recycling. |

## SUMMARY

As described above, emissions of criteria pollutants would be below SDAPCD screening level thresholds and the project would be consistent with the Attainment Plan. Sensitive receptors would not be exposed to substantial concentrations of TACs or odors. Thus, impacts to air quality would be less than significant and no mitigation measures would be required. Operational GHG emissions, including amortized construction GHG emissions, would be below the screening level threshold. Implementation of the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Therefore, GHG impacts would be less than significant no mitigation measures would be required.

Sincerely,



Victor Ortiz
Senior Air Quality Specialist

**Attachments:**

Figure 1: Regional Location
Figure 2: Project Location
Figure 3: Site Plan
Attachment A: CalEEMod Output

## REFERENCES

City of San Diego. 2016. California Environmental Quality Act Significance Determination Thresholds. Development Services Department.

City of Vista. 2012. Climate Action Plan. November.

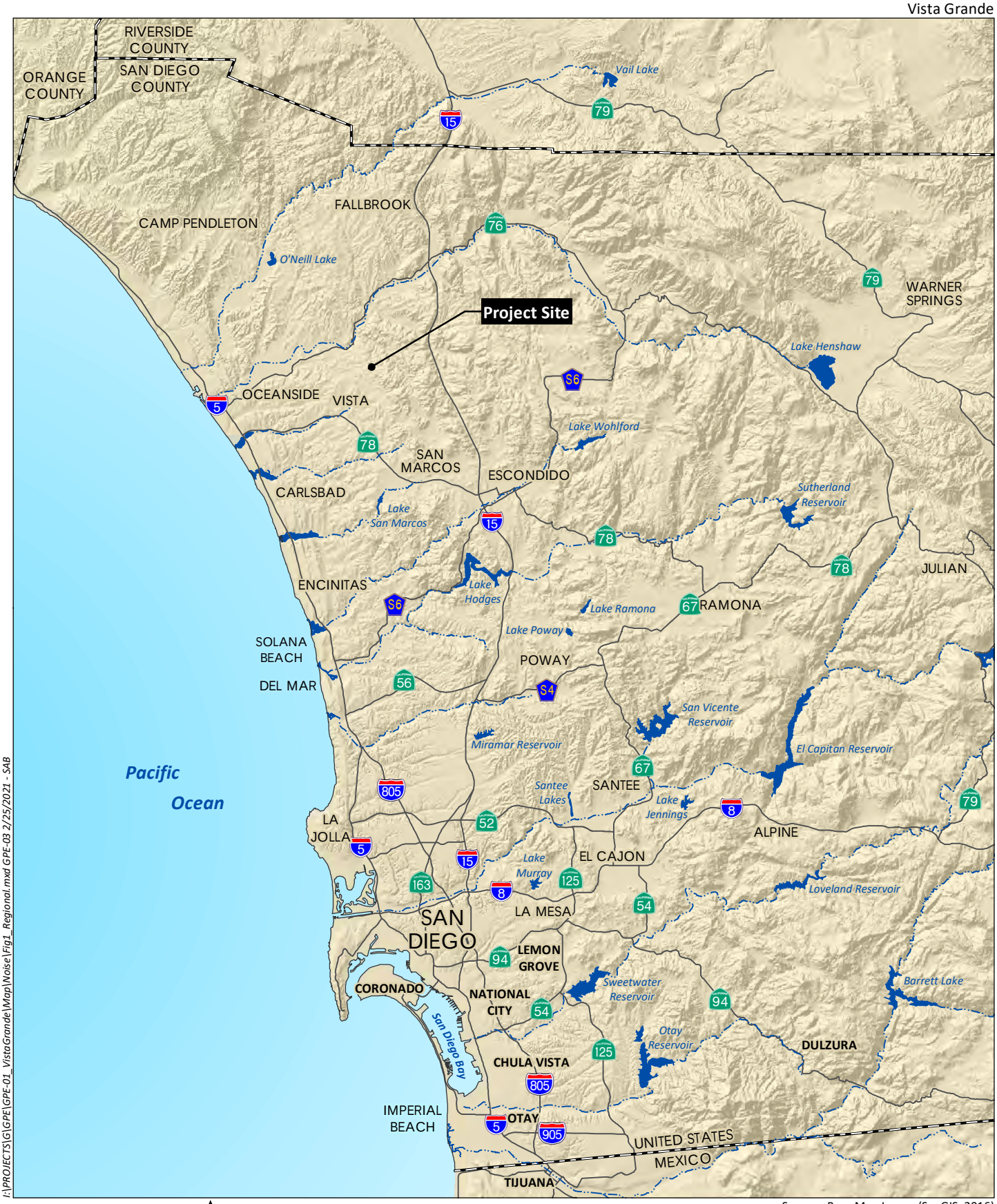
G. Perrine. 2021. Personal Communication – Vista Grande: Traffic and Schedule Information. February 2.

LSA. 2021. Vista Grande Residential Project Local Transportation Assessment.

San Diego Association of Governments (SANDAG). 2013. Series 13: 2050 Regional Growth Forecast. October 15.

Scientific Resources Associated (SRA). 2015a. Air Quality Assessment for the Vista Grande TSM Project. October 8.

2015b. Greenhouse Gas Analysis for the Vista Grande TSM Project. October 8.




I:\PROJECTS\G\GPE\GPE-01_VistaGrande\Map\Noise\Fig1_Regional.mxd GPE-03 2/25/2021 - SAB

0 8 Miles

Source: Base Map Layers (SanGIS, 2016)

HELIX Environmental Planning

# Regional Location

Figure 1

Source: Aerial (SanGIS, 2017)

HELIX Environmental Planning

# Project Location

Figure 2

**SITE INFORMATION**

| | |
|---|---|
| Address: | Vista Grande Drive |
| Parcel No. | 171-100-05 and 171-100-28 |
| Site Area | 16.99 ac |
| City: | Vista |
| County: | San Diego |
| Existing Zoning: | A-1 (Agricultural) |
| Existing General Plan: | Rural Residential (1 du/ac) |
| Proposed Zoning: | E-1 Estate Residential (City of Vista) |
| Proposed General Plan: | LD - Low Density Residential (2du/ac) |

**E-1 Zone Standard**

| | |
|---|---|
| Front Yard Setback | 50 Feet from CL |
| Side Yard Setback | 10 Feet |
| Rear Yard setback | 20 Feet |
| Building Height | 35 Feet/2-Story |
| Min. Lot Size | Half-acre Lot |
| Lot Coverage | 60% |
| Common Open Space: | N/A |
| Private Open Space | N/A |
| Parking/du | 2 spaces + 2 spaces guest |

**SIte Plan Summary**

| | |
|---|---|
| Site Area | 16.99 ac |
| Net Area | 14.5 ac (excl. easement and ROW ) |
| Units | 28 du |
| Gross Density | 1.6 du/ac |
| Net Density | 1.9 du/ac |

Source: ktgy Architecture and Planning (2020)

I:\PROJECTS\G\GPE\GPE-01_VistaGrande\Map\Noise\Fig3_SitePlan.indd GPE-03 2/25/2021 - SAB

HELIX Environmental Planning

# Site Plan

Figure 3

# Attachment A

## CalEEMod Output

# GPE 02 - Vista Grande

**San Diego County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Single Family Housing | 28.00 | Dwelling Unit | 16.99 | 50,400.00 | 80 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.6 | **Precipitation Freq (Days)** | 40 |
| **Climate Zone** | 13 | | | **Operational Year** | 2023 |
| **Utility Company** | San Diego Gas & Electric | | | | |
| **CO2 Intensity (lb/MWhr)** | 720.49 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 28 single-family dwelling units on 16.99 acres

Construction Phase - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Grading -

Demolition -

Trips and VMT - 23 debris haul trips for removal of existing residence

Vehicle Trips - LSA 2021

Woodstoves - No woodstoves

Area Coating - Rule 67.0.1

Construction Off-road Equipment Mitigation -

Water Mitigation -

Waste Mitigation -

Energy Mitigation - https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf

GPE 02 - Vista Grande - San Diego County, Annual

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblAreaCoating | Area_EF_Residential_Exterior | 250 | 100 |
| tblAreaCoating | Area_EF_Residential_Interior | 250 | 50 |
| tblConstDustMitigation | WaterUnpavedRoadMoistureContent | 0 | 12 |
| tblConstDustMitigation | WaterUnpavedRoadVehicleSpeed | 0 | 10 |
| tblConstructionPhase | NumDays | 20.00 | 8.00 |
| tblConstructionPhase | NumDays | 30.00 | 25.00 |
| tblConstructionPhase | NumDays | 30.00 | 45.00 |
| tblConstructionPhase | NumDays | 300.00 | 20.00 |
| tblConstructionPhase | NumDays | 300.00 | 20.00 |
| tblConstructionPhase | NumDays | 30.00 | 15.00 |
| tblConstructionPhase | NumDays | 20.00 | 25.00 |
| tblConstructionPhase | NumDays | 20.00 | 5.00 |
| tblConstructionPhase | NumDays | 30.00 | 7.00 |
| tblConstructionPhase | NumDays | 30.00 | 40.00 |
| tblConstructionPhase | NumDays | 30.00 | 25.00 |
| tblConstructionPhase | NumDays | 20.00 | 25.00 |
| tblConstructionPhase | PhaseEndDate | 6/28/2022 | 6/10/2022 |
| tblConstructionPhase | PhaseEndDate | 8/23/2022 | 7/15/2022 |
| tblConstructionPhase | PhaseStartDate | 7/13/2022 | 6/13/2022 |
| tblLandUse | LotAcreage | 9.09 | 16.99 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Dumpers/Tenders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Graders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Forklifts |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Graders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Graders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Forklifts |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblVehicleTrips | ST_TR | 9.91 | 10.00 |
| tblVehicleTrips | SU_TR | 8.62 | 10.00 |
| tblVehicleTrips | WD_TR | 9.52 | 10.00 |
| tblWoodstoves | NumberCatalytic | 1.40 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.40 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 3,019.20 | 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 | | | | | |
| 2022 | 0.1568 | 1.6630 | 1.3722 | 3.0100e-003 | 0.1595 | 0.0682 | 0.2277 | 0.0527 | 0.0628 | 0.1155 | 0.0000 | 264.8094 | 264.8094 | 0.0818 | 0.0000 | 266.8543 |
| **Maximum** | **0.1568** | **1.6630** | **1.3722** | **3.0100e-003** | **0.1595** | **0.0682** | **0.2277** | **0.0527** | **0.0628** | **0.1155** | **0.0000** | **264.8094** | **264.8094** | **0.0818** | **0.0000** | **266.8543** |

### 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 | | | | | |
| 2022 | 0.1568 | 1.6630 | 1.3722 | 3.0100e-003 | 0.0792 | 0.0682 | 0.1474 | 0.0257 | 0.0628 | 0.0885 | 0.0000 | 264.8091 | 264.8091 | 0.0818 | 0.0000 | 266.8540 |
| **Maximum** | **0.1568** | **1.6630** | **1.3722** | **3.0100e-003** | **0.0792** | **0.0682** | **0.1474** | **0.0257** | **0.0628** | **0.0885** | **0.0000** | **264.8091** | **264.8091** | **0.0818** | **0.0000** | **266.8540** |

| | ROG | NOx | 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** | **0.01** | **0.00** | **0.00** | **0.00** | **50.32** | **0.00** | **35.25** | **51.22** | **0.00** | **23.39** | **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) |
|---|---|---|---|---|
| 1 | 6-1-2022 | 8-31-2022 | 1.1473 | 1.1473 |
| 2 | 9-1-2022 | 9-30-2022 | 0.1911 | 0.1911 |
| | | Highest | 1.1473 | 1.1473 |

## 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 | 1.9512 | 0.0325 | 2.1175 | 3.0900e-003 | | 0.2630 | 0.2630 | | 0.2630 | 0.2630 | 23.2630 | 12.4694 | 35.7324 | 5.6000e-004 | 2.2700e-003 | 36.4243 |
| Energy | 3.5300e-003 | 0.0302 | 0.0128 | 1.9000e-004 | | 2.4400e-003 | 2.4400e-003 | | 2.4400e-003 | 2.4400e-003 | 0.0000 | 109.0270 | 109.0270 | 3.6500e-003 | 1.2600e-003 | 109.4930 |
| Mobile | 0.0738 | 0.2963 | 0.9016 | 3.2800e-003 | 0.3013 | 2.5300e-003 | 0.3038 | 0.0807 | 2.3600e-003 | 0.0830 | 0.0000 | 302.6972 | 302.6972 | 0.0152 | 0.0000 | 303.0765 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 6.6581 | 0.0000 | 6.6581 | 0.3935 | 0.0000 | 16.4952 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.5788 | 11.9390 | 12.5178 | 0.0599 | 1.5000e-003 | 14.4638 |
| **Total** | **2.0285** | **0.3589** | **3.0320** | **6.5600e-003** | **0.3013** | **0.2679** | **0.5692** | **0.0807** | **0.2678** | **0.3484** | **30.4999** | **436.1326** | **466.6325** | **0.4728** | **5.0300e-003** | **479.9529** |

## 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 | 1.9512 | 0.0325 | 2.1175 | 3.0900e-003 | | 0.2630 | 0.2630 | | 0.2630 | 0.2630 | 23.2630 | 12.4694 | 35.7324 | 5.6000e-004 | 2.2700e-003 | 36.4243 |
| Energy | 3.3300e-003 | 0.0284 | 0.0121 | 1.8000e-004 | | 2.3000e-003 | 2.3000e-003 | | 2.3000e-003 | 2.3000e-003 | 0.0000 | 72.8256 | 72.8256 | 2.2400e-003 | 9.4000e-004 | 73.1604 |
| Mobile | 0.0738 | 0.2963 | 0.9016 | 3.2800e-003 | 0.3013 | 2.5300e-003 | 0.3038 | 0.0807 | 2.3600e-003 | 0.0830 | 0.0000 | 302.6972 | 302.6972 | 0.0152 | 0.0000 | 303.0765 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 4.9936 | 0.0000 | 4.9936 | 0.2951 | 0.0000 | 12.3714 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.4630 | 9.5512 | 10.0142 | 0.0479 | 1.2000e-003 | 11.5711 |
| **Total** | **2.0283** | **0.3572** | **3.0313** | **6.5500e-003** | **0.3013** | **0.2678** | **0.5691** | **0.0807** | **0.2676** | **0.3483** | **28.7196** | **397.5434** | **426.2630** | **0.3610** | **4.4100e-003** | **436.6037** |

| | ROG | NOx | 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** | **0.01** | **0.48** | **0.02** | **0.15** | **0.00** | **0.05** | **0.02** | **0.00** | **0.05** | **0.04** | **5.84** | **8.85** | **8.65** | **23.64** | **12.33** | **9.03** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Onsite Demolition & Clearing | Demolition | 6/1/2022 | 6/10/2022 | 5 | 8 | |
| 2 | Offsite Demolition & Clearing | Demolition | 6/1/2022 | 6/7/2022 | 5 | 5 | |
| 3 | Onsite Grading | Grading | 6/13/2022 | 7/15/2022 | 5 | 25 | |
| 4 | Offsite Grading & Excavation | Grading | 6/16/2022 | 6/24/2022 | 5 | 7 | |
| 5 | Offsite Sewer, Storm Drain, and Water | Grading | 6/27/2022 | 8/19/2022 | 5 | 40 | |
| 6 | Onsite Sewer, Storm Drain, and Water | Grading | 7/13/2022 | 9/13/2022 | 5 | 45 | |
| 7 | Onsite Retaining Walls | Building Construction | 8/4/2022 | 8/31/2022 | 5 | 20 | |
| 8 | Offsite Dry Utilities | Grading | 8/15/2022 | 9/16/2022 | 5 | 25 | |
| 9 | Onsite Fencing | Building Construction | 9/1/2022 | 9/28/2022 | 5 | 20 | |
| 10 | Onsite Dry Utilities | Grading | 9/12/2022 | 9/30/2022 | 5 | 15 | |
| 11 | Offsite Concrete Flatwork and Paving | Paving | 9/19/2022 | 10/21/2022 | 5 | 25 | |
| 12 | Onsite Concrete Flatwork and Paving | Paving | 10/3/2022 | 11/4/2022 | 5 | 25 | |
| 13 | Offsite Parkway Landscaping | Site Preparation | 10/24/2022 | 11/4/2022 | 5 | 10 | |
| 14 | Onsite Parkway Landscaping | Site Preparation | 11/7/2022 | 11/18/2022 | 5 | 10 | |

**Acres of Grading (Site Preparation Phase): 0**

**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 |
|---|---|---|---|---|---|
| Offsite Sewer, Storm Drain, and Water | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Offsite Dry Utilities | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |

| | | | | | |
|---|---|---|---|---|---|
| Onsite Sewer, Storm Drain, and Water | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Onsite Dry Utilities | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Offsite Parkway Landscaping | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Onsite Parkway Landscaping | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Onsite Retaining Walls | Welders | 0 | 8.00 | 46 | 0.45 |
| Onsite Fencing | Welders | 0 | 8.00 | 46 | 0.45 |
| Onsite Demolition & Clearing | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Onsite Demolition & Clearing | Dumpers/Tenders | 1 | 4.00 | 16 | 0.38 |
| Onsite Demolition & Clearing | Crawler Tractors | 1 | 8.00 | 212 | 0.43 |
| Onsite Grading | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Onsite Grading | Crawler Tractors | 1 | 8.00 | 212 | 0.43 |
| Onsite Sewer, Storm Drain, and Water | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Onsite Dry Utilities | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Onsite Concrete Flatwork and Paving | Skid Steer Loaders | 2 | 8.00 | 65 | 0.37 |
| Onsite Concrete Flatwork and Paving | Graders | 1 | 8.00 | 187 | 0.41 |
| Onsite Concrete Flatwork and Paving | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Onsite Parkway Landscaping | Forklifts | 1 | 8.00 | 89 | 0.20 |
| Onsite Parkway Landscaping | Skid Steer Loaders | 3 | 8.00 | 65 | 0.37 |
| Offsite Demolition & Clearing | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Demolition & Clearing | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Offsite Demolition & Clearing | Graders | 1 | 8.00 | 187 | 0.41 |
| Offsite Demolition & Clearing | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Offsite Grading & Excavation | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Grading & Excavation | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Offsite Sewer, Storm Drain, and Water | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Dry Utilities | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Offsite Concrete Flatwork and Paving | Skid Steer Loaders | 2 | 8.00 | 65 | 0.37 |

| | | | | | |
|---|---|---|---|---|---|
| Offsite Concrete Flatwork and Paving | Graders | 1 | 8.00 | 187 | 0.41 |
| Offsite Concrete Flatwork and Paving | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Parkway Landscaping | Forklifts | 1 | 8.00 | 89 | 0.20 |
| Offsite Parkway Landscaping | Skid Steer Loaders | 3 | 8.00 | 65 | 0.37 |
| Offsite Demolition & Clearing | Concrete/Industrial Saws | 0 | 8.00 | 81 | 0.73 |
| Onsite Demolition & Clearing | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Demolition & Clearing | Concrete/Industrial Saws | 0 | 8.00 | 81 | 0.73 |
| Onsite Grading | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Retaining Walls | Cranes | 0 | 7.00 | 231 | 0.29 |
| Onsite Fencing | Cranes | 0 | 7.00 | 231 | 0.29 |
| Offsite Demolition & Clearing | Excavators | 0 | 8.00 | 158 | 0.38 |
| Offsite Grading & Excavation | Excavators | 0 | 8.00 | 158 | 0.38 |
| Offsite Sewer, Storm Drain, and Water | Excavators | 1 | 8.00 | 158 | 0.38 |
| Onsite Demolition & Clearing | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Offsite Dry Utilities | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Onsite Grading | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Onsite Sewer, Storm Drain, and Water | Excavators | 1 | 8.00 | 158 | 0.38 |
| Onsite Dry Utilities | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Retaining Walls | Forklifts | 1 | 8.00 | 89 | 0.20 |
| Onsite Grading | Scrapers | 4 | 8.00 | 367 | 0.48 |
| Onsite Fencing | Forklifts | 1 | 8.00 | 89 | 0.20 |
| Onsite Retaining Walls | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Onsite Fencing | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Offsite Grading & Excavation | Graders | 1 | 8.00 | 187 | 0.41 |
| Offsite Sewer, Storm Drain, and Water | Graders | 0 | 8.00 | 187 | 0.41 |

| | | | | | |
|---|---|---|---|---|---|
| Offsite Dry Utilities | Graders | 0 | 8.00 | 187 | 0.41 |
| Onsite Sewer, Storm Drain, and Water | Graders | 0 | 8.00 | 187 | 0.41 |
| Onsite Dry Utilities | Graders | 0 | 8.00 | 187 | 0.41 |
| Offsite Concrete Flatwork and Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Onsite Concrete Flatwork and Paving | Pavers | 1 | 8.00 | 130 | 0.42 |
| Offsite Concrete Flatwork and Paving | Paving Equipment | 0 | 8.00 | 132 | 0.36 |
| Onsite Concrete Flatwork and Paving | Paving Equipment | 0 | 8.00 | 132 | 0.36 |
| Offsite Concrete Flatwork and Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Onsite Concrete Flatwork and Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Offsite Demolition & Clearing | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Grading & Excavation | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Sewer, Storm Drain, and Water | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Dry Utilities | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Sewer, Storm Drain, and Water | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Dry Utilities | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Parkway Landscaping | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Parkway Landscaping | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Grading & Excavation | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Offsite Sewer, Storm Drain, and Water | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Offsite Dry Utilities | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Onsite Sewer, Storm Drain, and Water | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Onsite Dry Utilities | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Onsite Retaining Walls | Tractors/Loaders/Backhoes | 0 | 7.00 | 97 | 0.37 |
| Onsite Fencing | Tractors/Loaders/Backhoes | 0 | 7.00 | 97 | 0.37 |
| Offsite Grading & Excavation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |

**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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Onsite Demolition & Clearing | 3 | 8.00 | 0.00 | 23.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Retaining Walls | 1 | 10.00 | 3.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Grading | 8 | 20.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Fencing | 1 | 10.00 | 3.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Demolition & Clearing | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Grading & Excavation | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Sewer, Storm Drain, and Water | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Dry Utilities | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Sewer, Storm Drain, and Water | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Dry Utilities | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Concrete Flatwork and Paving | 8 | 20.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Concrete Flatwork and Paving | 7 | 18.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Parkway Landscaping | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Parkway Landscaping | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

## 3.2 Onsite Demolition & Clearing - 2022

### 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 | | | | | 2.4900e-003 | 0.0000 | 2.4900e-003 | 3.8000e-004 | 0.0000 | 3.8000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.2800e-003 | 0.0371 | 0.0159 | 6.0000e-005 | | 1.3500e-003 | 1.3500e-003 | | 1.2400e-003 | 1.2400e-003 | 0.0000 | 5.0627 | 5.0627 | 1.6100e-003 | 0.0000 | 5.1030 |
| **Total** | **3.2800e-003** | **0.0371** | **0.0159** | **6.0000e-005** | **2.4900e-003** | **1.3500e-003** | **3.8400e-003** | **3.8000e-004** | **1.2400e-003** | **1.6200e-003** | **0.0000** | **5.0627** | **5.0627** | **1.6100e-003** | **0.0000** | **5.1030** |

### 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 | 8.0000e-005 | 2.7500e-003 | 7.4000e-004 | 1.0000e-005 | 2.0000e-004 | 1.0000e-005 | 2.0000e-004 | 5.0000e-005 | 1.0000e-005 | 6.0000e-005 | 0.0000 | 0.8644 | 0.8644 | 8.0000e-005 | 0.0000 | 0.8663 |
| 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 | 1.1000e-004 | 7.0000e-005 | 7.4000e-004 | 0.0000 | 2.6000e-004 | 0.0000 | 2.6000e-004 | 7.0000e-005 | 0.0000 | 7.0000e-005 | 0.0000 | 0.2160 | 0.2160 | 1.0000e-005 | 0.0000 | 0.2161 |
| **Total** | **1.9000e-004** | **2.8200e-003** | **1.4800e-003** | **1.0000e-005** | **4.6000e-004** | **1.0000e-005** | **4.6000e-004** | **1.2000e-004** | **1.0000e-005** | **1.3000e-004** | **0.0000** | **1.0803** | **1.0803** | **9.0000e-005** | **0.0000** | **1.0824** |

## 3.2 Onsite Demolition & Clearing - 2022

### 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 | | | | | 1.1200e-003 | 0.0000 | 1.1200e-003 | 1.7000e-004 | 0.0000 | 1.7000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.2800e-003 | 0.0371 | 0.0159 | 6.0000e-005 | | 1.3500e-003 | 1.3500e-003 | | 1.2400e-003 | 1.2400e-003 | 0.0000 | 5.0627 | 5.0627 | 1.6100e-003 | 0.0000 | 5.1030 |
| **Total** | **3.2800e-003** | **0.0371** | **0.0159** | **6.0000e-005** | **1.1200e-003** | **1.3500e-003** | **2.4700e-003** | **1.7000e-004** | **1.2400e-003** | **1.4100e-003** | **0.0000** | **5.0627** | **5.0627** | **1.6100e-003** | **0.0000** | **5.1030** |

### 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 | 8.0000e-005 | 2.7500e-003 | 7.4000e-004 | 1.0000e-005 | 2.0000e-004 | 1.0000e-005 | 2.0000e-004 | 5.0000e-005 | 1.0000e-005 | 6.0000e-005 | 0.0000 | 0.8644 | 0.8644 | 8.0000e-005 | 0.0000 | 0.8663 |
| 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 | 1.1000e-004 | 7.0000e-005 | 7.4000e-004 | 0.0000 | 2.6000e-004 | 0.0000 | 2.6000e-004 | 7.0000e-005 | 0.0000 | 7.0000e-005 | 0.0000 | 0.2160 | 0.2160 | 1.0000e-005 | 0.0000 | 0.2161 |
| **Total** | **1.9000e-004** | **2.8200e-003** | **1.4800e-003** | **1.0000e-005** | **4.6000e-004** | **1.0000e-005** | **4.6000e-004** | **1.2000e-004** | **1.0000e-005** | **1.3000e-004** | **0.0000** | **1.0803** | **1.0803** | **9.0000e-005** | **0.0000** | **1.0824** |

## 3.3 Offsite Demolition & Clearing - 2022

### 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 | | | | | |
| Off-Road | 2.3500e-003 | 0.0272 | 0.0172 | 5.0000e-005 | | 9.8000e-004 | 9.8000e-004 | | 9.0000e-004 | 9.0000e-004 | 0.0000 | 3.9657 | 3.9657 | 1.2800e-003 | 0.0000 | 3.9978 |
| **Total** | **2.3500e-003** | **0.0272** | **0.0172** | **5.0000e-005** | | **9.8000e-004** | **9.8000e-004** | | **9.0000e-004** | **9.0000e-004** | **0.0000** | **3.9657** | **3.9657** | **1.2800e-003** | **0.0000** | **3.9978** |

### 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 | 8.0000e-005 | 6.0000e-005 | 5.8000e-004 | 0.0000 | 2.0000e-004 | 0.0000 | 2.0000e-004 | 5.0000e-005 | 0.0000 | 5.0000e-005 | 0.0000 | 0.1687 | 0.1687 | 0.0000 | 0.0000 | 0.1688 |
| **Total** | **8.0000e-005** | **6.0000e-005** | **5.8000e-004** | **0.0000** | **2.0000e-004** | **0.0000** | **2.0000e-004** | **5.0000e-005** | **0.0000** | **5.0000e-005** | **0.0000** | **0.1687** | **0.1687** | **0.0000** | **0.0000** | **0.1688** |

## 3.3 Offsite Demolition & Clearing - 2022

### 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 | | | | | |
| Off-Road | 2.3500e-003 | 0.0272 | 0.0172 | 5.0000e-005 | | 9.8000e-004 | 9.8000e-004 | | 9.0000e-004 | 9.0000e-004 | 0.0000 | 3.9657 | 3.9657 | 1.2800e-003 | 0.0000 | 3.9978 |
| **Total** | **2.3500e-003** | **0.0272** | **0.0172** | **5.0000e-005** | | **9.8000e-004** | **9.8000e-004** | | **9.0000e-004** | **9.0000e-004** | **0.0000** | **3.9657** | **3.9657** | **1.2800e-003** | **0.0000** | **3.9978** |

### 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 | 8.0000e-005 | 6.0000e-005 | 5.8000e-004 | 0.0000 | 2.0000e-004 | 0.0000 | 2.0000e-004 | 5.0000e-005 | 0.0000 | 5.0000e-005 | 0.0000 | 0.1687 | 0.1687 | 0.0000 | 0.0000 | 0.1688 |
| **Total** | **8.0000e-005** | **6.0000e-005** | **5.8000e-004** | **0.0000** | **2.0000e-004** | **0.0000** | **2.0000e-004** | **5.0000e-005** | **0.0000** | **5.0000e-005** | **0.0000** | **0.1687** | **0.1687** | **0.0000** | **0.0000** | **0.1688** |

## 3.4 Onsite Grading - 2022

### 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 | | | | | 0.1416 | 0.0000 | 0.1416 | 0.0485 | 0.0000 | 0.0485 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0636 | 0.7095 | 0.4314 | 1.0700e-003 | | 0.0280 | 0.0280 | | 0.0258 | 0.0258 | 0.0000 | 94.2215 | 94.2215 | 0.0305 | 0.0000 | 94.9833 |
| **Total** | **0.0636** | **0.7095** | **0.4314** | **1.0700e-003** | **0.1416** | **0.0280** | **0.1696** | **0.0485** | **0.0258** | **0.0743** | **0.0000** | **94.2215** | **94.2215** | **0.0305** | **0.0000** | **94.9833** |

### 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 | 8.2000e-004 | 5.7000e-004 | 5.8000e-003 | 2.0000e-005 | 2.0000e-003 | 1.0000e-005 | 2.0200e-003 | 5.3000e-004 | 1.0000e-005 | 5.5000e-004 | 0.0000 | 1.6871 | 1.6871 | 5.0000e-005 | 0.0000 | 1.6883 |
| **Total** | **8.2000e-004** | **5.7000e-004** | **5.8000e-003** | **2.0000e-005** | **2.0000e-003** | **1.0000e-005** | **2.0200e-003** | **5.3000e-004** | **1.0000e-005** | **5.5000e-004** | **0.0000** | **1.6871** | **1.6871** | **5.0000e-005** | **0.0000** | **1.6883** |

## 3.4 Onsite Grading - 2022

### 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 | | | | | 0.0637 | 0.0000 | 0.0637 | 0.0218 | 0.0000 | 0.0218 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0636 | 0.7095 | 0.4314 | 1.0700e-003 | | 0.0280 | 0.0280 | | 0.0258 | 0.0258 | 0.0000 | 94.2214 | 94.2214 | 0.0305 | 0.0000 | 94.9832 |
| **Total** | **0.0636** | **0.7095** | **0.4314** | **1.0700e-003** | **0.0637** | **0.0280** | **0.0917** | **0.0218** | **0.0258** | **0.0476** | **0.0000** | **94.2214** | **94.2214** | **0.0305** | **0.0000** | **94.9832** |

### 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 | 8.2000e-004 | 5.7000e-004 | 5.8000e-003 | 2.0000e-005 | 2.0000e-003 | 1.0000e-005 | 2.0200e-003 | 5.3000e-004 | 1.0000e-005 | 5.5000e-004 | 0.0000 | 1.6871 | 1.6871 | 5.0000e-005 | 0.0000 | 1.6883 |
| **Total** | **8.2000e-004** | **5.7000e-004** | **5.8000e-003** | **2.0000e-005** | **2.0000e-003** | **1.0000e-005** | **2.0200e-003** | **5.3000e-004** | **1.0000e-005** | **5.5000e-004** | **0.0000** | **1.6871** | **1.6871** | **5.0000e-005** | **0.0000** | **1.6883** |

## 3.5 Offsite Grading & Excavation - 2022

### 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 | | | | | 1.8600e-003 | 0.0000 | 1.8600e-003 | 2.0000e-004 | 0.0000 | 2.0000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.2900e-003 | 0.0381 | 0.0241 | 6.0000e-005 | | 1.3800e-003 | 1.3800e-003 | | 1.2700e-003 | 1.2700e-003 | 0.0000 | 5.5520 | 5.5520 | 1.8000e-003 | 0.0000 | 5.5969 |
| **Total** | **3.2900e-003** | **0.0381** | **0.0241** | **6.0000e-005** | **1.8600e-003** | **1.3800e-003** | **3.2400e-003** | **2.0000e-004** | **1.2700e-003** | **1.4700e-003** | **0.0000** | **5.5520** | **5.5520** | **1.8000e-003** | **0.0000** | **5.5969** |

### 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 | 1.2000e-004 | 8.0000e-005 | 8.1000e-004 | 0.0000 | 2.8000e-004 | 0.0000 | 2.8000e-004 | 7.0000e-005 | 0.0000 | 8.0000e-005 | 0.0000 | 0.2362 | 0.2362 | 1.0000e-005 | 0.0000 | 0.2364 |
| **Total** | **1.2000e-004** | **8.0000e-005** | **8.1000e-004** | **0.0000** | **2.8000e-004** | **0.0000** | **2.8000e-004** | **7.0000e-005** | **0.0000** | **8.0000e-005** | **0.0000** | **0.2362** | **0.2362** | **1.0000e-005** | **0.0000** | **0.2364** |

## 3.5 Offsite Grading & Excavation - 2022

### 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 | | | | | 8.4000e-004 | 0.0000 | 8.4000e-004 | 9.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.2900e-003 | 0.0381 | 0.0241 | 6.0000e-005 | | 1.3800e-003 | 1.3800e-003 | | 1.2700e-003 | 1.2700e-003 | 0.0000 | 5.5520 | 5.5520 | 1.8000e-003 | 0.0000 | 5.5969 |
| **Total** | **3.2900e-003** | **0.0381** | **0.0241** | **6.0000e-005** | **8.4000e-004** | **1.3800e-003** | **2.2200e-003** | **9.0000e-005** | **1.2700e-003** | **1.3600e-003** | **0.0000** | **5.5520** | **5.5520** | **1.8000e-003** | **0.0000** | **5.5969** |

### 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 | 1.2000e-004 | 8.0000e-005 | 8.1000e-004 | 0.0000 | 2.8000e-004 | 0.0000 | 2.8000e-004 | 7.0000e-005 | 0.0000 | 8.0000e-005 | 0.0000 | 0.2362 | 0.2362 | 1.0000e-005 | 0.0000 | 0.2364 |
| **Total** | **1.2000e-004** | **8.0000e-005** | **8.1000e-004** | **0.0000** | **2.8000e-004** | **0.0000** | **2.8000e-004** | **7.0000e-005** | **0.0000** | **8.0000e-005** | **0.0000** | **0.2362** | **0.2362** | **1.0000e-005** | **0.0000** | **0.2364** |

## 3.6 Offsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0132 | 0.1296 | 0.1405 | 2.9000e-004 | | 5.5500e-003 | 5.5500e-003 | | 5.1100e-003 | 5.1100e-003 | 0.0000 | 25.5267 | 25.5267 | 8.2600e-003 | 0.0000 | 25.7331 |
| **Total** | **0.0132** | **0.1296** | **0.1405** | **2.9000e-004** | **0.0000** | **5.5500e-003** | **5.5500e-003** | **0.0000** | **5.1100e-003** | **5.1100e-003** | **0.0000** | **25.5267** | **25.5267** | **8.2600e-003** | **0.0000** | **25.7331** |

### 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 | 5.3000e-004 | 3.6000e-004 | 3.7100e-003 | 1.0000e-005 | 1.2800e-003 | 1.0000e-005 | 1.2900e-003 | 3.4000e-004 | 1.0000e-005 | 3.5000e-004 | 0.0000 | 1.0798 | 1.0798 | 3.0000e-005 | 0.0000 | 1.0805 |
| **Total** | **5.3000e-004** | **3.6000e-004** | **3.7100e-003** | **1.0000e-005** | **1.2800e-003** | **1.0000e-005** | **1.2900e-003** | **3.4000e-004** | **1.0000e-005** | **3.5000e-004** | **0.0000** | **1.0798** | **1.0798** | **3.0000e-005** | **0.0000** | **1.0805** |

## 3.6 Offsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0132 | 0.1296 | 0.1405 | 2.9000e-004 | | 5.5500e-003 | 5.5500e-003 | | 5.1100e-003 | 5.1100e-003 | 0.0000 | 25.5267 | 25.5267 | 8.2600e-003 | 0.0000 | 25.7331 |
| **Total** | **0.0132** | **0.1296** | **0.1405** | **2.9000e-004** | **0.0000** | **5.5500e-003** | **5.5500e-003** | **0.0000** | **5.1100e-003** | **5.1100e-003** | **0.0000** | **25.5267** | **25.5267** | **8.2600e-003** | **0.0000** | **25.7331** |

### 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 | 5.3000e-004 | 3.6000e-004 | 3.7100e-003 | 1.0000e-005 | 1.2800e-003 | 1.0000e-005 | 1.2900e-003 | 3.4000e-004 | 1.0000e-005 | 3.5000e-004 | 0.0000 | 1.0798 | 1.0798 | 3.0000e-005 | 0.0000 | 1.0805 |
| **Total** | **5.3000e-004** | **3.6000e-004** | **3.7100e-003** | **1.0000e-005** | **1.2800e-003** | **1.0000e-005** | **1.2900e-003** | **3.4000e-004** | **1.0000e-005** | **3.5000e-004** | **0.0000** | **1.0798** | **1.0798** | **3.0000e-005** | **0.0000** | **1.0805** |

## 3.7 Onsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0148 | 0.1458 | 0.1581 | 3.3000e-004 | | 6.2400e-003 | 6.2400e-003 | | 5.7400e-003 | 5.7400e-003 | 0.0000 | 28.7175 | 28.7175 | 9.2900e-003 | 0.0000 | 28.9497 |
| **Total** | **0.0148** | **0.1458** | **0.1581** | **3.3000e-004** | **0.0000** | **6.2400e-003** | **6.2400e-003** | **0.0000** | **5.7400e-003** | **5.7400e-003** | **0.0000** | **28.7175** | **28.7175** | **9.2900e-003** | **0.0000** | **28.9497** |

### 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 | 5.9000e-004 | 4.1000e-004 | 4.1700e-003 | 1.0000e-005 | 1.4400e-003 | 1.0000e-005 | 1.4500e-003 | 3.8000e-004 | 1.0000e-005 | 3.9000e-004 | 0.0000 | 1.2147 | 1.2147 | 3.0000e-005 | 0.0000 | 1.2155 |
| **Total** | **5.9000e-004** | **4.1000e-004** | **4.1700e-003** | **1.0000e-005** | **1.4400e-003** | **1.0000e-005** | **1.4500e-003** | **3.8000e-004** | **1.0000e-005** | **3.9000e-004** | **0.0000** | **1.2147** | **1.2147** | **3.0000e-005** | **0.0000** | **1.2155** |

## 3.7 Onsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0148 | 0.1458 | 0.1581 | 3.3000e-004 | | 6.2400e-003 | 6.2400e-003 | | 5.7400e-003 | 5.7400e-003 | 0.0000 | 28.7175 | 28.7175 | 9.2900e-003 | 0.0000 | 28.9497 |
| **Total** | **0.0148** | **0.1458** | **0.1581** | **3.3000e-004** | **0.0000** | **6.2400e-003** | **6.2400e-003** | **0.0000** | **5.7400e-003** | **5.7400e-003** | **0.0000** | **28.7175** | **28.7175** | **9.2900e-003** | **0.0000** | **28.9497** |

### 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 | 5.9000e-004 | 4.1000e-004 | 4.1700e-003 | 1.0000e-005 | 1.4400e-003 | 1.0000e-005 | 1.4500e-003 | 3.8000e-004 | 1.0000e-005 | 3.9000e-004 | 0.0000 | 1.2147 | 1.2147 | 3.0000e-005 | 0.0000 | 1.2155 |
| **Total** | **5.9000e-004** | **4.1000e-004** | **4.1700e-003** | **1.0000e-005** | **1.4400e-003** | **1.0000e-005** | **1.4500e-003** | **3.8000e-004** | **1.0000e-005** | **3.9000e-004** | **0.0000** | **1.2147** | **1.2147** | **3.0000e-005** | **0.0000** | **1.2155** |

## 3.8 Onsite Retaining Walls - 2022

### 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 | | | | | |
| Off-Road | 1.1400e-003 | 0.0106 | 0.0115 | 2.0000e-005 | | 7.0000e-004 | 7.0000e-004 | | 6.4000e-004 | 6.4000e-004 | 0.0000 | 1.3429 | 1.3429 | 4.3000e-004 | 0.0000 | 1.3538 |
| **Total** | **1.1400e-003** | **0.0106** | **0.0115** | **2.0000e-005** | | **7.0000e-004** | **7.0000e-004** | | **6.4000e-004** | **6.4000e-004** | **0.0000** | **1.3429** | **1.3429** | **4.3000e-004** | **0.0000** | **1.3538** |

### 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 | 9.0000e-005 | 2.9100e-003 | 7.8000e-004 | 1.0000e-005 | 2.0000e-004 | 1.0000e-005 | 2.0000e-004 | 6.0000e-005 | 1.0000e-005 | 6.0000e-005 | 0.0000 | 0.7769 | 0.7769 | 6.0000e-005 | 0.0000 | 0.7783 |
| Worker | 3.3000e-004 | 2.3000e-004 | 2.3200e-003 | 1.0000e-005 | 8.0000e-004 | 1.0000e-005 | 8.1000e-004 | 2.1000e-004 | 1.0000e-005 | 2.2000e-004 | 0.0000 | 0.6748 | 0.6748 | 2.0000e-005 | 0.0000 | 0.6753 |
| **Total** | **4.2000e-004** | **3.1400e-003** | **3.1000e-003** | **2.0000e-005** | **1.0000e-003** | **2.0000e-005** | **1.0100e-003** | **2.7000e-004** | **2.0000e-005** | **2.8000e-004** | **0.0000** | **1.4517** | **1.4517** | **8.0000e-005** | **0.0000** | **1.4536** |

## 3.8 Onsite Retaining Walls - 2022

### 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 | | | | | |
| Off-Road | 1.1400e-003 | 0.0106 | 0.0115 | 2.0000e-005 | | 7.0000e-004 | 7.0000e-004 | | 6.4000e-004 | 6.4000e-004 | 0.0000 | 1.3429 | 1.3429 | 4.3000e-004 | 0.0000 | 1.3538 |
| **Total** | **1.1400e-003** | **0.0106** | **0.0115** | **2.0000e-005** | | **7.0000e-004** | **7.0000e-004** | | **6.4000e-004** | **6.4000e-004** | **0.0000** | **1.3429** | **1.3429** | **4.3000e-004** | **0.0000** | **1.3538** |

### 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 | 9.0000e-005 | 2.9100e-003 | 7.8000e-004 | 1.0000e-005 | 2.0000e-004 | 1.0000e-005 | 2.0000e-004 | 6.0000e-005 | 1.0000e-005 | 6.0000e-005 | 0.0000 | 0.7769 | 0.7769 | 6.0000e-005 | 0.0000 | 0.7783 |
| Worker | 3.3000e-004 | 2.3000e-004 | 2.3200e-003 | 1.0000e-005 | 8.0000e-004 | 1.0000e-005 | 8.1000e-004 | 2.1000e-004 | 1.0000e-005 | 2.2000e-004 | 0.0000 | 0.6748 | 0.6748 | 2.0000e-005 | 0.0000 | 0.6753 |
| **Total** | **4.2000e-004** | **3.1400e-003** | **3.1000e-003** | **2.0000e-005** | **1.0000e-003** | **2.0000e-005** | **1.0100e-003** | **2.7000e-004** | **2.0000e-005** | **2.8000e-004** | **0.0000** | **1.4517** | **1.4517** | **8.0000e-005** | **0.0000** | **1.4536** |

## 3.9 Offsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 4.9900e-003 | 0.0535 | 0.0733 | 1.0000e-004 | | 2.6800e-003 | 2.6800e-003 | | 2.4700e-003 | 2.4700e-003 | 0.0000 | 9.1044 | 9.1044 | 2.9400e-003 | 0.0000 | 9.1780 |
| **Total** | **4.9900e-003** | **0.0535** | **0.0733** | **1.0000e-004** | **0.0000** | **2.6800e-003** | **2.6800e-003** | **0.0000** | **2.4700e-003** | **2.4700e-003** | **0.0000** | **9.1044** | **9.1044** | **2.9400e-003** | **0.0000** | **9.1780** |

### 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 | 3.3000e-004 | 2.3000e-004 | 2.3200e-003 | 1.0000e-005 | 8.0000e-004 | 1.0000e-005 | 8.1000e-004 | 2.1000e-004 | 1.0000e-005 | 2.2000e-004 | 0.0000 | 0.6748 | 0.6748 | 2.0000e-005 | 0.0000 | 0.6753 |
| **Total** | **3.3000e-004** | **2.3000e-004** | **2.3200e-003** | **1.0000e-005** | **8.0000e-004** | **1.0000e-005** | **8.1000e-004** | **2.1000e-004** | **1.0000e-005** | **2.2000e-004** | **0.0000** | **0.6748** | **0.6748** | **2.0000e-005** | **0.0000** | **0.6753** |

## 3.9 Offsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 4.9900e-003 | 0.0535 | 0.0733 | 1.0000e-004 | | 2.6800e-003 | 2.6800e-003 | | 2.4700e-003 | 2.4700e-003 | 0.0000 | 9.1044 | 9.1044 | 2.9400e-003 | 0.0000 | 9.1780 |
| **Total** | **4.9900e-003** | **0.0535** | **0.0733** | **1.0000e-004** | **0.0000** | **2.6800e-003** | **2.6800e-003** | **0.0000** | **2.4700e-003** | **2.4700e-003** | **0.0000** | **9.1044** | **9.1044** | **2.9400e-003** | **0.0000** | **9.1780** |

### 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 | 3.3000e-004 | 2.3000e-004 | 2.3200e-003 | 1.0000e-005 | 8.0000e-004 | 1.0000e-005 | 8.1000e-004 | 2.1000e-004 | 1.0000e-005 | 2.2000e-004 | 0.0000 | 0.6748 | 0.6748 | 2.0000e-005 | 0.0000 | 0.6753 |
| **Total** | **3.3000e-004** | **2.3000e-004** | **2.3200e-003** | **1.0000e-005** | **8.0000e-004** | **1.0000e-005** | **8.1000e-004** | **2.1000e-004** | **1.0000e-005** | **2.2000e-004** | **0.0000** | **0.6748** | **0.6748** | **2.0000e-005** | **0.0000** | **0.6753** |

## 3.10 Onsite Fencing - 2022

### 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 | | | | | |
| Off-Road | 1.1400e-003 | 0.0106 | 0.0115 | 2.0000e-005 | | 7.0000e-004 | 7.0000e-004 | | 6.4000e-004 | 6.4000e-004 | 0.0000 | 1.3429 | 1.3429 | 4.3000e-004 | 0.0000 | 1.3538 |
| **Total** | **1.1400e-003** | **0.0106** | **0.0115** | **2.0000e-005** | | **7.0000e-004** | **7.0000e-004** | | **6.4000e-004** | **6.4000e-004** | **0.0000** | **1.3429** | **1.3429** | **4.3000e-004** | **0.0000** | **1.3538** |

### 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 | 9.0000e-005 | 2.9100e-003 | 7.8000e-004 | 1.0000e-005 | 2.0000e-004 | 1.0000e-005 | 2.0000e-004 | 6.0000e-005 | 1.0000e-005 | 6.0000e-005 | 0.0000 | 0.7769 | 0.7769 | 6.0000e-005 | 0.0000 | 0.7783 |
| Worker | 3.3000e-004 | 2.3000e-004 | 2.3200e-003 | 1.0000e-005 | 8.0000e-004 | 1.0000e-005 | 8.1000e-004 | 2.1000e-004 | 1.0000e-005 | 2.2000e-004 | 0.0000 | 0.6748 | 0.6748 | 2.0000e-005 | 0.0000 | 0.6753 |
| **Total** | **4.2000e-004** | **3.1400e-003** | **3.1000e-003** | **2.0000e-005** | **1.0000e-003** | **2.0000e-005** | **1.0100e-003** | **2.7000e-004** | **2.0000e-005** | **2.8000e-004** | **0.0000** | **1.4517** | **1.4517** | **8.0000e-005** | **0.0000** | **1.4536** |

## 3.10 Onsite Fencing - 2022

### 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 | | | | | |
| Off-Road | 1.1400e-003 | 0.0106 | 0.0115 | 2.0000e-005 | | 7.0000e-004 | 7.0000e-004 | | 6.4000e-004 | 6.4000e-004 | 0.0000 | 1.3429 | 1.3429 | 4.3000e-004 | 0.0000 | 1.3538 |
| **Total** | **1.1400e-003** | **0.0106** | **0.0115** | **2.0000e-005** | | **7.0000e-004** | **7.0000e-004** | | **6.4000e-004** | **6.4000e-004** | **0.0000** | **1.3429** | **1.3429** | **4.3000e-004** | **0.0000** | **1.3538** |

### 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 | 9.0000e-005 | 2.9100e-003 | 7.8000e-004 | 1.0000e-005 | 2.0000e-004 | 1.0000e-005 | 2.0000e-004 | 6.0000e-005 | 1.0000e-005 | 6.0000e-005 | 0.0000 | 0.7769 | 0.7769 | 6.0000e-005 | 0.0000 | 0.7783 |
| Worker | 3.3000e-004 | 2.3000e-004 | 2.3200e-003 | 1.0000e-005 | 8.0000e-004 | 1.0000e-005 | 8.1000e-004 | 2.1000e-004 | 1.0000e-005 | 2.2000e-004 | 0.0000 | 0.6748 | 0.6748 | 2.0000e-005 | 0.0000 | 0.6753 |
| **Total** | **4.2000e-004** | **3.1400e-003** | **3.1000e-003** | **2.0000e-005** | **1.0000e-003** | **2.0000e-005** | **1.0100e-003** | **2.7000e-004** | **2.0000e-005** | **2.8000e-004** | **0.0000** | **1.4517** | **1.4517** | **8.0000e-005** | **0.0000** | **1.4536** |

## 3.11 Onsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.9900e-003 | 0.0321 | 0.0440 | 6.0000e-005 | | 1.6100e-003 | 1.6100e-003 | | 1.4800e-003 | 1.4800e-003 | 0.0000 | 5.4626 | 5.4626 | 1.7700e-003 | 0.0000 | 5.5068 |
| **Total** | **2.9900e-003** | **0.0321** | **0.0440** | **6.0000e-005** | **0.0000** | **1.6100e-003** | **1.6100e-003** | **0.0000** | **1.4800e-003** | **1.4800e-003** | **0.0000** | **5.4626** | **5.4626** | **1.7700e-003** | **0.0000** | **5.5068** |

### 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 | 2.0000e-004 | 1.4000e-004 | 1.3900e-003 | 0.0000 | 4.8000e-004 | 0.0000 | 4.8000e-004 | 1.3000e-004 | 0.0000 | 1.3000e-004 | 0.0000 | 0.4049 | 0.4049 | 1.0000e-005 | 0.0000 | 0.4052 |
| **Total** | **2.0000e-004** | **1.4000e-004** | **1.3900e-003** | **0.0000** | **4.8000e-004** | **0.0000** | **4.8000e-004** | **1.3000e-004** | **0.0000** | **1.3000e-004** | **0.0000** | **0.4049** | **0.4049** | **1.0000e-005** | **0.0000** | **0.4052** |

## 3.11 Onsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.9900e-003 | 0.0321 | 0.0440 | 6.0000e-005 | | 1.6100e-003 | 1.6100e-003 | | 1.4800e-003 | 1.4800e-003 | 0.0000 | 5.4626 | 5.4626 | 1.7700e-003 | 0.0000 | 5.5068 |
| **Total** | **2.9900e-003** | **0.0321** | **0.0440** | **6.0000e-005** | **0.0000** | **1.6100e-003** | **1.6100e-003** | **0.0000** | **1.4800e-003** | **1.4800e-003** | **0.0000** | **5.4626** | **5.4626** | **1.7700e-003** | **0.0000** | **5.5068** |

### 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 | 2.0000e-004 | 1.4000e-004 | 1.3900e-003 | 0.0000 | 4.8000e-004 | 0.0000 | 4.8000e-004 | 1.3000e-004 | 0.0000 | 1.3000e-004 | 0.0000 | 0.4049 | 0.4049 | 1.0000e-005 | 0.0000 | 0.4052 |
| **Total** | **2.0000e-004** | **1.4000e-004** | **1.3900e-003** | **0.0000** | **4.8000e-004** | **0.0000** | **4.8000e-004** | **1.3000e-004** | **0.0000** | **1.3000e-004** | **0.0000** | **0.4049** | **0.4049** | **1.0000e-005** | **0.0000** | **0.4052** |

## 3.12 Offsite Concrete Flatwork and Paving - 2022

### 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 | | | | | |
| Off-Road | 0.0199 | 0.2224 | 0.1940 | 4.0000e-004 | | 9.2000e-003 | 9.2000e-003 | | 8.4600e-003 | 8.4600e-003 | 0.0000 | 34.7730 | 34.7730 | 0.0113 | 0.0000 | 35.0541 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0199** | **0.2224** | **0.1940** | **4.0000e-004** | | **9.2000e-003** | **9.2000e-003** | | **8.4600e-003** | **8.4600e-003** | **0.0000** | **34.7730** | **34.7730** | **0.0113** | **0.0000** | **35.0541** |

### 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 | 8.2000e-004 | 5.7000e-004 | 5.8000e-003 | 2.0000e-005 | 2.0000e-003 | 1.0000e-005 | 2.0200e-003 | 5.3000e-004 | 1.0000e-005 | 5.5000e-004 | 0.0000 | 1.6871 | 1.6871 | 5.0000e-005 | 0.0000 | 1.6883 |
| **Total** | **8.2000e-004** | **5.7000e-004** | **5.8000e-003** | **2.0000e-005** | **2.0000e-003** | **1.0000e-005** | **2.0200e-003** | **5.3000e-004** | **1.0000e-005** | **5.5000e-004** | **0.0000** | **1.6871** | **1.6871** | **5.0000e-005** | **0.0000** | **1.6883** |

## 3.12 Offsite Concrete Flatwork and Paving - 2022

### 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 | | | | | |
| Off-Road | 0.0199 | 0.2224 | 0.1940 | 4.0000e-004 | | 9.2000e-003 | 9.2000e-003 | | 8.4600e-003 | 8.4600e-003 | 0.0000 | 34.7729 | 34.7729 | 0.0113 | 0.0000 | 35.0541 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0199** | **0.2224** | **0.1940** | **4.0000e-004** | | **9.2000e-003** | **9.2000e-003** | | **8.4600e-003** | **8.4600e-003** | **0.0000** | **34.7729** | **34.7729** | **0.0113** | **0.0000** | **35.0541** |

### 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 | 8.2000e-004 | 5.7000e-004 | 5.8000e-003 | 2.0000e-005 | 2.0000e-003 | 1.0000e-005 | 2.0200e-003 | 5.3000e-004 | 1.0000e-005 | 5.5000e-004 | 0.0000 | 1.6871 | 1.6871 | 5.0000e-005 | 0.0000 | 1.6883 |
| **Total** | **8.2000e-004** | **5.7000e-004** | **5.8000e-003** | **2.0000e-005** | **2.0000e-003** | **1.0000e-005** | **2.0200e-003** | **5.3000e-004** | **1.0000e-005** | **5.5000e-004** | **0.0000** | **1.6871** | **1.6871** | **5.0000e-005** | **0.0000** | **1.6883** |

## 3.13 Onsite Concrete Flatwork and Paving - 2022

### 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 | | | | | |
| Off-Road | 0.0173 | 0.1961 | 0.1579 | 3.4000e-004 | | 7.9500e-003 | 7.9500e-003 | | 7.3200e-003 | 7.3200e-003 | 0.0000 | 29.6104 | 29.6104 | 9.5800e-003 | 0.0000 | 29.8498 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0173** | **0.1961** | **0.1579** | **3.4000e-004** | | **7.9500e-003** | **7.9500e-003** | | **7.3200e-003** | **7.3200e-003** | **0.0000** | **29.6104** | **29.6104** | **9.5800e-003** | **0.0000** | **29.8498** |

### 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 | 7.4000e-004 | 5.1000e-004 | 5.2200e-003 | 2.0000e-005 | 1.8000e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.5184 | 1.5184 | 4.0000e-005 | 0.0000 | 1.5194 |
| **Total** | **7.4000e-004** | **5.1000e-004** | **5.2200e-003** | **2.0000e-005** | **1.8000e-003** | **1.0000e-005** | **1.8200e-003** | **4.8000e-004** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **1.5184** | **1.5184** | **4.0000e-005** | **0.0000** | **1.5194** |

## 3.13 Onsite Concrete Flatwork and Paving - 2022

### 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 | | | | | |
| Off-Road | 0.0173 | 0.1961 | 0.1579 | 3.4000e-004 | | 7.9500e-003 | 7.9500e-003 | | 7.3200e-003 | 7.3200e-003 | 0.0000 | 29.6104 | 29.6104 | 9.5800e-003 | 0.0000 | 29.8498 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0173** | **0.1961** | **0.1579** | **3.4000e-004** | | **7.9500e-003** | **7.9500e-003** | | **7.3200e-003** | **7.3200e-003** | **0.0000** | **29.6104** | **29.6104** | **9.5800e-003** | **0.0000** | **29.8498** |

### 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 | 7.4000e-004 | 5.1000e-004 | 5.2200e-003 | 2.0000e-005 | 1.8000e-003 | 1.0000e-005 | 1.8200e-003 | 4.8000e-004 | 1.0000e-005 | 4.9000e-004 | 0.0000 | 1.5184 | 1.5184 | 4.0000e-005 | 0.0000 | 1.5194 |
| **Total** | **7.4000e-004** | **5.1000e-004** | **5.2200e-003** | **2.0000e-005** | **1.8000e-003** | **1.0000e-005** | **1.8200e-003** | **4.8000e-004** | **1.0000e-005** | **4.9000e-004** | **0.0000** | **1.5184** | **1.5184** | **4.0000e-005** | **0.0000** | **1.5194** |

## 3.14 Offsite Parkway Landscaping - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.6100e-003 | 0.0192 | 0.0266 | 4.0000e-005 | | 8.7000e-004 | 8.7000e-004 | | 8.0000e-004 | 8.0000e-004 | 0.0000 | 3.3983 | 3.3983 | 1.1000e-003 | 0.0000 | 3.4258 |
| **Total** | **1.6100e-003** | **0.0192** | **0.0266** | **4.0000e-005** | **0.0000** | **8.7000e-004** | **8.7000e-004** | **0.0000** | **8.0000e-004** | **8.0000e-004** | **0.0000** | **3.3983** | **3.3983** | **1.1000e-003** | **0.0000** | **3.4258** |

### 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 | 1.6000e-004 | 1.1000e-004 | 1.1600e-003 | 0.0000 | 4.0000e-004 | 0.0000 | 4.0000e-004 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.3374 | 0.3374 | 1.0000e-005 | 0.0000 | 0.3377 |
| **Total** | **1.6000e-004** | **1.1000e-004** | **1.1600e-003** | **0.0000** | **4.0000e-004** | **0.0000** | **4.0000e-004** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **0.3374** | **0.3374** | **1.0000e-005** | **0.0000** | **0.3377** |

## 3.14 Offsite Parkway Landscaping - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.6100e-003 | 0.0192 | 0.0266 | 4.0000e-005 | | 8.7000e-004 | 8.7000e-004 | | 8.0000e-004 | 8.0000e-004 | 0.0000 | 3.3983 | 3.3983 | 1.1000e-003 | 0.0000 | 3.4258 |
| **Total** | **1.6100e-003** | **0.0192** | **0.0266** | **4.0000e-005** | **0.0000** | **8.7000e-004** | **8.7000e-004** | **0.0000** | **8.0000e-004** | **8.0000e-004** | **0.0000** | **3.3983** | **3.3983** | **1.1000e-003** | **0.0000** | **3.4258** |

### 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 | 1.6000e-004 | 1.1000e-004 | 1.1600e-003 | 0.0000 | 4.0000e-004 | 0.0000 | 4.0000e-004 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.3374 | 0.3374 | 1.0000e-005 | 0.0000 | 0.3377 |
| **Total** | **1.6000e-004** | **1.1000e-004** | **1.1600e-003** | **0.0000** | **4.0000e-004** | **0.0000** | **4.0000e-004** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **0.3374** | **0.3374** | **1.0000e-005** | **0.0000** | **0.3377** |

## 3.15 Onsite Parkway Landscaping - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.6100e-003 | 0.0192 | 0.0266 | 4.0000e-005 | | 8.7000e-004 | 8.7000e-004 | | 8.0000e-004 | 8.0000e-004 | 0.0000 | 3.3983 | 3.3983 | 1.1000e-003 | 0.0000 | 3.4258 |
| **Total** | **1.6100e-003** | **0.0192** | **0.0266** | **4.0000e-005** | **0.0000** | **8.7000e-004** | **8.7000e-004** | **0.0000** | **8.0000e-004** | **8.0000e-004** | **0.0000** | **3.3983** | **3.3983** | **1.1000e-003** | **0.0000** | **3.4258** |

### 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 | 1.6000e-004 | 1.1000e-004 | 1.1600e-003 | 0.0000 | 4.0000e-004 | 0.0000 | 4.0000e-004 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.3374 | 0.3374 | 1.0000e-005 | 0.0000 | 0.3377 |
| **Total** | **1.6000e-004** | **1.1000e-004** | **1.1600e-003** | **0.0000** | **4.0000e-004** | **0.0000** | **4.0000e-004** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **0.3374** | **0.3374** | **1.0000e-005** | **0.0000** | **0.3377** |

### 3.15 Onsite Parkway Landscaping - 2022

**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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.6100e-003 | 0.0192 | 0.0266 | 4.0000e-005 | | 8.7000e-004 | 8.7000e-004 | | 8.0000e-004 | 8.0000e-004 | 0.0000 | 3.3983 | 3.3983 | 1.1000e-003 | 0.0000 | 3.4258 |
| **Total** | **1.6100e-003** | **0.0192** | **0.0266** | **4.0000e-005** | **0.0000** | **8.7000e-004** | **8.7000e-004** | **0.0000** | **8.0000e-004** | **8.0000e-004** | **0.0000** | **3.3983** | **3.3983** | **1.1000e-003** | **0.0000** | **3.4258** |

**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 | 1.6000e-004 | 1.1000e-004 | 1.1600e-003 | 0.0000 | 4.0000e-004 | 0.0000 | 4.0000e-004 | 1.1000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.3374 | 0.3374 | 1.0000e-005 | 0.0000 | 0.3377 |
| **Total** | **1.6000e-004** | **1.1000e-004** | **1.1600e-003** | **0.0000** | **4.0000e-004** | **0.0000** | **4.0000e-004** | **1.1000e-004** | **0.0000** | **1.1000e-004** | **0.0000** | **0.3374** | **0.3374** | **1.0000e-005** | **0.0000** | **0.3377** |

## 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 | 0.0738 | 0.2963 | 0.9016 | 3.2800e-003 | 0.3013 | 2.5300e-003 | 0.3038 | 0.0807 | 2.3600e-003 | 0.0830 | 0.0000 | 302.6972 | 302.6972 | 0.0152 | 0.0000 | 303.0765 |
| Unmitigated | 0.0738 | 0.2963 | 0.9016 | 3.2800e-003 | 0.3013 | 2.5300e-003 | 0.3038 | 0.0807 | 2.3600e-003 | 0.0830 | 0.0000 | 302.6972 | 302.6972 | 0.0152 | 0.0000 | 303.0765 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 280.00 | 280.00 | 280.00 | 799,485 | 799,485 |
| Total | 280.00 | 280.00 | 280.00 | 799,485 | 799,485 |

## 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 | 10.80 | 7.30 | 7.50 | 41.60 | 18.80 | 39.60 | 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 | 0.602700 | 0.040134 | 0.179939 | 0.104242 | 0.014985 | 0.005435 | 0.016642 | 0.024350 | 0.001934 | 0.001888 | 0.005938 | 0.000757 | 0.001056 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Exceed Title 24

Percent of Electricity Use Generated with Renewable 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 | 39.8901 | 39.8901 | 1.6100e-003 | 3.3000e-004 | 40.0292 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 74.0825 | 74.0825 | 2.9800e-003 | 6.2000e-004 | 74.3409 |
| NaturalGas Mitigated | 3.3300e-003 | 0.0284 | 0.0121 | 1.8000e-004 | | 2.3000e-003 | 2.3000e-003 | | 2.3000e-003 | 2.3000e-003 | 0.0000 | 32.9355 | 32.9355 | 6.3000e-004 | 6.0000e-004 | 33.1312 |
| NaturalGas Unmitigated | 3.5300e-003 | 0.0302 | 0.0128 | 1.9000e-004 | | 2.4400e-003 | 2.4400e-003 | | 2.4400e-003 | 2.4400e-003 | 0.0000 | 34.9444 | 34.9444 | 6.7000e-004 | 6.4000e-004 | 35.1521 |

## 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 | 654834 | 3.5300e-003 | 0.0302 | 0.0128 | 1.9000e-004 | | 2.4400e-003 | 2.4400e-003 | | 2.4400e-003 | 2.4400e-003 | 0.0000 | 34.9444 | 34.9444 | 6.7000e-004 | 6.4000e-004 | 35.1521 |
| **Total** | | **3.5300e-003** | **0.0302** | **0.0128** | **1.9000e-004** | | **2.4400e-003** | **2.4400e-003** | | **2.4400e-003** | **2.4400e-003** | **0.0000** | **34.9444** | **34.9444** | **6.7000e-004** | **6.4000e-004** | **35.1521** |

### 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 | 617188 | 3.3300e-003 | 0.0284 | 0.0121 | 1.8000e-004 | | 2.3000e-003 | 2.3000e-003 | | 2.3000e-003 | 2.3000e-003 | 0.0000 | 32.9355 | 32.9355 | 6.3000e-004 | 6.0000e-004 | 33.1312 |
| **Total** | | **3.3300e-003** | **0.0284** | **0.0121** | **1.8000e-004** | | **2.3000e-003** | **2.3000e-003** | | **2.3000e-003** | **2.3000e-003** | **0.0000** | **32.9355** | **32.9355** | **6.3000e-004** | **6.0000e-004** | **33.1312** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Single Family Housing | 226685 | 74.0825 | 2.9800e-003 | 6.2000e-004 | 74.3409 |
| **Total** | | **74.0825** | **2.9800e-003** | **6.2000e-004** | **74.3409** |

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Single Family Housing | 122059 | 39.8901 | 1.6100e-003 | 3.3000e-004 | 40.0292 |
| **Total** | | **39.8901** | **1.6100e-003** | **3.3000e-004** | **40.0292** |

# 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 | 1.9512 | 0.0325 | 2.1175 | 3.0900e-003 | | 0.2630 | 0.2630 | | 0.2630 | 0.2630 | 23.2630 | 12.4694 | 35.7324 | 5.6000e-004 | 2.2700e-003 | 36.4243 |
| Unmitigated | 1.9512 | 0.0325 | 2.1175 | 3.0900e-003 | | 0.2630 | 0.2630 | | 0.2630 | 0.2630 | 23.2630 | 12.4694 | 35.7324 | 5.6000e-004 | 2.2700e-003 | 36.4243 |

## 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 | 0.0197 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.1968 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 1.7284 | 0.0301 | 1.9096 | 3.0800e-003 | | 0.2618 | 0.2618 | | 0.2618 | 0.2618 | 23.2630 | 12.1298 | 35.3928 | 2.3000e-004 | 2.2700e-003 | 36.0766 |
| Landscaping | 6.2600e-003 | 2.4000e-003 | 0.2080 | 1.0000e-005 | | 1.1500e-003 | 1.1500e-003 | | 1.1500e-003 | 1.1500e-003 | 0.0000 | 0.3396 | 0.3396 | 3.3000e-004 | 0.0000 | 0.3478 |
| **Total** | **1.9512** | **0.0325** | **2.1175** | **3.0900e-003** | | **0.2630** | **0.2630** | | **0.2630** | **0.2630** | **23.2630** | **12.4694** | **35.7324** | **5.6000e-004** | **2.2700e-003** | **36.4243** |

### 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 | 0.0197 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.1968 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 1.7284 | 0.0301 | 1.9096 | 3.0800e-003 | | 0.2618 | 0.2618 | | 0.2618 | 0.2618 | 23.2630 | 12.1298 | 35.3928 | 2.3000e-004 | 2.2700e-003 | 36.0766 |
| Landscaping | 6.2600e-003 | 2.4000e-003 | 0.2080 | 1.0000e-005 | | 1.1500e-003 | 1.1500e-003 | | 1.1500e-003 | 1.1500e-003 | 0.0000 | 0.3396 | 0.3396 | 3.3000e-004 | 0.0000 | 0.3478 |
| **Total** | **1.9512** | **0.0325** | **2.1175** | **3.0900e-003** | | **0.2630** | **0.2630** | | **0.2630** | **0.2630** | **23.2630** | **12.4694** | **35.7324** | **5.6000e-004** | **2.2700e-003** | **36.4243** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

Apply Water Conservation Strategy

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 10.0142 | 0.0479 | 1.2000e-003 | 11.5711 |
| Unmitigated | 12.5178 | 0.0599 | 1.5000e-003 | 14.4638 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Single Family Housing | 1.82431 / 1.15011 | 12.5178 | 0.0599 | 1.5000e-003 | 14.4638 |
| **Total** | | **12.5178** | **0.0599** | **1.5000e-003** | **14.4638** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Single Family Housing | 1.45945 / 0.920088 | 10.0142 | 0.0479 | 1.2000e-003 | 11.5711 |
| **Total** | | **10.0142** | **0.0479** | **1.2000e-003** | **11.5711** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 4.9936 | 0.2951 | 0.0000 | 12.3714 |
| Unmitigated | 6.6581 | 0.3935 | 0.0000 | 16.4952 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Single Family Housing | 32.8 | 6.6581 | 0.3935 | 0.0000 | 16.4952 |
| **Total** | | **6.6581** | **0.3935** | **0.0000** | **16.4952** |

### 8.2 Waste by Land Use

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Single Family Housing | 24.6 | 4.9936 | 0.2951 | 0.0000 | 12.3714 |
| **Total** | | **4.9936** | **0.2951** | **0.0000** | **12.3714** |

## 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

# GPE 02 - Vista Grande

**San Diego County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Single Family Housing | 28.00 | Dwelling Unit | 16.99 | 50,400.00 | 80 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.6 | **Precipitation Freq (Days)** | 40 |
| **Climate Zone** | 13 | | | **Operational Year** | 2023 |
| **Utility Company** | San Diego Gas & Electric | | | | |
| **CO2 Intensity (lb/MWhr)** | 720.49 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 28 single-family dwelling units on 16.99 acres

Construction Phase - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Grading -

Demolition -

Trips and VMT - 23 debris haul trips for removal of existing residence

Vehicle Trips - LSA 2021

Woodstoves - No woodstoves

Area Coating - Rule 67.0.1

Construction Off-road Equipment Mitigation -

Water Mitigation -

Waste Mitigation -

Energy Mitigation - https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf

GPE 02 - Vista Grande - San Diego County, Summer

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblAreaCoating | Area_EF_Residential_Exterior | 250 | 100 |
| tblAreaCoating | Area_EF_Residential_Interior | 250 | 50 |
| tblConstDustMitigation | WaterUnpavedRoadMoistureContent | 0 | 12 |
| tblConstDustMitigation | WaterUnpavedRoadVehicleSpeed | 0 | 10 |
| tblConstructionPhase | NumDays | 20.00 | 8.00 |
| tblConstructionPhase | NumDays | 30.00 | 25.00 |
| tblConstructionPhase | NumDays | 30.00 | 45.00 |
| tblConstructionPhase | NumDays | 300.00 | 20.00 |
| tblConstructionPhase | NumDays | 300.00 | 20.00 |
| tblConstructionPhase | NumDays | 30.00 | 15.00 |
| tblConstructionPhase | NumDays | 20.00 | 25.00 |
| tblConstructionPhase | NumDays | 20.00 | 5.00 |
| tblConstructionPhase | NumDays | 30.00 | 7.00 |
| tblConstructionPhase | NumDays | 30.00 | 40.00 |
| tblConstructionPhase | NumDays | 30.00 | 25.00 |
| tblConstructionPhase | NumDays | 20.00 | 25.00 |
| tblConstructionPhase | PhaseEndDate | 6/28/2022 | 6/10/2022 |
| tblConstructionPhase | PhaseEndDate | 8/23/2022 | 7/15/2022 |
| tblConstructionPhase | PhaseStartDate | 7/13/2022 | 6/13/2022 |
| tblLandUse | LotAcreage | 9.09 | 16.99 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Dumpers/Tenders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Graders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Forklifts |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Graders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Graders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Forklifts |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblVehicleTrips | ST_TR | 9.91 | 10.00 |
| tblVehicleTrips | SU_TR | 8.62 | 10.00 |
| tblVehicleTrips | WD_TR | 9.52 | 10.00 |
| tblWoodstoves | NumberCatalytic | 1.40 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.40 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 3,019.20 | 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 | | | | | |
| 2022 | 6.5253 | 69.7907 | 49.4455 | 0.1177 | 12.1013 | 2.7993 | 14.7385 | 4.0054 | 2.5753 | 6.5366 | 0.0000 | 11,405.1921 | 11,405.1921 | 3.6050 | 0.0000 | 11,495.3169 |
| **Maximum** | **6.5253** | **69.7907** | **49.4455** | **0.1177** | **12.1013** | **2.7993** | **14.7385** | **4.0054** | **2.5753** | **6.5366** | **0.0000** | **11,405.1921** | **11,405.1921** | **3.6050** | **0.0000** | **11,495.3169** |

### 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 | | | | | |
| 2022 | 6.5253 | 69.7907 | 49.4455 | 0.1177 | 5.5811 | 2.7993 | 8.2184 | 1.8384 | 2.5753 | 4.4010 | 0.0000 | 11,405.1921 | 11,405.1921 | 3.6050 | 0.0000 | 11,495.3169 |
| **Maximum** | **6.5253** | **69.7907** | **49.4455** | **0.1177** | **5.5811** | **2.7993** | **8.2184** | **1.8384** | **2.5753** | **4.4010** | **0.0000** | **11,405.1921** | **11,405.1921** | **3.6050** | **0.0000** | **11,495.3169** |

| | ROG | NOx | 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** | **53.88** | **0.00** | **44.24** | **54.10** | **0.00** | **32.67** | **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 | 43.4113 | 0.7604 | 48.8858 | 0.0753 | | 6.3982 | 6.3982 | | 6.3982 | 6.3982 | 625.4408 | 330.2771 | 955.7179 | 0.0103 | 0.0612 | 974.2013 |
| Energy | 0.0194 | 0.1653 | 0.0704 | 1.0600e-003 | | 0.0134 | 0.0134 | | 0.0134 | 0.0134 | | 211.0665 | 211.0665 | 4.0500e-003 | 3.8700e-003 | 212.3207 |
| Mobile | 0.4291 | 1.5777 | 5.1163 | 0.0188 | 1.6951 | 0.0139 | 1.7090 | 0.4530 | 0.0130 | 0.4660 | | 1,914.1053 | 1,914.1053 | 0.0926 | | 1,916.4202 |
| **Total** | **43.8598** | **2.5034** | **54.0725** | **0.0952** | **1.6951** | **6.4255** | **8.1206** | **0.4530** | **6.4245** | **6.8776** | **625.4408** | **2,455.4489** | **3,080.8897** | **0.1069** | **0.0650** | **3,102.9422** |

### 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 | 43.4113 | 0.7604 | 48.8858 | 0.0753 | | 6.3982 | 6.3982 | | 6.3982 | 6.3982 | 625.4408 | 330.2771 | 955.7179 | 0.0103 | 0.0612 | 974.2013 |
| Energy | 0.0182 | 0.1558 | 0.0663 | 9.9000e-004 | | 0.0126 | 0.0126 | | 0.0126 | 0.0126 | | 198.9325 | 198.9325 | 3.8100e-003 | 3.6500e-003 | 200.1147 |
| Mobile | 0.4291 | 1.5777 | 5.1163 | 0.0188 | 1.6951 | 0.0139 | 1.7090 | 0.4530 | 0.0130 | 0.4660 | | 1,914.1053 | 1,914.1053 | 0.0926 | | 1,916.4202 |
| **Total** | **43.8587** | **2.4939** | **54.0684** | **0.0951** | **1.6951** | **6.4247** | **8.1198** | **0.4530** | **6.4238** | **6.8768** | **625.4408** | **2,443.3150** | **3,068.7558** | **0.1067** | **0.0648** | **3,090.7361** |

| | ROG | NOx | 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 | 0.38 | 0.01 | 0.07 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.49 | 0.39 | 0.22 | 0.34 | 0.39 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Onsite Demolition & Clearing | Demolition | 6/1/2022 | 6/10/2022 | 5 | 8 | |
| 2 | Offsite Demolition & Clearing | Demolition | 6/1/2022 | 6/7/2022 | 5 | 5 | |
| 3 | Onsite Grading | Grading | 6/13/2022 | 7/15/2022 | 5 | 25 | |
| 4 | Offsite Grading & Excavation | Grading | 6/16/2022 | 6/24/2022 | 5 | 7 | |
| 5 | Offsite Sewer, Storm Drain, and Water | Grading | 6/27/2022 | 8/19/2022 | 5 | 40 | |
| 6 | Onsite Sewer, Storm Drain, and Water | Grading | 7/13/2022 | 9/13/2022 | 5 | 45 | |
| 7 | Onsite Retaining Walls | Building Construction | 8/4/2022 | 8/31/2022 | 5 | 20 | |
| 8 | Offsite Dry Utilities | Grading | 8/15/2022 | 9/16/2022 | 5 | 25 | |
| 9 | Onsite Fencing | Building Construction | 9/1/2022 | 9/28/2022 | 5 | 20 | |
| 10 | Onsite Dry Utilities | Grading | 9/12/2022 | 9/30/2022 | 5 | 15 | |
| 11 | Offsite Concrete Flatwork and Paving | Paving | 9/19/2022 | 10/21/2022 | 5 | 25 | |
| 12 | Onsite Concrete Flatwork and Paving | Paving | 10/3/2022 | 11/4/2022 | 5 | 25 | |
| 13 | Offsite Parkway Landscaping | Site Preparation | 10/24/2022 | 11/4/2022 | 5 | 10 | |
| 14 | Onsite Parkway Landscaping | Site Preparation | 11/7/2022 | 11/18/2022 | 5 | 10 | |

**Acres of Grading (Site Preparation Phase): 0**

**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 |
|---|---|---|---|---|---|
| Offsite Sewer, Storm Drain, and Water | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Offsite Dry Utilities | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Onsite Sewer, Storm Drain, and Water | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Onsite Dry Utilities | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Offsite Parkway Landscaping | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Onsite Parkway Landscaping | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Onsite Retaining Walls | Welders | 0 | 8.00 | 46 | 0.45 |
| Onsite Fencing | Welders | 0 | 8.00 | 46 | 0.45 |
| Onsite Demolition & Clearing | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Onsite Demolition & Clearing | Dumpers/Tenders | 1 | 4.00 | 16 | 0.38 |
| Onsite Demolition & Clearing | Crawler Tractors | 1 | 8.00 | 212 | 0.43 |
| Onsite Grading | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Onsite Grading | Crawler Tractors | 1 | 8.00 | 212 | 0.43 |
| Onsite Sewer, Storm Drain, and Water | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Onsite Dry Utilities | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Onsite Concrete Flatwork and Paving | Skid Steer Loaders | 2 | 8.00 | 65 | 0.37 |
| Onsite Concrete Flatwork and Paving | Graders | 1 | 8.00 | 187 | 0.41 |
| Onsite Concrete Flatwork and Paving | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Onsite Parkway Landscaping | Forklifts | 1 | 8.00 | 89 | 0.20 |
| Onsite Parkway Landscaping | Skid Steer Loaders | 3 | 8.00 | 65 | 0.37 |
| Offsite Demolition & Clearing | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Demolition & Clearing | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Offsite Demolition & Clearing | Graders | 1 | 8.00 | 187 | 0.41 |

| | | | | | |
|---|---|---|---|---|---|
| Offsite Demolition & Clearing | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Offsite Grading & Excavation | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Grading & Excavation | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Offsite Sewer, Storm Drain, and Water | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Dry Utilities | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Offsite Concrete Flatwork and Paving | Skid Steer Loaders | 2 | 8.00 | 65 | 0.37 |
| Offsite Concrete Flatwork and Paving | Graders | 1 | 8.00 | 187 | 0.41 |
| Offsite Concrete Flatwork and Paving | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Parkway Landscaping | Forklifts | 1 | 8.00 | 89 | 0.20 |
| Offsite Parkway Landscaping | Skid Steer Loaders | 3 | 8.00 | 65 | 0.37 |
| Offsite Demolition & Clearing | Concrete/Industrial Saws | 0 | 8.00 | 81 | 0.73 |
| Onsite Demolition & Clearing | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Demolition & Clearing | Concrete/Industrial Saws | 0 | 8.00 | 81 | 0.73 |
| Onsite Grading | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Retaining Walls | Cranes | 0 | 7.00 | 231 | 0.29 |
| Onsite Fencing | Cranes | 0 | 7.00 | 231 | 0.29 |
| Offsite Demolition & Clearing | Excavators | 0 | 8.00 | 158 | 0.38 |
| Offsite Grading & Excavation | Excavators | 0 | 8.00 | 158 | 0.38 |
| Offsite Sewer, Storm Drain, and Water | Excavators | 1 | 8.00 | 158 | 0.38 |
| Onsite Demolition & Clearing | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Offsite Dry Utilities | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Onsite Grading | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Onsite Sewer, Storm Drain, and Water | Excavators | 1 | 8.00 | 158 | 0.38 |
| Onsite Dry Utilities | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Retaining Walls | Forklifts | 1 | 8.00 | 89 | 0.20 |

| | | | | | |
|---|---|---|---|---|---|
| Onsite Grading | Scrapers | 4 | 8.00 | 367 | 0.48 |
| Onsite Fencing | Forklifts | 1 | 8.00 | 89 | 0.20 |
| Onsite Retaining Walls | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Onsite Fencing | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Offsite Grading & Excavation | Graders | 1 | 8.00 | 187 | 0.41 |
| Offsite Sewer, Storm Drain, and Water | Graders | 0 | 8.00 | 187 | 0.41 |
| Offsite Dry Utilities | Graders | 0 | 8.00 | 187 | 0.41 |
| Onsite Sewer, Storm Drain, and Water | Graders | 0 | 8.00 | 187 | 0.41 |
| Onsite Dry Utilities | Graders | 0 | 8.00 | 187 | 0.41 |
| Offsite Concrete Flatwork and Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Onsite Concrete Flatwork and Paving | Pavers | 1 | 8.00 | 130 | 0.42 |
| Offsite Concrete Flatwork and Paving | Paving Equipment | 0 | 8.00 | 132 | 0.36 |
| Onsite Concrete Flatwork and Paving | Paving Equipment | 0 | 8.00 | 132 | 0.36 |
| Offsite Concrete Flatwork and Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Onsite Concrete Flatwork and Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Offsite Demolition & Clearing | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Grading & Excavation | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Sewer, Storm Drain, and Water | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Dry Utilities | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Sewer, Storm Drain, and Water | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Dry Utilities | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Parkway Landscaping | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Parkway Landscaping | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Grading & Excavation | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Offsite Sewer, Storm Drain, and Water | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Offsite Dry Utilities | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Onsite Sewer, Storm Drain, and Water | Scrapers | 0 | 8.00 | 367 | 0.48 |

| | | | | | |
|---|---|---|---|---|---|
| Onsite Dry Utilities | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Onsite Retaining Walls | Tractors/Loaders/Backhoes | 0 | 7.00 | 97 | 0.37 |
| Onsite Fencing | Tractors/Loaders/Backhoes | 0 | 7.00 | 97 | 0.37 |
| Offsite Grading & Excavation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |

**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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Onsite Demolition & Clearing | 3 | 8.00 | 0.00 | 23.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Retaining Walls | 1 | 10.00 | 3.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Grading | 8 | 20.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Fencing | 1 | 10.00 | 3.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Demolition & Clearing | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Grading & Excavation | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Sewer, Storm Drain, and Water | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Dry Utilities | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Sewer, Storm Drain, and Water | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Dry Utilities | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Concrete Flatwork and Paving | 8 | 20.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Concrete Flatwork and Paving | 7 | 18.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Parkway Landscaping | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Parkway Landscaping | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

## 3.2 Onsite Demolition & Clearing - 2022

### 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 | | | | | 0.6229 | 0.0000 | 0.6229 | 0.0943 | 0.0000 | 0.0943 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.8200 | 9.2651 | 3.9715 | 0.0145 | | 0.3369 | 0.3369 | | 0.3106 | 0.3106 | | 1,395.1668 | 1,395.1668 | 0.4446 | | 1,406.2829 |
| **Total** | **0.8200** | **9.2651** | **3.9715** | **0.0145** | **0.6229** | **0.3369** | **0.9598** | **0.0943** | **0.3106** | **0.4049** | | **1,395.1668** | **1,395.1668** | **0.4446** | | **1,406.2829** |

### 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 | 0.0200 | 0.6744 | 0.1792 | 2.1800e-003 | 0.0502 | 1.9000e-003 | 0.0521 | 0.0138 | 1.8200e-003 | 0.0156 | | 239.9613 | 239.9613 | 0.0213 | | 240.4930 |
| 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 | 0.0262 | 0.0164 | 0.1973 | 6.3000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 62.7648 | 62.7648 | 1.7000e-003 | | 62.8074 |
| **Total** | **0.0462** | **0.6908** | **0.3765** | **2.8100e-003** | **0.1160** | **2.3400e-003** | **0.1183** | **0.0312** | **2.2300e-003** | **0.0334** | | **302.7261** | **302.7261** | **0.0230** | | **303.3004** |

## 3.2 Onsite Demolition & Clearing - 2022

### 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 | | | | | 0.2803 | 0.0000 | 0.2803 | 0.0425 | 0.0000 | 0.0425 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.8200 | 9.2651 | 3.9715 | 0.0145 | | 0.3369 | 0.3369 | | 0.3106 | 0.3106 | 0.0000 | 1,395.1668 | 1,395.1668 | 0.4446 | | 1,406.2829 |
| **Total** | **0.8200** | **9.2651** | **3.9715** | **0.0145** | **0.2803** | **0.3369** | **0.6172** | **0.0425** | **0.3106** | **0.3531** | **0.0000** | **1,395.1668** | **1,395.1668** | **0.4446** | | **1,406.2829** |

### 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 | 0.0200 | 0.6744 | 0.1792 | 2.1800e-003 | 0.0502 | 1.9000e-003 | 0.0521 | 0.0138 | 1.8200e-003 | 0.0156 | | 239.9613 | 239.9613 | 0.0213 | | 240.4930 |
| 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 | 0.0262 | 0.0164 | 0.1973 | 6.3000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 62.7648 | 62.7648 | 1.7000e-003 | | 62.8074 |
| **Total** | **0.0462** | **0.6908** | **0.3765** | **2.8100e-003** | **0.1160** | **2.3400e-003** | **0.1183** | **0.0312** | **2.2300e-003** | **0.0334** | | **302.7261** | **302.7261** | **0.0230** | | **303.3004** |

## 3.3 Offsite Demolition & Clearing - 2022

### 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 | 0.9407 | 10.8868 | 6.8781 | 0.0181 | | 0.3933 | 0.3933 | | 0.3618 | 0.3618 | | 1,748.5735 | 1,748.5735 | 0.5655 | | 1,762.7116 |
| **Total** | **0.9407** | **10.8868** | **6.8781** | **0.0181** | | **0.3933** | **0.3933** | | **0.3618** | **0.3618** | | **1,748.5735** | **1,748.5735** | **0.5655** | | **1,762.7116** |

### 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 | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0327** | **0.0205** | **0.2466** | **7.9000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **78.4560** | **78.4560** | **2.1300e-003** | | **78.5092** |

## 3.3 Offsite Demolition & Clearing - 2022

### 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 | 0.9407 | 10.8868 | 6.8781 | 0.0181 | | 0.3933 | 0.3933 | | 0.3618 | 0.3618 | 0.0000 | 1,748.5734 | 1,748.5734 | 0.5655 | | 1,762.7116 |
| **Total** | **0.9407** | **10.8868** | **6.8781** | **0.0181** | | **0.3933** | **0.3933** | | **0.3618** | **0.3618** | **0.0000** | **1,748.5734** | **1,748.5734** | **0.5655** | | **1,762.7116** |

### 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 | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0327** | **0.0205** | **0.2466** | **7.9000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **78.4560** | **78.4560** | **2.1300e-003** | | **78.5092** |

## 3.4 Onsite Grading - 2022

### 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 | | | | | 11.3246 | 0.0000 | 11.3246 | 3.8828 | 0.0000 | 3.8828 | | | 0.0000 | | | 0.0000 |
| Off-Road | 5.0906 | 56.7617 | 34.5090 | 0.0858 | | 2.2423 | 2.2423 | | 2.0629 | 2.0629 | | 8,308.9135 | 8,308.9135 | 2.6873 | | 8,376.0953 |
| **Total** | **5.0906** | **56.7617** | **34.5090** | **0.0858** | **11.3246** | **2.2423** | **13.5669** | **3.8828** | **2.0629** | **5.9457** | | **8,308.9135** | **8,308.9135** | **2.6873** | | **8,376.0953** |

### 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 | 0.0654 | 0.0410 | 0.4933 | 1.5700e-003 | 0.1643 | 1.1100e-003 | 0.1654 | 0.0436 | 1.0200e-003 | 0.0446 | | 156.9120 | 156.9120 | 4.2600e-003 | | 157.0185 |
| **Total** | **0.0654** | **0.0410** | **0.4933** | **1.5700e-003** | **0.1643** | **1.1100e-003** | **0.1654** | **0.0436** | **1.0200e-003** | **0.0446** | | **156.9120** | **156.9120** | **4.2600e-003** | | **157.0185** |

## 3.4 Onsite Grading - 2022

### 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 | | | | | 5.0961 | 0.0000 | 5.0961 | 1.7473 | 0.0000 | 1.7473 | | | 0.0000 | | | 0.0000 |
| Off-Road | 5.0906 | 56.7617 | 34.5090 | 0.0858 | | 2.2423 | 2.2423 | | 2.0629 | 2.0629 | 0.0000 | 8,308.9135 | 8,308.9135 | 2.6873 | | 8,376.0953 |
| **Total** | **5.0906** | **56.7617** | **34.5090** | **0.0858** | **5.0961** | **2.2423** | **7.3384** | **1.7473** | **2.0629** | **3.8102** | **0.0000** | **8,308.9135** | **8,308.9135** | **2.6873** | | **8,376.0953** |

### 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 | 0.0654 | 0.0410 | 0.4933 | 1.5700e-003 | 0.1643 | 1.1100e-003 | 0.1654 | 0.0436 | 1.0200e-003 | 0.0446 | | 156.9120 | 156.9120 | 4.2600e-003 | | 157.0185 |
| **Total** | **0.0654** | **0.0410** | **0.4933** | **1.5700e-003** | **0.1643** | **1.1100e-003** | **0.1654** | **0.0436** | **1.0200e-003** | **0.0446** | | **156.9120** | **156.9120** | **4.2600e-003** | | **157.0185** |

## 3.5 Offsite Grading & Excavation - 2022

### 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 | | | | | 0.5303 | 0.0000 | 0.5303 | 0.0573 | 0.0000 | 0.0573 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.9407 | 10.8868 | 6.8781 | 0.0181 | | 0.3933 | 0.3933 | | 0.3618 | 0.3618 | | 1,748.5735 | 1,748.5735 | 0.5655 | | 1,762.7116 |
| **Total** | **0.9407** | **10.8868** | **6.8781** | **0.0181** | **0.5303** | **0.3933** | **0.9236** | **0.0573** | **0.3618** | **0.4191** | | **1,748.5735** | **1,748.5735** | **0.5655** | | **1,762.7116** |

### 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 | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0327** | **0.0205** | **0.2466** | **7.9000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **78.4560** | **78.4560** | **2.1300e-003** | | **78.5092** |

## 3.5 Offsite Grading & Excavation - 2022

### 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 | | | | | 0.2386 | 0.0000 | 0.2386 | 0.0258 | 0.0000 | 0.0258 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.9407 | 10.8868 | 6.8781 | 0.0181 | | 0.3933 | 0.3933 | | 0.3618 | 0.3618 | 0.0000 | 1,748.5734 | 1,748.5734 | 0.5655 | | 1,762.7116 |
| **Total** | **0.9407** | **10.8868** | **6.8781** | **0.0181** | **0.2386** | **0.3933** | **0.6319** | **0.0258** | **0.3618** | **0.3876** | **0.0000** | **1,748.5734** | **1,748.5734** | **0.5655** | | **1,762.7116** |

### 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 | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0327** | **0.0205** | **0.2466** | **7.9000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **78.4560** | **78.4560** | **2.1300e-003** | | **78.5092** |

## 3.6 Offsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6585 | 6.4776 | 7.0243 | 0.0145 | | 0.2775 | 0.2775 | | 0.2553 | 0.2553 | | 1,406.9185 | 1,406.9185 | 0.4550 | | 1,418.2942 |
| **Total** | **0.6585** | **6.4776** | **7.0243** | **0.0145** | **0.0000** | **0.2775** | **0.2775** | **0.0000** | **0.2553** | **0.2553** | | **1,406.9185** | **1,406.9185** | **0.4550** | | **1,418.2942** |

### 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 | 0.0262 | 0.0164 | 0.1973 | 6.3000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 62.7648 | 62.7648 | 1.7000e-003 | | 62.8074 |
| **Total** | **0.0262** | **0.0164** | **0.1973** | **6.3000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **62.7648** | **62.7648** | **1.7000e-003** | | **62.8074** |

## 3.6 Offsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6585 | 6.4776 | 7.0243 | 0.0145 | | 0.2775 | 0.2775 | | 0.2553 | 0.2553 | 0.0000 | 1,406.9185 | 1,406.9185 | 0.4550 | | 1,418.2942 |
| **Total** | **0.6585** | **6.4776** | **7.0243** | **0.0145** | **0.0000** | **0.2775** | **0.2775** | **0.0000** | **0.2553** | **0.2553** | **0.0000** | **1,406.9185** | **1,406.9185** | **0.4550** | | **1,418.2942** |

### 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 | 0.0262 | 0.0164 | 0.1973 | 6.3000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 62.7648 | 62.7648 | 1.7000e-003 | | 62.8074 |
| **Total** | **0.0262** | **0.0164** | **0.1973** | **6.3000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **62.7648** | **62.7648** | **1.7000e-003** | | **62.8074** |

## 3.7 Onsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6585 | 6.4776 | 7.0243 | 0.0145 | | 0.2775 | 0.2775 | | 0.2553 | 0.2553 | | 1,406.9185 | 1,406.9185 | 0.4550 | | 1,418.2942 |
| **Total** | **0.6585** | **6.4776** | **7.0243** | **0.0145** | **0.0000** | **0.2775** | **0.2775** | **0.0000** | **0.2553** | **0.2553** | | **1,406.9185** | **1,406.9185** | **0.4550** | | **1,418.2942** |

### 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 | 0.0262 | 0.0164 | 0.1973 | 6.3000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 62.7648 | 62.7648 | 1.7000e-003 | | 62.8074 |
| **Total** | **0.0262** | **0.0164** | **0.1973** | **6.3000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **62.7648** | **62.7648** | **1.7000e-003** | | **62.8074** |

## 3.7 Onsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6585 | 6.4776 | 7.0243 | 0.0145 | | 0.2775 | 0.2775 | | 0.2553 | 0.2553 | 0.0000 | 1,406.9185 | 1,406.9185 | 0.4550 | | 1,418.2942 |
| **Total** | **0.6585** | **6.4776** | **7.0243** | **0.0145** | **0.0000** | **0.2775** | **0.2775** | **0.0000** | **0.2553** | **0.2553** | **0.0000** | **1,406.9185** | **1,406.9185** | **0.4550** | | **1,418.2942** |

### 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 | 0.0262 | 0.0164 | 0.1973 | 6.3000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 62.7648 | 62.7648 | 1.7000e-003 | | 62.8074 |
| **Total** | **0.0262** | **0.0164** | **0.1973** | **6.3000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **62.7648** | **62.7648** | **1.7000e-003** | | **62.8074** |

## 3.8 Onsite Retaining Walls - 2022

### 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 | 0.1136 | 1.0549 | 1.1538 | 1.5300e-003 | | 0.0699 | 0.0699 | | 0.0643 | 0.0643 | | 148.0308 | 148.0308 | 0.0479 | | 149.2277 |
| **Total** | **0.1136** | **1.0549** | **1.1538** | **1.5300e-003** | | **0.0699** | **0.0699** | | **0.0643** | **0.0643** | | **148.0308** | **148.0308** | **0.0479** | | **149.2277** |

### 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 | 8.4400e-003 | 0.2887 | 0.0737 | 8.0000e-004 | 0.0203 | 5.5000e-004 | 0.0209 | 5.8500e-003 | 5.3000e-004 | 6.3700e-003 | | 86.5841 | 86.5841 | 6.0500e-003 | | 86.7355 |
| Worker | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0411** | **0.3092** | **0.3204** | **1.5900e-003** | **0.1025** | **1.1100e-003** | **0.1036** | **0.0276** | **1.0400e-003** | **0.0287** | | **165.0401** | **165.0401** | **8.1800e-003** | | **165.2447** |

## 3.8 Onsite Retaining Walls - 2022

### 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 | 0.1136 | 1.0549 | 1.1538 | 1.5300e-003 | | 0.0699 | 0.0699 | | 0.0643 | 0.0643 | 0.0000 | 148.0308 | 148.0308 | 0.0479 | | 149.2277 |
| **Total** | **0.1136** | **1.0549** | **1.1538** | **1.5300e-003** | | **0.0699** | **0.0699** | | **0.0643** | **0.0643** | **0.0000** | **148.0308** | **148.0308** | **0.0479** | | **149.2277** |

### 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 | 8.4400e-003 | 0.2887 | 0.0737 | 8.0000e-004 | 0.0203 | 5.5000e-004 | 0.0209 | 5.8500e-003 | 5.3000e-004 | 6.3700e-003 | | 86.5841 | 86.5841 | 6.0500e-003 | | 86.7355 |
| Worker | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0411** | **0.3092** | **0.3204** | **1.5900e-003** | **0.1025** | **1.1100e-003** | **0.1036** | **0.0276** | **1.0400e-003** | **0.0287** | | **165.0401** | **165.0401** | **8.1800e-003** | | **165.2447** |

## 3.9 Offsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3990 | 4.2799 | 5.8631 | 8.2900e-003 | | 0.2148 | 0.2148 | | 0.1976 | 0.1976 | | 802.8692 | 802.8692 | 0.2597 | | 809.3608 |
| **Total** | **0.3990** | **4.2799** | **5.8631** | **8.2900e-003** | **0.0000** | **0.2148** | **0.2148** | **0.0000** | **0.1976** | **0.1976** | | **802.8692** | **802.8692** | **0.2597** | | **809.3608** |

### 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 | 0.0262 | 0.0164 | 0.1973 | 6.3000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 62.7648 | 62.7648 | 1.7000e-003 | | 62.8074 |
| **Total** | **0.0262** | **0.0164** | **0.1973** | **6.3000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **62.7648** | **62.7648** | **1.7000e-003** | | **62.8074** |

## 3.9 Offsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3990 | 4.2799 | 5.8631 | 8.2900e-003 | | 0.2148 | 0.2148 | | 0.1976 | 0.1976 | 0.0000 | 802.8692 | 802.8692 | 0.2597 | | 809.3608 |
| **Total** | **0.3990** | **4.2799** | **5.8631** | **8.2900e-003** | **0.0000** | **0.2148** | **0.2148** | **0.0000** | **0.1976** | **0.1976** | **0.0000** | **802.8692** | **802.8692** | **0.2597** | | **809.3608** |

### 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 | 0.0262 | 0.0164 | 0.1973 | 6.3000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 62.7648 | 62.7648 | 1.7000e-003 | | 62.8074 |
| **Total** | **0.0262** | **0.0164** | **0.1973** | **6.3000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **62.7648** | **62.7648** | **1.7000e-003** | | **62.8074** |

## 3.10 Onsite Fencing - 2022

### 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 | 0.1136 | 1.0549 | 1.1538 | 1.5300e-003 | | 0.0699 | 0.0699 | | 0.0643 | 0.0643 | | 148.0308 | 148.0308 | 0.0479 | | 149.2277 |
| **Total** | **0.1136** | **1.0549** | **1.1538** | **1.5300e-003** | | **0.0699** | **0.0699** | | **0.0643** | **0.0643** | | **148.0308** | **148.0308** | **0.0479** | | **149.2277** |

### 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 | 8.4400e-003 | 0.2887 | 0.0737 | 8.0000e-004 | 0.0203 | 5.5000e-004 | 0.0209 | 5.8500e-003 | 5.3000e-004 | 6.3700e-003 | | 86.5841 | 86.5841 | 6.0500e-003 | | 86.7355 |
| Worker | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0411** | **0.3092** | **0.3204** | **1.5900e-003** | **0.1025** | **1.1100e-003** | **0.1036** | **0.0276** | **1.0400e-003** | **0.0287** | | **165.0401** | **165.0401** | **8.1800e-003** | | **165.2447** |

## 3.10 Onsite Fencing - 2022

### 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 | 0.1136 | 1.0549 | 1.1538 | 1.5300e-003 | | 0.0699 | 0.0699 | | 0.0643 | 0.0643 | 0.0000 | 148.0308 | 148.0308 | 0.0479 | | 149.2277 |
| **Total** | **0.1136** | **1.0549** | **1.1538** | **1.5300e-003** | | **0.0699** | **0.0699** | | **0.0643** | **0.0643** | **0.0000** | **148.0308** | **148.0308** | **0.0479** | | **149.2277** |

### 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 | 8.4400e-003 | 0.2887 | 0.0737 | 8.0000e-004 | 0.0203 | 5.5000e-004 | 0.0209 | 5.8500e-003 | 5.3000e-004 | 6.3700e-003 | | 86.5841 | 86.5841 | 6.0500e-003 | | 86.7355 |
| Worker | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0411** | **0.3092** | **0.3204** | **1.5900e-003** | **0.1025** | **1.1100e-003** | **0.1036** | **0.0276** | **1.0400e-003** | **0.0287** | | **165.0401** | **165.0401** | **8.1800e-003** | | **165.2447** |

## 3.11 Onsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3990 | 4.2799 | 5.8631 | 8.2900e-003 | | 0.2148 | 0.2148 | | 0.1976 | 0.1976 | | 802.8692 | 802.8692 | 0.2597 | | 809.3608 |
| **Total** | **0.3990** | **4.2799** | **5.8631** | **8.2900e-003** | **0.0000** | **0.2148** | **0.2148** | **0.0000** | **0.1976** | **0.1976** | | **802.8692** | **802.8692** | **0.2597** | | **809.3608** |

### 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 | 0.0262 | 0.0164 | 0.1973 | 6.3000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 62.7648 | 62.7648 | 1.7000e-003 | | 62.8074 |
| **Total** | **0.0262** | **0.0164** | **0.1973** | **6.3000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **62.7648** | **62.7648** | **1.7000e-003** | | **62.8074** |

## 3.11 Onsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3990 | 4.2799 | 5.8631 | 8.2900e-003 | | 0.2148 | 0.2148 | | 0.1976 | 0.1976 | 0.0000 | 802.8692 | 802.8692 | 0.2597 | | 809.3608 |
| **Total** | **0.3990** | **4.2799** | **5.8631** | **8.2900e-003** | **0.0000** | **0.2148** | **0.2148** | **0.0000** | **0.1976** | **0.1976** | **0.0000** | **802.8692** | **802.8692** | **0.2597** | | **809.3608** |

### 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 | 0.0262 | 0.0164 | 0.1973 | 6.3000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 62.7648 | 62.7648 | 1.7000e-003 | | 62.8074 |
| **Total** | **0.0262** | **0.0164** | **0.1973** | **6.3000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **62.7648** | **62.7648** | **1.7000e-003** | | **62.8074** |

## 3.12 Offsite Concrete Flatwork and Paving - 2022

### 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 | 1.5920 | 17.7893 | 15.5159 | 0.0317 | | 0.7361 | 0.7361 | | 0.6772 | 0.6772 | | 3,066.4493 | 3,066.4493 | 0.9918 | | 3,091.2431 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.5920** | **17.7893** | **15.5159** | **0.0317** | | **0.7361** | **0.7361** | | **0.6772** | **0.6772** | | **3,066.4493** | **3,066.4493** | **0.9918** | | **3,091.2431** |

### 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 | 0.0654 | 0.0410 | 0.4933 | 1.5700e-003 | 0.1643 | 1.1100e-003 | 0.1654 | 0.0436 | 1.0200e-003 | 0.0446 | | 156.9120 | 156.9120 | 4.2600e-003 | | 157.0185 |
| **Total** | **0.0654** | **0.0410** | **0.4933** | **1.5700e-003** | **0.1643** | **1.1100e-003** | **0.1654** | **0.0436** | **1.0200e-003** | **0.0446** | | **156.9120** | **156.9120** | **4.2600e-003** | | **157.0185** |

## 3.12 Offsite Concrete Flatwork and Paving - 2022

### 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 | 1.5920 | 17.7893 | 15.5159 | 0.0317 | | 0.7361 | 0.7361 | | 0.6772 | 0.6772 | 0.0000 | 3,066.4493 | 3,066.4493 | 0.9918 | | 3,091.2431 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.5920** | **17.7893** | **15.5159** | **0.0317** | | **0.7361** | **0.7361** | | **0.6772** | **0.6772** | **0.0000** | **3,066.4493** | **3,066.4493** | **0.9918** | | **3,091.2431** |

### 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 | 0.0654 | 0.0410 | 0.4933 | 1.5700e-003 | 0.1643 | 1.1100e-003 | 0.1654 | 0.0436 | 1.0200e-003 | 0.0446 | | 156.9120 | 156.9120 | 4.2600e-003 | | 157.0185 |
| **Total** | **0.0654** | **0.0410** | **0.4933** | **1.5700e-003** | **0.1643** | **1.1100e-003** | **0.1654** | **0.0436** | **1.0200e-003** | **0.0446** | | **156.9120** | **156.9120** | **4.2600e-003** | | **157.0185** |

## 3.13 Onsite Concrete Flatwork and Paving - 2022

### 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 | 1.3851 | 15.6904 | 12.6320 | 0.0270 | | 0.6363 | 0.6363 | | 0.5854 | 0.5854 | | 2,611.1913 | 2,611.1913 | 0.8445 | | 2,632.3041 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3851** | **15.6904** | **12.6320** | **0.0270** | | **0.6363** | **0.6363** | | **0.5854** | **0.5854** | | **2,611.1913** | **2,611.1913** | **0.8445** | | **2,632.3041** |

### 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 | 0.0589 | 0.0369 | 0.4440 | 1.4200e-003 | 0.1479 | 1.0000e-003 | 0.1489 | 0.0392 | 9.2000e-004 | 0.0401 | | 141.2208 | 141.2208 | 3.8400e-003 | | 141.3166 |
| **Total** | **0.0589** | **0.0369** | **0.4440** | **1.4200e-003** | **0.1479** | **1.0000e-003** | **0.1489** | **0.0392** | **9.2000e-004** | **0.0401** | | **141.2208** | **141.2208** | **3.8400e-003** | | **141.3166** |

## 3.13 Onsite Concrete Flatwork and Paving - 2022

### 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 | 1.3851 | 15.6904 | 12.6320 | 0.0270 | | 0.6363 | 0.6363 | | 0.5854 | 0.5854 | 0.0000 | 2,611.1913 | 2,611.1913 | 0.8445 | | 2,632.3041 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3851** | **15.6904** | **12.6320** | **0.0270** | | **0.6363** | **0.6363** | | **0.5854** | **0.5854** | **0.0000** | **2,611.1913** | **2,611.1913** | **0.8445** | | **2,632.3041** |

### 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 | 0.0589 | 0.0369 | 0.4440 | 1.4200e-003 | 0.1479 | 1.0000e-003 | 0.1489 | 0.0392 | 9.2000e-004 | 0.0401 | | 141.2208 | 141.2208 | 3.8400e-003 | | 141.3166 |
| **Total** | **0.0589** | **0.0369** | **0.4440** | **1.4200e-003** | **0.1479** | **1.0000e-003** | **0.1489** | **0.0392** | **9.2000e-004** | **0.0401** | | **141.2208** | **141.2208** | **3.8400e-003** | | **141.3166** |

## 3.14 Offsite Parkway Landscaping - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3224 | 3.8407 | 5.3153 | 7.7400e-003 | | 0.1734 | 0.1734 | | 0.1595 | 0.1595 | | 749.2046 | 749.2046 | 0.2423 | | 755.2623 |
| **Total** | **0.3224** | **3.8407** | **5.3153** | **7.7400e-003** | **0.0000** | **0.1734** | **0.1734** | **0.0000** | **0.1595** | **0.1595** | | **749.2046** | **749.2046** | **0.2423** | | **755.2623** |

### 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 | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0327** | **0.0205** | **0.2466** | **7.9000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **78.4560** | **78.4560** | **2.1300e-003** | | **78.5092** |

## 3.14 Offsite Parkway Landscaping - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3224 | 3.8407 | 5.3153 | 7.7400e-003 | | 0.1734 | 0.1734 | | 0.1595 | 0.1595 | 0.0000 | 749.2046 | 749.2046 | 0.2423 | | 755.2623 |
| **Total** | **0.3224** | **3.8407** | **5.3153** | **7.7400e-003** | **0.0000** | **0.1734** | **0.1734** | **0.0000** | **0.1595** | **0.1595** | **0.0000** | **749.2046** | **749.2046** | **0.2423** | | **755.2623** |

### 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 | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0327** | **0.0205** | **0.2466** | **7.9000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **78.4560** | **78.4560** | **2.1300e-003** | | **78.5092** |

## 3.15 Onsite Parkway Landscaping - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3224 | 3.8407 | 5.3153 | 7.7400e-003 | | 0.1734 | 0.1734 | | 0.1595 | 0.1595 | | 749.2046 | 749.2046 | 0.2423 | | 755.2623 |
| **Total** | **0.3224** | **3.8407** | **5.3153** | **7.7400e-003** | **0.0000** | **0.1734** | **0.1734** | **0.0000** | **0.1595** | **0.1595** | | **749.2046** | **749.2046** | **0.2423** | | **755.2623** |

### 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 | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0327** | **0.0205** | **0.2466** | **7.9000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **78.4560** | **78.4560** | **2.1300e-003** | | **78.5092** |

### 3.15 Onsite Parkway Landscaping - 2022

**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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3224 | 3.8407 | 5.3153 | 7.7400e-003 | | 0.1734 | 0.1734 | | 0.1595 | 0.1595 | 0.0000 | 749.2046 | 749.2046 | 0.2423 | | 755.2623 |
| **Total** | **0.3224** | **3.8407** | **5.3153** | **7.7400e-003** | **0.0000** | **0.1734** | **0.1734** | **0.0000** | **0.1595** | **0.1595** | **0.0000** | **749.2046** | **749.2046** | **0.2423** | | **755.2623** |

**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 | 0.0327 | 0.0205 | 0.2466 | 7.9000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 78.4560 | 78.4560 | 2.1300e-003 | | 78.5092 |
| **Total** | **0.0327** | **0.0205** | **0.2466** | **7.9000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **78.4560** | **78.4560** | **2.1300e-003** | | **78.5092** |

## 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 | 0.4291 | 1.5777 | 5.1163 | 0.0188 | 1.6951 | 0.0139 | 1.7090 | 0.4530 | 0.0130 | 0.4660 | | 1,914.1053 | 1,914.1053 | 0.0926 | | 1,916.4202 |
| Unmitigated | 0.4291 | 1.5777 | 5.1163 | 0.0188 | 1.6951 | 0.0139 | 1.7090 | 0.4530 | 0.0130 | 0.4660 | | 1,914.1053 | 1,914.1053 | 0.0926 | | 1,916.4202 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 280.00 | 280.00 | 280.00 | 799,485 | 799,485 |
| Total | 280.00 | 280.00 | 280.00 | 799,485 | 799,485 |

## 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 | 10.80 | 7.30 | 7.50 | 41.60 | 18.80 | 39.60 | 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 | 0.602700 | 0.040134 | 0.179939 | 0.104242 | 0.014985 | 0.005435 | 0.016642 | 0.024350 | 0.001934 | 0.001888 | 0.005938 | 0.000757 | 0.001056 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Exceed Title 24

Percent of Electricity Use Generated with Renewable 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 | 0.0182 | 0.1558 | 0.0663 | 9.9000e-004 | | 0.0126 | 0.0126 | | 0.0126 | 0.0126 | | 198.9325 | 198.9325 | 3.8100e-003 | 3.6500e-003 | 200.1147 |
| NaturalGas Unmitigated | 0.0194 | 0.1653 | 0.0704 | 1.0600e-003 | | 0.0134 | 0.0134 | | 0.0134 | 0.0134 | | 211.0665 | 211.0665 | 4.0500e-003 | 3.8700e-003 | 212.3207 |

## 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 | 1794.07 | 0.0194 | 0.1653 | 0.0704 | 1.0600e-003 | | 0.0134 | 0.0134 | | 0.0134 | 0.0134 | | 211.0665 | 211.0665 | 4.0500e-003 | 3.8700e-003 | 212.3207 |
| **Total** | | **0.0194** | **0.1653** | **0.0704** | **1.0600e-003** | | **0.0134** | **0.0134** | | **0.0134** | **0.0134** | | **211.0665** | **211.0665** | **4.0500e-003** | **3.8700e-003** | **212.3207** |

**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 | 1.69093 | 0.0182 | 0.1558 | 0.0663 | 9.9000e-004 | | 0.0126 | 0.0126 | | 0.0126 | 0.0126 | | 198.9325 | 198.9325 | 3.8100e-003 | 3.6500e-003 | 200.1147 |
| **Total** | | **0.0182** | **0.1558** | **0.0663** | **9.9000e-004** | | **0.0126** | **0.0126** | | **0.0126** | **0.0126** | | **198.9325** | **198.9325** | **3.8100e-003** | **3.6500e-003** | **200.1147** |

# 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 | 43.4113 | 0.7604 | 48.8858 | 0.0753 | | 6.3982 | 6.3982 | | 6.3982 | 6.3982 | 625.4408 | 330.2771 | 955.7179 | 0.0103 | 0.0612 | 974.2013 |
| Unmitigated | 43.4113 | 0.7604 | 48.8858 | 0.0753 | | 6.3982 | 6.3982 | | 6.3982 | 6.3982 | 625.4408 | 330.2771 | 955.7179 | 0.0103 | 0.0612 | 974.2013 |

## 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 | 0.1080 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 1.0786 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 42.1552 | 0.7337 | 46.5753 | 0.0752 | | 6.3854 | 6.3854 | | 6.3854 | 6.3854 | 625.4408 | 326.1177 | 951.5584 | 6.2500e-003 | 0.0612 | 969.9418 |
| Landscaping | 0.0696 | 0.0266 | 2.3106 | 1.2000e-004 | | 0.0128 | 0.0128 | | 0.0128 | 0.0128 | | 4.1595 | 4.1595 | 4.0000e-003 | | 4.2595 |
| **Total** | **43.4113** | **0.7604** | **48.8858** | **0.0753** | | **6.3982** | **6.3982** | | **6.3982** | **6.3982** | **625.4408** | **330.2771** | **955.7179** | **0.0103** | **0.0612** | **974.2013** |

### 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 | 0.1080 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 1.0786 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 42.1552 | 0.7337 | 46.5753 | 0.0752 | | 6.3854 | 6.3854 | | 6.3854 | 6.3854 | 625.4408 | 326.1177 | 951.5584 | 6.2500e-003 | 0.0612 | 969.9418 |
| Landscaping | 0.0696 | 0.0266 | 2.3106 | 1.2000e-004 | | 0.0128 | 0.0128 | | 0.0128 | 0.0128 | | 4.1595 | 4.1595 | 4.0000e-003 | | 4.2595 |
| **Total** | **43.4113** | **0.7604** | **48.8858** | **0.0753** | | **6.3982** | **6.3982** | | **6.3982** | **6.3982** | **625.4408** | **330.2771** | **955.7179** | **0.0103** | **0.0612** | **974.2013** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

Apply Water Conservation Strategy

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

## 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

# GPE 02 - Vista Grande

**San Diego County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Single Family Housing | 28.00 | Dwelling Unit | 16.99 | 50,400.00 | 80 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.6 | **Precipitation Freq (Days)** | 40 |
| **Climate Zone** | 13 | | | **Operational Year** | 2023 |
| **Utility Company** | San Diego Gas & Electric | | | | |
| **CO2 Intensity (lb/MWhr)** | 720.49 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 28 single-family dwelling units on 16.99 acres

Construction Phase - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Off-road Equipment - Construction assumptions provided by Greg Perrine

Grading -

Demolition -

Trips and VMT - 23 debris haul trips for removal of existing residence

Vehicle Trips - LSA 2021

Woodstoves - No woodstoves

Area Coating - Rule 67.0.1

Construction Off-road Equipment Mitigation -

Water Mitigation -

Waste Mitigation -

Energy Mitigation - https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf

GPE 02 - Vista Grande - San Diego County, Winter

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblAreaCoating | Area_EF_Residential_Exterior | 250 | 100 |
| tblAreaCoating | Area_EF_Residential_Interior | 250 | 50 |
| tblConstDustMitigation | WaterUnpavedRoadMoistureContent | 0 | 12 |
| tblConstDustMitigation | WaterUnpavedRoadVehicleSpeed | 0 | 10 |
| tblConstructionPhase | NumDays | 20.00 | 8.00 |
| tblConstructionPhase | NumDays | 30.00 | 25.00 |
| tblConstructionPhase | NumDays | 30.00 | 45.00 |
| tblConstructionPhase | NumDays | 300.00 | 20.00 |
| tblConstructionPhase | NumDays | 300.00 | 20.00 |
| tblConstructionPhase | NumDays | 30.00 | 15.00 |
| tblConstructionPhase | NumDays | 20.00 | 25.00 |
| tblConstructionPhase | NumDays | 20.00 | 5.00 |
| tblConstructionPhase | NumDays | 30.00 | 7.00 |
| tblConstructionPhase | NumDays | 30.00 | 40.00 |
| tblConstructionPhase | NumDays | 30.00 | 25.00 |
| tblConstructionPhase | NumDays | 20.00 | 25.00 |
| tblConstructionPhase | PhaseEndDate | 6/28/2022 | 6/10/2022 |
| tblConstructionPhase | PhaseEndDate | 8/23/2022 | 7/15/2022 |
| tblConstructionPhase | PhaseStartDate | 7/13/2022 | 6/13/2022 |
| tblLandUse | LotAcreage | 9.09 | 16.99 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Dumpers/Tenders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Crawler Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Graders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Forklifts |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Graders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Graders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Loaders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Forklifts |
| tblOffRoadEquipment | OffRoadEquipmentType | | Skid Steer Loaders |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 4.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblVehicleTrips | ST_TR | 9.91 | 10.00 |
| tblVehicleTrips | SU_TR | 8.62 | 10.00 |
| tblVehicleTrips | WD_TR | 9.52 | 10.00 |
| tblWoodstoves | NumberCatalytic | 1.40 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 1.40 | 0.00 |
| tblWoodstoves | WoodstoveWoodMass | 3,019.20 | 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 | | | | | |
| 2022 | 6.5414 | 69.7997 | 49.3904 | 0.1175 | 12.1013 | 2.7993 | 14.7385 | 4.0054 | 2.5753 | 6.5366 | 0.0000 | 11,387.8998 | 11,387.8998 | 3.6046 | 0.0000 | 11,478.0139 |
| **Maximum** | **6.5414** | **69.7997** | **49.3904** | **0.1175** | **12.1013** | **2.7993** | **14.7385** | **4.0054** | **2.5753** | **6.5366** | **0.0000** | **11,387.8998** | **11,387.8998** | **3.6046** | **0.0000** | **11,478.0139** |

### 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 | | | | | |
| 2022 | 6.5414 | 69.7997 | 49.3904 | 0.1175 | 5.5811 | 2.7993 | 8.2184 | 1.8384 | 2.5753 | 4.4010 | 0.0000 | 11,387.8998 | 11,387.8998 | 3.6046 | 0.0000 | 11,478.0139 |
| **Maximum** | **6.5414** | **69.7997** | **49.3904** | **0.1175** | **5.5811** | **2.7993** | **8.2184** | **1.8384** | **2.5753** | **4.4010** | **0.0000** | **11,387.8998** | **11,387.8998** | **3.6046** | **0.0000** | **11,478.0139** |

| | ROG | NOx | 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** | **53.88** | **0.00** | **44.24** | **54.10** | **0.00** | **32.67** | **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 | 43.4113 | 0.7604 | 48.8858 | 0.0753 | | 6.3982 | 6.3982 | | 6.3982 | 6.3982 | 625.4408 | 330.2771 | 955.7179 | 0.0103 | 0.0612 | 974.2013 |
| Energy | 0.0194 | 0.1653 | 0.0704 | 1.0600e-003 | | 0.0134 | 0.0134 | | 0.0134 | 0.0134 | | 211.0665 | 211.0665 | 4.0500e-003 | 3.8700e-003 | 212.3207 |
| Mobile | 0.4153 | 1.6248 | 5.0000 | 0.0178 | 1.6951 | 0.0140 | 1.7091 | 0.4530 | 0.0130 | 0.4660 | | 1,816.3200 | 1,816.3200 | 0.0928 | | 1,818.6390 |
| **Total** | **43.8460** | **2.5505** | **53.9562** | **0.0942** | **1.6951** | **6.4256** | **8.1207** | **0.4530** | **6.4246** | **6.8776** | **625.4408** | **2,357.6636** | **2,983.1044** | **0.1071** | **0.0650** | **3,005.1610** |

### 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 | 43.4113 | 0.7604 | 48.8858 | 0.0753 | | 6.3982 | 6.3982 | | 6.3982 | 6.3982 | 625.4408 | 330.2771 | 955.7179 | 0.0103 | 0.0612 | 974.2013 |
| Energy | 0.0182 | 0.1558 | 0.0663 | 9.9000e-004 | | 0.0126 | 0.0126 | | 0.0126 | 0.0126 | | 198.9325 | 198.9325 | 3.8100e-003 | 3.6500e-003 | 200.1147 |
| Mobile | 0.4153 | 1.6248 | 5.0000 | 0.0178 | 1.6951 | 0.0140 | 1.7091 | 0.4530 | 0.0130 | 0.4660 | | 1,816.3200 | 1,816.3200 | 0.0928 | | 1,818.6390 |
| **Total** | **43.8449** | **2.5410** | **53.9521** | **0.0942** | **1.6951** | **6.4248** | **8.1199** | **0.4530** | **6.4238** | **6.8768** | **625.4408** | **2,345.5297** | **2,970.9705** | **0.1068** | **0.0648** | **2,992.9549** |

| | ROG | NOx | 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 | 0.37 | 0.01 | 0.07 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 | 0.51 | 0.41 | 0.22 | 0.34 | 0.41 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Onsite Demolition & Clearing | Demolition | 6/1/2022 | 6/10/2022 | 5 | 8 | |
| 2 | Offsite Demolition & Clearing | Demolition | 6/1/2022 | 6/7/2022 | 5 | 5 | |
| 3 | Onsite Grading | Grading | 6/13/2022 | 7/15/2022 | 5 | 25 | |
| 4 | Offsite Grading & Excavation | Grading | 6/16/2022 | 6/24/2022 | 5 | 7 | |
| 5 | Offsite Sewer, Storm Drain, and Water | Grading | 6/27/2022 | 8/19/2022 | 5 | 40 | |
| 6 | Onsite Sewer, Storm Drain, and Water | Grading | 7/13/2022 | 9/13/2022 | 5 | 45 | |
| 7 | Onsite Retaining Walls | Building Construction | 8/4/2022 | 8/31/2022 | 5 | 20 | |
| 8 | Offsite Dry Utilities | Grading | 8/15/2022 | 9/16/2022 | 5 | 25 | |
| 9 | Onsite Fencing | Building Construction | 9/1/2022 | 9/28/2022 | 5 | 20 | |
| 10 | Onsite Dry Utilities | Grading | 9/12/2022 | 9/30/2022 | 5 | 15 | |
| 11 | Offsite Concrete Flatwork and Paving | Paving | 9/19/2022 | 10/21/2022 | 5 | 25 | |
| 12 | Onsite Concrete Flatwork and Paving | Paving | 10/3/2022 | 11/4/2022 | 5 | 25 | |
| 13 | Offsite Parkway Landscaping | Site Preparation | 10/24/2022 | 11/4/2022 | 5 | 10 | |
| 14 | Onsite Parkway Landscaping | Site Preparation | 11/7/2022 | 11/18/2022 | 5 | 10 | |

**Acres of Grading (Site Preparation Phase): 0**

**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 |
|---|---|---|---|---|---|
| Offsite Sewer, Storm Drain, and Water | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Offsite Dry Utilities | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Onsite Sewer, Storm Drain, and Water | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Onsite Dry Utilities | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Offsite Parkway Landscaping | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Onsite Parkway Landscaping | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Onsite Retaining Walls | Welders | 0 | 8.00 | 46 | 0.45 |
| Onsite Fencing | Welders | 0 | 8.00 | 46 | 0.45 |
| Onsite Demolition & Clearing | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Onsite Demolition & Clearing | Dumpers/Tenders | 1 | 4.00 | 16 | 0.38 |
| Onsite Demolition & Clearing | Crawler Tractors | 1 | 8.00 | 212 | 0.43 |
| Onsite Grading | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Onsite Grading | Crawler Tractors | 1 | 8.00 | 212 | 0.43 |
| Onsite Sewer, Storm Drain, and Water | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Onsite Dry Utilities | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Onsite Concrete Flatwork and Paving | Skid Steer Loaders | 2 | 8.00 | 65 | 0.37 |
| Onsite Concrete Flatwork and Paving | Graders | 1 | 8.00 | 187 | 0.41 |
| Onsite Concrete Flatwork and Paving | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Onsite Parkway Landscaping | Forklifts | 1 | 8.00 | 89 | 0.20 |
| Onsite Parkway Landscaping | Skid Steer Loaders | 3 | 8.00 | 65 | 0.37 |
| Offsite Demolition & Clearing | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Demolition & Clearing | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Offsite Demolition & Clearing | Graders | 1 | 8.00 | 187 | 0.41 |

| | | | | | |
|---|---|---|---|---|---|
| Offsite Demolition & Clearing | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Offsite Grading & Excavation | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Grading & Excavation | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Offsite Sewer, Storm Drain, and Water | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Dry Utilities | Skid Steer Loaders | 1 | 8.00 | 65 | 0.37 |
| Offsite Concrete Flatwork and Paving | Skid Steer Loaders | 2 | 8.00 | 65 | 0.37 |
| Offsite Concrete Flatwork and Paving | Graders | 1 | 8.00 | 187 | 0.41 |
| Offsite Concrete Flatwork and Paving | Rubber Tired Loaders | 1 | 8.00 | 203 | 0.36 |
| Offsite Parkway Landscaping | Forklifts | 1 | 8.00 | 89 | 0.20 |
| Offsite Parkway Landscaping | Skid Steer Loaders | 3 | 8.00 | 65 | 0.37 |
| Offsite Demolition & Clearing | Concrete/Industrial Saws | 0 | 8.00 | 81 | 0.73 |
| Onsite Demolition & Clearing | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Demolition & Clearing | Concrete/Industrial Saws | 0 | 8.00 | 81 | 0.73 |
| Onsite Grading | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Retaining Walls | Cranes | 0 | 7.00 | 231 | 0.29 |
| Onsite Fencing | Cranes | 0 | 7.00 | 231 | 0.29 |
| Offsite Demolition & Clearing | Excavators | 0 | 8.00 | 158 | 0.38 |
| Offsite Grading & Excavation | Excavators | 0 | 8.00 | 158 | 0.38 |
| Offsite Sewer, Storm Drain, and Water | Excavators | 1 | 8.00 | 158 | 0.38 |
| Onsite Demolition & Clearing | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Offsite Dry Utilities | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Onsite Grading | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Onsite Sewer, Storm Drain, and Water | Excavators | 1 | 8.00 | 158 | 0.38 |
| Onsite Dry Utilities | Excavators | 0 | 8.00 | 158 | 0.38 |
| Onsite Retaining Walls | Forklifts | 1 | 8.00 | 89 | 0.20 |

| | | | | | |
|---|---|---|---|---|---|
| Onsite Grading | Scrapers | 4 | 8.00 | 367 | 0.48 |
| Onsite Fencing | Forklifts | 1 | 8.00 | 89 | 0.20 |
| Onsite Retaining Walls | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Onsite Fencing | Generator Sets | 0 | 8.00 | 84 | 0.74 |
| Offsite Grading & Excavation | Graders | 1 | 8.00 | 187 | 0.41 |
| Offsite Sewer, Storm Drain, and Water | Graders | 0 | 8.00 | 187 | 0.41 |
| Offsite Dry Utilities | Graders | 0 | 8.00 | 187 | 0.41 |
| Onsite Sewer, Storm Drain, and Water | Graders | 0 | 8.00 | 187 | 0.41 |
| Onsite Dry Utilities | Graders | 0 | 8.00 | 187 | 0.41 |
| Offsite Concrete Flatwork and Paving | Pavers | 2 | 8.00 | 130 | 0.42 |
| Onsite Concrete Flatwork and Paving | Pavers | 1 | 8.00 | 130 | 0.42 |
| Offsite Concrete Flatwork and Paving | Paving Equipment | 0 | 8.00 | 132 | 0.36 |
| Onsite Concrete Flatwork and Paving | Paving Equipment | 0 | 8.00 | 132 | 0.36 |
| Offsite Concrete Flatwork and Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Onsite Concrete Flatwork and Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Offsite Demolition & Clearing | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Grading & Excavation | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Sewer, Storm Drain, and Water | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Dry Utilities | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Sewer, Storm Drain, and Water | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Dry Utilities | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Parkway Landscaping | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Onsite Parkway Landscaping | Rubber Tired Dozers | 0 | 8.00 | 247 | 0.40 |
| Offsite Grading & Excavation | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Offsite Sewer, Storm Drain, and Water | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Offsite Dry Utilities | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Onsite Sewer, Storm Drain, and Water | Scrapers | 0 | 8.00 | 367 | 0.48 |

| | | | | | |
|---|---|---|---|---|---|
| Onsite Dry Utilities | Scrapers | 0 | 8.00 | 367 | 0.48 |
| Onsite Retaining Walls | Tractors/Loaders/Backhoes | 0 | 7.00 | 97 | 0.37 |
| Onsite Fencing | Tractors/Loaders/Backhoes | 0 | 7.00 | 97 | 0.37 |
| Offsite Grading & Excavation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |

**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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Onsite Demolition & Clearing | 3 | 8.00 | 0.00 | 23.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Retaining Walls | 1 | 10.00 | 3.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Grading | 8 | 20.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Fencing | 1 | 10.00 | 3.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Demolition & Clearing | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Grading & Excavation | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Sewer, Storm Drain, and Water | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Dry Utilities | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Sewer, Storm Drain, and Water | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Dry Utilities | 3 | 8.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Concrete Flatwork and Paving | 8 | 20.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Concrete Flatwork and Paving | 7 | 18.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Offsite Parkway Landscaping | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Onsite Parkway Landscaping | 4 | 10.00 | 0.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

## 3.2 Onsite Demolition & Clearing - 2022

### 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 | | | | | 0.6229 | 0.0000 | 0.6229 | 0.0943 | 0.0000 | 0.0943 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.8200 | 9.2651 | 3.9715 | 0.0145 | | 0.3369 | 0.3369 | | 0.3106 | 0.3106 | | 1,395.1668 | 1,395.1668 | 0.4446 | | 1,406.2829 |
| **Total** | **0.8200** | **9.2651** | **3.9715** | **0.0145** | **0.6229** | **0.3369** | **0.9598** | **0.0943** | **0.3106** | **0.4049** | | **1,395.1668** | **1,395.1668** | **0.4446** | | **1,406.2829** |

### 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 | 0.0206 | 0.6794 | 0.1900 | 2.1400e-003 | 0.0502 | 1.9500e-003 | 0.0522 | 0.0138 | 1.8600e-003 | 0.0156 | | 235.7738 | 235.7738 | 0.0219 | | 236.3221 |
| 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 | 0.0297 | 0.0184 | 0.1851 | 5.9000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 58.9221 | 58.9221 | 1.6100e-003 | | 58.9623 |
| **Total** | **0.0503** | **0.6978** | **0.3751** | **2.7300e-003** | **0.1160** | **2.3900e-003** | **0.1183** | **0.0312** | **2.2700e-003** | **0.0335** | | **294.6959** | **294.6959** | **0.0235** | | **295.2844** |

## 3.2 Onsite Demolition & Clearing - 2022

### 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 | | | | | 0.2803 | 0.0000 | 0.2803 | 0.0425 | 0.0000 | 0.0425 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.8200 | 9.2651 | 3.9715 | 0.0145 | | 0.3369 | 0.3369 | | 0.3106 | 0.3106 | 0.0000 | 1,395.1668 | 1,395.1668 | 0.4446 | | 1,406.2829 |
| **Total** | **0.8200** | **9.2651** | **3.9715** | **0.0145** | **0.2803** | **0.3369** | **0.6172** | **0.0425** | **0.3106** | **0.3531** | **0.0000** | **1,395.1668** | **1,395.1668** | **0.4446** | | **1,406.2829** |

### 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 | 0.0206 | 0.6794 | 0.1900 | 2.1400e-003 | 0.0502 | 1.9500e-003 | 0.0522 | 0.0138 | 1.8600e-003 | 0.0156 | | 235.7738 | 235.7738 | 0.0219 | | 236.3221 |
| 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 | 0.0297 | 0.0184 | 0.1851 | 5.9000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 58.9221 | 58.9221 | 1.6100e-003 | | 58.9623 |
| **Total** | **0.0503** | **0.6978** | **0.3751** | **2.7300e-003** | **0.1160** | **2.3900e-003** | **0.1183** | **0.0312** | **2.2700e-003** | **0.0335** | | **294.6959** | **294.6959** | **0.0235** | | **295.2844** |

## 3.3 Offsite Demolition & Clearing - 2022

### 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 | 0.9407 | 10.8868 | 6.8781 | 0.0181 | | 0.3933 | 0.3933 | | 0.3618 | 0.3618 | | 1,748.5735 | 1,748.5735 | 0.5655 | | 1,762.7116 |
| **Total** | **0.9407** | **10.8868** | **6.8781** | **0.0181** | | **0.3933** | **0.3933** | | **0.3618** | **0.3618** | | **1,748.5735** | **1,748.5735** | **0.5655** | | **1,762.7116** |

### 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 | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0372** | **0.0230** | **0.2314** | **7.4000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **73.6526** | **73.6526** | **2.0100e-003** | | **73.7028** |

## 3.3 Offsite Demolition & Clearing - 2022

### 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 | 0.9407 | 10.8868 | 6.8781 | 0.0181 | | 0.3933 | 0.3933 | | 0.3618 | 0.3618 | 0.0000 | 1,748.5734 | 1,748.5734 | 0.5655 | | 1,762.7116 |
| **Total** | **0.9407** | **10.8868** | **6.8781** | **0.0181** | | **0.3933** | **0.3933** | | **0.3618** | **0.3618** | **0.0000** | **1,748.5734** | **1,748.5734** | **0.5655** | | **1,762.7116** |

### 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 | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0372** | **0.0230** | **0.2314** | **7.4000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **73.6526** | **73.6526** | **2.0100e-003** | | **73.7028** |

## 3.4 Onsite Grading - 2022

### 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 | | | | | 11.3246 | 0.0000 | 11.3246 | 3.8828 | 0.0000 | 3.8828 | | | 0.0000 | | | 0.0000 |
| Off-Road | 5.0906 | 56.7617 | 34.5090 | 0.0858 | | 2.2423 | 2.2423 | | 2.0629 | 2.0629 | | 8,308.9135 | 8,308.9135 | 2.6873 | | 8,376.0953 |
| **Total** | **5.0906** | **56.7617** | **34.5090** | **0.0858** | **11.3246** | **2.2423** | **13.5669** | **3.8828** | **2.0629** | **5.9457** | | **8,308.9135** | **8,308.9135** | **2.6873** | | **8,376.0953** |

### 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 | 0.0743 | 0.0460 | 0.4627 | 1.4800e-003 | 0.1643 | 1.1100e-003 | 0.1654 | 0.0436 | 1.0200e-003 | 0.0446 | | 147.3051 | 147.3051 | 4.0200e-003 | | 147.4057 |
| **Total** | **0.0743** | **0.0460** | **0.4627** | **1.4800e-003** | **0.1643** | **1.1100e-003** | **0.1654** | **0.0436** | **1.0200e-003** | **0.0446** | | **147.3051** | **147.3051** | **4.0200e-003** | | **147.4057** |

## 3.4 Onsite Grading - 2022

### 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 | | | | | 5.0961 | 0.0000 | 5.0961 | 1.7473 | 0.0000 | 1.7473 | | | 0.0000 | | | 0.0000 |
| Off-Road | 5.0906 | 56.7617 | 34.5090 | 0.0858 | | 2.2423 | 2.2423 | | 2.0629 | 2.0629 | 0.0000 | 8,308.9135 | 8,308.9135 | 2.6873 | | 8,376.0953 |
| **Total** | **5.0906** | **56.7617** | **34.5090** | **0.0858** | **5.0961** | **2.2423** | **7.3384** | **1.7473** | **2.0629** | **3.8102** | **0.0000** | **8,308.9135** | **8,308.9135** | **2.6873** | | **8,376.0953** |

### 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 | 0.0743 | 0.0460 | 0.4627 | 1.4800e-003 | 0.1643 | 1.1100e-003 | 0.1654 | 0.0436 | 1.0200e-003 | 0.0446 | | 147.3051 | 147.3051 | 4.0200e-003 | | 147.4057 |
| **Total** | **0.0743** | **0.0460** | **0.4627** | **1.4800e-003** | **0.1643** | **1.1100e-003** | **0.1654** | **0.0436** | **1.0200e-003** | **0.0446** | | **147.3051** | **147.3051** | **4.0200e-003** | | **147.4057** |

## 3.5 Offsite Grading & Excavation - 2022

### 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 | | | | | 0.5303 | 0.0000 | 0.5303 | 0.0573 | 0.0000 | 0.0573 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.9407 | 10.8868 | 6.8781 | 0.0181 | | 0.3933 | 0.3933 | | 0.3618 | 0.3618 | | 1,748.5735 | 1,748.5735 | 0.5655 | | 1,762.7116 |
| **Total** | **0.9407** | **10.8868** | **6.8781** | **0.0181** | **0.5303** | **0.3933** | **0.9236** | **0.0573** | **0.3618** | **0.4191** | | **1,748.5735** | **1,748.5735** | **0.5655** | | **1,762.7116** |

### 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 | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0372** | **0.0230** | **0.2314** | **7.4000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **73.6526** | **73.6526** | **2.0100e-003** | | **73.7028** |

## 3.5 Offsite Grading & Excavation - 2022

### 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 | | | | | 0.2386 | 0.0000 | 0.2386 | 0.0258 | 0.0000 | 0.0258 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.9407 | 10.8868 | 6.8781 | 0.0181 | | 0.3933 | 0.3933 | | 0.3618 | 0.3618 | 0.0000 | 1,748.5734 | 1,748.5734 | 0.5655 | | 1,762.7116 |
| **Total** | **0.9407** | **10.8868** | **6.8781** | **0.0181** | **0.2386** | **0.3933** | **0.6319** | **0.0258** | **0.3618** | **0.3876** | **0.0000** | **1,748.5734** | **1,748.5734** | **0.5655** | | **1,762.7116** |

### 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 | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0372** | **0.0230** | **0.2314** | **7.4000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **73.6526** | **73.6526** | **2.0100e-003** | | **73.7028** |

## 3.6 Offsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6585 | 6.4776 | 7.0243 | 0.0145 | | 0.2775 | 0.2775 | | 0.2553 | 0.2553 | | 1,406.9185 | 1,406.9185 | 0.4550 | | 1,418.2942 |
| **Total** | **0.6585** | **6.4776** | **7.0243** | **0.0145** | **0.0000** | **0.2775** | **0.2775** | **0.0000** | **0.2553** | **0.2553** | | **1,406.9185** | **1,406.9185** | **0.4550** | | **1,418.2942** |

### 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 | 0.0297 | 0.0184 | 0.1851 | 5.9000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 58.9221 | 58.9221 | 1.6100e-003 | | 58.9623 |
| **Total** | **0.0297** | **0.0184** | **0.1851** | **5.9000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **58.9221** | **58.9221** | **1.6100e-003** | | **58.9623** |

## 3.6 Offsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6585 | 6.4776 | 7.0243 | 0.0145 | | 0.2775 | 0.2775 | | 0.2553 | 0.2553 | 0.0000 | 1,406.9185 | 1,406.9185 | 0.4550 | | 1,418.2942 |
| **Total** | **0.6585** | **6.4776** | **7.0243** | **0.0145** | **0.0000** | **0.2775** | **0.2775** | **0.0000** | **0.2553** | **0.2553** | **0.0000** | **1,406.9185** | **1,406.9185** | **0.4550** | | **1,418.2942** |

### 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 | 0.0297 | 0.0184 | 0.1851 | 5.9000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 58.9221 | 58.9221 | 1.6100e-003 | | 58.9623 |
| **Total** | **0.0297** | **0.0184** | **0.1851** | **5.9000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **58.9221** | **58.9221** | **1.6100e-003** | | **58.9623** |

## 3.7 Onsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6585 | 6.4776 | 7.0243 | 0.0145 | | 0.2775 | 0.2775 | | 0.2553 | 0.2553 | | 1,406.9185 | 1,406.9185 | 0.4550 | | 1,418.2942 |
| **Total** | **0.6585** | **6.4776** | **7.0243** | **0.0145** | **0.0000** | **0.2775** | **0.2775** | **0.0000** | **0.2553** | **0.2553** | | **1,406.9185** | **1,406.9185** | **0.4550** | | **1,418.2942** |

### 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 | 0.0297 | 0.0184 | 0.1851 | 5.9000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 58.9221 | 58.9221 | 1.6100e-003 | | 58.9623 |
| **Total** | **0.0297** | **0.0184** | **0.1851** | **5.9000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **58.9221** | **58.9221** | **1.6100e-003** | | **58.9623** |

## 3.7 Onsite Sewer, Storm Drain, and Water - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6585 | 6.4776 | 7.0243 | 0.0145 | | 0.2775 | 0.2775 | | 0.2553 | 0.2553 | 0.0000 | 1,406.9185 | 1,406.9185 | 0.4550 | | 1,418.2942 |
| **Total** | **0.6585** | **6.4776** | **7.0243** | **0.0145** | **0.0000** | **0.2775** | **0.2775** | **0.0000** | **0.2553** | **0.2553** | **0.0000** | **1,406.9185** | **1,406.9185** | **0.4550** | | **1,418.2942** |

### 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 | 0.0297 | 0.0184 | 0.1851 | 5.9000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 58.9221 | 58.9221 | 1.6100e-003 | | 58.9623 |
| **Total** | **0.0297** | **0.0184** | **0.1851** | **5.9000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **58.9221** | **58.9221** | **1.6100e-003** | | **58.9623** |

## 3.8 Onsite Retaining Walls - 2022

### 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 | 0.1136 | 1.0549 | 1.1538 | 1.5300e-003 | | 0.0699 | 0.0699 | | 0.0643 | 0.0643 | | 148.0308 | 148.0308 | 0.0479 | | 149.2277 |
| **Total** | **0.1136** | **1.0549** | **1.1538** | **1.5300e-003** | | **0.0699** | **0.0699** | | **0.0643** | **0.0643** | | **148.0308** | **148.0308** | **0.0479** | | **149.2277** |

### 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 | 8.9000e-003 | 0.2877 | 0.0821 | 7.8000e-004 | 0.0203 | 5.8000e-004 | 0.0209 | 5.8500e-003 | 5.5000e-004 | 6.4000e-003 | | 84.3308 | 84.3308 | 6.4200e-003 | | 84.4913 |
| Worker | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0461** | **0.3107** | **0.3134** | **1.5200e-003** | **0.1025** | **1.1400e-003** | **0.1036** | **0.0276** | **1.0600e-003** | **0.0287** | | **157.9834** | **157.9834** | **8.4300e-003** | | **158.1942** |

## 3.8 Onsite Retaining Walls - 2022

### 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 | 0.1136 | 1.0549 | 1.1538 | 1.5300e-003 | | 0.0699 | 0.0699 | | 0.0643 | 0.0643 | 0.0000 | 148.0308 | 148.0308 | 0.0479 | | 149.2277 |
| **Total** | **0.1136** | **1.0549** | **1.1538** | **1.5300e-003** | | **0.0699** | **0.0699** | | **0.0643** | **0.0643** | **0.0000** | **148.0308** | **148.0308** | **0.0479** | | **149.2277** |

### 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 | 8.9000e-003 | 0.2877 | 0.0821 | 7.8000e-004 | 0.0203 | 5.8000e-004 | 0.0209 | 5.8500e-003 | 5.5000e-004 | 6.4000e-003 | | 84.3308 | 84.3308 | 6.4200e-003 | | 84.4913 |
| Worker | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0461** | **0.3107** | **0.3134** | **1.5200e-003** | **0.1025** | **1.1400e-003** | **0.1036** | **0.0276** | **1.0600e-003** | **0.0287** | | **157.9834** | **157.9834** | **8.4300e-003** | | **158.1942** |

## 3.9 Offsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3990 | 4.2799 | 5.8631 | 8.2900e-003 | | 0.2148 | 0.2148 | | 0.1976 | 0.1976 | | 802.8692 | 802.8692 | 0.2597 | | 809.3608 |
| **Total** | **0.3990** | **4.2799** | **5.8631** | **8.2900e-003** | **0.0000** | **0.2148** | **0.2148** | **0.0000** | **0.1976** | **0.1976** | | **802.8692** | **802.8692** | **0.2597** | | **809.3608** |

### 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 | 0.0297 | 0.0184 | 0.1851 | 5.9000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 58.9221 | 58.9221 | 1.6100e-003 | | 58.9623 |
| **Total** | **0.0297** | **0.0184** | **0.1851** | **5.9000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **58.9221** | **58.9221** | **1.6100e-003** | | **58.9623** |

## 3.9 Offsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3990 | 4.2799 | 5.8631 | 8.2900e-003 | | 0.2148 | 0.2148 | | 0.1976 | 0.1976 | 0.0000 | 802.8692 | 802.8692 | 0.2597 | | 809.3608 |
| **Total** | **0.3990** | **4.2799** | **5.8631** | **8.2900e-003** | **0.0000** | **0.2148** | **0.2148** | **0.0000** | **0.1976** | **0.1976** | **0.0000** | **802.8692** | **802.8692** | **0.2597** | | **809.3608** |

### 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 | 0.0297 | 0.0184 | 0.1851 | 5.9000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 58.9221 | 58.9221 | 1.6100e-003 | | 58.9623 |
| **Total** | **0.0297** | **0.0184** | **0.1851** | **5.9000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **58.9221** | **58.9221** | **1.6100e-003** | | **58.9623** |

## 3.10 Onsite Fencing - 2022

### 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 | 0.1136 | 1.0549 | 1.1538 | 1.5300e-003 | | 0.0699 | 0.0699 | | 0.0643 | 0.0643 | | 148.0308 | 148.0308 | 0.0479 | | 149.2277 |
| **Total** | **0.1136** | **1.0549** | **1.1538** | **1.5300e-003** | | **0.0699** | **0.0699** | | **0.0643** | **0.0643** | | **148.0308** | **148.0308** | **0.0479** | | **149.2277** |

### 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 | 8.9000e-003 | 0.2877 | 0.0821 | 7.8000e-004 | 0.0203 | 5.8000e-004 | 0.0209 | 5.8500e-003 | 5.5000e-004 | 6.4000e-003 | | 84.3308 | 84.3308 | 6.4200e-003 | | 84.4913 |
| Worker | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0461** | **0.3107** | **0.3134** | **1.5200e-003** | **0.1025** | **1.1400e-003** | **0.1036** | **0.0276** | **1.0600e-003** | **0.0287** | | **157.9834** | **157.9834** | **8.4300e-003** | | **158.1942** |

## 3.10 Onsite Fencing - 2022

### 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 | 0.1136 | 1.0549 | 1.1538 | 1.5300e-003 | | 0.0699 | 0.0699 | | 0.0643 | 0.0643 | 0.0000 | 148.0308 | 148.0308 | 0.0479 | | 149.2277 |
| **Total** | **0.1136** | **1.0549** | **1.1538** | **1.5300e-003** | | **0.0699** | **0.0699** | | **0.0643** | **0.0643** | **0.0000** | **148.0308** | **148.0308** | **0.0479** | | **149.2277** |

### 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 | 8.9000e-003 | 0.2877 | 0.0821 | 7.8000e-004 | 0.0203 | 5.8000e-004 | 0.0209 | 5.8500e-003 | 5.5000e-004 | 6.4000e-003 | | 84.3308 | 84.3308 | 6.4200e-003 | | 84.4913 |
| Worker | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0461** | **0.3107** | **0.3134** | **1.5200e-003** | **0.1025** | **1.1400e-003** | **0.1036** | **0.0276** | **1.0600e-003** | **0.0287** | | **157.9834** | **157.9834** | **8.4300e-003** | | **158.1942** |

## 3.11 Onsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3990 | 4.2799 | 5.8631 | 8.2900e-003 | | 0.2148 | 0.2148 | | 0.1976 | 0.1976 | | 802.8692 | 802.8692 | 0.2597 | | 809.3608 |
| **Total** | **0.3990** | **4.2799** | **5.8631** | **8.2900e-003** | **0.0000** | **0.2148** | **0.2148** | **0.0000** | **0.1976** | **0.1976** | | **802.8692** | **802.8692** | **0.2597** | | **809.3608** |

### 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 | 0.0297 | 0.0184 | 0.1851 | 5.9000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 58.9221 | 58.9221 | 1.6100e-003 | | 58.9623 |
| **Total** | **0.0297** | **0.0184** | **0.1851** | **5.9000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **58.9221** | **58.9221** | **1.6100e-003** | | **58.9623** |

## 3.11 Onsite Dry Utilities - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3990 | 4.2799 | 5.8631 | 8.2900e-003 | | 0.2148 | 0.2148 | | 0.1976 | 0.1976 | 0.0000 | 802.8692 | 802.8692 | 0.2597 | | 809.3608 |
| **Total** | **0.3990** | **4.2799** | **5.8631** | **8.2900e-003** | **0.0000** | **0.2148** | **0.2148** | **0.0000** | **0.1976** | **0.1976** | **0.0000** | **802.8692** | **802.8692** | **0.2597** | | **809.3608** |

### 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 | 0.0297 | 0.0184 | 0.1851 | 5.9000e-004 | 0.0657 | 4.4000e-004 | 0.0662 | 0.0174 | 4.1000e-004 | 0.0178 | | 58.9221 | 58.9221 | 1.6100e-003 | | 58.9623 |
| **Total** | **0.0297** | **0.0184** | **0.1851** | **5.9000e-004** | **0.0657** | **4.4000e-004** | **0.0662** | **0.0174** | **4.1000e-004** | **0.0178** | | **58.9221** | **58.9221** | **1.6100e-003** | | **58.9623** |

## 3.12 Offsite Concrete Flatwork and Paving - 2022

### 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 | 1.5920 | 17.7893 | 15.5159 | 0.0317 | | 0.7361 | 0.7361 | | 0.6772 | 0.6772 | | 3,066.4493 | 3,066.4493 | 0.9918 | | 3,091.2431 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.5920** | **17.7893** | **15.5159** | **0.0317** | | **0.7361** | **0.7361** | | **0.6772** | **0.6772** | | **3,066.4493** | **3,066.4493** | **0.9918** | | **3,091.2431** |

### 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 | 0.0743 | 0.0460 | 0.4627 | 1.4800e-003 | 0.1643 | 1.1100e-003 | 0.1654 | 0.0436 | 1.0200e-003 | 0.0446 | | 147.3051 | 147.3051 | 4.0200e-003 | | 147.4057 |
| **Total** | **0.0743** | **0.0460** | **0.4627** | **1.4800e-003** | **0.1643** | **1.1100e-003** | **0.1654** | **0.0436** | **1.0200e-003** | **0.0446** | | **147.3051** | **147.3051** | **4.0200e-003** | | **147.4057** |

## 3.12 Offsite Concrete Flatwork and Paving - 2022

### 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 | 1.5920 | 17.7893 | 15.5159 | 0.0317 | | 0.7361 | 0.7361 | | 0.6772 | 0.6772 | 0.0000 | 3,066.4493 | 3,066.4493 | 0.9918 | | 3,091.2431 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.5920** | **17.7893** | **15.5159** | **0.0317** | | **0.7361** | **0.7361** | | **0.6772** | **0.6772** | **0.0000** | **3,066.4493** | **3,066.4493** | **0.9918** | | **3,091.2431** |

### 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 | 0.0743 | 0.0460 | 0.4627 | 1.4800e-003 | 0.1643 | 1.1100e-003 | 0.1654 | 0.0436 | 1.0200e-003 | 0.0446 | | 147.3051 | 147.3051 | 4.0200e-003 | | 147.4057 |
| **Total** | **0.0743** | **0.0460** | **0.4627** | **1.4800e-003** | **0.1643** | **1.1100e-003** | **0.1654** | **0.0436** | **1.0200e-003** | **0.0446** | | **147.3051** | **147.3051** | **4.0200e-003** | | **147.4057** |

## 3.13 Onsite Concrete Flatwork and Paving - 2022

**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 | 1.3851 | 15.6904 | 12.6320 | 0.0270 | | 0.6363 | 0.6363 | | 0.5854 | 0.5854 | | 2,611.1913 | 2,611.1913 | 0.8445 | | 2,632.3041 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3851** | **15.6904** | **12.6320** | **0.0270** | | **0.6363** | **0.6363** | | **0.5854** | **0.5854** | | **2,611.1913** | **2,611.1913** | **0.8445** | | **2,632.3041** |

**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 | 0.0669 | 0.0414 | 0.4164 | 1.3300e-003 | 0.1479 | 1.0000e-003 | 0.1489 | 0.0392 | 9.2000e-004 | 0.0401 | | 132.5746 | 132.5746 | 3.6200e-003 | | 132.6651 |
| **Total** | **0.0669** | **0.0414** | **0.4164** | **1.3300e-003** | **0.1479** | **1.0000e-003** | **0.1489** | **0.0392** | **9.2000e-004** | **0.0401** | | **132.5746** | **132.5746** | **3.6200e-003** | | **132.6651** |

## 3.13 Onsite Concrete Flatwork and Paving - 2022

**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 | 1.3851 | 15.6904 | 12.6320 | 0.0270 | | 0.6363 | 0.6363 | | 0.5854 | 0.5854 | 0.0000 | 2,611.1913 | 2,611.1913 | 0.8445 | | 2,632.3041 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.3851** | **15.6904** | **12.6320** | **0.0270** | | **0.6363** | **0.6363** | | **0.5854** | **0.5854** | **0.0000** | **2,611.1913** | **2,611.1913** | **0.8445** | | **2,632.3041** |

**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 | 0.0669 | 0.0414 | 0.4164 | 1.3300e-003 | 0.1479 | 1.0000e-003 | 0.1489 | 0.0392 | 9.2000e-004 | 0.0401 | | 132.5746 | 132.5746 | 3.6200e-003 | | 132.6651 |
| **Total** | **0.0669** | **0.0414** | **0.4164** | **1.3300e-003** | **0.1479** | **1.0000e-003** | **0.1489** | **0.0392** | **9.2000e-004** | **0.0401** | | **132.5746** | **132.5746** | **3.6200e-003** | | **132.6651** |

## 3.14 Offsite Parkway Landscaping - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3224 | 3.8407 | 5.3153 | 7.7400e-003 | | 0.1734 | 0.1734 | | 0.1595 | 0.1595 | | 749.2046 | 749.2046 | 0.2423 | | 755.2623 |
| **Total** | **0.3224** | **3.8407** | **5.3153** | **7.7400e-003** | **0.0000** | **0.1734** | **0.1734** | **0.0000** | **0.1595** | **0.1595** | | **749.2046** | **749.2046** | **0.2423** | | **755.2623** |

### 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 | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0372** | **0.0230** | **0.2314** | **7.4000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **73.6526** | **73.6526** | **2.0100e-003** | | **73.7028** |

## 3.14 Offsite Parkway Landscaping - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3224 | 3.8407 | 5.3153 | 7.7400e-003 | | 0.1734 | 0.1734 | | 0.1595 | 0.1595 | 0.0000 | 749.2046 | 749.2046 | 0.2423 | | 755.2623 |
| **Total** | **0.3224** | **3.8407** | **5.3153** | **7.7400e-003** | **0.0000** | **0.1734** | **0.1734** | **0.0000** | **0.1595** | **0.1595** | **0.0000** | **749.2046** | **749.2046** | **0.2423** | | **755.2623** |

### 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 | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0372** | **0.0230** | **0.2314** | **7.4000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **73.6526** | **73.6526** | **2.0100e-003** | | **73.7028** |

## 3.15 Onsite Parkway Landscaping - 2022

### 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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3224 | 3.8407 | 5.3153 | 7.7400e-003 | | 0.1734 | 0.1734 | | 0.1595 | 0.1595 | | 749.2046 | 749.2046 | 0.2423 | | 755.2623 |
| **Total** | **0.3224** | **3.8407** | **5.3153** | **7.7400e-003** | **0.0000** | **0.1734** | **0.1734** | **0.0000** | **0.1595** | **0.1595** | | **749.2046** | **749.2046** | **0.2423** | | **755.2623** |

### 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 | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0372** | **0.0230** | **0.2314** | **7.4000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **73.6526** | **73.6526** | **2.0100e-003** | | **73.7028** |

### 3.15 Onsite Parkway Landscaping - 2022

**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 | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.3224 | 3.8407 | 5.3153 | 7.7400e-003 | | 0.1734 | 0.1734 | | 0.1595 | 0.1595 | 0.0000 | 749.2046 | 749.2046 | 0.2423 | | 755.2623 |
| **Total** | **0.3224** | **3.8407** | **5.3153** | **7.7400e-003** | **0.0000** | **0.1734** | **0.1734** | **0.0000** | **0.1595** | **0.1595** | **0.0000** | **749.2046** | **749.2046** | **0.2423** | | **755.2623** |

**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 | 0.0372 | 0.0230 | 0.2314 | 7.4000e-004 | 0.0822 | 5.6000e-004 | 0.0827 | 0.0218 | 5.1000e-004 | 0.0223 | | 73.6526 | 73.6526 | 2.0100e-003 | | 73.7028 |
| **Total** | **0.0372** | **0.0230** | **0.2314** | **7.4000e-004** | **0.0822** | **5.6000e-004** | **0.0827** | **0.0218** | **5.1000e-004** | **0.0223** | | **73.6526** | **73.6526** | **2.0100e-003** | | **73.7028** |

## 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 | 0.4153 | 1.6248 | 5.0000 | 0.0178 | 1.6951 | 0.0140 | 1.7091 | 0.4530 | 0.0130 | 0.4660 | | 1,816.3200 | 1,816.3200 | 0.0928 | | 1,818.6390 |
| Unmitigated | 0.4153 | 1.6248 | 5.0000 | 0.0178 | 1.6951 | 0.0140 | 1.7091 | 0.4530 | 0.0130 | 0.4660 | | 1,816.3200 | 1,816.3200 | 0.0928 | | 1,818.6390 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Single Family Housing | 280.00 | 280.00 | 280.00 | 799,485 | 799,485 |
| Total | 280.00 | 280.00 | 280.00 | 799,485 | 799,485 |

## 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 | 10.80 | 7.30 | 7.50 | 41.60 | 18.80 | 39.60 | 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 | 0.602700 | 0.040134 | 0.179939 | 0.104242 | 0.014985 | 0.005435 | 0.016642 | 0.024350 | 0.001934 | 0.001888 | 0.005938 | 0.000757 | 0.001056 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

Exceed Title 24

Percent of Electricity Use Generated with Renewable 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 | 0.0182 | 0.1558 | 0.0663 | 9.9000e-004 | | 0.0126 | 0.0126 | | 0.0126 | 0.0126 | | 198.9325 | 198.9325 | 3.8100e-003 | 3.6500e-003 | 200.1147 |
| NaturalGas Unmitigated | 0.0194 | 0.1653 | 0.0704 | 1.0600e-003 | | 0.0134 | 0.0134 | | 0.0134 | 0.0134 | | 211.0665 | 211.0665 | 4.0500e-003 | 3.8700e-003 | 212.3207 |

## 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 | 1794.07 | 0.0194 | 0.1653 | 0.0704 | 1.0600e-003 | | 0.0134 | 0.0134 | | 0.0134 | 0.0134 | | 211.0665 | 211.0665 | 4.0500e-003 | 3.8700e-003 | 212.3207 |
| **Total** | | **0.0194** | **0.1653** | **0.0704** | **1.0600e-003** | | **0.0134** | **0.0134** | | **0.0134** | **0.0134** | | **211.0665** | **211.0665** | **4.0500e-003** | **3.8700e-003** | **212.3207** |

**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 | 1.69093 | 0.0182 | 0.1558 | 0.0663 | 9.9000e-004 | | 0.0126 | 0.0126 | | 0.0126 | 0.0126 | | 198.9325 | 198.9325 | 3.8100e-003 | 3.6500e-003 | 200.1147 |
| **Total** | | **0.0182** | **0.1558** | **0.0663** | **9.9000e-004** | | **0.0126** | **0.0126** | | **0.0126** | **0.0126** | | **198.9325** | **198.9325** | **3.8100e-003** | **3.6500e-003** | **200.1147** |

# 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 | 43.4113 | 0.7604 | 48.8858 | 0.0753 | | 6.3982 | 6.3982 | | 6.3982 | 6.3982 | 625.4408 | 330.2771 | 955.7179 | 0.0103 | 0.0612 | 974.2013 |
| Unmitigated | 43.4113 | 0.7604 | 48.8858 | 0.0753 | | 6.3982 | 6.3982 | | 6.3982 | 6.3982 | 625.4408 | 330.2771 | 955.7179 | 0.0103 | 0.0612 | 974.2013 |

## 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 | 0.1080 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 1.0786 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 42.1552 | 0.7337 | 46.5753 | 0.0752 | | 6.3854 | 6.3854 | | 6.3854 | 6.3854 | 625.4408 | 326.1177 | 951.5584 | 6.2500e-003 | 0.0612 | 969.9418 |
| Landscaping | 0.0696 | 0.0266 | 2.3106 | 1.2000e-004 | | 0.0128 | 0.0128 | | 0.0128 | 0.0128 | | 4.1595 | 4.1595 | 4.0000e-003 | | 4.2595 |
| **Total** | **43.4113** | **0.7604** | **48.8858** | **0.0753** | | **6.3982** | **6.3982** | | **6.3982** | **6.3982** | **625.4408** | **330.2771** | **955.7179** | **0.0103** | **0.0612** | **974.2013** |

### 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 | 0.1080 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 1.0786 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 42.1552 | 0.7337 | 46.5753 | 0.0752 | | 6.3854 | 6.3854 | | 6.3854 | 6.3854 | 625.4408 | 326.1177 | 951.5584 | 6.2500e-003 | 0.0612 | 969.9418 |
| Landscaping | 0.0696 | 0.0266 | 2.3106 | 1.2000e-004 | | 0.0128 | 0.0128 | | 0.0128 | 0.0128 | | 4.1595 | 4.1595 | 4.0000e-003 | | 4.2595 |
| **Total** | **43.4113** | **0.7604** | **48.8858** | **0.0753** | | **6.3982** | **6.3982** | | **6.3982** | **6.3982** | **625.4408** | **330.2771** | **955.7179** | **0.0103** | **0.0612** | **974.2013** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

Apply Water Conservation Strategy

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

## 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

# GPE 02 - Vista Grande

## San Diego County, Mitigation Report

## Construction Mitigation Summary

| Phase | ROG | NOx | CO | SO2 | Exhaust PM10 | Exhaust PM2.5 | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | | | | | | | | | | | | |
| Offsite Concrete Flatwork and Paving | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Demolition & Clearing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Dry Utilities | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Grading & Excavation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Parkway Landscaping | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Sewer, Storm Drain, and Water | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Concrete Flatwork and Paving | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Demolition & Clearing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Dry Utilities | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Fencing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Grading | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Parkway Landscaping | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Retaining Walls | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Sewer, Storm Drain, and Water | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## OFFROAD Equipment Mitigation

| Equipment Type | Fuel Type | Tier | Number Mitigated | Total Number of Equipment | DPF | Oxidation Catalyst |
|---|---|---|---|---|---|---|
| Crawler Tractors | Diesel | No Change | 0 | 2 | No Change | 0.00 |
| Excavators | Diesel | No Change | 0 | 2 | No Change | 0.00 |
| Concrete/Industrial Saws | Diesel | No Change | 0 | 0 | No Change | 0.00 |
| Cranes | Diesel | No Change | 0 | 0 | No Change | 0.00 |
| Forklifts | Diesel | No Change | 0 | 4 | No Change | 0.00 |
| Graders | Diesel | No Change | 0 | 5 | No Change | 0.00 |
| Pavers | Diesel | No Change | 0 | 3 | No Change | 0.00 |
| Rollers | Diesel | No Change | 0 | 4 | No Change | 0.00 |
| Rubber Tired Dozers | Diesel | No Change | 0 | 1 | No Change | 0.00 |
| Tractors/Loaders/Backhoes | Diesel | No Change | 0 | 8 | No Change | 0.00 |
| Generator Sets | Diesel | No Change | 0 | 0 | No Change | 0.00 |
| Paving Equipment | Diesel | No Change | 0 | 0 | No Change | 0.00 |
| Scrapers | Diesel | No Change | 0 | 4 | No Change | 0.00 |
| Welders | Diesel | No Change | 0 | 0 | No Change | 0.00 |
| Dumpers/Tenders | Diesel | No Change | 0 | 1 | No Change | 0.00 |
| Rubber Tired Loaders | Diesel | No Change | 0 | 7 | No Change | 0.00 |
| Skid Steer Loaders | Diesel | No Change | 0 | 15 | No Change | 0.00 |

| Equipment Type | ROG | NOx | CO | SO2 | Exhaust PM10 | Exhaust PM2.5 | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unmitigated tons/yr | | | | | | Unmitigated mt/yr | | | | | |
| Concrete/Industrial Saws | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Cranes | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Crawler Tractors | 8.12000E-003 | 9.91300E-002 | 3.81900E-002 | 1.30000E-004 | 3.74000E-003 | 3.44000E-003 | 0.00000E+000 | 1.13616E+001 | 1.13616E+001 | 3.67000E-003 | 0.00000E+000 | 1.14535E+001 |
| Dumpers/Tenders | 1.50000E-004 | 9.30000E-004 | 5.00000E-004 | 0.00000E+000 | 3.00000E-005 | 3.00000E-005 | 0.00000E+000 | 1.10570E-001 | 1.10570E-001 | 1.00000E-005 | 0.00000E+000 | 1.10860E-001 |
| Excavators | 8.60000E-003 | 7.55200E-002 | 1.38340E-001 | 2.20000E-004 | 3.65000E-003 | 3.36000E-003 | 0.00000E+000 | 1.92783E+001 | 1.92783E+001 | 6.23000E-003 | 0.00000E+000 | 1.94341E+001 |
| Forklifts | 3.41000E-003 | 3.16500E-002 | 3.46100E-002 | 5.00000E-005 | 2.10000E-003 | 1.93000E-003 | 0.00000E+000 | 4.02874E+000 | 4.02874E+000 | 1.30000E-003 | 0.00000E+000 | 4.06131E+000 |
| Generator Sets | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Graders | 1.80500E-002 | 2.28710E-001 | 7.49000E-002 | 2.90000E-004 | 7.27000E-003 | 6.69000E-003 | 0.00000E+000 | 2.53065E+001 | 2.53065E+001 | 8.18000E-003 | 0.00000E+000 | 2.55111E+001 |
| Pavers | 7.76000E-003 | 7.87100E-002 | 1.08150E-001 | 1.80000E-004 | 3.74000E-003 | 3.44000E-003 | 0.00000E+000 | 1.54876E+001 | 1.54876E+001 | 5.01000E-003 | 0.00000E+000 | 1.56128E+001 |
| Paving Equipment | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Rollers | 8.31000E-003 | 8.62900E-002 | 9.30200E-002 | 1.30000E-004 | 4.97000E-003 | 4.58000E-003 | 0.00000E+000 | 1.15260E+001 | 1.15260E+001 | 3.73000E-003 | 0.00000E+000 | 1.16192E+001 |
| Rubber Tired Dozers | 1.04600E-002 | 1.09920E-001 | 4.47700E-002 | 1.10000E-004 | 5.22000E-003 | 4.80000E-003 | 0.00000E+000 | 9.37842E+000 | 9.37842E+000 | 3.03000E-003 | 0.00000E+000 | 9.45425E+000 |
| Rubber Tired Loaders | 2.25800E-002 | 2.34440E-001 | 1.18670E-001 | 4.80000E-004 | 7.86000E-003 | 7.23000E-003 | 0.00000E+000 | 4.25823E+001 | 4.25823E+001 | 1.37700E-002 | 0.00000E+000 | 4.29266E+001 |
| Scrapers | 4.09600E-002 | 4.47170E-001 | 3.18790E-001 | 7.60000E-004 | 1.74600E-002 | 1.60600E-002 | 0.00000E+000 | 6.66914E+001 | 6.66914E+001 | 2.15700E-002 | 0.00000E+000 | 6.72306E+001 |
| Skid Steer Loaders | 8.25000E-003 | 1.10040E-001 | 1.64380E-001 | 2.50000E-004 | 4.09000E-003 | 3.76000E-003 | 0.00000E+000 | 2.15423E+001 | 2.15423E+001 | 6.97000E-003 | 0.00000E+000 | 2.17165E+001 |
| Tractors/Loaders/Backhoes | 1.45800E-002 | 1.48290E-001 | 1.98060E-001 | 2.80000E-004 | 7.98000E-003 | 7.34000E-003 | 0.00000E+000 | 2.41852E+001 | 2.41852E+001 | 7.82000E-003 | 0.00000E+000 | 2.43808E+001 |
| Welders | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |

| Equipment Type | ROG | NOx | CO | SO2 | Exhaust PM10 | Exhaust PM2.5 | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mitigated tons/yr | | | | | | Mitigated mt/yr | | | | | |
| Concrete/Industrial Saws | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Cranes | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Crawler Tractors | 8.12000E-003 | 9.91300E-002 | 3.81900E-002 | 1.30000E-004 | 3.74000E-003 | 3.44000E-003 | 0.00000E+000 | 1.13616E+001 | 1.13616E+001 | 3.67000E-003 | 0.00000E+000 | 1.14535E+001 |
| Dumpers/Tenders | 1.50000E-004 | 9.30000E-004 | 5.00000E-004 | 0.00000E+000 | 3.00000E-005 | 3.00000E-005 | 0.00000E+000 | 1.10570E-001 | 1.10570E-001 | 1.00000E-005 | 0.00000E+000 | 1.10860E-001 |
| Excavators | 8.60000E-003 | 7.55200E-002 | 1.38340E-001 | 2.20000E-004 | 3.65000E-003 | 3.36000E-003 | 0.00000E+000 | 1.92782E+001 | 1.92782E+001 | 6.23000E-003 | 0.00000E+000 | 1.94341E+001 |
| Forklifts | 3.41000E-003 | 3.16500E-002 | 3.46100E-002 | 5.00000E-005 | 2.10000E-003 | 1.93000E-003 | 0.00000E+000 | 4.02873E+000 | 4.02873E+000 | 1.30000E-003 | 0.00000E+000 | 4.06131E+000 |
| Generator Sets | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Graders | 1.80500E-002 | 2.28700E-001 | 7.49000E-002 | 2.90000E-004 | 7.27000E-003 | 6.69000E-003 | 0.00000E+000 | 2.53065E+001 | 2.53065E+001 | 8.18000E-003 | 0.00000E+000 | 2.55111E+001 |
| Pavers | 7.76000E-003 | 7.87100E-002 | 1.08150E-001 | 1.80000E-004 | 3.74000E-003 | 3.44000E-003 | 0.00000E+000 | 1.54876E+001 | 1.54876E+001 | 5.01000E-003 | 0.00000E+000 | 1.56128E+001 |
| Paving Equipment | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Rollers | 8.31000E-003 | 8.62900E-002 | 9.30200E-002 | 1.30000E-004 | 4.97000E-003 | 4.58000E-003 | 0.00000E+000 | 1.15259E+001 | 1.15259E+001 | 3.73000E-003 | 0.00000E+000 | 1.16191E+001 |
| Rubber Tired Dozers | 1.04600E-002 | 1.09920E-001 | 4.47700E-002 | 1.10000E-004 | 5.22000E-003 | 4.80000E-003 | 0.00000E+000 | 9.37841E+000 | 9.37841E+000 | 3.03000E-003 | 0.00000E+000 | 9.45424E+000 |
| Rubber Tired Loaders | 2.25800E-002 | 2.34440E-001 | 1.18670E-001 | 4.80000E-004 | 7.86000E-003 | 7.23000E-003 | 0.00000E+000 | 4.25823E+001 | 4.25823E+001 | 1.37700E-002 | 0.00000E+000 | 4.29266E+001 |
| Scrapers | 4.09600E-002 | 4.47170E-001 | 3.18790E-001 | 7.60000E-004 | 1.74600E-002 | 1.60600E-002 | 0.00000E+000 | 6.66913E+001 | 6.66913E+001 | 2.15700E-002 | 0.00000E+000 | 6.72306E+001 |
| Skid Steer Loaders | 8.25000E-003 | 1.10040E-001 | 1.64380E-001 | 2.50000E-004 | 4.09000E-003 | 3.76000E-003 | 0.00000E+000 | 2.15423E+001 | 2.15423E+001 | 6.97000E-003 | 0.00000E+000 | 2.17165E+001 |
| Tractors/Loaders/Backhoes | 1.45800E-002 | 1.48290E-001 | 1.98060E-001 | 2.80000E-004 | 7.98000E-003 | 7.34000E-003 | 0.00000E+000 | 2.41852E+001 | 2.41852E+001 | 7.82000E-003 | 0.00000E+000 | 2.43808E+001 |
| Welders | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |

| Equipment Type | ROG | NOx | CO | SO2 | Exhaust PM10 | Exhaust PM2.5 | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | | | | | | | | | | | | |
| Concrete/Industrial Saws | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Cranes | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Crawler Tractors | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 8.80157E-007 | 8.80157E-007 | 0.00000E+000 | 0.00000E+000 | 1.74619E-006 |
| Dumpers/Tenders | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Excavators | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 1.03744E-006 | 1.03744E-006 | 0.00000E+000 | 0.00000E+000 | 1.02912E-006 |
| Forklifts | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 2.48217E-006 | 2.48217E-006 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Generator Sets | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Graders | 0.00000E+000 | 4.37235E-005 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 1.18547E-006 | 1.18547E-006 | 0.00000E+000 | 0.00000E+000 | 1.17596E-006 |
| Pavers | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 6.45677E-007 | 6.45677E-007 | 0.00000E+000 | 0.00000E+000 | 1.28100E-006 |
| Paving Equipment | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |
| Rollers | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 1.73521E-006 | 1.73521E-006 | 0.00000E+000 | 0.00000E+000 | 1.72130E-006 |
| Rubber Tired Dozers | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 1.06628E-006 | 1.06628E-006 | 0.00000E+000 | 0.00000E+000 | 1.05773E-006 |
| Rubber Tired Loaders | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 1.17420E-006 | 1.17420E-006 | 0.00000E+000 | 0.00000E+000 | 1.16478E-006 |
| Scrapers | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 1.19955E-006 | 1.19955E-006 | 0.00000E+000 | 0.00000E+000 | 1.18993E-006 |
| Skid Steer Loaders | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 1.39261E-006 | 1.39261E-006 | 0.00000E+000 | 0.00000E+000 | 1.38144E-006 |
| Tractors/Loaders/Backhoes | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 8.26951E-007 | 8.26951E-007 | 0.00000E+000 | 0.00000E+000 | 8.20319E-007 |
| Welders | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 | 0.00000E+000 |

## Fugitive Dust Mitigation

| Yes/No | Mitigation Measure | Mitigation Input | | Mitigation Input | | Mitigation Input | |
|---|---|---|---|---|---|---|---|
| No | Soil Stabilizer for unpaved Roads | PM10 Reduction | 0.00 | PM2.5 Reduction | 0.00 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| No | Replace Ground Cover of Area Disturbed | PM10 Reduction | 0.00 | PM2.5 Reduction | 0.00 | | |
| Yes | Water Exposed Area | PM10 Reduction | 55.00 | PM2.5 Reduction | 55.00 | Frequency (per day) | 2.00 |
| Yes | Unpaved Road Mitigation | Moisture Content % | 12.00 | Vehicle Speed (mph) | 10.00 | | |
| No | Clean Paved Road | % PM Reduction | 0.00 | | | | |

| | | Unmitigated | | Mitigated | | Percent Reduction | |
|---|---|---|---|---|---|---|---|
| Phase | Source | PM10 | PM2.5 | PM10 | PM2.5 | PM10 | PM2.5 |
| Offsite Concrete Flatwork and Paving | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Concrete Flatwork and Paving | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Demolition & Clearing | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Demolition & Clearing | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Dry Utilities | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Dry Utilities | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Grading & Excavation | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.55 | 0.55 |
| Offsite Grading & Excavation | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Parkway Landscaping | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Parkway Landscaping | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Sewer, Storm Drain, and Water | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Offsite Sewer, Storm Drain, and Water | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Concrete Flatwork and Paving | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Concrete Flatwork and Paving | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Demolition & Clearing | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.55 | 0.55 |
| Onsite Demolition & Clearing | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Onsite Dry Utilities | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Dry Utilities | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Fencing | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Fencing | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Grading | Fugitive Dust | 0.14 | 0.05 | 0.06 | 0.02 | 0.55 | 0.55 |
| Onsite Grading | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Parkway Landscaping | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Parkway Landscaping | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Retaining Walls | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Retaining Walls | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Sewer, Storm Drain, and Water | Fugitive Dust | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Onsite Sewer, Storm Drain, and Water | Roads | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## Operational Percent Reduction Summary

| Category | ROG | NOx | CO | SO2 | Exhaust PM10 | Exhaust PM2.5 | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | | | | | | | | | | | | |
| Architectural Coating | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Consumer Products | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Electricity | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 46.15 | 46.15 | 45.97 | 46.77 | 46.15 |
| Hearth | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Landscaping | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Mobile | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Natural Gas | 5.67 | 5.73 | 5.76 | 5.26 | 5.74 | 5.74 | 0.00 | 5.75 | 5.75 | 5.97 | 6.25 | 5.75 |
| Water Indoor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.00 | 20.00 | 20.00 | 20.01 | 20.00 | 20.00 |
| Water Outdoor | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## Operational Mobile Mitigation

Project Setting:

| Mitigation | Category | Measure | % Reduction | Input Value 1 | Input Value 2 | Input Value |
|---|---|---|---|---|---|---|
| No | Land Use | Increase Density | 0.00 | | | |
| No | Land Use | Increase Diversity | -0.01 | 0.13 | | |
| No | Land Use | Improve Walkability Design | 0.00 | | | |
| No | Land Use | Improve Destination Accessibility | 0.00 | | | |
| No | Land Use | Increase Transit Accessibility | 0.25 | | | |
| No | Land Use | Integrate Below Market Rate Housing | 0.00 | | | |
| | Land Use | Land Use SubTotal | 0.00 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| No | Neighborhood Enhancements | Improve Pedestrian Network | | | | |
| No | Neighborhood Enhancements | Provide Traffic Calming Measures | | | | |
| No | Neighborhood Enhancements | Implement NEV Network | 0.00 | | | |
| | Neighborhood Enhancements | Neighborhood Enhancements Subtotal | 0.00 | | | |
| No | Parking Policy Pricing | Limit Parking Supply | 0.00 | | | |
| No | Parking Policy Pricing | Unbundle Parking Costs | 0.00 | | | |
| No | Parking Policy Pricing | On-street Market Pricing | 0.00 | | | |
| | Parking Policy Pricing | Parking Policy Pricing Subtotal | 0.00 | | | |
| No | Transit Improvements | Provide BRT System | 0.00 | | | |
| No | Transit Improvements | Expand Transit Network | 0.00 | | | |
| No | Transit Improvements | Increase Transit Frequency | 0.00 | | | |
| | Transit Improvements | Transit Improvements Subtotal | 0.00 | | | |
| | | Land Use and Site Enhancement Subtotal | 0.00 | | | |
| No | Commute | Implement Trip Reduction Program | | | | |
| No | Commute | Transit Subsidy | | | | |
| No | Commute | Implement Employee Parking "Cash Out" | | | | |
| No | Commute | Workplace Parking Charge | | | | |
| No | Commute | Encourage Telecommuting and Alternative Work Schedules | 0.00 | | | |
| No | Commute | Market Commute Trip Reduction Option | 0.00 | | | |
| No | Commute | Employee Vanpool/Shuttle | 0.00 | | 2.00 | |
| No | Commute | Provide Ride Sharing Program | | | | |
| | Commute | Commute Subtotal | 0.00 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| No | School Trip | Implement School Bus Program | 0.00 | | | |
| | | Total VMT Reduction | 0.00 | | | |

**Area Mitigation**

| Measure Implemented | Mitigation Measure | Input Value |
|---|---|---|
| No | Only Natural Gas Hearth | |
| No | No Hearth | |
| No | Use Low VOC Cleaning Supplies | |
| No | Use Low VOC Paint (Residential Interior) | 50.00 |
| No | Use Low VOC Paint (Residential Exterior) | 100.00 |
| No | Use Low VOC Paint (Non-residential Interior) | 250.00 |
| No | Use Low VOC Paint (Non-residential Exterior) | 250.00 |
| No | Use Low VOC Paint (Parking) | 250.00 |
| No | % Electric Lawnmower | |
| No | % Electric Leafblower | |
| No | % Electric Chainsaw | |

**Energy Mitigation Measures**

| Measure Implemented | Mitigation Measure | Input Value 1 | Input Value 2 |
|---|---|---|---|
| Yes | Exceed Title 24 | 7.00 | |
| No | Install High Efficiency Lighting | | |
| Yes | On-site Renewable | | 46.00 |

| Appliance Type | Land Use Subtype | % Improvement |
|---|---|---|
| ClothWasher | | 30.00 |
| DishWasher | | 15.00 |
| Fan | | 50.00 |
| Refrigerator | | 15.00 |

**Water Mitigation Measures**

| Measure Implemented | Mitigation Measure | Input Value 1 | Input Value 2 |
|---|---|---|---|
| Yes | Apply Water Conservation on Strategy | 20.00 | 20.00 |
| No | Use Reclaimed Water | 0.00 | 0.00 |
| No | Use Grey Water | 0.00 | |
| No | Install low-flow bathroom faucet | 32.00 | |
| No | Install low-flow Kitchen faucet | 18.00 | |
| No | Install low-flow Toilet | 20.00 | |
| No | Install low-flow Shower | 20.00 | |
| No | Turf Reduction | 0.00 | |
| No | Use Water Efficient Irrigation Systems | 6.10 | |
| No | Water Efficient Landscape | 0.00 | 0.00 |

**Solid Waste Mitigation**

| Mitigation Measures | Input Value |
|---|---|

| | |
|---|---|
| Institute Recycling and Composting Services<br>Percent Reduction in Waste Disposed | 25.00 |

This page left intentionally blank.

# Attachment F – Local Transportation Assessment

This page left intentionally blank.

# LOCAL TRANSPORTATION ASSESSMENT

**VISTA GRANDE RESIDENTIAL PROJECT**

**VISTA, SAN DIEGO COUNTY, CALIFORNIA**

LSA

February 2021

# LOCAL TRANSPORTATION ASSESSMENT

## VISTA GRANDE RESIDENTIAL PROJECT

## VISTA, SAN DIEGO COUNTY, CALIFORNIA

Submitted to:

Greg Perrine
1151 Duryea Avenue
Irvine, California 92614

Prepared by:

LSA
20 Executive Park, Suite 200
Irvine, California 92614
949.553.0666

Project No. MRW2101

LSA

February 2021

# TABLE OF CONTENTS

TABLE OF CONTENTS .....
FIGURES AND TABLES .....
**INTRODUCTION ..... 1**
**ANALYSIS METHODOLOGY ..... 1**
Study Area ..... 4
Existing Traffic Volume Adjustments ..... 4
Intersection Level of Service Methodology ..... 5
Roadway Segment Level of Service Methodology ..... 5
Significance Criteria ..... 5
**EXISTING CONDITIONS ..... 6**
Existing Circulation System ..... 6
Existing Intersection Level of Service Analysis ..... 7
Existing Roadway Segment Level of Service Analysis ..... 9
**PROJECT IMPACTS ..... 9**
Trip Generation ..... 9
Trip Distribution and Assignment ..... 10
**EXISTING PLUS PROJECT CONDITIONS ..... 10**
Existing Plus Project Intersection Level of Service Analysis ..... 10
Existing Plus Project Roadway Segment Level of Service Analysis ..... 10
**ACCESS ANALYSIS ..... 10**
**CONCLUSIONS ..... 15**
**REFERENCES ..... 15**

## APPENDICES

A: APPROVED PROJECT INITIATION FORM
B: TRAFFIC VOLUME DATA AND ADJUSTMENTS
C: HCM LEVEL OF SERVICE WORKSHEETS

# FIGURES AND TABLES

## FIGURES

Figure 1: Project Location and Study Area Intersections and Roadway Segments ..... 2
Figure 2: Site Plan ..... 3
Figure 3: Existing Volumes ..... 8
Figure 4: Project Trip Distribution and Assignment ..... 11
Figure 5: Existing Plus Project Traffic Volumes ..... 12

## TABLES

Table A: Existing Intersection Level of Service Summary ..... 7
Table B: Existing Roadway Segment Level of Service Summary ..... 9
Table C: Project Trip Generation ..... 9
Table D: Existing Plus Project Intersection Level of Service Summary ..... 13
Table E: Existing Plus Project Roadway Segment Level of Service Summary ..... 14

# VISTA GRANDE RESIDENTIAL PROJECT
# LOCAL TRANSPORTATION ASSESSMENT

LSA has prepared the following analysis to identify traffic impacts resulting from development of the proposed Vista Grande Residential Project (project) in Vista, California. LSA has prepared this analysis consistent with the City of Vista (City) *Transportation Impact Analysis Guidelines* (City of Vista 2020), the County of San Diego (County) *Transportation Study Guidelines* (County of San Diego 2020), and applicable provisions of the California Environmental Quality Act (CEQA).

## INTRODUCTION

The purpose of this Local Transportation Assessment (LTA) is to identify and disclose any potential circulation effects to local intersections and roadway segments associated with the development of the proposed project. The existing project site is approved for 14 single-family detached homes, and the current proposal includes an additional 14 single-family detached homes. As such, the Vista Grande Residential project proposes to construct 28 total single-family detached homes directly north of Vista Grande Drive and northwest of Vista Grande Terrace. Access to the proposed project would be provided via a new paved roadway along Vista Grande Drive. Figure 1 shows the location of the proposed project and the study area intersections and roadway segments. Figure 2 illustrates the site plan.

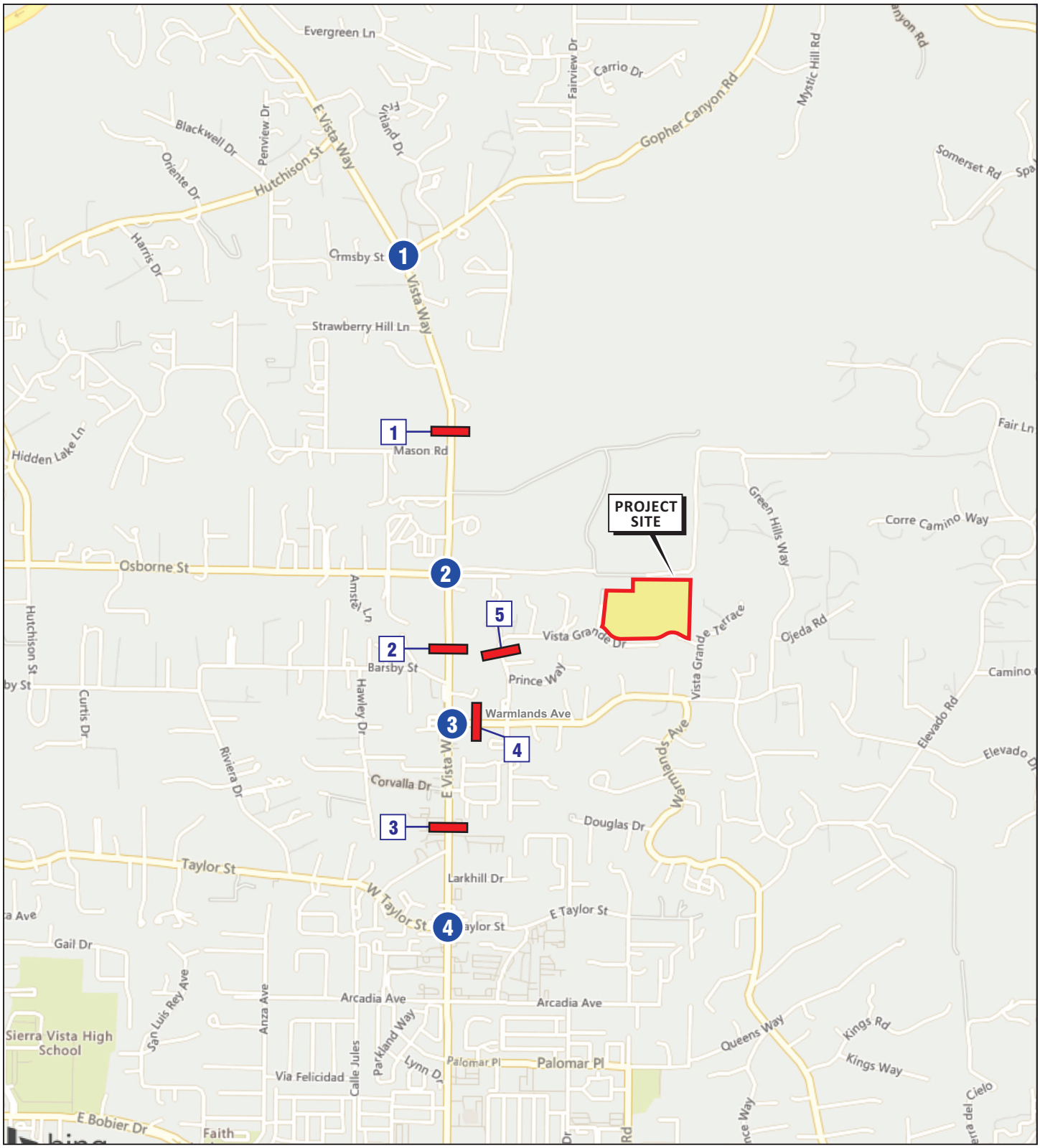
This LTA analyzes the a.m. and p.m. peak-hour intersection and daily roadway segment levels of service (LOS) during a typical weekday. Potential project impacts were determined based on the analysis of the following conditions, consistent with City and County requirements:

1. Existing conditions
2. Existing Plus Project conditions

Based on the results of this LTA, the proposed project can be implemented without impacting the operations of the surrounding roadway system. An evaluation of LOS shows that the addition of the project traffic to the existing traffic volumes would not significantly impact the study area intersections or roadways, according to the City's and County's performance criteria.

## ANALYSIS METHODOLOGY

This LTA is prepared consistent with the objectives and requirements of the City's *Transportation Impact Analysis Guidelines* (City of Vista 2020), the County's *Transportation Study Guidelines* (County of San Diego 2020), and applicable provisions of CEQA. The LTA is also conducted per the City's Project Initiation Form (PIF). The PIF that was reviewed and approved by the City staff is provided as Appendix A.




LSA

LEGEND

# - Study Area Intersection

- Study Area Roadway Segment

FIGURE 1

N

0 750 1500

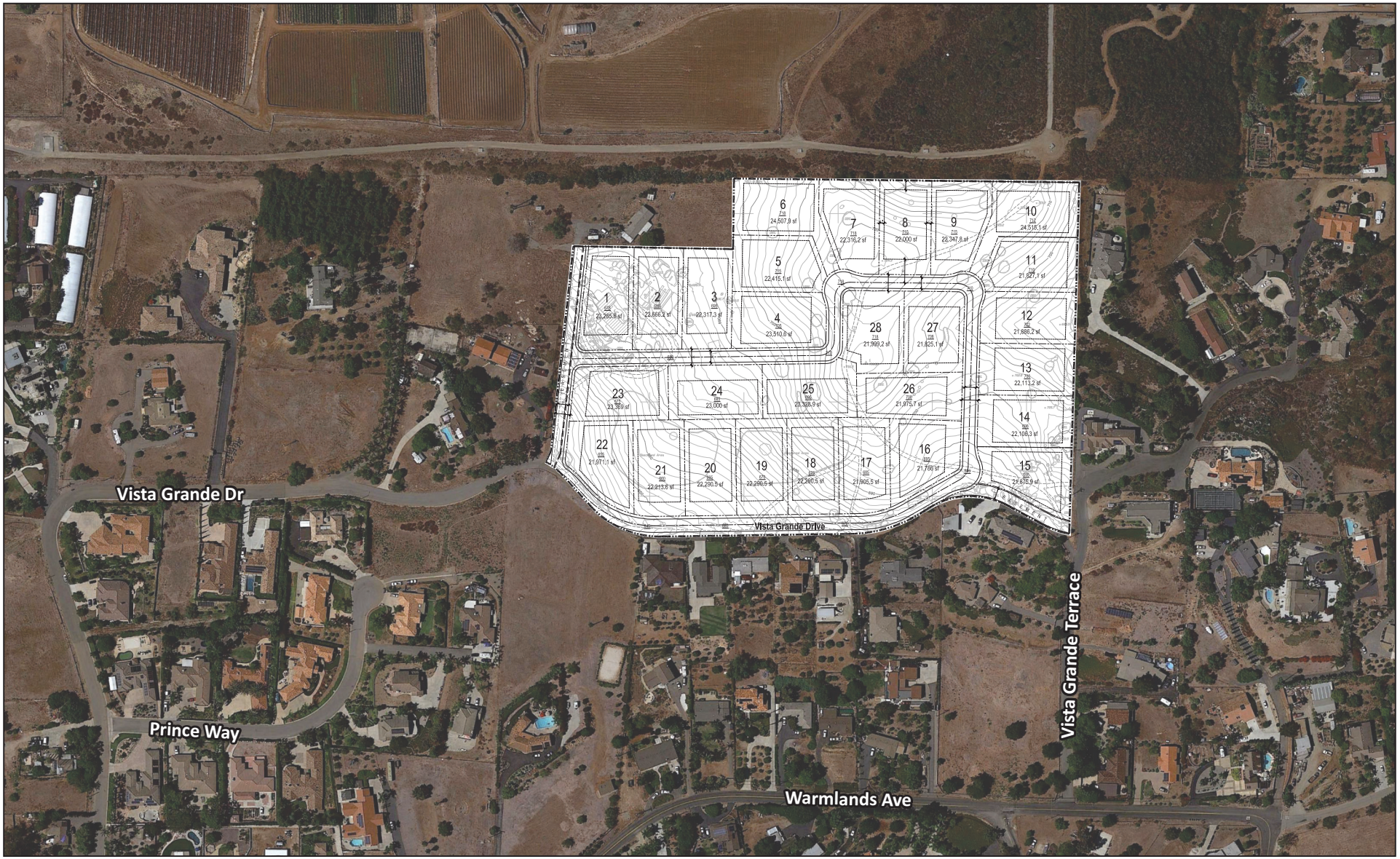
FEET

SOURCE: Bing Maps

*Vista Grande Residential*

Project Location and
Study Area Intersections and Roadway Segments

I:\MRW2101\G\Location-Ints.cdr (2/12/2021)




LSA

FIGURE 2

N

0 150 300

FEET

SOURCE: ktgy

I:\MRW2101\G\Site Plan.cdr (2/10/2021)

*Vista Grande Residential*

Site Plan

## Study Area

Based on discussions with the City staff, the project study area includes the following four intersections and five roadway segments, as shown on Figure 1:

**a. Intersections**

1. East Vista Way/Gopher Canyon Road
2. East Vista Way/Osborne Street
3. East Vista Way/Warmlands Avenue
4. East Vista Way/Taylor Street

**b. Roadway Segments**

1. East Vista Way between Gopher Canyon Road and Osborne Street
2. East Vista Way between Osborne Street and Warmlands Avenue
3. East Vista Way between Warmlands Avenue and Taylor Street
4. Warmlands Avenue between east of East Vista Way
5. Vista Grande Drive north of Warmlands Avenue

## Existing Traffic Volume Adjustments

Peak-hour traffic counts were collected at the four study area intersections, and daily (24-hour) traffic counts were collected at two study area roadway segments (East Vista Way between Gopher Canyon Road and Osborne Street, and Vista Grande Drive north of Warmlands Avenue), by Counts Unlimited on Thursday, January 21, 2021. City staff members provided historical (2017) daily traffic volumes for the three remaining study area roadway segments.

Due to atypical traffic conditions resulting from the COVID-19 pandemic, LSA coordinated with the City staff on adjustments to the peak-hour intersection and daily roadway segment traffic volume data to represent Existing (2021) no-pandemic conditions.

LSA conducted research and review of traffic volume trends in the San Diego region. Based on the San Diego Association of Governments (SANDAG) Highway Hot Spots & Volumes Tracker (SANDAG 2020), traffic volumes during COVID-19 (between June and October 2020) were approximately 15 percent to 16 percent lower than compared to the same period in 2019. As such, the new (January 2021) peak-hour counts for the four study area intersections were increased by 16 percent to account for traffic volume reductions during the pandemic. Similarly, the January 2021 daily roadway segment counts for two study area roadway segments (East Vista Way between Gopher Canyon Road and Osborne Street, and Vista Grande Drive north of Warmlands Avenue) were increased by 16 percent.

The 2017 daily traffic volumes for the three remaining study area roadway segments were increased by 2.14 percent per year (or 8.56 percent total) based on the linear (yearly) growth identified from historical SANDAG volume data (2000 and 2014).

These traffic volume adjustments were reviewed and approved by the City staff prior to preparation of the LTA. The existing traffic counts and volume adjustments are provided in Appendix B.

## Intersection Level of Service Methodology

The *Highway Capacity Manual*, 6th Edition (HCM) (TRB 2016) methodology and Synchro (Version 10.1) software were used to determine LOS at the signalized study area intersections. The HCM signalized intersection methodology presents LOS in terms of delay (in seconds per vehicle). This resulting delay is expressed in terms of LOS.

The relationship between LOS and delay (in seconds) for signalized intersections is as follows:

| Level of Service | Signalized Intersection Delay (seconds) |
|---|---|
| A | ≤10.0 |
| B | >10.0 and ≤20.0 |
| C | >20.0 and ≤35.0 |
| D | >35.0 and ≤55.0 |
| E | >55.0 and ≤80.0 |
| F | >80.0 |

Source: *Highway Capacity Manual* (TRB 2016).

## Roadway Segment Level of Service Methodology

Daily roadway segment volume-to-capacity (v/c) ratios and LOS were determined using the City's daily roadway capacities. Facility types and daily roadway capacities were obtained from the City's 2030 General Plan Circulation Element (City of Vista 2011). The following table shows the roadway classifications and capacities:

| Roadway Classification | Daily Capacity |
|---|---|
| 2-Lane Collector with TWLTL | 15,000 |
| 2-Lane Semi-Rural | 7,900 |

Source: 2030 General Plan Circulation Element, Table CE-1 (City of Vista 2011).
TWLTL = two-way left-turn lane

The relationship between LOS and v/c ratio is as follows:

| Level of Service | Roadway Segment V/C Ratio |
|---|---|
| A | ≤0.60 |
| B | >0.60 and ≤0.70 |
| C | >0.70 and ≤0.80 |
| D | >0.80 and ≤0.90 |
| E | >0.90 and ≤1.00 |
| F | >1.00 |

Source: *Highway Capacity Manual* (TRB 2017).
V/C = volume-to capacity

## Significance Criteria

The City and County consider LOS D as the upper limit of satisfactory operations (intersections with a delay of 55.0 seconds or a roadway segment with a v/c ratio of 0.90). According to the City's

improvement thresholds, a project will need to implement improvements when one of the following occurs to an intersection:

1. The addition of project traffic results in a service drop from LOS D or better to LOS E or F. Under this condition, the project is responsible for improvements necessary to restore the intersection to LOS D or better.

2. An intersection is operating at LOS E or F under the no-project scenario and the project adds more than 2 seconds of average vehicle delay. Under this condition, the project is responsible for improvements necessary to restore the intersection to preproject conditions or better.

The County's intersection improvement thresholds are similar to the City's. However, for a County intersection operating at LOS E or F under the no-project scenario, when the project adds more than 5 seconds of average delay, the project is responsible for the improvements necessary to restore the intersection to preproject conditions or better.

According to the City's *Transportation Impact Analysis Guidelines* (City of Vista 2020), roadway widening is typically only recommended if the peak-hour intersection analysis indicates the need for additional through lanes. Intersection performance, rather than roadway segment performance, is a more accurate and realistic indicator of true traffic operations and is used as the basis for defining LOS impacts and requiring improvements. The County has similar guidance and typically considers intersections as the constraint when analyzing traffic operations.

## EXISTING CONDITIONS

### Existing Circulation System

Key roadways in the vicinity of the proposed project are as follows:

- **East Vista Way** is a north-south, two-lane roadway with a two-way left-turn lane median west of the project site that extends through Vista and San Diego County. The posted speed limit along East Vista Way is 40 miles per hour (mph). Sidewalks and Class II bicycle lanes are provided on both sides of the roadway south of Taylor Street. On-street parking is prohibited. According to the City's 2030 General Plan Circulation Element (City of Vista 2011), East Vista Way is classified as a four-lane Major Roadway in the project vicinity (north of Bobier Drive and south of Barsby Street).

- **Warmlands Avenue** is an east-west, two-lane roadway east of East Vista Way and south of the project site. The posted speed limit along Warmlands Avenue is 35 mph. Sidewalks and Class II bicycle lanes are not provided on either side of this roadway. On-street parking is prohibited. According to the City's 2030 General Plan Circulation Element (City of Vista 2011), Warmlands Avenue is classified as a Semi-Rural Street.

- **Vista Grande Drive** is an east-west, two-lane roadway south of the project site. It provides direct access to the project site. The posted speed limit on Vista Grande Drive is 35 mph. Sidewalks and Class II bicycle lanes are not provided on either side of this roadway. On-street parking is prohibited.

- **Gopher Canyon Road** is a two-lane, east-west roadway north of the project site in San Diego County. The posted speed limit on Gopher Canyon Road is 45 mph. Sidewalks and Class II bicycle lanes are not provided on either side of this roadway. On-street parking is prohibited.

- **Osborne Street** is an east-west, two-lane roadway north of the project site in San Diego County. The posted speed limit on Osborne Street is 35 mph. Sidewalks and Class II bicycle lanes are not provided on either side of this roadway. On-street parking is prohibited.

- **Taylor Street** is an east-west, two lane roadway south of the project site. The posted speed limit is 35 mph. Sidewalks and Class II bicycle lanes are not provided on either side of this roadway. On-street parking is permitted on both sides of the roadway for approximately 1,000 feet (ft) west of East Vista Way and then is prohibited further west. According to the City's 2030 General Plan Circulation Element (City of Vista 2011), Taylor Street is classified as a Two-Lane Collector (w/Two-Way Left-Turn Lane).

Vehicle turning volumes were collected for the study area intersections during the peak morning (7:00 a.m. to 9:00 a.m.) and evening (4:00 p.m. to 6:00 p.m.) commute periods on a typical weekday (Thursday, January 21, 2021). In addition, daily (24-hour) traffic counts were conducted for two study area roadway segments on the same day. Daily traffic volumes for the three remaining study area roadway segments were provided by the City staff from 2017.

As previously described in the Analysis Methodology section, the peak-hour and daily traffic volumes were adjusted (increased) to reflect no-pandemic conditions. Figure 3 presents the existing traffic volumes for the study area locations.

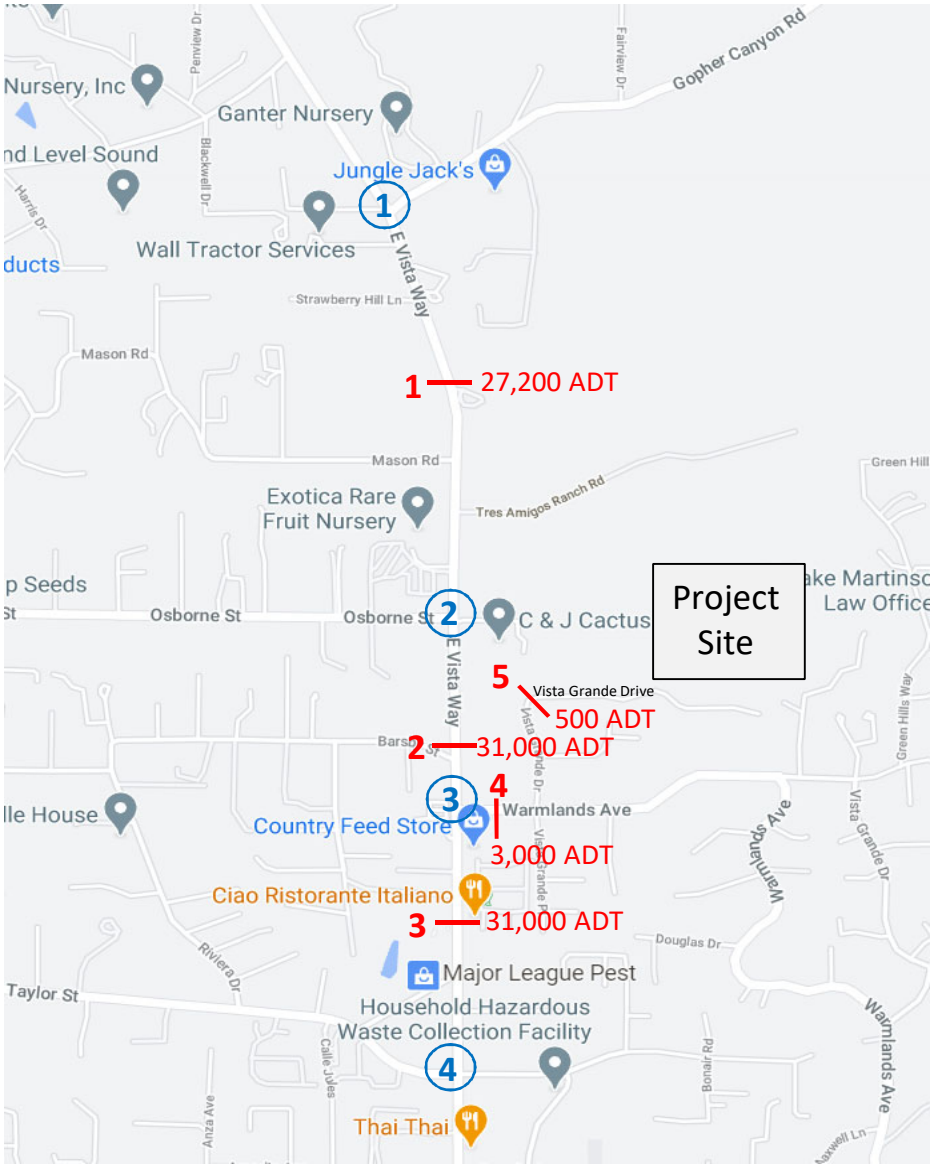
## Existing Intersection Level of Service Analysis

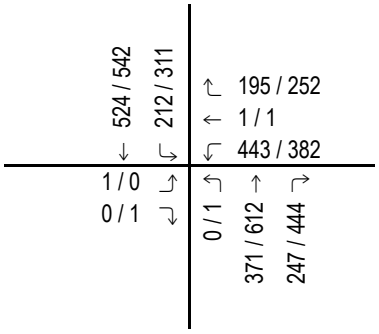
Table A summarizes the results of the Existing a.m. and p.m. peak-hour LOS analysis for the four study area intersections. All HCM analysis worksheets are provided in Appendix C. As Table A indicates, all study area intersections operate at an acceptable LOS (LOS D or better) in the a.m. and p.m. peak hours except for East Vista Way/Osborne Street (LOS E during both peak hours).

### Table A: Existing Intersection Level of Service Summary

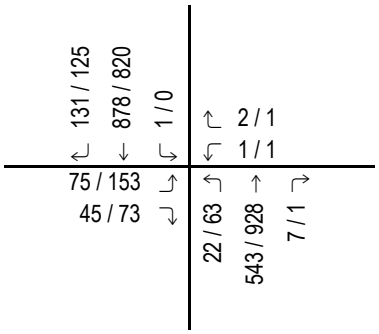
| Study Area No. | Intersection | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|
| | | Delay (sec) | LOS | Delay (sec) | LOS |
| 1 | East Vista Way/Gopher Canyon Road | 25.5 | C | 47.8 | D |
| 2 | East Vista Way/Osborne Street | 67.7 | E | 75.4 | E |
| 3 | East Vista Way/Warmlands Avenue | 9.6 | A | 18.3 | B |
| 4 | East Vista Way/Taylor Street | 11.2 | B | 12.6 | B |

= exceeds City's or County's LOS criteria
City = City of Vista
County = County of San Diego
LOS = level of service
sec = seconds

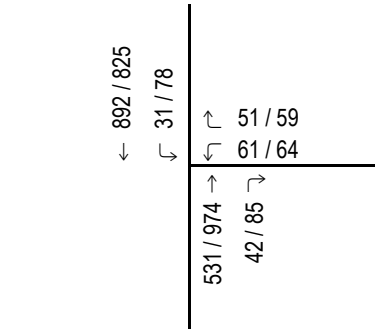


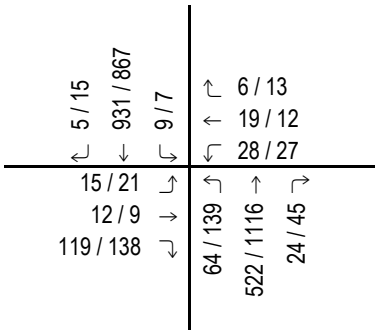

1 E Vista Way/Gopher Canyon Rd




2 E Vista Way/Osborne St




3 E Vista Way/Warmlands Ave




4 E Vista Way/Taylor St

LSA

FIGURE 3

Study Area Intersection

Study Area Roadway Segment and ADT Volume

XXX / YYY AM / PM Volume

*Vista Grande Residential*
Existing Traffic Volumes

### Existing Roadway Segment Level of Service Analysis

Table B summarizes the Existing daily traffic volumes, v/c ratios, and LOS for the five study area roadway segments. As Table B indicates, the study area roadway segments of Warmlands Avenue and Vista Grande Drive operate at an acceptable LOS (LOS A). However, the three study area roadway segments along East Vista Way operate at an unacceptable LOS (LOS F).

### Table B: Existing Roadway Segment Level of Service Summary

| Study Area No. | Roadway | Segment | Capacity | ADT | V/C | LOS |
|---|---|---|---|---|---|---|
| 1 | East Vista Way | Gopher Canyon Road to Osborne Street | 15,000 | 27,200 | 1.81 | F |
| 2 | East Vista Way | Osborne Street to Warmlands Avenue | 15,000 | 31,000 | 2.07 | F |
| 3 | East Vista Way | Warmlands Avenue to Taylor Street | 15,000 | 31,000 | 2.07 | F |
| 4 | Warmlands Avenue | East of Vista Way | 7,900 | 3,000 | 0.38 | A |
| 5 | Vista Grande Drive | North of Warmlands Avenue | 7,900 | 500 | 0.06 | A |

= exceeds City's or County's LOS criteria
ADT = average daily traffic
City = City of Vista
County = County of San Diego
LOS = level of service
V/C = volume-to-capacity ratio

## PROJECT IMPACTS

### Trip Generation

The daily and peak-hour trips for the proposed project were generated using trip rates contained in the San Diego Association of Governments (SANDAG) *(Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region* (SANDAG 2002). The project trip generation is presented in Table C. As Table C indicates, the existing site approval of 14 single-family detached homes would generate an average daily traffic (ADT) of 140 trips, including 11 trips (3 inbound and 8 outbound) in the a.m. peak hour and 14 trips (10 inbound and 4 outbound) in the p.m. peak hour. Similarly, the proposed addition of 14 single-family detached homes would also generate 140 ADT, including 11 trips (3 inbound and 8 outbound) in the a.m. peak hour and 14 trips (10 inbound and 4 outbound) in the p.m. peak hour. As such, the proposed project is anticipated to generate a total of 280 ADT, including 22 trips (6 inbound and 16 outbound) in the a.m. peak hour and 28 trips (20 inbound and 8 outbound) in the p.m. peak hour.

### Table C: Project Trip Generation

| Land Use | Size | Unit | ADT | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | In | Out | Total | In | Out | Total |
| **Trip Rates[1]** | | | | | | | | | |
| Single-Family Detached | | DU | 10.00 | 0.24 | 0.56 | 0.80 | 0.70 | 0.30 | 1.00 |
| **Project Trip Generation** | | | | | | | | | |
| Existing Site Approval | 14 | DU | 140 | 3 | 8 | 11 | 10 | 4 | 14 |
| Proposed Addition | 14 | DU | 140 | 3 | 8 | 11 | 10 | 4 | 14 |
| **Total** | **28** | **DU** | **280** | **6** | **16** | **22** | **20** | **8** | **28** |

[1] Trip rates are referenced from the *(Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region* (SANDAG 2002).
ADT = average daily traffic
DU = dwelling unit

### Trip Distribution and Assignment

To determine trip distribution for the proposed project, LSA considered likely traffic patterns to and from local and regional destinations and transportation facilities. Traffic from the project site was distributed 20 percent north on East Vista Way, 40 percent south on East Vista Way, 15 percent east on Gopher Canyon Road, 15 percent west on Osborne Street, and 10 percent west on Taylor Street. The project trip distribution was reviewed and approved by the City staff prior to preparation of the LTA. Figure 4 shows the regional trip distribution and assignment for the proposed project.

## EXISTING PLUS PROJECT CONDITIONS

The project trips were added to the existing traffic volumes at the study area intersections and roadway segments. Figure 5 shows the resulting Existing Plus Project traffic volumes.

### Existing Plus Project Intersection Level of Service Analysis

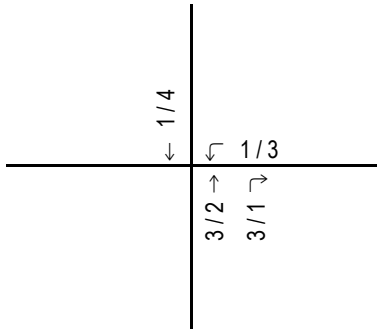
Table D summarizes the results of the Existing Plus Project a.m. and p.m. peak-hour LOS analysis for the four study area intersections. As Table D indicates, all study area intersections are anticipated to operate at an acceptable LOS (LOS D or better) in the a.m. and p.m. peak hours with implementation of the proposed project except for East Vista Way/Osborne Street (LOS E during both peak hours). Because the proposed project would not contribute more than 5 seconds of delay to East Vista Way/Osborne Street during the a.m. or p.m. peak hour, the proposed project would not be required to implement an intersection improvement based on the County's improvement thresholds.

### Existing Plus Project Roadway Segment Level of Service Analysis

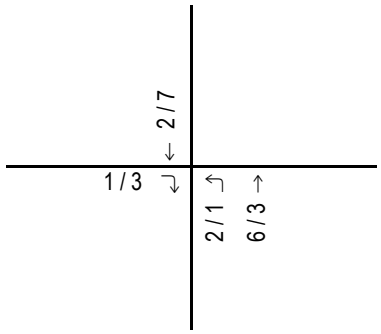
Table E summarizes the Existing Plus Project daily traffic volumes, v/c ratios, and LOS for the four study area roadway segments with the addition of project traffic. As Table E indicates, the study area roadway segments of Warmlands Avenue and Vista Grande Drive are anticipated to continue operating at an acceptable LOS (LOS A) with implementation of the proposed project. However, the three study area roadway segments along East Vista Way would continue to operate at an unacceptable LOS (LOS F). As previously described in the Analysis Methodology section, intersection performance is a more accurate and realistic indicator of true traffic operations and is used as the City's and County's basis for requiring improvements. Because the proposed project would not require intersection improvements, the proposed project would not be required to implement any roadway improvements along East Vista Way.

## ACCESS ANALYSIS

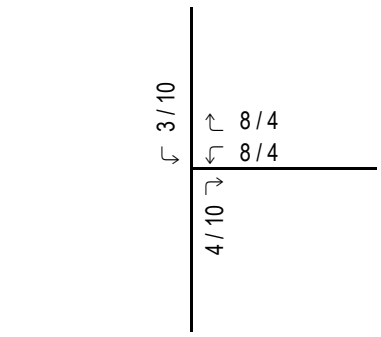
Local access to the project site is provided via the two-way stop-controlled intersection of Warmlands Avenue/Vista Grande Drive. Vista Grande Drive is an approximately 28 ft wide roadway that connects local residential, institutional, and commercial land uses to larger regional roadways. Adequate access along Vista Grande Drive is afforded by the project based on the existing configuration (14 ft travel lane in each direction), low traffic volume (Existing Plus Project volume of 780 ADT), and low vehicular speed (35 mph speed limit).



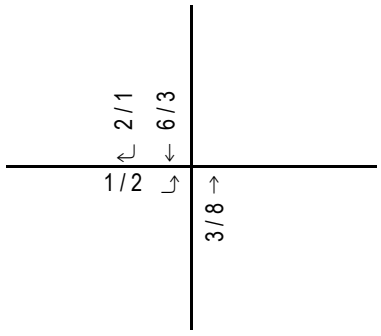

1 E Vista Way/Gopher Canyon Rd




2 E Vista Way/Osborne St




3 E Vista Way/Warmlands Ave




4 E Vista Way/Taylor St

LSA

FIGURE 4

Study Area Intersection

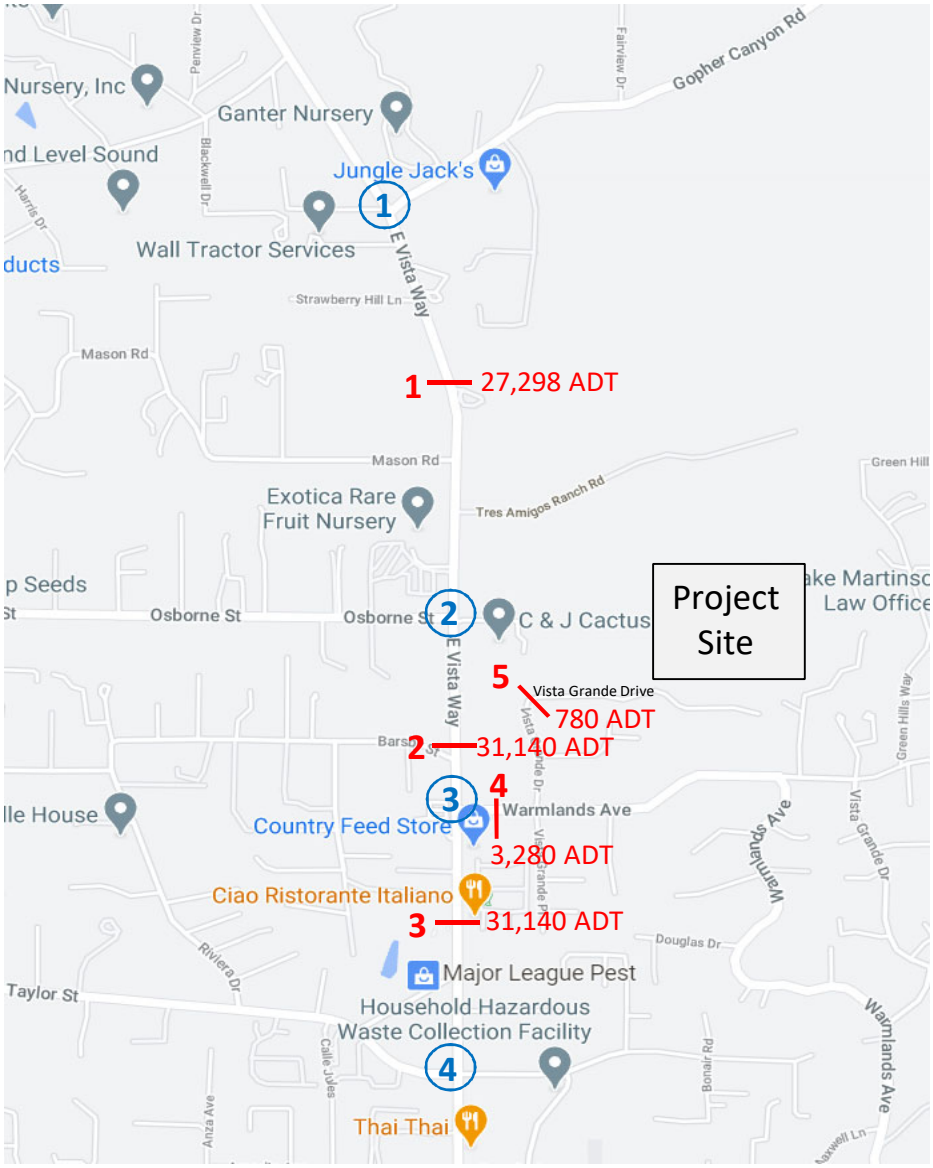
Study Area Roadway Segment and ADT Volume

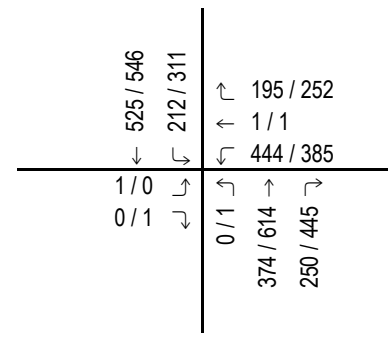
Trip Distribution

XXX / YYY AM / PM Volume

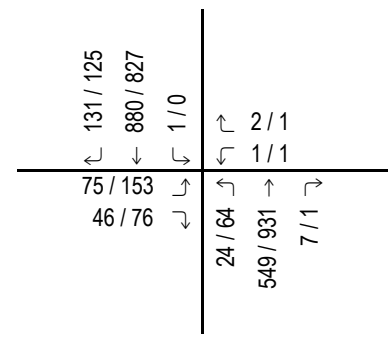
*Vista Grande Residential*

Project Trip Distribution and Assignment

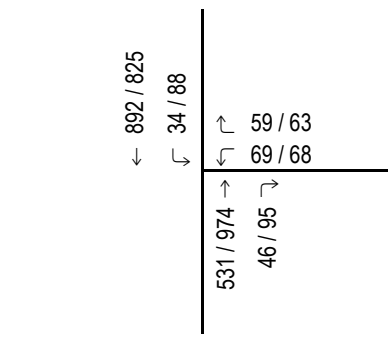


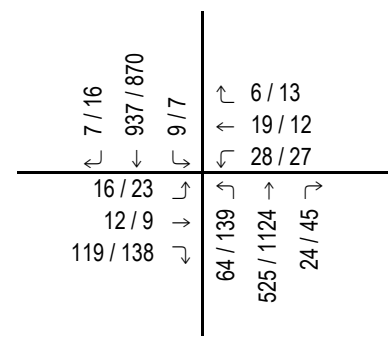

1 E Vista Way/Gopher Canyon Rd




2 E Vista Way/Osborne St




3 E Vista Way/Warmlands Ave




4 E Vista Way/Taylor St

LSA

FIGURE 5

Study Area Intersection

Study Area Roadway Segment and ADT Volume

XXX / YYY AM / PM Volume

*Vista Grande Residential*

Existing Plus Project Traffic Volumes

LSA

## Table D: Existing Plus Project Intersection Level of Service Summary

| Study Area No. | Intersection | Existing Baseline | | | | Existing Plus Project | | | | Δ Peak-Hour Delay | | Improvement Required? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | | | |
| | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | AM | PM | |
| 1 | East Vista Way/Gopher Canyon Road | 25.5 | C | 47.8 | D | 25.5 | C | 48.2 | D | 0.00 | 0.40 | No |
| 2 | East Vista Way/Osborne Street | 67.7 | E | 75.4 | E | 69.1 | E | 75.6 | E | 1.40 | 0.20 | No |
| 3 | East Vista Way/Warmlands Avenue | 9.6 | A | 18.3 | B | 10.7 | B | 20.1 | C | 1.10 | 1.80 | No |
| 4 | East Vista Way/Taylor Street | 11.2 | B | 12.6 | B | 11.3 | B | 12.6 | B | 0.10 | 0.00 | No |

= exceeds City's level of service criteria

Δ = change

Delay is reported in seconds.

LOS = level of service

LSA

## Table E: Existing Plus Project Roadway Segment Level of Service Summary

| Study Area No. | Roadway | Segment | Capacity | Existing Baseline | | | Existing Plus Project | | | Δ V/C | Improvement Required? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ADT | V/C | LOS | ADT | V/C | LOS | | |
| 1 | East Vista Way | Gopher Canyon Road to Osborne Street | 15,000 | 27,200 | 1.81 | F | 27,298 | 1.82 | F | 0.01 | No |
| 2 | East Vista Way | Osborne Street to Warmlands Avenue | 15,000 | 31,000 | 2.07 | F | 31,140 | 2.08 | F | 0.01 | No |
| 3 | East Vista Way | Warmlands Avenue to Taylor Street | 15,000 | 31,000 | 2.07 | F | 31,140 | 2.08 | F | 0.01 | No |
| 4 | Warmlands Avenue | east of East Vista Way | 7,900 | 3,000 | 0.38 | A | 3,280 | 0.42 | A | 0.04 | No |
| 5 | Vista Grande Drive | north of Warmlands Avenue | 7,900 | 500 | 0.06 | A | 780 | 0.10 | A | 0.04 | No |

= exceeds City's level of service criteria

Δ = change

ADT = average daily trips

LOS = level of service

V/C = volume-to-capacity ratio

The proposed project will provide a new paved roadway at the northeast terminus of Vista Grande Drive. The paved roadway and internal circulation will be 24 ft wide (providing 12 ft travel lanes) and constructed per applicable City design standards.

## CONCLUSIONS

Based on the results of this LTA, the proposed project can be implemented without impacting the operations of the surrounding roadway system. An evaluation of LOS shows that the addition of the project traffic to the existing traffic volumes would not significantly impact the study area intersections or roadways, according to the City's and County's performance criteria.

## REFERENCES

City of Vista. 2011. 2030 General Plan Circulation Element. Adopted February 28, 2012. Website: https://records.cityofvista.com/WebLink/DocView.aspx?dbid=0&id=712582 (accessed January 2021).

_____. 2020. *Transportation Impact Analysis Guidelines*. Adopted December 8, 2020. Website: https://www.cityofvista.com/home/showpublisheddocument?id=23682 (accessed January 2021).

County of San Diego. 2020. *Transportation Study Guidelines*. Certified June 24, 2020. Website: https://www.sandiegocounty.gov/content/dam/sdc/pds/SB743/COSD%20TSG%20FINAL.pdf (accessed January 2021).

San Diego Association of Governments (SANDAG). 2002. *(Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*. April. Website: https://www.sandag.org/uploads/publicationid/publicationid_1140_5044.pdf (accessed January 2021).

_____. 2020. Highway Hot Spots & Volumes Tracker. Website: https://experience.arcgis.com/experience/82fcdaa5a1804337af609b1d8720d8d6 (accessed January 2021).

Transportation Research Board (TRB). 2017. *Highway Capacity Manual.* 6th ed.

# APPENDIX A

# APPROVED PROJECT INITIATION FORM

# PROJECT INFORMATION FORM (PIF)

## THE FOLLOWING IS TO BE COMPLETED BY THE PROJECT APPLICANT:

| PROJECT INFORMATION FORM | | | |
|---|---|---|---|
| 1. | PROJECT DESCRIPTION: 28 Single-Family Detached Homes | | |
| 2. | PROJECT LOCATION: APNs 171-100-05 and 171-100-28 (north of Vista Grande Dr and northwest of Vista Grande Terrace) | | |
| 3. | LAND USE: Residential (Single-Family Detached)<br>SIZE/DENSITY: 14 acres (2 units/acre) | | |
| 4. | ZONING AND LAND USE CONSISTENT WITH ADOPTED GENERAL PLAN? | ☒ Yes | ☐ No |
| 5. | PROJECT LOCATED IN TRANSIT PRIORITY AREA[1], SMART GROWTH AREA, OR LOW VMT AREA[2]? | ☐ Yes | ☒ No |
| 6. | PROJECT TRIP GENERATION: 280 ADT (See attached Table A) | ☐ < 200 ADT ☐ > 400 ADT<br>☐ ≥ 500 ADT ☐ ≥ 1,000 ADT<br>☐ ≥ 2,400 ADT | |
| ATTACHMENTS | | | |
| A. | PROJECT LOCATION MAP | ☒ Attached (Figure 1) | |
| B. | PROJECT TRIP DISTRIBUTION | ☒ Attached | |
| C. | PROJECT TRIP ASSIGNMENT | ☒ Attached | |

1. Projects located in a TPA must be able to access the transit station within a ½ mile walking distance or 6 minute walk continuously without discontinuity of sidewalk or obstructions to the route. Qualifying transit stops means a site containing an existing rail transit station served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods (OPR, 2017). A high-quality transit corridor may also be considered if a corridor with fixed route bus service has service intervals no longer than 15 minutes during peak commute hours (OPR, 2017).
2. Based on the most recent SANDAG SB 743 Screening Map. Example shown in Appendix B.

## TO BE COMPLETED BY CITY STAFF AND RETURNED TO PROJECT APPLICANT

| PROJECT STUDY REQUIREMENTS | | | | |
|---|---|---|---|---|
| 1) | Does the project require a CEQA VMT analysis?<br>A. If yes, does the project require a SANDAG Model Run? | ☐ Yes<br>☐ Yes | ☒ No<br>☐ No | ☐ Incomplete(1) |
| 2a) | Does the project require a Local Transportation Study? | ☐ Yes | ☒ No | ☐ Incomplete(1) |
| OR | | | | |
| 2b) | Does the project require a Local Transportation Assessment? | ☒ Yes | ☐ No | ☐ Incomplete(1) |

HYH 1/19/2021

(1) Incomplete application or additional information is needed to determine study requirements.

LSA

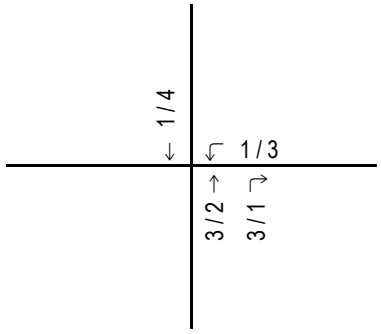
## Table A: Project Trip Generation

| Land Use | Size | Unit | ADT | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | In | Out | Total | In | Out | Total |
| **Trip Rates** | | | | | | | | | |
| Single-Family Detached Residential[1] | | DU | 10.00 | 0.24 | 0.56 | 0.80 | 0.70 | 0.30 | 1.00 |
| **Trip Generation** | | | | | | | | | |
| Single-Family Detached Residential | 28 | DU | 280 | 7 | 16 | 23 | 20 | 8 | 28 |

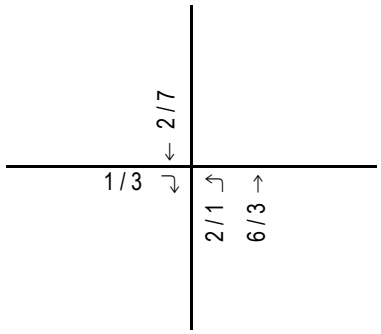
[1]Trip rates from the San Diego Association of Governments (SANDAG) *(Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region* (April 2002).

ADT = average daily trips

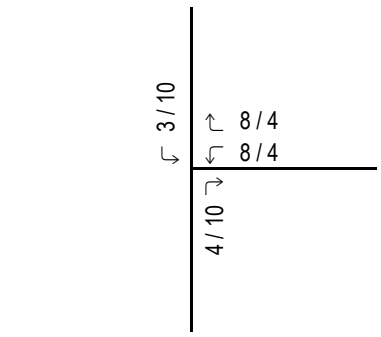
DU = dwelling unit



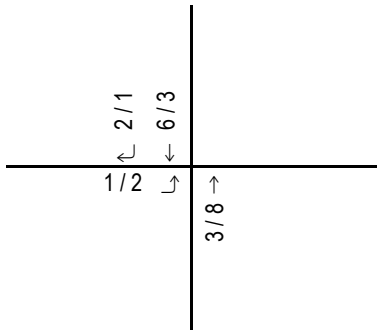

1 E Vista Way/Gopher Canyon Rd




2 E Vista Way/Osborne St




3 E Vista Way/Warmlands Ave




4 E Vista Way/Taylor St

LSA

FIGURE 1

Study Area Intersection

Study Area Roadway Segment and ADT Volume

Trip Distribution

XXX / YYY AM / PM Volume

*Vista Grande Residential*

Project Location, Trip Distribution, and Trip Assignment

P:\MRW2101\xls\Proj Loc-Dist-Assign.xlsx (1/20/2021)

# APPENDIX B

# TRAFFIC VOLUME DATA AND ADJUSTMENTS

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Ormsby Street/Gopher Canyon Road
Weather: Clear

File Name : 01_VST_Vista_Gopher AM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 1

Groups Printed- Total Volume

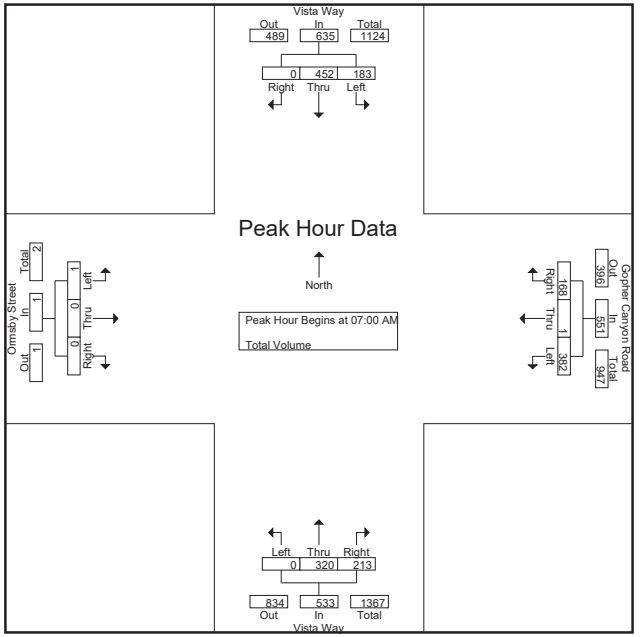
| | Vista Way Southbound | | | | Gopher Canyon Road Westbound | | | | Vista Way Northbound | | | | Ormsby Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 07:00 AM | 38 | 102 | 0 | 140 | 90 | 0 | 45 | 135 | 0 | 72 | 46 | 118 | 0 | 0 | 0 | 0 | 393 |
| 07:15 AM | 52 | 95 | 0 | 147 | 87 | 1 | 40 | 128 | 0 | 85 | 58 | 143 | 1 | 0 | 0 | 1 | 419 |
| 07:30 AM | 44 | 133 | 0 | 177 | 95 | 0 | 38 | 133 | 0 | 86 | 58 | 144 | 0 | 0 | 0 | 0 | 454 |
| 07:45 AM | 49 | 122 | 0 | 171 | 110 | 0 | 45 | 155 | 0 | 77 | 51 | 128 | 0 | 0 | 0 | 0 | 454 |
| Total | 183 | 452 | 0 | 635 | 382 | 1 | 168 | 551 | 0 | 320 | 213 | 533 | 1 | 0 | 0 | 1 | 1720 |
| 08:00 AM | 39 | 107 | 0 | 146 | 71 | 0 | 39 | 110 | 0 | 74 | 59 | 133 | 0 | 0 | 0 | 0 | 389 |
| 08:15 AM | 33 | 108 | 0 | 141 | 92 | 0 | 31 | 123 | 0 | 80 | 39 | 119 | 0 | 0 | 0 | 0 | 383 |
| 08:30 AM | 36 | 92 | 0 | 128 | 71 | 0 | 39 | 110 | 0 | 55 | 53 | 108 | 0 | 0 | 0 | 0 | 346 |
| 08:45 AM | 25 | 118 | 0 | 143 | 84 | 0 | 29 | 113 | 0 | 80 | 65 | 145 | 0 | 0 | 1 | 1 | 402 |
| Total | 133 | 425 | 0 | 558 | 318 | 0 | 138 | 456 | 0 | 289 | 216 | 505 | 0 | 0 | 1 | 1 | 1520 |
| Grand Total | 316 | 877 | 0 | 1193 | 700 | 1 | 306 | 1007 | 0 | 609 | 429 | 1038 | 1 | 0 | 1 | 2 | 3240 |
| Apprch % | 26.5 | 73.5 | 0 | | 69.5 | 0.1 | 30.4 | | 0 | 58.7 | 41.3 | | 50 | 0 | 50 | | |
| Total % | 9.8 | 27.1 | 0 | 36.8 | 21.6 | 0 | 9.4 | 31.1 | 0 | 18.8 | 13.2 | 32 | 0 | 0 | 0 | 0.1 | |

| | Vista Way Southbound | | | | Gopher Canyon Road Westbound | | | | Vista Way Northbound | | | | Ormsby Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:00 AM | | | | | | | | | | | | | | | | | |
| 07:00 AM | 38 | 102 | 0 | 140 | 90 | 0 | **45** | 135 | 0 | 72 | 46 | 118 | 0 | 0 | 0 | 0 | 393 |
| 07:15 AM | **52** | 95 | 0 | 147 | 87 | **1** | 40 | 128 | 0 | 85 | **58** | 143 | **1** | 0 | 0 | **1** | 419 |
| 07:30 AM | 44 | **133** | 0 | **177** | 95 | 0 | 38 | 133 | 0 | **86** | 58 | **144** | 0 | 0 | 0 | 0 | **454** |
| 07:45 AM | 49 | 122 | 0 | 171 | **110** | 0 | 45 | **155** | 0 | 77 | 51 | 128 | 0 | 0 | 0 | 0 | 454 |
| Total Volume | 183 | 452 | 0 | 635 | 382 | 1 | 168 | 551 | 0 | 320 | 213 | 533 | 1 | 0 | 0 | 1 | 1720 |
| % App. Total | 28.8 | 71.2 | 0 | | 69.3 | 0.2 | 30.5 | | 0 | 60 | 40 | | 100 | 0 | 0 | | |
| PHF | .880 | .850 | .000 | .897 | .868 | .250 | .933 | .889 | .000 | .930 | .918 | .925 | .250 | .000 | .000 | .250 | .947 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Ormsby Street/Gopher Canyon Road
Weather: Clear

File Name : 01_VST_Vista_Gopher AM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 2




Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 07:15 AM | | | | 07:00 AM | | | | 07:15 AM | | | | 07:00 AM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | **52** | 95 | 0 | 147 | 90 | 0 | **45** | 135 | 0 | 85 | 58 | 143 | 0 | 0 | 0 | 0 |
| +15 mins. | 44 | **133** | 0 | **177** | 87 | **1** | 40 | 128 | 0 | **86** | 58 | **144** | **1** | 0 | 0 | **1** |
| +30 mins. | 49 | 122 | 0 | 171 | 95 | 0 | 38 | 133 | 0 | 77 | 51 | 128 | 0 | 0 | 0 | 0 |
| +45 mins. | 39 | 107 | 0 | 146 | **110** | 0 | 45 | **155** | 0 | 74 | **59** | 133 | 0 | 0 | 0 | 0 |
| Total Volume | 184 | 457 | 0 | 641 | 382 | 1 | 168 | 551 | 0 | 322 | 226 | 548 | 1 | 0 | 0 | 1 |
| % App. Total | 28.7 | 71.3 | 0 | | 69.3 | 0.2 | 30.5 | | 0 | 58.8 | 41.2 | | 100 | 0 | 0 | |
| PHF | .885 | .859 | .000 | .905 | .868 | .250 | .933 | .889 | .000 | .936 | .958 | .951 | .250 | .000 | .000 | .250 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Ormsby Street/Gopher Canyon Road
Weather: Clear

File Name : 01_VST_Vista_Gopher PM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 1

Groups Printed- Total Volume

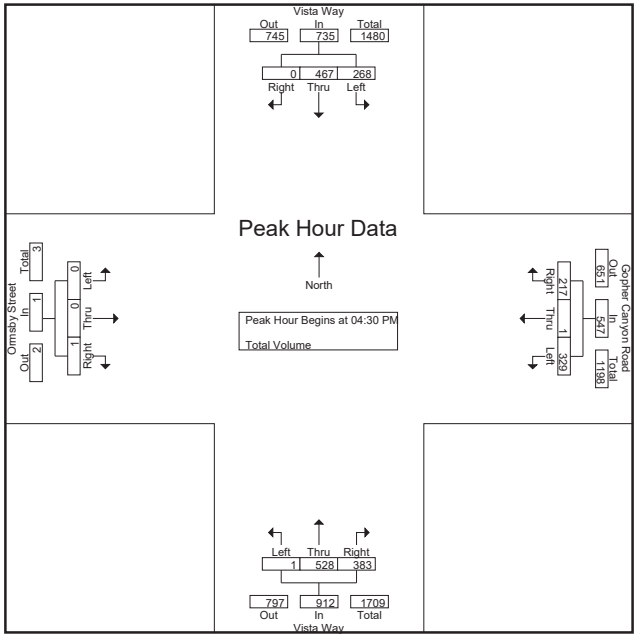
| | Vista Way Southbound | | | | Gopher Canyon Road Westbound | | | | Vista Way Northbound | | | | Ormsby Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 04:00 PM | 93 | 111 | 1 | 205 | 82 | 1 | 45 | 128 | 0 | 124 | 127 | 251 | 0 | 0 | 0 | 0 | 584 |
| 04:15 PM | 42 | 98 | 0 | 140 | 80 | 0 | 39 | 119 | 0 | 129 | 79 | 208 | 0 | 0 | 0 | 0 | 467 |
| 04:30 PM | 84 | 159 | 0 | 243 | 88 | 0 | 53 | 141 | 0 | 132 | 111 | 243 | 0 | 0 | 0 | 0 | 627 |
| 04:45 PM | 60 | 87 | 0 | 147 | 78 | 0 | 53 | 131 | 1 | 135 | 80 | 216 | 0 | 0 | 0 | 0 | 494 |
| Total | 279 | 455 | 1 | 735 | 328 | 1 | 190 | 519 | 1 | 520 | 397 | 918 | 0 | 0 | 0 | 0 | 2172 |
| 05:00 PM | 66 | 114 | 0 | 180 | 67 | 1 | 55 | 123 | 0 | 145 | 93 | 238 | 0 | 0 | 1 | 1 | 542 |
| 05:15 PM | 58 | 107 | 0 | 165 | 96 | 0 | 56 | 152 | 0 | 116 | 99 | 215 | 0 | 0 | 0 | 0 | 532 |
| 05:30 PM | 58 | 90 | 0 | 148 | 76 | 0 | 58 | 134 | 0 | 129 | 88 | 217 | 0 | 0 | 1 | 1 | 500 |
| 05:45 PM | 45 | 94 | 0 | 139 | 74 | 0 | 55 | 129 | 0 | 134 | 82 | 216 | 0 | 0 | 0 | 0 | 484 |
| Total | 227 | 405 | 0 | 632 | 313 | 1 | 224 | 538 | 0 | 524 | 362 | 886 | 0 | 0 | 2 | 2 | 2058 |
| Grand Total | 506 | 860 | 1 | 1367 | 641 | 2 | 414 | 1057 | 1 | 1044 | 759 | 1804 | 0 | 0 | 2 | 2 | 4230 |
| Apprch % | 37 | 62.9 | 0.1 | | 60.6 | 0.2 | 39.2 | | 0.1 | 57.9 | 42.1 | | 0 | 0 | 100 | | |
| Total % | 12 | 20.3 | 0 | 32.3 | 15.2 | 0 | 9.8 | 25 | 0 | 24.7 | 17.9 | 42.6 | 0 | 0 | 0 | 0 | |

| | Vista Way Southbound | | | | Gopher Canyon Road Westbound | | | | Vista Way Northbound | | | | Ormsby Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:30 PM | | | | | | | | | | | | | | | | | |
| 04:30 PM | **84** | **159** | 0 | **243** | 88 | 0 | 53 | 141 | 0 | 132 | **111** | **243** | 0 | 0 | 0 | 0 | **627** |
| 04:45 PM | 60 | 87 | 0 | 147 | 78 | 0 | 53 | 131 | **1** | 135 | 80 | 216 | 0 | 0 | 0 | 0 | 494 |
| 05:00 PM | 66 | 114 | 0 | 180 | 67 | **1** | 55 | 123 | 0 | **145** | 93 | 238 | 0 | 0 | **1** | **1** | 542 |
| 05:15 PM | 58 | 107 | 0 | 165 | **96** | 0 | **56** | **152** | 0 | 116 | 99 | 215 | 0 | 0 | 0 | 0 | 532 |
| Total Volume | 268 | 467 | 0 | 735 | 329 | 1 | 217 | 547 | 1 | 528 | 383 | 912 | 0 | 0 | 1 | 1 | 2195 |
| % App. Total | 36.5 | 63.5 | 0 | | 60.1 | 0.2 | 39.7 | | 0.1 | 57.9 | 42 | | 0 | 0 | 100 | | |
| PHF | .798 | .734 | .000 | .756 | .857 | .250 | .969 | .900 | .250 | .910 | .863 | .938 | .000 | .000 | .250 | .250 | .875 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Ormsby Street/Gopher Canyon Road
Weather: Clear

File Name : 01_VST_Vista_Gopher PM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 2




Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 04:00 PM | | | | 04:30 PM | | | | 04:00 PM | | | | 04:45 PM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | **93** | 111 | **1** | 205 | 88 | 0 | 53 | 141 | 0 | 124 | **127** | **251** | 0 | 0 | 0 | 0 |
| +15 mins. | 42 | 98 | 0 | 140 | 78 | 0 | 53 | 131 | 0 | 129 | 79 | 208 | 0 | 0 | **1** | **1** |
| +30 mins. | 84 | **159** | 0 | **243** | 67 | **1** | 55 | 123 | 0 | 132 | 111 | 243 | 0 | 0 | 0 | 0 |
| +45 mins. | 60 | 87 | 0 | 147 | **96** | 0 | **56** | **152** | **1** | **135** | 80 | 216 | 0 | 0 | 1 | 1 |
| Total Volume | 279 | 455 | 1 | 735 | 329 | 1 | 217 | 547 | 1 | 520 | 397 | 918 | 0 | 0 | 2 | 2 |
| % App. Total | 38 | 61.9 | 0.1 | | 60.1 | 0.2 | 39.7 | | 0.1 | 56.6 | 43.2 | | 0 | 0 | 100 | |
| PHF | .750 | .715 | .250 | .756 | .857 | .250 | .969 | .900 | .250 | .963 | .781 | .914 | .000 | .000 | .500 | .500 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Osborne Street
Weather: Clear

File Name : 02_VST_Vista_Osborne AM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 1

Groups Printed- Total Volume

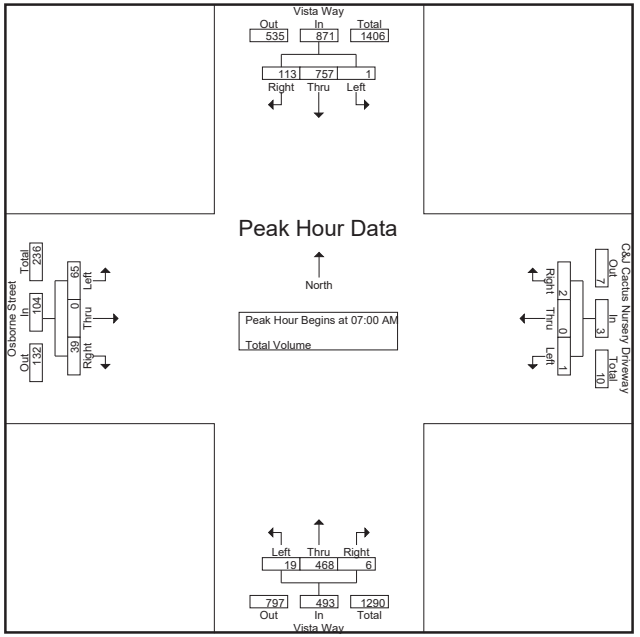
| | Vista Way Southbound | | | | C&J Cactus Nursery Driveway Westbound | | | | Vista Way Northbound | | | | Osborne Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 07:00 AM | 0 | 169 | 29 | 198 | 0 | 0 | 0 | 0 | 3 | 115 | 0 | 118 | 12 | 0 | 8 | 20 | 336 |
| 07:15 AM | 0 | 193 | 22 | 215 | 0 | 0 | 0 | 0 | 3 | 141 | 4 | 148 | 17 | 0 | 11 | 28 | 391 |
| 07:30 AM | 1 | 178 | 28 | 207 | 1 | 0 | 1 | 2 | 6 | 101 | 1 | 108 | 18 | 0 | 9 | 27 | 344 |
| 07:45 AM | 0 | 217 | 34 | 251 | 0 | 0 | 1 | 1 | 7 | 111 | 1 | 119 | 18 | 0 | 11 | 29 | 400 |
| Total | 1 | 757 | 113 | 871 | 1 | 0 | 2 | 3 | 19 | 468 | 6 | 493 | 65 | 0 | 39 | 104 | 1471 |
| 08:00 AM | 0 | 160 | 18 | 178 | 0 | 0 | 0 | 0 | 4 | 125 | 0 | 129 | 17 | 0 | 9 | 26 | 333 |
| 08:15 AM | 1 | 188 | 20 | 209 | 1 | 0 | 0 | 1 | 9 | 99 | 2 | 110 | 16 | 0 | 12 | 28 | 348 |
| 08:30 AM | 0 | 154 | 20 | 174 | 0 | 0 | 0 | 0 | 11 | 95 | 0 | 106 | 18 | 0 | 6 | 24 | 304 |
| 08:45 AM | 1 | 180 | 22 | 203 | 0 | 0 | 0 | 0 | 4 | 129 | 0 | 133 | 12 | 0 | 8 | 20 | 356 |
| Total | 2 | 682 | 80 | 764 | 1 | 0 | 0 | 1 | 28 | 448 | 2 | 478 | 63 | 0 | 35 | 98 | 1341 |
| Grand Total | 3 | 1439 | 193 | 1635 | 2 | 0 | 2 | 4 | 47 | 916 | 8 | 971 | 128 | 0 | 74 | 202 | 2812 |
| Apprch % | 0.2 | 88 | 11.8 | | 50 | 0 | 50 | | 4.8 | 94.3 | 0.8 | | 63.4 | 0 | 36.6 | | |
| Total % | 0.1 | 51.2 | 6.9 | 58.1 | 0.1 | 0 | 0.1 | 0.1 | 1.7 | 32.6 | 0.3 | 34.5 | 4.6 | 0 | 2.6 | 7.2 | |

| | Vista Way Southbound | | | | C&J Cactus Nursery Driveway Westbound | | | | Vista Way Northbound | | | | Osborne Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:00 AM | | | | | | | | | | | | | | | | | |
| 07:00 AM | 0 | 169 | 29 | 198 | 0 | 0 | 0 | 0 | 3 | 115 | 0 | 118 | 12 | 0 | 8 | 20 | 336 |
| 07:15 AM | 0 | 193 | 22 | 215 | 0 | 0 | 0 | 0 | 3 | **141** | **4** | **148** | 17 | 0 | **11** | 28 | 391 |
| 07:30 AM | **1** | 178 | 28 | 207 | **1** | 0 | **1** | **2** | 6 | 101 | 1 | 108 | **18** | 0 | 9 | 27 | 344 |
| 07:45 AM | 0 | **217** | **34** | **251** | 0 | 0 | 1 | 1 | **7** | 111 | 1 | 119 | 18 | 0 | 11 | **29** | **400** |
| Total Volume | 1 | 757 | 113 | 871 | 1 | 0 | 2 | 3 | 19 | 468 | 6 | 493 | 65 | 0 | 39 | 104 | 1471 |
| % App. Total | 0.1 | 86.9 | 13 | | 33.3 | 0 | 66.7 | | 3.9 | 94.9 | 1.2 | | 62.5 | 0 | 37.5 | | |
| PHF | .250 | .872 | .831 | .868 | .250 | .000 | .500 | .375 | .679 | .830 | .375 | .833 | .903 | .000 | .886 | .897 | .919 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Osborne Street
Weather: Clear

File Name : 02_VST_Vista_Osborne AM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 2




Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 07:00 AM | | | | 07:30 AM | | | | 07:15 AM | | | | 07:15 AM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 0 | 169 | 29 | 198 | **1** | 0 | **1** | **2** | 3 | **141** | **4** | **148** | 17 | 0 | **11** | 28 |
| +15 mins. | 0 | 193 | 22 | 215 | 0 | 0 | 1 | 1 | 6 | 101 | 1 | 108 | **18** | 0 | 9 | 27 |
| +30 mins. | **1** | 178 | 28 | 207 | 0 | 0 | 0 | 0 | **7** | 111 | 1 | 119 | 18 | 0 | 11 | **29** |
| +45 mins. | 0 | **217** | **34** | **251** | 1 | 0 | 0 | 1 | 4 | 125 | 0 | 129 | 17 | 0 | 9 | 26 |
| Total Volume | 1 | 757 | 113 | 871 | 2 | 0 | 2 | 4 | 20 | 478 | 6 | 504 | 70 | 0 | 40 | 110 |
| % App. Total | 0.1 | 86.9 | 13 | | 50 | 0 | 50 | | 4 | 94.8 | 1.2 | | 63.6 | 0 | 36.4 | |
| PHF | .250 | .872 | .831 | .868 | .500 | .000 | .500 | .500 | .714 | .848 | .375 | .851 | .972 | .000 | .909 | .948 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Osborne Street
Weather: Clear

File Name : 02_VST_Vista_Osborne PM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 1

Groups Printed- Total Volume

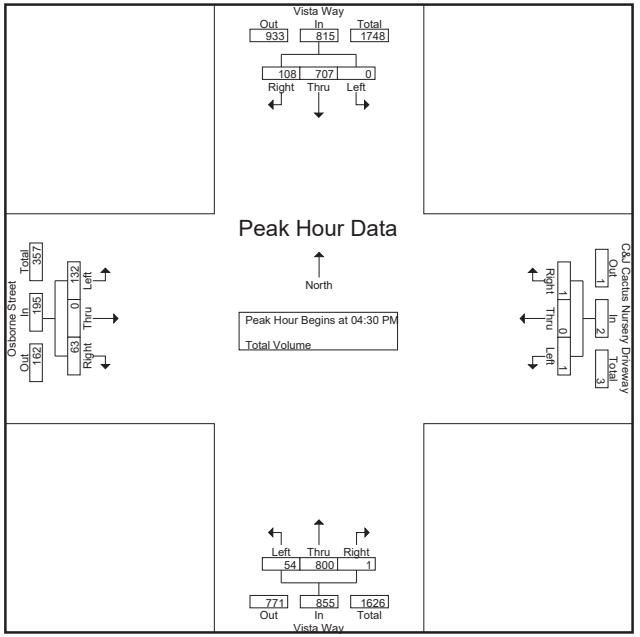
| | Vista Way Southbound | | | | C&J Cactus Nursery Driveway Westbound | | | | Vista Way Northbound | | | | Osborne Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 04:00 PM | 1 | 150 | 32 | 183 | 2 | 0 | 1 | 3 | 8 | 187 | 0 | 195 | 46 | 0 | 12 | 58 | 439 |
| 04:15 PM | 0 | 168 | 20 | 188 | 0 | 0 | 0 | 0 | 12 | 209 | 0 | 221 | 28 | 0 | 13 | 41 | 450 |
| 04:30 PM | 0 | 211 | 25 | 236 | 0 | 0 | 0 | 0 | 15 | 218 | 0 | 233 | 33 | 0 | 15 | 48 | 517 |
| 04:45 PM | 0 | 173 | 33 | 206 | 0 | 0 | 0 | 0 | 15 | 195 | 0 | 210 | 30 | 0 | 10 | 40 | 456 |
| Total | 1 | 702 | 110 | 813 | 2 | 0 | 1 | 3 | 50 | 809 | 0 | 859 | 137 | 0 | 50 | 187 | 1862 |
| 05:00 PM | 0 | 152 | 21 | 173 | 0 | 0 | 1 | 1 | 9 | 197 | 0 | 206 | 25 | 0 | 21 | 46 | 426 |
| 05:15 PM | 0 | 171 | 29 | 200 | 1 | 0 | 0 | 1 | 15 | 190 | 1 | 206 | 44 | 0 | 17 | 61 | 468 |
| 05:30 PM | 0 | 146 | 24 | 170 | 0 | 0 | 0 | 0 | 15 | 183 | 0 | 198 | 32 | 0 | 6 | 38 | 406 |
| 05:45 PM | 0 | 157 | 24 | 181 | 1 | 0 | 0 | 1 | 10 | 172 | 1 | 183 | 24 | 0 | 9 | 33 | 398 |
| Total | 0 | 626 | 98 | 724 | 2 | 0 | 1 | 3 | 49 | 742 | 2 | 793 | 125 | 0 | 53 | 178 | 1698 |
| Grand Total | 1 | 1328 | 208 | 1537 | 4 | 0 | 2 | 6 | 99 | 1551 | 2 | 1652 | 262 | 0 | 103 | 365 | 3560 |
| Apprch % | 0.1 | 86.4 | 13.5 | | 66.7 | 0 | 33.3 | | 6 | 93.9 | 0.1 | | 71.8 | 0 | 28.2 | | |
| Total % | 0 | 37.3 | 5.8 | 43.2 | 0.1 | 0 | 0.1 | 0.2 | 2.8 | 43.6 | 0.1 | 46.4 | 7.4 | 0 | 2.9 | 10.3 | |

| | Vista Way Southbound | | | | C&J Cactus Nursery Driveway Westbound | | | | Vista Way Northbound | | | | Osborne Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:30 PM | | | | | | | | | | | | | | | | | |
| 04:30 PM | 0 | **211** | 25 | **236** | 0 | 0 | 0 | 0 | **15** | **218** | 0 | **233** | 33 | 0 | 15 | 48 | **517** |
| 04:45 PM | 0 | 173 | **33** | 206 | 0 | 0 | 0 | 0 | 15 | 195 | 0 | 210 | 30 | 0 | 10 | 40 | 456 |
| 05:00 PM | 0 | 152 | 21 | 173 | 0 | 0 | **1** | **1** | 9 | 197 | 0 | 206 | 25 | 0 | **21** | 46 | 426 |
| 05:15 PM | 0 | 171 | 29 | 200 | **1** | 0 | 0 | 1 | 15 | 190 | **1** | 206 | **44** | 0 | 17 | **61** | 468 |
| Total Volume | 0 | 707 | 108 | 815 | 1 | 0 | 1 | 2 | 54 | 800 | 1 | 855 | 132 | 0 | 63 | 195 | 1867 |
| % App. Total | 0 | 86.7 | 13.3 | | 50 | 0 | 50 | | 6.3 | 93.6 | 0.1 | | 67.7 | 0 | 32.3 | | |
| PHF | .000 | .838 | .818 | .863 | .250 | .000 | .250 | .500 | .900 | .917 | .250 | .917 | .750 | .000 | .750 | .799 | .903 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Osborne Street
Weather: Clear

File Name : 02_VST_Vista_Osborne PM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 2




Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 04:30 PM | | | | 04:00 PM | | | | 04:15 PM | | | | 04:30 PM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 0 | **211** | 25 | **236** | **2** | 0 | **1** | **3** | 12 | 209 | 0 | 221 | 33 | 0 | 15 | 48 |
| +15 mins. | 0 | 173 | **33** | 206 | 0 | 0 | 0 | 0 | **15** | **218** | 0 | **233** | 30 | 0 | 10 | 40 |
| +30 mins. | 0 | 152 | 21 | 173 | 0 | 0 | 0 | 0 | 15 | 195 | 0 | 210 | 25 | 0 | **21** | 46 |
| +45 mins. | 0 | 171 | 29 | 200 | 0 | 0 | 0 | 0 | 9 | 197 | 0 | 206 | **44** | 0 | 17 | **61** |
| Total Volume | 0 | 707 | 108 | 815 | 2 | 0 | 1 | 3 | 51 | 819 | 0 | 870 | 132 | 0 | 63 | 195 |
| % App. Total | 0 | 86.7 | 13.3 | | 66.7 | 0 | 33.3 | | 5.9 | 94.1 | 0 | | 67.7 | 0 | 32.3 | |
| PHF | .000 | .838 | .818 | .863 | .250 | .000 | .250 | .250 | .850 | .939 | .000 | .933 | .750 | .000 | .750 | .799 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Warmlands Avenue
Weather: Clear

File Name : 03_VST_Vista_Warmlands AM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 1

Groups Printed- Total Volume

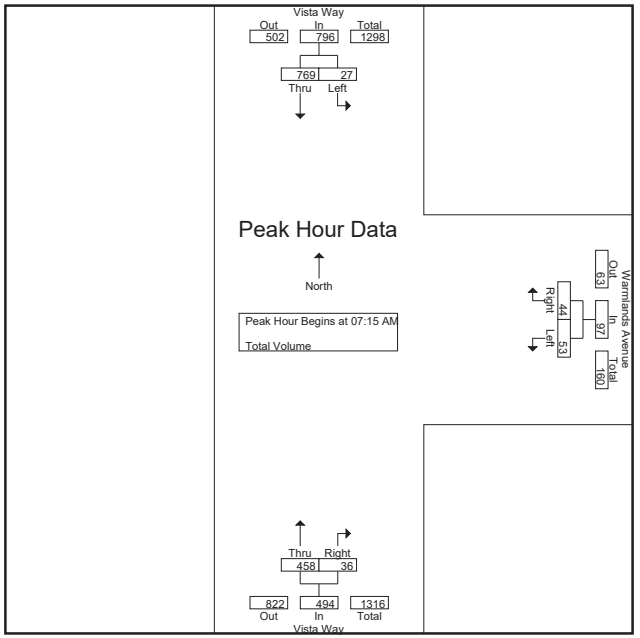
| | Vista Way Southbound | | | Warmlands Avenue Westbound | | | Vista Way Northbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | App. Total | Left | Right | App. Total | Thru | Right | App. Total | Int. Total |
| 07:00 AM | 7 | 159 | 166 | 10 | 13 | 23 | 102 | 8 | 110 | 299 |
| 07:15 AM | 7 | 188 | 195 | 15 | 16 | 31 | 124 | 7 | 131 | 357 |
| 07:30 AM | 9 | 197 | 206 | 14 | 7 | 21 | 111 | 10 | 121 | 348 |
| 07:45 AM | 6 | 213 | 219 | 14 | 11 | 25 | 106 | 10 | 116 | 360 |
| Total | 29 | 757 | 786 | 53 | 47 | 100 | 443 | 35 | 478 | 1364 |
| 08:00 AM | 5 | 171 | 176 | 10 | 10 | 20 | 117 | 9 | 126 | 322 |
| 08:15 AM | 8 | 190 | 198 | 13 | 11 | 24 | 100 | 7 | 107 | 329 |
| 08:30 AM | 3 | 168 | 171 | 13 | 10 | 23 | 93 | 9 | 102 | 296 |
| 08:45 AM | 13 | 160 | 173 | 9 | 6 | 15 | 130 | 6 | 136 | 324 |
| Total | 29 | 689 | 718 | 45 | 37 | 82 | 440 | 31 | 471 | 1271 |
| Grand Total | 58 | 1446 | 1504 | 98 | 84 | 182 | 883 | 66 | 949 | 2635 |
| Apprch % | 3.9 | 96.1 | | 53.8 | 46.2 | | 93 | 7 | | |
| Total % | 2.2 | 54.9 | 57.1 | 3.7 | 3.2 | 6.9 | 33.5 | 2.5 | 36 | |

| | Vista Way Southbound | | | Warmlands Avenue Westbound | | | Vista Way Northbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | App. Total | Left | Right | App. Total | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:15 AM | | | | | | | | | | |
| 07:15 AM | 7 | 188 | 195 | **15** | **16** | **31** | **124** | 7 | **131** | 357 |
| 07:30 AM | **9** | 197 | 206 | 14 | 7 | 21 | 111 | **10** | 121 | 348 |
| 07:45 AM | 6 | **213** | **219** | 14 | 11 | 25 | 106 | 10 | 116 | **360** |
| 08:00 AM | 5 | 171 | 176 | 10 | 10 | 20 | 117 | 9 | 126 | 322 |
| Total Volume | 27 | 769 | 796 | 53 | 44 | 97 | 458 | 36 | 494 | 1387 |
| % App. Total | 3.4 | 96.6 | | 54.6 | 45.4 | | 92.7 | 7.3 | | |
| PHF | .750 | .903 | .909 | .883 | .688 | .782 | .923 | .900 | .943 | .963 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Warmlands Avenue
Weather: Clear

File Name : 03_VST_Vista_Warmlands AM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 2




Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 07:30 AM | | | 07:00 AM | | | 07:15 AM | | |
|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | **9** | 197 | 206 | 10 | 13 | 23 | **124** | 7 | **131** |
| +15 mins. | 6 | **213** | **219** | **15** | **16** | **31** | 111 | **10** | 121 |
| +30 mins. | 5 | 171 | 176 | 14 | 7 | 21 | 106 | 10 | 116 |
| +45 mins. | 8 | 190 | 198 | 14 | 11 | 25 | 117 | 9 | 126 |
| Total Volume | 28 | 771 | 799 | 53 | 47 | 100 | 458 | 36 | 494 |
| % App. Total | 3.5 | 96.5 | | 53 | 47 | | 92.7 | 7.3 | |
| PHF | .778 | .905 | .912 | .883 | .734 | .806 | .923 | .900 | .943 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Warmlands Avenue
Weather: Clear

File Name : 03_VST_Vista_Warmlands PM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 1

Groups Printed- Total Volume

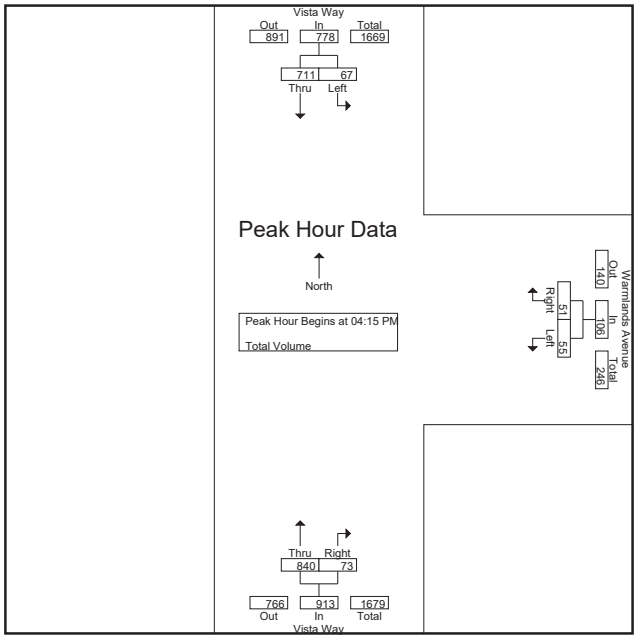
| | Vista Way Southbound | | | Warmlands Avenue Westbound | | | Vista Way Northbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | App. Total | Left | Right | App. Total | Thru | Right | App. Total | Int. Total |
| 04:00 PM | 7 | 168 | 175 | 16 | 9 | 25 | 204 | 18 | 222 | 422 |
| 04:15 PM | 23 | 168 | 191 | 17 | 15 | 32 | 205 | 17 | 222 | 445 |
| 04:30 PM | 14 | 214 | 228 | 19 | 16 | 35 | 212 | 21 | 233 | 496 |
| 04:45 PM | 11 | 163 | 174 | 10 | 15 | 25 | 191 | 14 | 205 | 404 |
| Total | 55 | 713 | 768 | 62 | 55 | 117 | 812 | 70 | 882 | 1767 |
| | | | | | | | | | | |
| 05:00 PM | 19 | 166 | 185 | 9 | 5 | 14 | 232 | 21 | 253 | 452 |
| 05:15 PM | 11 | 175 | 186 | 13 | 12 | 25 | 184 | 25 | 209 | 420 |
| 05:30 PM | 10 | 148 | 158 | 16 | 7 | 23 | 188 | 16 | 204 | 385 |
| 05:45 PM | 12 | 149 | 161 | 21 | 15 | 36 | 165 | 20 | 185 | 382 |
| Total | 52 | 638 | 690 | 59 | 39 | 98 | 769 | 82 | 851 | 1639 |
| | | | | | | | | | | |
| Grand Total | 107 | 1351 | 1458 | 121 | 94 | 215 | 1581 | 152 | 1733 | 3406 |
| Apprch % | 7.3 | 92.7 | | 56.3 | 43.7 | | 91.2 | 8.8 | | |
| Total % | 3.1 | 39.7 | 42.8 | 3.6 | 2.8 | 6.3 | 46.4 | 4.5 | 50.9 | |

| | Vista Way Southbound | | | Warmlands Avenue Westbound | | | Vista Way Northbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | App. Total | Left | Right | App. Total | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | |
| 04:15 PM | **23** | 168 | 191 | 17 | 15 | 32 | 205 | 17 | 222 | 445 |
| 04:30 PM | 14 | **214** | **228** | **19** | **16** | **35** | 212 | **21** | 233 | **496** |
| 04:45 PM | 11 | 163 | 174 | 10 | 15 | 25 | 191 | 14 | 205 | 404 |
| 05:00 PM | 19 | 166 | 185 | 9 | 5 | 14 | **232** | 21 | **253** | 452 |
| Total Volume | 67 | 711 | 778 | 55 | 51 | 106 | 840 | 73 | 913 | 1797 |
| % App. Total | 8.6 | 91.4 | | 51.9 | 48.1 | | 92 | 8 | | |
| PHF | .728 | .831 | .853 | .724 | .797 | .757 | .905 | .869 | .902 | .906 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Warmlands Avenue
Weather: Clear

File Name : 03_VST_Vista_Warmlands PM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 2




Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 04:15 PM | | | 04:00 PM | | | 04:15 PM | | |
|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | **23** | 168 | 191 | 16 | 9 | 25 | 205 | 17 | 222 |
| +15 mins. | 14 | **214** | **228** | 17 | 15 | 32 | 212 | **21** | 233 |
| +30 mins. | 11 | 163 | 174 | **19** | **16** | **35** | 191 | 14 | 205 |
| +45 mins. | 19 | 166 | 185 | 10 | 15 | 25 | **232** | 21 | **253** |
| Total Volume | 67 | 711 | 778 | 62 | 55 | 117 | 840 | 73 | 913 |
| % App. Total | 8.6 | 91.4 | | 53 | 47 | | 92 | 8 | |
| PHF | .728 | .831 | .853 | .816 | .859 | .836 | .905 | .869 | .902 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Taylor Street
Weather: Clear

File Name : 04_VST_Vista_Taylor AM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 1

Groups Printed- Total Volume

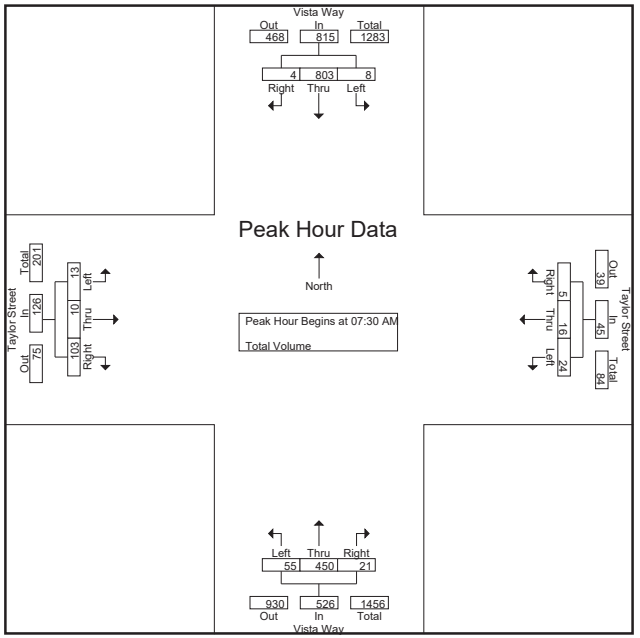
| | Vista Way Southbound | | | | Taylor Street Westbound | | | | Vista Way Northbound | | | | Taylor Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 07:00 AM | 1 | 175 | 1 | 177 | 5 | 4 | 6 | 15 | 7 | 108 | 2 | 117 | 2 | 2 | 26 | 30 | 339 |
| 07:15 AM | 2 | 192 | 0 | 194 | 2 | 3 | 0 | 5 | 16 | 114 | 4 | 134 | 8 | 0 | 31 | 39 | 372 |
| 07:30 AM | 2 | 212 | 3 | 217 | 8 | 3 | 0 | 11 | 18 | 108 | 5 | 131 | 2 | 3 | 30 | 35 | 394 |
| 07:45 AM | 2 | 214 | 0 | 216 | 7 | 5 | 2 | 14 | 15 | 116 | 5 | 136 | 2 | 3 | 26 | 31 | 397 |
| Total | 7 | 793 | 4 | 804 | 22 | 15 | 8 | 45 | 56 | 446 | 16 | 518 | 14 | 8 | 113 | 135 | 1502 |
| 08:00 AM | 2 | 159 | 1 | 162 | 5 | 3 | 2 | 10 | 12 | 115 | 4 | 131 | 7 | 2 | 24 | 33 | 336 |
| 08:15 AM | 2 | 218 | 0 | 220 | 4 | 5 | 1 | 10 | 10 | 111 | 7 | 128 | 2 | 2 | 23 | 27 | 385 |
| 08:30 AM | 3 | 172 | 0 | 175 | 1 | 2 | 2 | 5 | 14 | 105 | 6 | 125 | 1 | 2 | 22 | 25 | 330 |
| 08:45 AM | 6 | 176 | 0 | 182 | 10 | 3 | 4 | 17 | 12 | 155 | 6 | 173 | 5 | 1 | 28 | 34 | 406 |
| Total | 13 | 725 | 1 | 739 | 20 | 13 | 9 | 42 | 48 | 486 | 23 | 557 | 15 | 7 | 97 | 119 | 1457 |
| Grand Total | 20 | 1518 | 5 | 1543 | 42 | 28 | 17 | 87 | 104 | 932 | 39 | 1075 | 29 | 15 | 210 | 254 | 2959 |
| Apprch % | 1.3 | 98.4 | 0.3 | | 48.3 | 32.2 | 19.5 | | 9.7 | 86.7 | 3.6 | | 11.4 | 5.9 | 82.7 | | |
| Total % | 0.7 | 51.3 | 0.2 | 52.1 | 1.4 | 0.9 | 0.6 | 2.9 | 3.5 | 31.5 | 1.3 | 36.3 | 1 | 0.5 | 7.1 | 8.6 | |

| | Vista Way Southbound | | | | Taylor Street Westbound | | | | Vista Way Northbound | | | | Taylor Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | | | | | |
| 07:30 AM | **2** | 212 | **3** | 217 | **8** | 3 | 0 | 11 | **18** | 108 | 5 | 131 | 2 | **3** | **30** | **35** | 394 |
| 07:45 AM | 2 | 214 | 0 | 216 | 7 | **5** | **2** | **14** | 15 | **116** | 5 | **136** | 2 | 3 | 26 | 31 | **397** |
| 08:00 AM | 2 | 159 | 1 | 162 | 5 | 3 | 2 | 10 | 12 | 115 | 4 | 131 | **7** | 2 | 24 | 33 | 336 |
| 08:15 AM | 2 | **218** | 0 | **220** | 4 | 5 | 1 | 10 | 10 | 111 | **7** | 128 | 2 | 2 | 23 | 27 | 385 |
| Total Volume | 8 | 803 | 4 | 815 | 24 | 16 | 5 | 45 | 55 | 450 | 21 | 526 | 13 | 10 | 103 | 126 | 1512 |
| % App. Total | 1 | 98.5 | 0.5 | | 53.3 | 35.6 | 11.1 | | 10.5 | 85.6 | 4 | | 10.3 | 7.9 | 81.7 | | |
| PHF | 1.00 | .921 | .333 | .926 | .750 | .800 | .625 | .804 | .764 | .970 | .750 | .967 | .464 | .833 | .858 | .900 | .952 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Taylor Street
Weather: Clear

File Name : 04_VST_Vista_Taylor AM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 2




Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 07:30 AM | | | | 07:00 AM | | | | 08:00 AM | | | | 07:15 AM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | **2** | 212 | **3** | 217 | 5 | 4 | **6** | **15** | 12 | 115 | 4 | 131 | **8** | 0 | **31** | **39** |
| +15 mins. | 2 | 214 | 0 | 216 | 2 | 3 | 0 | 5 | 10 | 111 | **7** | 128 | 2 | **3** | 30 | 35 |
| +30 mins. | 2 | 159 | 1 | 162 | **8** | 3 | 0 | 11 | **14** | 105 | 6 | 125 | 2 | 3 | 26 | 31 |
| +45 mins. | 2 | **218** | 0 | **220** | 7 | **5** | 2 | 14 | 12 | **155** | 6 | **173** | 7 | 2 | 24 | 33 |
| Total Volume | 8 | 803 | 4 | 815 | 22 | 15 | 8 | 45 | 48 | 486 | 23 | 557 | 19 | 8 | 111 | 138 |
| % App. Total | 1 | 98.5 | 0.5 | | 48.9 | 33.3 | 17.8 | | 8.6 | 87.3 | 4.1 | | 13.8 | 5.8 | 80.4 | |
| PHF | 1.000 | .921 | .333 | .926 | .688 | .750 | .333 | .750 | .857 | .784 | .821 | .805 | .594 | .667 | .895 | .885 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Taylor Street
Weather: Clear

File Name : 04_VST_Vista_Taylor PM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 1

Groups Printed- Total Volume

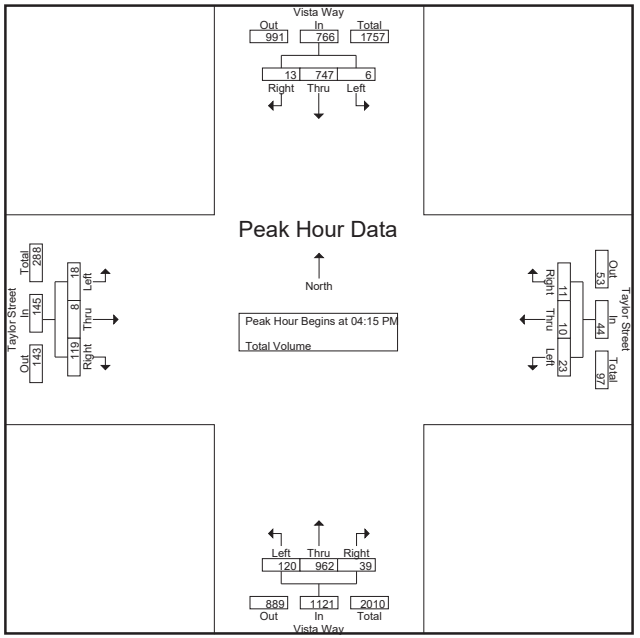
| | Vista Way Southbound | | | | Taylor Street Westbound | | | | Vista Way Northbound | | | | Taylor Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| 04:00 PM | 2 | 177 | 3 | 182 | 5 | 14 | 14 | 33 | 28 | 207 | 5 | 240 | 6 | 2 | 29 | 37 | 492 |
| 04:15 PM | 0 | 186 | 0 | 186 | 3 | 1 | 2 | 6 | 20 | 232 | 6 | 258 | 5 | 1 | 23 | 29 | 479 |
| 04:30 PM | 1 | 223 | 4 | 228 | 10 | 5 | 5 | 20 | 23 | 230 | 10 | 263 | 4 | 2 | 28 | 34 | 545 |
| 04:45 PM | 3 | 159 | 5 | 167 | 6 | 3 | 0 | 9 | 34 | 218 | 7 | 259 | 2 | 2 | 34 | 38 | 473 |
| Total | 6 | 745 | 12 | 763 | 24 | 23 | 21 | 68 | 105 | 887 | 28 | 1020 | 17 | 7 | 114 | 138 | 1989 |
| 05:00 PM | 2 | 179 | 4 | 185 | 4 | 1 | 4 | 9 | 43 | 282 | 16 | 341 | 7 | 3 | 34 | 44 | 579 |
| 05:15 PM | 3 | 168 | 2 | 173 | 1 | 3 | 1 | 5 | 24 | 212 | 11 | 247 | 2 | 3 | 28 | 33 | 458 |
| 05:30 PM | 2 | 162 | 5 | 169 | 7 | 2 | 3 | 12 | 34 | 212 | 13 | 259 | 5 | 1 | 36 | 42 | 482 |
| 05:45 PM | 1 | 168 | 1 | 170 | 4 | 1 | 4 | 9 | 37 | 175 | 10 | 222 | 7 | 1 | 30 | 38 | 439 |
| Total | 8 | 677 | 12 | 697 | 16 | 7 | 12 | 35 | 138 | 881 | 50 | 1069 | 21 | 8 | 128 | 157 | 1958 |
| Grand Total | 14 | 1422 | 24 | 1460 | 40 | 30 | 33 | 103 | 243 | 1768 | 78 | 2089 | 38 | 15 | 242 | 295 | 3947 |
| Apprch % | 1 | 97.4 | 1.6 | | 38.8 | 29.1 | 32 | | 11.6 | 84.6 | 3.7 | | 12.9 | 5.1 | 82 | | |
| Total % | 0.4 | 36 | 0.6 | 37 | 1 | 0.8 | 0.8 | 2.6 | 6.2 | 44.8 | 2 | 52.9 | 1 | 0.4 | 6.1 | 7.5 | |

| | Vista Way Southbound | | | | Taylor Street Westbound | | | | Vista Way Northbound | | | | Taylor Street Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Left | Thru | Right | App. Total | Int. Total |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | |
| 04:15 PM | 0 | 186 | 0 | 186 | 3 | 1 | 2 | 6 | 20 | 232 | 6 | 258 | 5 | 1 | 23 | 29 | 479 |
| 04:30 PM | 1 | **223** | 4 | **228** | **10** | **5** | **5** | **20** | 23 | 230 | 10 | 263 | 4 | 2 | 28 | 34 | 545 |
| 04:45 PM | **3** | 159 | **5** | 167 | 6 | 3 | 0 | 9 | 34 | 218 | 7 | 259 | 2 | 2 | **34** | 38 | 473 |
| 05:00 PM | 2 | 179 | 4 | 185 | 4 | 1 | 4 | 9 | **43** | **282** | **16** | **341** | **7** | **3** | 34 | **44** | **579** |
| Total Volume | 6 | 747 | 13 | 766 | 23 | 10 | 11 | 44 | 120 | 962 | 39 | 1121 | 18 | 8 | 119 | 145 | 2076 |
| % App. Total | 0.8 | 97.5 | 1.7 | | 52.3 | 22.7 | 25 | | 10.7 | 85.8 | 3.5 | | 12.4 | 5.5 | 82.1 | | |
| PHF | .500 | .837 | .650 | .840 | .575 | .500 | .550 | .550 | .698 | .853 | .609 | .822 | .643 | .667 | .875 | .824 | .896 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Vista
N/S: Vista Way
E/W: Taylor Street
Weather: Clear

File Name : 04_VST_Vista_Taylor PM
Site Code : 00321036
Start Date : 1/21/2021
Page No : 2




Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

| | 04:15 PM | | | | 04:00 PM | | | | 04:15 PM | | | | 04:45 PM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| +0 mins. | 0 | 186 | 0 | 186 | 5 | **14** | **14** | **33** | 20 | 232 | 6 | 258 | 2 | 2 | 34 | 38 |
| +15 mins. | 1 | **223** | 4 | **228** | 3 | 1 | 2 | 6 | 23 | 230 | 10 | 263 | **7** | **3** | 34 | **44** |
| +30 mins. | **3** | 159 | **5** | 167 | **10** | 5 | 5 | 20 | 34 | 218 | 7 | 259 | 2 | 3 | 28 | 33 |
| +45 mins. | 2 | 179 | 4 | 185 | 6 | 3 | 0 | 9 | **43** | **282** | **16** | **341** | 5 | 1 | **36** | 42 |
| Total Volume | 6 | 747 | 13 | 766 | 24 | 23 | 21 | 68 | 120 | 962 | 39 | 1121 | 16 | 9 | 132 | 157 |
| % App. Total | 0.8 | 97.5 | 1.7 | | 35.3 | 33.8 | 30.9 | | 10.7 | 85.8 | 3.5 | | 10.2 | 5.7 | 84.1 | |
| PHF | .500 | .837 | .650 | .840 | .600 | .411 | .375 | .515 | .698 | .853 | .609 | .822 | .571 | .750 | .917 | .892 |

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268
email: counts@countsunlimited.com

City of Vista
Vista Way
B/ Gopher Canyon Road - Osborne Street
24 Hour Directional Volume Count

VST001
Site Code: 003-21036

| Start | 1/21/2021 | Northbound | | Hour Totals | | Southbound | | Hour Totals | | Combined Totals | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Thu | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon |
| 12:00 | | 18 | 164 | | | 14 | 142 | | | | |
| 12:15 | | 20 | 163 | | | 16 | 142 | | | | |
| 12:30 | | 10 | 173 | | | 10 | 170 | | | | |
| 12:45 | | 14 | 160 | 62 | 660 | 11 | 151 | 51 | 605 | 113 | 1265 |
| 01:00 | | 10 | 155 | | | 15 | 147 | | | | |
| 01:15 | | 5 | 164 | | | 6 | 132 | | | | |
| 01:30 | | 4 | 158 | | | 8 | 145 | | | | |
| 01:45 | | 10 | 187 | 29 | 664 | 8 | 183 | 37 | 607 | 66 | 1271 |
| 02:00 | | 9 | 161 | | | 8 | 165 | | | | |
| 02:15 | | 6 | 196 | | | 13 | 156 | | | | |
| 02:30 | | 8 | 212 | | | 9 | 187 | | | | |
| 02:45 | | 14 | 204 | 37 | 773 | 10 | 170 | 40 | 678 | 77 | 1451 |
| 03:00 | | 7 | 196 | | | 9 | 148 | | | | |
| 03:15 | | 18 | 232 | | | 8 | 207 | | | | |
| 03:30 | | 23 | 215 | | | 10 | 286 | | | | |
| 03:45 | | 10 | **244** | 58 | 887 | 24 | 298 | 51 | 939 | 109 | 1826 |
| 04:00 | | 14 | **240** | | | 22 | 264 | | | | |
| 04:15 | | 17 | **232** | | | 28 | 246 | | | | |
| 04:30 | | 17 | **256** | | | 28 | 280 | | | | |
| 04:45 | | 24 | 225 | 72 | 953 | 48 | **336** | 126 | 1126 | 198 | 2079 |
| 05:00 | | 41 | 220 | | | 54 | **258** | | | | |
| 05:15 | | 42 | 222 | | | 72 | **326** | | | | |
| 05:30 | | 46 | 222 | | | 118 | **336** | | | | |
| 05:45 | | 90 | 221 | 219 | 885 | 107 | 252 | 351 | 1172 | 570 | 2057 |
| 06:00 | | 93 | 188 | | | 93 | 153 | | | | |
| 06:15 | | 116 | 179 | | | 127 | 144 | | | | |
| 06:30 | | 136 | 165 | | | 144 | 120 | | | | |
| 06:45 | | 158 | 170 | 503 | 702 | 181 | 116 | 545 | 533 | 1048 | 1235 |
| 07:00 | | 116 | 136 | | | 186 | 116 | | | | |
| 07:15 | | 145 | 126 | | | **198** | 96 | | | | |
| 07:30 | | 155 | 106 | | | **205** | 70 | | | | |
| 07:45 | | 116 | 94 | 532 | 462 | **242** | 78 | 831 | 360 | 1363 | 822 |
| 08:00 | | 116 | 91 | | | **204** | 70 | | | | |
| 08:15 | | 157 | 115 | | | 178 | 67 | | | | |
| 08:30 | | 104 | 85 | | | 190 | 70 | | | | |
| 08:45 | | 130 | 72 | 507 | 363 | 176 | 49 | 748 | 256 | 1255 | 619 |
| 09:00 | | 138 | 54 | | | 186 | 48 | | | | |
| 09:15 | | 130 | 78 | | | 165 | 61 | | | | |
| 09:30 | | 148 | 64 | | | 144 | 44 | | | | |
| 09:45 | | 152 | 75 | 568 | 271 | 138 | 51 | 633 | 204 | 1201 | 475 |
| 10:00 | | 155 | 43 | | | 136 | 35 | | | | |
| 10:15 | | 122 | 53 | | | 118 | 40 | | | | |
| 10:30 | | 129 | 34 | | | 128 | 32 | | | | |
| 10:45 | | 136 | 38 | 542 | 168 | 152 | 21 | 534 | 128 | 1076 | 296 |
| 11:00 | | **150** | 33 | | | 153 | 30 | | | | |
| 11:15 | | **171** | 34 | | | 130 | 25 | | | | |
| 11:30 | | **154** | 31 | | | 143 | 18 | | | | |
| 11:45 | | **168** | 18 | 643 | 116 | 150 | 18 | 576 | 91 | 1219 | 207 |
| Total | | 3772 | 6904 | 3772 | 6904 | 4523 | 6699 | 4523 | 6699 | 8295 | 13603 |
| Combined Total | | 10676 | | 10676 | | 11222 | | 11222 | | 21898 | |
| AM Peak | - | 11:00 | - | - | - | 07:15 | - | - | - | - | - |
| Vol. | - | 643 | - | - | - | 849 | - | - | - | - | - |
| P.H.F. | | 0.940 | | | | 0.877 | | | | | |
| PM Peak | - | - | 03:45 | - | - | - | 04:45 | - | - | - | - |
| Vol. | - | - | 972 | - | - | - | 1256 | - | - | - | - |
| P.H.F. | | | 0.949 | | | | 0.935 | | | | |
| Percentage | | 35.3% | 64.7% | | | 40.3% | 59.7% | | | | |
| ADT/AADT | | ADT 21,898 | | AADT 21,898 | | | | | | | |

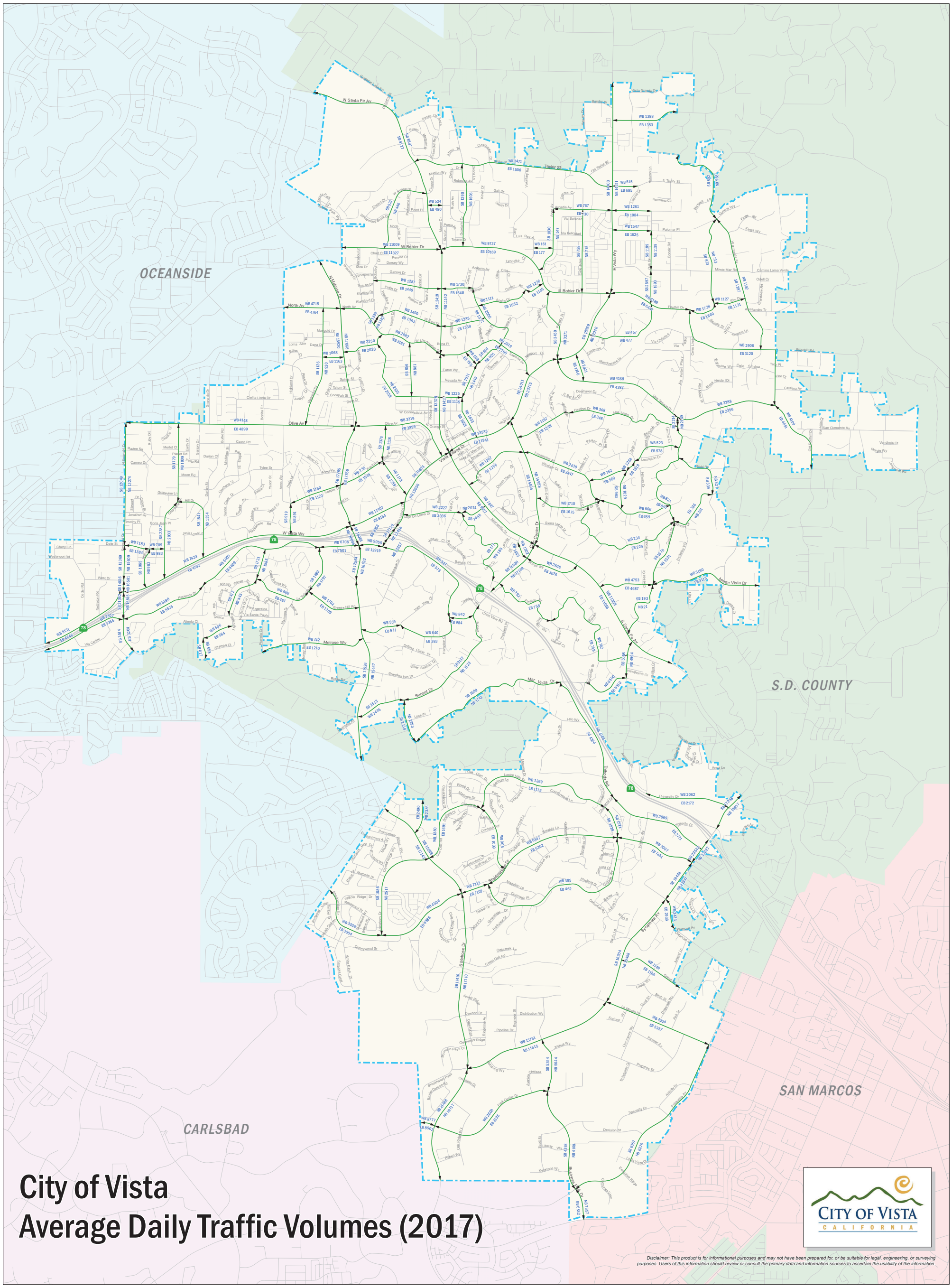
Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268
email: counts@countsunlimited.com



City of Vista
Vista Grande Drive
N/ Warmlands Avenue
24 Hour Directional Volume Count

VST002
Site Code: 003-21036

| Start | 1/21/2021 | Northbound | | Hour Totals | | Southbound | | Hour Totals | | Combined Totals | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Thu | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon |
| 12:00 | | 1 | 4 | | | 0 | 3 | | | | |
| 12:15 | | 0 | 3 | | | 0 | 1 | | | | |
| 12:30 | | 0 | 2 | | | 0 | 3 | | | | |
| 12:45 | | 0 | 3 | 1 | 12 | 0 | 1 | 0 | 8 | 1 | 20 |
| 01:00 | | 0 | 4 | | | 0 | 3 | | | | |
| 01:15 | | 0 | 2 | | | 0 | 3 | | | | |
| 01:30 | | 0 | 4 | | | 0 | 1 | | | | |
| 01:45 | | 0 | 6 | 0 | 16 | 0 | **8** | 0 | 15 | 0 | 31 |
| 02:00 | | 0 | 4 | | | 0 | **3** | | | | |
| 02:15 | | 0 | 6 | | | 0 | **8** | | | | |
| 02:30 | | 0 | 2 | | | 0 | **6** | | | | |
| 02:45 | | 0 | 5 | 0 | 17 | 0 | 3 | 0 | 20 | 0 | 37 |
| 03:00 | | 0 | 7 | | | 0 | 4 | | | | |
| 03:15 | | 0 | 1 | | | 0 | 1 | | | | |
| 03:30 | | 0 | 6 | | | 0 | 6 | | | | |
| 03:45 | | 0 | 3 | 0 | 17 | 1 | 4 | 1 | 15 | 1 | 32 |
| 04:00 | | 0 | 2 | | | 0 | 8 | | | | |
| 04:15 | | 0 | **3** | | | 0 | 1 | | | | |
| 04:30 | | 3 | **6** | | | 2 | 4 | | | | |
| 04:45 | | 0 | **8** | 3 | 19 | 3 | 1 | 5 | 14 | 8 | 33 |
| 05:00 | | 0 | **11** | | | 0 | 2 | | | | |
| 05:15 | | 0 | 3 | | | 1 | 5 | | | | |
| 05:30 | | 1 | 6 | | | 1 | 4 | | | | |
| 05:45 | | 2 | 6 | 3 | 26 | 4 | 4 | 6 | 15 | 9 | 41 |
| 06:00 | | 0 | 2 | | | 4 | 1 | | | | |
| 06:15 | | 2 | 4 | | | 6 | 2 | | | | |
| 06:30 | | 1 | 3 | | | 1 | 4 | | | | |
| 06:45 | | 1 | 1 | 4 | 10 | 4 | 1 | 15 | 8 | 19 | 18 |
| 07:00 | | 0 | 2 | | | 3 | 1 | | | | |
| 07:15 | | 4 | 2 | | | 3 | 1 | | | | |
| 07:30 | | 4 | 1 | | | 6 | 2 | | | | |
| 07:45 | | 2 | 5 | 10 | 10 | **5** | 4 | 17 | 8 | 27 | 18 |
| 08:00 | | 2 | 1 | | | **2** | 4 | | | | |
| 08:15 | | 2 | 0 | | | **4** | 1 | | | | |
| 08:30 | | 2 | 1 | | | **8** | 0 | | | | |
| 08:45 | | 3 | 0 | 9 | 2 | 1 | 0 | 15 | 5 | 24 | 7 |
| 09:00 | | 2 | 2 | | | 5 | 2 | | | | |
| 09:15 | | 1 | 0 | | | 3 | 0 | | | | |
| 09:30 | | 0 | 3 | | | 1 | 2 | | | | |
| 09:45 | | 3 | 0 | 6 | 5 | 4 | 2 | 13 | 6 | 19 | 11 |
| 10:00 | | 2 | 1 | | | 2 | 0 | | | | |
| 10:15 | | **6** | 1 | | | 6 | 0 | | | | |
| 10:30 | | **2** | 0 | | | 2 | 1 | | | | |
| 10:45 | | **4** | 1 | 14 | 3 | 2 | 0 | 12 | 1 | 26 | 4 |
| 11:00 | | **4** | 0 | | | 4 | 1 | | | | |
| 11:15 | | 2 | 0 | | | 3 | 1 | | | | |
| 11:30 | | 3 | 1 | | | 1 | 0 | | | | |
| 11:45 | | 2 | 0 | 11 | 1 | 4 | 0 | 12 | 2 | 23 | 3 |
| Total | | 61 | 138 | 61 | 138 | 96 | 117 | 96 | 117 | 157 | 255 |
| Combined Total | | 199 | | 199 | | 213 | | 213 | | 412 | |
| AM Peak | - | 10:15 | - | - | - | 07:45 | - | - | - | - | - |
| Vol. | - | 16 | - | - | - | 19 | - | - | - | - | - |
| P.H.F. | | 0.667 | | | | 0.594 | | | | | |
| PM Peak | - | - | 04:15 | - | - | - | 01:45 | - | - | - | - |
| Vol. | - | - | 28 | - | - | - | 25 | - | - | - | - |
| P.H.F. | | | 0.636 | | | | 0.781 | | | | |
| Percentage | | 30.7% | 69.3% | | | 45.1% | 54.9% | | | | |
| ADT/AADT | | ADT 412 | | AADT 412 | | | | | | | |




# City of Vista
# Average Daily Traffic Volumes (2017)

CITY OF VISTA
CALIFORNIA

*Disclaimer: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.*

| | Study Area | AM Peak Hour | | | | | | | | | | | | PM Peak Hour | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NBL | NBT | NBR | SBL | SBT | SBR | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | EBL | EBT | EBR | WBL | WBT | WBR |
| 1 | **East Vista Way/Gopher Canyon Road** | | | | | | | | | | | | | | | | | | | | | | | | |
| | Existing (COVID) Traffic Volumes | 0 | 320 | 213 | 183 | 452 | 0 | 1 | 0 | 0 | 382 | 1 | 168 | 1 | 528 | 383 | 268 | 467 | 0 | 0 | 0 | 1 | 329 | 1 | 217 |
| | Applied Growth | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% |
| | Existing (No-COVID) Traffic Volumes | 0 | 371 | 247 | 212 | 524 | 0 | 1 | 0 | 0 | 443 | 1 | 195 | 1 | 612 | 444 | 311 | 542 | 0 | 0 | 0 | 1 | 382 | 1 | 252 |
| | Project Trips | | 3 | 3 | | 1 | | | | | 1 | | | | 2 | 1 | | 4 | | 0 | | | 3 | | |
| | Existing Plus Project | 0 | 374 | 250 | 212 | 525 | 0 | 1 | 0 | 0 | 444 | 1 | 195 | 1 | 614 | 445 | 311 | 546 | 0 | 0 | 0 | 1 | 385 | 1 | 252 |
| 2 | **East Vista Way/Osborne Street** | | | | | | | | | | | | | | | | | | | | | | | | |
| | Existing (COVID) Traffic Volumes | 19 | 468 | 6 | 1 | 757 | 113 | 65 | 0 | 39 | 1 | 0 | 2 | 54 | 800 | 1 | 0 | 707 | 108 | 132 | 0 | 63 | 1 | 0 | 1 |
| | Applied Growth | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% |
| | Existing (No-COVID) Traffic Volumes | 22 | 543 | 7 | 1 | 878 | 131 | 75 | 0 | 45 | 1 | 0 | 2 | 63 | 928 | 1 | 0 | 820 | 125 | 153 | 0 | 73 | 1 | 0 | 1 |
| | Project Trips | 2 | 6 | | | 2 | | | | 1 | | | | 1 | 3 | | | 7 | | | | 3 | | | |
| | Existing Plus Project | 24 | 549 | 7 | 1 | 880 | 131 | 75 | 0 | 46 | 1 | 0 | 2 | 64 | 931 | 1 | 0 | 827 | 125 | 153 | 0 | 76 | 1 | 0 | 1 |
| 3 | **East Vista Way/Warmlands Avenue** | | | | | | | | | | | | | | | | | | | | | | | | |
| | Existing (COVID) Traffic Volumes | | 458 | 36 | 27 | 769 | | | | | 53 | | 44 | | 840 | 73 | 67 | 711 | | | | | 55 | | 51 |
| | Applied Growth | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% |
| | Existing (No-COVID) Traffic Volumes | 0 | 531 | 42 | 31 | 892 | 0 | 0 | 0 | 0 | 61 | 0 | 51 | 0 | 974 | 85 | 78 | 825 | 0 | 0 | 0 | 0 | 64 | 0 | 59 |
| | Project Trips | | | 4 | 3 | | | | | | 8 | | 8 | | | 10 | 10 | | | | | | 4 | | 4 |
| | Existing Plus Project | 0 | 531 | 46 | 34 | 892 | 0 | 0 | 0 | 0 | 69 | 0 | 59 | 0 | 974 | 95 | 88 | 825 | 0 | 0 | 0 | 0 | 68 | 0 | 63 |
| 4 | **Vista Way/Taylor Street** | | | | | | | | | | | | | | | | | | | | | | | | |
| | Existing (COVID) Traffic Volumes | 55 | 450 | 21 | 8 | 803 | 4 | 13 | 10 | 103 | 24 | 16 | 5 | 120 | 962 | 39 | 6 | 747 | 13 | 18 | 8 | 119 | 23 | 10 | 11 |
| | Applied Growth | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% | 16% |
| | Existing (No-COVID) Traffic Volumes | 64 | 522 | 24 | 9 | 931 | 5 | 15 | 12 | 119 | 28 | 19 | 6 | 139 | 1116 | 45 | 7 | 867 | 15 | 21 | 9 | 138 | 27 | 12 | 13 |
| | Project Trips | | 3 | | | 6 | 2 | 1 | | | | | | | 8 | | | 3 | 1 | 2 | | | | | |
| | Existing Plus Project | 64 | 525 | 24 | 9 | 937 | 7 | 16 | 12 | 119 | 28 | 19 | 6 | 139 | 1124 | 45 | 7 | 870 | 16 | 23 | 9 | 138 | 27 | 12 | 13 |

LSA

# Vista Grande Residential Project - Average Daily Traffic (ADT) Volumes

| | Roadway Segments | ADT Volume Data | | | | | | For Local Transportation Assessment Purposes | |
|---|---|---|---|---|---|---|---|---|---|
| | | SANDAG[1] (1997-2016) | | City[2] (2017) | New[3] (2021) | Percentage Change in ADT (Historical Trends) | | ADT Volume Adjustments[4] | Existing ADT Volumes[4] |
| 1 | E. Vista Way between Gopher Canyon Road and Osborne Street | 14,700 (1997) | 23,500 (2016) | N/A | 21,898 | 3.15%/year over 19 years (1997 to 2016) | -1.36%/year over 5 years (2016 to 2021) | 3.15%/year to 2016 ADT volume (15.75% total) or 16% to 2021 ADT volume | 27,200 or 25,400 |
| 2 | E. Vista Way between Osborne Street and Warmlands Avenue | 19,500 (2000) | 26,800 (2014) | 28,524 | N/A | 2.67%/year over 14 years (2000 to 2014) | 2.14%/year over 3 years (2014 to 2017) | 2.14%/year to 2017 ADT volume (8.56% total) | 31,000 |
| 3 | E. Vista Way between Warmlands Avenue and Taylor Street | 19,500 (2000) | 26,800 (2014) | 28,524 | N/A | 2.67%/year over 14 years (2000 to 2014) | 2.14%/year over 3 years (2014 to 2017) | 2.14%/year to 2017 ADT volume (8.56% total) | 31,000 |
| 4 | Warmlands Avenue east of Vista Way | N/A | N/A | 2,741 | N/A | N/A | N/A | 2.14%/year to 2017 ADT volume (8.56% total) | 3,000 |
| 5 | Vista Grande Drive north of Warmlands Avenue | N/A | N/A | N/A | 412 | N/A | N/A | 16% to 2021 ADT volume | 500 |

[1]Historical (1997-2016) ADT volumes from the San Diego Association of Governments (SANDAG) ADT volumes website (https://sandag.ms2soft.com/tcds/tsearch.asp?loc=Sandag&mod=TCDS).

[2] 2017 ADT volumes from the City of Vista ADT Map.

[3] 2021 ADT counts conducted by Counts Unlimited on Thursday, January 21, 2021.

[4] For Segments 1-4, ADT volume adjustments and existing ADT volumes are based on historical trends.

For Segments 1 and 5, ADT volume adjustments and existing ADT volumes are based on the SANDAG Hot Spots & Volumes Tracker (Tracker) (https://experience.arcgis.com/experience/82fcdaa5a1804337af609b1d8720d8d6).

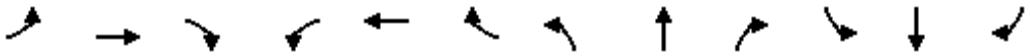
The Tracker shows that traffic volumes during COVID-19 (June to October 2020) were approximately 15%-16% lower than compared to 2019.

As such, a 16% growth rate was applied to the January 2021 ADT counts to account for traffic volume reductions from COVID-19.

N/A = not available

# APPENDIX C

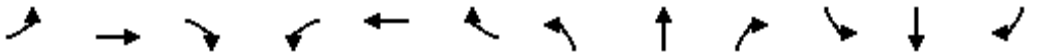
# HCM LEVEL OF SERVICE WORKSHEETS



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 1 | 0 | 0 | 443 | 1 | 195 | 0 | 371 | 247 | 212 | 524 | 0 |
| Future Volume (veh/h) | 1 | 0 | 0 | 443 | 1 | 195 | 0 | 371 | 247 | 212 | 524 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 0 |
| Adj Flow Rate, veh/h | 1 | 0 | 0 | 482 | 1 | 212 | 0 | 403 | 268 | 230 | 570 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 176 | 0 | 0 | 567 | 2 | 491 | 2 | 659 | 558 | 274 | 1061 | 0 |
| Arrive On Green | 0.07 | 0.00 | 0.00 | 0.18 | 0.31 | 0.31 | 0.00 | 0.35 | 0.35 | 0.15 | 0.57 | 0.00 |
| Sat Flow, veh/h | 1168 | 0 | 0 | 1781 | 7 | 1579 | 1781 | 1870 | 1585 | 1781 | 1870 | 0 |
| Grp Volume(v), veh/h | 1 | 0 | 0 | 482 | 0 | 213 | 0 | 403 | 268 | 230 | 570 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1169 | 0 | 0 | 1781 | 0 | 1586 | 1781 | 1870 | 1585 | 1781 | 1870 | 0 |
| Q Serve(g_s), s | 0.1 | 0.0 | 0.0 | 13.5 | 0.0 | 7.9 | 0.0 | 13.1 | 9.7 | 9.3 | 14.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.1 | 0.0 | 0.0 | 13.5 | 0.0 | 7.9 | 0.0 | 13.1 | 9.7 | 9.3 | 14.0 | 0.0 |
| Prop In Lane | 1.00 | | 0.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 176 | 0 | 0 | 567 | 0 | 493 | 2 | 659 | 558 | 274 | 1061 | 0 |
| V/C Ratio(X) | 0.01 | 0.00 | 0.00 | 0.85 | 0.00 | 0.43 | 0.00 | 0.61 | 0.48 | 0.84 | 0.54 | 0.00 |
| Avail Cap(c_a), veh/h | 383 | 0 | 0 | 567 | 0 | 774 | 121 | 659 | 558 | 350 | 1061 | 0 |
| 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 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 32.2 | 0.0 | 0.0 | 26.6 | 0.0 | 20.2 | 0.0 | 19.7 | 18.6 | 30.3 | 9.9 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 0.0 | 11.8 | 0.0 | 0.6 | 0.0 | 4.2 | 2.9 | 13.3 | 2.0 | 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 | 0.0 | 0.0 | 0.0 | 9.7 | 0.0 | 2.8 | 0.0 | 6.1 | 3.8 | 4.8 | 5.5 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 32.2 | 0.0 | 0.0 | 38.3 | 0.0 | 20.8 | 0.0 | 23.9 | 21.6 | 43.7 | 11.9 | 0.0 |
| LnGrp LOS | C | A | A | D | A | C | A | C | C | D | B | A |
| Approach Vol, veh/h | | 1 | | | 695 | | | 671 | | | 800 | |
| Approach Delay, s/veh | | 32.2 | | | 33.0 | | | 23.0 | | | 21.0 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 15.9 | 30.5 | 18.0 | 9.4 | 0.0 | 46.4 | | 27.4 | | | | |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | 14.5 | 26.0 | 13.5 | 18.0 | 5.0 | 35.5 | | 36.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 11.3 | 15.1 | 15.5 | 2.1 | 0.0 | 16.0 | | 9.9 | | | | |
| Green Ext Time (p_c), s | 0.2 | 2.7 | 0.0 | 0.0 | 0.0 | 3.7 | | 1.4 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HCM 6th Ctrl Delay | | | 25.5 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 75 | 0 | 46 | 1 | 0 | 2 | 22 | 543 | 7 | 1 | 878 | 131 |
| Future Volume (veh/h) | 75 | 0 | 46 | 1 | 0 | 2 | 22 | 543 | 7 | 1 | 878 | 131 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 82 | 0 | 50 | 1 | 0 | 2 | 24 | 590 | 8 | 1 | 954 | 142 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 460 | 0 | 369 | 0 | 0 | 87 | 52 | 827 | 11 | 4 | 789 | 668 |
| Arrive On Green | 0.07 | 0.00 | 0.23 | 0.00 | 0.00 | 0.05 | 0.03 | 0.45 | 0.45 | 0.00 | 0.42 | 0.42 |
| Sat Flow, veh/h | 1781 | 0 | 1585 | 0 | 0 | 1585 | 1781 | 1841 | 25 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 82 | 0 | 50 | 0 | 0 | 2 | 24 | 0 | 598 | 1 | 954 | 142 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1585 | 0 | 0 | 1585 | 1781 | 0 | 1866 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 1.7 | 0.0 | 1.1 | 0.0 | 0.0 | 0.1 | 0.6 | 0.0 | 11.1 | 0.0 | 18.0 | 2.4 |
| Cycle Q Clear(g_c), s | 1.7 | 0.0 | 1.1 | 0.0 | 0.0 | 0.1 | 0.6 | 0.0 | 11.1 | 0.0 | 18.0 | 2.4 |
| Prop In Lane | 1.00 | | 1.00 | 0.00 | | 1.00 | 1.00 | | 0.01 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 460 | 0 | 369 | 0 | 0 | 87 | 52 | 0 | 838 | 4 | 789 | 668 |
| V/C Ratio(X) | 0.18 | 0.00 | 0.14 | 0.00 | 0.00 | 0.02 | 0.46 | 0.00 | 0.71 | 0.24 | 1.21 | 0.21 |
| Avail Cap(c_a), veh/h | 539 | 0 | 668 | 0 | 0 | 668 | 209 | 0 | 838 | 209 | 789 | 668 |
| 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 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 15.2 | 0.0 | 13.0 | 0.0 | 0.0 | 19.1 | 20.4 | 0.0 | 9.5 | 21.3 | 12.3 | 7.8 |
| Incr Delay (d2), s/veh | 0.2 | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 6.4 | 0.0 | 5.1 | 27.2 | 105.9 | 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 | 0.3 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 4.4 | 0.0 | 28.6 | 0.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.4 | 0.0 | 13.1 | 0.0 | 0.0 | 19.2 | 26.8 | 0.0 | 14.7 | 48.5 | 118.3 | 8.6 |
| LnGrp LOS | B | A | B | A | A | B | C | A | B | D | F | A |
| Approach Vol, veh/h | | 132 | | | 2 | | | 622 | | | 1097 | |
| Approach Delay, s/veh | | 14.6 | | | 19.2 | | | 15.1 | | | 104.0 | |
| Approach LOS | | B | | | B | | | B | | | F | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 4.6 | 23.7 | 0.0 | 14.4 | 5.7 | 22.5 | 7.6 | 6.8 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 5.0 | 18.0 | 5.0 | 18.0 | 5.0 | 18.0 | 5.0 | 18.0 |
| Max Q Clear Time (g_c+I1), s | 2.0 | 13.1 | 0.0 | 3.1 | 2.6 | 20.0 | 3.7 | 2.1 |
| Green Ext Time (p_c), s | 0.0 | 1.7 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 67.7 |
| HCM 6th LOS | E |

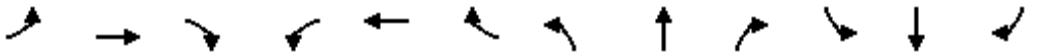
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 61 | 51 | 531 | 42 | 31 | 892 |
| Future Volume (veh/h) | 61 | 51 | 531 | 42 | 31 | 892 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 66 | 55 | 577 | 46 | 34 | 970 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 83 | 69 | 1204 | 1020 | 65 | 1415 |
| Arrive On Green | 0.09 | 0.09 | 0.64 | 0.64 | 0.04 | 0.76 |
| Sat Flow, veh/h | 913 | 761 | 1870 | 1585 | 1781 | 1870 |
| Grp Volume(v), veh/h | 122 | 0 | 577 | 46 | 34 | 970 |
| Grp Sat Flow(s),veh/h/ln | 1688 | 0 | 1870 | 1585 | 1781 | 1870 |
| Q Serve(g_s), s | 4.2 | 0.0 | 9.4 | 0.6 | 1.1 | 15.4 |
| Cycle Q Clear(g_c), s | 4.2 | 0.0 | 9.4 | 0.6 | 1.1 | 15.4 |
| Prop In Lane | 0.54 | 0.45 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 153 | 0 | 1204 | 1020 | 65 | 1415 |
| V/C Ratio(X) | 0.80 | 0.00 | 0.48 | 0.05 | 0.53 | 0.69 |
| Avail Cap(c_a), veh/h | 186 | 0 | 1204 | 1020 | 163 | 1415 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 26.2 | 0.0 | 5.4 | 3.8 | 27.9 | 3.6 |
| Incr Delay (d2), s/veh | 17.7 | 0.0 | 1.4 | 0.1 | 6.5 | 2.7 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.3 | 0.0 | 2.9 | 0.2 | 0.6 | 3.3 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 43.9 | 0.0 | 6.8 | 3.9 | 34.4 | 6.4 |
| LnGrp LOS | D | A | A | A | C | A |
| Approach Vol, veh/h | 122 | | 623 | | | 1004 |
| Approach Delay, s/veh | 43.9 | | 6.6 | | | 7.3 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | 1 | 2 | | | 6 | 8 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 6.6 | 42.4 | | | 49.0 | 9.8 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 5.4 | 34.6 | | | 44.5 | 6.5 |
| Max Q Clear Time (g_c+I1), s | 3.1 | 11.4 | | | 17.4 | 6.2 |
| Green Ext Time (p_c), s | 0.0 | 4.1 | | | 9.1 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 9.6 |
| HCM 6th LOS | A |

# HCM 6th Signalized Intersection Summary
## 4: Vista Way & Taylor Street /Taylor Street

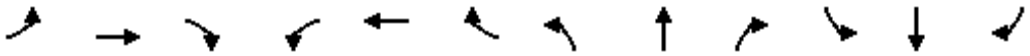
01/29/2021



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 15 | 12 | 119 | 28 | 19 | 6 | 64 | 522 | 24 | 9 | 931 | 5 |
| Future Volume (veh/h) | 15 | 12 | 119 | 28 | 19 | 6 | 64 | 522 | 24 | 9 | 931 | 5 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 16 | 13 | 129 | 30 | 21 | 7 | 70 | 567 | 26 | 10 | 1012 | 5 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 361 | 21 | 211 | 257 | 194 | 65 | 120 | 2526 | 115 | 23 | 1633 | 8 |
| Arrive On Green | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.07 | 0.50 | 0.50 | 0.01 | 0.45 | 0.45 |
| Sat Flow, veh/h | 1382 | 147 | 1460 | 1246 | 1342 | 447 | 1781 | 5005 | 228 | 1781 | 3626 | 18 |
| Grp Volume(v), veh/h | 16 | 0 | 142 | 30 | 0 | 28 | 70 | 385 | 208 | 10 | 496 | 521 |
| Grp Sat Flow(s),veh/h/ln | 1382 | 0 | 1607 | 1246 | 0 | 1790 | 1781 | 1702 | 1829 | 1781 | 1777 | 1867 |
| Q Serve(g_s), s | 0.4 | 0.0 | 3.3 | 0.9 | 0.0 | 0.5 | 1.5 | 2.5 | 2.5 | 0.2 | 8.5 | 8.5 |
| Cycle Q Clear(g_c), s | 1.0 | 0.0 | 3.3 | 4.2 | 0.0 | 0.5 | 1.5 | 2.5 | 2.5 | 0.2 | 8.5 | 8.5 |
| Prop In Lane | 1.00 | | 0.91 | 1.00 | | 0.25 | 1.00 | | 0.12 | 1.00 | | 0.01 |
| Lane Grp Cap(c), veh/h | 361 | 0 | 232 | 257 | 0 | 258 | 120 | 1718 | 923 | 23 | 800 | 841 |
| V/C Ratio(X) | 0.04 | 0.00 | 0.61 | 0.12 | 0.00 | 0.11 | 0.58 | 0.22 | 0.23 | 0.43 | 0.62 | 0.62 |
| Avail Cap(c_a), veh/h | 784 | 0 | 724 | 638 | 0 | 806 | 223 | 1718 | 923 | 223 | 800 | 841 |
| 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 | 15.3 | 0.0 | 16.0 | 18.0 | 0.0 | 14.9 | 18.1 | 5.5 | 5.5 | 19.6 | 8.4 | 8.4 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 2.6 | 0.2 | 0.0 | 0.2 | 4.4 | 0.3 | 0.6 | 11.8 | 3.6 | 3.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.1 | 0.0 | 1.2 | 0.2 | 0.0 | 0.2 | 0.7 | 0.6 | 0.8 | 0.2 | 3.0 | 3.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.3 | 0.0 | 18.6 | 18.2 | 0.0 | 15.0 | 22.5 | 5.8 | 6.1 | 31.4 | 12.0 | 11.8 |
| LnGrp LOS | B | A | B | B | A | B | C | A | A | C | B | B |
| Approach Vol, veh/h | | 158 | | | 58 | | | 663 | | | 1027 | |
| Approach Delay, s/veh | | 18.3 | | | 16.7 | | | 7.7 | | | 12.1 | |
| Approach LOS | | B | | | B | | | A | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.0 | 24.7 | | 10.3 | 7.2 | 22.5 | | 10.3 | | | | |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 18.0 | | 18.0 | 5.0 | 18.0 | | 18.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.2 | 4.5 | | 5.3 | 3.5 | 10.5 | | 6.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.2 | | 0.6 | 0.0 | 3.8 | | 0.1 | | | | |

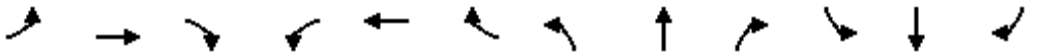
| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 11.2 | |
| HCM 6th LOS | | B | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 1 | 382 | 1 | 252 | 1 | 612 | 444 | 311 | 542 | 0 |
| Future Volume (veh/h) | 0 | 0 | 1 | 382 | 1 | 252 | 1 | 612 | 444 | 311 | 542 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 0 |
| Adj Flow Rate, veh/h | 0 | 0 | 1 | 415 | 1 | 274 | 1 | 665 | 483 | 338 | 589 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 0 | 0 | 103 | 497 | 2 | 472 | 2 | 632 | 535 | 335 | 981 | 0 |
| Arrive On Green | 0.00 | 0.00 | 0.06 | 0.18 | 0.30 | 0.30 | 0.00 | 0.34 | 0.34 | 0.19 | 0.52 | 0.00 |
| Sat Flow, veh/h | 0 | 0 | 1585 | 1781 | 6 | 1580 | 1781 | 1870 | 1585 | 1781 | 1870 | 0 |
| Grp Volume(v), veh/h | 0 | 0 | 1 | 415 | 0 | 275 | 1 | 665 | 483 | 338 | 589 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 0 | 1585 | 1781 | 0 | 1586 | 1781 | 1870 | 1585 | 1781 | 1870 | 0 |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 13.5 | 0.0 | 11.3 | 0.0 | 26.0 | 22.3 | 14.5 | 16.8 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 13.5 | 0.0 | 11.3 | 0.0 | 26.0 | 22.3 | 14.5 | 16.8 | 0.0 |
| Prop In Lane | 0.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 0 | 103 | 497 | 0 | 474 | 2 | 632 | 535 | 335 | 981 | 0 |
| V/C Ratio(X) | 0.00 | 0.00 | 0.01 | 0.84 | 0.00 | 0.58 | 0.41 | 1.05 | 0.90 | 1.01 | 0.60 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 0 | 371 | 497 | 0 | 742 | 116 | 632 | 535 | 335 | 981 | 0 |
| 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) | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 33.7 | 27.6 | 0.0 | 22.9 | 38.4 | 25.5 | 24.3 | 31.2 | 12.7 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 0.0 | 11.8 | 0.0 | 1.1 | 83.5 | 50.5 | 21.0 | 51.0 | 2.7 | 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 | 0.0 | 0.0 | 0.0 | 8.9 | 0.0 | 4.2 | 0.1 | 19.6 | 10.9 | 10.7 | 7.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 0.0 | 33.7 | 39.4 | 0.0 | 24.0 | 121.9 | 76.0 | 45.3 | 82.3 | 15.4 | 0.0 |
| LnGrp LOS | A | A | C | D | A | C | F | F | D | F | B | A |
| Approach Vol, veh/h | | 1 | | | 690 | | | 1149 | | | 927 | |
| Approach Delay, s/veh | | 33.7 | | | 33.3 | | | 63.1 | | | 39.8 | |
| Approach LOS | | C | | | C | | | E | | | D | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 19.0 | 30.5 | 18.0 | 9.5 | 4.6 | 44.9 | | 27.5 | | | | |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | 14.5 | 26.0 | 13.5 | 18.0 | 5.0 | 35.5 | | 36.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 16.5 | 28.0 | 15.5 | 2.0 | 2.0 | 18.8 | | 13.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.6 | | 1.8 | | | | |

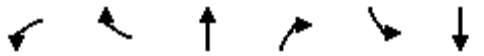
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 47.8 |
| HCM 6th LOS | D |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 153 | 0 | 76 | 1 | 0 | 1 | 63 | 931 | 1 | 0 | 827 | 125 |
| Future Volume (veh/h) | 153 | 0 | 76 | 1 | 0 | 1 | 63 | 931 | 1 | 0 | 827 | 125 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 166 | 0 | 83 | 1 | 0 | 1 | 68 | 1012 | 1 | 0 | 899 | 136 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 517 | 0 | 431 | 0 | 0 | 113 | 111 | 1005 | 1 | 4 | 711 | 603 |
| Arrive On Green | 0.11 | 0.00 | 0.27 | 0.00 | 0.00 | 0.07 | 0.06 | 0.54 | 0.54 | 0.00 | 0.38 | 0.38 |
| Sat Flow, veh/h | 1781 | 0 | 1585 | 0 | 0 | 1585 | 1781 | 1868 | 2 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 166 | 0 | 83 | 0 | 0 | 1 | 68 | 0 | 1013 | 0 | 899 | 136 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1585 | 0 | 0 | 1585 | 1781 | 0 | 1870 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 3.8 | 0.0 | 1.9 | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | 25.5 | 0.0 | 18.0 | 2.8 |
| Cycle Q Clear(g_c), s | 3.8 | 0.0 | 1.9 | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | 25.5 | 0.0 | 18.0 | 2.8 |
| Prop In Lane | 1.00 | | 1.00 | 0.00 | | 1.00 | 1.00 | | 0.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 517 | 0 | 431 | 0 | 0 | 113 | 111 | 0 | 1006 | 4 | 711 | 603 |
| V/C Ratio(X) | 0.32 | 0.00 | 0.19 | 0.00 | 0.00 | 0.01 | 0.61 | 0.00 | 1.01 | 0.00 | 1.26 | 0.23 |
| Avail Cap(c_a), veh/h | 517 | 0 | 603 | 0 | 0 | 603 | 188 | 0 | 1006 | 188 | 711 | 603 |
| 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 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 15.9 | 0.0 | 13.2 | 0.0 | 0.0 | 20.4 | 21.6 | 0.0 | 10.9 | 0.0 | 14.7 | 9.9 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 5.3 | 0.0 | 30.1 | 0.0 | 129.7 | 0.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.4 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 15.3 | 0.0 | 31.7 | 0.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 16.3 | 0.0 | 13.5 | 0.0 | 0.0 | 20.5 | 27.0 | 0.0 | 41.0 | 0.0 | 144.4 | 10.8 |
| LnGrp LOS | B | A | B | A | A | C | C | A | F | A | F | B |
| Approach Vol, veh/h | | 249 | | | 1 | | | 1081 | | | 1035 | |
| Approach Delay, s/veh | | 15.3 | | | 20.5 | | | 40.1 | | | 126.8 | |
| Approach LOS | | B | | | C | | | D | | | F | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 0.0 | 30.0 | 0.0 | 17.4 | 7.5 | 22.5 | 9.5 | 7.9 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 5.0 | 18.0 | 5.0 | 18.0 | 5.0 | 18.0 | 5.0 | 18.0 |
| Max Q Clear Time (g_c+I1), s | 0.0 | 27.5 | 0.0 | 3.9 | 3.8 | 20.0 | 5.8 | 2.0 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |

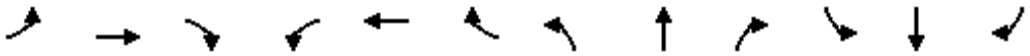
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 75.4 |
| HCM 6th LOS | E |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 64 | 59 | 974 | 85 | 78 | 825 |
| Future Volume (veh/h) | 64 | 59 | 974 | 85 | 78 | 825 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 70 | 64 | 1059 | 92 | 85 | 897 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 87 | 80 | 1140 | 966 | 113 | 1400 |
| Arrive On Green | 0.10 | 0.10 | 0.61 | 0.61 | 0.06 | 0.75 |
| Sat Flow, veh/h | 873 | 798 | 1870 | 1585 | 1781 | 1870 |
| Grp Volume(v), veh/h | 135 | 0 | 1059 | 92 | 85 | 897 |
| Grp Sat Flow(s),veh/h/ln | 1683 | 0 | 1870 | 1585 | 1781 | 1870 |
| Q Serve(g_s), s | 4.7 | 0.0 | 30.3 | 1.4 | 2.8 | 13.8 |
| Cycle Q Clear(g_c), s | 4.7 | 0.0 | 30.3 | 1.4 | 2.8 | 13.8 |
| Prop In Lane | 0.52 | 0.47 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 168 | 0 | 1140 | 966 | 113 | 1400 |
| V/C Ratio(X) | 0.80 | 0.00 | 0.93 | 0.10 | 0.75 | 0.64 |
| Avail Cap(c_a), veh/h | 184 | 0 | 1140 | 966 | 162 | 1400 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 26.2 | 0.0 | 10.5 | 4.8 | 27.4 | 3.6 |
| Incr Delay (d2), s/veh | 20.5 | 0.0 | 14.3 | 0.2 | 11.2 | 2.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.7 | 0.0 | 13.3 | 0.4 | 1.5 | 3.1 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 46.6 | 0.0 | 24.7 | 5.0 | 38.6 | 5.9 |
| LnGrp LOS | D | A | C | A | D | A |
| Approach Vol, veh/h | 135 | | 1151 | | | 982 |
| Approach Delay, s/veh | 46.6 | | 23.2 | | | 8.7 |
| Approach LOS | D | | C | | | A |

| Timer - Assigned Phs | 1 | 2 | | | 6 | 8 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.3 | 40.7 | | | 49.0 | 10.4 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 5.4 | 34.6 | | | 44.5 | 6.5 |
| Max Q Clear Time (g_c+I1), s | 4.8 | 32.3 | | | 15.8 | 6.7 |
| Green Ext Time (p_c), s | 0.0 | 1.7 | | | 8.2 | 0.0 |

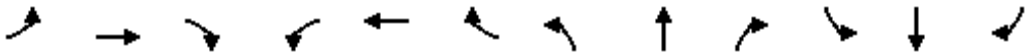
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 18.3 |
| HCM 6th LOS | B |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 21 | 9 | 138 | 27 | 12 | 13 | 139 | 1116 | 45 | 7 | 867 | 15 |
| Future Volume (veh/h) | 21 | 9 | 138 | 27 | 12 | 13 | 139 | 1116 | 45 | 7 | 867 | 15 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 23 | 10 | 150 | 29 | 13 | 14 | 151 | 1213 | 49 | 8 | 942 | 16 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 365 | 16 | 234 | 245 | 128 | 138 | 192 | 2608 | 105 | 19 | 1504 | 26 |
| Arrive On Green | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.11 | 0.52 | 0.52 | 0.01 | 0.42 | 0.42 |
| Sat Flow, veh/h | 1383 | 100 | 1500 | 1226 | 824 | 887 | 1781 | 5034 | 203 | 1781 | 3576 | 61 |
| Grp Volume(v), veh/h | 23 | 0 | 160 | 29 | 0 | 27 | 151 | 820 | 442 | 8 | 468 | 490 |
| Grp Sat Flow(s),veh/h/ln | 1383 | 0 | 1600 | 1226 | 0 | 1711 | 1781 | 1702 | 1834 | 1781 | 1777 | 1859 |
| Q Serve(g_s), s | 0.6 | 0.0 | 4.0 | 1.0 | 0.0 | 0.6 | 3.5 | 6.5 | 6.5 | 0.2 | 8.9 | 8.9 |
| Cycle Q Clear(g_c), s | 1.2 | 0.0 | 4.0 | 5.0 | 0.0 | 0.6 | 3.5 | 6.5 | 6.5 | 0.2 | 8.9 | 8.9 |
| Prop In Lane | 1.00 | | 0.94 | 1.00 | | 0.52 | 1.00 | | 0.11 | 1.00 | | 0.03 |
| Lane Grp Cap(c), veh/h | 365 | 0 | 250 | 245 | 0 | 267 | 192 | 1763 | 950 | 19 | 747 | 782 |
| V/C Ratio(X) | 0.06 | 0.00 | 0.64 | 0.12 | 0.00 | 0.10 | 0.79 | 0.47 | 0.47 | 0.42 | 0.63 | 0.63 |
| Avail Cap(c_a), veh/h | 731 | 0 | 673 | 569 | 0 | 720 | 208 | 1763 | 950 | 208 | 747 | 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 | 16.0 | 0.0 | 16.9 | 19.3 | 0.0 | 15.5 | 18.6 | 6.5 | 6.5 | 21.0 | 9.7 | 9.7 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 2.7 | 0.2 | 0.0 | 0.2 | 16.7 | 0.9 | 1.6 | 14.4 | 3.9 | 3.8 |
| 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 | 0.0 | 1.5 | 0.3 | 0.0 | 0.2 | 2.2 | 1.8 | 2.1 | 0.1 | 3.4 | 3.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 16.1 | 0.0 | 19.7 | 19.5 | 0.0 | 15.7 | 35.3 | 7.4 | 8.2 | 35.4 | 13.7 | 13.5 |
| LnGrp LOS | B | A | B | B | A | B | D | A | A | D | B | B |
| Approach Vol, veh/h | | 183 | | | 56 | | | 1413 | | | 966 | |
| Approach Delay, s/veh | | 19.2 | | | 17.6 | | | 10.6 | | | 13.8 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.0 | 26.7 | | 11.2 | 9.1 | 22.5 | | 11.2 | | | | |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 18.0 | | 18.0 | 5.0 | 18.0 | | 18.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.2 | 8.5 | | 6.0 | 5.5 | 10.9 | | 7.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.5 | | 0.7 | 0.0 | 3.4 | | 0.1 | | | | |

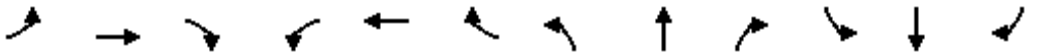
| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 12.6 | |
| HCM 6th LOS | | B | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 1 | 0 | 0 | 444 | 1 | 195 | 0 | 374 | 250 | 212 | 525 | 0 |
| Future Volume (veh/h) | 1 | 0 | 0 | 444 | 1 | 195 | 0 | 374 | 250 | 212 | 525 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 0 |
| Adj Flow Rate, veh/h | 1 | 0 | 0 | 483 | 1 | 212 | 0 | 407 | 272 | 230 | 571 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 176 | 0 | 0 | 567 | 2 | 491 | 2 | 659 | 558 | 274 | 1061 | 0 |
| Arrive On Green | 0.07 | 0.00 | 0.00 | 0.18 | 0.31 | 0.31 | 0.00 | 0.35 | 0.35 | 0.15 | 0.57 | 0.00 |
| Sat Flow, veh/h | 1168 | 0 | 0 | 1781 | 7 | 1579 | 1781 | 1870 | 1585 | 1781 | 1870 | 0 |
| Grp Volume(v), veh/h | 1 | 0 | 0 | 483 | 0 | 213 | 0 | 407 | 272 | 230 | 571 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1169 | 0 | 0 | 1781 | 0 | 1586 | 1781 | 1870 | 1585 | 1781 | 1870 | 0 |
| Q Serve(g_s), s | 0.1 | 0.0 | 0.0 | 13.5 | 0.0 | 7.9 | 0.0 | 13.3 | 9.9 | 9.3 | 14.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.1 | 0.0 | 0.0 | 13.5 | 0.0 | 7.9 | 0.0 | 13.3 | 9.9 | 9.3 | 14.0 | 0.0 |
| Prop In Lane | 1.00 | | 0.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 176 | 0 | 0 | 567 | 0 | 493 | 2 | 659 | 558 | 274 | 1061 | 0 |
| V/C Ratio(X) | 0.01 | 0.00 | 0.00 | 0.85 | 0.00 | 0.43 | 0.00 | 0.62 | 0.49 | 0.84 | 0.54 | 0.00 |
| Avail Cap(c_a), veh/h | 383 | 0 | 0 | 567 | 0 | 774 | 121 | 659 | 558 | 350 | 1061 | 0 |
| 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 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 32.2 | 0.0 | 0.0 | 26.6 | 0.0 | 20.2 | 0.0 | 19.8 | 18.7 | 30.3 | 9.9 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 0.0 | 11.9 | 0.0 | 0.6 | 0.0 | 4.3 | 3.0 | 13.3 | 2.0 | 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 | 0.0 | 0.0 | 0.0 | 9.8 | 0.0 | 2.8 | 0.0 | 6.2 | 3.9 | 4.8 | 5.5 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 32.2 | 0.0 | 0.0 | 38.5 | 0.0 | 20.8 | 0.0 | 24.1 | 21.7 | 43.7 | 11.9 | 0.0 |
| LnGrp LOS | C | A | A | D | A | C | A | C | C | D | B | A |
| Approach Vol, veh/h | | 1 | | | 696 | | | 679 | | | 801 | |
| Approach Delay, s/veh | | 32.2 | | | 33.1 | | | 23.1 | | | 21.0 | |
| Approach LOS | | C | | | C | | | C | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 15.9 | 30.5 | 18.0 | 9.4 | 0.0 | 46.4 | | 27.4 | | | | |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | 14.5 | 26.0 | 13.5 | 18.0 | 5.0 | 35.5 | | 36.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 11.3 | 15.3 | 15.5 | 2.1 | 0.0 | 16.0 | | 9.9 | | | | |
| Green Ext Time (p_c), s | 0.2 | 2.7 | 0.0 | 0.0 | 0.0 | 3.7 | | 1.4 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 25.5 | |
| HCM 6th LOS | | C | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 75 | 0 | 46 | 1 | 0 | 2 | 24 | 549 | 7 | 1 | 880 | 131 |
| Future Volume (veh/h) | 75 | 0 | 46 | 1 | 0 | 2 | 24 | 549 | 7 | 1 | 880 | 131 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 82 | 0 | 50 | 1 | 0 | 2 | 26 | 597 | 8 | 1 | 957 | 142 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 459 | 0 | 369 | 0 | 0 | 87 | 55 | 829 | 11 | 4 | 787 | 667 |
| Arrive On Green | 0.07 | 0.00 | 0.23 | 0.00 | 0.00 | 0.05 | 0.03 | 0.45 | 0.45 | 0.00 | 0.42 | 0.42 |
| Sat Flow, veh/h | 1781 | 0 | 1585 | 0 | 0 | 1585 | 1781 | 1841 | 25 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 82 | 0 | 50 | 0 | 0 | 2 | 26 | 0 | 605 | 1 | 957 | 142 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1585 | 0 | 0 | 1585 | 1781 | 0 | 1866 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 1.7 | 0.0 | 1.1 | 0.0 | 0.0 | 0.1 | 0.6 | 0.0 | 11.3 | 0.0 | 18.0 | 2.4 |
| Cycle Q Clear(g_c), s | 1.7 | 0.0 | 1.1 | 0.0 | 0.0 | 0.1 | 0.6 | 0.0 | 11.3 | 0.0 | 18.0 | 2.4 |
| Prop In Lane | 1.00 | | 1.00 | 0.00 | | 1.00 | 1.00 | | 0.01 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 459 | 0 | 369 | 0 | 0 | 87 | 55 | 0 | 841 | 4 | 787 | 667 |
| V/C Ratio(X) | 0.18 | 0.00 | 0.14 | 0.00 | 0.00 | 0.02 | 0.47 | 0.00 | 0.72 | 0.24 | 1.22 | 0.21 |
| Avail Cap(c_a), veh/h | 538 | 0 | 667 | 0 | 0 | 667 | 208 | 0 | 841 | 208 | 787 | 667 |
| 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 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 15.3 | 0.0 | 13.0 | 0.0 | 0.0 | 19.1 | 20.4 | 0.0 | 9.6 | 21.3 | 12.4 | 7.9 |
| Incr Delay (d2), s/veh | 0.2 | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 6.1 | 0.0 | 5.3 | 27.3 | 108.7 | 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 | 0.3 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 4.5 | 0.0 | 29.2 | 0.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.5 | 0.0 | 13.2 | 0.0 | 0.0 | 19.2 | 26.5 | 0.0 | 14.8 | 48.7 | 121.1 | 8.6 |
| LnGrp LOS | B | A | B | A | A | B | C | A | B | D | F | A |
| Approach Vol, veh/h | | 132 | | | 2 | | | 631 | | | 1100 | |
| Approach Delay, s/veh | | 14.6 | | | 19.2 | | | 15.3 | | | 106.5 | |
| Approach LOS | | B | | | B | | | B | | | F | |

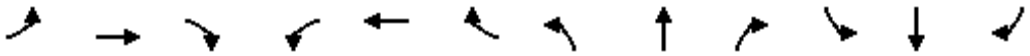
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 4.6 | 23.8 | 0.0 | 14.4 | 5.8 | 22.5 | 7.6 | 6.8 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 5.0 | 18.0 | 5.0 | 18.0 | 5.0 | 18.0 | 5.0 | 18.0 |
| Max Q Clear Time (g_c+I1), s | 2.0 | 13.3 | 0.0 | 3.1 | 2.6 | 20.0 | 3.7 | 2.1 |
| Green Ext Time (p_c), s | 0.0 | 1.7 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |

| Intersection Summary | | |
|---|---|---|
| HCM 6th Ctrl Delay | | 69.1 |
| HCM 6th LOS | | E |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 69 | 59 | 531 | 46 | 34 | 892 |
| Future Volume (veh/h) | 69 | 59 | 531 | 46 | 34 | 892 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 75 | 64 | 577 | 50 | 37 | 970 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 93 | 80 | 1182 | 1002 | 68 | 1395 |
| Arrive On Green | 0.10 | 0.10 | 0.63 | 0.63 | 0.04 | 0.75 |
| Sat Flow, veh/h | 903 | 771 | 1870 | 1585 | 1781 | 1870 |
| Grp Volume(v), veh/h | 140 | 0 | 577 | 50 | 37 | 970 |
| Grp Sat Flow(s),veh/h/ln | 1686 | 0 | 1870 | 1585 | 1781 | 1870 |
| Q Serve(g_s), s | 4.8 | 0.0 | 9.8 | 0.7 | 1.2 | 16.3 |
| Cycle Q Clear(g_c), s | 4.8 | 0.0 | 9.8 | 0.7 | 1.2 | 16.3 |
| Prop In Lane | 0.54 | 0.46 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 174 | 0 | 1182 | 1002 | 68 | 1395 |
| V/C Ratio(X) | 0.80 | 0.00 | 0.49 | 0.05 | 0.54 | 0.70 |
| Avail Cap(c_a), veh/h | 184 | 0 | 1182 | 1002 | 161 | 1395 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 26.2 | 0.0 | 5.8 | 4.2 | 28.2 | 4.0 |
| Incr Delay (d2), s/veh | 21.2 | 0.0 | 1.4 | 0.1 | 6.5 | 2.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 2.9 | 0.0 | 3.2 | 0.2 | 0.6 | 3.8 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 47.4 | 0.0 | 7.3 | 4.3 | 34.7 | 6.9 |
| LnGrp LOS | D | A | A | A | C | A |
| Approach Vol, veh/h | 140 | | 627 | | | 1007 |
| Approach Delay, s/veh | 47.4 | | 7.0 | | | 7.9 |
| Approach LOS | D | | A | | | A |

| Timer - Assigned Phs | 1 | 2 | | | | 6 | 8 |
|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 6.8 | 42.2 | | | | 49.0 | 10.7 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | | | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 5.4 | 34.6 | | | | 44.5 | 6.5 |
| Max Q Clear Time (g_c+I1), s | 3.2 | 11.8 | | | | 18.3 | 6.8 |
| Green Ext Time (p_c), s | 0.0 | 4.1 | | | | 9.0 | 0.0 |

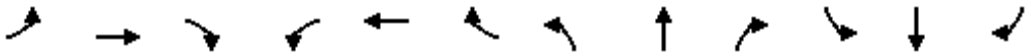
| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 10.7 |
| HCM 6th LOS | B |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 16 | 12 | 119 | 28 | 19 | 6 | 64 | 525 | 24 | 9 | 937 | 7 |
| Future Volume (veh/h) | 16 | 12 | 119 | 28 | 19 | 6 | 64 | 525 | 24 | 9 | 937 | 7 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 17 | 13 | 129 | 30 | 21 | 7 | 70 | 571 | 26 | 10 | 1018 | 8 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 361 | 21 | 211 | 257 | 194 | 65 | 120 | 2527 | 114 | 23 | 1627 | 13 |
| Arrive On Green | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.07 | 0.50 | 0.50 | 0.01 | 0.45 | 0.45 |
| Sat Flow, veh/h | 1382 | 147 | 1460 | 1246 | 1342 | 447 | 1781 | 5007 | 227 | 1781 | 3614 | 28 |
| Grp Volume(v), veh/h | 17 | 0 | 142 | 30 | 0 | 28 | 70 | 387 | 210 | 10 | 501 | 525 |
| Grp Sat Flow(s),veh/h/ln | 1382 | 0 | 1607 | 1246 | 0 | 1790 | 1781 | 1702 | 1830 | 1781 | 1777 | 1865 |
| Q Serve(g_s), s | 0.4 | 0.0 | 3.3 | 0.9 | 0.0 | 0.5 | 1.5 | 2.5 | 2.6 | 0.2 | 8.6 | 8.6 |
| Cycle Q Clear(g_c), s | 1.0 | 0.0 | 3.3 | 4.2 | 0.0 | 0.5 | 1.5 | 2.5 | 2.6 | 0.2 | 8.6 | 8.6 |
| Prop In Lane | 1.00 | | 0.91 | 1.00 | | 0.25 | 1.00 | | 0.12 | 1.00 | | 0.02 |
| Lane Grp Cap(c), veh/h | 361 | 0 | 232 | 257 | 0 | 259 | 120 | 1718 | 923 | 23 | 800 | 840 |
| V/C Ratio(X) | 0.05 | 0.00 | 0.61 | 0.12 | 0.00 | 0.11 | 0.58 | 0.23 | 0.23 | 0.43 | 0.63 | 0.63 |
| Avail Cap(c_a), veh/h | 784 | 0 | 724 | 638 | 0 | 806 | 223 | 1718 | 923 | 223 | 800 | 840 |
| 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 | 15.3 | 0.0 | 16.0 | 18.0 | 0.0 | 14.9 | 18.1 | 5.5 | 5.5 | 19.6 | 8.4 | 8.4 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 2.6 | 0.2 | 0.0 | 0.2 | 4.4 | 0.3 | 0.6 | 11.8 | 3.7 | 3.5 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.1 | 0.0 | 1.2 | 0.2 | 0.0 | 0.2 | 0.7 | 0.6 | 0.8 | 0.2 | 3.1 | 3.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.3 | 0.0 | 18.6 | 18.2 | 0.0 | 15.0 | 22.5 | 5.8 | 6.1 | 31.4 | 12.1 | 11.9 |
| LnGrp LOS | B | A | B | B | A | B | C | A | A | C | B | B |
| Approach Vol, veh/h | | 159 | | | 58 | | | 667 | | | 1036 | |
| Approach Delay, s/veh | | 18.3 | | | 16.7 | | | 7.7 | | | 12.2 | |
| Approach LOS | | B | | | B | | | A | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.0 | 24.7 | | 10.3 | 7.2 | 22.5 | | 10.3 | | | | |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 18.0 | | 18.0 | 5.0 | 18.0 | | 18.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.2 | 4.6 | | 5.3 | 3.5 | 10.6 | | 6.2 | | | | |
| Green Ext Time (p_c), s | 0.0 | 3.2 | | 0.6 | 0.0 | 3.8 | | 0.1 | | | | |

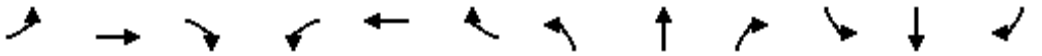
| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 11.3 | |
| HCM 6th LOS | | B | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 1 | 385 | 1 | 252 | 1 | 614 | 445 | 311 | 546 | 0 |
| Future Volume (veh/h) | 0 | 0 | 1 | 385 | 1 | 252 | 1 | 614 | 445 | 311 | 546 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 0 |
| Adj Flow Rate, veh/h | 0 | 0 | 1 | 418 | 1 | 274 | 1 | 667 | 484 | 338 | 593 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 0 | 0 | 103 | 497 | 2 | 472 | 2 | 632 | 535 | 335 | 981 | 0 |
| Arrive On Green | 0.00 | 0.00 | 0.06 | 0.18 | 0.30 | 0.30 | 0.00 | 0.34 | 0.34 | 0.19 | 0.52 | 0.00 |
| Sat Flow, veh/h | 0 | 0 | 1585 | 1781 | 6 | 1580 | 1781 | 1870 | 1585 | 1781 | 1870 | 0 |
| Grp Volume(v), veh/h | 0 | 0 | 1 | 418 | 0 | 275 | 1 | 667 | 484 | 338 | 593 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 0 | 1585 | 1781 | 0 | 1586 | 1781 | 1870 | 1585 | 1781 | 1870 | 0 |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 13.5 | 0.0 | 11.3 | 0.0 | 26.0 | 22.4 | 14.5 | 17.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 13.5 | 0.0 | 11.3 | 0.0 | 26.0 | 22.4 | 14.5 | 17.0 | 0.0 |
| Prop In Lane | 0.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 0 | 103 | 497 | 0 | 474 | 2 | 632 | 535 | 335 | 981 | 0 |
| V/C Ratio(X) | 0.00 | 0.00 | 0.01 | 0.84 | 0.00 | 0.58 | 0.41 | 1.06 | 0.90 | 1.01 | 0.60 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 0 | 371 | 497 | 0 | 742 | 116 | 632 | 535 | 335 | 981 | 0 |
| 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) | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 33.7 | 27.7 | 0.0 | 22.9 | 38.4 | 25.5 | 24.3 | 31.2 | 12.7 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 0.0 | 0.0 | 12.3 | 0.0 | 1.1 | 83.5 | 51.5 | 21.3 | 51.0 | 2.8 | 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 | 0.0 | 0.0 | 0.0 | 9.0 | 0.0 | 4.2 | 0.1 | 19.8 | 11.0 | 10.7 | 7.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 0.0 | 33.7 | 40.0 | 0.0 | 24.0 | 121.9 | 77.0 | 45.6 | 82.3 | 15.5 | 0.0 |
| LnGrp LOS | A | A | C | D | A | C | F | F | D | F | B | A |
| Approach Vol, veh/h | | 1 | | | 693 | | | 1152 | | | 931 | |
| Approach Delay, s/veh | | 33.7 | | | 33.7 | | | 63.8 | | | 39.7 | |
| Approach LOS | | C | | | C | | | E | | | D | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 19.0 | 30.5 | 18.0 | 9.5 | 4.6 | 44.9 | | 27.5 | | | | |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | 14.5 | 26.0 | 13.5 | 18.0 | 5.0 | 35.5 | | 36.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 16.5 | 28.0 | 15.5 | 2.0 | 2.0 | 19.0 | | 13.3 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.7 | | 1.8 | | | | |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 48.2 |
| HCM 6th LOS | D |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 153 | 0 | 76 | 1 | 0 | 1 | 64 | 931 | 1 | 0 | 827 | 125 |
| Future Volume (veh/h) | 153 | 0 | 76 | 1 | 0 | 1 | 64 | 931 | 1 | 0 | 827 | 125 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 166 | 0 | 83 | 1 | 0 | 1 | 70 | 1012 | 1 | 0 | 899 | 136 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 516 | 0 | 430 | 0 | 0 | 113 | 113 | 1006 | 1 | 4 | 711 | 602 |
| Arrive On Green | 0.11 | 0.00 | 0.27 | 0.00 | 0.00 | 0.07 | 0.06 | 0.54 | 0.54 | 0.00 | 0.38 | 0.38 |
| Sat Flow, veh/h | 1781 | 0 | 1585 | 0 | 0 | 1585 | 1781 | 1868 | 2 | 1781 | 1870 | 1585 |
| Grp Volume(v), veh/h | 166 | 0 | 83 | 0 | 0 | 1 | 70 | 0 | 1013 | 0 | 899 | 136 |
| Grp Sat Flow(s),veh/h/ln | 1781 | 0 | 1585 | 0 | 0 | 1585 | 1781 | 0 | 1870 | 1781 | 1870 | 1585 |
| Q Serve(g_s), s | 3.8 | 0.0 | 1.9 | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | 25.5 | 0.0 | 18.0 | 2.8 |
| Cycle Q Clear(g_c), s | 3.8 | 0.0 | 1.9 | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | 25.5 | 0.0 | 18.0 | 2.8 |
| Prop In Lane | 1.00 | | 1.00 | 0.00 | | 1.00 | 1.00 | | 0.00 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 516 | 0 | 430 | 0 | 0 | 113 | 113 | 0 | 1007 | 4 | 711 | 602 |
| V/C Ratio(X) | 0.32 | 0.00 | 0.19 | 0.00 | 0.00 | 0.01 | 0.62 | 0.00 | 1.01 | 0.00 | 1.27 | 0.23 |
| Avail Cap(c_a), veh/h | 516 | 0 | 602 | 0 | 0 | 602 | 188 | 0 | 1007 | 188 | 711 | 602 |
| 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 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 15.9 | 0.0 | 13.3 | 0.0 | 0.0 | 20.5 | 21.6 | 0.0 | 10.9 | 0.0 | 14.7 | 10.0 |
| Incr Delay (d2), s/veh | 0.4 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 5.4 | 0.0 | 29.8 | 0.0 | 130.4 | 0.9 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.4 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.9 | 0.0 | 15.3 | 0.0 | 31.8 | 0.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 16.3 | 0.0 | 13.5 | 0.0 | 0.0 | 20.5 | 27.0 | 0.0 | 40.8 | 0.0 | 145.0 | 10.8 |
| LnGrp LOS | B | A | B | A | A | C | C | A | F | A | F | B |
| Approach Vol, veh/h | | 249 | | | 1 | | | 1083 | | | 1035 | |
| Approach Delay, s/veh | | 15.4 | | | 20.5 | | | 39.9 | | | 127.4 | |
| Approach LOS | | B | | | C | | | D | | | F | |

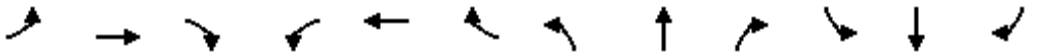
| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 0.0 | 30.0 | 0.0 | 17.4 | 7.5 | 22.5 | 9.5 | 7.9 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 5.0 | 18.0 | 5.0 | 18.0 | 5.0 | 18.0 | 5.0 | 18.0 |
| Max Q Clear Time (g_c+I1), s | 0.0 | 27.5 | 0.0 | 3.9 | 3.8 | 20.0 | 5.8 | 2.0 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 75.6 |
| HCM 6th LOS | E |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 68 | 63 | 974 | 95 | 88 | 825 |
| Future Volume (veh/h) | 68 | 63 | 974 | 95 | 88 | 825 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | 1900 | 1900 | 1870 | 1870 | 1870 | 1870 |
| Adj Flow Rate, veh/h | 74 | 68 | 1059 | 103 | 96 | 897 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 0 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 92 | 85 | 1122 | 951 | 123 | 1391 |
| Arrive On Green | 0.11 | 0.11 | 0.60 | 0.60 | 0.07 | 0.74 |
| Sat Flow, veh/h | 871 | 800 | 1870 | 1585 | 1781 | 1870 |
| Grp Volume(v), veh/h | 143 | 0 | 1059 | 103 | 96 | 897 |
| Grp Sat Flow(s),veh/h/ln | 1683 | 0 | 1870 | 1585 | 1781 | 1870 |
| Q Serve(g_s), s | 5.0 | 0.0 | 31.3 | 1.7 | 3.2 | 14.1 |
| Cycle Q Clear(g_c), s | 5.0 | 0.0 | 31.3 | 1.7 | 3.2 | 14.1 |
| Prop In Lane | 0.52 | 0.48 | | 1.00 | 1.00 | |
| Lane Grp Cap(c), veh/h | 178 | 0 | 1122 | 951 | 123 | 1391 |
| V/C Ratio(X) | 0.80 | 0.00 | 0.94 | 0.11 | 0.78 | 0.64 |
| Avail Cap(c_a), veh/h | 183 | 0 | 1122 | 951 | 161 | 1391 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 26.1 | 0.0 | 11.0 | 5.1 | 27.4 | 3.8 |
| Incr Delay (d2), s/veh | 21.9 | 0.0 | 16.4 | 0.2 | 16.5 | 2.3 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.0 | 0.0 | 14.3 | 0.5 | 1.8 | 3.3 |
| Unsig. Movement Delay, s/veh | | | | | | |
| LnGrp Delay(d),s/veh | 48.1 | 0.0 | 27.5 | 5.4 | 43.9 | 6.1 |
| LnGrp LOS | D | A | C | A | D | A |
| Approach Vol, veh/h | 143 | | 1162 | | | 993 |
| Approach Delay, s/veh | 48.1 | | 25.5 | | | 9.7 |
| Approach LOS | D | | C | | | A |

| Timer - Assigned Phs | 1 | 2 | | | 6 | 8 |
|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 8.6 | 40.4 | | | 49.0 | 10.8 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 5.4 | 34.6 | | | 44.5 | 6.5 |
| Max Q Clear Time (g_c+I1), s | 5.2 | 33.3 | | | 16.1 | 7.0 |
| Green Ext Time (p_c), s | 0.0 | 1.0 | | | 8.1 | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 6th Ctrl Delay | 20.1 |
| HCM 6th LOS | C |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 23 | 9 | 138 | 27 | 12 | 13 | 139 | 1124 | 45 | 7 | 870 | 16 |
| Future Volume (veh/h) | 23 | 9 | 138 | 27 | 12 | 13 | 139 | 1124 | 45 | 7 | 870 | 16 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 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 | 25 | 10 | 150 | 29 | 13 | 14 | 151 | 1222 | 49 | 8 | 946 | 17 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cap, veh/h | 366 | 16 | 234 | 245 | 129 | 139 | 192 | 2608 | 105 | 19 | 1502 | 27 |
| Arrive On Green | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.11 | 0.52 | 0.52 | 0.01 | 0.42 | 0.42 |
| Sat Flow, veh/h | 1383 | 100 | 1500 | 1226 | 824 | 887 | 1781 | 5036 | 202 | 1781 | 3571 | 64 |
| Grp Volume(v), veh/h | 25 | 0 | 160 | 29 | 0 | 27 | 151 | 826 | 445 | 8 | 471 | 492 |
| Grp Sat Flow(s),veh/h/ln | 1383 | 0 | 1600 | 1226 | 0 | 1711 | 1781 | 1702 | 1834 | 1781 | 1777 | 1859 |
| Q Serve(g_s), s | 0.7 | 0.0 | 4.0 | 1.0 | 0.0 | 0.6 | 3.5 | 6.6 | 6.6 | 0.2 | 8.9 | 8.9 |
| Cycle Q Clear(g_c), s | 1.3 | 0.0 | 4.0 | 5.0 | 0.0 | 0.6 | 3.5 | 6.6 | 6.6 | 0.2 | 8.9 | 8.9 |
| Prop In Lane | 1.00 | | 0.94 | 1.00 | | 0.52 | 1.00 | | 0.11 | 1.00 | | 0.03 |
| Lane Grp Cap(c), veh/h | 366 | 0 | 250 | 245 | 0 | 267 | 192 | 1763 | 950 | 19 | 747 | 782 |
| V/C Ratio(X) | 0.07 | 0.00 | 0.64 | 0.12 | 0.00 | 0.10 | 0.79 | 0.47 | 0.47 | 0.42 | 0.63 | 0.63 |
| Avail Cap(c_a), veh/h | 731 | 0 | 673 | 569 | 0 | 719 | 208 | 1763 | 950 | 208 | 747 | 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 | 16.0 | 0.0 | 16.9 | 19.3 | 0.0 | 15.5 | 18.6 | 6.6 | 6.6 | 21.0 | 9.8 | 9.8 |
| Incr Delay (d2), s/veh | 0.1 | 0.0 | 2.7 | 0.2 | 0.0 | 0.2 | 16.7 | 0.9 | 1.7 | 14.4 | 4.0 | 3.8 |
| 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 | 0.0 | 1.5 | 0.3 | 0.0 | 0.2 | 2.2 | 1.8 | 2.1 | 0.1 | 3.4 | 3.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 16.1 | 0.0 | 19.7 | 19.5 | 0.0 | 15.6 | 35.3 | 7.5 | 8.2 | 35.4 | 13.8 | 13.6 |
| LnGrp LOS | B | A | B | B | A | B | D | A | A | D | B | B |
| Approach Vol, veh/h | | 185 | | | 56 | | | 1422 | | | 971 | |
| Approach Delay, s/veh | | 19.2 | | | 17.6 | | | 10.7 | | | 13.9 | |
| Approach LOS | | B | | | B | | | B | | | B | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.0 | 26.7 | | 11.2 | 9.1 | 22.5 | | 11.2 | | | | |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | | 4.5 | | | | |
| Max Green Setting (Gmax), s | 5.0 | 18.0 | | 18.0 | 5.0 | 18.0 | | 18.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.2 | 8.6 | | 6.0 | 5.5 | 10.9 | | 7.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 5.5 | | 0.7 | 0.0 | 3.4 | | 0.1 | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 6th Ctrl Delay | | 12.6 | |
| HCM 6th LOS | | B | |

This page left intentionally blank.

# Attachment G – Phase I Report

This page left intentionally blank.

# PHASE I ENVIRONMENTAL SITE ASSESSMENT

Vista Grande Drive
Vista, California 92084

October 6, 2015

*Prepared for*:

Omni Financial
c/o Park Row Properties
Attn: Mr. Chip Hasley
P.O. Box 722
Del Mar, California 92014

*Prepared by*:

Vinje & Middleton Engineering, Inc.
2450 Auto Park Way
Escondido, California 92029

VINJE & MIDDLETON ENGINEERING, INC.

2450 Auto Park Way
Escondido, California 92029-1229

Phone (760) 743-1214
Fax (760) 739-0343

October 6, 2015

Omni Financial
c/o Park Row Properties
Attn: Mr. Chip Hasley
P.O. Box 722
Del Mar, California 92014

Subject: **Phase I Environmental Site Assessment**
**Vista Grande Drive**
**Vista, California 92084**

To Whom It May Concern:

Vinje & Middleton Engineering, Inc. (VM) has performed a Phase I Environmental Site Assessment (ESA) in conformance with the scope and limitations of American Society for Testing and Materials Practice (ASTM) E 1527-13 and 40 Code of Federal Regulations (CFR) Part 312, of the above-referenced property. This ESA included public environmental agency and historical record reviews, interviews, site observations, and report preparation. This report includes VM's findings, conclusions, and supporting documentation.

We appreciate the opportunity to be of service to you on this project. If you should have any questions regarding this report, or if we can be of further assistance, please contact us at (760) 743-1214.

Sincerely,

***Vinje & Middleton Engineering, Inc.***

Ralph M. Vinje
Principal Engineer
RCE #25115

REGISTERED PROFESSIONAL ENGINEER
RALPH M. VINJE
No. 25115
Exp. 12-31-15
Civil
STATE OF CALIFORNIA

Daniel Weis
Associate Environmental Scientist

# TABLE OF CONTENTS

**1.0 EXECUTIVE SUMMARY ..... 1**
1.1 Summary and Findings ..... 1
1.2 Conclusions ..... 2
**2.0 INTRODUCTION ..... 3**
2.1 Purpose ..... 3
2.2 Detailed Scope of Services ..... 4
2.3 Significant Assumptions ..... 5
2.4 Limitations and Exceptions ..... 5
2.5 Special Terms and Conditions ..... 6
2.6 User Reliance ..... 6
**3.0 SITE DESCRIPTION ..... 7**
3.1 Location and Legal Description ..... 7
3.2 Site and Vicinity General Characteristics ..... 7
3.3 Current Use of the Site ..... 7
3.4 Description of Structures, Roads, Other Improvements on the Site ..... 7
3.5 Current Uses of the Adjoining Properties ..... 7
**4.0 USER PROVIDED INFORMATION ..... 9**
4.1 Title Records ..... 9
4.2 Environmental Liens or Activity and Use Limitations ..... 9
4.3 Specialized Knowledge ..... 9
4.4 Commonly Known or Reasonably Ascertainable Information ..... 9
4.5 Valuation Reduction for Environmental Issues ..... 9
4.6 Owner, Property Manager, and Occupant Information ..... 9
4.7 Reason for Performing Phase I ESA ..... 9
**5.0 RECORDS REVIEW ..... 10**
5.1 Standard Environmental Record Sources ..... 10
5.2 Additional Environmental Record Sources ..... 14
5.3 Physical Setting Sources ..... 14
5.3.1 Topography and Hydrology ..... 14
5.3.2 Geology ..... 14
5.3.3 Hydrogeology ..... 15
5.4 Historical Use Information on the Subject Site ..... 15
5.4.1 Aerial Photographs and Topographic Maps ..... 15
5.4.2 State of California Division of Oil and Gas Records ..... 16
5.5 Historical Use Information on Adjoining Properties ..... 16
5.5.1 Aerial Photographs and Topographic Maps ..... 16
5.5.2 State of California Division of Oil and Gas Records ..... 17
**6.0 SITE RECONNAISSANCE ..... 18**
6.1 Methodology and Limiting Conditions ..... 18
6.2 General Site Setting ..... 18
6.3 Site Observations ..... 18

**7.0 INTERVIEW INFORMATION ..... 20**

7.1. Interview With Owner ..... 20
7.2 Interview With Site Manager ..... 20
7.3 Interviews With Occupants ..... 20
7.4 Interview With Local Government Official ..... 20
7.5 Interview With Others ..... 20

**8.0 FINDINGS, OPINION AND CONCLUSIONS ..... 21**

**9.0 DEVIATIONS AND DATA GAPS ..... 22**

**10.0 ADDITIONAL SERVICES ..... 23**

**11.0 REFERENCES ..... 24**

**12.0 SIGNATURES AND QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS ..... 25**

**13.0 APPENDICES**

13.1 Vicinity Map and Topographic Map
13.2 Site Plan
13.3 Site Photographs
13.4 Regulatory Database Report
13.5 Preliminary Title Report
13.6 Analytical Laboratory Report

# 1.0 Executive Summary

## 1.1 Summary and Findings

At the request of the Omni Financial, Vinje & Middleton Engineering, Inc. (VM) conducted a Phase I Environmental Site Assessment (ESA) in conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Practice E 1527-13 and 40 Code of Federal Regulations (CFR) Part 312, of the property located to the north of Vista Grande Drive, and west of Vista Grande Terrace in the City of Vista, San Diego County, California (hereinafter referred to as "the Site"). The Site is 16.99 acres in size and consists of two legal parcels. The Site is further identified by County of San Diego Assessor's Parcel Numbers (APNs) 171-100-028-00 and 171-100-05-00.

The Site consists of mostly vacant former agricultural land with a residence at the northwestern potion of the Site which includes a small area which appears to be used for minor agricultural activities. Trailers, sheds, and composting bins are also present at the residence and garden area. Unimproved roads traverse the Site. The residence is accessed from a driveway from Vista Grande Drive at the west, and via gate access at the southeast corner at Vista Grande Terrace. No significant environmental concerns were noted during the Site reconnaissance.

VM reviewed historical aerial photographs and topographic maps pertaining to the Site and adjacent properties. In the 1938 aerial photograph, the Site appears to be mostly vacant and undeveloped land. In the 1946 aerial photograph, the Site appears to be graded with agricultural activity on the western portion of the Site. A residence is first depicted in the 1953 aerial photograph in the northwestern corner of the Site with orchards depicted throughout the remainder of the Site In the aerial photographs from 1953 to 1981. In the 1989 to 2012 aerial photographs, the orchard has been removed and the Site is depicted as graded land with no other structures with the exception of the residence in the northwest corner is depicted in its current configuration.

The Site has historically been utilized for agricultural purposes. During historical agricultural activities throughout the State of California, various pesticides and more specifically organochlorine phosphates (OCPs) were commonly applied during the normal course of agricultural operations. Such compounds have since been banned from production and use in the United States. Section 105215 of the California Health and Safety Code discusses the regulatory reporting of incidents that pertain to pesticide spills and accidental releases of pesticide products. Based on the regulatory and historical research completed during the preparation of this assessment, no information has been revealed that would lead VM to believe that an accidental spill or release of pesticide products has occurred at the Site. In addition, neither stressed vegetation, nor evidence of the storage of pesticides was observed on the property during the Site reconnaissance or based on regulatory and historical research reviews. As such, the historical agricultural use of the Site is not considered to be a recognized environmental condition in connection with the Site.

VM reviewed standard regulatory record sources which included Federal, State and local environmental databases provided by Environmental Data Resources (EDR) for information pertaining to documented and/or suspected releases of regulated hazardous substances and/or petroleum products within specified search distances. The Site is not listed on any of the databases reviewed by EDR. There are multiple properties within the Site vicinity that appear on several of the regulatory databases but are not considered to be environmental concerns to the

Site. This opinion is based on several factors, including distance of the properties from the Site, orientation of the properties relative to the Site, depth and flow of groundwater in the area and reported property conditions.

On September 18, 2015 VM mobilized to the Site and collected soil from multiple locations at the Site. VM personnel collected soil samples from six locations at the Site identified as B1 through B6. Selected samples were analyzed for organochlorine pesticides (OCPs) By United States Environmental Protection Agency (EPA) test method 8081A. Minor detections of OCPs were reported in three of the samples analyzed. Detected concentrations include; DDE reported at 3.29 micrograms per kilogram (ug/kg) (sample B3-0.5), DDT reported at 1.65 ug/kg (sample B5-0.5), and chlordane reported at 1.06 ug/kg (sample B1-0.5). The detected concentrations of DDE, DDT, and Chlordane did not exceed their respective residential soil screening levels. Based on the negligible OCP concentrations detected in soil, VM does not recommend that additional subsurface assessment be conducted at the Site.

## 1.2 Conclusions

This assessment has revealed no evidence of recognized environmental conditions in connection with the Site. Additional assessment at the Site is not considered to be warranted at this time.

# 2.0 Introduction

## 2.1 Purpose

The purpose of this Phase I ESA is to provide a professional opinion on the presence of recognized environmental conditions and other suspect environmental conditions in connection with the Site, as they existed on the date of the site inspection, and to recommend whether further investigation is required. ASTM Standard Practice E 1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, specifies minimum requirements for conducting an ESA of a parcel of commercial real estate with respect to the range of contaminants pertinent to the scope of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as well as petroleum products. As such, this ESA is intended to satisfy one of the threshold criteria for satisfying the landowner liability protections to CERCLA liability assuming compliance with other elements of the defense. In other words, this ESA represents one of the practices that constitute “all appropriate inquiry” into the previous ownership and uses of the property consistent with good commercial or customary practice, as defined in 42 USC Section 9601(35)(B) and 40 CFR Part 312.

The goal of the process is to identify recognized environmental conditions, which are defined by the Practice 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 recognized environmental condition includes hazardous substances or petroleum products even under conditions in compliance with laws. In addition, the term also included historical recognized environmental conditions and controlled recognized environmental conditions. A historical recognized environmental condition is defined by the Practice as “a past release of hazardous substances or petroleum products that has occurred in connection with a property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).” A controlled recognized environmental condition is defined by the Practice as “a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).” The term recognized environmental condition is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public 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.

The term "environment" is defined in CERCLA 42 USC 9601(8) as "(A) the navigable waters, the water of the contiguous zone, and the ocean waters of which the natural resources are under the exclusive management authority of the United States under the Magnuson-Stevens Fishery conservation and Management Act, and (B) any other surface water, ground water, drinking water supply, land surface or subsurface strata, or ambient air within the United States or under the jurisdiction of the United States.

The term “release” means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant), but excludes (A) any release which results in exposure to persons solely within a workplace, with respect to a claim which such persons may assert against the employer of such persons, (B) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine, (C) release of source, byproduct, or special nuclear material from a nuclear incident, as those terms are defined in the Atomic Energy Act of 1954 [42 U.S.C. 2011 et seq.], if such release is subject to requirements with respect to financial protection established by the Nuclear Regulatory Commission under section 170 of such Act [42 U.S.C. 2210], or, for the purposes of 42 USC 9604 or any other response action, any release of source byproduct, or special nuclear material from any processing site designated under section 7912(a)(1) or 7942(a) of this title, and (D) the normal application of fertilizer.

## 2.2 Detailed Scope of Services

The Phase I ESA was conducted in accordance with generally accepted Phase I industry standards using ASTM Standard Practice E 1527-13, 40 CFR Part 312 and VM’s Agreement by and between VM and the client. The following services were provided for this assessment:

- A search for environmental liens recorded against the Site.
- An evaluation of standard environmental record sources contained within Federal, State and local environmental databases within specific search distances.
- An evaluation of additional environmental record sources obtained from local regulatory departments/agencies including the County of San Diego Department of Environmental Health (DEH).
- A qualitative evaluation of the physical characteristics of the Site through a review of published topographic, geologic, and hydrogeologic maps; published groundwater data; and area observations to characterize surface water flow in the Site area.
- An evaluation of past Site and adjacent/nearby property uses through a review of historical resources including aerial photographs, topographic maps and city directories.
- A physical inspection of the Site (interior and exterior) conducted to search for conditions indicative of potential environmental concerns including underground storage tanks (USTs), ASTs, associated tank piping; stained soil or pavement, equipment that may contain or have historically contained polychlorinated biphenyls (PCBs), and other potential environmental concerns as defined in the ASTM-2013 standard.
- A physical assessment of indications of past uses and visual observations of adjacent and surrounding properties (from curbside or public spaces) to assess potential impacts to the Site.
- Interviews completed with the client, the Site owner(s) and local regulatory officials.
- Soil sampling and analysis for agricultural chemicals.

- The preparation of this report, which includes the findings of the assessment, our opinion (i.e., conclusions) regarding their respective levels of significance, and recommendations, as appropriate.

## 2.3 Significant Assumptions

This Phase I ESA was conducted in accordance with ASTM guidelines and the terms and conditions of the aforementioned Agreement between VM and the client. No other warranty, express or implied, is made by VM. VM's evaluations, analyses, and opinions should not be taken as representations regarding subsurface conditions or the actual value of the Site. Subsurface conditions may differ from the conditions implied by the surficial observations and the data resources reviewed, and can only be reliably evaluated through intrusive techniques.

Documentation and data provided by the client, designated representatives of the client, other interested third parties, or from the public domain, and referred to in the preparation of this assessment, are assumed to be complete and correct and have been used and referenced with the understanding that VM assumes no responsibility or liability for their accuracy. VM's conclusions are based upon such information and documentation and on our observations of Site conditions, as they existed on the date of the site inspection. Because Site conditions may change significantly over a short period of time and additional data may become available, data reported and conclusions drawn in this report are limited to current conditions and should be considered less reliable with passing time.

## 2.4 Limitations and Exceptions

Reasonable efforts have been made during this assessment to uncover evidence of USTs, ASTs, ancillary equipment associated with such tanks, and other subsurface structures. "Reasonable efforts" are limited to information gained from visual observation of unobstructed areas, recorded database information held in public record, and available information gathered from interviews. Such methods may not identify subsurface equipment that may have been hidden from view due to paving, construction or debris pile storage, or incorrect information from sources.

This investigation was not an environmental compliance audit. While some observations and discussion in this report may address conditions and/or operations that may be regulated, the regulatory compliance of those conditions and/or operations is outside the scope of this investigation. Nothing in this report constitutes a legal opinion or legal advice. For information regarding specific individual or organizational liability, VM recommends consultation with independent legal counsel.

According to 40 CFR Part 312, Standards and Practices for All Appropriate Inquiry: Final Rule, CERCLA liability rests with the owner or operator of a property and not with an environmental professional hired by the prospective landowner and who is not involved with the ownership or operation of the property. This report meets the requirements set forth in 40 CFR Part 312 Standards and Practices for All Appropriate Inquiries; Final Rule. However, in order to qualify for certain landowner liability protections under CERCLA, "Bona Fide Prospective Purchasers, Contiguous Property Owners, and/or Innocent Landowners" must meet additional requirements of CERCLA (42 U.S.C. 9601 (35)(B)).

This ESA does not address non-scope ASTM considerations including asbestos containing materials, radon, lead-based paint, lead in drinking water, wetlands, protected environments and

habitat, industrial hygiene concerns, indoor air quality (unrelated to releases of hazardous substances or petroleum products into the environment) and high voltage power lines.

## 2.5 Special Terms and Conditions

No special terms and conditions between VM pertinent to the findings of this ESA or methodology used to complete this assessment are noted. In addition, VM does not have a financial interest in the Site.

## 2.6 User Reliance

This report was prepared for the sole and exclusive use of the client and its financing partners for this project and is not for the use or benefit of, nor may it be relied upon by, any other person or entity for any purpose without the advance written consent of VM and the client. VM makes no representation to any third party except that it has used the degree of care and skill ordinarily exercised by a reasonable prudent environmental professional in the same community and in the same time frame given the same or similar facts and circumstances. No other use or disclosure is intended or authorized by VM. In the preparation of this ESA, VM has used the degree of care and skill ordinarily exercised by a reasonably prudent environmental professional in the same community and in the same time frame given the same or similar facts and circumstances. No other warranties are made, express or implied.

# 3.0 Site Description

## 3.1 Location and Legal Description

The Site is 16.99 acres in size and consists of one legal parcel located to the north of Vista Grande Drive and to the west of Vista Grande Terrace in the City of Vista, San Diego County, California. The Site is currently vested in Omni Financial, LLC. The Site is further identified by County of San Diego APNs 171-100-28-00 and 171-011-05-00. A Vicinity Map and Topographic Map depicting the general location of the Site are included in Section 13.1.

## 3.2 Site and Vicinity General Characteristics

The Site primarily consists of vacant land with a residence at the northwestern portion of the Site. The general vicinity consists of active agricultural farming and rural residential use. Additional details pertaining to the Site and its adjoining properties are provided in the sections below.

## 3.3 Current Use of the Site

The Site consists of mostly vacant former agricultural land with a residence at the northwestern potion of the Site which includes a small area which appears to be used for minor agricultural activities.

## 3.4 Description of Structures, Roads, Other Improvements on the Site

As stated previously, the Site consists of mostly vacant former agricultural land with a residence at the northwestern potion of the Site which includes a small area which appears to be used for minor agricultural activities. Trailers, sheds, and composting bins are also present at the residence and garden area. Unimproved roads traverse the Site. The residence is accessed from a driveway from Vista Grande Drive, and via gate access at the southeast corner at Vista Grande Terrace. Potable water in the area is provided by the Vista Irrigation District and sewer service in the area is provided by City of Vista. Electrical and natural gas service in the area are provided by San Diego Gas & Electric (SDG&E). A Site Plan is included in Section 13.2. Photographs taken of the Site are included in Section 13.3.

## 3.5 Current Uses of the Adjoining Properties

The area surrounding the Site consists of public roadways, residential properties and vacant land. VM performed a visual inspection of adjoining properties from adjacent sidewalks and public right-of-ways. The following table identifies the adjacent property uses:

| General Direction | Adjoining Property Use |
|---|---|
| **North** | Agricultural properties |
| **South** | Residential properties |
| **East** | Residential properties |
| **West** | Residential properties |

None of the adjoining properties were observed to be a potential environmental concern to the Site based on VM's visual inspection from public right-of-ways.

# 4.0 User Provided Information

## 4.1 Title Records

VM was provided with a preliminary title report pertaining to the Site prepared by First American Title Company and dated April 15, 2014. According to the title report, the Site is currently vested in Omni Financial, LLC. No environmentally related liens, deed restrictions or activity and use limitations pertaining to the Site were noted during review of the preliminary title report and research completed with the San Diego County Office of the Assessor. A copy of the title report is included in Section 13.5.

## 4.2 Environmental Liens or Activity and Use Limitations

The client reportedly has no knowledge of any environmental related liens or activity and use limitations (i.e. engineering or institutional controls) that are related to potential environmental issues at the Site.

## 4.3 Specialized Knowledge

The client reportedly has no specialized knowledge pertinent to potential recognized environmental conditions at the Site.

## 4.4 Commonly Known or Reasonably Ascertainable Information

The client was unaware of commonly known or reasonably ascertainable information pertinent to potential recognized environmental conditions at the Site.

## 4.5 Valuation Reduction for Environmental Issues

As of the date of this report, the client reportedly has no information pertaining to the relationship of the purchase price to the estimated fair market value of the property that might indicate that significant contamination exists.

## 4.6 Owner, Property Manager, and Occupant Information

As stated previously, the Site is currently vested in Omni Financial, LLC. This entity is also considered the Site manager. The residence at the northwest portion of the Site is currently occupied.

## 4.7 Reason for Performing Phase I ESA

VM, as an independent consultancy, has been retained to conduct this Phase I ESA to identify environmental issues that may be present and to comply with 40 CFR Part 312.

# 5.0 Records Review

## 5.1 Standard Environmental Record Sources

VM reviewed Federal and State environmental databases provided by Environmental Data Resources, Inc. (EDR) of Shelton, Connecticut for information pertaining to documented and/or suspected releases of regulated hazardous substances and/or petroleum products within specified search distances. A copy of the EDR report is included in Section 13.4.

VM also reviewed unmappable sites listed in the environmental database report by cross-referencing addresses and site names. Unmappable sites are sites that cannot be plotted with confidence, but can be located by zip code or city name. In general, a site cannot be mapped because of inaccurate or missing location information in the record provided by the regulatory agency. Any unmappable sites that VM identifies within the specified search radii were evaluated as part of the preparation of this report.

The following Federal databases related to potential on-site and off-site sources of contamination were reviewed and interpreted by VM:

| Federal Databases | Search Distance From Site |
|---|---|
| National Priorities List (NPL) | One mile |
| Delisted NPL | One mile |
| Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) | One-half mile |
| CERCLIS No Further Remedial Action Planned (NFRAP) | One-half mile |
| Resource Conservation and Recovery Act (RCRA) CORRACTS Hazardous Waste Treatment, Storage and Disposal (TSD) Facilities | One mile |
| Resource Conservation and Recovery Act (RCRA) NON-CORRACTS Hazardous Waste TSD Facilities | One-half mile |
| RCRA Hazardous Waste Generators (RCRA GEN) | One-eighth mile |
| Emergency Response Notification System (ERNS) | One-eighth mile |
| Facility Index Systems (FINDS) | One-eighth mile |
| Federal Institutional/Engineering Control Registries (IC/EC) | One-half mile |

The following State/local databases related to potential on-site and off-site sources of contamination were also searched and reviewed:

| State/Local Databases | Search Distance From Site |
|---|---|
| State Equivalent NPL and CERCLIS (RESPONSE and Envirostor) | One mile |
| State Voluntary Cleanup Sites (VCP) | One-half mile |
| State/Local Brownfield Sites and Institutional/Engineering Control Registries | One-half mile |
| Inactive, Active, and/or Permitted Solid Waste/Landfill Facilities (SWL) | One-half mile |
| Leaking Underground Storage Tanks (LUST) | One-half mile |
| Spills, Leaks, Investigations and cleanup (SLIC) | One-half mile |
| Registered Underground and Aboveground Storage Tanks (UST/AST) | One-eighth mile |

| State/Local Databases | Search Distance From Site |
|---|---|
| San Diego County DEH Site Assessment and Mitigation (SAM) | One-half mile |

Descriptions/sources of each of the above referenced regulatory databases and the dates these databases were last updated by the applicable regulatory agencies are included in the EDR report.

***Subject Site***

The Site was not listed in any of the standard regulatory databases searched by EDR.

***Adjoining and Nearby Properties***

The adjoining properties were not listed in any of the standard regulatory databases searched by EDR within the ASTM specified search distances. Several nearby properties (as summarized below) were identified on the databases searched by EDR.

| Listed Property and Address | Database(s) | Mapped Distance and Direction From Site | Details | Likely Concern To Site? |
|---|---|---|---|---|
| Rancho Lomas Verdes 2461 East Vista Way | SLIC | 0.344-mile WNW | Referenced for the known presence of elevated pesticide concentrations. The case is currently under regulatory agency oversight and has a case "open" status pending remedial plan implementation. | No |
| East Vista Way Shell 2131 East Vista Way | San Diego Co. SAM LUST | 0.368-mile WSW | Referenced as a facility that had a release of gasoline that impacted soil and groundwater. The release was first discovered in 1989 and assessment (including the installation and sampling of 24 groundwater monitoring wells) and remediation (including the excavation and off-Site disposal of 820- cubic yards of impacted soil) was conducted under regulatory agency oversight. Case closure was granted in December of 2014. | No |

| Listed Property and Address | Database(s) | Mapped Distance and Direction From Site | Details | Likely Concern To Site? |
|---|---|---|---|---|
| Kawano High School East Vista Way/Mason Road | ENVIROSTOR | 0.422-mile NW | Referenced as a school investigation due to past agricultural row crop site use. The case is currently inactive. | No |
| East Vista Way Property 2019 East Vista Way | SLIC | 0.471mile SW | Referenced for the known presence of elevated pesticide concentrations and development of the property. The case is currently under regulatory agency oversight and has a case "open" status with remedial actions reportedly conducted in September and October of 2014. | No |
| Riviera School Barsby Street/Riviera Drive | ENVIROSTOR | 0.8326-mile W | Referenced as a school investigation due to past agricultural row crop site use. The case is currently inactive. | No |

***Non-ASTM Database Reviews***

Below is a list of non-ASTM databases searched by EDR and reviewed by VM during the preparation of this assessment. The descriptions of each database and their data release frequency are included in the EDR report, included in Section 13.5.

Local Brownfield Lists
US BROWNFIELDS - A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites
DEBRIS REGION 9 - Torres Martinez Reservation Illegal Dump Site Locations
ODI - Open Dump Inventory
WMUDS/SWAT - Waste Management Unit Database
SWRCY - Recycler Database
HAULERS - Registered Waste Tire Haulers Listing

Local Lists of Hazardous Waste / Contaminated Sites
US CDL - Clandestine Drug Labs
HIST Cal-Sites - Historical Calsites Database
SCH - School Property Evaluation Program
Toxic Pits - Toxic Pits Cleanup Act Sites
CDL - Clandestine Drug Labs

US HIST CDL - National Clandestine Laboratory Register
SD HMMD – San Diego County DEH Hazardous Materials Management Division

Local Land Records
LIENS 2 - CERCLA Lien Information
LIENS - Environmental Liens Listing
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

Other Ascertainable Records
RCRA-NonGen - RCRA - Non Generators
DOT OPS - Incident and Accident Data
DOD - Department of Defense Sites
FUDS - Formerly Used Defense Sites
CONSENT - Superfund (CERCLA) Consent Decrees
ROD - Records Of Decision
UMTRA - Uranium Mill Tailings Sites
MINES - Mines Master Index File
TRIS - Toxic Chemical Release Inventory System
TSCA - Toxic Substances Control Act
FTTSFIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS - FIFRA/TSCA Tracking System Administrative Case Listing
SSTS - Section 7 Tracking Systems
ICIS - Integrated Compliance Information System
PADS - PCB Activity Database System
MLTS - Material Licensing Tracking System
RADINFO - Radiation Information Database
FINDS - Facility Index System/Facility Registry System
RAATS - RCRA Administrative Action Tracking System
RMP - Risk Management Plans
CA BOND EXP. PLAN - Bond Expenditure Plan
UIC - UIC Listing
NPDES - NPDES Permits Listing
Cortese - "Cortese" Hazardous Waste & Substances Sites List
HIST CORTESE - Hazardous Waste & Substance Site List
CUPA Listings - CUPA Resources List
Notify 65 - Proposition 65 Records
DRYCLEANERS - Cleaner Facilities
WIP - Well Investigation Program Case List
ENF - Enforcement Action List
HAZNET - Facility and Manifest Data
EMI - Emissions Inventory Data
INDIAN RESERV - Indian Reservations
SCRD DRYCLEANERS - State Coalition for Remediation of Drycleaners Listing
MWMP - Medical Waste Management Program Listing
COAL ASDH DOE – Sleam Electric Plan Operation Data Listing

COAL ASH EPA – Coal Combustion Residues Surface Impoundments List
HWT - Registered Hazardous Waste Transporter Database
HWP - Envirostor Permitted Facilities List
FINANCIAL ASSURANCE - Financial Assurance Information Listing
LEAD SMELTERS - Lead Smelter Sites
2020 COR ACTION - 2020 Corrective Action Program List
US AIRS - Aerometric Information Retrieval System Facility Subsystem
PRP - Potentially Responsible Parties
WDS - Waste Discharge System
EPA WATCH LIST - EPA WATCH LIST
US FIN ASSUR - Financial Assurance Information
PCB TRANSFORMER - PCB Transformer Registration Database
PROC - Certified Processors Database

The Site and any properties within the Site vicinity are not listed on any of the non-ASTM databases searched by EDR.

## 5.2 Additional Environmental Record Sources

**San Diego County Department of Environmental Health (DEH)**

No records of releases of hazardous substances or petroleum products pertaining to the Site are on file with the County of San Diego DEH.

## 5.3 Physical Setting Sources

The following physical setting sources were reviewed to provide information about the topographic, hydrologic, geologic and/or hydrogeologic characteristics of the Site.

### 5.3.1 Topography and Hydrology

***USGS Topographic Quadrangle***

The Site is depicted on the USGS topographic map for the 1996 San Marcos, California 7.5 minute quadrangle at an elevation of approximately 700 feet above mean sea level. No features of environmental concern are noted on the map. Streets and public roadways bordering the Site are shown in their current configurations.

***Hydrology/Storm Water Management***

The Site slopes gently to the south and southwest and does not appear to receive significant drainage from off-Site properties.

### 5.3.2 Geology

The Site lies within the coastal section of the Peninsular Ranges Geomorphic Province; one of 11 physiographic provinces in California recognized by defining features based on geology, faults, topography, and climate. The Peninsular Ranges Province is dominated by a series of northwest-oriented mountain ranges extending from the Baja California peninsula in the south to the Transverse Ranges in the north. The series of mountain ranges are separated by northwest

trending valleys, subparallel to faults branching from the San Andreas Fault System. Igneous, metamorphic, and sedimentary rocks are all found within the Peninsular Ranges Province. Plutonic (igneous) rocks of the Peninsular Ranges batholith are predominant throughout much of the Province. The batholithic rocks were emplaced during Cretaceous-age orogenic events, and uplifted into the present mountain ranges during the late Tertiary and Quaternary. The coastal section of the Province is underlain by a thick sequence of marine- and terrestrial-derived sedimentary rock units that unconformably overlie basement rocks. Nearly flat marine terraces lie at different elevations throughout the coastal section of the Province as a result of sea floor erosion during marine standstills and subsequent Quaternary faulting and uplift. According to geologic map sources, the Site is underlain at depth by mid-cretaceous San Marcos Gabbro, consisting of medium-grained gabbro and norite. The Site, as is all of Southern California, is an active seismic area. However, no faults are mapped across the Site.

### 5.3.3 Hydrogeology

The Site is situated within the Vista Hydrologic Sub-Area of the Buena Vista Creek Hydrologic Area of the Carlsbad Hydrologic Unit. Site specific information regarding depth to groundwater and water quality is not available for the Site. However, static groundwater is anticipated to be at depths of greater than 20-feet below grade. The inferred regional groundwater flow direction is toward the southwest. According to the California Regional Water Quality Control Board- San Diego Region, groundwater in the area has existing beneficial uses for municipal, agricultural, and industrial supply purposes.

## 5.4 Historical Use Information on the Subject Site

VM reviewed several historical sources (as described in the following sections) to develop a history of the previous uses of the Site, in order to help identify the likelihood of past uses having led to recognized environmental conditions in connection with the Site.

### 5.4.1 Aerial Photographs and Topographic Maps

***Aerial Photographs***

VM reviewed historical aerial photographs from the years 1938, 1946, 1953, 1964, 1967, 1980, 1981, 1989, 1994, 1996, 2002, 2003, 2005, 2009, 2010, and 2012 via online resources provided by NETROnline. In the 1938 aerial photograph, the Site appears to be mostly vacant and undeveloped land. In the 1946 aerial photograph, the Site appears to be graded with agricultural activity on the western portion of the Site. A residence is first depicted in the 1953 aerial photograph in the northwestern corner of the Site with orchards depicted throughout the remainder of the Site In the aerial photographs from 1953 to 1981. In the 1989 to 2012 aerial photographs, the orchard has been removed and the Site is depicted as graded land with no other structures with the exception of the residence in the northwest corner is depicted in its current configuration.

The Site has historically been utilized for agricultural purposes. During historical agricultural activities throughout the State of California, various pesticides and more specifically OCPs were commonly applied during the normal course of agricultural operations. Such compounds have since been banned from production and use in the United States. Section 105215 of the California Health and Safety Code discusses the regulatory reporting of incidents that pertain to pesticide spills and accidental releases of pesticide products. Based on the regulatory and

historical research completed during the preparation of this assessment, no information has been revealed that would lead VM to believe that an accidental spill or release of pesticide products has occurred at the Site. In addition, neither stressed vegetation, nor evidence of the storage of pesticides was observed on the property during the Site reconnaissance or based on regulatory and historical research reviews. As such, the historical agricultural use of the Site is not considered to be a recognized environmental condition in connection with the Site. Soil sampling and analysis was conducted at the Site by VM. Results of sampling activities are described in section 10.0.

***Topographic Maps***

VM reviewed historical topographic maps from the years 1893, 1897, 1901, 1906, 1907, 1911, 1913, 1921, 1929, 1933, 1937, 1941, 1946, 1949, 1955, 1965, 1970, 1979, 1983, and 2000 via online resources provided by NETROnline. The Site is depicted as mostly vacant land on all of the maps until 1965. On the 1970 to 1983 maps, a residence is depicted in the northwest corner of the Site with the remainder of the Site depicted with orchards. On the 2000 map, the Site is depicted as vacant with the exception of the residence at the northwest corner.

### 5.4.2 State of California Division of Oil and Gas Records

According to online resources provided by the California Department of Conservation, Division of Oil, Gas and Geothermal Resources, there are no oil, gas or geothermal wells located on the Site.

## 5.5 Historical Use Information on Adjoining Properties

VM also reviewed several historical sources (as described in the following sections) to develop a history of the previous uses of adjoining properties and the surrounding area, in order to help identify the likelihood of past uses having led to recognized environmental conditions in connection with the Site.

### 5.5.1 Aerial Photographs and Topographic Maps

***Aerial Photographs***

As stated previously, VM reviewed historical aerial photographs from the years 1938, 1946, 1953, 1964, 1967, 1980, 1981, 1989, 1994, 1996, 2002, 2003, 2005, 2009, 2010, and 2012 via online resources provided by NETROnline. In the 1938 aerial photograph, Vista Grande Road is depicted as unimproved adjacent to the south of the Site. The areas to the east and west of the Site are depicted as mostly vacant and undeveloped. Areas to the north and south of the Site are depicted with agricultural use. Single residences are depicted adjacent to the south and east of the Site in the 1946 aerial photograph. In the 1953 to 1967 aerial photographs, scattered residences and orchards are depicted mostly adjacent to the south and northwest of the Site. A water tank is depicted adjacent to the north of the Site. Vista Grande Road is depicted as improved on the 1980 Aerial photograph. Increased development of residences replaces much of the orchards in the surrounding area beginning in 1980 with the area mostly in its current configurations by 1996. Increased agricultural use is depicted from 2002 to 2012. In the 2012 aerial photograph, the adjacent properties appear to consist of residences, agricultural land, and vacant land similar to their current configurations. No environmental concerns to the Site relative to adjacent and nearby properties were noted during the historical aerial photograph review.

### *Topographic Maps*

VM reviewed historical topographic maps from the years 1893, 1897, 1901, 1906, 1907, 1911, 1913, 1921, 1929, 1933, 1937, 1941, 1946, 1949, 1955, 1965, 1970, 1979, 1983, and 2000 via online resources provided by NETROnline. The surrounding area is depicted as vacant and undeveloped on the maps reviewed from 1893 to 1946 maps. On the 1949 to 1965 maps, an unimproved roadway is depicted adjacent to the southeast of the Site. Scattered residences are depicted mostly to the South of the Site with much surrounding depicted as vacant and undeveloped. On the 1970 to 1983 maps, much of the surrounding area is depicted with agricultural use as orchards. A water tank is depicted adjacent to the north of the Site. More residences are depicted in the surrounding vicinity, mostly to the south of the Site. On the 2000 map, areas to the east south and beyond to the west are depicted as pink indicating urban development. No environmental concerns associated with the surrounding area were noted during the historical topographic map review.

## 5.5.2 State of California Division of Oil and Gas Records

According to online resources provided by the California Department of Conservation, Division of Oil, Gas and Geothermal Resources, there are no oil, gas or geothermal wells located on adjoining properties of the Site.

# 6.0 Site Reconnaissance

The objective of the Site reconnaissance was to obtain information indicating the likelihood of recognized environmental conditions in connection with the Site. VM was unaccompanied during the Site reconnaissance.

## 6.1 Methodology and Limiting Conditions

The Site reconnaissance consisted of inspecting the Site and walking accessible roads surrounding the Site. VM inspected all exterior and common areas. As stated previously, a Site Plan is included in Section 13.2. Photographs of the Site were taken to document existing Site conditions and several are included and described in Section 13.3.

## 6.2 General Site Setting

As stated previously, the Site consists of mostly vacant former agricultural land with a residence at the northwestern potion of the Site which includes a small area which appears to be used for minor agricultural activities. Trailers, sheds, and composting bins are also present at the residence and garden area. Unimproved roads traverse the Site. The residence is accessed from a driveway from Vista Grande Drive, and via gate access at the southeast corner at Vista Grande Terrace. Additional details pertaining to the Site and its adjoining properties are provided in the sections below. The general vicinity consists of agricultural land to the north, with residential properties east, south, and west.

## 6.3 Site Observations

VM examined accessible areas of the Site for evidence of the following potential environmental concerns:

| Conditions | Not Observed or Noted | Observed or Noted | Significant Concern? |
|---|---|---|---|
| Hazardous Substances/Petroleum Products | X | | -- |
| Waste Generation/Storage/Disposal | X | | -- |
| ASTs | | X | No |
| USTs | X | | -- |
| PCB Containing Equipment | X | | -- |
| Chemical/Petroleum Odors | X | | -- |
| Pools of Liquid | X | | -- |
| Floor Drains/Sumps/Wells | X | | -- |
| Drums | X | | -- |
| Stains or Corrosion | X | | -- |
| Unidentified Substance Containers | X | | -- |
| Stained Soil or Pavement | X | | -- |
| Stressed Vegetation | X | | -- |
| Pits, Ponds or Lagoons | X | | -- |
| Wastewater Discharges/Disposal Systems | X | | -- |
| Septic Systems/Cesspools | X | | -- |
| Non-Hazardous Solid Waste Disposal Areas | | X | No |
| Drinking Water Systems/Water Wells/Other Wells | X | | -- |
| Other | | X | No |

The noted items in the table above are discussed below:

***AST***

A single propane AST was noted at the western side of the residence. No suspect conditions were noted in the area of the propane AST.

***Non-Hazardous Solid Waste Disposal Areas***

Several areas of agricultural (plastic sheeting, tires, metal, and irrigation pipes) and construction (wood, pipe) debris were observed at the gardening area of the residence Site. Other areas of minor miscellaneous debris (furniture, litter) were noted throughout the Site. No suspect soil conditions were noted in such areas.

***Other***

Several small soil stockpiles were observed at the gardening area at the residence. The majority of the stockpiles consist of gardening soil or compost. No staining, odors, or suspect soil conditions were noted in the vicinity of the soil stockpiles.

# 7.0 Interview Information

## 7.1. Interview With Owner

As stated previously, the Site is currently owned by Omni Financial, LLC. A representative of the Site owner had no knowledge of environmental concerns in connection with the Site.

## 7.2 Interview With Site Manager

Omni Financial, LLC is also considered to be the Site Manager.

## 7.3 Interviews With Occupants

The Site is mostly vacant land with a single residence at the northwest section of the Site. Occupants were unaware of any environmental concerns at the Site.

## 7.4 Interview With Local Government Official

During the preparation of this assessment, multiple governmental agency representatives were interviewed regarding the availability of public records pertaining to the Site.

## 7.5 Interview With Others

No other interviews were conducted as a part of this assessment.

# 8.0 Findings, Opinion and Conclusions

VM has performed a Phase I Environmental Site Assessment, in conformance with the scope and limitations of ASTM Practice E 1527-13 and 40 CFR Part 312 of the property located to the north of Vista Grande Drive, and west of Vista Grande Terrace in the City of Vista, San Diego County, California. Any exceptions to, or deletions from, this practice are described in Section 9.0 of this report.

This assessment has revealed no evidence of recognized environmental conditions in connection with the Site. Additional assessment at the Site is not considered to be warranted at this time.

## 9.0 Deviations and Data Gaps

No deviations or data gaps as defined in the ASTM-2013 standard were noted during the preparation of this assessment.

## 10.0 Additional Services

On September 18, 2015 VM mobilized to the Site and collected soil from multiple locations at the Site. VM personnel collected soil samples from six locations at the Site identified as B1 through B6. The sampling locations are depicted on a Site Plan included in Section 13.2 of this report.

Soil samples were collected from each boring location at depths from 0.5-foot bgs up to two-feet bgs or until hand auger refusal, whichever came first. Each of the borings were successfully advanced to two-feet bgs, with samples collected at 0.5, one, and two-foot depths. The soil samples collected at 0.5-feet from each boring (B1-0.5, B2-0.5, B3-0.5, B4-0.5, B5-0.5, and B6-0.5) were analyzed for organochlorine pesticides (OCPs) by United States Environmental Protection Agency (EPA) test Method 8081A. The remaining soil samples that were collected were not analyzed and archived by the analytical laboratory for potential future analysis (if needed). The laboratory reported that three of the six samples analyzed contained concentrations of OCPs above laboratory detection limits. The detections include; DDE reported at 3.29 micrograms per kilogram (ug/kg) (sample B3-0.5), DDT reported at 1.65 ug/kg (sample B5-0.5), and chlordane reported at 1.06 ug/kg (sample B1-0.5). The detected concentrations of DDE, DDT, and Chlordane did not exceed their respective residential soil screening levels.

The analytical laboratory reports are included in Section 13.6 of this report. Based on the negligible OCP concentrations detected in soil, VM does not recommend that additional subsurface assessment be conducted at the Site.

## 11.0 References

"All Appropriate Inquiry" as necessary to satisfy the defenses available under 42 U.S.C. §§ 9607(b)(3), 9607(r)(1), and 9607(q), relying on definitions provided at 42 U.S.C. §§ 9601(35)(B); and as further explained in 40 CFR §§ 312.1 – 312.31.

ASTM International, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process," ASTM Designation E 1527-13, Published November 2013.

California State Water Resources Control Board, GeoTracker online database: http://www.geotracker.swrcb.ca.gov;

California State Water Resources Control Board, Water Quality Control Plan for the San Diego Basin (9), San Diego, California, Published 1994;

Environmental Data Resources Services, Regulatory Database Report Dated June 29, 2015;

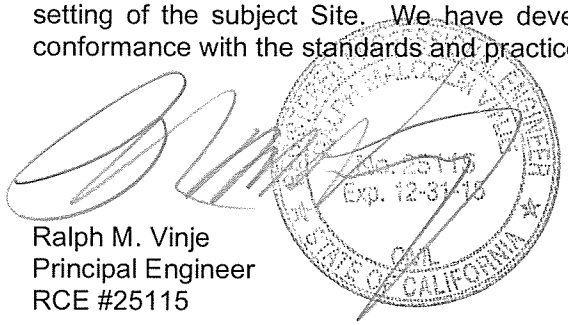
NETROnline, Historical aerial photographs;

State of California Department of Conservation, Division of Oil and Gas and Geothermal Resources: http://www.consrv.ca.gov/DOG/maps/index_map.htm;

USGS topographic map, San Marcos, California Quadrangle (1996).

## 12.0 Signatures and Qualifications of Environmental Professionals

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in 40 CFR 312.10. We have the specific qualifications based on education, training and experience to assess a property of the nature, history and setting of the subject Site. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

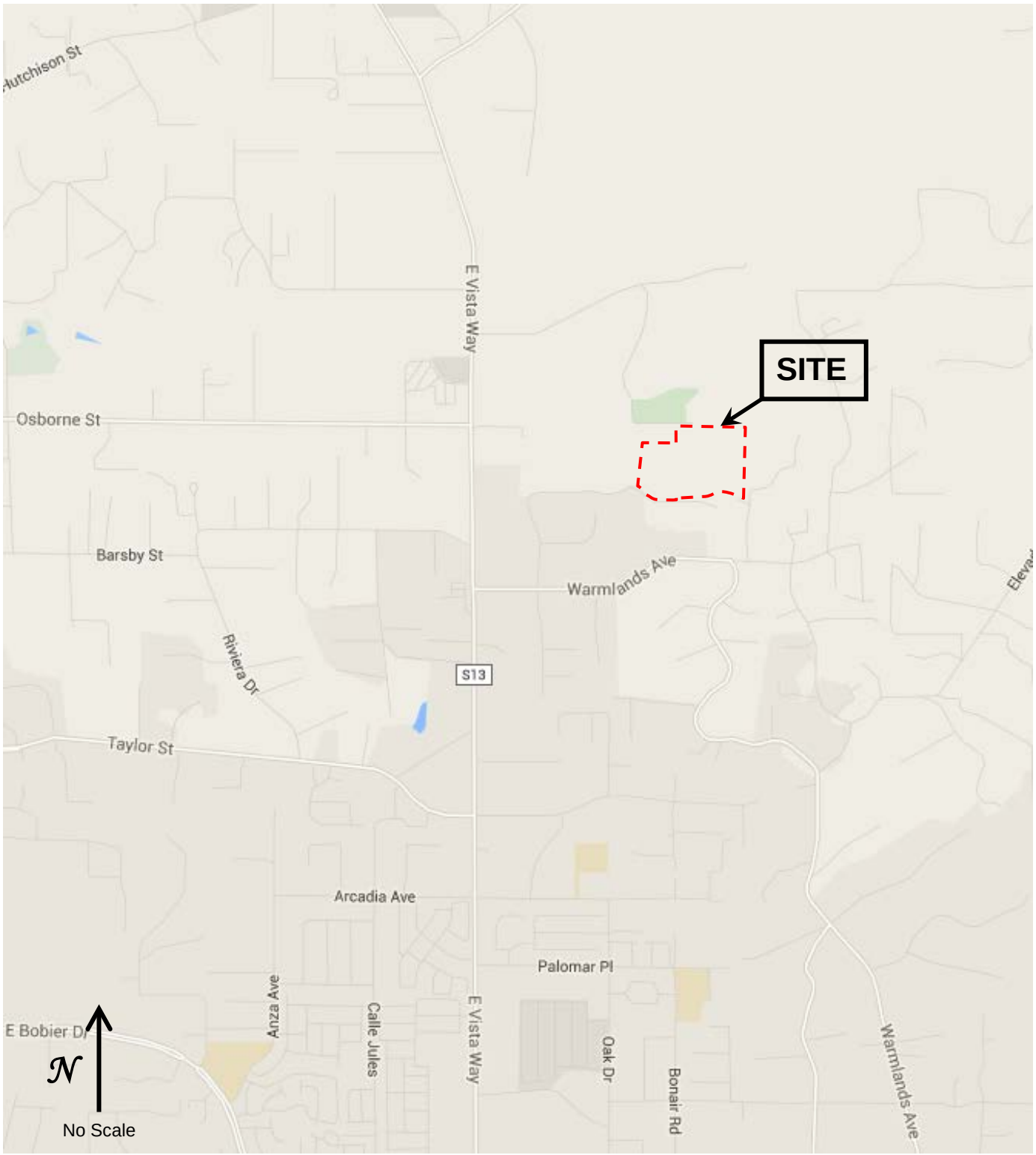



Ralph M. Vinje
Principal Engineer
RCE #25115

Daniel Weis
Associate Environmental Scientist

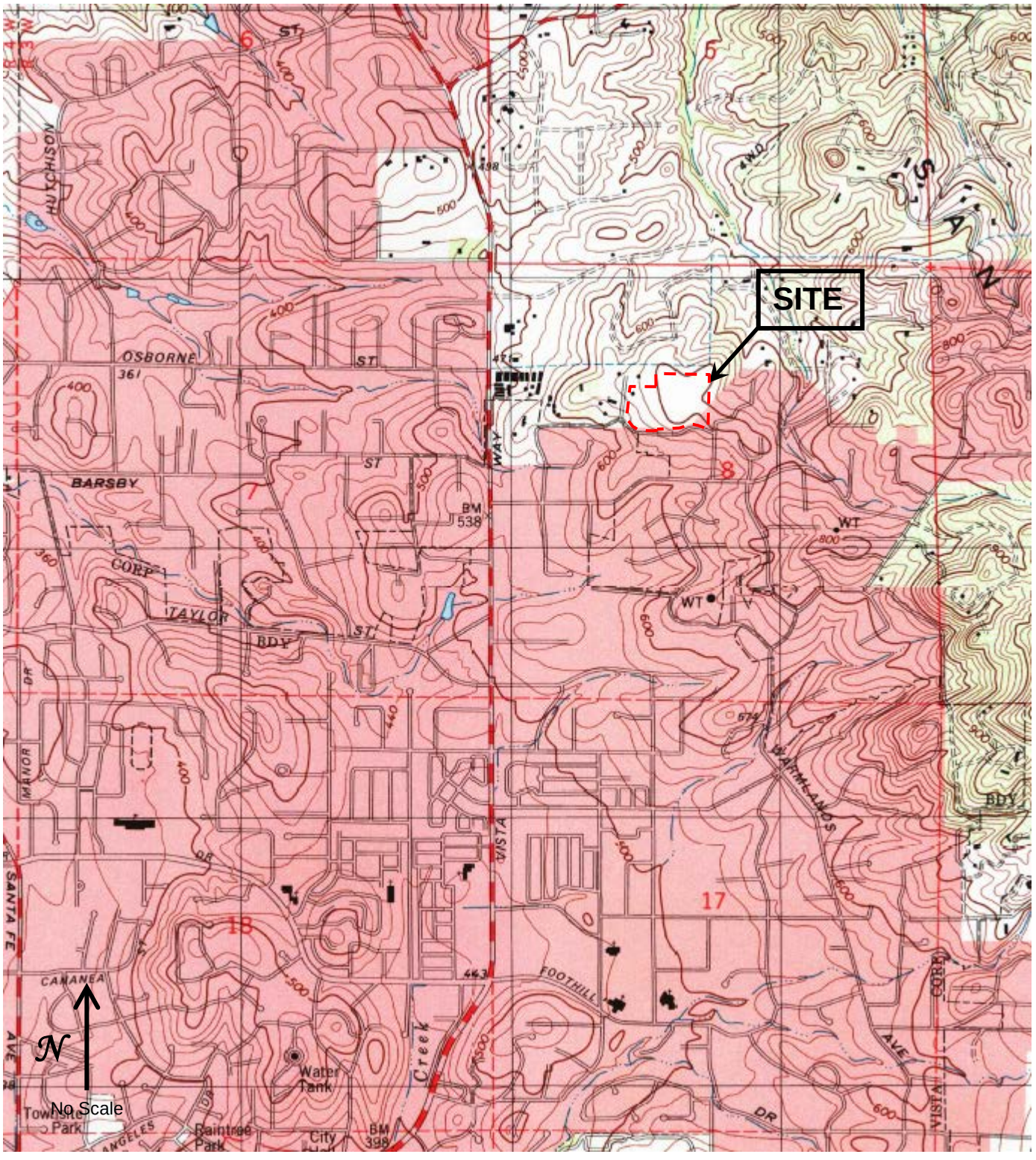
# 13.0 Appendices

## 13.1 Vicinity Map and Topographic Map




Vinje & Middleton Engineering, Inc.
2450 Auto Park Way
Escondido, California 92029

Vicinity Map
Vista Grande Drive
Vista, California




Vinje & Middleton Engineering, Inc.
2450 Auto Park Way
Escondido, California 92029

Topographic Map
Vista Grande Drive
Vista, California

## 13.2 Site Plan

| | |
|---|---|
| Vinje & Middleton Engineering, Inc.<br>2450 Auto Park Way<br>Escondido, California 92029 | Site Plan with Approximate Boring Locations<br>Vista Grande Drive<br>Vista, California |

## 13.3 Site Photographs

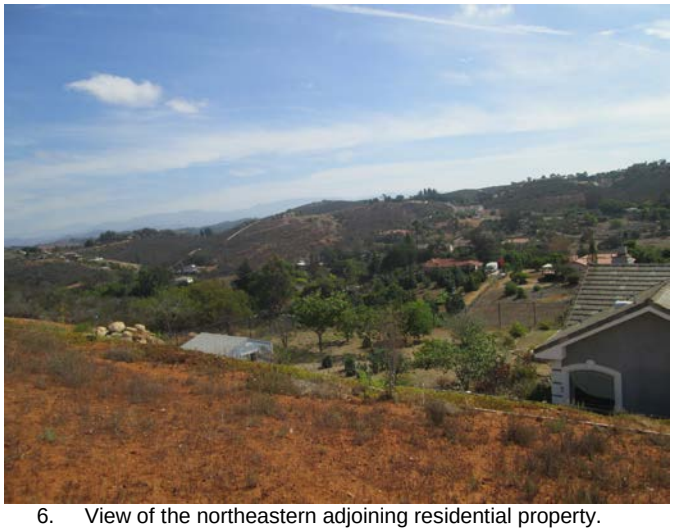
1. View of the Site from the southeastern corner.

2. Northern view from the south central area of the Site..

3. View of the northern adjacent property.

4. Debris at the north central area of the Site.

5. View of the southeastern adjoining residential property.



6. View of the northeastern adjoining residential property.

7. Southern view along the western edge of the Site and adjoining property.

8. Western view towards the on Site residence.

9. On Site residential property, trailer, miscellaneous debris, and gardening area depicted

10. View of the farming /gardening stockpiles in residential area.

11. Residential area.

12. View of gardening material at the residential property.

13. Propane AST.

14. Miscellaneous debris.

15. Southern view of the western driveway.

16. Southern view of the western driveway and western adjacent property.

17. Eastern view of the on-Site residence form the northwest corner.

18. Eastern view of the Site from the residence.

## 13.4 Regulatory Database Report

**Vista Grande**
VISTA GRANDE DR
Vista, CA 92084

Inquiry Number: 4405320.1s
September 09, 2015

# The EDR Radius Map™ Report

Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

# TABLE OF CONTENTS


| SECTION | PAGE |
|---|---|
| Executive Summary | ES1 |
| Overview Map | 2 |
| Detail Map | 3 |
| Map Findings Summary | 4 |
| Map Findings | 8 |
| Orphan Summary | 17 |
| Government Records Searched/Data Currency Tracking | GR-1 |

**GEOCHECK ADDENDUM**

**GeoCheck - Not Requested**


***Thank you for your business.***
Please contact EDR at 1-800-352-0050
with any questions or comments.


**Disclaimer - Copyright and Trademark Notice**

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

Copyright 2015 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

# 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) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

## TARGET PROPERTY INFORMATION

### ADDRESS

VISTA GRANDE DR
VISTA, CA 92084

### COORDINATES

| | |
|---|---|
| Latitude (North): | 33.2367000 - 33° 14' 12.12'' |
| Longitude (West): | 117.2193000 - 117° 13' 9.48'' |
| Universal Tranverse Mercator: | Zone 11 |
| UTM X (Meters): | 479568.3 |
| UTM Y (Meters): | 3677357.5 |
| Elevation: | 705 ft. above sea level |

### USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

| | |
|---|---|
| Target Property Map: | 5641320 SAN MARCOS, CA |
| Version Date: | 2012 |
| North Map: | 5641328 BONSALL, CA |
| Version Date: | 2012 |

### AERIAL PHOTOGRAPHY IN THIS REPORT

| | |
|---|---|
| Portions of Photo from: | 20120519 |
| Source: | USDA |

## MAPPED SITES SUMMARY

Target Property Address:
VISTA GRANDE DR
VISTA, CA 92084

Click on Map ID to see full detail.

| MAP ID | SITE NAME | ADDRESS | DATABASE ACRONYMS | RELATIVE ELEVATION | DIST (ft. & mi.) DIRECTION |
|---|---|---|---|---|---|
| 1 | RANCHO LOMAS VERDES | 2461 EAST VISTA WAY | SLIC | Lower | 1815, 0.344, WNW |
| A2 | SHELL 204-8202-14 | 2131 E VISTA WY | RGA LUST | Lower | 1941, 0.368, WSW |
| A3 | EAST VISTA WAY SHELL | 2131 E VISTA WY | RGA LUST | Lower | 1941, 0.368, WSW |
| A4 | EAST VISTA WAY SHELL | 2131 E VISTA WY | LUST | Lower | 1953, 0.370, WSW |
| A5 | EAST VISTA WAY SHELL | 2131 E VISTA WY | SAN DIEGO CO. SAM | Lower | 1953, 0.370, WSW |
| A6 | SHELL STATION | 2131 VISTA WAY E | LUST | Lower | 1953, 0.370, WSW |
| 7 | KAWANO HIGH SCHOOL | EAST VISTA WAY/MASON | ENVIROSTOR | Lower | 2227, 0.422, NW |
| 8 | EAST VISTA WAY PROPE | 2019 EAST VISTA WAY | SLIC | Lower | 2487, 0.471, SW |
| 9 | RIVIERA SCHOOL | BARSBY STREET/RIVIER | ENVIROSTOR | Lower | 4391, 0.832, West |

# 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
CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System

### *Federal CERCLIS NFRAP site List*

CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned

### *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 landfill and/or solid waste disposal site lists***

SWF/LF ---------- Solid Waste Information System

***State and tribal leaking storage tank lists***

INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

***State and tribal registered storage tank lists***

FEMA UST ---------- Underground Storage Tank Listing
UST ---------- Active UST Facilities
AST ---------- Aboveground Petroleum Storage Tank Facilities
INDIAN UST ---------- Underground Storage Tanks on Indian Land

***State and tribal voluntary cleanup sites***

VCP ---------- Voluntary Cleanup Program Properties
INDIAN VCP ---------- Voluntary Cleanup Priority Listing

***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***

WMUDS/SWAT ---------- Waste Management Unit Database
SWRCY ---------- Recycler Database
HAULERS ---------- Registered Waste Tire Haulers Listing
ODI ---------- Open Dump Inventory
DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations

***Local Lists of Hazardous waste / Contaminated Sites***

US HIST CDL ---------- National Clandestine Laboratory Register
HIST Cal-Sites ---------- Historical Calsites Database
SCH ---------- School Property Evaluation Program
CDL ---------- Clandestine Drug Labs

San Diego Co. HMMD ..... Hazardous Materials Management Division Database
Toxic Pits ..... Toxic Pits Cleanup Act Sites
US CDL ..... Clandestine Drug Labs

***Local Lists of Registered Storage Tanks***

SWEEPS UST ..... SWEEPS UST Listing
HIST UST ..... Hazardous Substance Storage Container Database
CA FID UST ..... Facility Inventory Database

***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
UMTRA ..... Uranium Mill Tailings Sites
LEAD SMELTERS ..... Lead Smelter Sites

US AIRS ---- Aerometric Information Retrieval System Facility Subsystem
US MINES ---- Mines Master Index File
FINDS ---- Facility Index System/Facility Registry System
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
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

**EDR RECOVERED GOVERNMENT ARCHIVES**

***Exclusive Recovered Govt. Archives***

RGA LF ---- Recovered Government Archive Solid Waste Facilities List

**SURROUNDING SITES: SEARCH RESULTS**

Surrounding sites were identified in the following databases.

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 - equivalent CERCLIS***

ENVIROSTOR: 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.

A review of the ENVIROSTOR list, as provided by EDR, and dated 08/03/2015 has revealed that there are 2 ENVIROSTOR sites within approximately 1 mile of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***KAWANO HIGH SCHOOL*** | ***EAST VISTA WAY/MASON*** | ***NW 1/4 - 1/2 (0.422 mi.)*** | ***7*** | ***13*** |
| Facility Id: 37010035 | | | | |
| Status: Inactive - Withdrawn | | | | |
| ***RIVIERA SCHOOL*** | ***BARSBY STREET/RIVIER*** | ***W 1/2 - 1 (0.832 mi.)*** | ***9*** | ***15*** |
| Facility Id: 37010027 | | | | |
| Status: Inactive - Withdrawn | | | | |

***State and tribal leaking storage tank lists***

SAN DIEGO CO. SAM: 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.

A review of the SAN DIEGO CO. SAM list, as provided by EDR, and dated 03/23/2010 has revealed that there is 1 SAN DIEGO CO. SAM site within approximately 0.5 miles of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***EAST VISTA WAY SHELL*** | ***2131 E VISTA WY*** | ***WSW 1/4 - 1/2 (0.370 mi.)*** | ***A5*** | ***12*** |
| Case Number: H00665-001 | | | | |
| Facility Status: Remedial Investigation | | | | |

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 06/15/2015 has revealed that there are 2 LUST sites within approximately 0.5 miles of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| EAST VISTA WAY SHELL | 2131 E VISTA WY | WSW 1/4 - 1/2 (0.370 mi.) | A4 | 9 |
| Status: Completed - Case Closed | | | | |
| Global Id: T0607300259 | | | | |
| ***SHELL STATION*** | ***2131 VISTA WAY E*** | ***WSW 1/4 - 1/2 (0.370 mi.)*** | ***A6*** | ***13*** |
| Status: Preliminary site assessment underway | | | | |
| Case Number: 9UT1428 | | | | |

SLIC: SLIC Region comes from the California Regional Water Quality Control Board.

A review of the SLIC list, as provided by EDR, and dated 06/15/2015 has revealed that there are 2 SLIC sites within approximately 0.5 miles of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| RANCHO LOMAS VERDES<br>Facility Status: Open - Site Assessment<br>Global Id: T10000003505 | 2461 EAST VISTA WAY | WNW 1/4 - 1/2 (0.344 mi.) | 1 | 8 |
| EAST VISTA WAY PROPE<br>Facility Status: Open - Site Assessment<br>Global Id: T10000005623 | 2019 EAST VISTA WAY | SW 1/4 - 1/2 (0.471 mi.) | 8 | 15 |

**EDR RECOVERED GOVERNMENT ARCHIVES**

***Exclusive Recovered Govt. Archives***

RGA LUST: 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.

A review of the RGA LUST list, as provided by EDR, has revealed that there are 2 RGA LUST sites within approximately 0.5 miles of the target property.

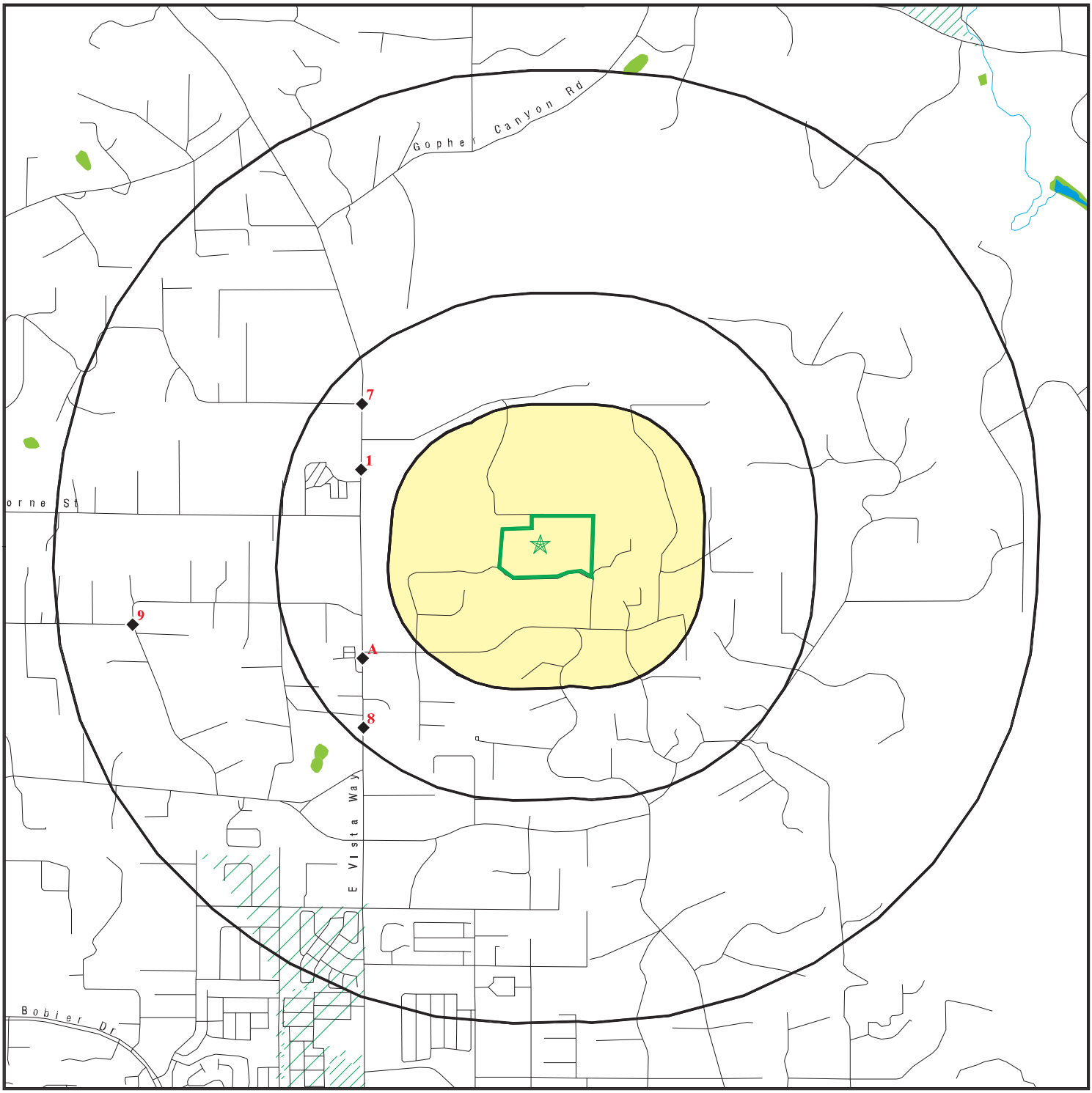
| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| SHELL 204-8202-14 | 2131 E VISTA WY | WSW 1/4 - 1/2 (0.368 mi.) | A2 | 8 |
| EAST VISTA WAY SHELL | 2131 E VISTA WY | WSW 1/4 - 1/2 (0.368 mi.) | A3 | 8 |

# EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 6 records.

| Site Name | Database(s) |
|---|---|
| VISTA PROPOSED TRANSIT CENTER | RGA LUST |
| PETO'S - VISTA REDEVELOPMENT | RGA LUST |
| VISTA INDEPEN. MERCEDES REPAIR | RGA LUST |
| VISTA INDEPEN. MERCEDES REPAIR | RGA LUST |
| VISTA VILLAGE PHASE 2 | NPDES |
| SDG&E - NORTH VISTA SUBSTATION | FINDS |

# OVERVIEW MAP - 4405320.1S



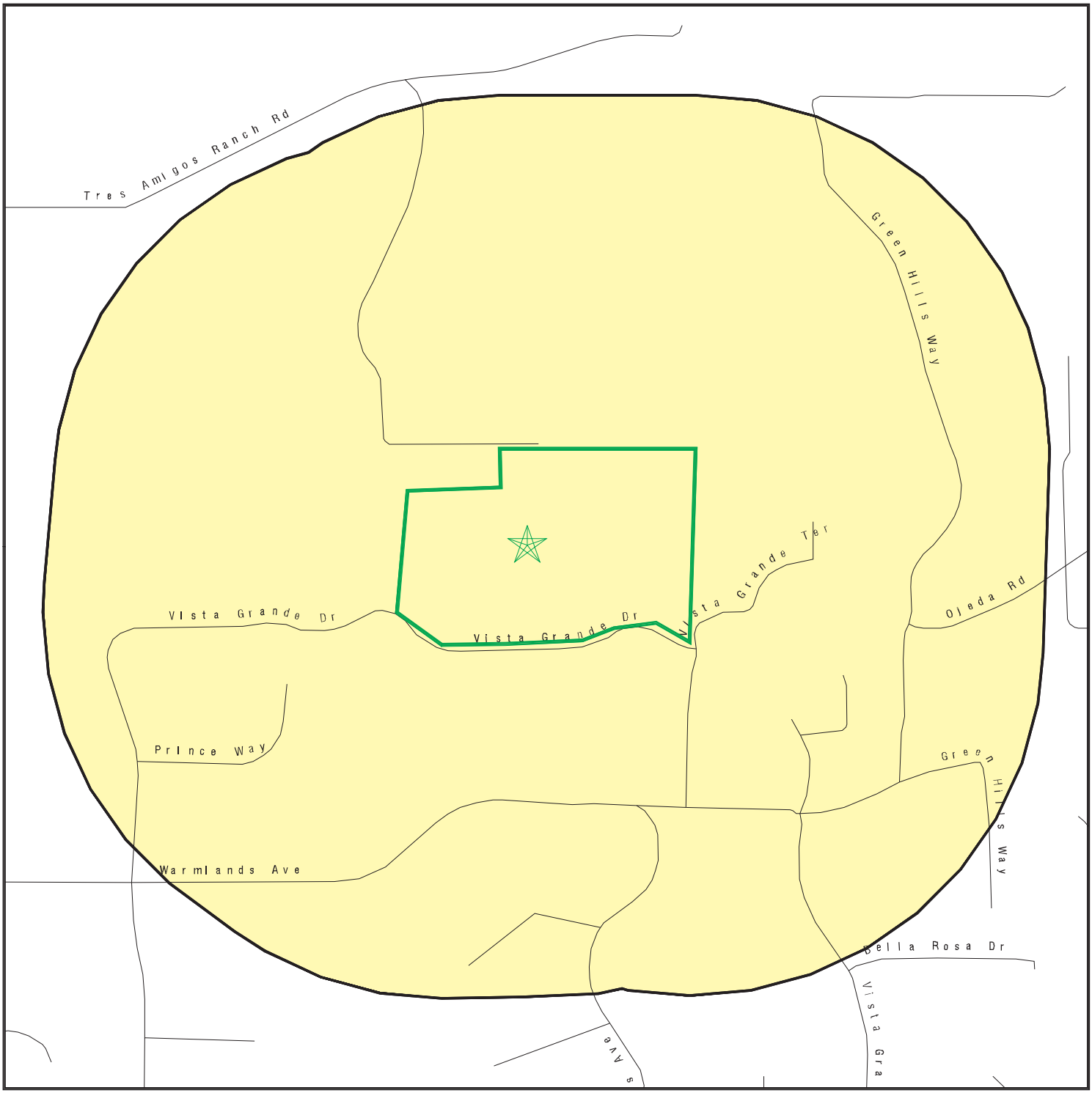

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

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: Vista Grande<br>ADDRESS: VISTA GRANDE DR<br>Vista CA 92084<br>LAT/LONG: 33.2367 / 117.2193 | CLIENT: Advantage Env. Consultants LLC<br>CONTACT: Keith Sy<br>INQUIRY #: 4405320.1s<br>DATE: September 09, 2015 8:59 am |

Copyright © 2015 EDR, Inc. © 2010 Tele Atlas Rel. 07/2009.

# DETAIL MAP - 4405320.1S




- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- 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: Vista Grande | CLIENT: Advantage Env. Consultants LLC |
| ADDRESS: VISTA GRANDE DR<br>Vista CA 92084 | CONTACT: Keith Sy |
| LAT/LONG: 33.2367 / 117.2193 | INQUIRY #: 4405320.1s<br>DATE: September 09, 2015 9:00 am |

Copyright © 2015 EDR, Inc. © 2010 Tele Atlas Rel. 07/2009.

# 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 | TP | | NR | 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 | TP | | NR | NR | NR | NR | NR | 0 |
| CERCLIS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Federal CERCLIS NFRAP site List*** | | | | | | | | |
| CERC-NFRAP | 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 | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| RCRA-SQG | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| RCRA-CESQG | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| ***Federal institutional controls / engineering controls registries*** | | | | | | | | |
| LUCIS | TP | | NR | NR | NR | 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 | 0.125 | | 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 | 1 | 1 | NR | 2 |
| ***State and tribal landfill and/or solid waste disposal site lists*** | | | | | | | | |
| SWF/LF | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***State and tribal leaking storage tank lists*** | | | | | | | | |
| SAN DIEGO CO. SAM | 0.500 | | 0 | 0 | 1 | NR | NR | 1 |

# 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 |
|---|---|---|---|---|---|---|---|---|
| LUST | 0.500 | | 0 | 0 | 2 | NR | NR | 2 |
| INDIAN LUST | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| SLIC | 0.500 | | 0 | 0 | 2 | NR | NR | 2 |
| ***State and tribal registered storage tank lists*** | | | | | | | | |
| FEMA UST | TP | | NR | NR | NR | NR | NR | 0 |
| UST | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| AST | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| INDIAN UST | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| ***State and tribal voluntary cleanup sites*** | | | | | | | | |
| VCP | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| INDIAN 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 | TP | | NR | NR | NR | NR | NR | 0 |
| SWRCY | TP | | NR | NR | NR | NR | NR | 0 |
| HAULERS | TP | | NR | NR | NR | NR | NR | 0 |
| ODI | TP | | NR | NR | NR | NR | NR | 0 |
| DEBRIS REGION 9 | TP | | NR | NR | NR | NR | NR | 0 |
| ***Local Lists of Hazardous waste / Contaminated Sites*** | | | | | | | | |
| US HIST CDL | TP | | NR | NR | NR | NR | NR | 0 |
| HIST Cal-Sites | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| SCH | TP | | NR | NR | NR | NR | NR | 0 |
| CDL | TP | | NR | NR | NR | NR | NR | 0 |
| San Diego Co. HMMD | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| Toxic Pits | TP | | NR | NR | NR | NR | NR | 0 |
| US CDL | TP | | NR | NR | NR | NR | NR | 0 |
| ***Local Lists of Registered Storage Tanks*** | | | | | | | | |
| SWEEPS UST | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| HIST UST | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| CA FID UST | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| ***Local Land Records*** | | | | | | | | |
| LIENS | TP | | NR | NR | NR | NR | NR | 0 |
| LIENS 2 | TP | | NR | NR | NR | NR | NR | 0 |
| DEED | TP | | NR | NR | NR | NR | NR | 0 |
| ***Records of Emergency Release Reports*** | | | | | | | | |
| HMIRS | TP | | NR | 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 |
|---|---|---|---|---|---|---|---|---|
| CHMIRS | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| LDS | TP | | NR | NR | NR | NR | NR | 0 |
| MCS | TP | | NR | NR | NR | NR | NR | 0 |
| SPILLS 90 | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| ***Other Ascertainable Records*** | | | | | | | | |
| RCRA NonGen / NLR | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| FUDS | TP | | NR | NR | NR | NR | NR | 0 |
| DOD | TP | | NR | NR | NR | NR | NR | 0 |
| SCRD DRYCLEANERS | TP | | NR | NR | NR | NR | NR | 0 |
| US FIN ASSUR | TP | | NR | NR | NR | NR | NR | 0 |
| EPA WATCH LIST | TP | | NR | NR | NR | NR | NR | 0 |
| 2020 COR ACTION | 0.250 | | 0 | 0 | NR | NR | NR | 0 |
| TSCA | TP | | NR | NR | NR | NR | NR | 0 |
| TRIS | TP | | NR | NR | NR | NR | NR | 0 |
| SSTS | TP | | NR | NR | NR | NR | NR | 0 |
| ROD | TP | | NR | NR | NR | NR | NR | 0 |
| RMP | TP | | NR | NR | NR | NR | NR | 0 |
| RAATS | TP | | NR | NR | NR | NR | NR | 0 |
| PRP | TP | | NR | NR | NR | NR | NR | 0 |
| PADS | TP | | NR | NR | NR | NR | NR | 0 |
| ICIS | TP | | NR | NR | NR | NR | NR | 0 |
| FTTS | TP | | NR | NR | NR | NR | NR | 0 |
| MLTS | TP | | NR | NR | NR | NR | NR | 0 |
| COAL ASH DOE | TP | | NR | NR | NR | NR | NR | 0 |
| COAL ASH EPA | TP | | NR | NR | NR | NR | NR | 0 |
| PCB TRANSFORMER | TP | | NR | NR | NR | NR | NR | 0 |
| RADINFO | TP | | NR | NR | NR | NR | NR | 0 |
| HIST FTTS | TP | | NR | NR | NR | NR | NR | 0 |
| DOT OPS | TP | | NR | NR | NR | NR | NR | 0 |
| CONSENT | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| INDIAN RESERV | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| UMTRA | TP | | NR | NR | NR | NR | NR | 0 |
| LEAD SMELTERS | TP | | NR | NR | NR | NR | NR | 0 |
| US AIRS | TP | | NR | NR | NR | NR | NR | 0 |
| US MINES | TP | | NR | NR | NR | NR | NR | 0 |
| FINDS | TP | | NR | NR | NR | NR | NR | 0 |
| CA BOND EXP. PLAN | TP | | NR | NR | NR | NR | NR | 0 |
| Cortese | TP | | NR | NR | NR | NR | NR | 0 |
| CUPA Listings | 0.125 | | 0 | NR | NR | NR | NR | 0 |
| DRYCLEANERS | TP | | NR | NR | NR | NR | NR | 0 |
| EMI | TP | | NR | NR | NR | NR | NR | 0 |
| ENF | TP | | NR | NR | NR | NR | NR | 0 |
| Financial Assurance | TP | | NR | NR | NR | NR | NR | 0 |
| HAZNET | TP | | NR | NR | NR | NR | NR | 0 |
| HIST CORTESE | TP | | NR | NR | NR | NR | NR | 0 |
| HWP | TP | | NR | NR | NR | NR | NR | 0 |
| HWT | TP | | NR | NR | NR | NR | NR | 0 |
| MINES | TP | | NR | NR | NR | NR | NR | 0 |
| MWMP | TP | | NR | NR | NR | NR | NR | 0 |
| NPDES | TP | | NR | 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 |
|---|---|---|---|---|---|---|---|---|
| PEST LIC | TP | | NR | NR | NR | NR | NR | 0 |
| PROC | TP | | NR | NR | NR | NR | NR | 0 |
| Notify 65 | TP | | NR | NR | NR | NR | NR | 0 |
| UIC | TP | | NR | NR | NR | NR | NR | 0 |
| WASTEWATER PITS | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| WDS | TP | | NR | NR | NR | NR | NR | 0 |
| WIP | TP | | NR | NR | NR | NR | NR | 0 |
| **EDR RECOVERED GOVERNMENT ARCHIVES** | | | | | | | | |
| ***Exclusive Recovered Govt. Archives*** | | | | | | | | |
| RGA LF | 0.500 | | 0 | 0 | 0 | NR | NR | 0 |
| RGA LUST | 0.500 | | 0 | 0 | 2 | NR | NR | 2 |
| - Totals -- | | 0 | 0 | 0 | 8 | 1 | 0 | 9 |

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

**1**
**WNW**
**1/4-1/2**
**0.344 mi.**
**1815 ft.**

**RANCHO LOMAS VERDES**
**2461 EAST VISTA WAY**
**VISTA, CA 92084**

**SLIC** **S111711553**
**N/A**

**Relative:**
**Lower**

**Actual:**
**481 ft.**

SLIC:

| | |
|---|---|
| Region: | STATE |
| **Facility Status:** | **Open - Site Assessment** |
| Status Date: | 01/24/2012 |
| Global Id: | T10000003505 |
| Lead Agency: | SAN DIEGO COUNTY LOP |
| Lead Agency Case Number: | H39783-001 |
| Latitude: | 33.2395848768029 |
| Longitude: | -117.223434448242 |
| Case Type: | Cleanup Program Site |
| Case Worker: | LA |
| Local Agency: | SAN DIEGO COUNTY LOP |
| RB Case Number: | Not reported |
| File Location: | Not reported |
| Potential Media Affected: | Not reported |
| Potential Contaminants of Concern: | Not reported |
| Site History: | This is a new VAP Case. This section will be updated as data is received. |

Click here to access the California GeoTracker records for this facility:

---

**A2**
**WSW**
**1/4-1/2**
**0.368 mi.**
**1941 ft.**

**SHELL 204-8202-14**
**2131 E VISTA WY**
**VISTA, CA**

**Site 1 of 5 in cluster A**

**RGA LUST** **S114686717**
**N/A**

**Relative:**
**Lower**

**Actual:**
**537 ft.**

RGA LUST:

| | | |
|---|---|---|
| 2003 | SHELL 204-8202-14 | 2131 E VISTA WY |

---

**A3**
**WSW**
**1/4-1/2**
**0.368 mi.**
**1941 ft.**

**EAST VISTA WAY SHELL**
**2131 E VISTA WY**
**VISTA, CA**

**Site 2 of 5 in cluster A**

**RGA LUST** **S114613181**
**N/A**

**Relative:**
**Lower**

**Actual:**
**537 ft.**

RGA LUST:

| | | |
|---|---|---|
| 2012 | EAST VISTA WAY SHELL | 2131 E VISTA WY |
| 2011 | EAST VISTA WAY SHELL | 2131 E VISTA WY |
| 2010 | EAST VISTA WAY SHELL | 2131 E VISTA WY |
| 2009 | EAST VISTA WAY SHELL | 2131 E VISTA WY |
| 2008 | EAST VISTA WAY SHELL | 2131 E VISTA WY |
| 2007 | EAST VISTA WAY SHELL | 2131 E VISTA WY |
| 2006 | EAST VISTA WAY SHELL | 2131 E VISTA WY |
| 2005 | EAST VISTA WAY SHELL | 2131 E VISTA WY |

**A4**
**WSW**
**1/4-1/2**
**0.370 mi.**
**1953 ft.**

**EAST VISTA WAY SHELL**
**2131 E VISTA WY**
**VISTA, CA 92083**

**Site 3 of 5 in cluster A**

**LUST** **S105126628**
**N/A**

**Relative:**
**Lower**

**Actual:**
**537 ft.**

LUST:

| | |
|---|---|
| Region: | STATE |
| Global Id: | T0607300259 |
| Latitude: | 33.232921839092 |
| Longitude: | -117.225735783577 |
| Case Type: | Not reported |
| Status: | Completed - Case Closed |
| Status Date: | 12/19/2014 |
| Lead Agency: | Not reported |
| Case Worker: | JS |
| Local Agency: | Not reported |
| RB Case Number: | 9UT1428 |
| LOC Case Number: | Not reported |
| File Location: | Local Agency |
| Potential Media Affect: | Aquifer used for drinking water supply |
| Potential Contaminants of Concern: | Gasoline |
| Site History: | Please see "Site Maps/Documents" tab for Closure Letter/Summary |

Click here to access the California GeoTracker records for this facility:

Contact:

| | |
|---|---|
| Global Id: | T0607300259 |
| Contact Type: | Local Agency Caseworker |
| Contact Name: | JON SENAHA |
| Organization Name: | SAN DIEGO COUNTY LOP |
| Address: | P.O. Box 129261 |
| City: | San Diego |
| Email: | jon.senaha@sdcounty.ca.gov |
| Phone Number: | Not reported |

Status History:

| | |
|---|---|
| Global Id: | T0607300259 |
| Status: | Completed - Case Closed |
| Status Date: | 10/10/2013 |
| Global Id: | T0607300259 |
| Status: | Completed - Case Closed |
| Status Date: | 12/19/2014 |
| Global Id: | T0607300259 |
| Status: | Open - Case Begin Date |
| Status Date: | 09/02/1987 |
| Global Id: | T0607300259 |
| Status: | Open - Remediation |
| Status Date: | 03/22/1990 |
| Global Id: | T0607300259 |
| Status: | Open - Site Assessment |
| Status Date: | 07/07/2009 |

Regulatory Activities:

| | |
|---|---|
| Global Id: | T0607300259 |

**EAST VISTA WAY SHELL (Continued)** **S105126628**

Action Type: RESPONSE
Date: 07/27/2009
Action: Monitoring Report - Quarterly

Global Id: T0607300259
Action Type: RESPONSE
Date: 04/24/2009
Action: Monitoring Report - Quarterly

Global Id: T0607300259
Action Type: RESPONSE
Date: 07/29/2011
Action: Monitoring Report - Semi-Annually

Global Id: T0607300259
Action Type: ENFORCEMENT
Date: 09/02/1987
Action: Notice of Responsibility

Global Id: T0607300259
Action Type: ENFORCEMENT
Date: 07/31/2008
Action: Technical Correspondence / Assistance / Other

Global Id: T0607300259
Action Type: RESPONSE
Date: 01/30/2012
Action: Monitoring Report - Semi-Annually

Global Id: T0607300259
Action Type: RESPONSE
Date: 07/29/2010
Action: Monitoring Report - Semi-Annually

Global Id: T0607300259
Action Type: RESPONSE
Date: 09/27/2012
Action: Monitoring Report - Semi-Annually

Global Id: T0607300259
Action Type: Other
Date: 03/31/1989
Action: Leak Discovery

Global Id: T0607300259
Action Type: ENFORCEMENT
Date: 12/19/2014
Action: Closure/No Further Action Letter

Global Id: T0607300259
Action Type: RESPONSE
Date: 08/22/2013
Action: Monitoring Report - Semi-Annually

Global Id: T0607300259
Action Type: ENFORCEMENT
Date: 10/10/2013

**EAST VISTA WAY SHELL (Continued)** **S105126628**

Action: Technical Correspondence / Assistance / Other

Global Id: T0607300259
Action Type: Other
Date: 03/31/1989
Action: Leak Reported

Global Id: T0607300259
Action Type: Other
Date: 03/31/1989
Action: Leak Began

Global Id: T0607300259
Action Type: ENFORCEMENT
Date: 03/26/2012
Action: Technical Correspondence / Assistance / Other

Global Id: T0607300259
Action Type: RESPONSE
Date: 12/19/2013
Action: Other Report / Document

Global Id: T0607300259
Action Type: RESPONSE
Date: 02/04/2014
Action: Correspondence

Global Id: T0607300259
Action Type: RESPONSE
Date: 03/11/2014
Action: Correspondence

Global Id: T0607300259
Action Type: ENFORCEMENT
Date: 03/24/2014
Action: Notice of Responsibility

Global Id: T0607300259
Action Type: RESPONSE
Date: 04/09/2013
Action: Monitoring Report - Semi-Annually

Global Id: T0607300259
Action Type: ENFORCEMENT
Date: 03/20/2014
Action: Technical Correspondence / Assistance / Other

Global Id: T0607300259
Action Type: ENFORCEMENT
Date: 03/24/2014
Action: Notification - Preclosure

Global Id: T0607300259
Action Type: RESPONSE
Date: 07/30/2013
Action: Request for Closure - Regulator Responded

**EAST VISTA WAY SHELL (Continued)** **S105126628**

| | |
|---|---|
| Global Id: | T0607300259 |
| Action Type: | RESPONSE |
| Date: | 11/20/2013 |
| Action: | Other Report / Document - Regulator Responded |
| Global Id: | T0607300259 |
| Action Type: | ENFORCEMENT |
| Date: | 03/24/2010 |
| Action: | Notice of Responsibility |
| Global Id: | T0607300259 |
| Action Type: | RESPONSE |
| Date: | 06/21/2012 |
| Action: | Correspondence |
| Global Id: | T0607300259 |
| Action Type: | Other |
| Date: | 03/31/1989 |
| Action: | Leak Stopped |
| Global Id: | T0607300259 |
| Action Type: | ENFORCEMENT |
| Date: | 07/14/2009 |
| Action: | Letter - Notice |
| Global Id: | T0607300259 |
| Action Type: | ENFORCEMENT |
| Date: | 12/20/2013 |
| Action: | Technical Correspondence / Assistance / Other |
| Global Id: | T0607300259 |
| Action Type: | RESPONSE |
| Date: | 01/27/2011 |
| Action: | Monitoring Report - Semi-Annually |

---

**A5** **EAST VISTA WAY SHELL** **SAN DIEGO CO. SAM** **S104397308**
**WSW** **2131 E VISTA WY** **N/A**
**1/4-1/2** **VISTA, CA 92083**
**0.370 mi.**
**1953 ft.** **Site 4 of 5 in cluster A**

**Relative:**
**Lower**

**Actual:**
**537 ft.**

SAN DIEGO CO. SAM:

| | |
|---|---|
| Case Number: | H00665-001 |
| Agency: | DEH Site Assessment & Mitigation |
| **Funding:** | **LOP - State Fund** |
| Facility Type: | Drinking Water Aquifer Impacted |
| Facility Status: | Remedial Investigation |
| Date: | 3/22/1990 |
| Date Began: | 3/31/1989 |

**A6**
**WSW**
**1/4-1/2**
**0.370 mi.**
**1953 ft.**

**SHELL STATION**
**2131 VISTA WAY E**
**VISTA, CA 92083**

**Site 5 of 5 in cluster A**

**LUST** **S103066111**
**N/A**

**Relative:**
**Lower**

**Actual:**
**537 ft.**

LUST REG 9:

| | |
|---|---|
| Region: | 9 |
| Status: | Preliminary site assessment underway |
| Case Number: | 9UT1428 |
| Local Case: | H00665-001 |
| Substance: | Gasoline |
| Qty Leaked: | Not reported |
| Abate Method: | Not reported |
| Local Agency: | San Diego |
| How Found: | Other Means |
| How Stopped: | Not reported |
| Source: | Not reported |
| Cause: | Not reported |
| Lead Agency: | Local Agency |
| Case Type: | Aquifer affected |
| Date Found: | 03/31/1989 |
| Date Stopped: | 03/31/1989 |
| Confirm Date: | 03/31/1989 |
| Submit Workplan: | Not reported |
| Prelim Assess: | 06/08/1989 |
| Desc Pollution: | Not reported |
| Remed Plan: | / / |
| Remed Action: | Not reported |
| Began Monitor: | Not reported |
| Release Date: | 03/31/1989 |
| Enforce Date: | 9/2/87 |
| Closed Date: | Not reported |
| Enforce Type: | SEL |
| Pilot Program: | LOP |
| Basin Number: | 904.26 |
| GW Depth: | Not reported |
| Beneficial Use: | Municipal groundwater use |
| NPDES Number: | Not reported |
| Priority: | 2A |
| File Dispn: | Not reported |
| Interim Remedial Actions: | No |
| Cleanup and Abatement order Number: | Not reported |
| Waste Discharge Requirement Number: | Not reported |

---

**7**
**NW**
**1/4-1/2**
**0.422 mi.**
**2227 ft.**

**KAWANO HIGH SCHOOL**
**EAST VISTA WAY/MASON ROAD**
**VISTA, CA 92084**

**ENVIROSTOR** **S105628893**
**N/A**

**Relative:**
**Lower**

**Actual:**
**498 ft.**

ENVIROSTOR:

| | |
|---|---|
| Facility ID: | 37010035 |
| Status: | Inactive - Withdrawn |
| Status Date: | 09/05/2002 |
| Site Code: | 404377 |
| Site Type: | School Investigation |
| Site Type Detailed: | School |
| Acres: | 50 |
| NPL: | NO |

**KAWANO HIGH SCHOOL (Continued)** **S105628893**

Regulatory Agencies: SMBRP
Lead Agency: SMBRP
Program Manager: Not reported
Supervisor: Javier Hinojosa
Division Branch: Southern California Schools & Brownfields Outreach
Assembly: 76
Senate: 36
Special Program: Not reported
Restricted Use: NO
Site Mgmt Req: NONE SPECIFIED
Funding: School District
Latitude: 33.22595
Longitude: -117.2224
APN: NONE SPECIFIED
Past Use: AGRICULTURAL - ROW CROPS
Potential COC: NONE SPECIFIED
Confirmed COC: NONE SPECIFIED
Potential Description: NONE SPECIFIED
Alias Name: KAWANO HIGH SCHOOL
Alias Type: Alternate Name
Alias Name: VISTA UNIFIED SCHOOL DISTRICT
Alias Type: Alternate Name
Alias Name: VISTA USD-PROPOSED KAWANO HIGH SCHOOL
Alias Type: Alternate Name
Alias Name: 404377
Alias Type: Project Code (Site Code)
Alias Name: 37010035
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 04/28/2003
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 09/05/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Inspections/Visit (Non LUR)
Completed Date: 10/21/2002
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

**8**
**SW**
**1/4-1/2**
**0.471 mi.**
**2487 ft.**

**EAST VISTA WAY PROPERTY**
**2019 EAST VISTA WAY**
**VISTA, CA 92084**

**SLIC** **S116290494**
**N/A**

**Relative:**
**Lower**

**Actual:**
**513 ft.**

SLIC:

| | |
|---|---|
| Region: | STATE |
| **Facility Status:** | **Open - Site Assessment** |
| Status Date: | 02/04/2014 |
| Global Id: | T10000005623 |
| Lead Agency: | SAN DIEGO COUNTY LOP |
| Lead Agency Case Number: | DEH2014-LSAM-000228 |
| Latitude: | 33.2307404332833 |
| Longitude: | -117.224494804893 |
| Case Type: | Cleanup Program Site |
| Case Worker: | EP |
| Local Agency: | SAN DIEGO COUNTY LOP |
| RB Case Number: | Not reported |
| File Location: | Local Agency |
| Potential Media Affected: | Not reported |
| Potential Contaminants of Concern: | Not reported |
| Site History: | This is a new VAP case. This section will be updated as data is received. |

Click here to access the California GeoTracker records for this facility:

---

**9**
**West**
**1/2-1**
**0.832 mi.**
**4391 ft.**

**RIVIERA SCHOOL**
**BARSBY STREET/RIVIERA DRIVE**
**VISTA, CA 92084**

**ENVIROSTOR** **S107737161**
**N/A**

**Relative:**
**Lower**

**Actual:**
**400 ft.**

ENVIROSTOR:

| | |
|---|---|
| Facility ID: | 37010027 |
| Status: | Inactive - Withdrawn |
| Status Date: | 09/16/2004 |
| Site Code: | 404334 |
| Site Type: | School Investigation |
| Site Type Detailed: | School |
| Acres: | 10.13 |
| NPL: | NO |
| Regulatory Agencies: | SMBRP |
| Lead Agency: | SMBRP |
| Program Manager: | Not reported |
| Supervisor: | Javier Hinojosa |
| Division Branch: | Southern California Schools & Brownfields Outreach |
| Assembly: | 76 |
| Senate: | 36 |
| Special Program: | Not reported |
| Restricted Use: | NO |
| Site Mgmt Req: | NONE SPECIFIED |
| Funding: | School District |
| Latitude: | 33.22595 |
| Longitude: | -117.2224 |
| APN: | NONE SPECIFIED |
| Past Use: | AGRICULTURAL - ROW CROPS |
| Potential COC: | NONE SPECIFIED |
| Confirmed COC: | NONE SPECIFIED |
| Potential Description: | NONE SPECIFIED |

**RIVIERA SCHOOL (Continued)** **S107737161**

Alias Name: RIVIERA SCHOOL (PROPOSED)
Alias Type: Alternate Name
Alias Name: VISTA UNIFIED SCHOOL DISTRICT
Alias Type: Alternate Name
Alias Name: VISTA USD-PROPOSED RIVIERA SCHOOL
Alias Type: Alternate Name
Alias Name: 404334
Alias Type: Project Code (Site Code)
Alias Name: 37010027
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: * Workplan
Completed Date: 12/23/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 09/16/2004
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 05/01/2002
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

Count: 6 records. ORPHAN SUMMARY

| City | EDR ID | Site Name | Site Address | Zip | Database(s) |
|---|---|---|---|---|---|
| VISTA | 1016426894 | SDG&E - NORTH VISTA SUBSTATION | 1000 ARCADIA AV (EST OF E VIST | 92084 | FINDS |
| VISTA | S114719238 | VISTA PROPOSED TRANSIT CENTER | N E CRNR OLIVE/W VISTA | | RGA LUST |
| VISTA | S117714964 | VISTA VILLAGE PHASE 2 | SEC VISTA VIL DR LADO DE LOMA | | NPDES |
| VISTA | S114668815 | PETO'S - VISTA REDEVELOPMENT | 122 W VISTA WY | | RGA LUST |
| VISTA | S114719199 | VISTA INDEPEN. MERCEDES REPAIR | 727 VISTA WAY, EAST | | RGA LUST |
| VISTA | S114719198 | VISTA INDEPEN. MERCEDES REPAIR | 727 VISTA WAY E | | RGA LUST |

# 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: 03/26/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 75

Source: EPA
Telephone: N/A
Last EDR Contact: 07/09/2015
Next Scheduled EDR Contact: 10/19/2015
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: 03/26/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 75

Source: EPA
Telephone: N/A
Last EDR Contact: 07/09/2015
Next Scheduled EDR Contact: 10/19/2015
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: 03/26/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 75

Source: EPA
Telephone: N/A
Last EDR Contact: 07/09/2015
Next Scheduled EDR Contact: 10/19/2015
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: 03/26/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 07/10/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Varies

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS 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). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Quarterly

***Federal CERCLIS NFRAP site List***

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS 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 this 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. This 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 a potential NPL site.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
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: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
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: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
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: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
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: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
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: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

***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: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 08/12/2015
Next Scheduled EDR Contact: 11/30/2015
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: 06/09/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/02/2015
Number of Days to Update: 68

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 08/31/2015
Next Scheduled EDR Contact: 12/14/2015
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: 06/09/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/02/2015
Number of Days to Update: 68

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 08/31/2015
Next Scheduled EDR Contact: 12/14/2015
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: 03/30/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 63

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Annually

***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: 08/03/2015
Date Data Arrived at EDR: 08/04/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 30

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 08/04/2015
Next Scheduled EDR Contact: 11/16/2015
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: 08/03/2015
Date Data Arrived at EDR: 08/04/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 30

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 08/04/2015
Next Scheduled EDR Contact: 11/16/2015
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: 08/17/2015
Date Data Arrived at EDR: 08/18/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 16

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 08/18/2015
Next Scheduled EDR Contact: 11/30/2015
Data Release Frequency: Quarterly

***State and tribal leaking storage tank lists***

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 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 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 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 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 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

LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

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 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 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 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

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/03/2015
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 29

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Quarterly

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: 01/08/2015
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 07/31/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Quarterly

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: 04/30/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 48

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 04/28/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 55

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
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: 03/17/2015
Date Data Arrived at EDR: 05/01/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 52

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
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: 02/03/2015
Date Data Arrived at EDR: 04/30/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 53

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/31/2015
Next Scheduled EDR Contact: 11/09/2015
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: 09/30/2014
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Semi-Annually

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: 04/30/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 24

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

SLIC: Statewide SLIC Cases
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: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
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: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 07/10/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Varies

UST: Active UST Facilities

Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 19

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
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: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

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: 09/30/2014
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Semi-Annually

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: 04/30/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 27

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
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: 03/17/2015
Date Data Arrived at EDR: 05/01/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 52

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Semi-Annually

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: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
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: 04/30/2015
Date Data Arrived at EDR: 05/05/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 48

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Quarterly

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: 05/06/2015
Date Data Arrived at EDR: 05/19/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 34

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
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: 02/03/2015
Date Data Arrived at EDR: 04/30/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 53

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/31/2015
Next Scheduled EDR Contact: 11/09/2015
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: 12/14/2014
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 28

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 07/31/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Quarterly

***State and tribal voluntary cleanup sites***

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: 09/29/2014
Date Data Arrived at EDR: 10/01/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 36

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
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: 08/03/2015
Date Data Arrived at EDR: 08/04/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 30

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 08/04/2015
Next Scheduled EDR Contact: 11/16/2015
Data Release Frequency: Quarterly

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

***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: 06/08/2015
Date Data Arrived at EDR: 06/09/2015
Date Made Active in Reports: 07/10/2015
Number of Days to Update: 31

Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

**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: 06/22/2015
Date Data Arrived at EDR: 06/24/2015
Date Made Active in Reports: 09/02/2015
Number of Days to Update: 70

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/24/2015
Next Scheduled EDR Contact: 10/05/2015
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: 08/04/2015
Next Scheduled EDR Contact: 11/23/2015
Data Release Frequency: No Update Planned

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 47

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 8

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 08/12/2015
Next Scheduled EDR Contact: 11/30/2015
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: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
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

***Local Lists of Hazardous waste / Contaminated Sites***

US HIST CDL: National Clandestine Laboratory Register

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: 02/25/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/14/2015
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: 08/03/2015
Date Data Arrived at EDR: 08/04/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 30

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 08/04/2015
Next Scheduled EDR Contact: 11/16/2015
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: 12/31/2014
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/18/2015
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 08/07/2015
Next Scheduled EDR Contact: 10/28/2015
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: 02/25/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/14/2015
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: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
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

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

***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: 06/11/2015
Date Data Arrived at EDR: 06/16/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 28

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
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: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

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: 06/08/2015
Date Data Arrived at EDR: 06/09/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 35

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 06/09/2015
Next Scheduled EDR Contact: 09/21/2015
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: 06/24/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/02/2015
Number of Days to Update: 68

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Annually

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: 06/15/2015
Date Data Arrived at EDR: 07/28/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 6

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 07/28/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 27

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
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: 03/10/2015
Date Data Arrived at EDR: 03/31/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Varies

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: 06/06/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 8

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 07/08/2015
Next Scheduled EDR Contact: 09/21/2015
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: 07/14/2015
Next Scheduled EDR Contact: 10/28/2015
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: 07/14/2015
Next Scheduled EDR Contact: 10/28/2015
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: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 08/31/2015
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: 03/09/2015
Date Data Arrived at EDR: 03/10/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 08/12/2015
Next Scheduled EDR Contact: 11/30/2015
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: 08/04/2015
Next Scheduled EDR Contact: 11/23/2015
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: 05/14/2015
Next Scheduled EDR Contact: 08/24/2015
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: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14
Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/25/2015
Next Scheduled EDR Contact: 10/05/2015
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: 12/31/2013
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 110
Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 01/29/2015
Next Scheduled EDR Contact: 06/08/2015
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: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
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: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74
Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/12/2015
Next Scheduled EDR Contact: 09/21/2015
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: 02/01/2015
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
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: 05/14/2015
Next Scheduled EDR Contact: 08/24/2015
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: 07/01/2014
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 33

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 07/17/2015
Next Scheduled EDR Contact: 10/28/2015
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: 01/23/2015
Date Data Arrived at EDR: 02/06/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 07/09/2015
Next Scheduled EDR Contact: 10/28/2015
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: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
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: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
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: 03/31/2015
Date Data Arrived at EDR: 04/09/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 63
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 06/04/2015
Next Scheduled EDR Contact: 09/21/2015
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: 07/13/2015
Next Scheduled EDR Contact: 10/28/2015
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: 06/12/2015
Next Scheduled EDR Contact: 09/21/2015
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: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 07/31/2015
Next Scheduled EDR Contact: 11/09/2015
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: 04/07/2015
Date Data Arrived at EDR: 04/09/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 63
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/09/2015
Next Scheduled EDR Contact: 10/19/2015
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: 08/04/2015
Next Scheduled EDR Contact: 11/16/2015
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: 12/31/2014
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 46

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/12/2015
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: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/29/2015
Next Scheduled EDR Contact: 09/07/2015
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: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/14/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Semi-Annually

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: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 11/25/2014
Date Data Arrived at EDR: 11/26/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 07/07/2015
Next Scheduled EDR Contact: 10/19/2015
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: 07/22/2015
Date Data Arrived at EDR: 07/24/2015
Date Made Active in Reports: 09/02/2015
Number of Days to Update: 40

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 07/22/2015
Date Data Arrived at EDR: 07/24/2015
Date Made Active in Reports: 09/02/2015
Number of Days to Update: 40

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/22/2015
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: 05/14/2015
Date Data Arrived at EDR: 06/03/2015
Date Made Active in Reports: 09/02/2015
Number of Days to Update: 91

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 09/01/2015
Next Scheduled EDR Contact: 12/14/2015
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: 06/05/2015
Next Scheduled EDR Contact: 09/14/2015
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: 06/05/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Varies

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: 01/18/2015
Date Data Arrived at EDR: 02/27/2015
Date Made Active in Reports: 03/25/2015
Number of Days to Update: 26

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/21/2015
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: 06/24/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 18

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 06/26/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

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: 02/18/2015
Date Data Arrived at EDR: 02/20/2015
Date Made Active in Reports: 03/12/2015
Number of Days to Update: 20

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 07/31/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 03/25/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 34

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 06/25/2015
Next Scheduled EDR Contact: 10/05/2015
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: 04/30/2015
Date Data Arrived at EDR: 05/01/2015
Date Made Active in Reports: 05/13/2015
Number of Days to Update: 12

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 08/07/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 08/03/2015
Date Data Arrived at EDR: 08/06/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 28

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 07/24/2015
Next Scheduled EDR Contact: 11/09/2015
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: 08/17/2015
Date Data Arrived at EDR: 08/18/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 16

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 08/14/2015
Next Scheduled EDR Contact: 11/30/2015
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: 12/31/2013
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/19/2014
Number of Days to Update: 35

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 07/17/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Annually

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: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 8
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/28/2015
Next Scheduled EDR Contact: 09/07/2015
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: 07/13/2015
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 20
Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 07/14/2015
Next Scheduled EDR Contact: 10/28/2015
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: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 27
Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Varies

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: 05/07/2015
Date Data Arrived at EDR: 06/09/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 35
Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 06/09/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 05/18/2015
Date Data Arrived at EDR: 05/20/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 22
Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 08/31/2015
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: 06/07/2015
Date Data Arrived at EDR: 06/10/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 34
Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 06/15/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 27
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
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: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18
Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
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: 11/19/2014
Date Data Arrived at EDR: 12/15/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 45
Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 06/19/2015
Next Scheduled EDR Contact: 09/28/2015
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 board?s 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: 07/13/2015
Next Scheduled EDR Contact: 10/28/2015
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: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
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: 06/22/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Varies

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**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: 07/21/2015
Date Data Arrived at EDR: 07/24/2015
Date Made Active in Reports: 08/05/2015
Number of Days to Update: 12

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 08/10/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 07/21/2015
Date Data Arrived at EDR: 07/22/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 12

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 06/05/2015
Date Data Arrived at EDR: 06/09/2015
Date Made Active in Reports: 07/10/2015
Number of Days to Update: 31

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing
Cupa facility list.

Date of Government Version: 11/20/2014
Date Data Arrived at EDR: 11/24/2014
Date Made Active in Reports: 01/07/2015
Number of Days to Update: 44

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 07/15/2015
Date Data Arrived at EDR: 07/17/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 17

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 06/11/2014
Date Data Arrived at EDR: 06/13/2014
Date Made Active in Reports: 07/07/2014
Number of Days to Update: 24

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 08/10/2015
Next Scheduled EDR Contact: 11/23/2015
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 08/03/2015
Next Scheduled EDR Contact: 11/16/2015
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 05/20/2015
Date Data Arrived at EDR: 08/03/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 31

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 07/31/2015
Next Scheduled EDR Contact: 11/16/2015
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/26/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 7

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 08/03/2015
Next Scheduled EDR Contact: 11/16/2015
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: 07/13/2015
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 20

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 07/06/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 08/04/2015
Date Data Arrived at EDR: 08/07/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 27

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 08/24/2015
Next Scheduled EDR Contact: 12/07/2015
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 08/11/2015
Date Data Arrived at EDR: 08/14/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 20

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 08/07/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/14/2013
Number of Days to Update: 33

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 05/19/2015
Date Data Arrived at EDR: 06/18/2015
Date Made Active in Reports: 07/22/2015
Number of Days to Update: 34

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 08/07/2015
Next Scheduled EDR Contact: 11/23/2015
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: 05/26/2015
Date Data Arrived at EDR: 05/28/2015
Date Made Active in Reports: 06/15/2015
Number of Days to Update: 18

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 05/21/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 08/11/2015
Date Data Arrived at EDR: 08/14/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 20

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 07/20/2015
Next Scheduled EDR Contact: 11/02/2015
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: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 11/24/2014
Date Data Arrived at EDR: 01/30/2015
Date Made Active in Reports: 03/04/2015
Number of Days to Update: 33

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 07/10/2015
Next Scheduled EDR Contact: 10/28/2015
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 07/20/2015
Date Data Arrived at EDR: 07/21/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 13

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 07/21/2015
Next Scheduled EDR Contact: 11/02/2015
Data Release Frequency: Varies

City of Los Angeles Landfills

Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 01/01/2015
Date Data Arrived at EDR: 07/27/2015
Date Made Active in Reports: 08/10/2015
Number of Days to Update: 14

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 07/20/2015
Next Scheduled EDR Contact: 11/02/2015
Data Release Frequency: Varies

Site Mitigation List

Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/15/2015
Date Data Arrived at EDR: 01/29/2015
Date Made Active in Reports: 03/10/2015
Number of Days to Update: 40

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 07/15/2015
Next Scheduled EDR Contact: 11/02/2015
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank

Underground storage tank sites located in El Segundo city.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 04/02/2015
Date Made Active in Reports: 04/13/2015
Number of Days to Update: 11

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 07/17/2015
Next Scheduled EDR Contact: 11/02/2015
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: 03/03/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 16

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 07/27/2015
Next Scheduled EDR Contact: 11/09/2015
Data Release Frequency: Annually

City of Torrance Underground Storage Tank

Underground storage tank sites located in the city of Torrance.

Date of Government Version: 06/03/2015
Date Data Arrived at EDR: 06/04/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 32

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 06/04/2015
Next Scheduled EDR Contact: 10/28/2015
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: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/15/2015
Number of Days to Update: 17

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 10/08/2014
Date Data Arrived at EDR: 10/22/2014
Date Made Active in Reports: 12/15/2014
Number of Days to Update: 54

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 07/06/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/05/2015
Number of Days to Update: 10

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 06/01/2015
Date Data Arrived at EDR: 06/03/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 33

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 06/30/2015
Date Data Arrived at EDR: 07/07/2015
Date Made Active in Reports: 07/16/2015
Number of Days to Update: 9

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
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: 12/05/2011
Date Data Arrived at EDR: 12/06/2011
Date Made Active in Reports: 02/07/2012
Number of Days to Update: 63

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
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: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 06/03/2015
Date Data Arrived at EDR: 06/04/2015
Date Made Active in Reports: 07/22/2015
Number of Days to Update: 48

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 07/31/2015
Next Scheduled EDR Contact: 11/16/2015
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 08/01/2015
Date Data Arrived at EDR: 08/10/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 24

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 08/06/2015
Next Scheduled EDR Contact: 11/23/2015
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 05/01/2015
Date Data Arrived at EDR: 05/12/2015
Date Made Active in Reports: 06/08/2015
Number of Days to Update: 27

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/06/2015
Next Scheduled EDR Contact: 08/24/2015
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 08/01/2015
Date Data Arrived at EDR: 08/11/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 23

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 08/11/2015
Next Scheduled EDR Contact: 11/23/2015
Data Release Frequency: Quarterly

PLACER COUNTY:

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 07/01/2015
Date Data Arrived at EDR: 07/07/2015
Date Made Active in Reports: 08/05/2015
Number of Days to Update: 29

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 07/15/2015
Date Data Arrived at EDR: 07/17/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 17

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 07/15/2015
Date Data Arrived at EDR: 07/17/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 17

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/05/2015
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: 05/07/2015
Date Data Arrived at EDR: 07/24/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 10

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 10/19/2015
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: 05/07/2015
Date Data Arrived at EDR: 07/27/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 7

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 10/19/2015
Data Release Frequency: Quarterly

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: 06/30/2015
Date Data Arrived at EDR: 07/07/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 7

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 08/10/2015
Next Scheduled EDR Contact: 11/23/2015
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: 09/23/2013
Date Data Arrived at EDR: 09/24/2013
Date Made Active in Reports: 10/17/2013
Number of Days to Update: 23

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2014
Date Data Arrived at EDR: 11/21/2014
Date Made Active in Reports: 12/29/2014
Number of Days to Update: 38

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 07/22/2015
Next Scheduled EDR Contact: 11/09/2015
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: 06/03/2015
Next Scheduled EDR Contact: 09/21/2015
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: 08/06/2015
Next Scheduled EDR Contact: 11/23/2015
Data Release Frequency: Quarterly

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/29/2010
Date Data Arrived at EDR: 03/10/2011
Date Made Active in Reports: 03/15/2011
Number of Days to Update: 5

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 08/06/2015
Next Scheduled EDR Contact: 11/23/2015
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: 06/22/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 10

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/10/2015
Number of Days to Update: 15

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 05/20/2015
Next Scheduled EDR Contact: 09/07/2015
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: 07/20/2015
Date Data Arrived at EDR: 07/22/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 12

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/15/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 06/10/2015
Date Data Arrived at EDR: 06/16/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 28

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 06/29/2015
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: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 06/10/2015
Date Data Arrived at EDR: 06/16/2015
Date Made Active in Reports: 07/10/2015
Number of Days to Update: 24

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/07/2015
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: 06/01/2015
Next Scheduled EDR Contact: 09/14/2015
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 08/10/2015
Date Data Arrived at EDR: 08/14/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 20

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 08/07/2015
Next Scheduled EDR Contact: 11/23/2015
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 05/22/2015
Date Data Arrived at EDR: 05/26/2015
Date Made Active in Reports: 06/08/2015
Number of Days to Update: 13

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 05/22/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 06/12/2015
Date Data Arrived at EDR: 06/16/2015
Date Made Active in Reports: 07/10/2015
Number of Days to Update: 24

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
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: 06/19/2015
Date Data Arrived at EDR: 06/24/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 20

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 06/19/2015
Date Data Arrived at EDR: 06/30/2015
Date Made Active in Reports: 07/07/2015
Number of Days to Update: 7

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 06/10/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 06/22/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 18

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/12/2015
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: 07/01/2015
Date Data Arrived at EDR: 07/07/2015
Date Made Active in Reports: 07/14/2015
Number of Days to Update: 7

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 06/22/2015
Next Scheduled EDR Contact: 10/12/2015
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 06/05/2015
Date Data Arrived at EDR: 06/09/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 27

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 06/05/2015
Next Scheduled EDR Contact: 09/21/2015
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 07/13/2015
Date Data Arrived at EDR: 07/28/2015
Date Made Active in Reports: 08/03/2015
Number of Days to Update: 6

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 07/24/2015
Next Scheduled EDR Contact: 11/09/2015
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: 07/27/2015
Date Data Arrived at EDR: 08/17/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 17

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 08/12/2015
Next Scheduled EDR Contact: 11/30/2015
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: 06/26/2015
Next Scheduled EDR Contact: 10/19/2015
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: 08/12/2015
Next Scheduled EDR Contact: 11/30/2015
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: 07/27/2015
Date Data Arrived at EDR: 07/29/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 36

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 07/27/2015
Next Scheduled EDR Contact: 11/09/2015
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: 05/27/2015
Date Data Arrived at EDR: 06/17/2015
Date Made Active in Reports: 07/06/2015
Number of Days to Update: 19

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/17/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Underground storage tank sites located in Yolo county.

Date of Government Version: 07/08/2015
Date Data Arrived at EDR: 07/13/2015
Date Made Active in Reports: 07/22/2015
Number of Days to Update: 9

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 07/06/2015
Next Scheduled EDR Contact: 10/05/2015
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 08/04/2015
Date Data Arrived at EDR: 08/07/2015
Date Made Active in Reports: 09/03/2015
Number of Days to Update: 27

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 07/31/2015
Next Scheduled EDR Contact: 11/16/2015
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: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/18/2015
Next Scheduled EDR Contact: 08/31/2015
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 07/17/2015
Date Made Active in Reports: 08/12/2015
Number of Days to Update: 26

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 07/13/2015
Next Scheduled EDR Contact: 10/28/2015
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: 08/01/2015
Date Data Arrived at EDR: 08/06/2015
Date Made Active in Reports: 08/24/2015
Number of Days to Update: 18

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 08/06/2015
Next Scheduled EDR Contact: 11/16/2015
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/24/2015
Date Made Active in Reports: 08/18/2015
Number of Days to Update: 25

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 07/20/2015
Next Scheduled EDR Contact: 11/02/2015
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/19/2015
Date Made Active in Reports: 07/15/2015
Number of Days to Update: 26

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/26/2015
Next Scheduled EDR Contact: 09/07/2015
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 03/19/2015
Date Made Active in Reports: 04/07/2015
Number of Days to Update: 19

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/11/2015
Next Scheduled EDR Contact: 09/28/2015
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Telephone: 281-546-1505
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
Telephone: 800-823-6277
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.

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, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

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.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

**STREET AND ADDRESS INFORMATION**

© 2010 Tele Atlas North America, Inc. All rights reserved. This material is proprietary and the subject of copyright protection and other intellectual property rights owned by or licensed to Tele Atlas North America, Inc. The use of this material is subject to the terms of a license agreement. You will be held liable for any unauthorized copying or disclosure of this material.

## 13.5 Preliminary Title Report

**UPDATED**

First American Title

# First American Title Company

**4450 Capitola Road, Suite 103**
**Capitola, CA 95010**

| | |
|---|---|
| Escrow Officer: | Bill Bredl |
| Phone: | (831)464-6444 |
| Fax No.: | (866)488-1023 |
| E-Mail: | bbredl@firstam.com |
| E-Mail Loan Documents to: | Lenders please contact the Escrow Officer for email address for sending loan documents. |
| Borrower: | |
| Property: | 2277 VISTA GRANDE DRIVE<br>San Diego, CA |

## PRELIMINARY REPORT

In response to the above referenced application for a policy of title insurance, this company hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms.

The printed Exceptions and Exclusions from the coverage and Limitations on Covered Risks of said policy or policies are set forth in Exhibit A attached. *The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than that set forth in the arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties.* Limitations on Covered Risks applicable to the CLTA and ALTA Homeowner's Policies of Title Insurance which establish a Deductible Amount and a Maximum Dollar Limit of Liability for certain coverages are also set forth in Exhibit A. Copies of the policy forms should be read. They are available from the office which issued this report.

**Please read the exceptions shown or referred to below and the exceptions and exclusions set forth in Exhibit A of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.**

**It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects, and encumbrances affecting title to the land.**

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.

Dated as of April 15, 2014 at 7:30 A.M.

The form of Policy of title insurance contemplated by this report is:

ALTA Loan Policy 1056.06 (6-17-06)

A specific request should be made if another form or additional coverage is desired.

Title to said estate or interest at the date hereof is vested in:

OMNI FINANCIAL, LLC

The estate or interest in the land hereinafter described or referred to covered by this Report is:

Fee simple.

The Land referred to herein is described as follows:

(See attached Legal Description)

At the date hereof exceptions to coverage in addition to the printed Exceptions and Exclusions in said policy form would be as follows:

1. General and special taxes and assessments for the fiscal year 2014-2015, a lien not yet due or payable.

2. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.

3. Rights of the public in and to that portion of the land lying within any Road, Street, Alley or Highway.

**The Following Matters Affect PARCEL 1:**

4. An easement for public utilities and incidental purposes, recorded June 27, 1951 in Book 4150, Page 27 of Official Records.
   In Favor of: San Diego Gas and Electric Company
   Affects: The land

5. An easement for road and incidental purposes in the document recorded October 19, 1953 in Book 5020, Page 264 of Official Records.

6. An easement for public utilities and incidental purposes, recorded December 29, 1954 in Book 5477, Page 536 of Official Records.
   In Favor of: San Diego Gas and Electric Company
   Affects: The land

7. An easement for county highway and incidental purposes, recorded July 21, 1961 as Instrument No. 61-125815 of Official Records.
   In Favor of: City of San Diego
   Affects: The land

8. A waiver of any claims for damages by reason of the location, construction, landscaping or maintenance of a contiguous freeway, highway, roadway or transit facility as contained in the document recorded July 21, 1961 as Instrument No. 61-125815 of Official Records.

9. An easement for public utilities and incidental purposes, recorded November 20, 1961 as Instrument No. 61-201031 of Official Records.
   In Favor of: San Diego Gas and Electric Company
   Affects: The land

**The Following Matters Affect PARCEL 2:**

10. An easement for water pipelines and incidental purposes, recorded August 10, 1926 in Book 1270 of Deeds, Page 21.
    In Favor of: Vista Irrigation District
    Affects: As described therein

    The location of the easement cannot be determined from record information.

11. An easement for road purposes and incidental purposes, recorded December 31, 1945 in Book 2004, Page 481 of Official Records.
    In Favor of: George Pepperdine Foundation, a Non-Profit California Corporation
    Affects: As described therein

12. An easement for poles & wires and incidental purposes, recorded June 8, 1951 as Instrument No. 80571 in Book 4151, Page 458 of Official Records.
    In Favor of: San Diego Gas & Electric Company
    Affects: As described therein

13. The terms and provisions contained in the document entitled "Road Maintenance Agreement" recorded October 19, 1953 in Book 5020, Page 264 of Official Records.

14. The effect of a map purporting to show the land and other property, filed as Map No. 2676 of Record of Surveys.

15. An easement for the transmission and distribution of electricity and incidental purposes, recorded January 15, 1974 as Instrument No. 10771 of Official Records.
    In Favor of: San Diego Gas & Electric Company
    Affects: As described therein

16. An easement for poles & wires and incidental purposes, recorded January 15, 1974 as Instrument No. 10784 of Official Records.
    In Favor of: San Diego Gas & Electric Company
    Affects: As described therein

17. An easement for ingress and egress for roadway purposes and for the installation, maintenance and repair of sewer, gas, and water lines and conduits and wires and lines for the transmission of electric energy and incidental purposes, recorded December 15, 1977 as Instrument No. 518755 of Official Records.
    In Favor of: Audley S. Davies, et ux
    Affects: As described therein

18. An easement for ingress and egress for roadway purposes and for the installation, maintenance and repair of sewer, gas, and water lines and conduits and wires and lines for the transmission of electrical energy and incidental purposes, recorded December 15, 1977 as Instrument No. 518756 of Official Records.
    In Favor of: Audley S. Davies, et ux
    Affects: As described therein

**The Following Matters Affect BOTH THE PARCELS:**

19. Any irregularity in the foreclosure proceedings leading up to the Trustee's Deed recorded July 10, 2009 as Instrument No. 09-379208 of Official Records.

20. Rights of parties in possession and rights of tenant(s) in the Land, including rights of all parties claiming by, through or under said tenant(s).

    We will require an approved declaration signed by the seller/seller's authorized agent and the buyer prior to close of this transaction.

21. A Deed of Trust to secure an original indebtedness of $3,026,848.62 recorded October 10, 2012 as Instrument No. 12-620008 of Official Records.
    Dated: September 20, 2012
    Trustor: OMNI FINANCIAL, LLC
    Trustee: UNITED SECURITY BANK, A CALIFORNIA FINANCIAL INSTITUTION
    Beneficiary: UNITED SECURITY BANK

    Affects: The land and other property.

    A document recorded June 27, 2013 as Instrument No. 13-404113 of Official Records provides that the deed of trust or the obligation secured thereby has been modified.

22. Water rights, claims or title to water, whether or not shown by the public records.

**Prior to the issuance of any policy of title insurance, the Company will require:**

23. With respect to OMNI FINANCIAL, LLC, a limited liability company:
a. A copy of its operating agreement and any amendments thereto;
b. If it is a California limited liability company, that a certified copy of its articles of organization (LLC-1) and any certificate of correction (LLC-11), certificate of amendment (LLC-2), or restatement of articles of organization (LLC-10) be recorded in the public records;
c. If it is a foreign limited liability company, that a certified copy of its application for registration (LLC-5) be recorded in the public records;
d. With respect to any deed, deed of trust, lease, subordination agreement or other document or instrument executed by such limited liability company and presented for recordation by the Company or upon which the Company is asked to rely, that such document or instrument be executed in accordance with one of the following, as appropriate:
(i) If the limited liability company properly operates through officers appointed or elected pursuant to the terms of a written operating agreement, such document must be executed by at least two duly elected or appointed officers, as follows: the chairman of the board, the president or any vice president, and any secretary, assistant secretary, the chief financial officer or any assistant treasurer;
(ii) If the limited liability company properly operates through a manager or managers identified in the articles of organization and/or duly elected pursuant to the terms of a written operating agreement, such document must be executed by at least two such managers or by one manager if the limited liability company properly operates with the existence of only one manager.
e. Other requirements which the Company may impose following its review of the material required herein and other information which the Company may require

24. With respect to OMNI FINANCIAL, LLC, a certificate of revivor and a certificate of relief from contract voidability issued by the Franchise Tax Board of the State of California.

## INFORMATIONAL NOTES

Note: The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than the certain dollar amount set forth in any applicable arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties. If you desire to review the terms of the policy, including any arbitration clause that may be included, contact the office that issued this Commitment or Report to obtain a sample of the policy jacket for the policy that is to be issued in connection with your transaction.

1. General and special taxes and assessments for the fiscal year 2013-2014.

| | |
|---|---|
| First Installment: | $5,796.97, PAID |
| Penalty: | $0.00 |
| Second Installment: | $5,796.97, PAID |
| Penalty: | $0.00 |
| Tax Rate Area: | 96005 |
| A. P. No.: | 171-100-05-00 |

2. General and special taxes and assessments for the fiscal year 2013-2014.

| | |
|---|---|
| First Installment: | $2,042.32, PAID |
| Penalty: | $0.00 |
| Second Installment: | $2,042.32, PAID |
| Penalty: | $0.00 |
| Tax Rate Area: | 96005 |
| A. P. No.: | 171-100-28-00 |

3. The property covered by this report is vacant land.

   AFFECTS: PARCEL 1

4. This report is preparatory to the issuance of an ALTA Loan Policy. We have no knowledge of any fact which would preclude the issuance of the policy with CLTA endorsement forms 100 and 116 and if applicable, 115 and 116.2 attached.

   When issued, the CLTA endorsement form 116 or 116.2, if applicable will reference a(n) Single Family Residence known as 2277 VISTA GRANDE DRIVE, San Diego, California.

   AFFECTS: PARCEL 2

5. According to the public records, there has been no conveyance of the land within a period of twenty-four months prior to the date of this report, except as follows:

   None

   NOTE to proposed insured lender only: No Private transfer fee covenant, as defined in Federal Housing Finance Agency Final Rule 12 CFR Part 1228, that was created and first appears in the Public Records on or after February 8, 2011, encumbers the Title except as follows: None

The map attached, if any, may or may not be a survey of the land depicted hereon. First American expressly disclaims any liability for loss or damage which may result from reliance on this map except to the extent coverage for such loss or damage is expressly provided by the terms and provisions of the title insurance policy, if any, to which this map is attached.

**WIRE INSTRUCTIONS**
**for**
**First American Title Company, Demand/Draft Sub-Escrow Deposits**
**San Diego County, California**

**First American Trust Company**
Santa Ana Branch
421 North Main Street
Santa Ana, California 92701

**ABA 122241255**
**Credit to First American Title Company**
**Account No. 2000013101**

**Reference Title Order Number 4408-4546419, and Title Officer**

**Please wire the day before recording.**

## LEGAL DESCRIPTION

Real property in the unincorporated area of the County of San Diego, State of California, described as follows:

PARCEL 1:

THAT PORTION OF SECTION 8, TOWNSHIP 11 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO UNITED STATES GOVERNMENT SURVEY APPROVED DECEMBER 14, 1885, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF SAID SECTION 8; THENCE NORTH 0° 29' 42" WEST 2656.08 FEET; THENCE NORTH 0° 24' 20" WEST ALONG THE WESTERLY LINE OF SAID SECTION 8, A DISTANCE OF 1328.21 FEET TO THE NORTHWEST CORNER OF THE SOUTH ½ OF THE NORTHWEST ¼ OF SAID SECTION 8; THENCE SOUTH 89° 48' 28" EAST, ALONG THE NORTH LINE OF THE SOUTH ½ OF THE NORTHWEST ¼ OF SAID SECTION 8, A DISTANCE OF 2021.24 FEET TO THE TRUE POINT OF BEGINNING; THENCE FROM SAID TRUE POINT OF BEGINNING, SOUTH 89° 48' 28" EAST ALONG SAID NORTH LINE, A DISTANCE OF 733.05 FEET TO THE NORTHWEST CORNER OF THE SOUTHWEST ¼ OF THE NORTHEAST ¼ OF SAID SECTION 8; THENCE ALONG THE NORTH AND SOUTH CENTER LINE OF SAID SECTION 8, SOUTH 1° 09' 26" WEST, 744.74 FEET; THENCE NORTH 79° 34' 00" WEST 0.60 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 200.40 FEET; THENCE NORTHWESTERLY ALONG THE ARC OF SAID CURVE AN ARC DISTANCE OF 60.16 FEET; THENCE TANGENT TO SAID CURVE, NORTH 62° 22' 00" WEST, 84.64 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHERLY AND HAVING A RADIUS OF 164.50 FEET; THENCE WESTERLY ALONG THE ARC OF SAID CURVE AN ARC DISTANCE OF 179.22 FEET TO A POINT OF REVERSE CURVATURE WITH A CURVE CONCAVE NORTHWESTERLY AND HAVING A RADIUS OF 298.17 FEET, A RADIAL LINE OF SAID POINT BEARING NORTH 34° 47' 20" WEST; THENCE SOUTHWESTERLY ALONG THE ARC OF SAID CURVE AN ARC DISTANCE OF 174.45 FEET; THENCE TANGENT TO SAID CURVE SOUTH 88° 44' 00" WEST 254.56 FEET; THENCE NORTH 0° 11' 05" EAST 757.50 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL 2:

ALL THAT PORTION OF SECTION 8, TOWNSHIP 11 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO UNITED STATES GOVERNMENT SURVEY APPROVED DECEMBER 14, 1885, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF SAID SECTION 8; THENCE NORTH 00° 29' 42" WEST ALONG THE WESTERLY LINE OF SAID SECTION 8, A DISTANCE OF 2656.08 FEET; THENCE NORTH 00° 24' 20" WEST ALONG THE WESTERLY LINE OF SAID SECTION 8, A DISTANCE OF 1328.21 FEET TO THE NORTHWEST CORNER OF THE SOUTH HALF OF THE NORTHWEST QUARTER OF SAID SECTION 8; THENCE SOUTH 89° 48' 28" EAST ALONG THE NORTH LINE OF THE SOUTH HALF OF THE NORTHWEST QUARTER OF SAID SECTION 8, A DISTANCE OF 1696.51 FEET TO THE TRUE POINT OF BEGINNING; THENCE FROM SAID TRUE POINT OF BEGINNING SOUTH 89° 48' 28" EAST ALONG SAID NORTH LINE A DISTANCE OF 324.73 FEET TO THE NORTHWESTERLY CORNER OF LAND DESCRIBED IN DEED TO FRED G. ANDERSON, ET UX, RECORDED AUGUST 25, 1950 IN BOOK 3752, PAGE 170 OF OFFICIAL RECORDS; THENCE ALONG THE WESTERLY LINE OF SAID ANDERSON LAND, SOUTH 00° 11' 05" WEST 757.70 FEET TO THE SOUTHERLY LINE OF LAND DESCRIBED IN DEED TO FRED

BUECHNER, ET UX, RECORDED JANUARY 23, 1946, IN BOOK 2038, PAGE 148 OF OFFICIAL RECORDS; THENCE ALONG SAID SOUTHERLY LINE AS FOLLOWS:

SOUTH 88° 44' WEST 144.82 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHERLY AND HAVING A RADIUS OF 200 FEET; THENCE WESTERLY ALONG THE ARC OF SAID CURVE AN ARC DISTANCE OF 169.30 FEET; THENCE TANGENT TO SAID CURVE NORTH 42° 46' WEST 95.19 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY AND HAVING A RADIUS OF 100 FEET; THENCE NORTHWESTERLY ALONG THE ARC OF SAID CURVE AN ARC DISTANCE OF 38.40 FEET TO A POINT, A RADIAL LINE TO SAID POINT BEARING NORTH 25° 14' EAST; THENCE NORTH 25°14' EAST 25 FEET; THENCE NORTH 05° 44' EAST 585.71 FEET TO THE TRUE POINT OF BEGINNING.

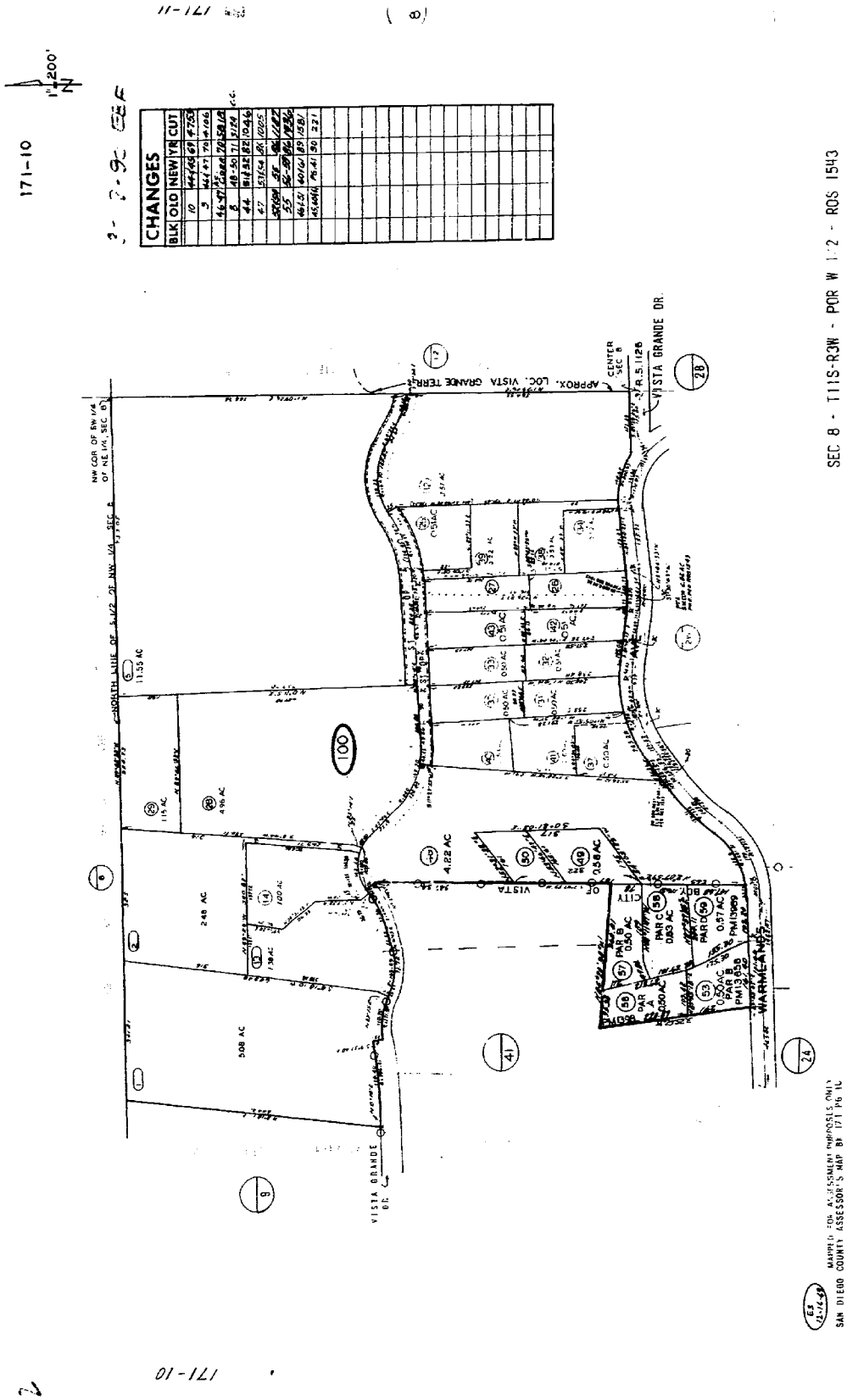
EXCEPTING THEREFROM THAT PORTION CONVEYED TO AUDLEY S. DAVIES, ET UX, BY DEED RECORDED MARCH 20, 1962 IN THE OFFICE OF THE COUNTY RECORDER OF SAID SAN DIEGO COUNTY AS INSTRUMENT NO. 46949.

SAID PORTION BEING DESCRIBED AS FOLLOWS:

THAT PORTION OF SECTION 8, TOWNSHIP 11 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO UNITED STATES GOVERNMENT SURVEY, APPROVED DECEMBER 14, 1885, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF SAID SECTION 8; THENCE NORTH 00° 29' 42" WEST ALONG THE WESTERLY LINE OF SAID SECTION 8, A DISTANCE OF 2656.08 FEET; THENCE NORTH 00° 24' 20" WEST ALONG THE WESTERLY LINE OF SAID SECTION 8, A DISTANCE OF 1328.21 FEET TO THE NORTHWEST CORNER OF THE SOUTH HALF OF THE NORTHWEST QUARTER OF SAID SECTION 8; THENCE SOUTH 89° 48' 28" EAST ALONG THE NORTH LINE OF THE SOUTH HALF OF THE NORTHWEST QUARTER OF SAID SECTION 8, A DISTANCE OF 1696.51 FEET TO THE TRUE POINT OF BEGINNING; THENCE FROM SAID TRUE POINT OF BEGINNING SOUTH 89° 48' 28" EAST ALONG SAID NORTH LINE A DISTANCE OF 324.73 FEET TO THE NORTHWESTERLY CORNER OF THE LAND DESCRIBED IN DEED TO FRED G. ANDERSON, ET UX., RECORDED AUGUST 25, 1950 IN BOOK 3752, PAGE 170 OF OFFICIAL RECORDS; THENCE ALONG THE WESTERLY LINE OF SAID ANDERSON LAND SOUTH 01° 11' 05" WEST 150 FEET; THENCE SOUTH 89° 56' 33" WEST; THENCE NORTH 5°44' EAST TO THE POINT OF TRUE BEGINNING. TOGETHER WITH AN EASEMENT FOR ROAD AND PUBLIC UTILITIES OVER THE WESTERLY 20 FEET OF THE DESCRIBED PROPERTY.

APN: 171-100-05 and 171-100-28


171-10
1" = 200'
CHANGES
BLK OLD NEW YR CUT
SEC 8 - T11S-R3W - POR W 1/2 - ROS 1543
VISTA GRANDE DR.
APPROX. LOC. VISTA GRANDE TERR.
CENTER SEC 8
R.S. 1128
NORTH LINE OF S 1/2 OF NW 1/4 SEC 8
NW COR OF SW 1/4 OF NE 1/4, SEC 8
VISTA GRANDE DR.
WARMLANDS
CITY OF VISTA
100
41
24
28
9
248 AC
508 AC
4.22 AC
0.58 AC
0.57 AC
0.50 AC
0.83 AC
PAR B
PAR C
PAR D
PM13658
PM13659
SAN DIEGO COUNTY ASSESSOR'S MAP BK 171 PG 10
171-10

## ***NOTICE***

Section 12413.1 of the California Insurance Code, effective January 1, 1990, requires that any title insurance company, underwritten title company, or controlled escrow company handling funds in an escrow or sub-escrow capacity, wait a specified number of days after depositing funds, before recording any documents in connection with the transaction or disbursing funds. This statute allows for funds deposited by wire transfer to be disbursed the same day as deposit. In the case of cashier's checks or certified checks, funds may be disbursed the next day after deposit. In order to avoid unnecessary delays of three to seven days, or more, please use wire transfer, cashier's checks, or certified checks whenever possible.

## INCOMING DOMESTIC WIRE INSTRUCTIONS

| | |
|---|---|
| PAYABLE TO: | First American Title Company |
| BANK: | First American Trust, FSB |
| ADDRESS: | 5 First American Way, Santa Ana, CA 92707 |
| ACCOUNT NO: | 3005610000 |
| ROUTING NUMBER: | 122241255 |

PLEASE REFERENCE THE FOLLOWING:

| | |
|---|---|
| PROPERTY: | 2277 VISTA GRANDE DRIVE, San Diego, CA |
| BORROWER NAME: | Omni Financial |
| FILE NUMBER: | 4408-4546419 (BB) |
| ATTENTION: | Bill Bredl |

PLEASE USE THE ABOVE INFORMATION WHEN WIRING FUNDS TO **First American Title Company**. **FUNDS MUST BE WIRED FROM A BANK WITHIN THE UNITED STATES.** PLEASE NOTIFY **Bill Bredl** AT **(831)464-6444** OR **bbredl@firstam.com** WHEN YOU HAVE TRANSMITTED YOUR WIRE.

IF YOUR FUNDS ARE BEING WIRED FROM A NON-U.S. BANK, ADDITIONAL CHARGES MAY APPLY. PLEASE CONTACT YOUR ESCROW OFFICER/CLOSER FOR INTERNATIONAL WIRING INSTRUCTIONS.

PLEASE NOTE THAT AN ACH TRANSFER IS NOT THE SAME AS A WIRE, REQUIRES ADDITIONAL TIME FOR CLEARANCE AND MAY DELAY CLOSING.

**FIRST AMERICAN TRUST CONTACT INFO:** Banking Services 1-877-600-9473

**ALL WIRES WILL BE RETURNED IF THE FILE NUMBER AND/OR PROPERTY REFERENCE ARE NOT INCLUDED**

**EXHIBIT A**
**LIST OF PRINTED EXCEPTIONS AND EXCLUSIONS (BY POLICY TYPE)**

**CLTA/ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE (02-03-10)**
**EXCLUSIONS**

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of those portions of any law or government regulation concerning:
   (a) building; (d) improvements on the Land;
   (b) zoning; (e) land division; and
   (c) land use; (f) environmental protection.
   This Exclusion does not limit the coverage described in Covered Risk 8.a., 14, 15, 16, 18, 19, 20, 23 or 27.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not limit the coverage described in Covered Risk 14 or 15.
3. The right to take the Land by condemning it. This Exclusion does not limit the coverage described in Covered Risk 17.
4. Risks:
   (a) that are created, allowed, or agreed to by You, whether or not they are recorded in the Public Records;
   (b) that are Known to You at the Policy Date, but not to Us, unless they are recorded in the Public Records at the Policy Date;
   (c) that result in no loss to You; or
   (d) that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.e., 25, 26, 27 or 28.
5. Failure to pay value for Your Title.
6. Lack of a right:
   (a) to any land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   (b) in streets, alleys, or waterways that touch the Land.
   This Exclusion does not limit the coverage described in Covered Risk 11 or 21.
7. The transfer of the Title to You is invalid as a preferential transfer or as a fraudulent transfer or conveyance under federal bankruptcy, state insolvency, or similar creditors' rights laws.

**LIMITATIONS ON COVERED RISKS**

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows: For Covered Risk 16, 18, 19, and 21 Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.

| **Your Deductible Amount** | **Our Maximum Dollar Limit of Liability** |
|---|---|
| Covered Risk 16: 1% of Policy Amount or $2,500.00 (whichever is less) | $10,000.00 |
| Covered Risk 18: 1% of Policy Amount or $5,000.00 (whichever is less) | $25,000.00 |
| Covered Risk 19: 1% of Policy Amount or $5,000.00 (whichever is less) | $25,000.00 |
| Covered Risk 21: 1% of Policy Amount or $2,500.00 (whichever is less) | $5,000.00 |

**ALTA RESIDENTIAL TITLE INSURANCE POLICY (6-1-87)**
**EXCLUSIONS**

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes building and zoning ordinances and also laws and regulations concerning:
   (a) and use
   (b) improvements on the land
   (c) and division
   (d) environmental protection
   This exclusion does not apply to violations or the enforcement of these matters which appear in the public records at Policy Date.
   This exclusion does not limit the zoning coverage described in Items 12 and 13 of Covered Title Risks.
2. The right to take the land by condemning it, unless:

(a) a notice of exercising the right appears in the public records on the Policy Date

(b) the taking happened prior to the Policy Date and is binding on you if you bought the land without knowing of the taking

3. Title Risks:
   (a) that are created, allowed, or agreed to by you
   (b) that are known to you, but not to us, on the Policy Date -- unless they appeared in the public records
   (c) that result in no loss to you
   (d) that first affect your title after the Policy Date -- this does not limit the labor and material lien coverage in Item 8 of Covered Title Risks
4. Failure to pay value for your title.
5. Lack of a right:
   (a) to any land outside the area specifically described and referred to in Item 3 of Schedule A OR
   (b) in streets, alleys, or waterways that touch your land
   This exclusion does not limit the access coverage in Item 5 of Covered Title Risks.

**2006 ALTA LOAN POLICY (06-17-06)**

**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
   (a) a fraudulent conveyance or fraudulent transfer, or
   (b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

**EXCEPTIONS FROM COVERAGE**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an

inspection of the Land or that may be asserted by persons in possession of the Land.

3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**2006 ALTA OWNER'S POLICY (06-17-06)**

**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to

   (i) the occupancy, use, or enjoyment of the Land;

   (ii) the character, dimensions, or location of any improvement erected on the Land;

   (iii) the subdivision of land; or

   (iv) environmental protection;

   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.

   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters

   (a) created, suffered, assumed, or agreed to by the Insured Claimant;

   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;

   (c) resulting in no loss or damage to the Insured Claimant;

   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 or 10); or

   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is

   (a) a fraudulent conveyance or fraudulent transfer, or

   (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

**EXCEPTIONS FROM COVERAGE**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (07-26-10)**

**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to

   (i) the occupancy, use, or enjoyment of the Land;

   (ii) the character, dimensions, or location of any improvement erected on the Land;

   (iii) the subdivision of land; or

   (iv) environmental protection;

   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.

   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters

   (a) created, suffered, assumed, or agreed to by the Insured Claimant;

   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;

   (c) resulting in no loss or damage to the Insured Claimant;

   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27 or 28); or

   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law. This Exclusion does not modify or limit the coverage provided in Covered Risk 26.
6. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to Advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching subsequent to Date of Policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11(b) or 25.
8. The failure of the residential structure, or any portion of it, to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6.
9. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is

   (a) a fraudulent conveyance or fraudulent transfer, or

   (b) a preferential transfer for any reason not stated in Covered Risk 27(b) of this policy.

First American Title

**Privacy Information**
**We Are Committed to Safeguarding Customer Information**
In order to better serve your needs now and in the future, we may ask you to provide us with certain information. We understand that you may be concerned about what we will do with such information - particularly any personal or financial information. We agree that you have a right to know how we will utilize the personal information you provide to us. Therefore, together with our subsidiaries we have adopted this Privacy Policy to govern the use and handling of your personal information.

**Applicability**
This Privacy Policy governs our use of the information that you provide to us. It does not govern the manner in which we may use information we have obtained from any other source, such as information obtained from a public record or from another person or entity. First American has also adopted broader guidelines that govern our use of personal information regardless of its source. First American calls these guidelines its Fair Information Values.

**Types of Information**
Depending upon which of our services you are utilizing, the types of nonpublic personal information that we may collect include:
- Information we receive from you on applications, forms and in other communications to us, whether in writing, in person, by telephone or any other means;
- Information about your transactions with us, our affiliated companies, or others; and
- Information we receive from a consumer reporting agency.

**Use of Information**
We request information from you for our own legitimate business purposes and not for the benefit of any nonaffiliated party. Therefore, we will not release your information to nonaffiliated parties except: (1) as necessary for us to provide the product or service you have requested of us; or (2) as permitted by law. We may, however, store such information indefinitely, including the period after which any customer relationship has ceased. Such information may be used for any internal purpose, such as quality control efforts or customer analysis. We may also provide all of the types of nonpublic personal information listed above to one or more of our affiliated companies. Such affiliated companies include financial service providers, such as title insurers, property and casualty insurers, and trust and investment advisory companies, or companies involved in real estate services, such as appraisal companies, home warranty companies and escrow companies. Furthermore, we may also provide all the information we collect, as described above, to companies that perform marketing services on our behalf, on behalf of our affiliated companies or to other financial institutions with whom we or our affiliated companies have joint marketing agreements.

**Former Customers**
Even if you are no longer our customer, our Privacy Policy will continue to apply to you.

**Confidentiality and Security**
We will use our best efforts to ensure that no unauthorized parties have access to any of your information. We restrict access to nonpublic personal information about you to those individuals and entities who need to know that information to provide products or services to you. We will use our best efforts to train and oversee our employees and agents to ensure that your information will be handled responsibly and in accordance with this Privacy Policy and First American's Fair Information Values. We currently maintain physical, electronic, and procedural safeguards that comply with federal regulations to guard your nonpublic personal information.

**Information Obtained Through Our Web Site**
First American Financial Corporation is sensitive to privacy issues on the Internet. We believe it is important you know how we treat the information about you we receive on the Internet.
In general, you can visit First American or its affiliates' Web sites on the World Wide Web without telling us who you are or revealing any information about yourself. Our Web servers collect the domain names, not the e-mail addresses, of visitors. This information is aggregated to measure the number of visits, average time spent on the site, pages viewed and similar information. First American uses this information to measure the use of our site and to develop ideas to improve the content of our site.
There are times, however, when we may need information from you, such as your name and email address. When information is needed, we will use our best efforts to let you know at the time of collection how we will use the personal information. Usually, the personal information we collect is used only by us to respond to your inquiry, process an order or allow you to access specific account/profile information. If you choose to share any personal information with us, we will only use it in accordance with the policies outlined above.

**Business Relationships**
First American Financial Corporation's site and its affiliates' sites may contain links to other Web sites. While we try to link only to sites that share our high standards and respect for privacy, we are not responsible for the content or the privacy practices employed by other sites.

**Cookies**
Some of First American's Web sites may make use of "cookie" technology to measure site activity and to customize information to your personal tastes. A cookie is an element of data that a Web site can send to your browser, which may then store the cookie on your hard drive.
FirstAm.com uses stored cookies. The goal of this technology is to better serve you when visiting our site, save you time when you are here and to provide you with a more meaningful and productive Web site experience.

---

**Fair Information Values**
**Fairness** We consider consumer expectations about their privacy in all our businesses. We only offer products and services that assure a favorable balance between consumer benefits and consumer privacy.
**Public Record** We believe that an open public record creates significant value for society, enhances consumer choice and creates consumer opportunity. We actively support an open public record and emphasize its importance and contribution to our economy.
**Use** We believe we should behave responsibly when we use information about a consumer in our business. We will obey the laws governing the collection, use and dissemination of data.
**Accuracy** We will take reasonable steps to help assure the accuracy of the data we collect, use and disseminate. Where possible, we will take reasonable steps to correct inaccurate information. When, as with the public record, we cannot correct inaccurate information, we will take all reasonable steps to assist consumers in identifying the source of the erroneous data so that the consumer can secure the required corrections.
**Education** We endeavor to educate the users of our products and services, our employees and others in our industry about the importance of consumer privacy. We will instruct our employees on our fair information values and on the responsible collection and use of data. We will encourage others in our industry to collect and use information in a responsible manner.
**Security** We will maintain appropriate facilities and systems to protect against unauthorized access to and corruption of the data we maintain.

## 13.6 Analytical Laboratory Report

American Environmental Testing Laboratory Inc.
2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

**Ordered By**

| |
|---|
| **Advantage Environmental Consultants** |
| **145 Vallecitos De Oro Suite 201** |
| **San Marcos, CA 92069-** |

| | |
|---|---|
| **Number of Pages** | **6** |
| **Date Received** | **09/21/2015** |
| **Date Reported** | **09/25/2015** |

**Telephone: (760)744-3363**
**Attention: Dan Weis**

| Job Number | Order Date | Client |
|---|---|---|
| 78376 | 09/21/2015 | AEC |

---

**Project ID:** 15-179SD
**Project Name:** Vista Grande
**Site:** Vista, CA

Enclosed please find results of analyses of 6 soil samples which were analyzed as specified on the attached chain of custody. If there are any questions, please do not hesitate to call.

Checked By: _____ Approved By: C. Razmara

Cyrus Razmara, Ph.D.
Laboratory Director

American Environmental Testing Laboratory Inc.
2834 & 2908 North Naomi Street, Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

# CHAIN OF CUSTODY RECORD

№ 93651

AETL JOB No. 78376



COMPANY: AEC
PROJECT MANAGER: Dan Weis / Keith Sy
COMPANY ADDRESS: 145 Vallecitos De Oro, Ste. 201, San Marcos, CA 92069
PHONE: 760-744-3363
FAX: -3463
PROJECT NAME: Vista Grande
PROJECT #: 15-17950
SITE NAME AND ADDRESS: Vista, CA
PO #:

| | SAMPLE ID | LAB ID | DATE | TIME | MATRIX | CONTAINER NUMBER/SIZE | PRES. | ANALYSIS REQUESTED: OCP's 608/8141 | TEST INSTRUCTIONS & COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| 1 | B1-0.5 | 78376.01 | 9/14/15 | | SOIL | 4oz jar | ice | X | |
| 2 | B1-1 | 78376.02 | | | | | | | |
| 3 | B1-2 | 78376.03 | | | | | | | |
| 4 | B2-0.5 | 78376.04 | | | | | | X | |
| 5 | B2-1 | 78376.05 | | | | | | | |
| 6 | B2-2 | 78376.06 | | | | | | | |
| 7 | B3-0.5 | 78376.07 | | | | | | X | |
| 8 | B3-1 | 78376.08 | | | | | | | |
| 9 | B3-2 | 78376.09 | | | | | | | |
| 10 | B4-0.5 | 78376.10 | | | | | | X | |
| 11 | B4-1 | 78376.11 | | | | | | | |
| 12 | B4-2 | 78376.12 | | | | | | | |
| 13 | B5-0.5 | 78376.13 | | | | | | X | |
| 14 | B5-1 | 78376.14 | | | | | | | |
| 15 | B5-2 | 78376.15 | | | | | | | |

## SAMPLE RECEIPT - TO BE FILLED BY LABORATORY

| | | | |
|---|---|---|---|
| TOTAL NUMBER OF CONTAINERS | 15 | PROPERLY COOLED Y / N / NA | Y |
| CUSTODY SEALS Y / N / NA | N | SAMPLES INTACT Y / N / NA | Y |
| RECEIVED IN GOOD COND. Y / N | Y | SAMPLES ACCEPTED Y / N | Y |

**TURN AROUND TIME**

☒ NORMAL ☐ RUSH ☐ SAME DAY ☐ NEXT DAY ☐ 2 DAYS ☐ 3 DAYS

**DATA DELIVERABLE REQUIRED**

☐ HARD COPY ☐ PDF ☐ GEOTRACKER (GLOBAL ID) _____ ☐ OTHER (PLEASE SPECIFY) _____

| RELINQUISHED BY SAMPLER: 1. | RELINQUISHED BY: 2. | RELINQUISHED BY: 3. |
|---|---|---|
| Signature: | Signature: | Signature: |
| Printed Name: Keith Sy | Printed Name: | Printed Name: Thomas Robinson |
| Date: 9-21-15 Time: 1215 | Date: Time: | Date: 9-21-15 Time: 1630 |
| **RECEIVED BY: 1.** | **RECEIVED BY: 2.** | **RECEIVED BY LABORATORY: AETL 3.** |
| Signature: | Signature: | Signature: |
| Printed Name: Thomas Robinson | Printed Name: | Printed Name: |
| Date: 9-21-15 Time: 1215 | Date: Time: | Date: 09/21/15 Time: 1630 |

DISTRIBUTION: WHITE - Laboratory, CANARY - Laboratory, PINK - Project/Account Manager, YELLOW - Sampler/Originator

American Environmental Testing Laboratory Inc.
2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com



**Ordered By**

Advantage Environmental Consultants
145 Vallecitos De Oro Suite 201
San Marcos, CA 92069-

Telephone: (760)744-3363
Attention: Dan Weis

Project ID: 15-179SD
Date Received 09/21/2015
Date Reported 09/25/2015

| Job Number | Order Date | Client |
|---|---|---|
| 78376 | 09/21/2015 | AEC |

# CERTIFICATE OF ANALYSIS
## CASE NARRATIVE

AETL received 18 samples with the following specification on 09/21/2015.

| Lab ID | Sample ID | Sample Date | Matrix | Quantity Of Containers |
|---|---|---|---|---|
| 78376.01 | B1-0.5 | 09/18/2015 | Soil | 1 |
| 78376.04 | B2-0.5 | 09/18/2015 | Soil | 1 |
| 78376.07 | B3-0.5 | 09/18/2015 | Soil | 1 |
| 78376.10 | B4-0.5 | 09/18/2015 | Soil | 1 |
| 78376.13 | B5-0.5 | 09/18/2015 | Soil | 1 |
| 78376.16 | B6-0.5 | 09/18/2015 | Soil | 1 |

| Method ^ Submethod | Req Date | Priority | TAT | Units |
|---|---|---|---|---|
| (8081A) | 09/28/2015 | 2 | Normal | ug/Kg |

| Lab ID | Sample ID | Sample Date | Matrix | Quantity Of Containers |
|---|---|---|---|---|
| 78376.02 | B1-1 | 09/18/2015 | Soil | 1 |
| 78376.03 | B1-2 | 09/18/2015 | Soil | 1 |
| 78376.05 | B2-1 | 09/18/2015 | Soil | 1 |
| 78376.06 | B2-2 | 09/18/2015 | Soil | 1 |
| 78376.08 | B3-1 | 09/18/2015 | Soil | 1 |
| 78376.09 | B3-2 | 09/18/2015 | Soil | 1 |
| 78376.11 | B4-1 | 09/18/2015 | Soil | 1 |
| 78376.12 | B4-2 | 09/18/2015 | Soil | 1 |
| 78376.14 | B5-1 | 09/18/2015 | Soil | 1 |
| 78376.15 | B5-2 | 09/18/2015 | Soil | 1 |
| 78376.17 | B6-1 | 09/18/2015 | Soil | 1 |
| 78376.18 | B6-2 | 09/18/2015 | Soil | 1 |

| Method ^ Submethod | Req Date | Priority | TAT | Units |
|---|---|---|---|---|
| ARCHIVE | 09/28/2015 | 2 | Normal | -- |

Continued

American Environmental Testing Laboratory Inc.
2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com



**Ordered By**

| |
|---|
| Advantage Environmental Consultants |
| 145 Vallecitos De Oro Suite 201 |
| San Marcos, CA 92069- |

| |
|---|
| Project ID: 15-179SD |
| Date Received 09/21/2015 |
| Date Reported 09/25/2015 |

Telephone: (760)744-3363
Attention: Dan Weis

| Job Number | Order Date | Client |
|---|---|---|
| 78376 | 09/21/2015 | AEC |

## CERTIFICATE OF ANALYSIS
### CASE NARRATIVE

The samples were analyzed as specified on the enclosed chain of custody. No analytical non-conformances were encountered.

Unless otherwise noted, all results of soil and solid samples are based on wet weight.

Checked By: _____ Approved By: C. Razmara

Cyrus Razmara, Ph.D.
Laboratory Director

American Environmental Testing Laboratory Inc.
2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

# ANALYTICAL RESULTS

**Ordered By**

Advantage Environmental Consultants
145 Vallecitos De Oro
Suite 201
San Marcos, CA 92069-

Telephone: (760)744-3363
Attn: Dan Weis

**Site**

Vista, CA

Page: **2**

Project ID: 15-179SD
Project Name: Vista Grande

| AETL Job Number | Submitted | Client |
|---|---|---|
| 78376 | 09/21/2015 | AEC |

## Method: (8081A), Organochlorine Pesticides by GC

**QC Batch No: 092415MB1**

| Our Lab I.D. | | | Method Blank | 78376.01 | 78376.04 | 78376.07 | 78376.10 |
|---|---|---|---|---|---|---|---|
| Client Sample I.D. | | | | B1-0.5 | B2-0.5 | B3-0.5 | B4-0.5 |
| Date Sampled | | | | 09/18/2015 | 09/18/2015 | 09/18/2015 | 09/18/2015 |
| Date Prepared | | | 09/24/2015 | 09/24/2015 | 09/24/2015 | 09/24/2015 | 09/24/2015 |
| Preparation Method | | | 3550B | 3550B | 3550B | 3550B | 3550B |
| Date Analyzed | | | 09/25/2015 | 09/25/2015 | 09/25/2015 | 09/25/2015 | 09/25/2015 |
| Matrix | | | Soil | Soil | Soil | Soil | Soil |
| Units | | | ug/Kg | ug/Kg | ug/Kg | ug/Kg | ug/Kg |
| Dilution Factor | | | 1 | 1 | 1 | 1 | 1 |
| **Analytes** | **MDL** | **PQL** | **Results** | **Results** | **Results** | **Results** | **Results** |
| Aldrin | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Chlordane (Total) | 1.0 | 2.0 | ND | 1.06J | ND | ND | ND |
| Chlordane (alpha) | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| 4,4'-DDD (DDD) | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| 4,4'-DDE (DDE) | 1.0 | 2.0 | ND | ND | ND | 3.29 | ND |
| 4,4'-DDT (DDT) | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Dieldrin | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Endosulfan 1 | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Endosulfan 11 | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Endosulfan sulfate | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Endrin | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Endrin aldehyde | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Endrin ketone | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Chlordane (gamma) | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Heptachlor | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Heptachlor epoxide | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| alpha-Hexachlorocyclohexane (Alpha-BHC) | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| beta-Hexachlorocyclohexane (Betta-BHC) | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| delta-Hexachlorocyclohexane (Delta-BHC) | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| gamma-Hexachlorocyclohexane (Gamma-BHC, Lindane) | 1.0 | 2.0 | ND | ND | ND | ND | ND |
| Methoxychlor | 5.0 | 10.0 | ND | ND | ND | ND | ND |
| Toxaphene | 85.0 | 170.0 | ND | ND | ND | ND | ND |

American Environmental Testing Laboratory Inc.
2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

# ANALYTICAL RESULTS



Project ID: 15-179SD
Project Name: Vista Grande

| AETL Job Number | Submitted | Client |
|---|---|---|
| 78376 | 09/21/2015 | AEC |

## Method: (8081A), Organochlorine Pesticides by GC

| Our Lab I.D. | | | Method Blank | 78376.01 | 78376.04 | 78376.07 | 78376.10 |
|---|---|---|---|---|---|---|---|
| Surrogates | %Rec.Limit | | % Rec. | % Rec. | % Rec. | % Rec. | % Rec. |
| Decachlorobiphenyl | 30-150 | | 64.2 | 87.2 | 90.0 | 99.4 | 78.2 |
| Tetrachloro-m-xylene | 30-150 | | 79.4 | 89.2 | 95.6 | 98.2 | 89.8 |

American Environmental Testing Laboratory Inc.
2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

# ANALYTICAL RESULTS

**Ordered By**

Advantage Environmental Consultants
145 Vallecitos De Oro
Suite 201
San Marcos, CA 92069-

Telephone: (760)744-3363
Attn: Dan Weis

**Site**

Vista, CA

Page: **4**

Project ID: 15-179SD
Project Name: Vista Grande

| AETL Job Number | Submitted | Client |
|---|---|---|
| 78376 | 09/21/2015 | AEC |

## Method: (8081A), Organochlorine Pesticides by GC

**QC Batch No: 092415MB1**

| Our Lab I.D. | | | 78376.13 | 78376.16 | | | |
|---|---|---|---|---|---|---|---|
| Client Sample I.D. | | | B5-0.5 | B6-0.5 | | | |
| Date Sampled | | | 09/18/2015 | 09/18/2015 | | | |
| Date Prepared | | | 09/24/2015 | 09/24/2015 | | | |
| Preparation Method | | | 3550B | 3550B | | | |
| Date Analyzed | | | 09/25/2015 | 09/25/2015 | | | |
| Matrix | | | Soil | Soil | | | |
| Units | | | ug/Kg | ug/Kg | | | |
| Dilution Factor | | | 1 | 1 | | | |
| **Analytes** | **MDL** | **PQL** | **Results** | **Results** | | | |
| Aldrin | 1.0 | 2.0 | ND | ND | | | |
| Chlordane (Total) | 1.0 | 2.0 | ND | ND | | | |
| Chlordane (alpha) | 1.0 | 2.0 | ND | ND | | | |
| 4,4'-DDD (DDD) | 1.0 | 2.0 | ND | ND | | | |
| 4,4'-DDE (DDE) | 1.0 | 2.0 | ND | ND | | | |
| 4,4'-DDT (DDT) | 1.0 | 2.0 | 1.65J | ND | | | |
| Dieldrin | 1.0 | 2.0 | ND | ND | | | |
| Endosulfan 1 | 1.0 | 2.0 | ND | ND | | | |
| Endosulfan 11 | 1.0 | 2.0 | ND | ND | | | |
| Endosulfan sulfate | 1.0 | 2.0 | ND | ND | | | |
| Endrin | 1.0 | 2.0 | ND | ND | | | |
| Endrin aldehyde | 1.0 | 2.0 | ND | ND | | | |
| Endrin ketone | 1.0 | 2.0 | ND | ND | | | |
| Chlordane (gamma) | 1.0 | 2.0 | ND | ND | | | |
| Heptachlor | 1.0 | 2.0 | ND | ND | | | |
| Heptachlor epoxide | 1.0 | 2.0 | ND | ND | | | |
| alpha-Hexachlorocyclohexane (Alpha-BHC) | 1.0 | 2.0 | ND | ND | | | |
| beta-Hexachlorocyclohexane (Betta-BHC) | 1.0 | 2.0 | ND | ND | | | |
| delta-Hexachlorocyclohexane (Delta-BHC) | 1.0 | 2.0 | ND | ND | | | |
| gamma-Hexachlorocyclohexane (Gamma-BHC, Lindane) | 1.0 | 2.0 | ND | ND | | | |
| Methoxychlor | 5.0 | 10.0 | ND | ND | | | |
| Toxaphene | 85.0 | 170.0 | ND | ND | | | |

American Environmental Testing Laboratory Inc.
2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

# ANALYTICAL RESULTS



Project ID: 15-179SD
Project Name: Vista Grande

| AETL Job Number | Submitted | Client |
|---|---|---|
| 78376 | 09/21/2015 | AEC |

## Method: (8081A), Organochlorine Pesticides by GC

| Our Lab I.D. | | | 78376.13 | 78376.16 | | | |
|---|---|---|---|---|---|---|---|
| Surrogates | %Rec.Limit | | % Rec. | % Rec. | | | |
| Decachlorobiphenyl | 30-150 | | 84.2 | 81.2 | | | |
| Tetrachloro-m-xylene | 30-150 | | 88.0 | 88.8 | | | |

American Environmental Testing Laboratory Inc.
2834 & 2908 North Naomi Street Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

# QUALITY CONTROL RESULTS

**Ordered By**

Advantage Environmental Consultants
145 Vallecitos De Oro
Suite 201
San Marcos, CA 92069-

Telephone: (760)744-3363
Attn: Dan Weis
Page: 6

**Site**

Vista, CA

Project ID: 15-179SD
Project Name: Vista Grande

| AETL Job Number | Submitted | Client |
|---|---|---|
| 78376 | 09/21/2015 | AEC |

## Method: (8081A), Organochlorine Pesticides by GC

**QC Batch No: 092415MB1; Dup or Spiked Sample: 78352.28; LCS: Clean Sand; QC Prepared: 09/24/2015; QC Analyzed: 09/25/2015; Units: ug/Kg**

| Analytes | Sample Result | MS Concen | MS Recov | MS % REC | MS DUP Concen | MS DUP Recov | MS DUP % REC | RPD % | MS/MSD % Limit | MS RPD % Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Aldrin | 0.00 | 20.0 | 17.4 | 87.0 | 20.0 | 16.2 | 81.0 | 7.14 | 40-150 | <40 |
| 4,4'-DDT (DDT) | 6.53 | 50.0 | 67.2 | 121 | 50.0 | 59.0 | 105 | 14.2 | 40-150 | <40 |
| Dieldrin | 2.66 | 50.0 | 49.3 | 93.3 | 50.0 | 44.6 | 83.9 | 10.6 | 40-150 | <40 |
| Endrin | 0.00 | 50.0 | 72.9 | 146 | 50.0 | 69.2 | 138 | 5.63 | 40-150 | <40 |
| Heptachlor | 0.00 | 20.0 | 18.1 | 90.5 | 20.0 | 17.2 | 86.0 | 5.10 | 40-150 | <40 |
| gamma-Hexachlorocyclohexane (Gamma-BHC, Lindane) | 0.00 | 20.0 | 17.1 | 85.5 | 20.0 | 16.0 | 80.0 | 6.65 | 40-150 | <40 |
| **Surrogates** | | | | | | | | | | |
| Decachlorobiphenyl | 0.00 | 50.0 | 43.3 | 86.6 | 50.0 | 39.6 | 79.2 | 8.55 | 30-150 | <40 |
| Tetrachloro-m-xylene | 0.00 | 50.0 | 44.5 | 89.0 | 50.0 | 42.3 | 84.6 | 4.94 | 30-150 | <40 |

**QC Batch No: 092415MB1; Dup or Spiked Sample: 78352.28; LCS: Clean Sand; QC Prepared: 09/24/2015; QC Analyzed: 09/25/2015; Units: ug/Kg**

| Analytes | LCS Concen | LCS Recov | LCS % REC | LCS/LCSD % Limit | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Aldrin | 20.0 | 16.5 | 82.5 | 50-150 | | | | | | |
| 4,4'-DDT (DDT) | 50.0 | 50.8 | 102 | 50-150 | | | | | | |
| Dieldrin | 50.0 | 42.4 | 84.8 | 50-150 | | | | | | |
| Endrin | 50.0 | 62.3 | 125 | 50-150 | | | | | | |
| Heptachlor | 20.0 | 16.4 | 82.0 | 50-150 | | | | | | |
| gamma-Hexachlorocyclohexane (Gamma-BHC, Lindane) | 20.0 | 16.7 | 83.5 | 50-150 | | | | | | |
| **Surrogates** | | | | | | | | | | |
| Decachlorobiphenyl | 50.0 | 39.0 | 78.0 | 30-150 | | | | | | |
| Tetrachloro-m-xylene | 50.0 | 43.4 | 86.8 | 30-150 | | | | | | |

American Environmental Testing Laboratory Inc.
2834 & 2908 North Naomi Street, Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

# Data Qualifiers and Descriptors

## *Data Qualifier:*

| | |
|---|---|
| #: | Recovery is not within acceptable control limits. |
| *: | In the QC section, sample results have been taken directly from the ICP reading. No preparation factor has been applied. |
| B: | Analyte was present in the Method Blank. |
| D: | Result is from a diluted analysis. |
| E: | Result is beyond calibration limits and is estimated. |
| H: | Analysis was performed over the allowed holding time due to circumstances which were beyond laboratory control. |
| J: | Analyte was detected . However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL). |
| M: | Matrix spike recovery is outside control limits due to matrix interference. Laboratory Control Sample recovery was acceptable. |
| MCL: | Maximum Contaminant Level |
| NS: | No Standard Available |
| S6: | Surrogate recovery is outside control limits due to matrix interference. |
| S8: | The analysis of the sample required a dilution such that the surrogate concentration was diluted below the method acceptance criteria. |
| X: | Results represent LCS and LCSD data. |

## *Definition:*

| | |
|---|---|
| %Limi: | Percent acceptable limits. |
| %REC: | Percent recovery. |
| Con.L: | Acceptable Control Limits |
| Conce: | Added concentration to the sample. |
| LCS: | Laboratory Control Sample |
| MDL: | Method Detection Limit is a statistically derived number which is specific for each instrument, each method, and each compound. It indicates a distinctively detectable quantity with 99% probability. |

American Environmental Testing Laboratory Inc.
2834 & 2908 North Naomi Street, Burbank, CA 91504 • DOHS NO: 1541, LACSD NO: 10181
Tel: (888) 288-AETL • (818) 845-8200 • Fax: (818) 845-8840 • www.aetlab.com

# Data Qualifiers and Descriptors

| | |
|---|---|
| MS: | Matrix Spike |
| MS DU: | Matrix Spike Duplicate |
| ND: | Analyte was not detected in the sample at or above MDL. |
| PQL: | Practical Quantitation Limit or ML (Minimum Level as per RWQCB) is the minimum concentration that can be quantified with more than 99% confidence. Taking into account all aspects of the entire analytical instrumentation and practice. |
| Recov: | Recovered concentration in the sample. |
| RPD: | Relative Percent Difference |

This page left intentionally blank.

# Attachment H – Hydrology Study and SWQMP

This page left intentionally blank.

# HYDROLOGY STUDY

# FOR

# 2277 VISTA GRANDE DRIVE
# APN: 171-100-05 & 171-100-28

CITY OF VISTA, CA

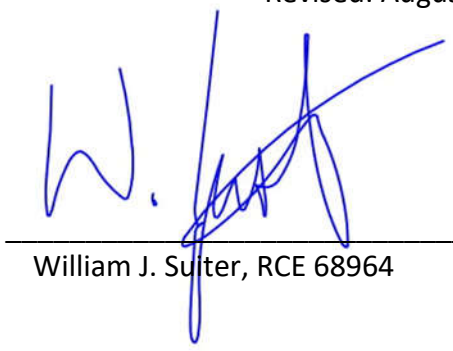
PREPARED FOR:

Greg Perrine
1151 Duryea Avenue
Irvine, CA 92614

PREPARED BY:

PASCO LARET SUITER & ASSOCIATES, INC.
27127 Calle Arroyo, Suite 1904
San Juan Capistrano, CA 92675
949-661-6695

Prepared: March 2021
Revised: May 2021
Revised: August 2021



William J. Suiter, RCE 68964 DATE

# TABLE OF CONTENTS


| | SECTION |
|---|---|
| **Executive Summary** | **1.0** |
| Introduction | 1.1 |
| Existing Conditions | 1.2 |
| Proposed Project | 1.3 |
| Conclusions | 1.4 |
| References | 1.5 |
| **Methodology** | **2.0** |
| Rational Method | 2.1 |
| County of San Diego Criteria | 2.2 |
| AES Rational Method Computer Model | 2.3 |
| **Hydrologic Analysis** | **3.0** |
| Existing Condition Hydrologic Model Output (100-Year Event) | 3.1 |
| Proposed Condition Hydrologic Model Output (100-Year Event Undetained) | 3.2 |
| Detention Analysis | 3.3 |
| Proposed Condition Hydrologic Model Output (100-Year Event Detained) | 3.4 |
| Hydromodification Management | 3.5 |
| Storm Water Pollutant Control | 3.6 |

**Appendices**

Appendix A: Hydrology Support Material

Appendix B: Detention Support Material

Appendix C: Existing and Proposed Hydrology Maps

# 1.0 EXECUTIVE SUMMARY

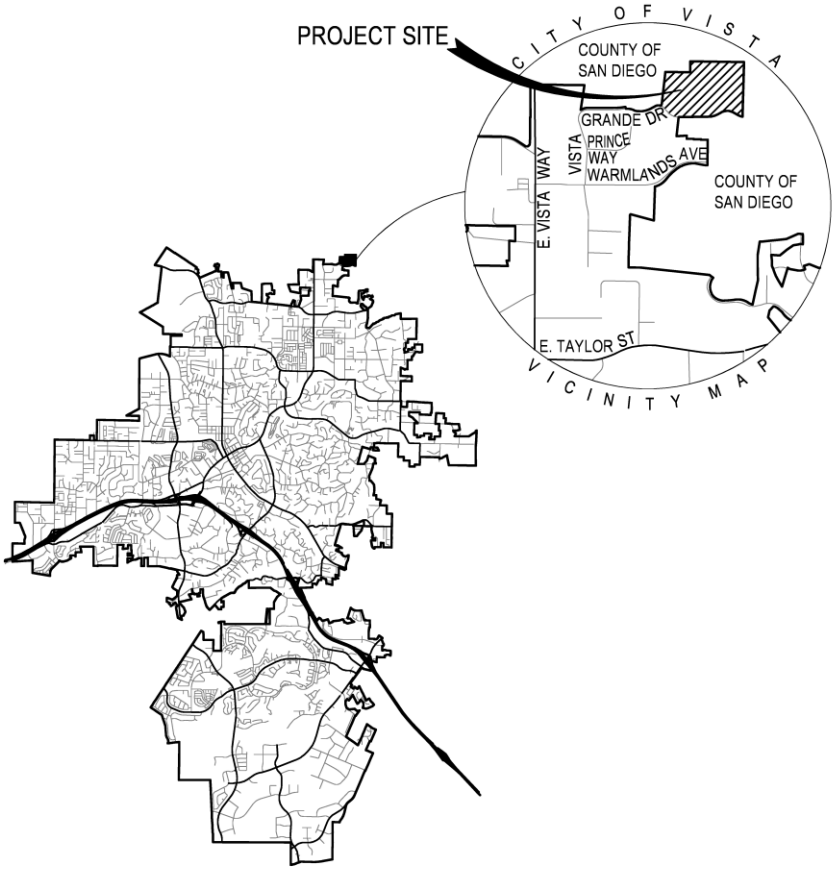
## 1.1 Introduction

This Hydrology Study for the proposed development has been prepared to analyze the hydrologic characteristics of the existing and proposed project site. This report presents both the methodology and the calculations used for determining the storm water runoff from the project site in the pre-developed (existing) conditions and the post-developed (proposed) conditions produced by the 100-year, 6-hour storm event.

## 1.2 Existing Conditions

The subject property is located at 2277 Vista Grande Drive in the City of Vista. The site is east of E Vista Way, approximately 3 miles northwest of the CA-78 freeway and 1.5 miles southeast of the CA-76 freeway.

**Vicinity Map**



The site is surrounded by residential homes to the west, south and east, and farmland to the north. The site has one single-family residence and an asphalt paved driveway along the western boundary. The remainder of the project site is undeveloped land with moderately steep slopes facing north, east, south and west. Elevations across the site range from a high of approximately 724 feet in the north central portion of the property to a low of approximately 624 feet at the southwest corner of the property.

The site is approximately 16.99 acres. In the existing condition, storm water runoff flows overland to the north, east, south and west. There are four main discharge points located along the northern, eastern, southeastern and southwestern boundaries.

There is no underground storm drain system in Vista Grande Drive near the project site. Per the City of Vista GIS Storm Water Atlas, the nearest underground storm drain system is located approximately 240 feet west of the site on the adjacent property.

Per the United States Department of Agriculture Web Soil Survey, the project site is underlain with Hydrologic Soil Group C. Refer to Appendix A for soil information.

Area weighted runoff coefficients were calculated using the methodology described in section 3.2.1 of the San Diego County Hydrology Manual and Table 3-1 Runoff Coefficients for Urban Areas. Using the Rational Method Procedure outlined in the San Diego County Hydrology Manual, a peak flow rate was calculated for the existing condition 100-year, 6-hour storm event. The table below summarizes the existing condition hydrologic data.

**Summary of Existing Condition 100-yr Peak Discharge Rates**

| Discharge Node | Area (ac) | Q100 (cfs) |
|---|---|---|
| 110 | 2.45 | 4.76 |
| 120 | 3.1 | 5.36 |
| 135 | 1.1 | 2.18 |
| 145 | 0.85 | 1.35 |
| 155 | 8.97 | 14.28 |
| 165 | 0.53 | 0.84 |

Refer to the existing condition hydrologic calculations included in Section 3.1 for detailed analysis.

### 1.3 Proposed Project

The project proposes to redevelop the existing site into a residential development consisting of single-family lots, access drive, landscape, associated utilities and improvements, Modular Wetlands Systems to meet the requirements for pollutant control and underground storm water storage facilities to meet the requirements for hydromodification management flow control and to mitigate for the 100-year 6-hour storm event.

In the proposed condition, onsite storm water runoff will be collected in proposed storm drain and conveyed to the proposed Modular Wetlands Systems (BMPs) and subsequently the proposed underground storage facilities (BMPs).

In the proposed condition, the site consists of six (6) drainage basins. Storm water runoff will be conveyed overland and in proposed storm drain to four (4) Modular Wetlands Systems and four (4) proposed underground storage facilities to meet the requirements for pollutant control, hydromodification management flow control and to mitigate for the 100-year 6-hour storm event.

Drainage Basin 1 consists of the northwestern portion of the site. Runoff will flow westerly to a proposed Modular Wetlands System (BMP-1) and subsequently a proposed underground storage facility (BMP-A) located near the western boundary. BMP-A will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 2 consists of the central western portion of the site. Runoff will flow westerly to a proposed Modular Wetlands System (BMP-2) and subsequently a proposed underground storage facility (BMP-B) located near the western boundary. BMP-B will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 3 consists of a small area at the southwestern corner of the site. Runoff will flow southerly and westerly to a proposed Modular Wetlands System (BMP-3) which will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 4 consists of the eastern portion of the site. Runoff will flow easterly and southerly to a proposed underground storage facility (BMP-D) located near the southeastern corner of the site. BMP-D will discharge to the surface of Vista Grande Drive at the southeastern corner of the site, flow westerly in the street, confluencing with flow from Drainage Basin 6, to a proposed curb inlet and storm drain that discharges to a proposed Modular Wetlands System (BMP-4) and subsequently another proposed underground storage facility (BMP-C) located near the southwestern corner of the site.

Drainage Basin 5 consists of the small area of perimeter landscape slopes along the northern and eastern boundaries. Runoff will flow offsite northerly and easterly as in the existing condition.

Drainage Basin 6 consists of the southern portion of the site. Runoff will flow westerly, confluencing with discharge from BMP-D, to a proposed Modular Wetlands System (BMP-4) and subsequently a proposed underground storage facility (BMP-C) located near the southwestern corner of the site. BMP-C will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

The BMPs will provide hydromodification management flow control and storm water pollutant control to meet the requirements the California Regional Water Quality Control Board San Diego Region municipal storm water permit (Order No. R9-2013-0001, referred to as MS4 Permit). For detailed pollutant control and HMP calculations refer to the report titled "Priority Development Project Storm Water Quality Management Plan for 2277 Vista Grande Drive" dated March 2021, prepared by Pasco Laret Suiter & Associates.

Area weighted runoff coefficients were calculated using the methodology described in section 3.2.1 of the San Diego County Hydrology Manual and Table 3-1 Runoff Coefficients for Urban Areas. Using the Rational Method Procedure outlined in the San Diego County Hydrology Manual, a peak flow rate was calculated for the proposed condition 100-year, 6-hour storm event. The underground storm water storage facilities provide mitigation for the 100-year 6-hour storm event. A detention analysis was performed to evaluate the effects of the storage facilities on the 100-year, 6-hour storm event peak discharge rates. The table below summarizes the proposed condition hydrologic data.

**Summary of Proposed Condition 100-yr Peak Discharge Rates**

| Discharge Node | Area (ac) | Q100 (cfs) Undetained | Q100 (cfs) Detained |
|---|---|---|---|
| 301 | 16.16 | 27.40 | 9.92 |
| 503 | 0.91 | 1.17 | 1.17 |

Refer to the proposed undetained and detained hydrologic calculations and detention analysis included in Sections 3.2, 3.3, 3.4 and Appendix B for detailed analysis.

### 1.4 Conclusions

Based upon the analyses included in this report, the proposed Modular Wetlands Systems and underground storage facilities are sized to accommodate the increase in peak runoff in the proposed condition and are designed to meet the requirements of the MS4 Permit for both pollutant control and hydromodification management.

### 1.5 References

*"San Diego County Hydrology Manual",* revised June 2003, County of San Diego, Department of Public Works, Flood Control Section.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov.

# 2.0 METHODOLOGY

Pursuant to the San Diego County Hydrology Manual (SDCHM) dated June 2003, the Rational Method is recommended for analyzing the runoff response from drainage areas up to approximately 1 square mile in size. The proposed project and associated watershed basins are less than 1 square mile, therefore the Rational Method was used to analyze the project's hydrologic characteristics in the existing and proposed conditions.

## 2.1 Rational Method

The Rational Method (RM) formula estimates the peak rate of runoff based on the variables of area, runoff coefficient, and rainfall intensity. The rainfall intensity (I) is equal to:

$$I = 7.44 \times P_6 \times D^{-0.645}$$

Where:

I = Intensity (in/hr)
$P_6$ = 6-hour precipitation (in)
D = duration (min – use Tc)

Using the Time of Concentration (Tc) which is the time required for a given element of water that originates at the most remote point of the basin being analyzed to reach the point at which the runoff from the basin is being analyzed, the RM equation determines the storm water runoff rate (Q) for a given basin in terms of flow, typically in cubic feet per second (cfs). The RM equation is as follows:

$$Q = CIA$$

Where:

Q= flow (cfs)
C = runoff coefficient, ratio of rainfall that produces storm water runoff (runoff vs. infiltration/evaporation/absorption/etc)
I = average rainfall intensity for a duration equal to the Tc for the area (in/hr)
A = drainage area contributing to the basin (ac)

The RM equation assumes that the storm event being analyzed delivers precipitation to the entire basin uniformly, and therefore the peak discharge rate will occur when a raindrop that falls at the most remote portion of the basin arrives at the point of analysis. The RM also assumes that the fraction of rainfall that becomes runoff or the runoff coefficient, C, is not affected by the storm intensity, I, or the precipitation zone number.

## 2.2 County of San Diego Criteria

The County of San Diego has developed its own tables, nomographs, and methodologies for analyzing storm water runoff for areas within the County. The County has also developed precipitation isopluvial contour maps that show even lines of rainfall anticipated from a given storm event (i.e. 100-year, 6-hour storm). The 100-year 6-hour storm event rainfall isopluvial map is included in Appendix A.

One of the variables of the RM equation is the runoff coefficient, C, which is dependent upon land use and soil type. Table 3-1 Runoff Coefficients for Urban Areas in the SDCHM categorizes the land use, the associated development density (dwelling units per acre) and the percentage of impervious area. Each of the categories listed has an associated runoff coefficient for each soil type class. A composite runoff coefficient can also be calculated for an area based on soil type and impervious percentage using the following equation from Section 3.1.2 of the SDCHM:

$$C = 0.90 \times (\% \text{ Impervious}) + Cp \times (1 - \% \text{ Impervious})$$

Where: Cp = Pervious Coefficient Runoff Value for the soil type
(shown in Table 3-1 as Undisturbed Natural Terrain/Permanent Open Space, 0% Impervious)

The onsite hydrologic calculations contained herein figure a composite runoff coefficient for the onsite project areas based on the percentage of impervious area and the percentage of pervious or landscape area. Refer to Appendix A for runoff coefficient calculations.

The County has also illustrated in detail the methodology for determining the time of concentration, in particular the initial time of concentration. The County has adopted the Federal Aviation Agency's (FAA) overland time of flow equation. This equation essentially limits the flow path length for the initial time of concentration to lengths of 100 feet or less, and is dependent on land use and slope.

## 2.3 AES Rational Method Computer Model

The Rational Method computer program developed by Advanced Engineering Software (AES) satisfies the County of San Diego design criteria, therefore it is the computer model used for this study. The AES hydrologic model is capable of creating independent node-link models of each interior drainage basin and linking these sub-models together at confluence points to determine peak flow rates. The program utilizes base information input by the user to perform calculations for up to 15 hydrologic processes. The required base information includes drainage basin area, storm water facility locations and sizes, land uses, flow patterns, and topographic elevations. The hydrologic conditions were analyzed in accordance with the 2003 County of San Diego Hydrology Manual criteria as follows:

| | |
|---|---|
| Design Storm | 100-year, 6-hour |
| 100-year, 6-hour Precipitation | 3.2 inches |

| | | |
|---|---|---|
| Rainfall Intensity | Based on the 2003 County of San Diego Hydrology Manual criteria | |
| Runoff Coefficient* | Pervious C soil | C = 0.30 |
| | Impervious C soil | C = 0.90 |
| Soil Type | C | |

*Weighted runoff coefficients were calculated where appropriate. Refer to Appendix A.

## 3.0 HYDROLOGIC ANALYSIS

Table 1 below compares and summarizes the hydrologic calculations provided in Sections 3.1, 3.2 and 3.4.

**Table 1: Summary of 100-yr Peak Discharge Rates**

| **Existing** | | | **Proposed** | | | **Proposed Detained** | | |
|---|---|---|---|---|---|---|---|---|
| Discharge Node | Area (ac) | Q100 (cfs) | Discharge Node | Area (ac) | Q100 (cfs) | Discharge Node | Area (ac) | Q100 (cfs) |
| 110 | 2.45 | 4.76 | n/a | 0 | 0 | n/a | 0 | 0 |
| 120 | 3.10 | 5.36 | 503 | 0.91 | 1.17 | 503 | 0.91 | 1.17 |
| 135 | 1.10 | 2.18 | n/a | 0 | 0 | n/a | 0 | 0 |
| 145 | 10.35 | 16.70 | 301 | 16.16 | 27.40 | 301 | 16.16 | 9.92 |

## 3.1 Existing Condition Hydrologic Model Output (100-Year Event)

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1452

                              Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* 3474   VISTA GRANDE                                                    *
* EXISTING CONDITION                                                     *
* 100-YR                                                                 *
 **************************************************************************

  FILE NAME: 100PRE.DAT
  TIME/DATE OF STUDY: 15:44 08/09/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.200
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   12.0      1.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    719.30
  DOWNSTREAM ELEVATION(FEET) =    711.70
  ELEVATION DIFFERENCE(FEET) =      7.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.789
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.671
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    711.70  DOWNSTREAM(FEET) =    679.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   286.00   CHANNEL SLOPE =  0.1122
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.482
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.76
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   1.73
  Tc(MIN.) =    7.52
  SUBAREA AREA(ACRES) =     2.35       SUBAREA RUNOFF(CFS) =    4.57
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        2.4         PEAK FLOW RATE(CFS) =       4.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   3.49
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    110.00 =     361.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
```

```
  UPSTREAM ELEVATION(FEET) =    719.30
  DOWNSTREAM ELEVATION(FEET) =    714.40
  ELEVATION DIFFERENCE(FEET) =      4.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.671
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.000
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    120.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    714.40  DOWNSTREAM(FEET) =    683.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   379.00   CHANNEL SLOPE =  0.0821
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.759
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.68
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   2.36
  Tc(MIN.) =    9.03
  SUBAREA AREA(ACRES) =     3.01       SUBAREA RUNOFF(CFS) =    5.20
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =       5.36

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   3.19
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =     454.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    130.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    724.20
  DOWNSTREAM ELEVATION(FEET) =    718.30
  ELEVATION DIFFERENCE(FEET) =      5.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.271
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.285
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    130.00 TO NODE    135.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    718.30  DOWNSTREAM(FEET) =    697.70
 CHANNEL LENGTH THRU SUBAREA(FEET) =   146.00   CHANNEL SLOPE =  0.1411
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.598
 USER-SPECIFIED RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) =  85
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.25
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.34
 AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.04
 Tc(MIN.) =    7.31
 SUBAREA AREA(ACRES) =     0.97       SUBAREA RUNOFF(CFS) =    1.92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
 TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       2.18

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.92
 LONGEST FLOWPATH FROM NODE    125.00 TO NODE    135.00 =     221.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    140.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 USER-SPECIFIED RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) =  85
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    724.20
 DOWNSTREAM ELEVATION(FEET) =    721.00
 ELEVATION DIFFERENCE(FEET) =      3.20
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.689
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.387
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    140.00 TO NODE    145.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    721.00  DOWNSTREAM(FEET) =    694.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   272.00   CHANNEL SLOPE =  0.0974
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.280
 USER-SPECIFIED RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) =  85
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.76
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.72
 AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   2.64
 Tc(MIN.) =   10.33
 SUBAREA AREA(ACRES) =     0.78       SUBAREA RUNOFF(CFS) =    1.24
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
 TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       1.35

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   2.15
 LONGEST FLOWPATH FROM NODE    125.00 TO NODE    145.00 =     347.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    150.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 USER-SPECIFIED RUNOFF COEFFICIENT = .3000
 S.C.S. CURVE NUMBER (AMC II) =  85
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    724.20
 DOWNSTREAM ELEVATION(FEET) =    721.50
 ELEVATION DIFFERENCE(FEET) =      2.70
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.137
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.158
 SUBAREA RUNOFF(CFS) =      0.17
 TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    721.50  DOWNSTREAM(FEET) =    624.40
 CHANNEL LENGTH THRU SUBAREA(FEET) =   776.00   CHANNEL SLOPE =  0.1251
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.979
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3200
 S.C.S. CURVE NUMBER (AMC II) =  85
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.31
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.07
 AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   3.18
 Tc(MIN.) =   11.31
 SUBAREA AREA(ACRES) =     8.88       SUBAREA RUNOFF(CFS) =   14.15
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.320
  TOTAL AREA(ACRES) =        9.0         PEAK FLOW RATE(CFS) =      14.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   5.06
  LONGEST FLOWPATH FROM NODE    125.00 TO NODE    155.00 =     851.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    160.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    719.30
  DOWNSTREAM ELEVATION(FEET) =    711.00
  ELEVATION DIFFERENCE(FEET) =      8.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.113
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.717
  SUBAREA RUNOFF(CFS) =      0.12
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.12

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    165.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    711.00  DOWNSTREAM(FEET) =    671.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.1218
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.282
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =  85
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.69
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   3.21
  Tc(MIN.) =   10.32
  SUBAREA AREA(ACRES) =     0.47       SUBAREA RUNOFF(CFS) =    0.74
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       0.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.89
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    165.00 =     425.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =     10.32
```

```
  PEAK FLOW RATE(CFS)   =       0.84
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

## 3.2 Proposed Undetained Condition Hydrologic Model Output (100-Year Event)

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1452

                             Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* 3474 VISTA GRANDE                                                     *
* PROPOSED CONDITION                                                    *
* 100-YR                                                                *
 ************************************************************************

  FILE NAME: 3474P00.DAT
  TIME/DATE OF STUDY: 16:01 08/03/2021
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.200
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   12.0      1.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   182.00
  UPSTREAM ELEVATION(FEET) =    717.00
  DOWNSTREAM ELEVATION(FEET) =    716.40
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.904
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.099
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.36   TOTAL RUNOFF(CFS) =      0.77

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  716.40  DOWNSTREAM ELEVATION(FEET) =  651.10
  STREET LENGTH(FEET) =   645.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.48
  STREET FLOW TRAVEL TIME(MIN.) =   1.86   Tc(MIN.) =   12.76
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.607
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4200
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.420
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =    4.72
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       5.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.44
  FLOW VELOCITY(FEET/SEC.) =  6.52   DEPTH*VELOCITY(FT*FT/SEC.) =   1.92
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     827.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   648.10  DOWNSTREAM(FEET) =   648.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.42
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   12.81
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     842.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   644.50  DOWNSTREAM(FEET) =   629.30
  FLOW LENGTH(FEET) =   273.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.91
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.42
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   13.23
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.23
  RAINFALL INTENSITY(INCH/HR) =   4.50
  TOTAL STREAM AREA(ACRES) =     2.80
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.42

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   141.00
  UPSTREAM ELEVATION(FEET) =    715.60
  DOWNSTREAM ELEVATION(FEET) =    709.60
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.554
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.431
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  709.60  DOWNSTREAM ELEVATION(FEET) =  653.20
  STREET LENGTH(FEET) =   551.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.64
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =    6.06
```

```
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.448
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.466
  SUBAREA AREA(ACRES) =    1.79      SUBAREA RUNOFF(CFS) =    6.00
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.26
  FLOW VELOCITY(FEET/SEC.) =  6.84   DEPTH*VELOCITY(FT*FT/SEC.) =   2.13
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     692.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   648.70  DOWNSTREAM(FEET) =   640.80
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.79
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.67
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.07
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     707.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.440
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5052
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    1.42
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       8.08
  TC(MIN.) =    6.07

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   637.80  DOWNSTREAM(FEET) =   629.30
  FLOW LENGTH(FEET) =   213.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.66
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.08
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    6.40
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    105.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.40
  RAINFALL INTENSITY(INCH/HR) =   7.19
  TOTAL STREAM AREA(ACRES) =     2.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.08

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.42    13.23        4.501          2.80
      2        8.08     6.40        7.188          2.15

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       10.70     6.40       7.188
      2       10.48    13.23       4.501

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.70   Tc(MIN.) =    6.40
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    301.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    629.30  DOWNSTREAM(FEET) =    616.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   145.00   CHANNEL SLOPE =  0.0917
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
```

```
  CHANNEL FLOW THRU SUBAREA(CFS) =      10.70
  FLOW VELOCITY(FEET/SEC.) =   7.34   FLOW DEPTH(FEET) =   0.17
  TRAVEL TIME(MIN.) =   0.33   Tc(MIN.) =    6.73
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    301.00 =    1260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.73
  RAINFALL INTENSITY(INCH/HR) =   6.96
  TOTAL STREAM AREA(ACRES) =     4.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.70

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   265.00
  UPSTREAM ELEVATION(FEET) =    642.60
  DOWNSTREAM ELEVATION(FEET) =    616.00
  ELEVATION DIFFERENCE(FEET) =     26.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.922
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.431
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.98
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      1.98

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    1.92
  RAINFALL INTENSITY(INCH/HR) =   8.43
  TOTAL STREAM AREA(ACRES) =     0.27
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.98

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.70     6.73        6.959          4.95
      2        1.98     1.92        8.431          0.27

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       10.81     1.92       8.431
      2       12.34     6.73       6.959

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.34   Tc(MIN.) =    6.73
  TOTAL AREA(ACRES) =        5.2
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    301.00 =    1260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4300
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   202.00
  UPSTREAM ELEVATION(FEET) =    717.00
  DOWNSTREAM ELEVATION(FEET) =    715.70
  ELEVATION DIFFERENCE(FEET) =      1.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.429
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    55.74
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.248
  SUBAREA RUNOFF(CFS) =      0.72
  TOTAL AREA(ACRES) =      0.32   TOTAL RUNOFF(CFS) =      0.72

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  715.70  DOWNSTREAM ELEVATION(FEET) =  685.10
 STREET LENGTH(FEET) =   684.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.94
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.70
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.66
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.49
 STREET FLOW TRAVEL TIME(MIN.) =   2.44   Tc(MIN.) =   12.87
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.581
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .4200
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.421
 SUBAREA AREA(ACRES) =    4.37      SUBAREA RUNOFF(CFS) =    8.41
 TOTAL AREA(ACRES) =        4.7        PEAK FLOW RATE(CFS) =       9.04

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
 FLOW VELOCITY(FEET/SEC.) =  5.26   DEPTH*VELOCITY(FT*FT/SEC.) =   1.92
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    402.00 =     886.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    405.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.581
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .4600
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.4312
 SUBAREA AREA(ACRES) =    1.72   SUBAREA RUNOFF(CFS) =    3.62
 TOTAL AREA(ACRES) =        6.4   TOTAL RUNOFF(CFS) =      12.66
```

```
  TC(MIN.) =   12.87

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   684.00  DOWNSTREAM(FEET) =   683.90
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.07
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.66
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   12.91
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    403.00 =     901.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   681.40  DOWNSTREAM(FEET) =   681.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.07
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.66
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   13.08
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    406.00 =     961.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.08
  RAINFALL INTENSITY(INCH/HR) =   4.53
  TOTAL STREAM AREA(ACRES) =     6.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.66

****************************************************************************
  FLOW PROCESS FROM NODE    606.00 TO NODE    406.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .7200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.00
  UPSTREAM ELEVATION(FEET) =    695.30
  DOWNSTREAM ELEVATION(FEET) =    681.00
  ELEVATION DIFFERENCE(FEET) =     14.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.845
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.431
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.21
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.21

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.85
  RAINFALL INTENSITY(INCH/HR) =   8.43
  TOTAL STREAM AREA(ACRES) =     0.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.66    13.08        4.535          6.41
      2        1.21     3.85        8.431          0.20

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.94     3.85       8.431
      2       13.32    13.08       4.535

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.32   Tc(MIN.) =   13.08
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    406.00 =     961.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    406.00 TO NODE    604.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  681.00  DOWNSTREAM ELEVATION(FEET) =  644.20
  STREET LENGTH(FEET) =   627.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.87
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    6.02
    SPLIT DEPTH(FEET) =    0.30   SPLIT FLOOD WIDTH(FEET) =    8.74
    SPLIT FLOW(CFS) =    4.49   SPLIT VELOCITY(FEET/SEC.) =    5.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.20
  STREET FLOW TRAVEL TIME(MIN.) =   1.74   Tc(MIN.) =   14.81
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.184
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.455
  SUBAREA AREA(ACRES) =    0.36      SUBAREA RUNOFF(CFS) =    1.10
  TOTAL AREA(ACRES) =        7.0        PEAK FLOW RATE(CFS) =      13.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  6.02   DEPTH*VELOCITY(FT*FT/SEC.) =   2.20
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    604.00 =    1588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    604.00 TO NODE    602.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   639.80  DOWNSTREAM(FEET) =   639.50
```

```
  FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.77
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.32
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   14.90
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    602.00 =    1621.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    602.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.90
  RAINFALL INTENSITY(INCH/HR) =   4.17
  TOTAL STREAM AREA(ACRES) =     6.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.32

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4600
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   242.00
  UPSTREAM ELEVATION(FEET) =    690.50
  DOWNSTREAM ELEVATION(FEET) =    674.50
  ELEVATION DIFFERENCE(FEET) =     16.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.138
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.386
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.60   TOTAL RUNOFF(CFS) =      2.04

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  674.50  DOWNSTREAM ELEVATION(FEET) =  643.70
  STREET LENGTH(FEET) =   511.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.83
  STREET FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =    7.67
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.396
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.426
  SUBAREA AREA(ACRES) =    3.27      SUBAREA RUNOFF(CFS) =    8.78
  TOTAL AREA(ACRES) =        3.9        PEAK FLOW RATE(CFS) =      10.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  6.10   DEPTH*VELOCITY(FT*FT/SEC.) =   2.23
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     753.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    602.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.67
  RAINFALL INTENSITY(INCH/HR) =   6.40
  TOTAL STREAM AREA(ACRES) =     3.87
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.55

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.32    14.90        4.170          6.97
      2       10.55     7.67        6.396          3.87

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       19.23     7.67       6.396
      2       20.19    14.90       4.170

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.19   Tc(MIN.) =   14.90
  TOTAL AREA(ACRES) =       10.8
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    602.00 =    1621.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   639.50  DOWNSTREAM(FEET) =   631.10
  FLOW LENGTH(FEET) =   194.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.19
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   15.14
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    603.00 =    1815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    607.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   627.60  DOWNSTREAM(FEET) =   627.40
  FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.53
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.19
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   15.19
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    607.00 =    1838.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    607.00 TO NODE    301.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    627.40  DOWNSTREAM(FEET) =    616.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   145.00   CHANNEL SLOPE =  0.0786
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      20.19
  FLOW VELOCITY(FEET/SEC.) =   8.22   FLOW DEPTH(FEET) =   0.25
  TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =   15.48
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    301.00 =    1983.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       20.19    15.48       4.067       10.84
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    301.00 =    1983.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       12.34     6.73       6.959        5.22
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    301.00 =    1260.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      21.12       6.73        6.959
      2      27.40      15.48        4.067

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.40   Tc(MIN.) =   15.48
  TOTAL AREA(ACRES) =       16.1

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   106.00
  UPSTREAM ELEVATION(FEET) =    717.00
  DOWNSTREAM ELEVATION(FEET) =    703.50
  ELEVATION DIFFERENCE(FEET) =     13.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```

```
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.991
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   703.50  DOWNSTREAM(FEET) =   700.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.018
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.75
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.34
  PIPE TRAVEL TIME(MIN.) =   6.68    Tc(MIN.) =   13.37
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    502.00 =     806.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.472
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3000
  SUBAREA AREA(ACRES) =    0.35   SUBAREA RUNOFF(CFS) =    0.47
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       0.68
  TC(MIN.) =   13.37

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   700.00  DOWNSTREAM(FEET) =   684.50
  FLOW LENGTH(FEET) =   294.00   MANNING'S N =  0.018
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO  8.000
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.02
  ESTIMATED PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.68
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =   14.34
```

```
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    503.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.273
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3000
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.51
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       1.17
  TC(MIN.) =   14.34
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.9  TC(MIN.) =     14.34
  PEAK FLOW RATE(CFS)   =       1.17
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

### 3.3 Detention Analysis (100-Year Event)

The underground storm water storage facilities (BMPs) provide hydromodification management flow control and mitigation of the 100-year storm event peak flow rate. The 100-year storm event detention analysis was performed using HydroCAD Stormwater Modeling software. The inflow runoff hydrographs to the BMPs were modeled using RatHydro which is a Rational Method Design Storm Hydrograph software that creates a hydrograph using the results of the Rational Method calculations. HydroCAD has the ability to route the 100-year 6-hour storm event inflow hydrograph through the BMPs. Based on the BMP cross sectional geometry, stage storage and outlet structure data, HydroCAD calculates the detained peak flow rate and detained time to peak.

Each underground storm water storage facility has a low-flow orifice to comply with HMP requirements and an overflow weir for larger storm events. Refer to the plans for facility details.

BMP-A and B will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site. BMP-D will discharge to the surface of Vista Grande Drive at the southeastern corner of the site, flow westerly in the street, confluencing with flow from Drainage Basin 6, to a proposed curb inlet and storm drain that discharges to BMP-C located near the southwestern corner of the site. BMP-C will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

For the proposed detained hydrologic analysis, the effects of the detention provided by the 4 underground storage facilities were incorporated into the AES analysis. This was done by inserting the results from the HydroCAD analysis, detained peak flow rate and detained time to peak, into the proposed undetained condition AES model to create the proposed detained condition model. Refer to Section 3.4 for the detained AES output.

Based on the results of the HydroCAD analysis, mitigation for the 100-year storm event peak flow rate is provided. Refer to Appendix B for the HydroCAD detention detailed output.

## 3.4 Proposed Detained Condition Hydrologic Model Output (100-Year Event)

```
******************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1452

                            Analysis prepared by:

                        PASCO LARET SUITER & ASSOCIATES
                          535 NORTH HIGHWAY 101, STE A
                             SOLANA BEACH, CA 92075
                                  858-259-8212

 ************************* DESCRIPTION OF STUDY *************************
* 3474 VISTA GRANDE                                                     *
* PROPOSED CONDITION DETAINED                                           *
* 100-YR                                                                *
 ************************************************************************

  FILE NAME: 3474PD00.DAT
  TIME/DATE OF STUDY: 11:11 08/11/2021
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.200
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   12.0      1.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

******************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   182.00
  UPSTREAM ELEVATION(FEET) =    717.00
  DOWNSTREAM ELEVATION(FEET) =    716.40
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.904
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    50.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.099
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.36   TOTAL RUNOFF(CFS) =      0.77

******************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  716.40  DOWNSTREAM ELEVATION(FEET) =  651.10
  STREET LENGTH(FEET) =   645.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.48
  STREET FLOW TRAVEL TIME(MIN.) =   1.86   Tc(MIN.) =   12.76
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.607
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.420
  SUBAREA AREA(ACRES) =    2.44      SUBAREA RUNOFF(CFS) =    4.72
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       5.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.44
  FLOW VELOCITY(FEET/SEC.) =  6.52   DEPTH*VELOCITY(FT*FT/SEC.) =   1.92
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     827.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   648.10  DOWNSTREAM(FEET) =   648.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.42
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   12.81
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     842.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  18.51   RAIN INTENSITY(INCH/HOUR) =  3.62
  TOTAL AREA(ACRES) =     2.80   TOTAL RUNOFF(CFS) =      3.50

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   644.50  DOWNSTREAM(FEET) =   633.20
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.52
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.50
```

```
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   18.70
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =     972.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.70
  RAINFALL INTENSITY(INCH/HR) =   3.60
  TOTAL STREAM AREA(ACRES) =     2.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.50

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   141.00
  UPSTREAM ELEVATION(FEET) =    715.60
  DOWNSTREAM ELEVATION(FEET) =    709.60
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.554
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.431
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  709.60  DOWNSTREAM ELEVATION(FEET) =  653.20
  STREET LENGTH(FEET) =   551.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.64
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =    6.06
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.448
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.466
  SUBAREA AREA(ACRES) =    1.79      SUBAREA RUNOFF(CFS) =    6.00
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.26
```

```
  FLOW VELOCITY(FEET/SEC.) =  6.84   DEPTH*VELOCITY(FT*FT/SEC.) =   2.13
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     692.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   648.70  DOWNSTREAM(FEET) =   640.80
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.79
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.67
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.07
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     707.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.440
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5052
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    1.42
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       8.08
  TC(MIN.) =    6.07

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   8.17   RAIN INTENSITY(INCH/HOUR) =  6.14
  TOTAL AREA(ACRES) =     2.10   TOTAL RUNOFF(CFS) =      5.81

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   634.00  DOWNSTREAM(FEET) =   633.20
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.46
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.81
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.23
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    105.00 =     737.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.23
  RAINFALL INTENSITY(INCH/HR) =   6.11
  TOTAL STREAM AREA(ACRES) =     2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.81

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1         3.50    18.70        3.601          2.80
```

```
      2        5.81     8.23        6.114          2.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        7.35     8.23       6.114
      2        6.92    18.70       3.601

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.35   Tc(MIN.) =    8.23
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =     972.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   633.20  DOWNSTREAM(FEET) =   621.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.53
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.35
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.37
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    1097.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4300
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   202.00
  UPSTREAM ELEVATION(FEET) =    717.00
  DOWNSTREAM ELEVATION(FEET) =    715.70
  ELEVATION DIFFERENCE(FEET) =      1.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.429
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    55.74
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.248
  SUBAREA RUNOFF(CFS) =      0.72
  TOTAL AREA(ACRES) =      0.32   TOTAL RUNOFF(CFS) =      0.72

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  715.70  DOWNSTREAM ELEVATION(FEET) =  685.10
  STREET LENGTH(FEET) =   684.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
```

```
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.49
  STREET FLOW TRAVEL TIME(MIN.) =   2.44   Tc(MIN.) =   12.87
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.581
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4200
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.421
  SUBAREA AREA(ACRES) =    4.37      SUBAREA RUNOFF(CFS) =    8.41
  TOTAL AREA(ACRES) =        4.7        PEAK FLOW RATE(CFS) =       9.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  5.26   DEPTH*VELOCITY(FT*FT/SEC.) =   1.92
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    402.00 =     886.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.581
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4312
  SUBAREA AREA(ACRES) =    1.72   SUBAREA RUNOFF(CFS) =    3.62
  TOTAL AREA(ACRES) =        6.4   TOTAL RUNOFF(CFS) =      12.66
  TC(MIN.) =   12.87

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   684.00  DOWNSTREAM(FEET) =   683.90
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.07
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.66
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   12.91
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    403.00 =     901.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  14.01   RAIN INTENSITY(INCH/HOUR) =  4.34
  TOTAL AREA(ACRES) =     6.40   TOTAL RUNOFF(CFS) =     12.03

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   681.40  DOWNSTREAM(FEET) =   681.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.82
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      12.03
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   14.18
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    406.00 =     961.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.18
  RAINFALL INTENSITY(INCH/HR) =   4.30
  TOTAL STREAM AREA(ACRES) =     6.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.03

****************************************************************************
  FLOW PROCESS FROM NODE    606.00 TO NODE    406.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   254.00
  UPSTREAM ELEVATION(FEET) =    695.30
  DOWNSTREAM ELEVATION(FEET) =    681.00
  ELEVATION DIFFERENCE(FEET) =     14.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.845
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.431
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.21
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      1.21

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.85
  RAINFALL INTENSITY(INCH/HR) =   8.43
  TOTAL STREAM AREA(ACRES) =     0.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.03    14.18        4.304          6.40
      2        1.21     3.85        8.431          0.20

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.48     3.85       8.431
      2       12.65    14.18       4.304

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.65   Tc(MIN.) =   14.18
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    406.00 =     961.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    604.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  681.00  DOWNSTREAM ELEVATION(FEET) =  641.50
  STREET LENGTH(FEET) =   672.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.21
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    6.02
    SPLIT DEPTH(FEET) =    0.29   SPLIT FLOOD WIDTH(FEET) =    8.14
    SPLIT FLOW(CFS) =    3.82   SPLIT VELOCITY(FEET/SEC.) =    4.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.21
  STREET FLOW TRAVEL TIME(MIN.) =   1.86   Tc(MIN.) =   16.04
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.975
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.458
  SUBAREA AREA(ACRES) =    0.38      SUBAREA RUNOFF(CFS) =    1.12
  TOTAL AREA(ACRES) =        7.0        PEAK FLOW RATE(CFS) =      12.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  6.02   DEPTH*VELOCITY(FT*FT/SEC.) =   2.21
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    604.00 =    1633.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    604.00 TO NODE    602.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   639.80  DOWNSTREAM(FEET) =   637.10
  FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.57
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.71
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   16.08
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    602.00 =    1666.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    602.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.08
  RAINFALL INTENSITY(INCH/HR) =   3.97
  TOTAL STREAM AREA(ACRES) =     6.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.71

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4600
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   242.00
  UPSTREAM ELEVATION(FEET) =    690.50
  DOWNSTREAM ELEVATION(FEET) =    674.50
  ELEVATION DIFFERENCE(FEET) =     16.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.138
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.386
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.60   TOTAL RUNOFF(CFS) =      2.04

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  674.50  DOWNSTREAM ELEVATION(FEET) =  641.35
  STREET LENGTH(FEET) =   548.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.75
  STREET FLOW TRAVEL TIME(MIN.) =   1.67   Tc(MIN.) =    7.81
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.324
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4300
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.435
  SUBAREA AREA(ACRES) =    2.75      SUBAREA RUNOFF(CFS) =    7.48
  TOTAL AREA(ACRES) =        3.3        PEAK FLOW RATE(CFS) =       9.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.84
  FLOW VELOCITY(FEET/SEC.) =  6.06   DEPTH*VELOCITY(FT*FT/SEC.) =   2.20
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    602.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.81
  RAINFALL INTENSITY(INCH/HR) =   6.32
  TOTAL STREAM AREA(ACRES) =     3.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.22

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.71    16.08        3.969          6.98
```

```
     2        9.22     7.81        6.324          3.35

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       17.20     7.81       6.324
      2       18.50    16.08       3.969

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.50   Tc(MIN.) =   16.08
  TOTAL AREA(ACRES) =       10.3
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    602.00 =    1666.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   639.50  DOWNSTREAM(FEET) =   631.25
  FLOW LENGTH(FEET) =   128.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.50
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   16.21
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    603.00 =    1794.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.21
  RAINFALL INTENSITY(INCH/HR) =   3.95
  TOTAL STREAM AREA(ACRES) =    10.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.50

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  15.11   RAIN INTENSITY(INCH/HOUR) =  4.13
  TOTAL AREA(ACRES) =     0.60   TOTAL RUNOFF(CFS) =      1.07

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    603.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.11
  RAINFALL INTENSITY(INCH/HR) =   4.13
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.50    16.21        3.948         10.33
      2        1.07    15.11        4.131          0.60

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       18.75    15.11       4.131
      2       19.53    16.21       3.948

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.53   Tc(MIN.) =   16.21
  TOTAL AREA(ACRES) =       10.9
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    603.00 =    1794.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    604.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   629.75  DOWNSTREAM(FEET) =   629.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.74
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.53
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   16.27
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    604.00 =    1819.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    604.00 TO NODE    604.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  29.47   RAIN INTENSITY(INCH/HOUR) =  2.69
  TOTAL AREA(ACRES) =    10.90   TOTAL RUNOFF(CFS) =      6.03

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   621.20  DOWNSTREAM(FEET) =   621.00
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.03
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   29.53
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    1839.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        6.03    29.53       2.682       10.90
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    1839.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.35     8.37       6.046        4.90
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    1097.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       9.06       8.37        6.046
```

```
      2       9.29      29.53        2.682

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.29   Tc(MIN.) =   29.53
  TOTAL AREA(ACRES) =       15.8

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    301.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   621.00  DOWNSTREAM(FEET) =   616.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.49
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.29
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   29.75
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    301.00 =    1979.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   29.75
  RAINFALL INTENSITY(INCH/HR) =   2.67
  TOTAL STREAM AREA(ACRES) =    15.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.29

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8800
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   265.00
  UPSTREAM ELEVATION(FEET) =    642.60
  DOWNSTREAM ELEVATION(FEET) =    616.00
  ELEVATION DIFFERENCE(FEET) =     26.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.838
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.431
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    1.84
  RAINFALL INTENSITY(INCH/HR) =   8.43
  TOTAL STREAM AREA(ACRES) =     0.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.00
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.29    29.75        2.669         15.80
      2        2.00     1.84        8.431          0.27

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.58     1.84       8.431
      2        9.92    29.75       2.669

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.92   Tc(MIN.) =   29.75
  TOTAL AREA(ACRES) =       16.1
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    301.00 =    1979.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   106.00
  UPSTREAM ELEVATION(FEET) =    717.00
  DOWNSTREAM ELEVATION(FEET) =    703.50
  ELEVATION DIFFERENCE(FEET) =     13.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.684
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.991
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   703.50  DOWNSTREAM(FEET) =   700.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.018
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.75
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.34
  PIPE TRAVEL TIME(MIN.) =   6.68    Tc(MIN.) =   13.37
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    502.00 =     806.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.472
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3000
  SUBAREA AREA(ACRES) =    0.35   SUBAREA RUNOFF(CFS) =    0.47
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       0.68
  TC(MIN.) =   13.37

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  31
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   700.00  DOWNSTREAM(FEET) =   684.50
  FLOW LENGTH(FEET) =   294.00   MANNING'S N =  0.018
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO  8.000
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.02
  ESTIMATED PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.68
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =   14.34
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    503.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.273
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3000
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.51
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       1.17
  TC(MIN.) =   14.34
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.9  TC(MIN.) =     14.34
  PEAK FLOW RATE(CFS)   =       1.17
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

### 3.5 Hydromodification Management

To satisfy the requirements of the MS4 Permit, a hydromodification management strategy has been developed for the project based on the Final Hydromodification Management Plan dated March 2011, (Final HMP). A continuous simulation model, the Environmental Protection Agency (EPA) Storm Water Management Model (SWMM) version 5.1, was selected to size mitigation measures. The SWMM model is capable of modeling hydromodification management facilities to mitigate the effects of increased runoff from the post-development conditions and use changes that may cause negative impacts (i.e. erosion) to downstream channels. For HMP calculations refer to the report titled "Priority Development Project Storm Water Quality Management Plan for 2277 Vista Grande" dated August 2021, prepared by Pasco Laret Suiter & Associates.

### 3.6 Storm Water Pollutant Control

To meet the requirements of the MS4 Permit, the Modular Wetlands Systems are designed to treat onsite storm water pollutants for the 24-hour, 85$^{th}$ percentile storm event. For detailed pollutant control calculations refer to the report titled "Priority Development Project Storm Water Quality Management Plan for 2277 Vista Grande" dated August 2021, prepared by Pasco Laret Suiter & Associates.

# APPENDIX A

## Hydrology Support Material

Vista Grande
3474
8/11/2021

| Existing Condition | | | | | | |
|---|---|---|---|---|---|---|
| Basin ID | Total Area (ac) | Impervious Area (Soil C) (sq-ft) | Pervious Area (Soil C) (sq-ft) | % Impervious | % Pervious | Weighted Runoff Coef C: |
| 1.0 | 0.10 | 0 | 4,187 | 0% | 100% | 0.30 |
| 1.1 | 2.35 | 0 | 102,269 | 0% | 100% | 0.30 |
| 2.0 | 0.09 | 0 | 3,926 | 0% | 100% | 0.30 |
| 2.1 | 3.01 | 0 | 130,991 | 0% | 100% | 0.30 |
| 3.0 | 0.13 | 0 | 5,740 | 0% | 100% | 0.30 |
| 3.1 | 0.97 | 0 | 42,151 | 0% | 100% | 0.30 |
| 4.0 | 0.07 | 0 | 3,136 | 0% | 100% | 0.30 |
| 4.1 | 0.78 | 0 | 33,838 | 0% | 100% | 0.30 |
| 5.0 | 0.09 | 0 | 3,974 | 0% | 100% | 0.30 |
| 5.1 | 8.88 | 14,928 | 371,861 | 4% | 96% | 0.32 |
| 6.0 | 0.06 | 0 | 2,588 | 0% | 100% | 0.30 |
| 6.1 | 0.47 | 0 | 20,520 | 0% | 100% | 0.30 |

| Runoff Coefficient Table | |
|---|---|
| Soil Type | C |
| Impervious | 0.9 |
| Pervious (landscape) | 0.3 |

Vista Grande
3474
8/11/2021

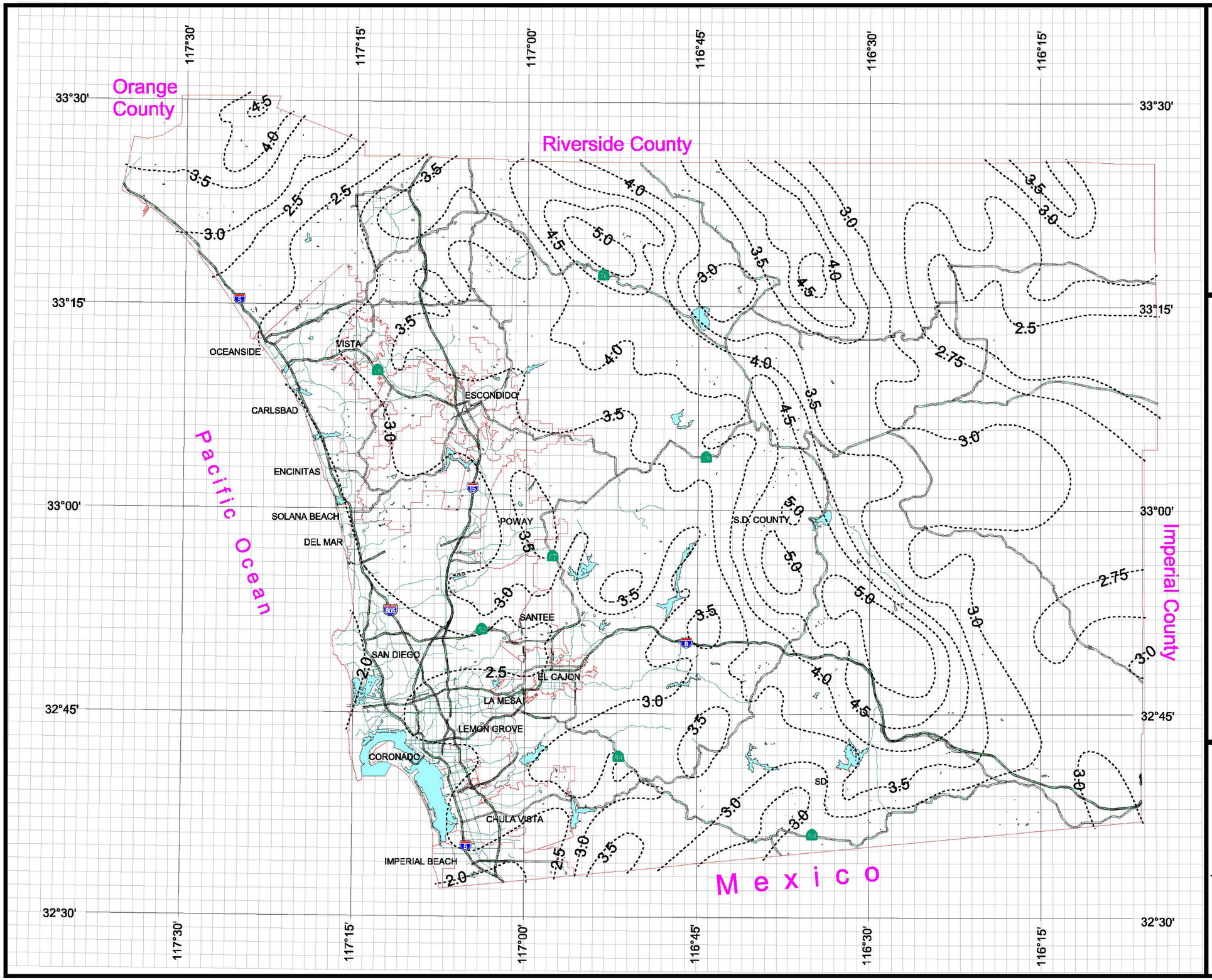
| Proposed Condition | | | | | | |
|---|---|---|---|---|---|---|
| Basin ID | Total Area (ac) | Impervious Area (Soil C) (sq-ft) | Pervious Area (Soil C) (sq-ft) | % Impervious | % Pervious | Weighted Runoff Coef C: |
| 1.0 | 0.36 | 3,051 | 12,795 | 19% | 81% | 0.42 |
| 1.1 | 2.44 | 20,995 | 85,270 | 20% | 80% | 0.42 |
| 2.0 | 0.13 | 3,539 | 1,941 | 65% | 35% | 0.69 |
| 2.1 | 1.79 | 19,424 | 58,376 | 25% | 75% | 0.45 |
| 2.2 | 0.23 | 8,752 | 1,076 | 89% | 11% | 0.83 |
| 3.0 | 0.27 | 11,398 | 442 | 96% | 4% | 0.88 |
| 4.0 | 0.32 | 3,051 | 10,949 | 22% | 78% | 0.43 |
| 4.1 | 4.37 | 38,311 | 152,233 | 20% | 80% | 0.42 |
| 4.2 | 1.72 | 19,679 | 55,301 | 26% | 74% | 0.46 |
| 5.0 | 0.16 | - | 6,841 | 0% | 100% | 0.30 |
| 5.1 | 0.35 | - | 15,095 | 0% | 100% | 0.30 |
| 5.2 | 0.40 | - | 17,500 | 0% | 100% | 0.30 |
| 6.0 | 0.60 | 7,087 | 18,878 | 27% | 73% | 0.46 |
| 6.1 | 2.75 | 25,822 | 94,042 | 22% | 78% | 0.43 |
| 6.15 | 0.60 | 5,767 | 20,339 | 22% | 78% | 0.43 |
| 6.2 | 0.20 | 6,123 | 2,661 | 70% | 30% | 0.72 |
| 6.3 | 0.38 | 12,151 | 4,609 | 73% | 28% | 0.74 |

# County of San Diego Hydrology Manual

*Rainfall Isopluvials*

**100 Year Rainfall Event - 6 Hours**

Isopluvial (inches)




DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

N W E S

3 0 3 Miles

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for San Diego County Area, California

## Vista Grande Drive Vista,CA

February 3, 2021

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

# Contents

**Preface**..... 2
**Soil Information for All Uses**..... 5
Soil Properties and Qualities..... 5
Soil Qualities and Features..... 5
Hydrologic Soil Group..... 5

# Soil Information for All Uses

## Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

### Hydrologic Soil Group

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.

Map Scale: 1:2,300 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 30 60 120 180

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 Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 24, 2020—Feb 12, 2020

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.

## Table—Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| LpD2 | Las Posas fine sandy loam, 9 to 15 percent slopes, eroded | C | 1.1 | 4.4% |
| LpE2 | Las Posas fine sandy loam, 15 to 30 percent slopes, eroded | C | 24.1 | 95.6% |
| **Totals for Area of Interest** | | | **25.2** | **100.0%** |

## Rating Options—Hydrologic Soil Group

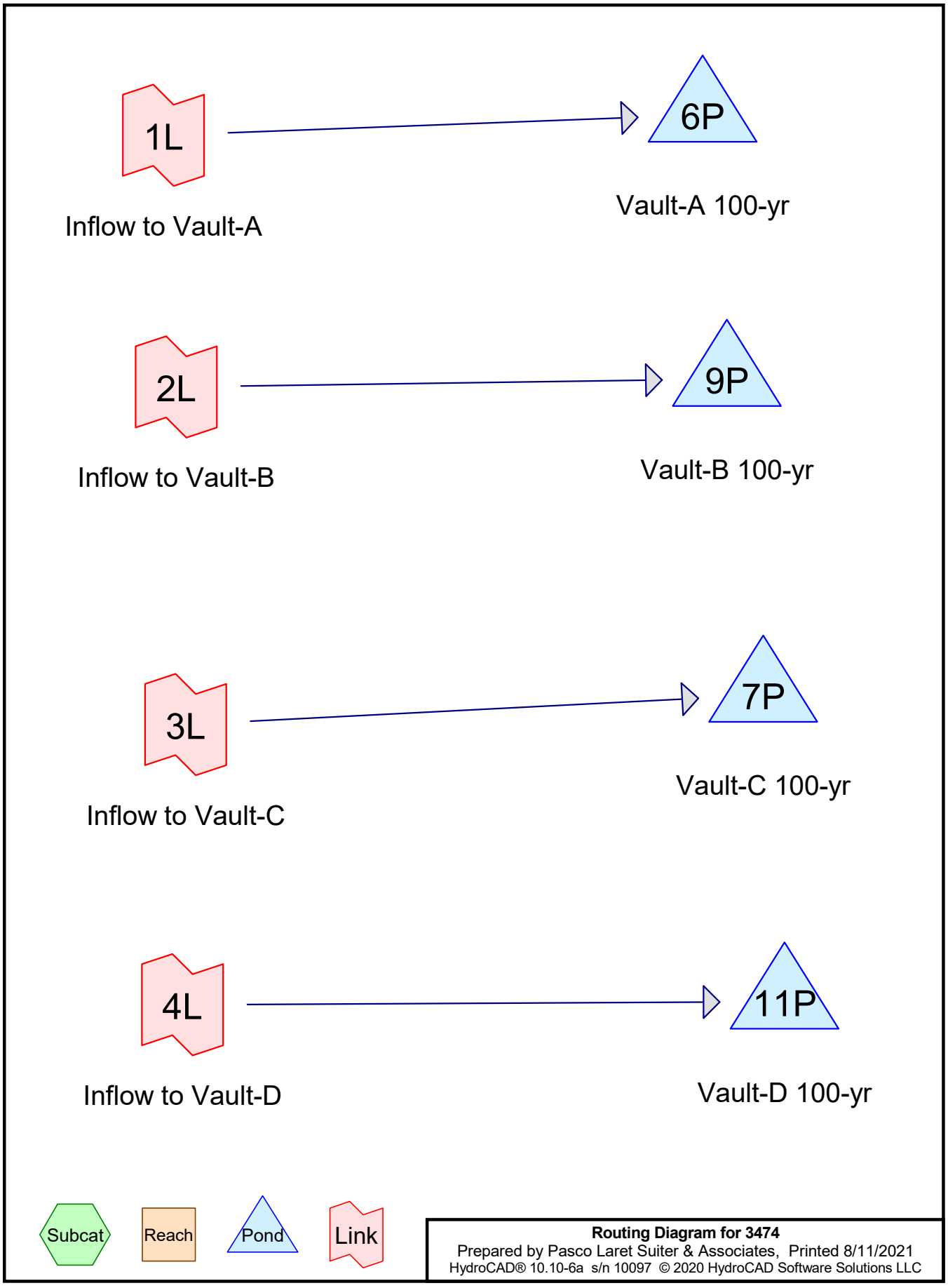
*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

# APPENDIX B

## Detention Support Material




**Routing Diagram for 3474**

Prepared by Pasco Laret Suiter & Associates, Printed 8/11/2021

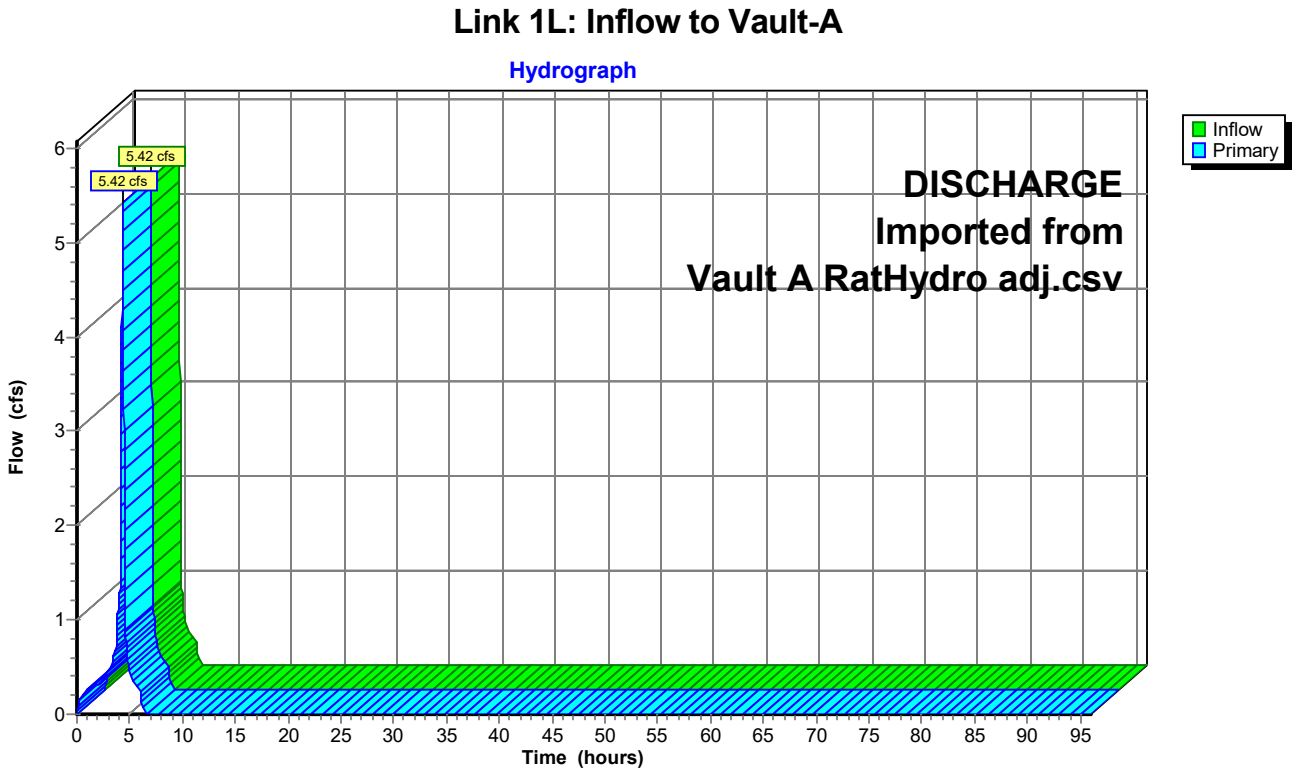
HydroCAD® 10.10-6a s/n 10097 © 2020 HydroCAD Software Solutions LLC

## Summary for Link 1L: Inflow to Vault-A

Inflow = 5.42 cfs @ 4.33 hrs, Volume= 0.313 af
Primary = 5.42 cfs @ 4.33 hrs, Volume= 0.313 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 6P : Vault-A 100-yr

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

DISCHARGE Imported from Vault A RatHydro adj.csv



## Summary for Pond 6P: Vault-A 100-yr

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 5.42 cfs @ | 4.33 hrs, | Volume= | 0.313 af |
| Outflow | = | 3.50 cfs @ | 4.43 hrs, | Volume= | 0.313 af, Atten= 36%, Lag= 5.7 min |
| Primary | = | 3.50 cfs @ | 4.43 hrs, | Volume= | 0.313 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 654.81' @ 4.43 hrs Surf.Area= 2,000 sf Storage= 9,142 cf

Plug-Flow detention time= 871.7 min calculated for 0.313 af (100% of inflow)
Center-of-Mass det. time= 871.9 min ( 1,096.4 - 224.4 )

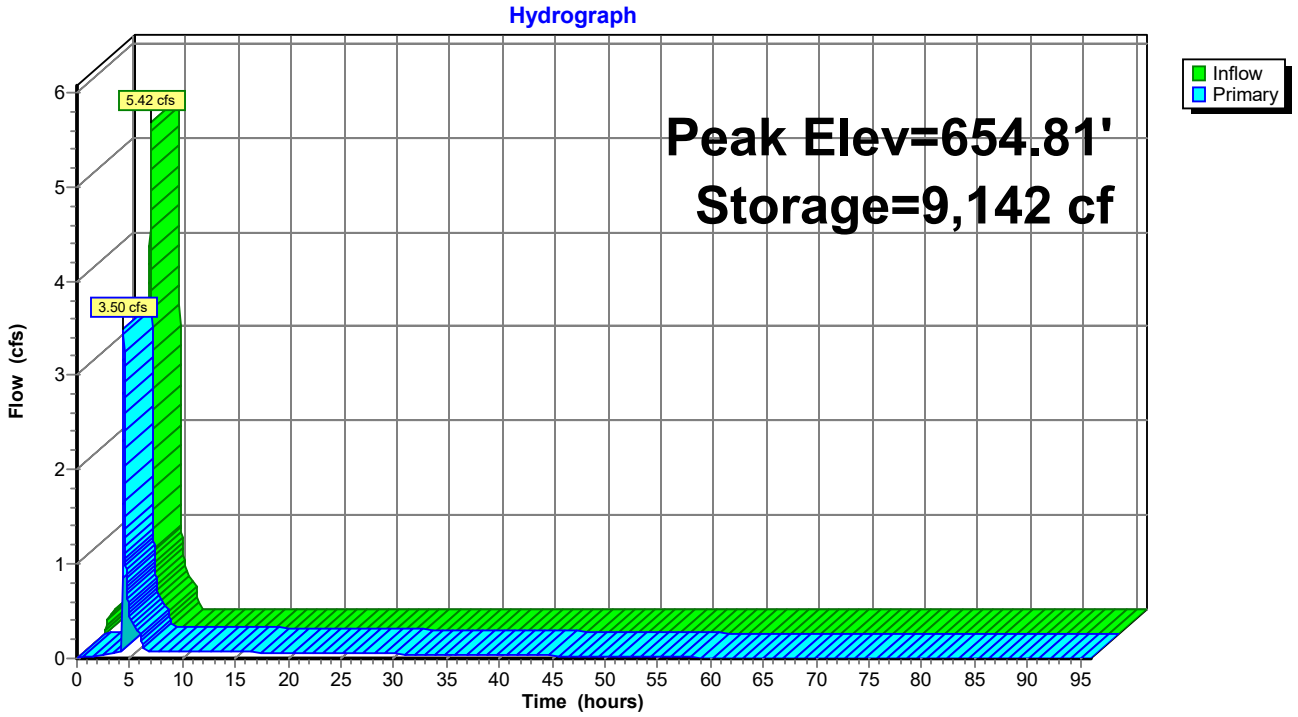
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 650.00' | 9,500 cf | **Custom Stage Data (Conic)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 650.00 | 2,000 | 0.0 | 0 | 0 | 2,000 |
| 651.00 | 2,000 | 95.0 | 1,900 | 1,900 | 2,159 |
| 652.00 | 2,000 | 95.0 | 1,900 | 3,800 | 2,317 |
| 653.00 | 2,000 | 95.0 | 1,900 | 5,700 | 2,476 |
| 654.00 | 2,000 | 95.0 | 1,900 | 7,600 | 2,634 |
| 654.50 | 2,000 | 95.0 | 950 | 8,550 | 2,713 |
| 655.00 | 2,000 | 95.0 | 950 | 9,500 | 2,793 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 650.00' | **12.0" Round Culvert**<br>L= 100.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 650.00' / 649.00' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 0.79 sf |
| #2 | Device 1 | 650.00' | **1.2" Vert. Orifice** C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 654.50' | **Custom Weir, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 0.50<br>Width (feet) 6.00 6.00 0.00 |

**Primary OutFlow** Max=3.49 cfs @ 4.43 hrs HW=654.81' (Free Discharge)
└**1=Culvert** (Passes 3.49 cfs of 6.64 cfs potential flow)
  ├**2=Orifice** (Orifice Controls 0.08 cfs @ 10.51 fps)
  └**3=Custom Weir** (Weir Controls 3.41 cfs @ 1.83 fps)

## Pond 6P: Vault-A 100-yr

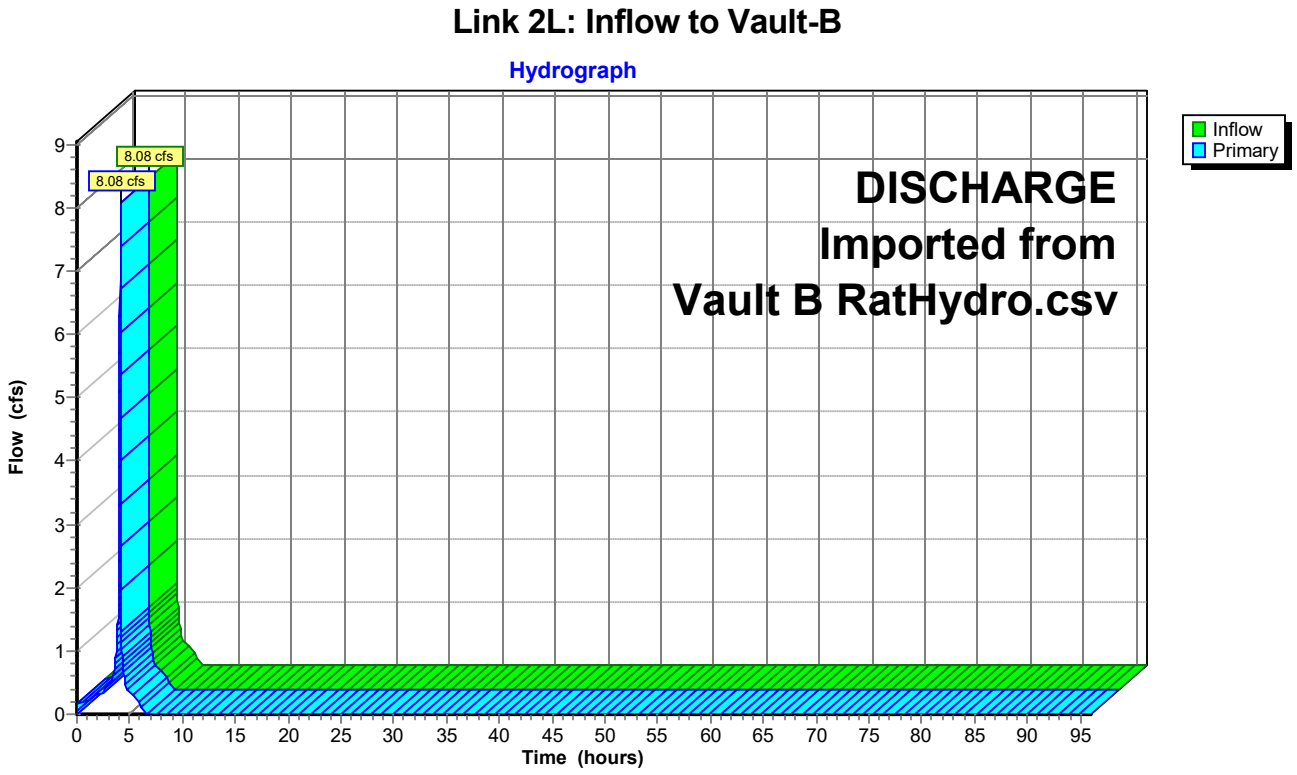


## Summary for Link 2L: Inflow to Vault-B

Inflow = 8.08 cfs @ 4.10 hrs, Volume= 0.280 af
Primary = 8.08 cfs @ 4.10 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 9P : Vault-B 100-yr

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

DISCHARGE Imported from Vault B RatHydro.csv



## Summary for Pond 9P: Vault-B 100-yr

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 8.08 cfs @ | 4.10 hrs, | Volume= | 0.280 af |
| Outflow | = | 5.81 cfs @ | 4.13 hrs, | Volume= | 0.280 af, Atten= 28%, Lag= 2.1 min |
| Primary | = | 5.81 cfs @ | 4.13 hrs, | Volume= | 0.280 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 661.86' @ 4.13 hrs Surf.Area= 1,200 sf Storage= 7,825 cf

Plug-Flow detention time= 867.6 min calculated for 0.280 af (100% of inflow)
Center-of-Mass det. time= 867.5 min ( 1,081.6 - 214.1 )

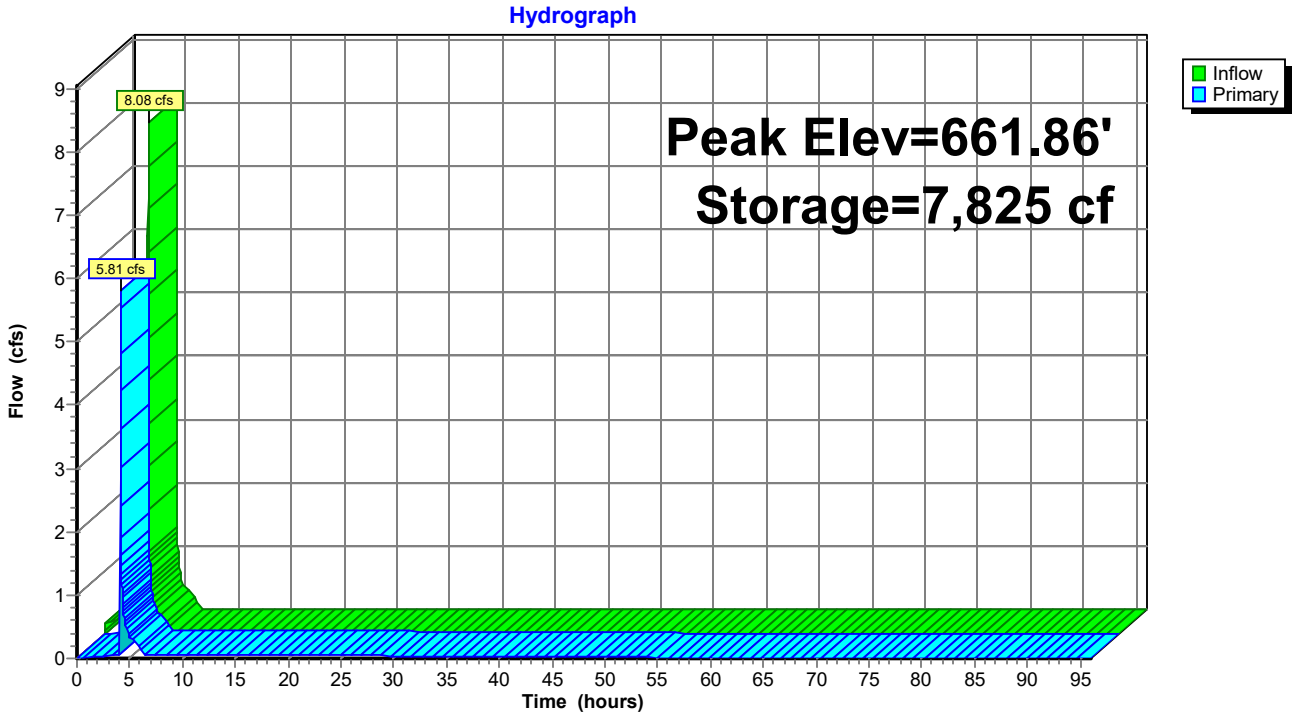
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 655.00' | 7,980 cf | **Custom Stage Data (Conic)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 655.00 | 1,200 | 0.0 | 0 | 0 | 1,200 |
| 656.00 | 1,200 | 95.0 | 1,140 | 1,140 | 1,323 |
| 657.00 | 1,200 | 95.0 | 1,140 | 2,280 | 1,446 |
| 658.00 | 1,200 | 95.0 | 1,140 | 3,420 | 1,568 |
| 659.00 | 1,200 | 95.0 | 1,140 | 4,560 | 1,691 |
| 660.00 | 1,200 | 95.0 | 1,140 | 5,700 | 1,814 |
| 661.00 | 1,200 | 95.0 | 1,140 | 6,840 | 1,937 |
| 661.50 | 1,200 | 95.0 | 570 | 7,410 | 1,998 |
| 662.00 | 1,200 | 95.0 | 570 | 7,980 | 2,060 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 655.00' | **12.0" Round Culvert**<br>L= 100.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 655.00' / 654.00' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 0.79 sf |
| #2 | Device 1 | 655.00' | **1.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 661.50' | **Custom Weir, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 0.50<br>Width (feet) 8.00 8.00 0.00 |

**Primary OutFlow** Max=5.72 cfs @ 4.13 hrs HW=661.86' (Free Discharge)
└**1=Culvert** (Passes 5.72 cfs of 7.92 cfs potential flow)
  ├**2=Orifice** (Orifice Controls 0.07 cfs @ 12.57 fps)
  └**3=Custom Weir** (Weir Controls 5.65 cfs @ 1.96 fps)

## Pond 9P: Vault-B 100-yr

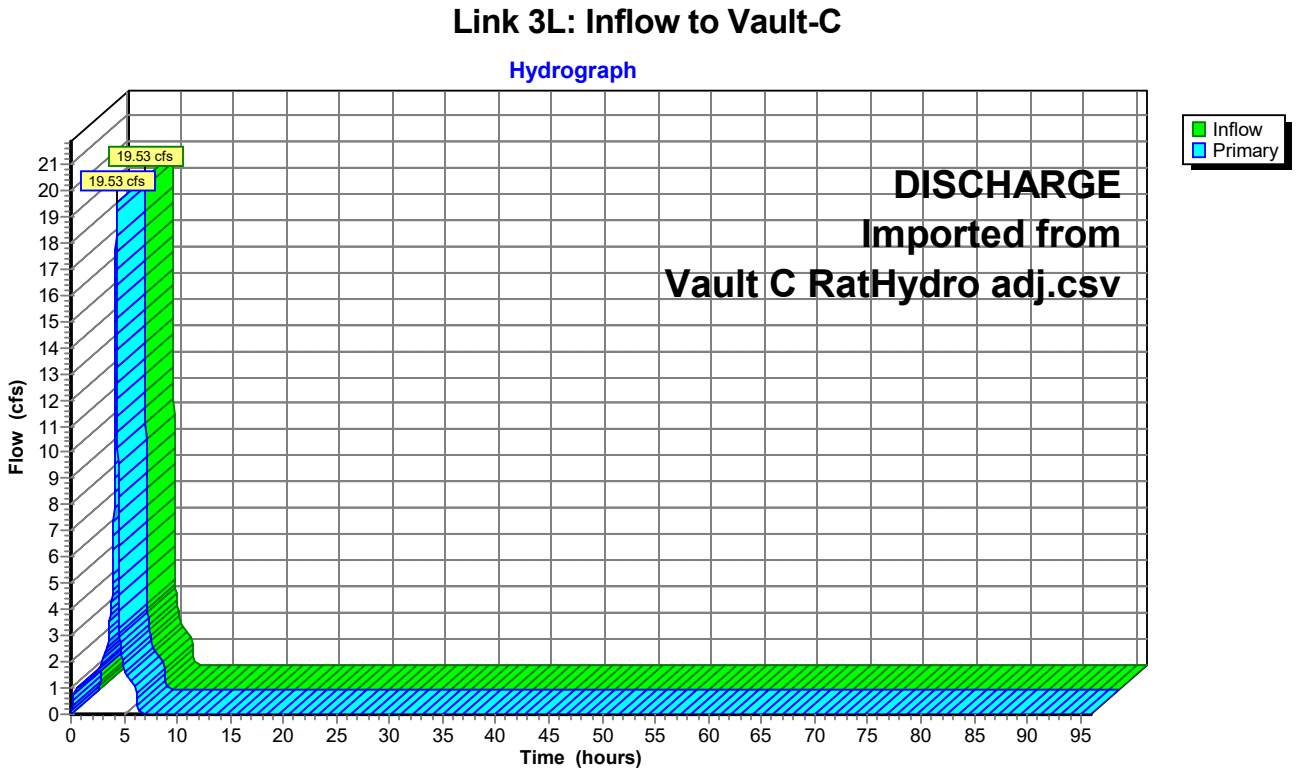


## Summary for Link 3L: Inflow to Vault-C

Inflow = 19.53 cfs @ 4.27 hrs, Volume= 1.307 af
Primary = 19.53 cfs @ 4.27 hrs, Volume= 1.307 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 7P : Vault-C 100-yr

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

DISCHARGE Imported from Vault C RatHydro adj.csv



## Summary for Pond 7P: Vault-C 100-yr

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 19.53 cfs @ | 4.27 hrs, | Volume= | 1.307 af |
| Outflow | = | 6.03 cfs @ | 4.49 hrs, | Volume= | 1.303 af, Atten= 69%, Lag= 13.2 min |
| Primary | = | 6.03 cfs @ | 4.49 hrs, | Volume= | 1.303 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 639.71' @ 4.49 hrs Surf.Area= 5,000 sf Storage= 43,702 cf

Plug-Flow detention time= 1,364.9 min calculated for 1.303 af (100% of inflow)
Center-of-Mass det. time= 1,364.4 min ( 1,587.1 - 222.7 )

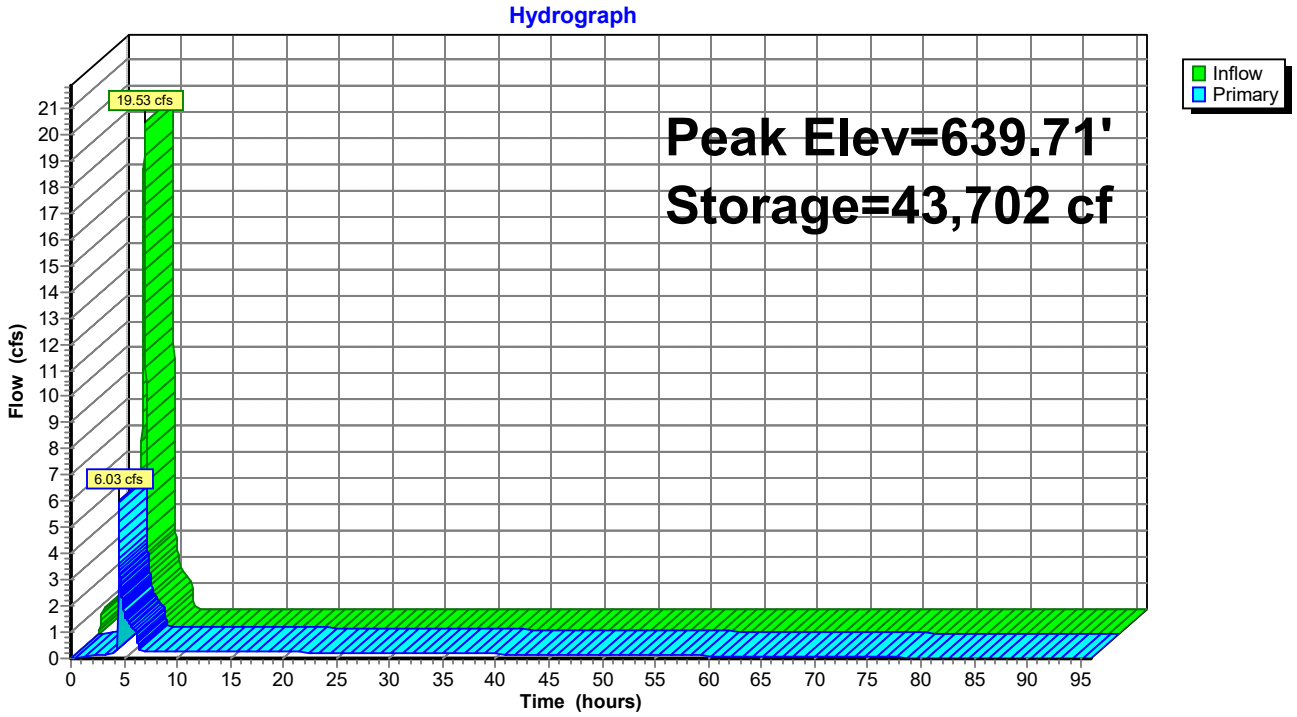
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 630.00' | 45,000 cf | **Custom Stage Data (Conic)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 630.00 | 5,000 | 0.0 | 0 | 0 | 5,000 |
| 631.00 | 5,000 | 90.0 | 4,500 | 4,500 | 5,251 |
| 632.00 | 5,000 | 90.0 | 4,500 | 9,000 | 5,501 |
| 633.00 | 5,000 | 90.0 | 4,500 | 13,500 | 5,752 |
| 634.00 | 5,000 | 90.0 | 4,500 | 18,000 | 6,003 |
| 635.00 | 5,000 | 90.0 | 4,500 | 22,500 | 6,253 |
| 636.00 | 5,000 | 90.0 | 4,500 | 27,000 | 6,504 |
| 637.00 | 5,000 | 90.0 | 4,500 | 31,500 | 6,755 |
| 638.00 | 5,000 | 90.0 | 4,500 | 36,000 | 7,005 |
| 639.00 | 5,000 | 90.0 | 4,500 | 40,500 | 7,256 |
| 639.50 | 5,000 | 90.0 | 2,250 | 42,750 | 7,381 |
| 640.00 | 5,000 | 90.0 | 2,250 | 45,000 | 7,507 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 630.00' | **18.0" Round Culvert**<br>L= 100.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 630.00' / 629.00' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 630.00' | **1.9" Vert. Orifice** C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 639.50' | **Custom Weir, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 0.50<br>Width (feet) 18.00 18.00 0.00 |

**Primary OutFlow** Max=6.01 cfs @ 4.49 hrs HW=639.71' (Free Discharge)
└**1=Culvert** (Passes 6.01 cfs of 24.73 cfs potential flow)
  ├**2=Orifice** (Orifice Controls 0.29 cfs @ 14.94 fps)
  └**3=Custom Weir** (Weir Controls 5.72 cfs @ 1.50 fps)

## Pond 7P: Vault-C 100-yr



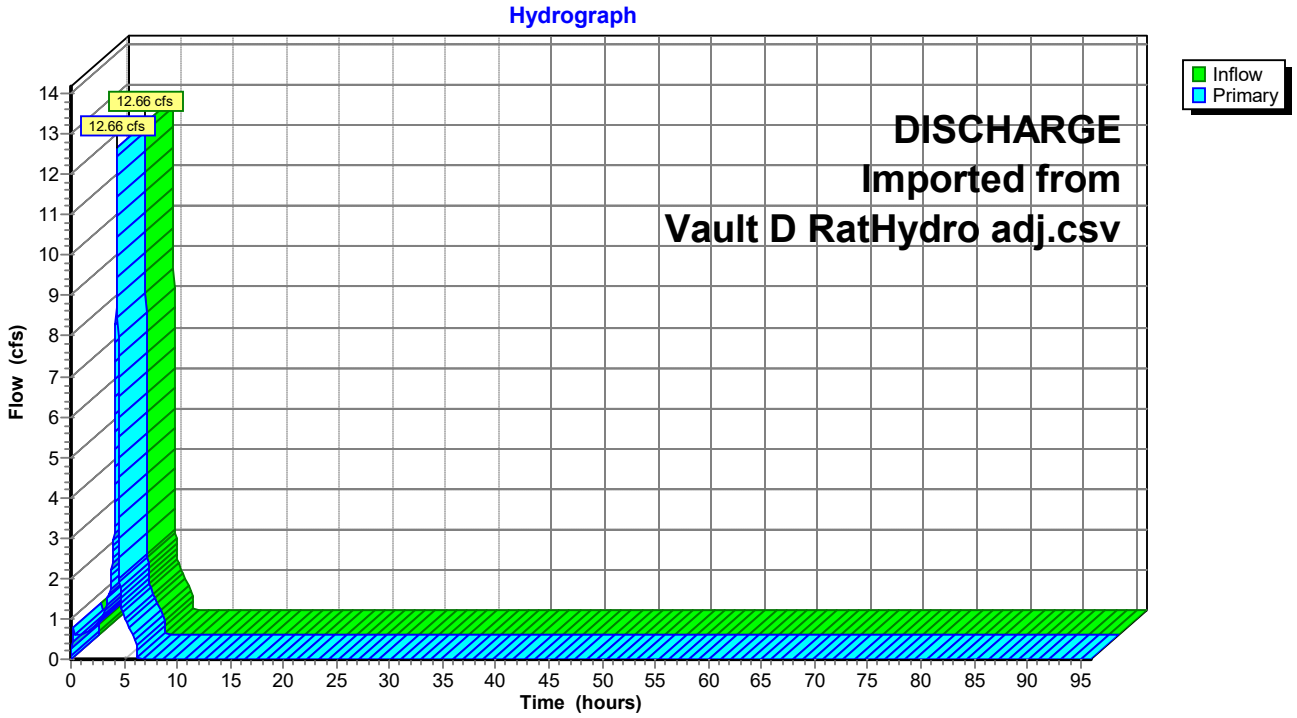
## Summary for Link 4L: Inflow to Vault-D

Inflow = 12.66 cfs @ 4.33 hrs, Volume= 0.741 af
Primary = 12.66 cfs @ 4.33 hrs, Volume= 0.741 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 11P : Vault-D 100-yr

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

DISCHARGE Imported from Vault D RatHydro adj.csv

### Link 4L: Inflow to Vault-D



## Summary for Pond 11P: Vault-D 100-yr

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 12.66 cfs @ | 4.33 hrs, | Volume= | 0.741 af |
| Outflow | = | 12.03 cfs @ | 4.35 hrs, | Volume= | 0.740 af, Atten= 5%, Lag= 1.1 min |
| Primary | = | 12.03 cfs @ | 4.35 hrs, | Volume= | 0.740 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Peak Elev= 683.95' @ 4.35 hrs Surf.Area= 3,400 sf Storage= 15,992 cf

Plug-Flow detention time= 689.6 min calculated for 0.740 af (100% of inflow)
Center-of-Mass det. time= 689.3 min ( 911.1 - 221.8 )

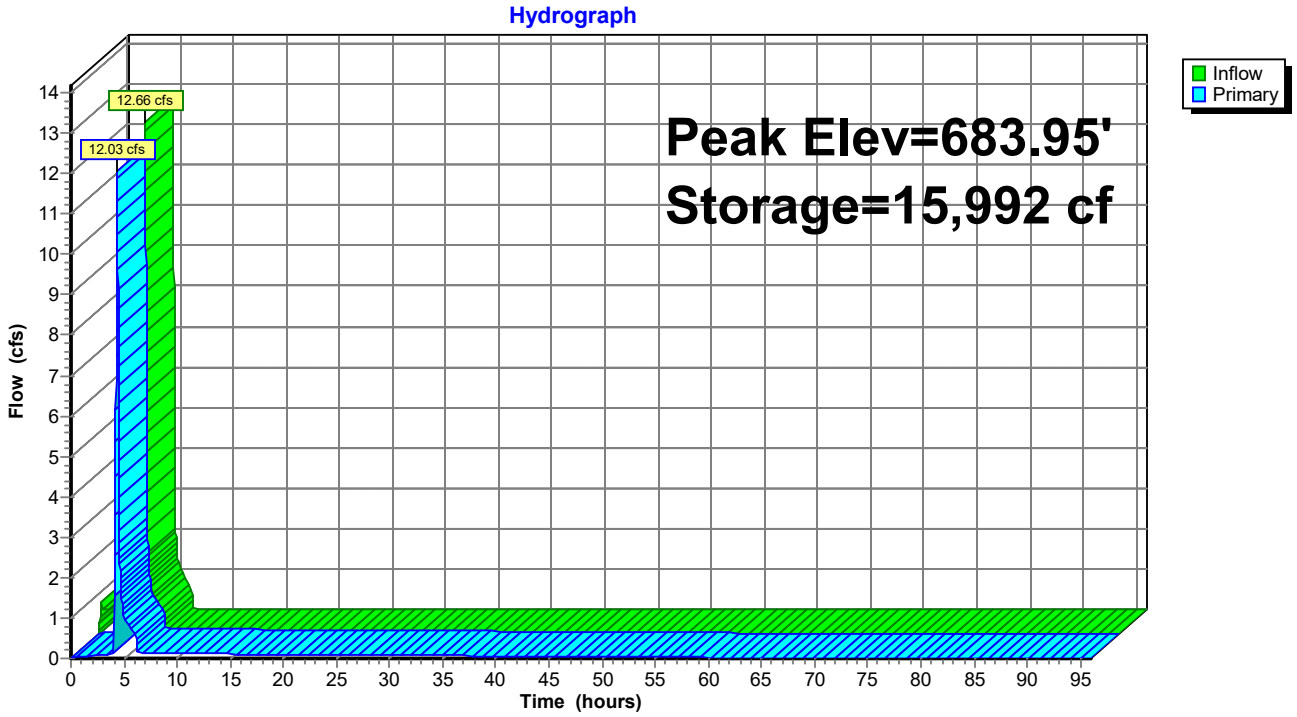
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 679.00' | 16,150 cf | **Custom Stage Data (Conic)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 679.00 | 3,400 | 0.0 | 0 | 0 | 3,400 |
| 680.00 | 3,400 | 95.0 | 3,230 | 3,230 | 3,607 |
| 681.00 | 3,400 | 95.0 | 3,230 | 6,460 | 3,813 |
| 682.00 | 3,400 | 95.0 | 3,230 | 9,690 | 4,020 |
| 683.00 | 3,400 | 95.0 | 3,230 | 12,920 | 4,227 |
| 683.50 | 3,400 | 95.0 | 1,615 | 14,535 | 4,330 |
| 684.00 | 3,400 | 95.0 | 1,615 | 16,150 | 4,434 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 679.00' | **18.0" Round Culvert**<br>L= 100.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 679.00' / 678.00' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 679.00' | **1.5" Vert. Orifice** C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 683.50' | **Custom Weir, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 0.50<br>Width (feet) 12.00 12.00 0.00 |

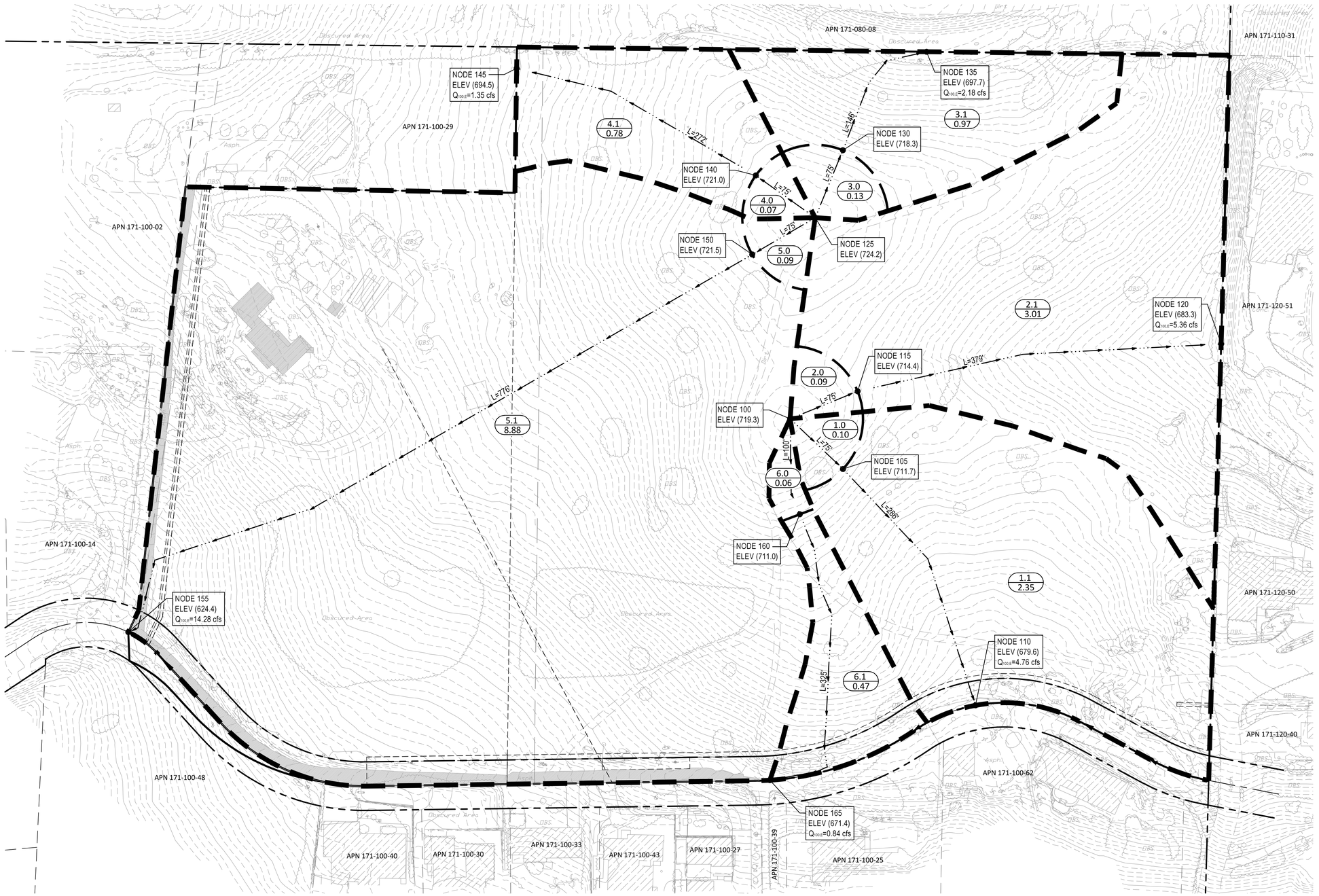
**Primary OutFlow** Max=12.03 cfs @ 4.35 hrs HW=683.95' (Free Discharge)
└**1=Culvert** (Passes 12.03 cfs of 17.19 cfs potential flow)
  ├**2=Orifice** (Orifice Controls 0.13 cfs @ 10.65 fps)
  └**3=Custom Weir** (Weir Controls 11.90 cfs @ 2.20 fps)

## Pond 11P: Vault-D 100-yr



# APPENDIX C

## Existing and Proposed Hydrology Maps

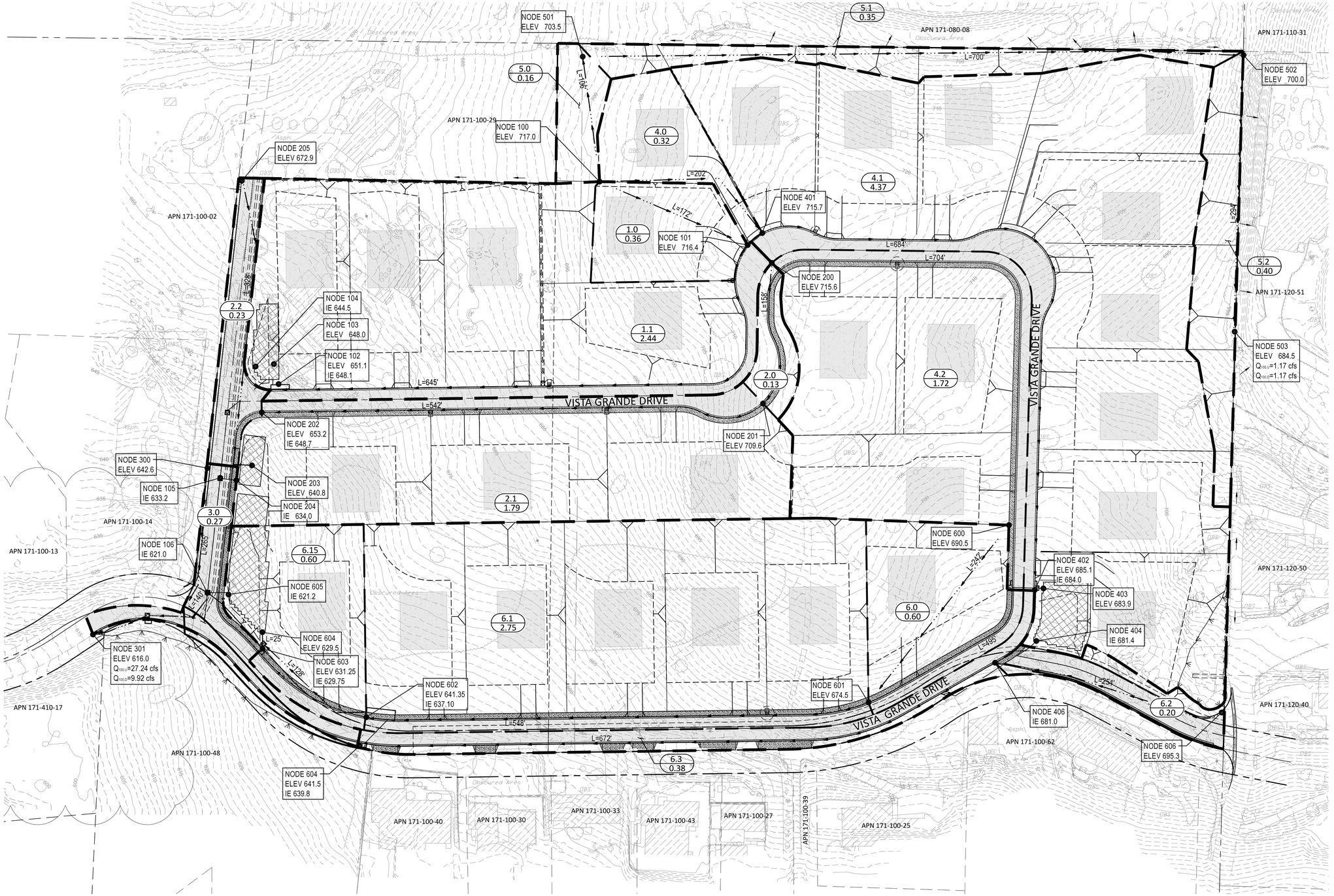



# EXISTING CONDITION DRAINAGE EXHIBIT

2277 VISTA GRANDE DRIVE
VISTA, CA
SCALE: 1" = 50'
DATE: AUGUST 2021
SHEET 1 OF 1

**PASCO LARET SUITER & ASSOCIATES**
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SAVE DATE: 08/09/21 - PLOT DATE: 08/09/21 - FILE NAME: J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\REPORTS\HYDROLOGY\Appendix C - Pre and Post Maps\3474-HYDRO-Existing Condition Drainage Exhibit.dwg




# PROPOSED CONDITION DRAINAGE EXHIBIT

2277 VISTA GRANDE DRIVE
VISTA, CA
SCALE: 1" = 50'
DATE: AUGUST 2021
SHEET 1 OF 1

**PASCO LARET SUITER & ASSOCIATES**
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SAVE DATE: --- PLOT DATE: 08/11/21 - FILE NAME: J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\REPORTS\HYDROLOGY\Appendix C - Pre and Post Maps\3474-HYDRO-Proposed Condition Drainage Exhibit.dwg

# CONTENTS

**ENGINEER OF WORK CERTIFICATION STATEMENT ..... 3**

**PROJECT OWNER CERTIFICATION STATEMENT ..... 4**

**CITY OF VISTA STAFF REVIEW ..... 5**

**PROJECT VICINITY MAP ..... 7**

**FORM 1 – PROJECT CATEGORY DETERMINATION CHECKLIST ..... 8**

**FORM 2 – PROJECT OVERVIEW ..... 9**

*DESCRIPTION OF EXISTING SITE CONDITIONS ..... 10*

*DESCRIPTION OF EXISTING SITE DRAINAGE PATTERNS ..... 12*

*DESCRIPTION OF PROPOSED SITE DEVELOPMENT ..... 13*

*DESCRIPTION OF PROPOSED SITE DRAINAGE PATTERNS ..... 14*

*POTENTIAL POLLUTANT SOURCE AREAS ..... 16*

*IDENTIFICATION AND NARRATIVE OF RECEIVING WATER AND POLLUTANTS OF CONCERN ..... 17*

*HYDROMODIFICATION MANAGEMENT REQUIREMENTS ..... 19*

*CRITICAL COARSE SEDIMENT YIELD AREAS ..... 20*

*FLOW CONTROL FOR POST-PROJECT RUNOFF ..... 21*

*OTHER SITE REQUIREMENTS AND CONSTRAINTS ..... 22*

**FORM 3 – SOURCE CONTROL BMPS FOR ALL DEVELOPMENT PROJECTS ..... 23**

*PROJECT IDENTIFICATION & SOURCE CONTROLS ..... 23*

**FORM 4 – SITE DESIGN BMPS FOR ALL DEVELOPMENT PROJECTS ..... 27**

*PROJECT IDENTIFICATION ..... 27*

**FORM 5 – STRUCTURAL POLLUTANT CONTROL AND HYDROMODIFICATION MANAGEMENT BMPS ..... 29**

*PROJECT IDENTIFICATION ..... 29*

*PDP Structural BMPs ..... 29*

**FORM 6 – STORMWATER BMP MAINTENANCE MECHANISM ..... 30**

*PROJECT IDENTIFICATION ..... 30*

*Maintenance Requirements ..... 30*

**attachment 1 – POLLUTANT CONTROLS: SUPPORT DOCUMENT AND CHECKLIST ..... 31**

**attachment 1a – DMA EXHIBIT CHECKLIST ..... 32**

**attachment 2 – hydromodification management CONTROLS: SUPPORT DOCUMENTATION & CHECKLIST ..... 33**

**attachment 2a – hydromodification management exhibit ..... 34**

**ATTACHMENT 3 - BMP MAINTENANCE information ..... 35**

**Attachment 3a – maintenance plan requirements ..... 36**

**attachment 3b – Maintenance agreement ..... 37**

**ATTACHMENT 4 - REQUIREMENTS FOR CONSTRUCTION PLANS ..... 38**

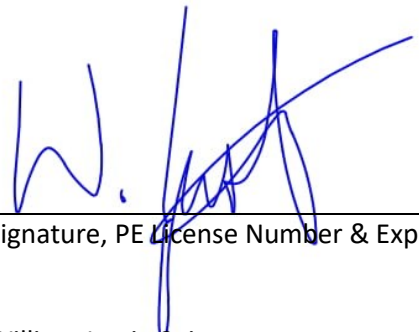
# ENGINEER OF WORK CERTIFICATION STATEMENT

**Preparer's Certification**

I hereby declare that I am the Engineer in Responsible Charge of design of storm water best management practices (BMPs) for this project, and that I have exercised responsible charge over the design of the BMPs as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the PDP requirements of the City of Vista BMP Design Manual, which is a design manual for compliance with local City and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

**SWQMP PREPARED BY:**
William J. Suiter
Pasco Laret Suiter & Associates
27127 Calle Arroyo, Suite 1904
San Juan Capistrano, CA 92675
949-661-6695
jsuiter@plsaengineering.com
RCE 68964
12-31-21



Signature, PE License Number & Expiration Date

William Justin Suiter
Print Name

Date

[INSERT STAMP IN SPACE BELOW]

# PROJECT OWNER CERTIFICATION STATEMENT

**Owners Certification**

This PDP SWQMP has been prepared for Greg Perrine by Pasco Laret Suiter & Associates. The PDP SWQMP is intended to comply with the PDP requirements of the City of Vista BMP Design Manual, which is a design manual for compliance with local City and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2015-0100) requirements for storm water management.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan. Once the undersigned transfers its interests in the property, its successor-in-interest shall bear the aforementioned responsibility to implement the best management practices (BMPs) described within this plan, including ensuring on-going operation and maintenance of structural BMPs. A signed copy of this document shall be available on the subject property into perpetuity.

**OWNER DETAILS:**

GREG PERRINE
1151 DURYEA AVENUE
IRVINE, CA 92614
949-988-3270
GPERRINE@MURROWDC.COM

_____
Project Owner's Signature

_____
Print Name

_____
Date

# CITY OF VISTA STAFF REVIEW

| | |
|---|---|
| Reviewed and Approved: | |
| City Staff Signature: | Date: |

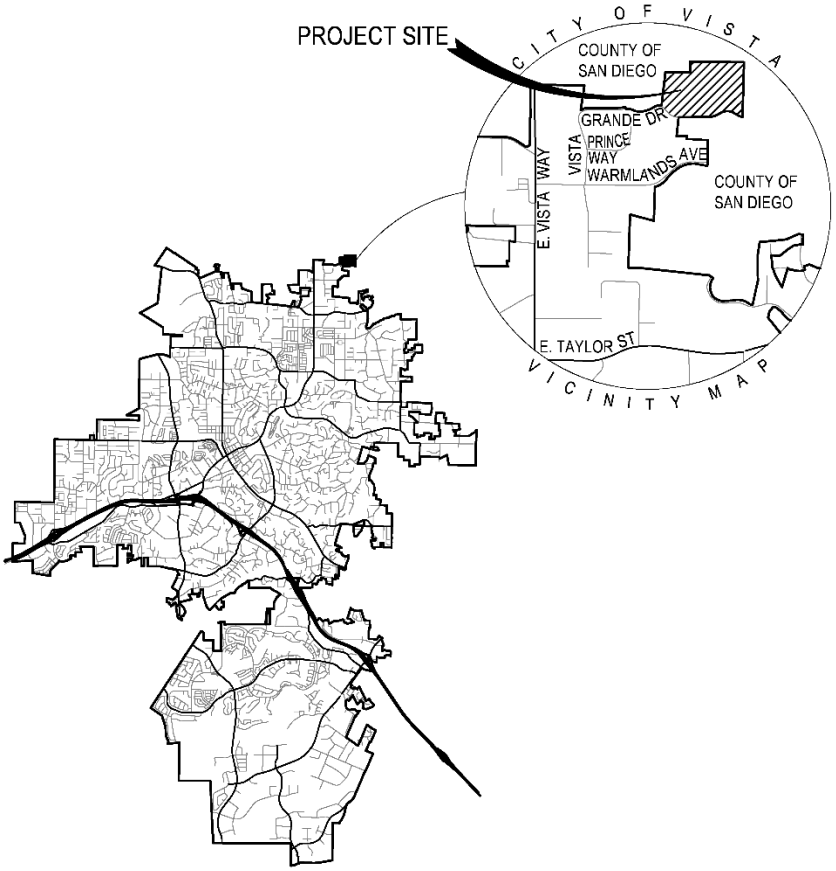
PAGE INTENTIONALLY BLANK

# PROJECT VICINITY MAP

Project Name: 2277 Vista Grande Drive

Permit Application Number: P21-0114

Insert Project Vicinity Map Below:



# FORM 1 – PROJECT CATEGORY DETERMINATION CHECKLIST

This form is used to assess stormwater BMP requirements applicable to the proposed project. The form is available as a stand-alone fillable checklist on the City's website and a completed copy must be included with the final SWQMP submitted to the City. The form is available at:

http://www.cityofvista.com/services/city-departments/community-development/building-planning-permits-applications/land-development-autocad-templates/storm-water-forms

| Project ID: |
|---|
| |

CITY OF VISTA
CALIFORNIA

# CHECKLIST FOR DETERMINATION OF PROJECT CATEGORY

Project Name: 2277 Vista Grande Drive

Project Location: _____

## APPLICABILITY OF PERMANENT, POST-CONSTRUCTION STORMWATER BMP REQUIREMENTS AND PROJECT TYPE DETERMINATION

### Overview and Instructions

The City of Vista's (City's) Stormwater Management Program is regulated by the San Diego regional municipal stormwater permit (referred to as a Municipal Separate Storm Sewer System Permit). This permit requires that new development and redevelopment projects incorporate permanent stormwater Best Management Practices (BMPs) into the project design. The City of Vista's *BMP Design Manual* (formerly *SUSMP Manual*) discusses BMP requirements applicable to new development and redevelopment projects.

ALL STANDARD AND PRIORITY PROJECTS ARE REQUIRED TO INCORPORATE SITE DESIGN AND SOURCE CONTROL BMPS. Additional treatment control and hydromodification management BMP requirements apply to projects that meet specific criteria or thresholds. This checklist must be completed by the project applicant or proponent, and is used to determine if those additional BMPs are required.

***Not all site improvements are considered "development projects" under the MS4 Permit.***

Development projects are defined by the MS4 Permit as "construction, rehabilitation, redevelopment, or reconstruction of any public or private projects". Development projects are issued local permits to allow construction activities. To further clarify, this checklist applies only to new development or redevelopment activities and/or projects that have the potential to contact storm water and contribute an anthropogenic source of pollutants, or reduce the natural absorption and infiltration abilities of the land.

***A project must be defined consistent with the California Environmental Quality Act (CEQA) definitions of "project."***

CEQA requires that the project include "the whole of the action". "Whole of the Action" means the project may not be segmented or phased into small parts either onsite or offsite if the effect is to reduce the quantity of impervious area and fall below thresholds for applicability of storm water requirements. This requirement precludes "piece-mealing," which is the improper (and often artificial) separation of a project into smaller parts to avoid preparing Environmental Impact Report level documentation.

As indicated above, for the purposes of the *BMP Design Manual*, the "project" is the "whole of the action" which has the potential for adding or replacing or resulting in the addition or replacement of, roofs, pavement, or other impervious surfaces, thereby resulting in increased flows and storm water pollutants.

When defining the project, the following questions are considered:

- What are the project activities?
- Do they occur onsite or offsite?
- What are the limits of the project (project boundary)?
- What is the whole of the action associated with the project (i.e. what is the total amount of new or

replaced impervious area considering all of the collective project components through all phases of the project)?

- Are any facilities or agreements to build facilities offsite in conjunction with providing service to the project (street-widening, utilities)?

Responses to the checklist represent an initial assessment of the proposed project conditions and impacts. City staff will confirm this checklist based on assessment of the development application and/or project plans. Results of the checklist will classify a project as one of the following: Priority Development Project, Standard Project, or Non-development Project.

If additional information is needed while completing this checklist, please refer to the City's *BMP Design Manual*. Alternatively, contact City Land Development staff.

This Form is divided into 4 sections:

1. Post-Construction Stormwater Requirement Exemptions
2. Priority Development Project Determination
3. Special Consideration for Redevelopment Projects (50 Percent Rule)
4. Final Project Determination

| SECTION 1 – POST CONSTRUCTION STORMWATER REQUIREMENT EXEMPTIONS | City of Vista BMP Design Manual | |
|---|---|---|
| This section will determine whether your project is exempt from post-construction BMP requirements and would be classified as a Non-Development Project. See section 1.3 of the City's *BMP Design Manual* for further discussion. | **YES** | **NO** |
| (a) Replacement of impervious surfaces that are part of a routine maintenance activity, such as (check yes if any apply):<br>(i) Replacing roof material on an existing building<br>(ii) Rebuilding a structure to original design after damage from earthquake, fire or similar disaster<br>(iii) Restoring pavement or other surface materials affected by trenches from utility work<br>(iv) Resurfacing existing roads and parking lots, including slurry, overlay and restriping<br>(v) Routine replacement of damaged pavement, including full depth replacement, if the sole purpose is to repair the damage<br>(vi) Constructing new sidewalk, pedestrian ramps or bike lanes on existing roads (within existing street right-of-way)<br>(vii) Restoring a historic building to its original historic design<br>(viii) Routine replacement of damaged pavement, such as pothole repair<br><br>**Note**: Work that creates impervious surface outside of the existing impervious footprint is not considered routine maintenance. | ☐ | ☒ |
| (b) Repair or improvements to an existing building or structure that do not alter the size (check yes if any apply):<br>(i) Plumbing, electrical and HVAC work<br>(ii) Interior alterations including major interior remodels and tenant build-out within an existing commercial building<br>(iii) Exterior alterations that do not change the general dimensions and structural framing of the building (does not include building additions or projects where the existing building is demolished) | ☐ | ☒ |
| If you answered **YES** to either category (a) or (b), your project is considered a Non-Development Project, and post construction BMP requirements do not apply. Please proceed to Section 4 and check the **Non-Development Project** box.<br><br>If you answered **NO** to category (a) and (b), please proceed to Section 2. | | |

| SECTION 2 – PRIORITY DEVELOPMENT PROJECT DETERMINATION | City of Vista BMP Design Manual | |
|---|---|---|
| This section determines whether your project is a **Priority Development Project (PDP)** or a **Standard Project.** See section 1.4 of the City's *BMP Design Manual* for further discussion. The following eight (8) types of projects are defined as **PDPs:** | **YES** | **NO** |
| (a) New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land. | ☐ | ☒ |
| (b) Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land. | ☒ | ☐ |
| (c) New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses:<br>(i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812).<br>(ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater.<br>(iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce.<br>(iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles. | ☒ | ☐ |

| | | |
|---|---|---|
| (d) New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharge directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).<br>**Note:** ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the City.<br>For projects adjacent to an ESA, but not discharging to an ESA, the 2,500 sq-ft threshold does not apply as long as the project does not physically disturb the ESA and the ESA is upstream of the project.<br>There are no Areas of Special Biological Significance (ASBS) or State Water Quality Protected Areas in the City's jurisdiction. The ESAs within the City's boundaries which include 303(d)-listed impairments and RARE beneficial use designations are listed below:<br>• Agua Hedionda Creek<br>• Buena Creek<br>• Buena Vista Creek<br>• Loma Alta Creek | ☐ | ☒ |
| (e) New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses:<br>(i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.<br>(ii) Retail gasoline outlets. This category includes Retail gasoline outlets that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic of 100 or more vehicles per day. | ☐ | ☒ |
| (f) New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. This means any activity that moves soils or substantially alters the pre-existing vegetated or man-made cover of any land. This includes, but is not limited to the following:<br>(i) Grading, digging, cutting, scraping, stockpiling, pavement removal, and exterior construction;<br>(ii) Substantial removal of vegetation where soils are disturbed including but not limited to removal by clearing or grubbing; or<br>(iii) Any activity which bares soil or rock or involves streambed alterations or the diversion or piping of any watercourse. | ☒ | ☐ |
| If you answered **YES** to any of the categories above (a-f), your project is considered a PDP. Please proceed to section 3 and check the **Priority Development Project** Box in Section 4.<br>If you answer **NO** to all categories, then your project is considered a Standard Project. Please proceed to Section 4 and check the **Standard Project Box**. | | |

| SECTION 3 – SPECIAL CONSIDERATIONS FOR REDEVELOPMENT PROJECTS (50 PERCENT RULE) | City of Vista BMP Design Manual | |
|---|---|---|
| This section determines additional considerations required for **Redevelopment PDPs.** See section 1.7 of the City's *BMP Design Manual* for further discussion. | **YES** | **NO** |
| Will redevelopment result in the creation or replacement of impervious surface in an amount of more than 50 percent of the surface area of the previously existing development? See clarification on calculation of the ratio of impervious surface below.<br><br>These requirements for managing storm water on an entire redevelopment project site are commonly referred to as the "50 Percent Rule". For the purpose of calculating the ratio, the surface area of the previously existing development shall be the area of impervious surface within the previously existing development. The following steps shall be followed to estimate the area that requires treatment to satisfy the MS4 Permit requirements:<br>1. How much total impervious area currently exists on the site?<br>2. How much existing impervious area will be replaced with new impervious area?<br>3. How much new impervious area will be created in areas that are pervious in the existing condition?<br>4. Total created and/or replaced impervious surface = Step 2 + Step 3.<br>5. **50 Percent Rule Test**: Is step 4 more than 50 Percent of Step 1? If yes, treat all impervious surface on the site (including existing impervious surface not being replaced or added). If no, then treat only Step 4 impervious surface and any area that comingles with created and/or replaced impervious surface area.<br><br>Note: Step 2 and Step 3 must not overlap, as it is fundamentally not possible for a given area to be both "replaced" and "created" at the same time. Also activities that occur as routine maintenance (see Section 1 of this form) shall not be included in Step 2 and Step 3 calculation.<br>For example, a 10,000 square foot development proposes replacement of 4,000 square feet of impervious area. The treated area is less than 50 percent of the total development area and only the 4,000 square foot area is required to be treated. | ☒ | ☐ |

If you answered **YES**, then you must implement the PDP requirements for all impervious surfaces across the entire site. Please proceed to Section 4 and check the box under PDP indicating that the Project **Is a Redevelopment Project Subject to the 50 Percent Rule**.

If you answered **NO,** then you are only required to treat impervious surfaces that are replaced or created. Please proceed to section 4 and check the box under PDP indicating this is **Not a Redevelopment Project Subject to the 50 Percent Rule**.

# SECTION 4 – FINAL PROJECT DETERMINATION

City of Vista

BMP Design Manual

BASED ON THE INFORMATION PROVIDED IN SECTIONS 1-3, THIS PROJECT IS DETERMINED TO BE A:

☒ **PRIORITY DEVELOPMENT PROJECT.** PRIORITY REQUIREMENTS APPLY AND A STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) MUST BE SUBMITTED AT THE TIME OF APPLICATION.

- ☒ THIS **IS** A REDEVELOPMENT PROJECT SUBJECT TO THE 50 PERCENT RULE.
- ☐ THIS **IS NOT** A REDEVELOPEMNT PROJECT SUBJECT TO THE 50 PERCENT RULE.

☐ **STANDARD PROJECT.** STANDARD REQUIREMENTS APPLY AND APPLICABLE SECTIONS OF A STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) MUST BE SUBMITTED AT THE TIME OF APPLICATION.

☐ **NON DEVELOPMENT PROJECT.**

**Applicant Information and Signature Box**

| | |
|---|---|
| Address:<br>2277 Vista Grande Drive | APN(s)<br>171-100-05, 171-100-28 |
| Applicant Name: | Applicant Title: |
| Applicant Signature: | Date: |

**City use only**

| | | |
|---|---|---|
| Concur: | Yes | No |
| | | |
| By: | | |
| Date: | | |
| Land Dev #: | | |

**Supporting discussion for this checklist, as well as BMP requirements for Priority Development Projects and Standard Projects, is provided in the City of Vista *BMP Design Manual*.**

# FORM 2 – PROJECT OVERVIEW

**Page 1 of 11**

| | |
|---|---|
| Project Name | 2277 Vista Grande Drive |
| Project Address | 2277 Vista Grande Drive<br>Vista, CA 92084 |
| Assessor's Parcel Number(s) (APN(s)) | 171-100-05, 171-100-28 |
| Permit Application Number | P21-0114 |
| Watershed *(select <u>one</u> checkbox; use webpage below to determine watershed)*<br>http://www.cityofvista.com/services/city-departments/community-development/building-planning-permits-applications/land-development-autocad-templates/storm-water-forms | |
| San Luis Rey | ☒ Lower San Luis Rey – Mission, 903.11 |
| Carlsbad | ☐ Loma Alta – Loma Alta, 904.10<br>☐ Buena Vista – El Salto, 904.21<br>☐ Buena Vista – Vista, 904.22<br>☐ Agua Hedionda – Los Monos, 904.31<br>☐ Agua Hedionda – Buena, 904.32<br>☐ San Marcos – Batiquitos, 904.51 |
| Parcel Area<br>(total area of Assessor's Parcel(s) associated with the project) | 16.99 Acres ( 740,109 Square Feet) |
| Area to be Disturbed by the Project<br>(Project Area) | 17.07 Acres ( 743,498 Square Feet) |
| Project Proposed Impervious Area<br>(subset of Project Area) | 4.25 Acres ( 185,150 Square Feet) |
| Project Proposed Pervious Area<br>(subset of Project Area) | 12.82 Acres ( 558,348 Square Feet) |
| <u>NOTE</u>: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area. | |

**Form 2, Page 2 of 11**

**DESCRIPTION OF EXISTING SITE CONDITIONS**

Current Status of the Site (select all that apply and describe below):

- ☒ Existing development
- ☐ Previously graded but not built out
- ☐ Demolition completed without new construction
- ☐ Agricultural or other non-impervious use
- ☒ Vacant, undeveloped/natural

Describe:

An existing single-family home is located in the northwest corner of APN 171-100-28. An existing paved road is located to the west and south of APN 171-100-28 and south of APN 171-100-05. The remaining portions of APNs 171-100-28 and 171-100-05 are undeveloped.

Existing Land Cover Includes (select all that apply and describe below):

- ☒ Vegetative Cover 16.65 Acres ( 725,181 Square Feet)
- ☐ Non-Vegetated Pervious Areas Acres ( Square Feet)
- ☒ Impervious Areas 0.34 Acres ( 14,928 Square Feet)

Describe:

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):

- ☐ NRCS Type A
- ☐ NRCS Type B
- ☒ NRCS Type C
- ☐ NRCS Type D

Approximate Depth to Groundwater (GW):

- ☐ GW Depth < 5 feet
- ☐ 5 feet < GW Depth < 10 feet
- ☐ 10 feet < GW Depth < 20 feet
- ☒ GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply and describe in next section):

- ☐ Drainage ditch/Swale/Waterway
- ☐ Seeps
- ☐ Springs
- ☐ Wetlands
- ☒ None

**Form 2, Page 3 of 11**

**DESCRIPTION OF EXISTING SITE DRAINAGE PATTERNS**

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

1. Is existing site drainage conveyance natural or improved storm drain (urbanized);
2. Is runoff from offsite conveyed through the site? If yes, quantify all offsite drainage areas, design flows, and locations where offsite flows enter the project site, and summarize how such flows are conveyed through the site;
3. Provide details regarding existing project site drainage conveyance network, including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels; and
4. Identify all discharge locations from the existing project site along with a summary of conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Describe existing site drainage patterns:

In the existing condition, the site has one single-family residence and an asphalt paved driveway along the western boundary. The remainder of the project site is undeveloped land with moderately steep slopes facing north, east, south and west. Elevations across the site range from a high of approximately 724 feet in the north central portion of the property to a low of approximately 624 feet at the southwest corner of the property.

In the existing condition, storm water runoff flows overland to the north, east, south and west. There are four main discharge points located along the northern, eastern, southeastern and southwestern boundaries. The table below summarizes the existing condition hydrologic data.

**Summary of Existing Condition 100-yr Peak Discharge Rates**

| Discharge Node | Area (ac) | Q100 (cfs) |
|---|---|---|
| 110 | 2.45 | 4.76 |
| 120 | 3.10 | 5.36 |
| 135 | 1.10 | 2.18 |
| 145 | 0.85 | 1.35 |
| 155 | 8.97 | 14.28 |
| 165 | 0.53 | 0.84 |

For detailed calculations refer to the drainage report for the project titled “Hydrology Study for 2277 Vista Grande Drive” prepared by Pasco Laret Suiter & Associates dated August 2021.

**Form 2, Page 4 of 11**

**DESCRIPTION OF PROPOSED SITE DEVELOPMENT**

Project Description / Proposed Land Use and/or Activities:

The project proposes to redevelop the existing site into a residential development consisting of single-family lots, access drive, decomposed granite sidewalk, landscape, associated utilities and improvements, Modular Wetlands Systems to meet the requirements for pollutant control and underground storm water storage facilities to meet the requirements for hydromodification management flow control and to mitigate for the 100-year 6-hour storm event.

DMA 1-6 require additional site design BMPs to satisfy volume retention requirements, therefore tree wells have been sized to meet the requirements. The proposed trees are located within DMA 1-4,6. They are designed with a uniform surface depth of 6 inches, 48-inch layer of amended soil, and a 6-inch perforated subdrain. Tree credit volume has been calculated per Appendix B.2.2.1 of the Storm Water Standards Manual. Volume retention compliance has been shown using Worksheet B.5-6. Refer to Attachment 1e for all applicable completed BMP Sizing Worksheets.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):

Proposed impervious features include residential structures and access drive.

List/describe proposed pervious features of the project (e.g., landscape areas):

Proposed pervious features include decomposed granite sidewalks and landscape areas.

Does the project include grading and changes to site topography?

☒ Yes

☐ No

Describe:

Grading is proposed to accommodate the proposed lots, access drive and storm drain system.

**Form 2, Page 5 of 11**

**DESCRIPTION OF PROPOSED SITE DRAINAGE PATTERNS**

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

☒ Yes

☐ No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre- and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Describe proposed site drainage patterns:

In the proposed condition, onsite storm water runoff will be collected in proposed storm drain and conveyed to the proposed Modular Wetlands Systems (BMPs) which have been designed for pollutant control and subsequently the proposed underground storage facilities (BMPs) which have been designed to provide hydromodification management flow control and mitigation for the 100-year 6-hour storm event.

In the proposed condition, the site consists of six (6) drainage basins. Storm water runoff will be conveyed overland and in proposed storm drain to four (4) Modular Wetlands Systems and four (4) proposed underground storage facilities to meet the requirements for pollutant control, hydromodification management flow control and to mitigate for the 100-year 6-hour storm event.

Drainage Basin 1 consists of the northwestern portion of the site. Runoff will flow westerly to a proposed Modular Wetlands System (BMP-1) and subsequently a proposed underground storage facility (BMP-A) located near the western boundary. BMP-A will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 2 consists of the central western portion of the site. Runoff will flow westerly to a proposed Modular Wetlands System (BMP-2) and subsequently a proposed underground storage facility (BMP-B) located near the western boundary. BMP-B will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 3 consists of a small area at the southwestern corner of the site. Runoff will flow southerly and westerly to a proposed Modular Wetlands System (BMP-3) which will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 4 consists of the eastern portion of the site. Runoff will flow easterly and southerly to a proposed underground storage facility (BMP-D) located near the southeastern corner of the site. BMP-D will discharge to the surface of Vista Grande Drive at the southeastern corner of the site, flow westerly in the street, confluencing with flow from Drainage Basin 6, to a proposed curb inlet and storm

drain that discharges to a proposed Modular Wetlands System (BMP-4) and subsequently another proposed underground storage facility (BMP-C) located near the southwestern corner of the site.

Drainage Basin 5 consists of the small area of perimeter landscape slopes along the northern and eastern boundaries. Runoff will flow offsite northerly and easterly as in the existing condition.

Drainage Basin 6 consists of the southern portion of the site. Runoff will flow westerly, confluencing with discharge from BMP-D, to a proposed Modular Wetlands System (BMP-4) and subsequently a proposed underground storage facility (BMP-C) located near the southwestern corner of the site. BMP-C will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

The underground storm water storage facilities provide hydromodification management flow control. Refer to the continuous simulation analysis located in Attachment 2d. The storage facilities also provide mitigation for the 100-year 6-hour storm event. A detention analysis was performed to evaluate the effects of the storage facilities on the 100-year, 6-hour storm event peak discharge rates. The table below summarizes the proposed condition hydrologic data.

**Summary of Proposed Condition 100-yr Peak Discharge Rates**

| Discharge Node | Area (ac) | Q100 (cfs) Undetained | Q100 (cfs) Detained |
|---|---|---|---|
| 301 | 16.16 | 27.24 | 9.92 |
| 503 | 0.91 | 1.17 | 1.17 |

For detailed calculations refer to the drainage report for the project titled “Hydrology Study for 2277 Vista Grande Drive” prepared by Pasco Laret Suiter & Associates dated August 2021.

DMA 1-6 require additional site design BMPs to satisfy volume retention requirements, therefore tree wells have been sized to meet the requirements. The proposed trees are located within DMA 1-4,6. They are designed with a uniform surface depth of 6 inches, 48-inch layer of amended soil, and a 6-inch perforated subdrain. Tree credit volume has been calculated per Appendix B.2.2.1 of the Storm Water Standards Manual. Volume retention compliance has been shown using Worksheet B.5-6. Refer to Attachment 1e for all applicable completed BMP Sizing Worksheets.

**Form 2, Page 6 of 11**

**POTENTIAL POLLUTANT SOURCE AREAS**

Identify whether any of the following features, activities, and/or pollutant source areas will be present. Select all Pollutant Source Areas that apply and include them on the DMA Exhibit. Source control BMPs must be identified for each of these areas in Form 3 of this SWQMP:

☒ On-site storm drain inlets

☐ Sump pumps or French drains

☐ Interior or sub-surface parking garages

☐ Need for future indoor & structural pest control

☒ Landscape/outdoor pesticide use

☐ Pools, spas, ponds, decorative fountains, or other water features

☐ Food preparation and/or service

☐ Refuse/trash collection areas

☐ Industrial processes

☐ Outdoor storage of equipment, chemicals, or materials

☐ Vehicle and equipment cleaning

☐ Vehicle/equipment repair and maintenance

☐ Fuel dispensing areas

☐ Loading docks

☐ Fire sprinkler test and relief point

☐ Miscellaneous drain or wash down areas

☐ Plazas, sidewalks, and parking lots

Describe:

**Form 2, Page 7 of 11**

**IDENTIFICATION AND NARRATIVE OF RECEIVING WATER AND POLLUTANTS OF CONCERN**

Describe flow path of storm water from the project site discharge location(s), through urban storm conveyance systems as applicable, to receiving creeks, rivers, and lagoons as applicable, and ultimate discharge to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable):

Storm water that discharges the project site along the eastern and northern borders flows northerly to the San Luis Rey River (Lower) which flows westerly. Storm water that discharges the project site along the southern and southwestern borders flows westerly to Guajome Lake which flows to the San Luis Rey River (Lower) which flows westerly and ultimately discharges to the Pacific Ocean.

List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

| 303(d) Impaired Water Body | Pollutant(s)/Stressor(s) | TMDLs / WQIP Highest Priority Pollutant |
|---|---|---|
| Guajome Lake | Eutrophic | TMDL expected 2019 per 303(d) list report |
| San Luis Rey River Lower | Benthic Community Effects | TMDL expected 2025 per 303(d) list report |
| | Bifenthrin | TMDL expected 2029 per 303(d) list report |
| | Chloride | TMDL expected 2019 per 303(d) list report |
| | Indicator Bacteria | TMDL expected 2021 per 303(d) list report / WQIP Highest Priority Pollutant |
| | Nitrogen | TMDL expected 2021 per 303(d) list report |
| | Phosphorus | TMDL expected 2021 per 303(d) list report |
| | Total Dissolved Solids | TMDL expected 2019 per 303(d) list report |
| | Toxicity | TMDL expected 2021 per 303(d) list report |
| Pacific Ocean Shoreline at San Luis Rey River Outlet | Indicator Bacteria | TMDL approved 2011 per 303(d) list report |

**Identification of Project Site Pollutants***

***Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)**

Identify pollutants expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix B.6):

| Pollutant | Not Applicable to the Project Site | Expected from the Project Site | Also a Receiving Water Pollutant of Concern |
|---|---|---|---|
| Sediment | ☐ | ☒ | ☒ |
| Nutrients | ☐ | ☒ | ☒ |

| | | | |
|---|---|---|---|
| Heavy Metals | ☐ | ☒ | ☒ |
| Organic Compounds | ☐ | ☒ | ☐ |
| Trash & Debris | ☐ | ☒ | ☐ |
| Oxygen Demanding Substances | ☐ | ☒ | ☒ |
| Oil & Grease | ☐ | ☒ | ☐ |
| Bacteria & Viruses | ☐ | ☒ | ☒ |
| Pesticides | ☐ | ☒ | ☒ |

**Form 2, Page 8 of 11**

**HYDROMODIFICATION MANAGEMENT REQUIREMENTS**

Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual; select one box and describe below)?

☒ Yes, hydromodification management flow control structural BMPs required.

☐ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

Describe:

**Form 2, Page 9 of 11**

**CRITICAL COARSE SEDIMENT YIELD AREAS**

**This section only required if hydromodification management requirements apply*

Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries (select all that apply and describe below)? Additional signed and stamped reports must be provided to document any exemption from coarse sediment yield requirements.

☐ Yes

☒ No, No critical coarse sediment yield areas to be protected based on WMAA maps

If yes, have any of the optional analyses presented in Section 6.2 of the BMP Design Manual been performed?

☐ 6.2.1 Verification of Geomorphic Landscape Units (GLUs) Onsite

☐6.2.2 Downstream Systems Sensitivity to Coarse Sediment

☐6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite

☐No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps

If optional analyses were performed, what is the final result?

☐No critical coarse sediment yield areas to be protected based on verification of GLUs onsite

☐Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 2.B of the SWQMP.

☐Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit.

Describe:

Refer to the exhibit located in Attachment 2b.

**Form 2, Page 10 of 11**

**FLOW CONTROL FOR POST-PROJECT RUNOFF**

**This section only required if hydromodification management requirements apply*

List and describe point(s) of compliance for hydromodification management flow control (see Section 6.3.1). Identify each point of compliance for flow control on the Hydromodification Management Exhibit in Attachment 2A.

Has a geomorphic assessment been performed for the receiving channel(s)?

☒ No, the low flow threshold is 0.1Q2 (default low flow threshold)

☐ Yes, the result is the low flow threshold is 0.1Q2

☐ Yes, the result is the low flow threshold is 0.3Q2

☐ Yes, the result is the low flow threshold is 0.5Q2

If a geomorphic assessment has been performed, provide the report.

Discussion / Additional Information: (optional)

**Form 2, Page 11 of 11**

**OTHER SITE REQUIREMENTS AND CONSTRAINTS**

When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

**Optional Additional Information or Continuation of Previous Sections As Needed**

This space provided for additional information or continuation of information from previous sections as needed.

# FORM 3 – SOURCE CONTROL BMPS FOR ALL DEVELOPMENT PROJECTS

Page 1 of 4

| **PROJECT IDENTIFICATION & SOURCE CONTROLS** | | | |
|---|---|---|---|
| Project Name 2277 Vista Grande Drive | | | |
| Permit Application Number P21-0114 | | | |
| All development projects must implement source control BMPs SC-1 through SC-6, unless justification is provided by qualified design professional See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement source control BMPs shown in this checklist.<br><br>Answer each category below pursuant to the following, and provide description.<br>• "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual.<br>• "No" means the BMP is applicable to the project but it is not feasible to implement.<br>• "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). | | | |
| **Source Control Requirement** | **Applied?** | | |
| **SC-1** Prevention of Illicit Discharges into the MS4 | ☒ Yes | ☐ No | ☐ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-Provide effective irrigation, dispersion of non-storm water discharges into landscape | | | |
| **SC-2** Storm Drain Stenciling or Signage | ☒ Yes | ☐ No | ☐ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-Provide prohibitive dumping placards and/or signage<br>-Post signage at public access points to deter prohibitive dumping<br>-Maintain legibility of placards and signage | | | |
| **SC-3** Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No outdoor storage areas proposed | | | |
| **SC-4** Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No outdoor work areas proposed | | | |

| **Form 3, Page 2 of 4** | | | |
|---|---|---|---|
| **Source Control Requirement** | **Applied?** | | |
| **SC-5** Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No trash storage areas proposed | | | |
| **SC-6** Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below) | **Applied?** | | |
| a. On-site storm drain inlets | ☒ Yes | ☐ No | ☐ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-Provide prohibitive dumping placards and/or signage<br>-Post signage at public access points to deter prohibitive dumping<br>-Maintain legibility of placards and signage | | | |
| b. Sump pumps or French drains | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No sump pumps or French drains proposed | | | |
| c. Interior or sub-surface parking garages | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No parking garages proposed | | | |
| d. Need for future indoor & structural pest control | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible: | | | |
| e. Landscape/outdoor pesticide use | ☒ Yes | ☐ No | ☐ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-Landscaping will be designed to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution. | | | |

| **Form 3, Page 3 of 4** | | | |
|---|---|---|---|
| **Source Control Requirement** | **Applied?** | | |
| f. Pools, spas, ponds, decorative fountains, or other water features | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No water features proposed | | | |
| g. Food preparation and/or service | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No food preparation proposed | | | |
| h. Refuse/trash collection areas | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No refuse areas proposed | | | |
| i. Industrial processes | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No industrial processes proposed | | | |
| j. Outdoor storage of equipment, chemicals, or materials | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No outdoor storage proposed | | | |
| k. Vehicle and equipment cleaning | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No vehicle cleaning proposed | | | |
| l. Vehicle/equipment repair and maintenance | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No vehicle maintenance proposed | | | |
| m. Fuel dispensing areas | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No fuel dispensing areas proposed | | | |

| **Form 3, Page 4 of 4** | | | |
|---|---|---|---|
| n. Loading docks | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No loading docks proposed | | | |
| o. Fire sprinkler test water and relief point | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No fire sprinklers proposed | | | |
| p. Miscellaneous drain or wash down areas | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No miscellaneous drain or wash areas proposed | | | |
| q. Plaza, sidewalks, parking lots | ☐ Yes | ☐ No | ☒ N/A |
| Describe how source control will be implemented, or justify if not feasible:<br>-No impervious plaza, sidewalks or parking lots proposed | | | |
| | | | |
| Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above. | | | |

# FORM 4 – SITE DESIGN BMPS FOR ALL DEVELOPMENT PROJECTS

Page 1 of 2

**PROJECT IDENTIFICATION**

Project Name 2277 Vista Grande Drive

Permit Application Number P21-0114

All development projects must implement site design BMPs SD-1 through SD-8, unless justification is provided by qualified design professional. See Chapter 4 and Appendix E of the Model BMP Design Manual for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following, and provide description.

- "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the Model BMP Design Manual.
- "No" means the BMP is applicable to the project but it is not feasible to implement.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve).

| Site Design Requirement | Applied? | | |
|---|---|---|---|
| **SD-1** Maintain Natural Drainage Pathways and Hydrologic Features | ☒ Yes | ☐ No | ☐ N/A |
| Describe how site design will be implemented, or justify if not feasible:<br>-Existing drainage discharge points will be maintained | | | |
| **SD-2** Conserve Natural Areas, Soils, and Vegetation | ☒ Yes | ☐ No | ☐ N/A |
| Describe how site design will be implemented, or justify if not feasible:<br>-Landscaping is proposed where feasible throughout the site and along the perimeter slopes | | | |
| **SD-3** Minimize Impervious Area | ☒ Yes | ☐ No | ☐ N/A |
| Describe how site design will be implemented, or justify if not feasible:<br>-Decomposed granite sidewalks are proposed | | | |
| **SD-4** Minimize Soil Compaction | ☒ Yes | ☐ No | ☐ N/A |
| Describe how site design will be implemented, or justify if not feasible:<br>-Soil compaction will be minimized in proposed landscaped areas | | | |
| **Form 4, Page 2 of 2** | | | |
| **SD-5** Impervious Area Dispersion | ☒ Yes | ☐ No | ☐ N/A |
| Describe how site design will be implemented, or justify if not feasible:<br>-Roof runoff designed to discharge to pervious areas | | | |

| | | | |
|---|---|---|---|
| **SD-6** Runoff Collection | ☒ Yes | ☐ No | ☐ N/A |
| Describe how site design will be implemented, or justify if not feasible:<br>-Onsite runoff will be effectively collected, conveyed and discharged via proposed storm drain | | | |
| **SD-7** Landscaping with Native or Drought Tolerant Species | ☒ Yes | ☐ No | ☐ N/A |
| Describe how site design will be implemented, or justify if not feasible:<br>-Landscaping design shall consist of native and drought tolerant species | | | |
| **SD-8** Harvest and Use of Precipitation<br>*Note: Worksheet B.3-1, "Harvest and Use Feasibility" must be included in this section of the SWQMP.* | ☐Yes | ☒ No | ☐ N/A |
| Describe how site design will be implemented, or justify if not feasible:<br>-Harvesting and using precipitation is not a feasible BMP to implement. Refer to Attachment 1c. | | | |

# FORM 5 – STRUCTURAL POLLUTANT CONTROL AND HYDROMODIFICATION MANAGEMENT BMPS

| **PROJECT IDENTIFICATION** |
|---|
| Project Name 2277 Vista Grande Drive |
| Permit Application Number P21-0114 |
| **PDP Structural BMPs** |
| All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the *BMP Design Manual*). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the *BMP Design Manual*). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).<br><br>PDP structural BMPs must be verified by the local jurisdiction at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the *BMP Design Manual*). PDP structural BMPs must be maintained into perpetuity, and the local jurisdiction must confirm the maintenance (see Section 7 of the *BMP Design Manual*).<br><br>Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP). |
| Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the *BMP Design Manual* were followed, and the results (type of BMP selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate structures.<br><br>Step 1A: The DMAs draining to the structural BMPs are not self-mitigating, de minimis, or self-retaining.<br>Step 1B: There are no site design BMPs proposed for the project for which the runoff factor can be adjusted.<br>Step 2: Harvest and use is not feasible. Refer to Attachment 1c.<br>Step 3: Infiltration is not feasible. Refer to Attachment 1d.<br>Step 3C: Modular Wetlands Systems and underground storage facilities have been selected and sized per the design criteria to meet pollutant control and hydromodification management flow control requirements. |

# FORM 6 – STORMWATER BMP MAINTENANCE MECHANISM

| **PROJECT IDENTIFICATION** |
|---|
| Project Name 2277 Vista Grande Drive |
| Permit Application Number P21-0114 |
| **Maintenance Requirements** |
| A stormwater structural BMP operations and maintenance plan must be prepared for PDPs. A template plan is available at:<br>http://www.cityofvista.com/services/city-departments/community-development/building-planning-permits-applications/land-development-autocad-templates/storm-water-forms<br><br>Has a stormwater structural BMP operations and maintenance plan been prepared?<br>☒ Yes, included with Attachment 3A<br>☐ No<br><br>Storm Water Operations & Maintenance Plan for 2277 Vista Grande Drive<br>August 2021<br>William J. Suiter<br>Pasco, Laret, Suiter & Associates |
| All projects are required to maintain designed functionality of structural BMPs in perpetuity. Privately-owned projects must record a *Storm Drain Maintenance Agreement* with the County of San Diego Assessor's Office. A template *Storm Drain Maintenance Agreement* is available at:<br>http://www.cityofvista.com/services/city-departments/community-development/building-planning-permits-applications/land-development-autocad-templates/storm-water-forms<br><br>Has a Storm Drain Maintenance Agreement been submitted to the County?<br><br>☐ Yes, copy included with Attachment 3B<br>☒ No<br>☐ Not Applicable (e.g., city-owned property/project) |

# ATTACHMENT 1 – POLLUTANT CONTROLS: SUPPORT DOCUMENT AND CHECKLIST

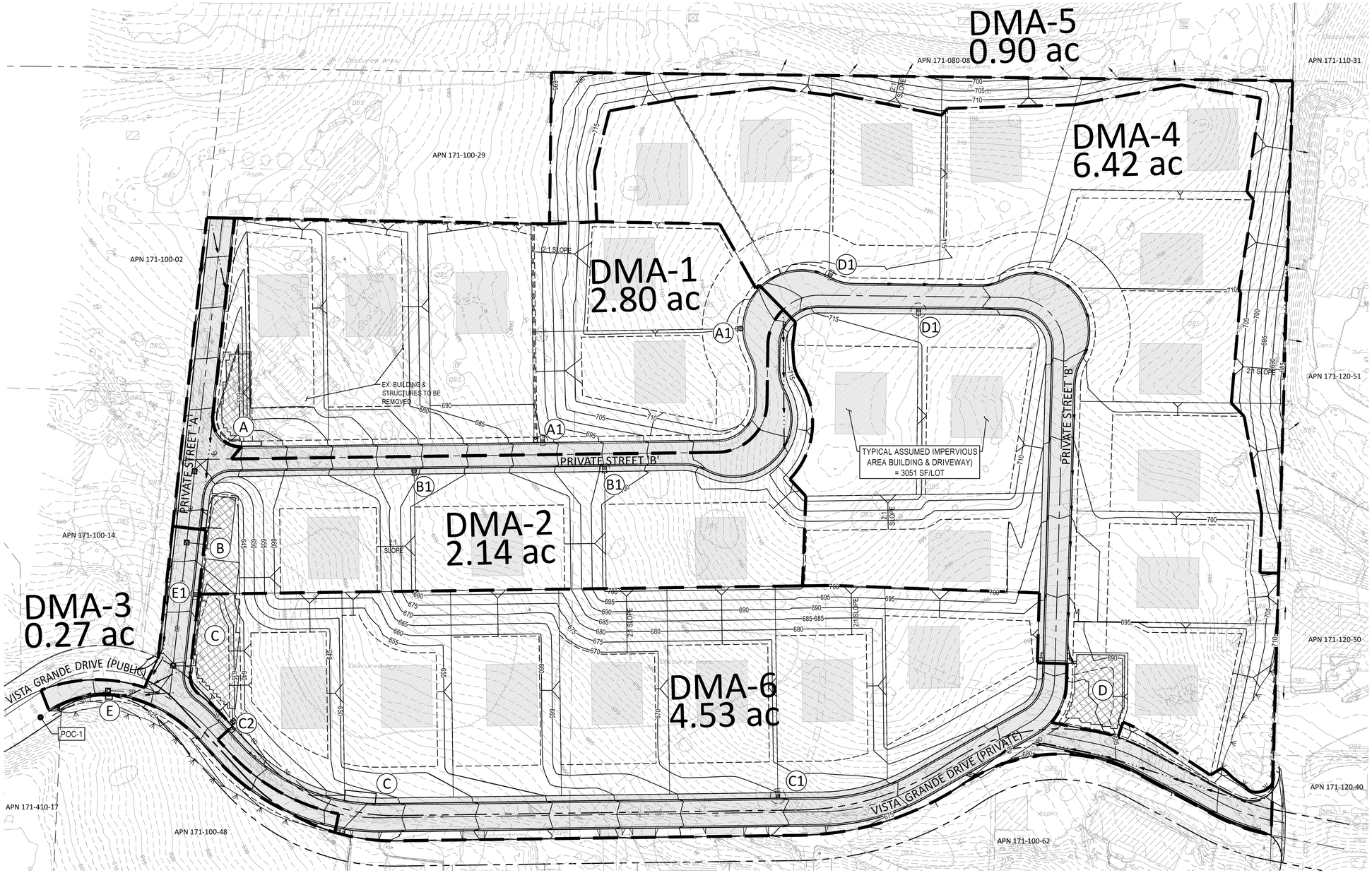
Each of the attachments indicated below should be considered for inclusion with the SWQMP. Use this checklist to indicate which attachments are included behind this coversheet.

| Attachment Sequence | Contents | Checklist |
|---|---|---|
| Attachment 1A | Drainage Management Area (DMA) Exhibit<br><br>See DMA Exhibit Checklist on next page. | ☒ Included |
| Attachment 1B | Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, DMA Type, and BMPs*<br><br>*Provide table in this Attachment OR on DMA Exhibit in Attachment 1A | ☒ Included on DMA Exhibit in Attachment 1A<br><br>☐ Included as Attachment 1B |
| Attachment 1C | Harvest and Use Feasibility Screening Checklist (Worksheet B.3-1)<br><br>Refer to Appendix B.3-1 of the *BMP Design Manual*. | ☒ Included<br>☐ Not included because the entire project will use Infiltration BMPs |
| Attachment 1D | Categorization of Infiltration Feasibility Condition (Worksheet C.4-1)<br><br>Refer to Appendices C and D of the *BMP Design Manual*. | ☒ Included<br>☐ Not included because the entire project will use Harvest and Use BMPs |
| Attachment 1E | Pollutant Control BMP Design Worksheets and Calculations<br><br>Refer to Appendices B and E of the *BMP Design Manual* for structural pollutant control BMP design guidelines | ☒ Included |

# ATTACHMENT 1A – DMA EXHIBIT CHECKLIST

For Attachment 1A, provide map(s) for the project site, titled "DMA Exhibit." The checklist below identifies minimum elements that must be included with the DMA Exhibit.

☒ Underlying hydrologic soil group
☒ Approximate depth to groundwater
☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands, etc.)
☒ Critical coarse sediment yield areas to be protected
☒ Existing topography and impervious areas
☒ Existing and proposed site drainage network and storm drain structures
☒ Proposed connections to offsite drainage
☒ Proposed demolition
☒ Proposed grading
☒ Proposed impervious features
☒ Proposed design features and surface treatments used to minimize imperviousness
☒ Drainage management area (DMA) boundaries
☒ DMA identification numbers (DMA ID)
☒ DMA areas (square footage or acreage)
☒ DMA type (Drains to BMP, Self-mitigating, De Minimis, or Self-retaining)
☒ Potential pollutant source areas and corresponding required source controls (see Form 2 and Form 3 of SWQMP, *BMP Design Manual* Chapter 4 and Appendix E.1)
☒ Proposed Structural BMPs (see Form 5 of SWQMP)




## GENERAL INFORMATION

THE PROPOSED PROJECT IS LOCATED WITHIN THE SAN LUIS REY UNIT (HU) – LOWER SAN LUIS REY – MISSION, 903.11. STORM WATER THAT DISCHARGES THE PROJECT SITE ALONG THE EASTERN AND NORTHERN BORDERS FLOWS NORTHERLY TO THE SAN LUIS REY RIVER (LOWER) WHICH FLOWS WESTERLY. STORM WATER THAT DISCHARGES THE PROJECT SITE ALONG THE SOUTHERN AND SOUTHWESTERN BORDERS FLOWS WESTERLY TO GUAJOME LAKE WHICH FLOWS TO THE SAN LUIS REY RIVER (LOWER) WHICH FLOWS WESTERLY AND ULTIMATELY DISCHARGES TO THE PACIFIC OCEAN.

POLUTTANTS OF CONCERN - EUTROPHIC, BENTHIC COMMUNITY EFFECTS, BIFENTHRIN, CHLORIDE, NITROGEN, PHOSPHORUS, TOTAL DISSOLVED SOLIDS, TOXICITY AND INDICATOR BACTERIA

## LID SITE DESIGN BMP'S

1. MODULAR WETLAND SYSTEMS
2. DENTENTION VAULTS
3. ROOF DRAIN TO LANDSCAPING
4. MINIMIZE IMPERVIOUS SURFACES
5. PROTECT SLOPES AND CHANNELS

## SOURCE CONTROL BMP'S

1. STORM DRAIN STENCILING
2. EMPLOY INTEGRATED PEST MANAGEMENT PRACTICES
3. EMPLOY EFFICIENT IRRIGATION AND DROUGHT TOLERANT LANDSCAPE DESIGN

## SOIL INFORMATION

HYDROLOGIC SOIL GROUP: TYPE C

## GROUND WATER INFORMATION

GROUND WATER WAS NOT ENCOUNTERED AT THE SITE. SEE REPORT PREPARED BY: GEOSOILS, INC
DATED: W.O. 5053-A1-SC FEBRUARY 23, 2006

## COARSE SEDIMENT YIELD

REFER TO ATTACHEMENT 2B OF THIS REPORT FOR CRITICAL COARSE SEDIMENT YIELD AREAS WITHIN THIS PROJECT SITE.

## BMP NOTES

1. THESE BMPS AREA MANDATORY TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS OR THERE PLANS
2. NO CHANGES TO THE PROPOSED BMPS ON THIS SHEET WITHOUT PRIOR APPROVAL FORM THE CITY ENGINEERING DEPARTMENT
3. NO SUBSTITUTIONS TO THE MATERIAL TYPES OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE LAND DEVELOPMENT ENGINEER
4. NO OCCUPANCY WILL BE GRANTED UNTIL THE CITY INSPECTOR STAFF HAS INSPECTED THIS PROJECT FOR APPRORIATE BMP CONSTRUCTION AND INSTALLATION.

## WATER QUALITY TECHNICAL REPOT

TITLE - PRIORITY DEVELOPMENT PROJECT STORM WATER QUALITY MANAGEMENT REPORT FOR 2277 VISTA GRANDE DRIVE
DATE - MARCH 2021
PREPARED BY - PASCO LARET SUITER & ASSOCIATES

## MAINTENANCE AGREEMENT DOCUMENT

TITLE -
DATE -
PREPARED BY -

## OPERATIONS AND MAINTENANCE PLAN

TITLE - STORM WATER OPERATIONS & MAINTENANCE PLAN FOR 2277 VISTA GRANDE DRIVE
DATE - MARCH 2021
PREPARED BY - PASCO LARET SUITER & ASSOCIATES

## RESPONSIBLE PARTY INFORMATION

GREG PERRINE

1151 DURYEA AVENUE

IRVINE, CA 92614

## BMP SUMMARY

| DMA # | BMP # | BMP TYPE | BMP AREA | BMP OUTLET | OULET PIPE |
|---|---|---|---|---|---|
| 1 | A | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT A | MWS L-4-19 / 2,000 SF, 5' HIGH R-TANK | 1.2-INCH ORIFICE / 6-FT WIDE WEIR @ 4.5-FT HIGH | 12" |
| | A1 | TREE WELL | 5 FT TREE AND 10 FT TREE | -- | -- |
| 2 | B | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT B | MWS L-4-19 / 1,200 SF, 7' HIGH R-TANK | 1.0-INCH ORIFICE / 8-FT WIDE WEIR @ 6.5-FT HIGH | 12" |
| | B1 | TREE WELL | 5 FT TREE AND 10 FT TREE | -- | -- |
| 3 | E | MODULAR WETLAND SYSTEM INLET | MWS L-4-6 | N/A | 12" |
| | E1 | TREE WELL | 10 FT TREE | -- | -- |
| 4 | D | DETENTION VAULT D | 3,400 SF, 5' HIGH R-TANK | 1.5-INCH ORIFICE / 12-FT WIDE WEIR @ 4.5-FT HIGH | 18" |
| | D1 | TREE WELL | 10 FT TREE AND 15 FT TREE | -- | -- |
| 5 | -- | SELF MITIGATING AREA | -- | -- | -- |
| 6 | C | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT C | MWS L-10-30 / 5,000 SF, 10' HIGH R-TANK | 1.9-INCH ORIFICE / 18-FT WIDE WEIR @ 9.5-FT HIGH | 18" |
| | C1 | TREE WELL | 15 FT TREE | -- | -- |
| | C2 | MODULAR WETLAND SYSTEM INLET | MWS L-4-4 | N/A | 12" |

## POST-CONSTRUCTION PERMANENT BMP OPERATION & MAINTENANCE PROCEDURE DETAILS

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT APPROVAL NO:

O&M RESPONSBILE PARTY DESIGNEE: GREG PERRINE

| BMP DESCRIPTION | INSPECTION FREQUENCY | MAINTENANCE FREQUENCY | MAINTENANCE METHOD | QUANTITY | SHEET NUMBER(S) |
|---|---|---|---|---|---|
| EDUCATION PROGRAM (SOURCE CONTROL) | ANNUAL | AS NEEDED | EMPLOYEE EDUCATION PROGRAM | N/A | N/A |
| SIGNAGE & STENCILING | ANNUAL | AS NEEDED | REPAIR AND/OR REPLACE AS NECESSARY | 3 | -- |
| MODULAR WETLAND SYSTEM | ANNUAL | AS NEEDED | REPAIR AND/OR REPLACE AS NECESSARY | 5 | -- |
| DETENTION VAULT - RTANK | ANNUAL | AS NEEDED | REPAIR AND/OR REPLACE AS NECESSARY | 4 | -- |
| TREE WELL | MONTHLY | AS NEEDED | INSPECT TREE HEALTH & REPAIR/REPLACE AS NECESSARY | 8 | -- |

## BMP NOTES

1. THESE BMPS AREA MANDATORY TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS OR THERE PLANS
2. NO CHANGES TO THE PROPOSED BMPS ON THIS SHEET WITHOUT PRIOR APPROVAL FORM THE CITY ENGINEERING DEPARTMENT
3. NO SUBSTITUTIONS TO THE MATERIAL TYPES OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE LAND DEVELOPMENT ENGINEER
4. NO OCCUPANCY WILL BE GRANTED UNTIL THE CITY INSPECTOR STAFF HAS INSPECTED THIS PROJECT FOR APPRORIATE BMP CONSTRUCTION AND INSTALLATION.

MAJOR BASIN BOUNDARY

HMP POINT OF COMPLIANCE — POC 1

IMPERVIOUS AREA 4.25 AC (184,989 SF)

PERVIOUS AREA 12.82 AC (558,506 SF)

**ASSUMED IMPERVIOUS AREA PER LOT 3,051 SF (BLDG + DWY)

## DMA HMP EXHIBIT

2277 VISTA GRANDE DRIVE
VISTA, CA
SCALE: 1" = 50'
DATE: AUGUST 2021
SHEET 1 OF 1

**PASCO LARET SUITER & ASSOCIATES**
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SAVE DATE: — - PLOT DATE: 08/11/21 - FILE NAME: J:\ACTIVE JOBS\5474 Vista Grande\CIVIL\REPORTS\SWQMP\SWMM\5474-HMP-POST .dwg

**ATTACHMENT 1c**

| **Harvest and Use Feasibility Screening** | **Worksheet B.3-1** |
|---|---|

1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?

∨ Toilet and urinal flushing
√ Landscape irrigation
Other:_____

2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.

Toilet/Urinal Flushing
(9.3 gal/person-day) x (0.13368 cuft/gal) x (1.5 days) = 1.86 cuft/person-36hr
Assume (3 people per house x 28 houses) x (1.86 cuft/person-36 hr) = 157 cuft/36hr

Landscape Irrigation
(13.019 ac irrigated) x (390 gal/ac-36hr) x (0.13368 cuft/gal) = 679 cuft/36hr

**Total = 157 cuft + 679 cuft = 836 cuft**

3. Calculate the DCV using worksheet B-2.1.

DCV = 11,015 cuft

| 3a. Is the 36-hour demand greater than or equal to the DCV? | 3b. Is the 36-hour demand greater than 0.25DCV but less than the full DCV? | 3c. Is the 36-hour demand less than 0.25DCV? |
|---|---|---|
| Yes / ∨ No | Yes / ∨ No | ∨ Yes |
| Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria. | Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours. | ∨ Harvest and use is considered to be infeasible. |

**ATTACHMENT 1d**

Pertaining to Basins: 1, 4, 8, 10, 11, 12, 13, and 14 (Transition and Fill Basins)

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

| Categorization of Infiltration Condition | | | Worksheet C.4-1 |
|---|---|---|---|
| **Part 1 - Full Infiltration Feasibility Screening Criteria**<br><br>**Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?** | | | |
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 1 | **Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D. | X | |
| Provide basis:<br><br>Yes. GSI (this study) has evaluated the infiltration rate of natural surface soils as close to 4.50 to 9.36 in/hr,(Hydrologic Soil Group C). The areas for development for the basins listed above will result in partial removal of surface soils, yielding medium dense to dense granitics, and/or fill, at the infiltration surface. Site soils where the proposed basins are to be constructed in cut have relatively moderate to high permeability at depth below basin surface grade. However, the infiltration rates for fill materials is expected to be about 0.5 in/hr., or similar to the parent material.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 2 | **Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2. | | X |
| Provide basis:<br><br>No. The moderate to high permeability at depth suggests that surficial manifestations due to infiltration should not be a problem. There is an increased potential for the creation of perched groundwater (mounding) conditions along zones of contrasting permeabilities, including shallow cut/fill contacts, and transitions between colluvial earth materials, fill materials, and the granitic bedrock. Due to the strong permeability contrast between bedrock and colluvial and fill deposits or within fill lifts, utility trenches can potentially act as french drains and provide conduits for the movement of excessive moisture beneath the structure(s), further exacerbating slope instability, as well as potentially causing settlement in onsite and offsite trench backfill. Future perched groundwater conditions may develop along granitic bedrock contacts, and should be anticipated. The limited permeability of granitic bedrock will tend to result in the lateral migration of water and saturated conditions at, or near the surface, increasing the potential for distress to foundations, floor slabs, and slope instability, etc. Superjacent basins proposed next to subjacent pads may cause local slope stability, water intrusion, and distress to retaining walls below basin elevation. See text of GSI (2006) for other related discussions and references.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |

Pertaining to Basins: 1, 4, 8, 10, 11, 12, 13, and 14 (Transition and Fill Basins)

| Worksheet C.4.1 Page 2 of 4 | | | |
|---|---|---|---|
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 3 | **Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensible evaluation of the factors presented in Appendix C.3. | | X |
| Provide basis:<br>While the GSI (2013) study did not include an environmental assessment, visual observation did not indicate the presence of potential contaminants. While the regional groundwater table is not considered a factor in the development of this site, the creation of a shallow "perched" water table would likely occur through infiltration.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 4 | **Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as a change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br>Yes. The site currently drains offsite and no runoff appears to be retained onsite. The regional groundwater table is not considered a factor in the development of this site.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| **Part 1 Result*** | In the answers to rows 1-4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration**<br><br>If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design.<br>Proceed to Part 2 | | **No** |

* To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by [City Engineer] to substantiate findings.

Pertaining to Basins: 1, 4, 8, 10, 11, 12, 13, and 14 (Transition and Fill Basins)

**Worksheet C.4-1 Page 3 of 4**

**Part 2 - Partial Infiltration vs. No Infiltration Feasibility Screening Criteria**

**Would infiltration of water in an appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?**

| Criteria | Screening Question | Yes | No |
|---|---|---|---|
| 5 | **Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D. | X | |

Provide basis:

Yes. The Ksat of natural surface soils is greater than 0.5 in./hr., and the lowest infiltration rate recorded was 4.50, which is 9 times the limit (0.5 in./hr.) for feasible infiltration. Infiltration rates of fill material is not known.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

| | | | |
|---|---|---|---|
| 6 | **Can infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2. | | X |

Provide basis:

No. The limited permeability of granitic bedrock will tend to result in the lateral migration of water and saturated conditions at, or near the surface, increasing the potential for distress to foundations, floor slabs, and slope instability, etc. There is an increased potential for the creation of perched groundwater (mounding) conditions along zones of contrasting permeabilities, including shallow cut/fill contacts, and transitions between colluvial earth materials within the granitic bedrock. Due to the strong permeability contrast between bedrock and backfill, utility trenches can potentially act as french drains and provide conduits for the movement of excessive moisture beneath the structure(s) further exacerbating slope instability, as well as potentially causing settlement in onsite and offsite trench backfill. Superjacent basins proposed next to subjacent pads may cause local slope stability, water intrusion, and distress to retaining walls below basin elevation. See text of GSI (2006) for other related discussions and references.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Pertaining to Basins: 1, 4, 8, 10, 11, 12, 13, and 14 (Transition and Fill Basins)

| Worksheet C.4-1 Page 4 of 4 | | | |
|---|---|---|---|
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 7 | **Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | | X |
| Provide basis:<br>While the regional groundwater table is not considered a factor in the development of this site, the creation of a shallow "perched" water table can occur and increase the potential for distress to the structure(s) due to water vapor transmission through foundations, slabs, and any resultant corrosive effects on metal conduit in trenches, as well as settlement in onsite and offsite trench backfill.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 8 | **Can infiltration be allowed without violating downstream water rights?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br>The site currently drains offsite and no runoff appears to be retained onsite. The regional groundwater table is not considered a factor in the development of this site.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| Part 2 Result* | If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.**<br>If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.** | | **No Infiltration** |

* To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings.

Pertaining to Basins: 2, 3, 5, 6, 7, 9, and 15 (Cut Basins)

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition

| Categorization of Infiltration Condition | | | Worksheet C.4-1 |
|---|---|---|---|
| **Part 1 - Full Infiltration Feasibility Screening Criteria**<br><br>**Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?** | | | |
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 1 | **Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D. | X | |
| Provide basis:<br><br>Yes. GSI (this study) has evaluated the infiltration rate of natural surface soils as close to 4.50 to 9.36 in/hr (Hydrologic Soil Group C). Areas for development will also result in the removal of natural surface soils, exposing medium dense to dense granitics. The resultant infiltration rates for these much denser materials are expected to be close to 4.5 in/hr. Site soils where the proposed basins are to be constructed have relatively moderate to high permeability at depth below basin surface grade.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 2 | **Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2. | | X |
| Provide basis:<br><br>No. The moderate to high permeability at depth suggests that surficial manifestations due to infiltration should not be a problem. There is an increased potential for the creation of perched groundwater (mounding) conditions along zones of contrasting permeabilities, including shallow cut/fill contacts, and transitions between colluvial earth materials and the granitic bedrock. Due to the strong permeability contrast between bedrock and colluvial deposits, utility trenches can potentially act as french drains and provide conduits for the movement of excessive moisture beneath the structure(s), further exacerbating slope instability, as well as potentially causing settlement in onsite and offsite trench backfill. Future perched groundwater conditions may develop along granitic bedrock contacts. The limited permeability of granitic bedrock will tend to result in the lateral migration of water and saturated conditions at, or near the surface, increasing the potential for distress to foundations, floor slabs, and slope instability, etc. Superjacent basins proposed next to subjacent pads may cause local slope stability, water intrusion, and distress to retaining walls below basin elevation. See text of GSI (2006) for other related discussions and references.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |

Pertaining to Basins: 2, 3, 5, 6, 7, 9, and 15 (Cut Basins)

| Worksheet C.4-1 Page 2 of 4 | | | |
|---|---|---|---|
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 3 | **Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensible evaluation of the factors presented in Appendix C.3. | | X |
| Provide basis:<br>No. While the GSI (2013) study did not include an environmental assessment, visual observation did not indicate the presence of potential contaminants. While the regional groundwater table is not considered a factor in the development of this site, the creation of a shallow "perched" water table would likely occur through infiltration.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 4 | **Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as a change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br>Yes. The site currently drains offsite and no runoff appears to be retained onsite. The regional groundwater table is not considered a factor in the development of this site.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| **Part 1 Result*** | In the answers to rows 1-4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration**<br><br>If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design.<br>Proceed to Part 2 | | **No** |

* To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by [City Engineer] to substantiate findings.

Pertaining to Basins: 2, 3, 5, 6, 7, 9, and 15 (Cut Basins)

| Worksheet C.4-1 Page 3 of 4 | | | |
|---|---|---|---|
| **Part 2 - Partial Infiltration vs. No Infiltration Feasibility Screening Criteria**<br><br>**Would infiltration of water in an appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?** | | | |
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 5 | **Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D. | X | |
| Provide basis:<br><br>Yes. The $K_{sat}$ of natural surface soils is greater than 0.5 in./hr., and the lowest infiltration rate recorded was 4.50, which is 9 times the limit (0.5 in./hr.) for feasible infiltration.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 6 | **Can infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2. | | X |
| Provide basis:<br><br>No. The limited permeability of granitic bedrock will tend to result in the lateral migration of water and saturated conditions at, or near the surface, increasing the potential for distress to foundations, floor slabs, and slope instability, etc. There is an increased potential for the creation of perched groundwater (mounding) conditions along zones of contrasting permeabilities, including shallow cut/fill contacts, and transitions between colluvial earth materials within the granitic bedrock. Due to the strong permeability contrast between bedrock and backfill, utility trenches can potentially act as french drains and provide conduits for the movement of excessive moisture beneath the structure(s) further exacerbating slope instability, as well as potentially causing settlement in onsite and offsite trench backfill. Superjacent basins proposed next to subjacent pads may cause local slope stability, water intrusion, and distress to retaining walls below basin elevation. See text of GSI (2006) for other related discussions and references.<br><br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |

Pertaining to Basins: 2, 3, 5, 6, 7, 9, and 15 (Cut Basins)

| Worksheet C.4-1 Page 4 of 4 | | | |
|---|---|---|---|
| **Criteria** | **Screening Question** | **Yes** | **No** |
| 7 | **Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | | X |
| Provide basis:<br>While the regional groundwater table is not considered a factor in the development of this site, the creation of a shallow "perched" water table can occur and increase the potential for distress to the structure(s) due to water vapor transmission through foundations, slabs, and any resultant corrosive effects on metal conduit in trenches, as well as settlement in onsite and offsite trench backfill.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| 8 | **Can infiltration be allowed without violating downstream water rights?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3. | X | |
| Provide basis:<br>The site currently drains offsite and no runoff appears to be retained onsite. The regional groundwater table is not considered a factor in the development of this site.<br>Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability. | | | |
| Part 2 Result* | If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.**<br>If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.** | | **No Infiltration** |

* To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings.

**ATTACHMENT 1e**

3474 Vista Grande
8/11/2021

## Appendix B: Stormwater Pollutant Control Hydrologic Calculations and Sizing Methods

### Worksheet B.2-1. DCV

**DMA-1**

| Design Capture Volume | | Worksheet B-2.1 | | |
|---|---|---|---|---|
| 1 | 85th percentile 24-hr storm depth from Figure B.1-1 | d= | 0.6 | inches |
| 2 | Area tributary to BMP (s) | A= | 2.80 | acres |
| 3 | Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1) * See calculation below | C= | 0.26 | unitless |
| 4 | Street trees volume reduction | TCV= | 0 | cubic-feet |
| 5 | Rain barrels volume reduction (1 cubic foot=7.48 gallons) | RCV= | 0 | cubic-feet |
| 6 | Calculate DCV = (3630 x C x d x A) – TCV - RCV | DCV= | 1572 | cubic-feet |

**Tree Well Volume Credit**

| | | |
|---|---|---|
| Retention Requirement = 3% of DCV= | 47 | cf |
| Number of Tree Wells = | 2 | |
| Mature Tree Canopy Diameter = | 5 and 10 | ft |
| Tree Well Volume Credit = | 50 | cf |

| | Area (sq ft) | Runoff Factor | A x RF | Weighted RF |
|---|---|---|---|---|
| Impervious | 24,046 | 0.9 | 21,641 | |
| Pervious | 98,065 | 0.1 | 9,807 | |
| Total | 122,111 | | 31,448 | 0.26 |

**DMA-2**

| Design Capture Volume | | Worksheet B-2.1 | | |
|---|---|---|---|---|
| 1 | 85th percentile 24-hr storm depth from Figure B.1-1 | d= | 0.6 | inches |
| 2 | Area tributary to BMP (s) | A= | 2.14 | acres |
| 3 | Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1) * See calculation below | C= | 0.37 | unitless |
| 4 | Street trees volume reduction | TCV= | 0 | cubic-feet |
| 5 | Rain barrels volume reduction (1 cubic foot=7.48 gallons) | RCV= | 0 | cubic-feet |
| 6 | Calculate DCV = (3630 x C x d x A) – TCV - RCV | DCV= | 1734 | cubic-feet |

**Tree Well Volume Credit**

| | | |
|---|---|---|
| Retention Requirement = 3% of DCV= | 52 | cf |
| Number of Tree Wells = | 2 | |
| Mature Tree Canopy Diameter = | 5 and 10 | ft |
| Tree Well Volume Credit = | 50 | cf |

(additional 2 cf of tree well volume credit provided by DMA-1)

| | Area (sq ft) | Runoff Factor | A x RF | Weighted RF |
|---|---|---|---|---|
| Impervious | 31,715 | 0.9 | 28,544 | |
| Pervious | 61,393 | 0.1 | 6,139 | |
| Total | 93,108 | | 34,683 | 0.37 |

3474 Vista Grande
8/11/2021

## Appendix B: Stormwater Pollutant Control Hydrologic Calculations and Sizing Methods

### Worksheet B.2-1. DCV

**DMA-3**

| Design Capture Volume | | Worksheet B-2.1 | | |
|---|---|---|---|---|
| 1 | 85th percentile 24-hr storm depth from Figure B.1-1 | d= | 0.6 | inches |
| 2 | Area tributary to BMP (s) | A= | 0.27 | acres |
| 3 | Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1) * See calculation below | C= | 0.87 | unitless |
| 4 | Street trees volume reduction | TCV= | 0 | cubic-feet |
| 5 | Rain barrels volume reduction (1 cubic foot=7.48 gallons) | RCV= | 0 | cubic-feet |
| 6 | Calculate DCV = (3630 x C x d x A) – TCV - RCV | DCV= | 515 | cubic-feet |

**Tree Well Volume Credit**

| | | |
|---|---|---|
| Retention Requirement = 3% of DCV= | 15 | cf |
| Number of Tree Wells = | 1 | |
| Mature Tree Canopy Diameter = | 10 | ft |
| Tree Well Volume Credit = | 40 | cf |

| | Area (sq ft) | Runoff Factor | A x RF | Weighted RF |
|---|---|---|---|---|
| Impervious | 11,398 | 0.9 | 10,258 | |
| Pervious | 442 | 0.1 | 44 | |
| Total | 11,840 | | 10,302 | 0.87 |

**DMA-4**

| Design Capture Volume | | Worksheet B-2.1 | | |
|---|---|---|---|---|
| 1 | 85th percentile 24-hr storm depth from Figure B.1-1 | d= | 0.6 | inches |
| 2 | Area tributary to BMP (s) | A= | 6.42 | acres |
| 3 | Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1) * See calculation below | C= | 0.27 | unitless |
| 4 | Street trees volume reduction | TCV= | 0 | cubic-feet |
| 5 | Rain barrels volume reduction (1 cubic foot=7.48 gallons) | RCV= | 0 | cubic-feet |
| 6 | Calculate DCV = (3630 x C x d x A) – TCV - RCV | DCV= | 3839 | cubic-feet |

**Tree Well Volume Credit**

| | | |
|---|---|---|
| Retention Requirement = 3% of DCV= | 115 | cf |
| Number of Tree Wells = | 2 | |
| Mature Tree Canopy Diameter = | 10 and 15 | ft |
| Tree Well Volume Credit = | 140 | cf |

| | Area (sq ft) | Runoff Factor | A x RF | Weighted RF |
|---|---|---|---|---|
| Impervious | 61,041 | 0.9 | 54,937 | |
| Pervious | 218,483 | 0.1 | 21,848 | |
| Total | 279,524 | | 76,785 | 0.27 |

3474 Vista Grande
8/11/2021

## Appendix B: Stormwater Pollutant Control Hydrologic Calculations and Sizing Methods

### Worksheet B.2-1. DCV

**DMA-5**

| Design Capture Volume | | Worksheet B-2.1 | | |
|---|---|---|---|---|
| 1 | 85th percentile 24-hr storm depth from Figure B.1-1 | d= | 0.6 | inches |
| 2 | Area tributary to BMP (s) | A= | 0.91 | acres |
| 3 | Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1) * See calculation below | C= | 0.10 | unitless |
| 4 | Street trees volume reduction | TCV= | 0 | cubic-feet |
| 5 | Rain barrels volume reduction (1 cubic foot=7.48 gallons) | RCV= | 0 | cubic-feet |
| 6 | Calculate DCV = (3630 x C x d x A) – TCV - RCV | DCV= | 197 | cubic-feet |

| | Area (sq ft) | Runoff Factor | A x RF | Weighted RF |
|---|---|---|---|---|
| Impervious | - | 0.9 | - | |
| Pervious | 39,436 | 0.1 | 3,944 | |
| Total | 39,436 | | 3,944 | 0.10 |

**Tree Well Volume Credit provided in DMA-3**

| | | |
|---|---|---|
| Retention Requirement = 3% of DCV= | 6 | cf |

**DMA-6**

| Design Capture Volume | | Worksheet B-2.1 | | |
|---|---|---|---|---|
| 1 | 85th percentile 24-hr storm depth from Figure B.1-1 | d= | 0.6 | inches |
| 2 | Area tributary to BMP (s) | A= | 4.53 | acres |
| 3 | Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1) * See calculation below | C= | 0.33 | unitless |
| 4 | Street trees volume reduction | TCV= | 0 | cubic-feet |
| 5 | Rain barrels volume reduction (1 cubic foot=7.48 gallons) | RCV= | 0 | cubic-feet |
| 6 | Calculate DCV = (3630 x C x d x A) – TCV - RCV | DCV= | 3265 | cubic-feet |

| | Area (sq ft) | Runoff Factor | A x RF | Weighted RF |
|---|---|---|---|---|
| Impervious | 56,950 | 0.9 | 51,255 | |
| Pervious | 140,529 | 0.1 | 14,053 | |
| Total | 197,479 | | 65,308 | 0.33 |

**Tree Well Volume Credit**

| | | |
|---|---|---|
| Retention Requirement = 3% of DCV= | 98 | cf |
| Number of Tree Wells = | 1 | |
| Mature Tree Canopy Diameter = | 15 | ft |
| Tree Well Volume Credit = | 100 | cf |

3474 Vista Grande
8/11/2021

## Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

### Worksheet B.6-1: Flow-Thru Design Flows

**DMA-1**

| Flow-thru Design Flows | | Worksheet B.6-1 | | |
|---|---|---|---|---|
| 4 | DCV requiring flow-thru | $DCV_{flow\text{-}thru}$ | 1572 | cubic-feet |
| 6 | Design rainfall intensity | i= | 0.20 | in/hr |
| 7 | Area tributary to BMP (s) | A= | 2.80 | acres |
| 8 | Area-weighted runoff factor (estimate using Appendix B.2) | C= | 0.26 | unitless |
| 9 | Calculate Flow Rate = (C x i x A) | Q= | 0.14 | cfs |
| | | 1.5Q= | 0.22 | cfs |

**DMA-2**

| Flow-thru Design Flows | | Worksheet B.6-1 | | |
|---|---|---|---|---|
| 4 | DCV requiring flow-thru | $DCV_{flow\text{-}thru}$ | 1734 | cubic-feet |
| 6 | Design rainfall intensity | i= | 0.20 | in/hr |
| 7 | Area tributary to BMP (s) | A= | 2.14 | acres |
| 8 | Area-weighted runoff factor (estimate using Appendix B.2) | C= | 0.37 | unitless |
| 9 | Calculate Flow Rate = (C x i x A) | Q= | 0.15 | cfs |
| | | 1.5Q= | 0.22 | cfs |

3474 Vista Grande
8/11/2021

## Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

### Worksheet B.6-1: Flow-Thru Design Flows

**DMA-3**

| Flow-thru Design Flows | | Worksheet B.6-1 | | |
|---|---|---|---|---|
| 4 | DCV requiring flow-thru | $DCV_{flow\text{-}thru}$ | 453 | cubic-feet |
| 6 | Design rainfall intensity | i= | 0.20 | in/hr |
| 7 | Area tributary to BMP (s) | A= | 0.27 | acres |
| 8 | Area-weighted runoff factor (estimate using Appendix B.2) | C= | 0.87 | unitless |
| 9 | Calculate Flow Rate = (C x i x A) | Q= | 0.05 | cfs |
| | | 1.5Q= | 0.07 | cfs |

**DMA-4 and 6**

| Flow-thru Design Flows | | Worksheet B.6-1 | | |
|---|---|---|---|---|
| 4 | DCV requiring flow-thru | $DCV_{flow\text{-}thru}$ | 5685 | cubic-feet |
| 6 | Design rainfall intensity | i= | 0.30 | in/hr |
| 7 | Area tributary to BMP (s) | A= | 10.35 | acres |
| 8 | Area-weighted runoff factor (estimate using Appendix B.2) | C= | 0.29 | unitless |
| 9 | Calculate Flow Rate = (C x i x A) | Q= | 0.90 | cfs |
| | | 1.5Q= | 1.35 | cfs |

**DMA-6.15**

| Flow-thru Design Flows | | Worksheet B.6-1 | | |
|---|---|---|---|---|
| 4 | DCV requiring flow-thru | $DCV_{flow\text{-}thru}$ | 561 | cubic-feet |
| 5 | Adjustment factor (Line 4 / Line 1)* | AF= | 1 | unitless |
| 6 | Design rainfall intensity | i= | 0.28 | in/hr |
| 7 | Area tributary to BMP (s) | A= | 0.60 | acres |
| 8 | Area-weighted runoff factor (estimate using Appendix B.2) | C= | 0.29 | unitless |
| 9 | Calculate Flow Rate = (C x i x A) | Q= | 0.05 | cfs |
| | | 1.5Q= | 0.07 | cfs |

# ATTACHMENT 2 – HYDROMODIFICATION MANAGEMENT CONTROLS: SUPPORT DOCUMENTATION & CHECKLIST

☐ Check this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

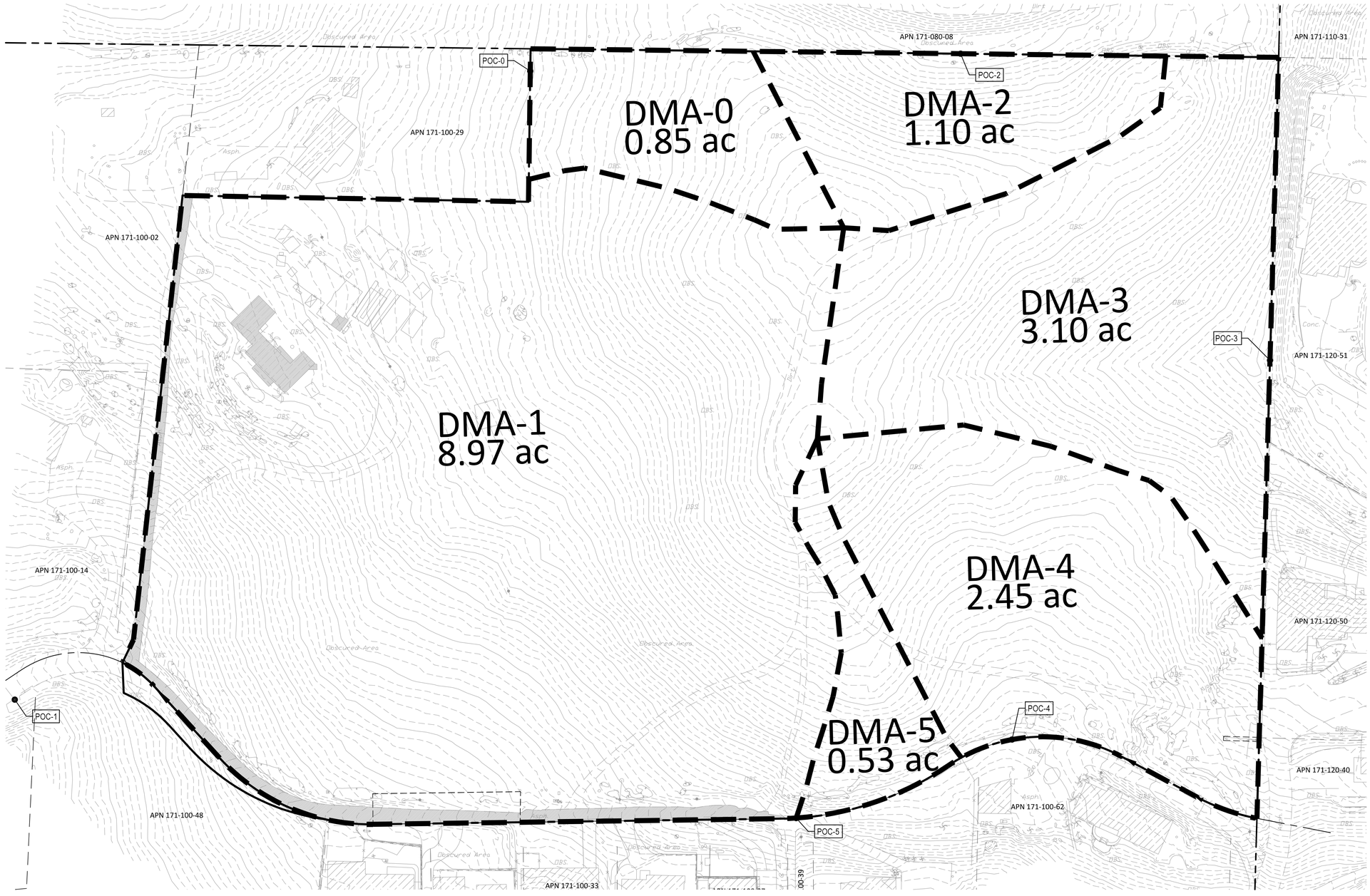
Each of the attachments indicated below should be considered for inclusion with the SWQMP. Use this checklist to indicate which attachments are included behind this coversheet.

| Attachment Sequence | Contents | Checklist |
|---|---|---|
| Attachment 2A | Hydromodification Management Exhibit | ☒ Included<br>See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet. |
| Attachment 2B | Management of Critical Coarse Sediment Yield Areas<br>See Section 6.2 of the *BMP Design Manual*. | ☒ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map<br>Analyses, as applicable, for Critical Coarse Sediment Yield Area Determination, per *BMP Design Manual:*<br>☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite<br>☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment<br>☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite |
| Attachment 2C | Geomorphic Assessment of Receiving Channels<br>See Section 6.3.4 of the *BMP Design Manual*. | ☒ Not performed<br>☐ Included<br>☐ Submitted as separate stand-alone document |
| Attachment 2D | Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary<br>See Chapter 6 and Appendix G of the *BMP Design Manual* | ☒ Included<br>☐ Submitted as separate stand-alone document |
| Attachment 2E | Vector Control Plan | ☐ Included<br>☒ Not required because BMPs will drain in less than 96 hours |

# ATTACHMENT 2A – HYDROMODIFICATION MANAGEMENT EXHIBIT

For Attachment 2A, provide map(s) for the project site, titled "Hydromodification Management Exhibit." The checklist below identifies minimum elements that must be included with the exhibit.

- ☐ Underlying hydrologic soil group
- ☐ Approximate depth to groundwater
- ☐ Existing natural hydrologic features (watercourses, seeps, springs, wetlands, etc.)
- ☐ Critical coarse sediment yield areas to be protected
- ☐ Existing topography and impervious areas
- ☐ Existing and proposed site drainage network and storm drain structures
- ☐ Proposed connections to offsite drainage
- ☐ Proposed demolition
- ☐ Proposed grading
- ☐ Proposed impervious features
- ☐ Proposed design features and surface treatments used to minimize imperviousness
- ☐ Points of Compliance for hydromodification management
- ☐ Existing and proposed drainage boundary and drainage area to each Point of Compliance (when necessary, create separate exhibits for pre-development and post-project conditions)
- ☐ Structural BMPs for hydromodification management (location, type, and size)




MAJOR BASIN BOUNDARY

MINOR BASIN BOUNDARY

FLOW PATH

HYDROLOGIC NODE
ELEVATION AT NODE

HYDROLOGIC SUB-BASIN NUMBER
HYDROLOGIC AREA (ACRES)

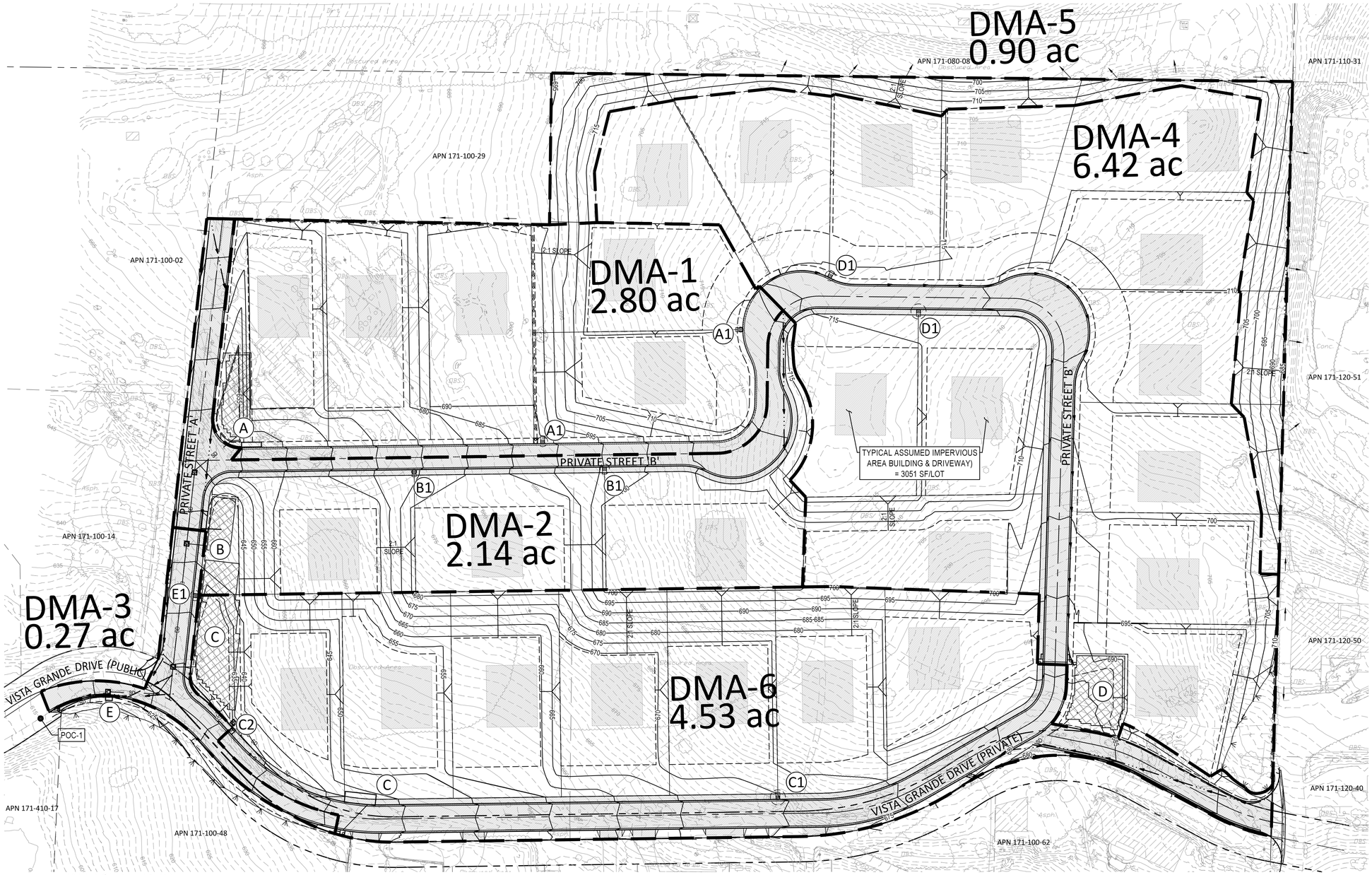
| | |
|---|---|
| IMPERVIOUS AREA | 0.34 AC (14,928 SF) |
| PERVIOUS AREA | 16.65 AC (725,274 SF) |

# PRE-PROJECT HMP EXHIBIT

2277 VISTA GRANDE DRIVE
VISTA, CA
SCALE: 1' = 50'
DATE: AUGUST 2021
SHEET 1 OF 1

**PASCO LARET SUITER & ASSOCIATES**
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SAVE DATE: 08/03/21 - PLOT DATE: 08/05/21 - FILE NAME: J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\REPORTS\SWQMP\SWMM\3474-HMP-PRE.dwg




## BMP SUMMARY

| DMA # | BMP # | BMP TYPE | BMP AREA | BMP OUTLET | OULET PIPE |
|---|---|---|---|---|---|
| 1 | A | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT A | MWS L-4-19 / 2,000 SF, 5' HIGH R-TANK | 1.2-INCH ORIFICE / 6-FT WIDE WEIR @ 4.5-FT HIGH | 12" |
| | A1 | TREE WELL | 5 FT TREE AND 10 FT TREE | -- | -- |
| 2 | B | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT B | MWS L-4-19 / 1,200 SF, 7' HIGH R-TANK | 1.0-INCH ORIFICE / 8-FT WIDE WEIR @ 6.5-FT HIGH | 12" |
| | B1 | TREE WELL | 5 FT TREE AND 10 FT TREE | -- | -- |
| 3 | E | MODULAR WETLAND SYSTEM INLET | MWS L-4-6 | N/A | 12" |
| | E1 | TREE WELL | 10 FT TREE | -- | -- |
| 4 | D | DETENTION VAULT D | 3,400 SF, 5' HIGH R-TANK | 1.5-INCH ORIFICE / 12-FT WIDE WEIR @ 4.5-FT HIGH | 18" |
| | D1 | TREE WELL | 10 FT TREE AND 15 FT TREE | -- | -- |
| 5 | -- | SELF MITIGATING AREA | -- | -- | -- |
| 6 | C | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT C | MWS L-10-30 / 5,000 SF, 10' HIGH R-TANK | 1.9-INCH ORIFICE / 18-FT WIDE WEIR @ 9.5-FT HIGH | 18" |
| | C1 | TREE WELL | 15 FT TREE | -- | -- |
| | C2 | MODULAR WETLAND SYSTEM INLET | MWS L-4-4 | N/A | 12" |

MAJOR BASIN BOUNDARY

HMP POINT OF COMPLIANCE — POC 1

IMPERVIOUS AREA 4.25 AC (184,989 SF)

PERVIOUS AREA 12.82 AC (558,506 SF)

**ASSUMED IMPERVIOUS AREA PER LOT 3,051 SF (BLDG + DWY)

POST-PROJECT HMP EXHIBIT

2277 VISTA GRANDE DRIVE
VISTA, CA
SCALE: 1' = 50'
DATE: AUGUST 2021
SHEET 1 OF 1

PASCO LARET SUITER & ASSOCIATES
San Diego I Solana Beach I Orange County
Phone 858.259.8212 I www.plsaengineering.com

SAVE DATE: ---- - PLOT DATE: 08/12/21 - FILE NAME: J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\REPORTS\SWMP\SWMM\3474-HMP-POST.dwg

ATTACHMENT 2b

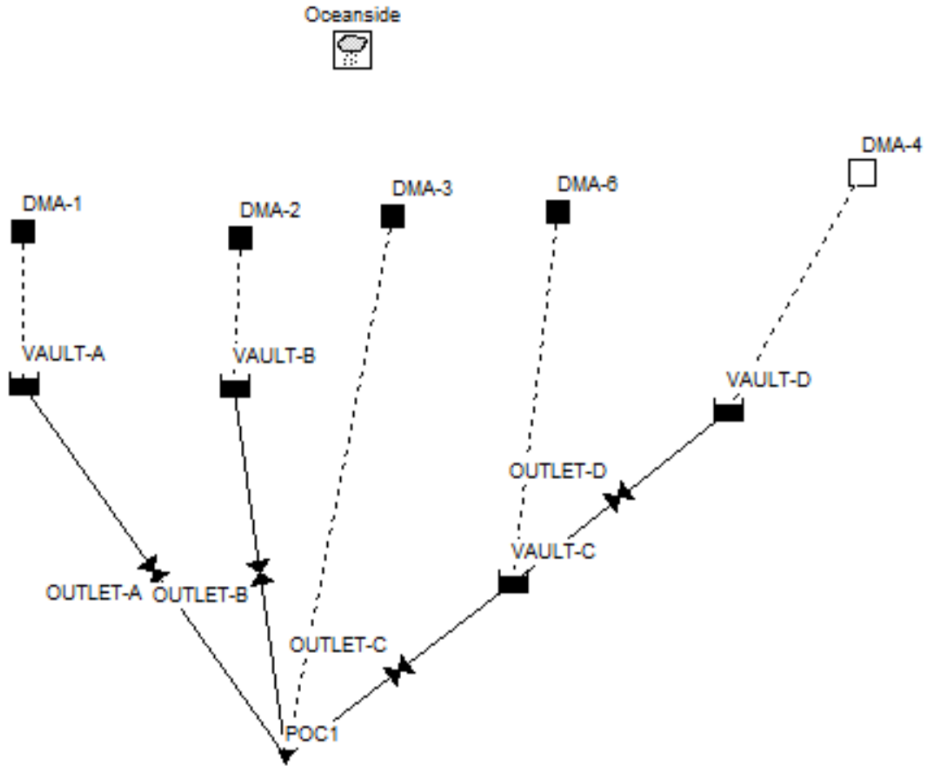
# Potential Critical Coarse Sediment Yield Areas Regional San Diego County Watersheds

Source: 2015 Regional Potential Critical Coarse Sediment Yield Area Mapping Google Earth kmz file from www.projectcleanwater.org

**ATTACHMENT 2d**

# POC-1

## SWMM MODEL SCHEMATICS

| PRE-PROJECT MODEL | POST-PROJECT MODEL |
|---|---|
| |  |

3474 Vista Grande
3/22/2021

**POC-1**

PRE-PROJECT

| DMA | N-perv | Area (ac) | Width (Area/Flow Length) (ft) | % Slope | % Impervious | % C Soils | % D Soils | Weighted Infiltration (in/hr): | Weighted Suction Head (in): | Weighted Initial Deficit: |
|---|---|---|---|---|---|---|---|---|---|---|
| DMA-1 | 0.045 | 10.30 | 763 | 11.0% | 0% | 100% | 0% | 0.100 | 6.000 | 0.320 |
| | **Total:** | **10.30** | | | | | | | | |

POST-PROJECT

| DMA | N-perv | Area (ac) | Width (Area/Flow Length) (ft) | % Slope | % Impervious | % C Soils | % D Soils | Weighted Infiltration (in/hr): | Weighted Suction Head (in): | Weighted Initial Deficit: |
|---|---|---|---|---|---|---|---|---|---|---|
| DMA-1 | 0.06 | 2.900 | 770 | 11.0% | 20% | 100% | 0% | 0.075 | 6.000 | 0.320 |
| DMA-2 | 0.06 | 2.200 | 879 | 10.0% | 30% | 100% | 0% | 0.075 | 6.000 | 0.320 |
| DMA-3 | 0.06 | 0.210 | 145 | 12.0% | 97% | 100% | 0% | 0.075 | 6.000 | 0.320 |
| DMA-4 | 0.06 | 6.300 | 2144 | 5.0% | 22% | 100% | 0% | 0.075 | 6.000 | 0.320 |
| DMA-6 | 0.06 | 4.600 | 1698 | 7.0% | 28% | 100% | 0% | 0.075 | 6.000 | 0.320 |
| | **Total:** | **16.21** | | | | | | | | |

| Infiltration: | | |
|---|---|---|
| C | 0.1 | in/hr |

| Suction Head: | | |
|---|---|---|
| C | 6 | in |

| Initial Deficit: | |
|---|---|
| C | 0.32 |

# POC-1

```
[TITLE]
;;Project Title/Notes
3474 Vista Grande
Pre-Project Condition
POC-1

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           08/28/1951
START_TIME           05:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    05:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    .15    .17    .19    .19    .18    .15    .11    .08    .06
DRY_ONLY         NO

[RAINGAGES]
```

# POC-1

```
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Oceanside        INTENSITY 1:00     1.0      TIMESERIES Oceanside

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
DMA-1            Oceanside        poc-1            10.3     0        763      11       0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-1            0.012      0.045      0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA-1            6          0.1        0.32

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
;Basin 1
POC-1            0          FREE                        NO

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Oceanside        FILE "J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\REPORTS\SWQMP\SWMM\Rain Data\oceanside.dat"

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            995.831            5101.735

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
```

# POC-1

```
[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-1            1006.431           6977.959

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Oceanside        1000.000           7500.000
```

# POC-1

```
[TITLE]
;;Project Title/Notes
3474 Vista Grande
Proposed Condition

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           08/28/1951
START_TIME           05:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    05:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          .06    .08    .11    .15    .17    .19    .19    .18    .15    .11    .08    .06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
```

# POC-1

```
;;-------------- --------- ------ ------ ----------
Oceanside        INTENSITY 1:00     1.0      TIMESERIES Oceanside

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
DMA-1            Oceanside        VAULT-A          2.9      20       770      11       0
DMA-2            Oceanside        VAULT-B          2.2      30       879      10       0
DMA-3            Oceanside        POC1             0.21     97       145      12       0
DMA-4            Oceanside        VAULT-D          6.3      22       2144     5        0
DMA-6            Oceanside        VAULT-C          4.6      28       1698     7        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
DMA-1            0.012      0.06       0.05       0.1        25         OUTLET
DMA-2            0.012      0.06       0.05       0.1        25         OUTLET
DMA-3            0.012      0.06       0.05       0.1        25         OUTLET
DMA-4            0.012      0.06       0.05       0.1        25         OUTLET
DMA-6            0.012      0.06       0.05       0.1        25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
DMA-1            6          .075       0.32
DMA-2            6          .075       0.32
DMA-3            6          .075       0.32
DMA-4            6          .075       0.32
DMA-6            6          .075       0.32

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
;Basin 1
POC1             0          FREE                        NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- -------- -------- -------- --------
VAULT-A          0        5          0          TABULAR    VAULT-A                      0        0
VAULT-B          0        7          0          TABULAR    VAULT-B                      0        0
VAULT-D          0        5          0          TABULAR    VAULT-D                      0        0
VAULT-C          0        10         0          TABULAR    VAULT-C                      0        0

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --------
OUTLET-A         VAULT-A          POC1             0          TABULAR/DEPTH   OUTLET-A                    NO
OUTLET-B         VAULT-B          POC1             0          TABULAR/DEPTH   OUTLET-B                    NO
OUTLET-C         VAULT-C          POC1             0          TABULAR/DEPTH   OUTLET-C                    NO
OUTLET-D         VAULT-D          VAULT-C          0          TABULAR/DEPTH   OUTLET-D                    NO
```

# POC-1

```
[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
OUTLET-A         Rating     0          0
OUTLET-A                    0.1        0.01
OUTLET-A                    0.2        0.02
OUTLET-A                    0.3        0.03
OUTLET-A                    0.4        0.04
OUTLET-A                    0.5        0.04
OUTLET-A                    0.6        0.05
OUTLET-A                    0.7        0.05
OUTLET-A                    0.8        0.06
OUTLET-A                    0.9        0.06
OUTLET-A                    1          0.06
OUTLET-A                    1.1        0.07
OUTLET-A                    1.2        0.07
OUTLET-A                    1.3        0.07
OUTLET-A                    1.4        0.08
OUTLET-A                    1.5        0.08
OUTLET-A                    1.6        0.08
OUTLET-A                    1.7        0.09
OUTLET-A                    1.8        0.09
OUTLET-A                    1.9        0.09
OUTLET-A                    2          0.09
OUTLET-A                    2.1        0.1
OUTLET-A                    2.2        0.1
OUTLET-A                    2.3        0.1
OUTLET-A                    2.4        0.1
OUTLET-A                    2.5        0.1
OUTLET-A                    2.6        0.11
OUTLET-A                    2.7        0.11
OUTLET-A                    2.8        0.11
OUTLET-A                    2.9        0.11
OUTLET-A                    3          0.12
OUTLET-A                    3.1        0.12
OUTLET-A                    3.2        0.12
OUTLET-A                    3.3        0.12
OUTLET-A                    3.4        0.12
OUTLET-A                    3.5        0.12
OUTLET-A                    3.6        0.13
OUTLET-A                    3.7        0.13
OUTLET-A                    3.8        0.13
OUTLET-A                    3.9        0.13
OUTLET-A                    4          0.13
OUTLET-A                    4.1        0.14
OUTLET-A                    4.2        0.14
OUTLET-A                    4.3        0.14
OUTLET-A                    4.4        0.14
OUTLET-A                    4.5        0.14
OUTLET-A                    4.6        0.76
```

# POC-1

```
OUTLET-A                  4.7         1.9
OUTLET-A                  4.8         3.38
OUTLET-A                  4.9         5.12
OUTLET-A                  5           6.77
;
OUTLET-B          Rating  0           0
OUTLET-B                  0.2         0.01
OUTLET-B                  0.4         0.02
OUTLET-B                  0.6         0.03
OUTLET-B                  0.8         0.03
OUTLET-B                  1           0.04
OUTLET-B                  1.2         0.04
OUTLET-B                  1.4         0.04
OUTLET-B                  1.6         0.05
OUTLET-B                  1.8         0.05
OUTLET-B                  2           0.05
OUTLET-B                  2.2         0.06
OUTLET-B                  2.4         0.06
OUTLET-B                  2.6         0.06
OUTLET-B                  2.8         0.06
OUTLET-B                  3           0.06
OUTLET-B                  3.2         0.07
OUTLET-B                  3.4         0.07
OUTLET-B                  3.6         0.07
OUTLET-B                  3.8         0.07
OUTLET-B                  4           0.08
OUTLET-B                  4.2         0.08
OUTLET-B                  4.4         0.08
OUTLET-B                  4.6         0.08
OUTLET-B                  4.8         0.08
OUTLET-B                  5           0.08
OUTLET-B                  5.2         0.09
OUTLET-B                  5.4         0.09
OUTLET-B                  5.6         0.09
OUTLET-B                  5.8         0.09
OUTLET-B                  6           0.09
OUTLET-B                  6.2         0.09
OUTLET-B                  6.4         0.1
OUTLET-B                  6.6         0.93
OUTLET-B                  6.8         4.4
OUTLET-B                  7           8
;
OUTLET-C          Rating  0           0
OUTLET-C                  0.2         0.03
OUTLET-C                  0.4         0.05
OUTLET-C                  0.6         0.06
OUTLET-C                  0.8         0.07
OUTLET-C                  1           0.08
OUTLET-C                  1.2         0.09
OUTLET-C                  1.4         0.1
OUTLET-C                  1.6         0.11
```

# POC-1

```
OUTLET-C                    1.8         0.11
OUTLET-C                    2           0.12
OUTLET-C                    2.2         0.12
OUTLET-C                    2.4         0.13
OUTLET-C                    2.6         0.14
OUTLET-C                    2.8         0.14
OUTLET-C                    3           0.15
OUTLET-C                    3.2         0.15
OUTLET-C                    3.4         0.16
OUTLET-C                    3.6         0.16
OUTLET-C                    3.8         0.16
OUTLET-C                    4           0.17
OUTLET-C                    4.2         0.17
OUTLET-C                    4.4         0.18
OUTLET-C                    4.6         0.18
OUTLET-C                    4.8         0.18
OUTLET-C                    5           0.19
OUTLET-C                    5.2         0.19
OUTLET-C                    5.4         0.2
OUTLET-C                    5.6         0.2
OUTLET-C                    5.8         0.2
OUTLET-C                    6           0.21
OUTLET-C                    6.2         0.21
OUTLET-C                    6.4         0.21
OUTLET-C                    6.6         0.22
OUTLET-C                    6.8         0.22
OUTLET-C                    7           0.22
OUTLET-C                    7.2         0.23
OUTLET-C                    7.4         0.23
OUTLET-C                    7.6         0.23
OUTLET-C                    7.8         0.24
OUTLET-C                    8           0.24
OUTLET-C                    8.2         0.24
OUTLET-C                    8.4         0.25
OUTLET-C                    8.6         0.25
OUTLET-C                    8.8         0.25
OUTLET-C                    9           0.25
OUTLET-C                    9.2         0.26
OUTLET-C                    9.4         0.26
OUTLET-C                    9.6         2.13
OUTLET-C                    9.8         9.95
OUTLET-C                    10          21.11
;
OUTLET-D          Rating    0           0
OUTLET-D                    0.1         0.02
OUTLET-D                    0.2         0.06
OUTLET-D                    0.3         0.08
OUTLET-D                    0.4         0.1
OUTLET-D                    0.5         0.12
OUTLET-D                    0.6         0.13
OUTLET-D                    0.7         0.15
```

# POC-1

```
OUTLET-D                    0.8         0.16
OUTLET-D                    0.9         0.17
OUTLET-D                    1           0.18
OUTLET-D                    1.1         0.19
OUTLET-D                    1.2         0.2
OUTLET-D                    1.3         0.21
OUTLET-D                    1.4         0.22
OUTLET-D                    1.5         0.23
OUTLET-D                    1.6         0.23
OUTLET-D                    1.7         0.24
OUTLET-D                    1.8         0.25
OUTLET-D                    1.9         0.26
OUTLET-D                    2           0.26
OUTLET-D                    2.1         0.27
OUTLET-D                    2.2         0.28
OUTLET-D                    2.3         0.28
OUTLET-D                    2.4         0.29
OUTLET-D                    2.5         0.3
OUTLET-D                    2.6         0.3
OUTLET-D                    2.7         0.31
OUTLET-D                    2.8         0.31
OUTLET-D                    2.9         0.32
OUTLET-D                    3           0.33
OUTLET-D                    3.1         0.33
OUTLET-D                    3.2         0.34
OUTLET-D                    3.3         0.34
OUTLET-D                    3.4         0.35
OUTLET-D                    3.5         0.35
OUTLET-D                    3.6         0.36
OUTLET-D                    3.7         0.36
OUTLET-D                    3.8         0.37
OUTLET-D                    3.9         0.37
OUTLET-D                    4           0.38
OUTLET-D                    4.1         0.38
OUTLET-D                    4.2         0.39
OUTLET-D                    4.3         0.39
OUTLET-D                    4.4         0.4
OUTLET-D                    4.5         0.4
OUTLET-D                    4.6         1.65
OUTLET-D                    4.7         3.93
OUTLET-D                    4.8         6.87
OUTLET-D                    4.9         10.36
OUTLET-D                    5           14.32
;
VAULT-A          Storage    0           1900
VAULT-A                     5           1900
;
VAULT-B          Storage    0           1140
VAULT-B                     7           1140
;
VAULT-C          Storage    0           4050
```

# POC-1

```
VAULT-C                     10         4050
;
VAULT-D          Storage    0          3230
VAULT-D                     5          3230

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
Oceanside        FILE "J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\REPORTS\SWQMP\SWMM\Rain Data\oceanside.dat"

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC1             948.454            1927.835
VAULT-A          -1546.392          5453.608
VAULT-B          450.880            5428.032
VAULT-D          5134.021           5206.186
VAULT-C          3092.784           3577.320

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
DMA-1            -1546.392          6917.526
DMA-2            525.180            6848.921
DMA-3            1958.763           7061.856
DMA-4            6412.371           7474.227
DMA-6            3525.773           7103.093

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Oceanside        1608.247           8608.247
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)
--------------------------------------------------------------

3474 Vista Grande
Pre-Project Condition
POC-1


***********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
***********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Starting Date ............ 08/28/1951 05:00:00
Ending Date .............. 05/23/2008 23:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00


*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Total Precipitation ......       579.452       675.090
Evaporation Loss .........         5.688         6.627
Infiltration Loss ........       533.806       621.910
Surface Runoff ...........        43.596        50.791
Final Storage ............         0.000         0.000
Continuity Error (%) .....        -0.628


*************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......        43.596        14.206
```

| | | |
|---|---|---|
| Groundwater Inflow ..... | 0.000 | 0.000 |
| RDII Inflow ..... | 0.000 | 0.000 |
| External Inflow ..... | 0.000 | 0.000 |
| External Outflow ..... | 43.596 | 14.206 |
| Flooding Loss ..... | 0.000 | 0.000 |
| Evaporation Loss ..... | 0.000 | 0.000 |
| Exfiltration Loss ..... | 0.000 | 0.000 |
| Initial Stored Volume .... | 0.000 | 0.000 |
| Final Stored Volume ..... | 0.000 | 0.000 |
| Continuity Error (%) ..... | 0.000 | |

**********
Subcatchment Runoff Summary
**********

| Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS | Runoff Coeff |
|---|---|---|---|---|---|---|---|---|---|---|
| DMA-1 | 675.09 | 0.00 | 6.63 | 621.91 | 0.00 | 50.79 | 50.79 | 14.21 | 11.35 | 0.075 |

Analysis begun on: Tue Mar 16 13:48:31 2021
Analysis ended on: Tue Mar 16 13:49:08 2021
Total elapsed time: 00:00:37

```
  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)
  --------------------------------------------------------------

  3474 Vista Grande
  Proposed Condition


  ***********************************************************
  NOTE: The summary statistics displayed in this report are
  based on results found at every computational time step,
  not just on results from each reporting time step.
  ***********************************************************

  ****************
  Analysis Options
  ****************
  Flow Units ............... CFS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ...... GREEN_AMPT
  Flow Routing Method ...... KINWAVE
  Starting Date ............ 08/28/1951 05:00:00
  Ending Date .............. 05/23/2008 23:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 01:00:00
  Wet Time Step ............ 00:15:00
  Dry Time Step ............ 04:00:00
  Routing Time Step ........ 60.00 sec


  *************************        Volume         Depth
  Runoff Quantity Continuity     acre-feet        inches
  *************************     ---------       -------
  Total Precipitation ......       911.934       675.090
  Evaporation Loss .........        41.219        30.514
  Infiltration Loss ........       610.043       451.605
  Surface Runoff ...........       270.353       200.138
  Final Storage ............         0.014         0.010
  Continuity Error (%) .....        -1.063


  *************************        Volume        Volume
  Flow Routing Continuity        acre-feet      10^6 gal
  *************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......       270.352        88.098
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
```

| | | |
|---|---|---|
| External Inflow ..... | 0.000 | 0.000 |
| External Outflow ..... | 270.283 | 88.076 |
| Flooding Loss ..... | 0.000 | 0.000 |
| Evaporation Loss ..... | 0.000 | 0.000 |
| Exfiltration Loss ..... | 0.000 | 0.000 |
| Initial Stored Volume .... | 0.000 | 0.000 |
| Final Stored Volume ..... | 0.009 | 0.003 |
| Continuity Error (%) ..... | 0.022 | |

**********
Highest Flow Instability Indexes
**********
All links are stable.

**********
Routing Time Step Summary
**********

| | | |
|---|---|---|
| Minimum Time Step | : | 60.00 sec |
| Average Time Step | : | 60.00 sec |
| Maximum Time Step | : | 60.00 sec |
| Percent in Steady State | : | 0.00 |
| Average Iterations per Step | : | 1.00 |
| Percent Not Converging | : | 0.00 |

**********
Subcatchment Runoff Summary
**********

| Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS | Runoff Coeff |
|---|---|---|---|---|---|---|---|---|---|---|
| DMA-1 | 675.09 | 0.00 | 25.53 | 484.40 | 117.76 | 54.15 | 171.91 | 13.54 | 3.31 | 0.255 |
| DMA-2 | 675.09 | 0.00 | 34.64 | 423.22 | 176.60 | 48.61 | 225.21 | 13.45 | 2.53 | 0.334 |
| DMA-3 | 675.09 | 0.00 | 96.52 | 18.05 | 570.09 | 2.26 | 572.35 | 3.26 | 0.25 | 0.848 |
| DMA-4 | 675.09 | 0.00 | 27.43 | 472.51 | 129.43 | 52.41 | 181.84 | 31.11 | 7.21 | 0.269 |
| DMA-6 | 675.09 | 0.00 | 32.89 | 435.67 | 164.73 | 49.28 | 214.01 | 26.73 | 5.29 | 0.317 |

**********
Node Depth Summary
**********

| Node | Type | Average Depth Feet | Maximum Depth Feet | Maximum HGL Feet | Time of Max Occurrence days hr:min | Reported Max Depth Feet |
|---|---|---|---|---|---|---|
| POC1 | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| VAULT-A | STORAGE | 0.01 | 4.80 | 4.80 | 18857 11:37 | 4.80 |
| VAULT-B | STORAGE | 0.03 | 6.69 | 6.69 | 18857 11:32 | 6.69 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| VAULT-D | STORAGE | 0.01 | 4.81 | 4.81 | 18857 | 11:49 | 4.81 |
| VAULT-C | STORAGE | 0.07 | 9.85 | 9.85 | 18857 | 11:55 | 9.85 |

**********
Node Inflow Summary
**********

| Node | Type | Maximum Lateral Inflow CFS | Maximum Total Inflow CFS | Time of Max Occurrence days | hr:min | Lateral Inflow Volume 10^6 gal | Total Inflow Volume 10^6 gal | Flow Balance Error Percent |
|---|---|---|---|---|---|---|---|---|
| POC1 | OUTFALL | 0.25 | 18.64 | 18857 | 11:55 | 3.26 | 88.1 | 0.000 |
| VAULT-A | STORAGE | 3.31 | 3.31 | 18857 | 11:46 | 13.5 | 13.5 | 0.021 |
| VAULT-B | STORAGE | 2.53 | 2.53 | 18857 | 12:01 | 13.5 | 13.5 | 0.021 |
| VAULT-D | STORAGE | 7.21 | 7.21 | 18857 | 11:46 | 31.1 | 31.1 | 0.033 |
| VAULT-C | STORAGE | 5.29 | 12.50 | 18857 | 12:01 | 26.7 | 57.8 | 0.006 |

**********
Node Flooding Summary
**********

No nodes were flooded.

**********
Storage Volume Summary
**********

| Storage Unit | Average Volume 1000 ft3 | Avg Pcnt Full | Evap Pcnt Loss | Exfil Pcnt Loss | Maximum Volume 1000 ft3 | Max Pcnt Full | Time of Max Occurrence days | hr:min | Maximum Outflow CFS |
|---|---|---|---|---|---|---|---|---|---|
| VAULT-A | 0.027 | 0 | 0 | 0 | 9.114 | 96 | 18857 | 11:35 | 3.33 |
| VAULT-B | 0.033 | 0 | 0 | 0 | 7.631 | 96 | 18857 | 11:31 | 2.55 |
| VAULT-D | 0.040 | 0 | 0 | 0 | 15.538 | 96 | 18857 | 11:26 | 7.21 |
| VAULT-C | 0.269 | 1 | 0 | 0 | 39.881 | 98 | 18857 | 11:54 | 12.54 |

**********
Outfall Loading Summary
**********

| Outfall Node | Flow Freq Pcnt | Avg Flow CFS | Max Flow CFS | Total Volume 10^6 gal |
|---|---|---|---|---|
| POC1 | 11.33 | 0.06 | 18.64 | 88.069 |
| System | 11.33 | 0.06 | 18.64 | 88.069 |

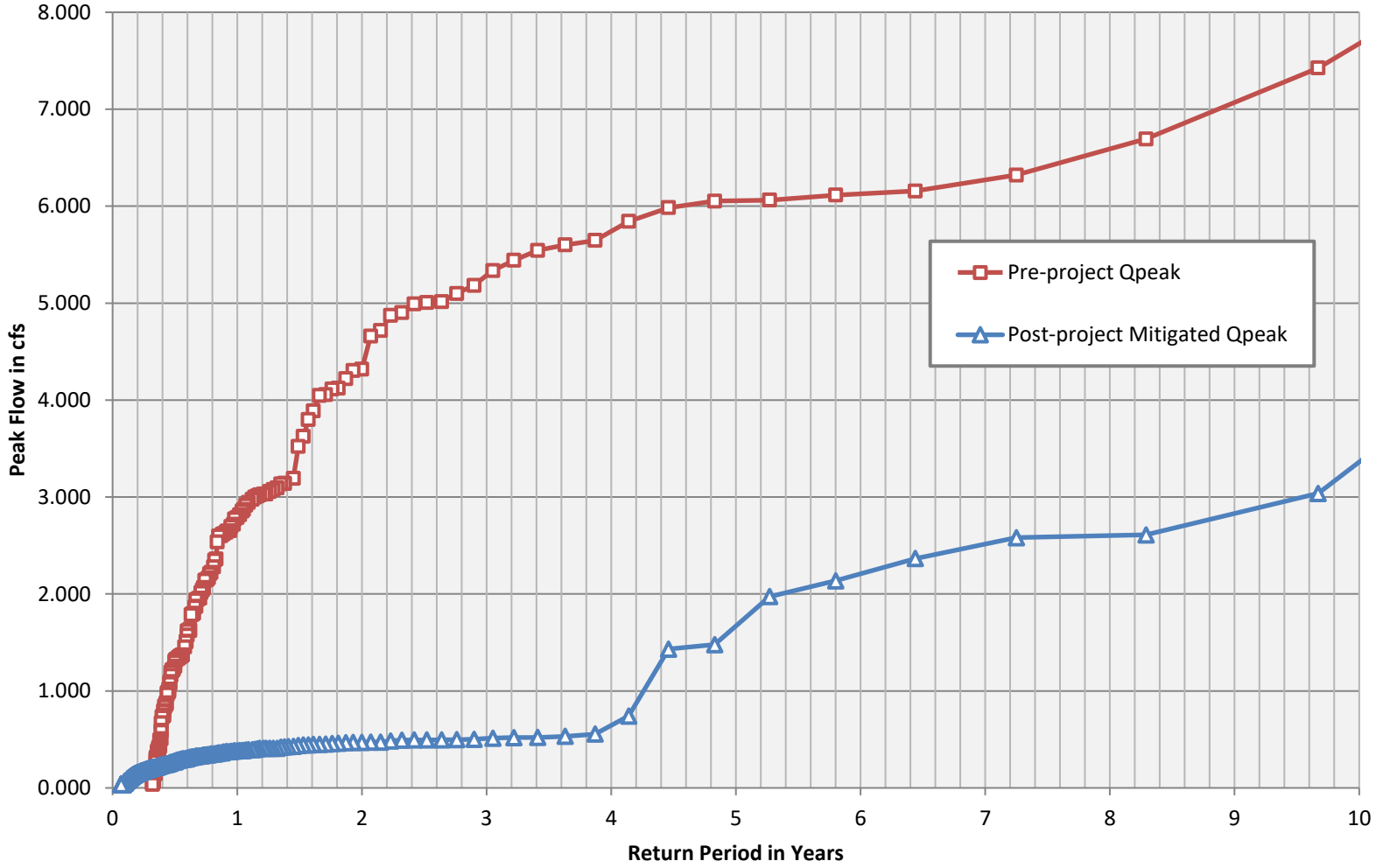
```
********************
Link Flow Summary
********************

------------------------------------------------------------------------------
                                Maximum  Time of Max   Maximum    Max/    Max/
                                |Flow|   Occurrence   |Veloc|    Full    Full
Link                 Type          CFS  days hr:min    ft/sec    Flow   Depth
------------------------------------------------------------------------------
OUTLET-A             DUMMY        3.33  18857  11:37
OUTLET-B             DUMMY        2.55  18857  11:32
OUTLET-C             DUMMY       12.54  18857  11:55
OUTLET-D             DUMMY        7.21  18857  11:49


************************
Conduit Surcharge Summary
************************

No conduits were surcharged.


Analysis begun on:  Thu Mar 18 13:50:52 2021
Analysis ended on:  Thu Mar 18 13:51:53 2021
Total elapsed time: 00:01:01
```

**POC-1**

## Peak Flow Frequency Summary

| Return Period | Pre-project Qpeak (cfs) | Post-project - Mitigated Q (cfs) |
|---|---|---|
| LF = 0.1xQ2 | 0.432 | 0.047 |
| 2-year | 4.319 | 0.468 |
| 5-year | 6.057 | 1.669 |
| 10-year | 7.679 | 3.361 |

# POC-1
# Peak Flow Frequency Curves



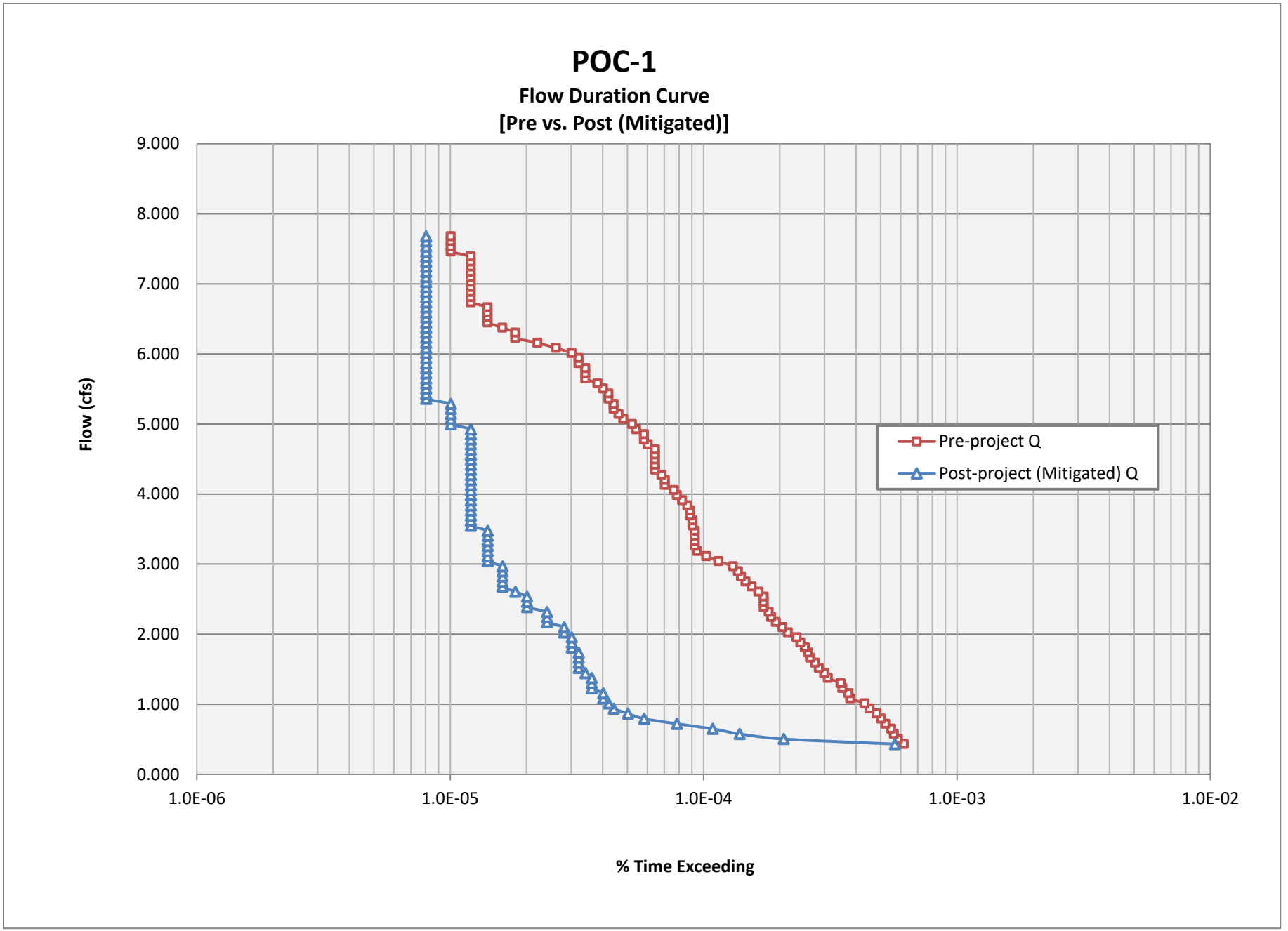
| | | |
|---|---|---|
| **Low-flow Threshold:** | 10% | |
| **0.1xQ2 (Pre):** | 0.432 | cfs |
| **Q10 (Pre):** | 7.679 | cfs |
| **Ordinate #:** | 100 | |
| **Incremental Q (Pre):** | 0.07247 | cfs |
| **Total Hourly Data:** | 497370 | hours |

**POC-1**

**The proposed BMP:** PASSED

| Interval | Pre-project Flow (cfs) | Pre-project Hours | Pre-project % Time Exceeding | Post-project Hours | Post-project % Time Exceeding | Percentage | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 0 | 0.432 | 307 | 6.17E-04 | 283 | 5.69E-04 | 92% | Pass |
| 1 | 0.504 | 291 | 5.85E-04 | 103 | 2.07E-04 | 35% | Pass |
| 2 | 0.577 | 281 | 5.65E-04 | 69 | 1.39E-04 | 25% | Pass |
| 3 | 0.649 | 274 | 5.51E-04 | 54 | 1.09E-04 | 20% | Pass |
| 4 | 0.722 | 260 | 5.23E-04 | 39 | 7.84E-05 | 15% | Pass |
| 5 | 0.794 | 250 | 5.03E-04 | 29 | 5.83E-05 | 12% | Pass |
| 6 | 0.867 | 240 | 4.83E-04 | 25 | 5.03E-05 | 10% | Pass |
| 7 | 0.939 | 225 | 4.52E-04 | 22 | 4.42E-05 | 10% | Pass |
| 8 | 1.012 | 215 | 4.32E-04 | 21 | 4.22E-05 | 10% | Pass |
| 9 | 1.084 | 189 | 3.80E-04 | 20 | 4.02E-05 | 11% | Pass |
| 10 | 1.157 | 186 | 3.74E-04 | 20 | 4.02E-05 | 11% | Pass |
| 11 | 1.229 | 176 | 3.54E-04 | 18 | 3.62E-05 | 10% | Pass |
| 12 | 1.301 | 173 | 3.48E-04 | 18 | 3.62E-05 | 10% | Pass |
| 13 | 1.374 | 154 | 3.10E-04 | 18 | 3.62E-05 | 12% | Pass |
| 14 | 1.446 | 149 | 3.00E-04 | 17 | 3.42E-05 | 11% | Pass |
| 15 | 1.519 | 142 | 2.86E-04 | 16 | 3.22E-05 | 11% | Pass |
| 16 | 1.591 | 137 | 2.75E-04 | 16 | 3.22E-05 | 12% | Pass |
| 17 | 1.664 | 131 | 2.63E-04 | 16 | 3.22E-05 | 12% | Pass |
| 18 | 1.736 | 129 | 2.59E-04 | 16 | 3.22E-05 | 12% | Pass |
| 19 | 1.809 | 125 | 2.51E-04 | 15 | 3.02E-05 | 12% | Pass |
| 20 | 1.881 | 120 | 2.41E-04 | 15 | 3.02E-05 | 13% | Pass |
| 21 | 1.954 | 116 | 2.33E-04 | 15 | 3.02E-05 | 13% | Pass |
| 22 | 2.026 | 107 | 2.15E-04 | 14 | 2.81E-05 | 13% | Pass |
| 23 | 2.099 | 102 | 2.05E-04 | 14 | 2.81E-05 | 14% | Pass |
| 24 | 2.171 | 96 | 1.93E-04 | 12 | 2.41E-05 | 13% | Pass |
| 25 | 2.244 | 92 | 1.85E-04 | 12 | 2.41E-05 | 13% | Pass |
| 26 | 2.316 | 90 | 1.81E-04 | 12 | 2.41E-05 | 13% | Pass |
| 27 | 2.388 | 86 | 1.73E-04 | 10 | 2.01E-05 | 12% | Pass |
| 28 | 2.461 | 86 | 1.73E-04 | 10 | 2.01E-05 | 12% | Pass |
| 29 | 2.533 | 86 | 1.73E-04 | 10 | 2.01E-05 | 12% | Pass |
| 30 | 2.606 | 82 | 1.65E-04 | 9 | 1.81E-05 | 11% | Pass |
| 31 | 2.678 | 77 | 1.55E-04 | 8 | 1.61E-05 | 10% | Pass |
| 32 | 2.751 | 73 | 1.47E-04 | 8 | 1.61E-05 | 11% | Pass |
| 33 | 2.823 | 70 | 1.41E-04 | 8 | 1.61E-05 | 11% | Pass |
| 34 | 2.896 | 68 | 1.37E-04 | 8 | 1.61E-05 | 12% | Pass |
| 35 | 2.968 | 65 | 1.31E-04 | 8 | 1.61E-05 | 12% | Pass |
| 36 | 3.041 | 57 | 1.15E-04 | 7 | 1.41E-05 | 12% | Pass |
| 37 | 3.113 | 51 | 1.03E-04 | 7 | 1.41E-05 | 14% | Pass |
| 38 | 3.186 | 47 | 9.45E-05 | 7 | 1.41E-05 | 15% | Pass |
| 39 | 3.258 | 46 | 9.25E-05 | 7 | 1.41E-05 | 15% | Pass |
| 40 | 3.331 | 46 | 9.25E-05 | 7 | 1.41E-05 | 15% | Pass |
| 41 | 3.403 | 46 | 9.25E-05 | 7 | 1.41E-05 | 15% | Pass |
| 42 | 3.475 | 46 | 9.25E-05 | 7 | 1.41E-05 | 15% | Pass |
| 43 | 3.548 | 45 | 9.05E-05 | 6 | 1.21E-05 | 13% | Pass |
| 44 | 3.620 | 45 | 9.05E-05 | 6 | 1.21E-05 | 13% | Pass |
| 45 | 3.693 | 44 | 8.85E-05 | 6 | 1.21E-05 | 14% | Pass |
| 46 | 3.765 | 44 | 8.85E-05 | 6 | 1.21E-05 | 14% | Pass |
| 47 | 3.838 | 43 | 8.65E-05 | 6 | 1.21E-05 | 14% | Pass |
| 48 | 3.910 | 41 | 8.24E-05 | 6 | 1.21E-05 | 15% | Pass |
| 49 | 3.983 | 39 | 7.84E-05 | 6 | 1.21E-05 | 15% | Pass |

| Interval | Pre-project Flow (cfs) | Pre-project Hours | Pre-project % Time Exceeding | Post-project Hours | Post-project % Time Exceeding | Percentage | Pass/Fail |
|---|---|---|---|---|---|---|---|
| 50 | 4.055 | 38 | 7.64E-05 | 6 | 1.21E-05 | 16% | Pass |
| 51 | 4.128 | 35 | 7.04E-05 | 6 | 1.21E-05 | 17% | Pass |
| 52 | 4.200 | 35 | 7.04E-05 | 6 | 1.21E-05 | 17% | Pass |
| 53 | 4.273 | 34 | 6.84E-05 | 6 | 1.21E-05 | 18% | Pass |
| 54 | 4.345 | 32 | 6.43E-05 | 6 | 1.21E-05 | 19% | Pass |
| 55 | 4.418 | 32 | 6.43E-05 | 6 | 1.21E-05 | 19% | Pass |
| 56 | 4.490 | 32 | 6.43E-05 | 6 | 1.21E-05 | 19% | Pass |
| 57 | 4.562 | 32 | 6.43E-05 | 6 | 1.21E-05 | 19% | Pass |
| 58 | 4.635 | 32 | 6.43E-05 | 6 | 1.21E-05 | 19% | Pass |
| 59 | 4.707 | 30 | 6.03E-05 | 6 | 1.21E-05 | 20% | Pass |
| 60 | 4.780 | 29 | 5.83E-05 | 6 | 1.21E-05 | 21% | Pass |
| 61 | 4.852 | 29 | 5.83E-05 | 6 | 1.21E-05 | 21% | Pass |
| 62 | 4.925 | 27 | 5.43E-05 | 6 | 1.21E-05 | 22% | Pass |
| 63 | 4.997 | 26 | 5.23E-05 | 5 | 1.01E-05 | 19% | Pass |
| 64 | 5.070 | 24 | 4.83E-05 | 5 | 1.01E-05 | 21% | Pass |
| 65 | 5.142 | 23 | 4.62E-05 | 5 | 1.01E-05 | 22% | Pass |
| 66 | 5.215 | 22 | 4.42E-05 | 5 | 1.01E-05 | 23% | Pass |
| 67 | 5.287 | 22 | 4.42E-05 | 5 | 1.01E-05 | 23% | Pass |
| 68 | 5.360 | 21 | 4.22E-05 | 4 | 8.04E-06 | 19% | Pass |
| 69 | 5.432 | 21 | 4.22E-05 | 4 | 8.04E-06 | 19% | Pass |
| 70 | 5.505 | 20 | 4.02E-05 | 4 | 8.04E-06 | 20% | Pass |
| 71 | 5.577 | 19 | 3.82E-05 | 4 | 8.04E-06 | 21% | Pass |
| 72 | 5.649 | 17 | 3.42E-05 | 4 | 8.04E-06 | 24% | Pass |
| 73 | 5.722 | 17 | 3.42E-05 | 4 | 8.04E-06 | 24% | Pass |
| 74 | 5.794 | 17 | 3.42E-05 | 4 | 8.04E-06 | 24% | Pass |
| 75 | 5.867 | 16 | 3.22E-05 | 4 | 8.04E-06 | 25% | Pass |
| 76 | 5.939 | 16 | 3.22E-05 | 4 | 8.04E-06 | 25% | Pass |
| 77 | 6.012 | 15 | 3.02E-05 | 4 | 8.04E-06 | 27% | Pass |
| 78 | 6.084 | 13 | 2.61E-05 | 4 | 8.04E-06 | 31% | Pass |
| 79 | 6.157 | 11 | 2.21E-05 | 4 | 8.04E-06 | 36% | Pass |
| 80 | 6.229 | 9 | 1.81E-05 | 4 | 8.04E-06 | 44% | Pass |
| 81 | 6.302 | 9 | 1.81E-05 | 4 | 8.04E-06 | 44% | Pass |
| 82 | 6.374 | 8 | 1.61E-05 | 4 | 8.04E-06 | 50% | Pass |
| 83 | 6.447 | 7 | 1.41E-05 | 4 | 8.04E-06 | 57% | Pass |
| 84 | 6.519 | 7 | 1.41E-05 | 4 | 8.04E-06 | 57% | Pass |
| 85 | 6.592 | 7 | 1.41E-05 | 4 | 8.04E-06 | 57% | Pass |
| 86 | 6.664 | 7 | 1.41E-05 | 4 | 8.04E-06 | 57% | Pass |
| 87 | 6.736 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 88 | 6.809 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 89 | 6.881 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 90 | 6.954 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 91 | 7.026 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 92 | 7.099 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 93 | 7.171 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 94 | 7.244 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 95 | 7.316 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 96 | 7.389 | 6 | 1.21E-05 | 4 | 8.04E-06 | 67% | Pass |
| 97 | 7.461 | 5 | 1.01E-05 | 4 | 8.04E-06 | 80% | Pass |
| 98 | 7.534 | 5 | 1.01E-05 | 4 | 8.04E-06 | 80% | Pass |
| 99 | 7.606 | 5 | 1.01E-05 | 4 | 8.04E-06 | 80% | Pass |
| 100 | 7.679 | 5 | 1.01E-05 | 4 | 8.04E-06 | 80% | Pass |


POC-1
Flow Duration Curve
[Pre vs. Post (Mitigated)]
Flow (cfs)
9.000
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
1.0E-06
1.0E-05
1.0E-04
1.0E-03
1.0E-02
% Time Exceeding
Pre-project Q
Post-project (Mitigated) Q

## Summary for Pond 5P: Vault-A 100-yr

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 650.00' | 9,500 cf | **Custom Stage Data (Conic)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 650.00 | 2,000 | 0.0 | 0 | 0 | 2,000 |
| 651.00 | 2,000 | 95.0 | 1,900 | 1,900 | 2,159 |
| 652.00 | 2,000 | 95.0 | 1,900 | 3,800 | 2,317 |
| 653.00 | 2,000 | 95.0 | 1,900 | 5,700 | 2,476 |
| 654.00 | 2,000 | 95.0 | 1,900 | 7,600 | 2,634 |
| 654.50 | 2,000 | 95.0 | 950 | 8,550 | 2,713 |
| 655.00 | 2,000 | 95.0 | 950 | 9,500 | 2,793 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 650.00' | **12.0" Round Culvert**<br>L= 100.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 650.00' / 649.00' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 0.79 sf |
| #2 | Device 1 | 650.00' | **1.6" Vert. Orifice** C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 654.50' | **Custom Weir, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 0.50<br>Width (feet) 6.00 6.00 0.00 |

## Stage-Discharge for Pond 5P: Vault-A 100-yr

| Elevation (feet) | Primary (cfs) |
|---|---|
| 650.00 | 0.00 |
| 650.10 | 0.01 |
| 650.20 | 0.02 |
| 650.30 | 0.03 |
| 650.40 | 0.04 |
| 650.50 | 0.04 |
| 650.60 | 0.05 |
| 650.70 | 0.05 |
| 650.80 | 0.06 |
| 650.90 | 0.06 |
| 651.00 | 0.06 |
| 651.10 | 0.07 |
| 651.20 | 0.07 |
| 651.30 | 0.07 |
| 651.40 | 0.08 |
| 651.50 | 0.08 |
| 651.60 | 0.08 |
| 651.70 | 0.09 |
| 651.80 | 0.09 |
| 651.90 | 0.09 |
| 652.00 | 0.09 |
| 652.10 | 0.10 |
| 652.20 | 0.10 |
| 652.30 | 0.10 |
| 652.40 | 0.10 |
| 652.50 | 0.10 |
| 652.60 | 0.11 |
| 652.70 | 0.11 |
| 652.80 | 0.11 |
| 652.90 | 0.11 |
| 653.00 | 0.12 |
| 653.10 | 0.12 |
| 653.20 | 0.12 |
| 653.30 | 0.12 |
| 653.40 | 0.12 |
| 653.50 | 0.12 |
| 653.60 | 0.13 |
| 653.70 | 0.13 |
| 653.80 | 0.13 |
| 653.90 | 0.13 |
| 654.00 | 0.13 |
| 654.10 | 0.14 |
| 654.20 | 0.14 |
| 654.30 | 0.14 |
| 654.40 | 0.14 |
| 654.50 | 0.14 |
| 654.60 | 0.76 |
| 654.70 | 1.90 |
| 654.80 | 3.38 |
| 654.90 | 5.12 |
| 655.00 | **6.77** |

# Summary for Pond 6P: Vault-B 100-yr

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 655.00' | 7,980 cf | **Custom Stage Data (Conic)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 655.00 | 1,200 | 0.0 | 0 | 0 | 1,200 |
| 656.00 | 1,200 | 95.0 | 1,140 | 1,140 | 1,323 |
| 657.00 | 1,200 | 95.0 | 1,140 | 2,280 | 1,446 |
| 658.00 | 1,200 | 95.0 | 1,140 | 3,420 | 1,568 |
| 659.00 | 1,200 | 95.0 | 1,140 | 4,560 | 1,691 |
| 660.00 | 1,200 | 95.0 | 1,140 | 5,700 | 1,814 |
| 661.00 | 1,200 | 95.0 | 1,140 | 6,840 | 1,937 |
| 661.50 | 1,200 | 95.0 | 570 | 7,410 | 1,998 |
| 662.00 | 1,200 | 95.0 | 570 | 7,980 | 2,060 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 655.00' | **12.0" Round Culvert**<br>L= 100.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 655.00' / 654.00' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 0.79 sf |
| #2 | Device 1 | 655.00' | **1.2" Vert. Orifice** C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 661.50' | **Custom Weir, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 0.50<br>Width (feet) 8.00 8.00 0.00 |

## Stage-Discharge for Pond 6P: Vault-B 100-yr

| Elevation (feet) | Primary (cfs) |
|---|---|
| 655.00 | 0.00 |
| 655.20 | 0.01 |
| 655.40 | 0.02 |
| 655.60 | 0.03 |
| 655.80 | 0.03 |
| 656.00 | 0.04 |
| 656.20 | 0.04 |
| 656.40 | 0.04 |
| 656.60 | 0.05 |
| 656.80 | 0.05 |
| 657.00 | 0.05 |
| 657.20 | 0.06 |
| 657.40 | 0.06 |
| 657.60 | 0.06 |
| 657.80 | 0.06 |
| 658.00 | 0.06 |
| 658.20 | 0.07 |
| 658.40 | 0.07 |
| 658.60 | 0.07 |
| 658.80 | 0.07 |
| 659.00 | 0.08 |
| 659.20 | 0.08 |
| 659.40 | 0.08 |
| 659.60 | 0.08 |
| 659.80 | 0.08 |
| 660.00 | 0.08 |
| 660.20 | 0.09 |
| 660.40 | 0.09 |
| 660.60 | 0.09 |
| 660.80 | 0.09 |
| 661.00 | 0.09 |
| 661.20 | 0.09 |
| 661.40 | 0.10 |
| 661.60 | 0.93 |
| 661.80 | 4.40 |
| 662.00 | **8.00** |

## Summary for Pond 7P: Vault-C 100-yr

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 630.00' | 40,500 cf | **Custom Stage Data (Conic)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 630.00 | 4,500 | 0.0 | 0 | 0 | 4,500 |
| 631.00 | 4,500 | 90.0 | 4,050 | 4,050 | 4,738 |
| 632.00 | 4,500 | 90.0 | 4,050 | 8,100 | 4,976 |
| 633.00 | 4,500 | 90.0 | 4,050 | 12,150 | 5,213 |
| 634.00 | 4,500 | 90.0 | 4,050 | 16,200 | 5,451 |
| 635.00 | 4,500 | 90.0 | 4,050 | 20,250 | 5,689 |
| 636.00 | 4,500 | 90.0 | 4,050 | 24,300 | 5,927 |
| 637.00 | 4,500 | 90.0 | 4,050 | 28,350 | 6,165 |
| 638.00 | 4,500 | 90.0 | 4,050 | 32,400 | 6,402 |
| 639.00 | 4,500 | 90.0 | 4,050 | 36,450 | 6,640 |
| 639.50 | 4,500 | 90.0 | 2,025 | 38,475 | 6,759 |
| 640.00 | 4,500 | 90.0 | 2,025 | 40,500 | 6,878 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 630.00' | **18.0" Round Culvert**<br>L= 100.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 630.00' / 629.00' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 630.00' | **1.8" Vert. Orifice** C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 639.50' | **Custom Weir, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 0.50<br>Width (feet) 18.00 18.00 0.00 |

## Stage-Discharge for Pond 7P: Vault-C 100-yr

| Elevation (feet) | Primary (cfs) |
|---|---|
| 630.00 | 0.00 |
| 630.20 | 0.03 |
| 630.40 | 0.05 |
| 630.60 | 0.06 |
| 630.80 | 0.07 |
| 631.00 | 0.08 |
| 631.20 | 0.09 |
| 631.40 | 0.10 |
| 631.60 | 0.11 |
| 631.80 | 0.11 |
| 632.00 | 0.12 |
| 632.20 | 0.12 |
| 632.40 | 0.13 |
| 632.60 | 0.14 |
| 632.80 | 0.14 |
| 633.00 | 0.15 |
| 633.20 | 0.15 |
| 633.40 | 0.16 |
| 633.60 | 0.16 |
| 633.80 | 0.16 |
| 634.00 | 0.17 |
| 634.20 | 0.17 |
| 634.40 | 0.18 |
| 634.60 | 0.18 |
| 634.80 | 0.18 |
| 635.00 | 0.19 |
| 635.20 | 0.19 |
| 635.40 | 0.20 |
| 635.60 | 0.20 |
| 635.80 | 0.20 |
| 636.00 | 0.21 |
| 636.20 | 0.21 |
| 636.40 | 0.21 |
| 636.60 | 0.22 |
| 636.80 | 0.22 |
| 637.00 | 0.22 |
| 637.20 | 0.23 |
| 637.40 | 0.23 |
| 637.60 | 0.23 |
| 637.80 | 0.24 |
| 638.00 | 0.24 |
| 638.20 | 0.24 |
| 638.40 | 0.25 |
| 638.60 | 0.25 |
| 638.80 | 0.25 |
| 639.00 | 0.25 |
| 639.20 | 0.26 |
| 639.40 | 0.26 |
| 639.60 | 2.13 |
| 639.80 | 9.95 |
| 640.00 | **21.11** |

## Summary for Pond 9P: Vault-D 100-yr

[43] Hint: Has no inflow (Outflow=Zero)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 679.00' | 16,150 cf | **Custom Stage Data (Conic)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|---|
| 679.00 | 3,400 | 0.0 | 0 | 0 | 3,400 |
| 680.00 | 3,400 | 95.0 | 3,230 | 3,230 | 3,607 |
| 681.00 | 3,400 | 95.0 | 3,230 | 6,460 | 3,813 |
| 682.00 | 3,400 | 95.0 | 3,230 | 9,690 | 4,020 |
| 683.00 | 3,400 | 95.0 | 3,230 | 12,920 | 4,227 |
| 683.50 | 3,400 | 95.0 | 1,615 | 14,535 | 4,330 |
| 684.00 | 3,400 | 95.0 | 1,615 | 16,150 | 4,434 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 679.00' | **18.0" Round Culvert**<br>L= 100.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 679.00' / 678.00' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 679.00' | **2.7" Vert. Orifice** C= 0.600 Limited to weir flow at low heads |
| #3 | Device 1 | 683.50' | **Custom Weir, Cv= 2.62 (C= 3.28)**<br>Head (feet) 0.00 0.50 0.50<br>Width (feet) 12.00 12.00 0.00 |

## Stage-Discharge for Pond 9P: Vault-D 100-yr

| Elevation (feet) | Primary (cfs) |
|---|---|
| 679.00 | 0.00 |
| 679.10 | 0.02 |
| 679.20 | 0.06 |
| 679.30 | 0.08 |
| 679.40 | 0.10 |
| 679.50 | 0.12 |
| 679.60 | 0.13 |
| 679.70 | 0.15 |
| 679.80 | 0.16 |
| 679.90 | 0.17 |
| 680.00 | 0.18 |
| 680.10 | 0.19 |
| 680.20 | 0.20 |
| 680.30 | 0.21 |
| 680.40 | 0.22 |
| 680.50 | 0.23 |
| 680.60 | 0.23 |
| 680.70 | 0.24 |
| 680.80 | 0.25 |
| 680.90 | 0.26 |
| 681.00 | 0.26 |
| 681.10 | 0.27 |
| 681.20 | 0.28 |
| 681.30 | 0.28 |
| 681.40 | 0.29 |
| 681.50 | 0.30 |
| 681.60 | 0.30 |
| 681.70 | 0.31 |
| 681.80 | 0.31 |
| 681.90 | 0.32 |
| 682.00 | 0.33 |
| 682.10 | 0.33 |
| 682.20 | 0.34 |
| 682.30 | 0.34 |
| 682.40 | 0.35 |
| 682.50 | 0.35 |
| 682.60 | 0.36 |
| 682.70 | 0.36 |
| 682.80 | 0.37 |
| 682.90 | 0.37 |
| 683.00 | 0.38 |
| 683.10 | 0.38 |
| 683.20 | 0.39 |
| 683.30 | 0.39 |
| 683.40 | 0.40 |
| 683.50 | 0.40 |
| 683.60 | 1.65 |
| 683.70 | 3.93 |
| 683.80 | 6.87 |
| 683.90 | 10.36 |
| 684.00 | **14.32** |

## Vault Drawdown Calculation

| | | | |
|---|---|---|---|
| Project Name | Vista Grande | Vault A | |
| Project No | 3474 | Date | 3/22/2021 |

| | | |
|---|---|---|
| **Vault Drawdown** | **34.4** | **hrs** |

Note: Drawdown time is calculated assuming an initial water surface depth equal to the invert of the lowest surface discharge opening in the vault outlet structure.

| | | |
|---|---|---|
| **Underdrain Orifice Diameter:** | **1.6** | in |
| **C:** | **0.6** | |
| **Amended Soil Depth:** | **0** | ft |
| **Gravel Depth:** | **0** | ft |

| Surface Depth (ft) | Volume (cf) | $Q_{orifice}$ (cfs) | ΔT (hr) | Total Time (hr) |
|---|---|---|---|---|
| 4.5 | 8550 | 0.141 | 0.000 | 0.0 |
| 4 | 7600 | 0.133 | 1.925 | 1.9 |
| 3 | 5700 | 0.115 | 4.261 | 6.2 |
| 2 | 3800 | 0.093 | 5.080 | 11.3 |
| 1 | 1900 | 0.064 | 6.708 | 18.0 |
| 0 | 0 | 0.000 | 16.407 | 34.4 |

## Vault Drawdown Calculation

| | | | |
|---|---|---|---|
| Project Name | Vista Grande | Vault B | |
| Project No | 3474 | Date | 3/22/2021 |
| **Vault Drawdown** | **43.9** | **hrs** | |

Note: Drawdown time is calculated assuming an initial water surface depth equal to the invert of the lowest surface discharge opening in the vault outlet structure.

| | | |
|---|---|---|
| **Underdrain Orifice Diameter:** | **1.2** | in |
| **C:** | **0.6** | |
| **Amended Soil Depth:** | **0** | ft |
| **Gravel Depth:** | **0** | ft |

| Surface Depth (ft) | Volume (cf) | $Q_{orifice}$ (cfs) | ΔT (hr) | Total Time (hr) |
|---|---|---|---|---|
| 6.5 | 7410 | 0.096 | 0.000 | 0.0 |
| 6 | 6840 | 0.092 | 1.687 | 1.7 |
| 5 | 5700 | 0.084 | 3.604 | 5.3 |
| 4 | 4560 | 0.075 | 3.993 | 9.3 |
| 3 | 3420 | 0.065 | 4.545 | 13.8 |
| 2 | 2280 | 0.052 | 5.419 | 19.2 |
| 1 | 1140 | 0.036 | 7.155 | 26.4 |
| 0 | 0 | 0.000 | 17.501 | 43.9 |

## Vault Drawdown Calculation

| | | | |
|---|---|---|---|
| Project Name | Vista Grande | Vault C | |
| Project No | 3474 | Date | 3/22/2021 |

| | | |
|---|---|---|
| **Vault Drawdown** | **81.1** | **hrs** |

Note: Drawdown time is calculated assuming an initial water surface depth equal to the invert of the lowest surface discharge opening in the vault outlet structure.

| | | |
|---|---|---|
| **Underdrain Orifice Diameter:** | **1.8** | in |
| **C:** | **0.6** | |
| **Amended Soil Depth:** | **0** | ft |
| **Gravel Depth:** | **0** | ft |

| Surface Depth (ft) | Volume (cf) | $Q_{orifice}$ (cfs) | ΔT (hr) | Total Time (hr) |
|---|---|---|---|---|
| 9.5 | 38475 | 0.261 | 0.000 | 0.0 |
| 9 | 36450 | 0.254 | 2.185 | 2.2 |
| 8 | 32400 | 0.239 | 4.562 | 6.7 |
| 7 | 28350 | 0.224 | 4.860 | 11.6 |
| 6 | 24300 | 0.207 | 5.226 | 16.8 |
| 5 | 20250 | 0.189 | 5.690 | 22.5 |
| 4 | 16200 | 0.168 | 6.305 | 28.8 |
| 3 | 12150 | 0.145 | 7.176 | 36.0 |
| 2 | 8100 | 0.118 | 17.112 | 42.1 |
| 1 | 4050 | 0.081 | 11.297 | 53.4 |
| 0 | 0 | 0.000 | 27.633 | 81.1 |

## Vault Drawdown Calculation

| | | | |
|---|---|---|---|
| Project Name | Vista Grande | Vault D | |
| Project No | 3474 | Date | 3/22/2021 |

| | | |
|---|---|---|
| **Vault Drawdown** | **20.5** | **hrs** |

Note: Drawdown time is calculated assuming an initial water surface depth equal to the invert of the lowest surface discharge opening in the vault outlet structure.

| | | |
|---|---|---|
| **Underdrain Orifice Diameter:** | **2.7** | in |
| **C:** | **0.6** | |
| **Amended Soil Depth:** | **0** | ft |
| **Gravel Depth:** | **0** | ft |

| Surface Depth (ft) | Volume (cf) | $Q_{orifice}$ (cfs) | ΔT (hr) | Total Time (hr) |
|---|---|---|---|---|
| 4.5 | 14535 | 0.402 | 0.000 | 0.0 |
| 4 | 12920 | 0.379 | 1.149 | 1.1 |
| 3 | 9690 | 0.327 | 2.544 | 3.7 |
| 2 | 6460 | 0.265 | 3.033 | 6.7 |
| 1 | 3230 | 0.183 | 4.004 | 10.7 |
| 0 | 0 | 0.000 | 9.795 | 20.5 |

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for San Diego County Area, California

## Vista Grande Drive Vista,CA

February 3, 2021

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

# Contents

**Preface**..... 2
**Soil Information for All Uses**..... 5
Soil Properties and Qualities..... 5
Soil Qualities and Features..... 5
Hydrologic Soil Group..... 5

# Soil Information for All Uses

## Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

### Hydrologic Soil Group

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.

Map Scale: 1:2,300 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 30 60 120 180

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 Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 24, 2020—Feb 12, 2020

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.

## Table—Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| LpD2 | Las Posas fine sandy loam, 9 to 15 percent slopes, eroded | C | 1.1 | 4.4% |
| LpE2 | Las Posas fine sandy loam, 15 to 30 percent slopes, eroded | C | 24.1 | 95.6% |
| **Totals for Area of Interest** | | | **25.2** | **100.0%** |

## Rating Options—Hydrologic Soil Group

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

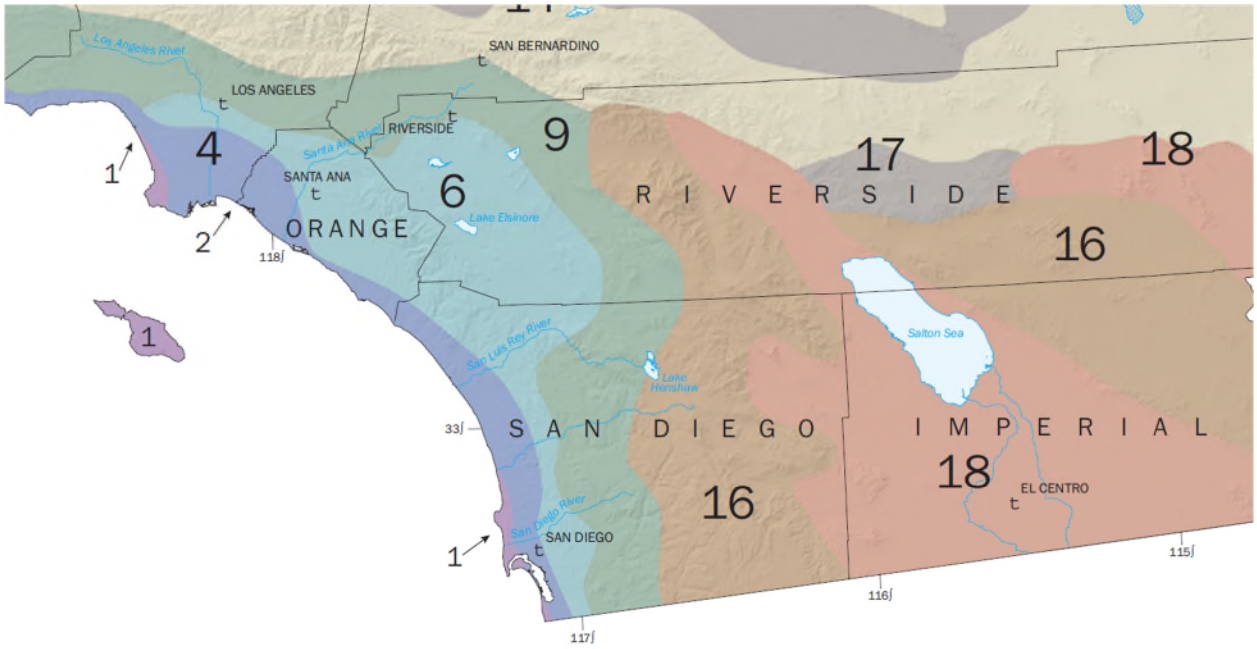



**Figure G.1-2: California Irrigation Management Information System "Reference Evapotranspiration Zones"**

**Table G.1-1: Monthly Average Reference Evapotranspiration by ETo Zone (inches/month and inches/day) for use in SWMM Models for Hydromodification Management Studies in San Diego County CIMIS Zones 1, 4, 6, 9, and 16 (See CIMIS ETo Zone Map)**

| | January | February | March | April | May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zone | in/month | in/month | in/month | in/month | in/month | in/month | in/month | in/month | in/month | in/month | in/month | in/month |
| 1 | 0.93 | 1.4 | 2.48 | 3.3 | 4.03 | 4.5 | 4.65 | 4.03 | 3.3 | 2.48 | 1.2 | 0.62 |
| 4 | 1.86 | 2.24 | 3.41 | 4.5 | 5.27 | 5.7 | 5.89 | 5.58 | 4.5 | 3.41 | 2.4 | 1.86 |
| 6 | 1.86 | 2.24 | 3.41 | 4.8 | 5.58 | 6.3 | 6.51 | 6.2 | 4.8 | 3.72 | 2.4 | 1.86 |
| 9 | 2.17 | 2.8 | 4.03 | 5.1 | 5.89 | 6.6 | 7.44 | 6.82 | 5.7 | 4.03 | 2.7 | 1.86 |
| 16 | 1.55 | 2.52 | 4.03 | 5.7 | 7.75 | 8.7 | 9.3 | 8.37 | 6.3 | 4.34 | 2.4 | 1.55 |
| | January | February | March | April | May | June | July | August | September | October | November | December |
| Days | 31 | 28 | 31 | 30 | 31 | 30 | 31 | 31 | 30 | 31 | 30 | 31 |
| Zone | in/day | in/day | in/day | in/day | in/day | in/day | in/day | in/day | in/day | in/day | in/day | in/day |
| 1 | 0.030 | 0.050 | 0.080 | 0.110 | 0.130 | 0.150 | 0.150 | 0.130 | 0.110 | 0.080 | 0.040 | 0.020 |
| 4 | 0.060 | 0.080 | 0.110 | 0.150 | 0.170 | 0.190 | 0.190 | 0.180 | 0.150 | 0.110 | 0.080 | 0.060 |
| 6 | 0.060 | 0.080 | 0.110 | 0.160 | 0.180 | 0.210 | 0.210 | 0.200 | 0.160 | 0.120 | 0.080 | 0.060 |
| 9 | 0.070 | 0.100 | 0.130 | 0.170 | 0.190 | 0.220 | 0.240 | 0.220 | 0.190 | 0.130 | 0.090 | 0.060 |
| 16 | 0.050 | 0.090 | 0.130 | 0.190 | 0.250 | 0.290 | 0.300 | 0.270 | 0.210 | 0.140 | 0.080 | 0.050 |

# ATTACHMENT 3 - BMP MAINTENANCE INFORMATION

Each of the attachments indicated below should be considered for inclusion with the SWQMP. Use this checklist to indicate which attachments are included behind this coversheet.

| Attachment Sequence | Contents | Checklist |
|---|---|---|
| Attachment 3A | Structural BMP Operations and Maintenance Plan | ☒ Included<br><br>See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet. |
| Attachment 3B | Draft Maintenance Agreement | ☐ Included<br>☐ Not Applicable |

# ATTACHMENT 3A – MAINTENANCE PLAN REQUIREMENTS

For Attachment 3A, provide a BMP operation and maintenance plan (O&M Plan). The checklist below identifies minimum elements to be included with the O&M Plan. An O&M Plan template is available at:

http://www.cityofvista.com/services/city-departments/community-development/building-planning-permits-applications/land-development-autocad-templates/storm-water-forms

☐ Specific maintenance indicators and actions for proposed structural BMP(s). This shall be based on Section 7.7 of the *BMP Design Manual* and enhanced to reflect actual proposed components of the structural BMP(s)

☐ Use of O&M Plan template, or plan of equivalent content

# Storm Water Operations & Maintenance Plan
# for
# 2277 Vista Grande Drive
## APN 171-100-05, 171-100-28

CITY OF VISTA, CA

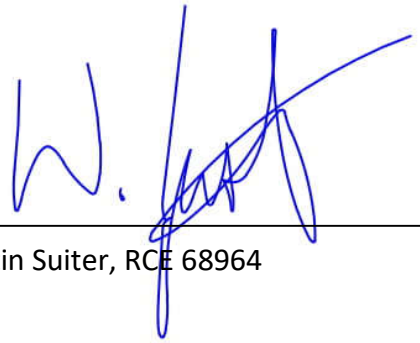
PREPARED FOR:

Greg Perrine
(949) 988-3270
1151 Duryea Avenue
Irvine, Ca 92614

PREPARED BY:

om
PASCO LARET SUITER & ASSOCIATES, INC.
27127 Calle Arroyo, Suite 1904
San Juan Capistrano, CA 92675
949-661-6695

DATE:
Prepared March 2021
Resubmitted May 2021
Resubmitted August 2021



W. Justin Suiter, RCE 68964 DATE

# TABLE OF CONTENTS


| | | |
|---|---|---|
| 1.0 | Operation and Maintenance Plan - Responsible Party | 3 |
| 2.0 | Project Site Summary | 4 |
| 2.1 | Vicinity Map | 4 |
| 2.2 | Project Description | 5 |
| 2.3 | Storm Water Mitigation Site Plan | 5 |
| 2.4 | Existing and Proposed Drainage Pattern and Storm Drain System | 5 |
| 2.5 | Identify Receiving Waters, Watershed and Hydrologic Unit Basin Number | 7 |
| 2.6 | Project Type and Activities | 7 |
| 3.0 | Summary of Storm Water Quality Management Plan (SWQMP) | 8 |
| 4.0 | Employee Training Program | 8 |
| 5.0 | Inspection Program | 9 |
| 6.0 | Maintenance Program | 9 |
| 7.0 | Record Keeping | 9 |
| 8.0 | Cost Estimate | 9 |
| 9.0 | Engineer of Work Statement | 9 |

Appendix A - Storm Water Mitigation Site Map
Appendix B - Source Control BMPs
Appendix C - Structural Control BMPs
Appendix D - Employee Training Program
Appendix E - Inspection Program
Appendix F - Maintenance Program
Appendix G - Cost Estimate

## 1.0 OPERATION AND MAINTENANCE PLAN – RESPONSIBLE PARTY

This Operation and Maintenance (O&M) Plan addresses the requirements for the implementation of long-term operation and maintenance associated with the proposed permanent storm water BMPs constructed for 2277 Vista Grande Drive approved by the City of Vista. For specific discussion on the selection of BMPs refer to the City of Vista approved Storm Water Quality Management Plan (SWQMP) for the project.

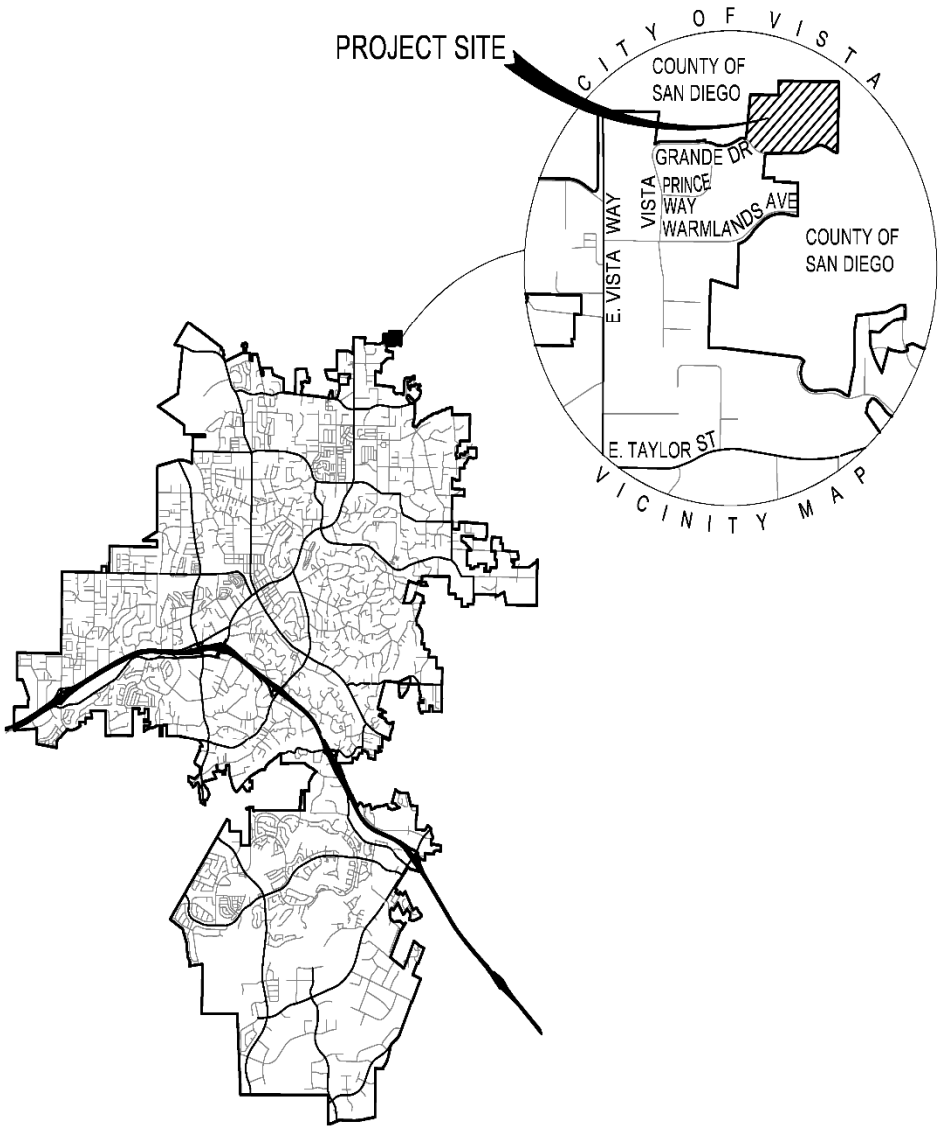
The responsible party for the long-term Operation and Maintenance of the onsite BMPs is the future HOA.

## 2.0 Project Site Summary

The subject property is located at 2277 Vista Grande Drive in the City of Vista. The site is east of E Vista Way, approximately 3 miles northwest of the CA-78 freeway and 1.5 miles southeast of the CA-76 freeway.

The site is APN 171-100-05, 171-100-28.

## 2.1 Vicinity Map:



## 2.2 Project Description:

The project is classified as a “Priority Development Project”. Therefore, it is subject to local storm water quality and hydromodification management requirements.

The project proposes to redevelop the existing site into a residential development consisting of 28 single-family lots, access drive, landscape, associated utilities and improvements, Modular Wetlands Systems to meet the requirements for pollutant control and underground storm water storage facilities to meet the requirements for hydromodification management flow control and to mitigate for the 100-year 6-hour storm event.

The project area consists of hydrologic soil group C. The project will not have slopes steeper than 2:1. All slopes will include slope protection for construction and post-construction.

## 2.3 Storm Water Mitigation Site Plan

Refer to Appendix A for the Storm Water Mitigation Site Plan.

## 2.4 Existing and Proposed Drainage Pattern and Storm Drain System

In the existing condition, the site has one single-family residence and an asphalt paved driveway along the western boundary. The remainder of the project site is undeveloped land with moderately steep slopes facing north, east, south and west. Elevations across the site range from a high of approximately 724 feet in the north central portion of the property to a low of approximately 624 feet at the southwest corner of the property.

In the existing condition, storm water runoff flows overland to the north, east, south and west. There are four main discharge points located along the northern, eastern, southeastern and southwestern boundaries.

In the proposed condition, onsite storm water runoff will be collected in proposed storm drain and conveyed to the proposed Modular Wetlands Systems (BMPs) which have been designed for pollutant control and subsequently the proposed underground storage facilities (BMPs) which have been designed to provide hydromodification management flow control and mitigation for the 100-year 6-hour storm event.

In the proposed condition, the site consists of six (6) drainage basins. Storm water runoff will be conveyed overland and in proposed storm drain to four (4) Modular Wetlands Systems and four (4) proposed underground storage facilities to meet the requirements for pollutant control, hydromodification management flow control and to mitigate for

the 100-year 6-hour storm event.

Drainage Basin 1 consists of the northwestern portion of the site. Runoff will flow westerly to a proposed Modular Wetlands System (BMP-1) and subsequently a proposed underground storage facility (BMP-A) located near the western boundary. BMP-A will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 2 consists of the central western portion of the site. Runoff will flow westerly to a proposed Modular Wetlands System (BMP-2) and subsequently a proposed underground storage facility (BMP-B) located near the western boundary. BMP-B will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 3 consists of a small area at the southwestern corner of the site. Runoff will flow southerly and westerly to a proposed Modular Wetlands System (BMP-3) which will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

Drainage Basin 4 consists of the eastern portion of the site. Runoff will flow easterly and southerly to a proposed underground storage facility (BMP-D) located near the southeastern corner of the site. BMP-D will discharge to the surface of Vista Grande Drive at the southeastern corner of the site, flow westerly in the street, confluencing with flow from Drainage Basin 6, to a proposed curb inlet and storm drain that discharges to a proposed Modular Wetlands System (BMP-4) and subsequently another proposed underground storage facility (BMP-C) located near the southwestern corner of the site.

Drainage Basin 5 consists of the small area of perimeter landscape slopes along the northern and eastern boundaries. Runoff will flow offsite northerly and easterly as in the existing condition.

Drainage Basin 6 consists of the southern portion of the site. Runoff will flow westerly, confluencing with discharge from BMP-D, to a proposed Modular Wetlands System (BMP-4) and subsequently a proposed underground storage facility (BMP-C) located near the southwestern corner of the site. BMPC will discharge via proposed storm drain and curb outlet to the surface of Vista Grande Drive at the southwestern corner of the site.

The underground storm water storage facilities provide hydromodification management flow control. The storage facilities also provide mitigation for the 100-year 6-hour storm event.

The proposed BMPs will be maintained by the future subdivision HOA. Refer to the project's Storm Water Quality Management Plan (SWQMP) for the hydromodification management and pollutant control analysis.

## 2.5 Identify Receiving Waters, Watershed and Hydrologic Unit Basin Number

The proposed project is located within the San Luis Rey Unit (HU) – Lower San Luis Rey – Mission, 903.11. Storm water that discharges the project site along the eastern and northern borders flows northerly to the San Luis Rey River (Lower) which flows westerly. Storm water that discharges the project site along the southern and southwestern borders flows westerly to Guajome Lake which flows to the San Luis Rey River (Lower) which flows westerly and ultimately discharges to the Pacific Ocean.

The San Luis Rey Watershed encompasses a land area of about 560 square miles. It lies in the northern portion of the County and neighbors Santa Margarita Watershed to the north and Carlsbad and San Dieguito Watersheds to the south. The HU contains three hydrologic areas included Lower San luis Rey (903.1), Monserate (903.2), and Warner Valley (903.3).

Based on Final 2012 Clean Water Act Section 303(d) Integrated Report (USEPA Final Approval July 30, 2015) Guajome Lakes, San Luis Rey River Lower, and Pacific Ocean Shoreline at San Luis Reye River Outlet is listed as a 303(d) impaired water body. The pollutants listed are: Eutrophic, Benthic Community Effects, Bifenthrin, Chloride, Indicator Bacteria, Nitrogen, Phosphorus, Total Dissolved Solids, Toxicity, and Indication Bacteria.

Refer to:
http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml

## 2.6 Project Type and Activities

The project consists of a single-family subdivision with 28 residential lots. The anticipated activities are consistent with normal residential use. The anticipated pollutants to be generated by the land use are:

Detached Residential Development and Streets:

- Sediment
- Nutrients
- Trash and Debris
- Oxygen demanding substances
- Oil and Grease
- Bacteria and Viruses
- Pesticides
- Heavy Metals
- Organic Compounds including petroleum hydrocarbons

## 3.0 Summary of Storm Water Quality Management Plan (SWQMP)

The project is classified as a "Priority Development Project". Therefore, it is subject to local storm water quality and hydromodification management requirements.

To comply with storm water requirements, the project includes site design, source control and a treatment control BMPs. The plans for the project detail the construction of proposed storm drain that is conveyed to the proposed Modular Wetlands Systems (BMPs) which have been designed for pollutant control and subsequently the proposed underground storage facilities (BMPs) which have been designed to provide hydromodification management flow control and mitigation for the 100-year 6-hour storm event. The locations, details and pollutant control and hydromodification calculations are included in the approved SWQMP for the project on file with the City of Vista.

A summary of the project's BMPs are as follows:

1. Site Design:
   Optimize the site layout; Use pervious surfaces; Disperse runoff; and
Design Integrated Management Practices (IMPs)
2. Source Control:
Maintain on-site storm drain inlets; Limit Landscape/Outdoor Pesticide Use;
Provide Efficient Irrigation; Sweep Streets
3. Treatment Control:
Modular Wetland Systems

## 4.0 Employee Training Program

The BMP maintenance is the responsibility of the future HOA. The future HOA will be responsible to train personnel in the practices of maintenance and record keeping of the permanent BMPs.

All applicable employees will be trained in a timely fashion, and at a minimum will be trained within one month of hiring. Training and refreshment courses will occur at least one time a year.

Training shall include but not be limited to training for the inspection of all source control and treatment control BMP's.

An example Training Log is located in Appendix D.

## 5.0 Inspection Program

At a minimum, the BMP shall be inspected annually or following significant rain events. Inspections shall be conducted by trained staff. An inspection form shall be completed with each inspection. Inspection logs shall be kept for a minimum of five years.

In addition, the BMP owner must verify annually that the O&M Plan is being implemented by submitting a self-certification statement to the City of Vista. The verification must include a record of inspection of the BMPs prior to the rainy season (October 1st of each year).

An example Inspection Log is located in Appendix E.

## 6.0 Maintenance Program

The cost and expense of maintaining the storm water permanent BMP shall be the responsibility of and paid for by the legally responsible party, owner or the heir, assigns and successors in interest of each such owner. The storm water BMP facility constructed by the owners, or their successors, include, but are not limited to Modular Wetland Systems, drainage inlets, etc., all as shown on City approved SWQMP on file with the City of Vista.

A Maintenance Log will be filled out and kept for each maintenance service. The records will be kept for a minimum of five years. An example Maintenance Log is located in Appendix F.

## 7.0 Record Keeping

The legally responsible entity designated in this document will be the source for record keeping.

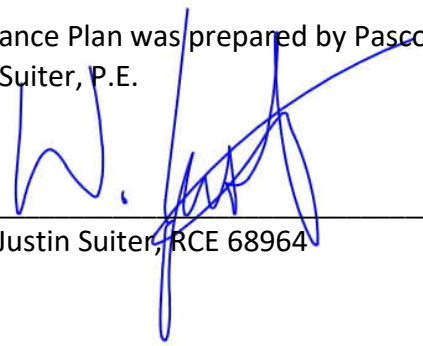
Examples of Training, Inspection and Maintenance Logs are contained in the Appendices. These shall be kept for a minimum of five years.

## 8.0 Cost Estimate

See Appendix G for the Cost Estimate.

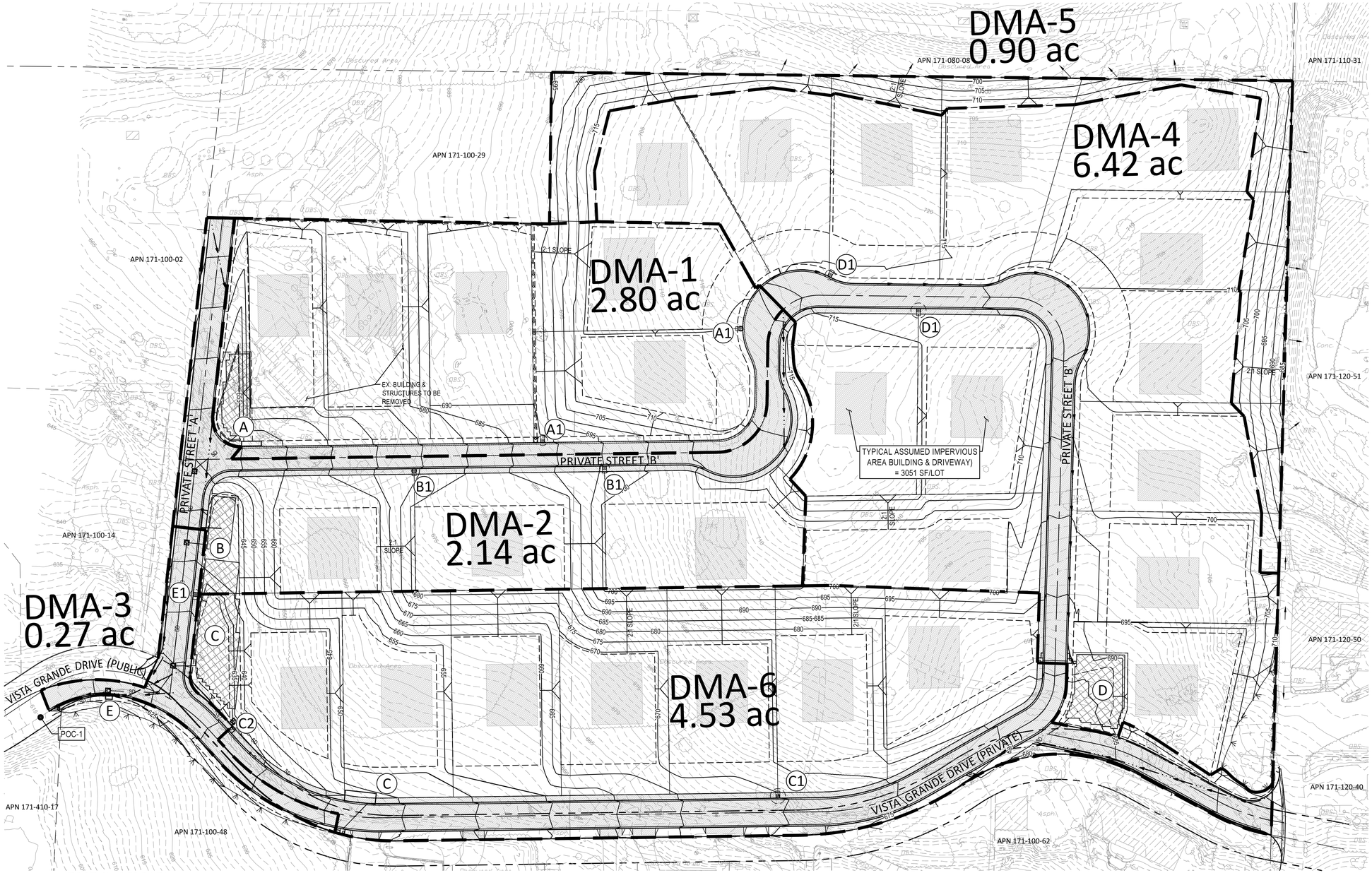
## 9.0 Engineer of Work Statement

This Operation and Maintenance Plan was prepared by Pasco Laret Suiter & Associates under the supervision of W. Justin Suiter, P.E.



W. Justin Suiter, RCE 68964 DATE

# Appendix A – Storm Water Mitigation Site Plan




## GENERAL INFORMATION

THE PROPOSED PROJECT IS LOCATED WITHIN THE SAN LUIS REY UNIT (HU) – LOWER SAN LUIS REY – MISSION, 903.11. STORM WATER THAT DISCHARGES THE PROJECT SITE ALONG THE EASTERN AND NORTHERN BORDERS FLOWS NORTHERLY TO THE SAN LUIS REY RIVER (LOWER) WHICH FLOWS WESTERLY. STORM WATER THAT DISCHARGES THE PROJECT SITE ALONG THE SOUTHERN AND SOUTHWESTERN BORDERS FLOWS WESTERLY TO GUAJOME LAKE WHICH FLOWS TO THE SAN LUIS REY RIVER (LOWER) WHICH FLOWS WESTERLY AND ULTIMATELY DISCHARGES TO THE PACIFIC OCEAN.

POLUTTANTS OF CONCERN - EUTROPHIC, BENTHIC COMMUNITY EFFECTS, BIFENTHRIN, CHLORIDE, NITROGEN, PHOSPHORUS, TOTAL DISSOLVED SOLIDS, TOXICITY AND INDICATOR BACTERIA

## LID SITE DESIGN BMP'S

1. MODULAR WETLAND SYSTEMS
2. DENTENTION VAULTS
3. ROOF DRAIN TO LANDSCAPING
4. MINIMIZE IMPERVIOUS SURFACES
5. PROTECT SLOPES AND CHANNELS

## SOURCE CONTROL BMP'S

1. STORM DRAIN STENCILING
2. EMPLOY INTEGRATED PEST MANAGEMENT PRACTICES
3. EMPLOY EFFICIENT IRRIGATION AND DROUGHT TOLERANT LANDSCAPE DESIGN

## SOIL INFORMATION

HYDROLOGIC SOIL GROUP: TYPE C

## GROUND WATER INFORMATION

GROUND WATER WAS NOT ENCOUNTERED AT THE SITE. SEE REPORT PREPARED BY: GEOSOILS, INC
DATED: W.O. 5053-A1-SC FEBRUARY 23, 2006

## COARSE SEDIMENT YIELD

REFER TO ATTACHEMENT 2B OF THIS REPORT FOR CRITICAL COARSE SEDIMENT YIELD AREAS WITHIN THIS PROJECT SITE.

## BMP NOTES

1. THESE BMPS AREA MANDATORY TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS OR THERE PLANS
2. NO CHANGES TO THE PROPOSED BMPS ON THIS SHEET WITHOUT PRIOR APPROVAL FORM THE CITY ENGINEERING DEPARTMENT
3. NO SUBSTITUTIONS TO THE MATERIAL TYPES OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE LAND DEVELOPMENT ENGINEER
4. NO OCCUPANCY WILL BE GRANTED UNTIL THE CITY INSPECTOR STAFF HAS INSPECTED THIS PROJECT FOR APPRORIATE BMP CONSTRUCTION AND INSTALLATION.

## WATER QUALITY TECHNICAL REPOT

TITLE - PRIORITY DEVELOPMENT PROJECT STORM WATER QUALITY MANAGEMENT REPORT FOR 2277 VISTA GRANDE DRIVE
DATE - MARCH 2021
PREPARED BY - PASCO LARET SUITER & ASSOCIATES

## MAINTENANCE AGREEMENT DOCUMENT

TITLE -
DATE -
PREPARED BY -

## OPERATIONS AND MAINTENANCE PLAN

TITLE - STORM WATER OPERATIONS & MAINTENANCE PLAN FOR 2277 VISTA GRANDE DRIVE
DATE - MARCH 2021
PREPARED BY - PASCO LARET SUITER & ASSOCIATES

## RESPONSIBLE PARTY INFORMATION

GREG PERRINE

1151 DURYEA AVENUE

IRVINE, CA 92614

## BMP SUMMARY

| DMA # | BMP # | BMP TYPE | BMP AREA | BMP OUTLET | OULET PIPE |
|---|---|---|---|---|---|
| 1 | A | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT A | MWS L-4-19 / 2,000 SF, 5' HIGH R-TANK | 1.2-INCH ORIFICE / 6-FT WIDE WEIR @ 4.5-FT HIGH | 12" |
| | A1 | TREE WELL | 5 FT TREE AND 10 FT TREE | -- | -- |
| 2 | B | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT B | MWS L-4-19 / 1,200 SF, 7' HIGH R-TANK | 1.0-INCH ORIFICE / 8-FT WIDE WEIR @ 6.5-FT HIGH | 12" |
| | B1 | TREE WELL | 5 FT TREE AND 10 FT TREE | -- | -- |
| 3 | E | MODULAR WETLAND SYSTEM INLET | MWS L-4-6 | N/A | 12" |
| | E1 | TREE WELL | 10 FT TREE | -- | -- |
| 4 | D | DETENTION VAULT D | 3,400 SF, 5' HIGH R-TANK | 1.5-INCH ORIFICE / 12-FT WIDE WEIR @ 4.5-FT HIGH | 18" |
| | D1 | TREE WELL | 10 FT TREE AND 15 FT TREE | -- | -- |
| 5 | -- | SELF MITIGATING AREA | -- | -- | -- |
| 6 | C | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT C | MWS L-10-30 / 5,000 SF, 10' HIGH R-TANK | 1.9-INCH ORIFICE / 18-FT WIDE WEIR @ 9.5-FT HIGH | 18" |
| | C1 | TREE WELL | 15 FT TREE | -- | -- |
| | C2 | MODULAR WETLAND SYSTEM INLET | MWS L-4-4 | N/A | 12" |

## POST-CONSTRUCTION PERMANENT BMP OPERATION & MAINTENANCE PROCEDURE DETAILS

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT APPROVAL NO:

O&M RESPONSBILE PARTY DESIGNEE: GREG PERRINE

| BMP DESCRIPTION | INSPECTION FREQUENCY | MAINTENANCE FREQUENCY | MAINTENANCE METHOD | QUANTITY | SHEET NUMBER(S) |
|---|---|---|---|---|---|
| EDUCATION PROGRAM (SOURCE CONTROL) | ANNUAL | AS NEEDED | EMPLOYEE EDUCATION PROGRAM | N/A | N/A |
| SIGNAGE & STENCILING | ANNUAL | AS NEEDED | REPAIR AND/OR REPLACE AS NECESSARY | 3 | -- |
| MODULAR WETLAND SYSTEM | ANNUAL | AS NEEDED | REPAIR AND/OR REPLACE AS NECESSARY | 5 | -- |
| DETENTION VAULT - RTANK | ANNUAL | AS NEEDED | REPAIR AND/OR REPLACE AS NECESSARY | 4 | -- |
| TREE WELL | MONTHLY | AS NEEDED | INSPECT TREE HEALTH & REPAIR/REPLACE AS NECESSARY | 8 | -- |

## BMP NOTES

1. THESE BMPS AREA MANDATORY TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS OR THERE PLANS
2. NO CHANGES TO THE PROPOSED BMPS ON THIS SHEET WITHOUT PRIOR APPROVAL FORM THE CITY ENGINEERING DEPARTMENT
3. NO SUBSTITUTIONS TO THE MATERIAL TYPES OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE LAND DEVELOPMENT ENGINEER
4. NO OCCUPANCY WILL BE GRANTED UNTIL THE CITY INSPECTOR STAFF HAS INSPECTED THIS PROJECT FOR APPRORIATE BMP CONSTRUCTION AND INSTALLATION.

MAJOR BASIN BOUNDARY

HMP POINT OF COMPLIANCE — POC 1

IMPERVIOUS AREA 4.25 AC (184,989 SF)

PERVIOUS AREA 12.82 AC (558,506 SF)

**ASSUMED IMPERVIOUS AREA PER LOT 3,051 SF (BLDG + DWY)

## DMA HMP EXHIBIT

2277 VISTA GRANDE DRIVE
VISTA, CA
SCALE: 1" = 50'
DATE: AUGUST 2021
SHEET 1 OF 1

**PASCO LARET SUITER & ASSOCIATES**
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SAVE DATE: — - PLOT DATE: 08/11/21 - FILE NAME: J:\ACTIVE JOBS\5474 Vista Grande\CIVIL\REPORTS\SWQMP\SWMM\5474-HMP-POST .dwg

# Appendix B – Source Control BMPs

Chapter 4



# Source Control and Site Design Requirements for All Development Projects

This chapter presents general, source control, and site design requirements to be met by all Standard projects and PDPs. This Manual should be the first guidance document consulted during the development planning process. A second important County reference related to site design and source control is the Low Impact Development (LID) Handbook. The LID Handbook provides a comprehensive list of LID planning and stormwater management techniques for developers, builders, contractors, planners, landscape architects, engineers, and government employees. It can be found on the County's website:
http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/DevelopmentandConstruction.html

Specific requirements and limitations for each site design and source control BMP are contained in applicable SWQMP forms, and in corresponding instructions and attachments. In some cases, separate Fact Sheets have also been developed for individual BMPs. The content of these and other materials specified by the County provides further, more detailed articulation of the requirements generally described in this Chapter.

## 4.1 General Requirements (GR) and Guidance

Per MS4 Permit Provision E.3.a.(1) and WPO Section 67.811(a)(3), BMPs must be designed, constructed and maintained subject to the following criteria:

***4.1.1: Onsite BMPs must be located so as to remove pollutants from runoff prior to its discharge to any receiving waters, and as close to the source as possible.***

BMP location affects its ability to retain, and/or treat, the pollutants from the contributing drainage area. BMPs must remove pollutants from runoff and should be placed as close to the pollutant source as possible.

> **How to comply**: Projects must implement source control (Section 4.2) and site design BMPs (Section 4.3) that are applicable to their project and site conditions.

### *4.1.2: Structural BMPs must not be constructed within the Waters of the U.S.*

Construction, operation, and maintenance of a structural BMP in a water body can negatively impact the physical, chemical, and biological integrity, as well as the beneficial uses, of the water body. However, offsite alternative compliance opportunities involving restoration of areas within Waters of the U.S. may be identified by the County.

> **How to comply**: Projects must prepare project plans depicting the location of receiving waters and proposed BMPs within the project boundary. These plans must demonstrate that storm water BMPs are not located within Waters of the U.S.

### *4.1.3: Onsite BMPs must be designed and implemented with measures to avoid the creation of nuisances or pollutions associated with vectors (e.g. mosquitos, rodents, or flies).*

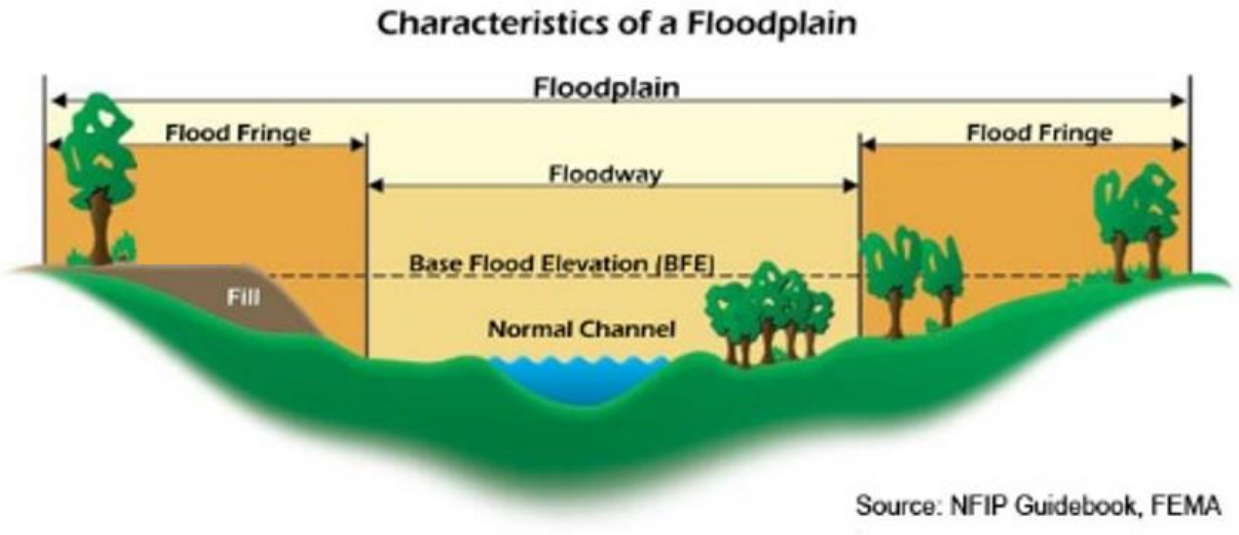
According to the California Department of Health, structural BMPs that retain standing water for over 96 hours are particularly concerning for facilitating mosquito breeding. Certain site design features that hold standing water may similarly produce mosquitoes.

> **How to comply**: Projects must incorporate design, construction, and maintenance principles demonstrating that they will drain retained water within **96 hours** and minimize standing water. Design calculations must be provided to demonstrate the potential for standing water ponding at surface level and accessible to mosquitos has been addressed.

### *4.1.4: Use caution when placing Structural BMPs in FEMA or County Floodplains and Floodways.*

Placement of Structural BMPs within FEMA or County Floodplains or Floodways should be consulted with a wetland biologist to avoid future creation of habitat, where the S-BMP could become jurisdictional or connected to a jurisdictional area. If that is the case, an outside agency (such as the Army Corps of Engineers, Regional Water Quality Control Board, or California Department of Fish & Wildlife) may impose future restrictions on maintenance of these S-BMPs, and activities may need to be coordinated with those agencies, including processing of permits.

> **How to comply**: Use caution when placing BMPs within the floodway or floodplain. Consult with applicable agencies if necessary.



#### *4.1.5: BMPs that provide for flood control detention in addition to water quality requirements and relationship to County Hydraulic Design Manual.*

BMPs that are serving flood control purposes in addition to pollutant control and/or hydromodification management may not operate appropriately to satisfy the requirements of the County Hydraulic Design Manual.

> **How to comply**: Consult the County Hydraulic Design Manual in addition to the Conjunctive Use handout that is posted in the Development Resources web page under Calculators and Modeling Software.

## 4.2 Source Control (SC) BMP Requirements

Source control BMPs avoid and reduce pollutants in storm water runoff. Everyday activities, such as recycling, trash disposal, and irrigation generate potential storm water pollutants. Source control BMPs are defined as activities or features that reduce the potential for storm water runoff to come into contact with pollutants. Per MS4 Permit Provision E.3.a.(2) and WPO Section 67.811(a)(4)), all development projects must implement source control BMPs where applicable and feasible.

> **How to comply**: Projects must implement all source control BMPs that are applicable to their project. Applicability should be determined through a consideration of the development project's proposed features and the anticipated pollutant sources associated with them. Appendix C provides guidance for identifying source control BMPs applicable to a project. Table 2 "Baseline BMPs for Pollutant-Generating Sources" located in Standard and PDP SWQMPs must be used to document compliance with these requirements. Table 2 applies to all projects except for Small Residential Projects. Small Residential Projects are those requiring either: a Building Permit, Minor Residential Grading Permit, or site Plan Permit for a single family home; or a Tentative Parcel Map Permit for up to 4 single family homes and a remainder parcel.

### 4.2.1 Prevent illicit discharges into the MS4

Per WPO Section 67.804, illicit discharges (i.e., discharges to the MS4 that are not composed entirely of storm water) are prohibited, except as exempted per WPO Section 67.805. Projects must effectively eliminate discharges of non-storm water into the MS4.

For outdoor areas, exposure reduction generally requires work areas and storage areas to be covered to prevent rain exposure; graded to prevent stormwater run-on and run-off; and protected from the wind so that materials are not dispersed. See Fact Sheet BL-5 (Work and Storage Areas) in Appendix C. If there are storm water discharges from outdoor areas work areas or storage areas, Fact Sheet BL-6 (Management of Stormwater Discharges) in Appendix C provides practices to prevent discharge of materials from these areas. For interior work surfaces, floor drains and sumps, drain lines, and fire sprinkler test water, exposure reduction generally requires directing the discharge to the sanitary sewer. See Fact Sheet BL-7 (Management of Non-Stormwater Discharges) in Appendix C. Fact Sheet BL-7 also discusses education for prevention of illicit discharges, which is discussed in more detail below in Section 1.2.2.

### 4.2.2 Identify the storm drain system using stenciling or signage

Storm drain signs and stencils are visible source controls typically placed adjacent to inlets. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signage must be provided for all storm water conveyance system inlets and catch basins within the

project area. Storm drain signage may include concrete stamping, concrete painting, placards, or other methods approved by the County. A stenciling template used by the County is attached in the "Storm Drain Signage" section of Fact Sheet BL-7 in Appendix C. This template may be modified and used as educational pieces promoting improved water quality.

In addition to storm drain signage, the "Educational BMP Signage" section of Fact Sheet BL-7 encourages applicants to post temporary BMP signage to alert contractors during construction that a permanent BMP has been completed and to ensure it does not get disturbed during subsequent grading and building construction activities. Developments with model homes are encouraged to place educational signage to provide future homeowners a description of the benefits and responsibilities of the BMPs constructed on their property. Interpretive BMP signage provides permanent educational signage for the public to detail how BMPs benefit the local waterways, and may include prohibitive language (with graphical icons) regarding illegal dumping at trailheads, parks, building entrances, and public access points along channels and creeks within the project area.

### 4.2.3 Protect outdoor material storage areas from rainfall, run-on, runoff, and wind dispersal

Materials with the potential to pollute storm water runoff must be stored in a manner that prevents contact with rainfall and storm water runoff. All development projects must incorporate the following structural or pollutant control BMPs for outdoor material storage areas, as applicable and feasible:

- Storage areas must be paved and sufficiently impervious to contain leaks and spills, where necessary.
- The storage area must be sloped towards a sump or another equivalent measure that is effective to contain spills.
- Runoff from downspouts/roofs must be directed away from storage areas.
- The storage area must have a roof or awning that extends beyond the storage area to minimize collection of storm water within the secondary containment area. A manufactured storage shed may be used for small containers.
- Use other methods approved by the County.

See Fact Sheet BL-5 (Work and Storage Areas) in Appendix C for more information.

### 4.2.4 Protect materials stored in outdoor work areas from rainfall, run-on, runoff, and wind dispersal

Outdoor work areas have an elevated potential for pollutant loading and spills. All development projects must include the following structural or pollutant control BMPs for any outdoor work areas with potential for pollutant generation, as applicable and feasible:

- Create an impermeable surface such as concrete or asphalt, or a prefabricated metal drip pan, depending on the size needed to protect the materials.
- Cover the area with a roof or other acceptable cover.
- Berm the perimeter of the area to prevent water from adjacent areas from flowing on to the surface of the work area.

- Directly connect runoff to sanitary sewer or other specialized containment system(s), as needed and where feasible. This allows the more highly concentrated pollutants from these areas to receive special treatment that removes particular constituents. Approval for this connection must be obtained from the appropriate sanitary sewer agency.
- Locate the work area away from storm drains or catch basins.
- Use other methods approved by the County.

See Fact Sheets BL-5 (Work and Storage Areas) and BL-6 (Management of Stormwater Discharges) in Appendix C for more information.

### 4.2.5 Protect trash storage areas from rainfall, run-on, runoff, and wind dispersal

Storm water runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, or creeks. All development projects must include the following structural or pollutant control BMPs, as applicable:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This can include berming or grading the waste handling area to prevent run-on of storm water.
- Ensure trash container areas are screened or walled to prevent offsite transport of trash.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Locate storm drains away from immediate vicinity of the trash storage area and vice versa.
- Post signs on all dumpsters informing users that hazardous material are not to be disposed.
- Use other methods approved by the County.

See Fact Sheets BL-5 (Work and Storage Areas) and BL-6 (Management of Stormwater Discharges) in Appendix C for more information.

### 4.2.6 Use any additional BMPs determined to be necessary by the County to minimize pollutant generation at each project site

At its discretion, the County may determine that additional on-site controls are necessary to minimize pollutant generation. These determinations will be made on a project-specific basis. Appendix C provides guidance on permanent controls that are applicable at a project site based on potential sources of runoff pollutants at the project site. Applicants must implement all applicable and feasible source control BMPs listed in Appendix C.

## 4.3 Site Design (SD) BMP Requirements

***Site design BMPs (also referred to as LID BMPs) are intended to reduce the rate and volume of storm water runoff and associated pollutant loads*** by minimizing surface soil compaction, reducing impervious surfaces, or providing flow pathways that are "disconnected" from the storm drain system, such as by routing flow over pervious surfaces. Site design BMPs may incorporate interception, storage, evaporation, evapotranspiration, infiltration, and/or filtration processes to retain and/or treat pollutants in storm water before it is discharged from a site.

Applicants are referred to the County of San Diego LID Handbook for additional guidance and information on the incorporation of low impact design features in the design of projects. Appendix K (Guidance for Green Infrastructure) provides additional guidance for implementing green street and other sustainable project features and types.

Appendix C also provides the following fact sheets to assist project applicants with designing BMPs to meet Site Design requirements:

- BL-1 – Existing Natural Site Features
- BL-2 – Outdoor Impervious Areas
- BL-3 – Rooftop Areas
- BL-4 – Landscaped Areas

In addition, Appendix E also provides the following fact sheets to assist applicants in Design Capture Volume (DCV) reduction using Enhanced Site Design BMPs:

- SD-A – Tree Wells
- SD-B – Impervious Area Dispersion
- SD-C – Green Roofs
- SD-D – Permeable Pavement (Site Design BMP)
- SD-E – Rain Barrels; and
- SD-F – Amended Soil

The County strongly encourages applicants to utilize these resources to inform the design and construction of low impact design and sustainable infrastructure features for their projects. In addition to generally being environmentally preferable, incorporation of these features can be significantly less expensive than traditional structural approaches, both for construction and ongoing maintenance. Incorporating many of these features may also reduce the sizing requirements for Structural BMPs.

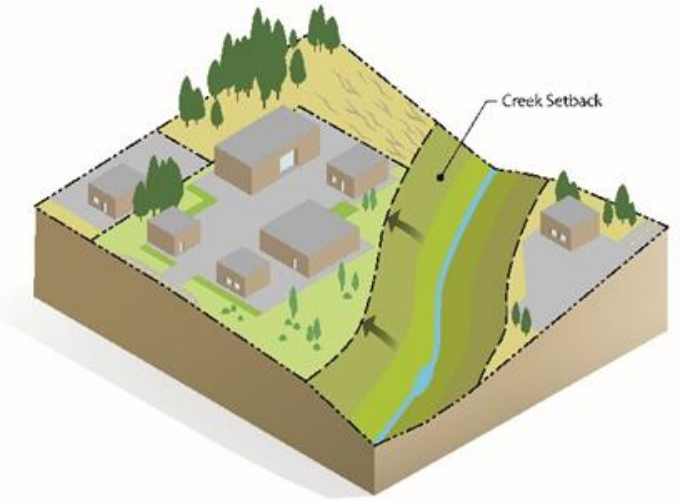
Implementation of Enhanced Site Design BMPs may result in quantifiable reductions in the site's DCV (refer to Appendix B.1); however, failure to meet the minimum thresholds for DCV reductions does not eliminate requirements to implement applicable Site Design BMPs. All applicable and feasible Site Design BMPs must be implemented to the maximum extent practicable. Additionally, implementation of Significant Site Design BMPs (SSD-BMPs) such as Tree Wells and Impervious Area Dispersion when designed to meet flow control per Fact Sheets SD-A and SD-B, respectfully may result in quantifiable hydromodification flow control benefits; refer to Section 6.1 and Appendix I.1.

**Per MS4 Permit Provision E.3.a.(3) and WPO Section 67.811(a)(5), s*ite design BMPs listed below in 4.3.1 to 4.3.8 must be applied to all development projects as applicable and feasible for the project site and project conditions.***

**How to comply**: Projects must comply with this requirement by using all of the site design BMPs listed in this section that are applicable and practicable to their project type and site conditions. Applicability of a given site design BMP should be determined based on project type, soil conditions, presence of natural features (e.g. streams), and presence of site features (e.g. parking areas). Applicants must provide an explanation for any site design BMP they do not consider to be applicable and feasible. Site plans must identify site design BMPs and provide adequate supporting detail to ensure their effective implementation. Table 1 "Baseline BMPs for Existing and Proposed Site Features" which is part of both the Standard SWQMP and the PDP SWQMP listed in Appendix A, should be used to document compliance with site design BMP requirements. Table 1 applies to all development projects.

## 4.3.1 Maintain natural drainage pathways and hydrologic features

- ☐ Maintain or restore natural storage reservoirs and drainage corridors (including topographic depressions, areas of permeable soils, natural swales, and ephemeral and intermittent streams)
- ☐ Buffer zones for natural water bodies (where buffer zones are technically infeasible, require project applicant to include other buffers such as trees, access restrictions, etc.)




During the site assessment, natural drainages must be identified along with their connection to creeks or streams, if any. Natural drainages offer a benefit to storm water management as the soils and habitat already function as a natural filtering or infiltrating swale. When determining the development footprint of the site, altering natural drainages should be avoided. By providing a development envelope set back from natural drainages, the drainage can retain some water quality benefits to the watershed. In some situations, site constraints, regulations, economics, or other factors may not allow avoidance of drainages and sensitive areas. Projects proposing to dredge or fill materials in Waters of the U.S. must obtain Clean Water Act Section 401 Water Quality Certification. Projects proposing to dredge or fill waters of the State must obtain waste discharge requirements. Both the 401 Certification and the Waste Discharge Requirements are administered by the San Diego Water Board.

A setback of 50-200 feet is recommended for development proposed adjacent to Waters of the U.S depending on the type of Water of the U.S. For further guidance, refer to the County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements Biological Resources last revised in September 15, 2010. This document can be found at http://www.sandiegocounty.gov/content/dam/sdc/pds/ProjectPlanning/docs/Biological_Guidelines.pdf.

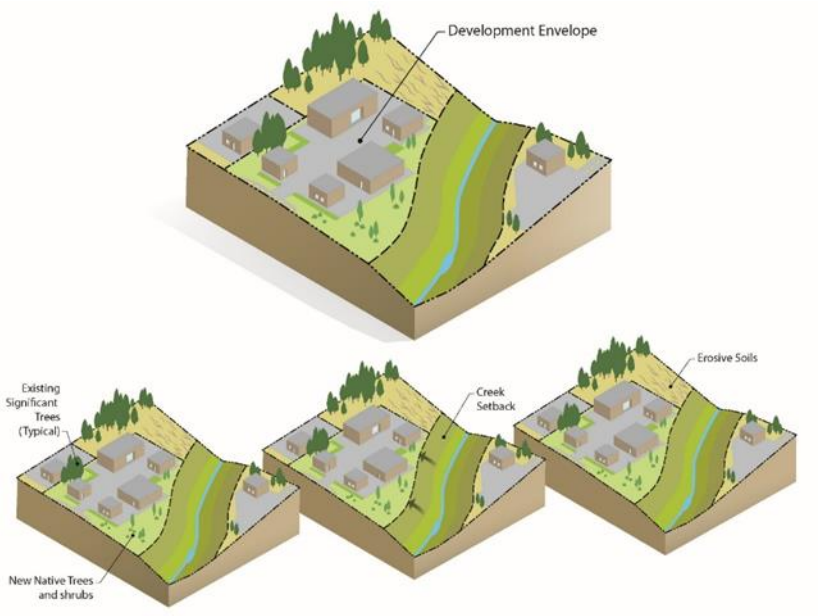
Projects can maintain these features into a project by implementing the following planning and design phase techniques:

- Evaluate surface drainage and topography in considering selection of Site Design BMPs that will be most beneficial for a given project site. Where feasible, maintain topographic depressions for infiltration.
- Optimize the existing site layout and reduce the need for grading. Where possible, conform the site layout along natural landforms, avoid grading and disturbance of vegetation and soils, and replicate the site's natural drainage patterns. Integrating existing drainage patterns into the site plan will help maintain the site's predevelopment hydrologic function and may reduce construction costs.
- Preserve existing drainage paths and depressions to maintain the time of concentration and infiltration rates of runoff, and decrease peak flow.
- Do not locate structural BMPs in buffer zones if a State or Federal resource agency (SDRWQCB, California Department of Fish and Wildlife; U.S. Army Corps of Engineers, etc.) prohibits maintenance or activity in the area.

See Fact Sheet BL-1 (Existing Natural Site Features) in Appendix C for more information.

## 4.3.2 Conserve natural areas, soils and vegetation

- Conserve natural areas within the project footprint including existing trees, other vegetation, and soils




To enhance a site's ability to support source control and reduce runoff, the conservation and restoration of natural areas must be considered in the site design process. By conserving or restoring the natural drainage features, natural processes are able to intercept storm water, thereby reducing the amount of runoff.

The upper soil layers of a natural area contain organic material, soil biota, vegetation, and a configuration favorable for storing and slowly conveying storm water and establishing or restoring vegetation to stabilize the site after construction. The canopy of existing native trees and shrubs also provide a water conservation benefit by intercepting rain water before it hits the ground. By minimizing disturbances in these areas, natural processes are able to intercept storm water, providing a water quality benefit. By concentrating development in the least environmentally sensitive areas of the site and set back from natural areas, storm water runoff is reduced, water quality can be improved, environmental impacts can be decreased, and many of the site's most attractive native landscape features can be retained. In some situations, site constraints, regulations, economics, or other factors may not allow avoidance of all sensitive areas on a project site. Project applicant must consult the County for specific requirements for mitigation of removal of sensitive areas.

Projects can incorporate BMPs SD-G (Conserve Natural Features) and SD-H (Buffers) in Fact Sheet BL-1 in Appendix C by implementing the following planning and design phase techniques:

- Identify areas most suitable for development, and areas that should be left undisturbed. Additionally, disturbance may be reduced by increasing building density and increasing height, if possible.
- Cluster development on the least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.

1. AREAS DEVOID OF VEGETATION, INCLUDING PREVIOUSLY GRADED AREAS AND AGRICULTURAL FIELDS
2. AREAS OF NON-NATIVE VEGETATION, DISTURBED HABITATS AND EUCALYPTUS WOODLANDS WHERE RECEIVING WATERS ARE NOT PRESENT
3. AREAS OF CHAMISE OR MIXED CHAPARRAL, AND NON-NATIVE GRASSLANDS
4. AREAS CONTAINING COASTAL SCRUB COMMUNITIES
5. ALL OTHER UPLAND COMMUNITIES
6. OCCUPIED HABITAT OF SENSITIVE SPECIES AND ALL WETLANDS (AS BOTH ARE DEFINED BY THE LOCAL JURISDICTION)

- Avoid areas with thick, undisturbed vegetation. Soils in these areas have a much higher capacity to store and infiltrate runoff than disturbed soils, and reestablishment of a mature vegetative community can take decades. Vegetative cover can also provide additional volume storage of rainfall by retaining water on the surfaces of leaves, branches, and trunks of trees during and after storm events.
- Preserve trees, especially native trees and shrubs, and identify locations for planting additional native or drought tolerant trees and large shrubs. Refer to Appendix E for additional guidance on implementing SD-A Tree Wells as a Site Design BMP.
- In areas of disturbance, topsoil should be removed before construction and replaced after the project is completed. When handled carefully, such an approach limits the disturbance to native soils and reduces the need for additional (purchased) topsoil during later phases.
- Avoid sensitive areas, such as wetlands, biological open space areas, biological mitigation sites, streams, floodplains, or particular vegetation communities, such as coastal sage scrub and intact forest. Also, avoid areas that are habitat for sensitive plants and animals, particularly those that are State or federally listed as endangered, threatened, or rare. Development in these areas is often restricted by federal, state and local laws.

See Fact Sheet BL-1 (Existing Natural Site Features) in Appendix C for more information.

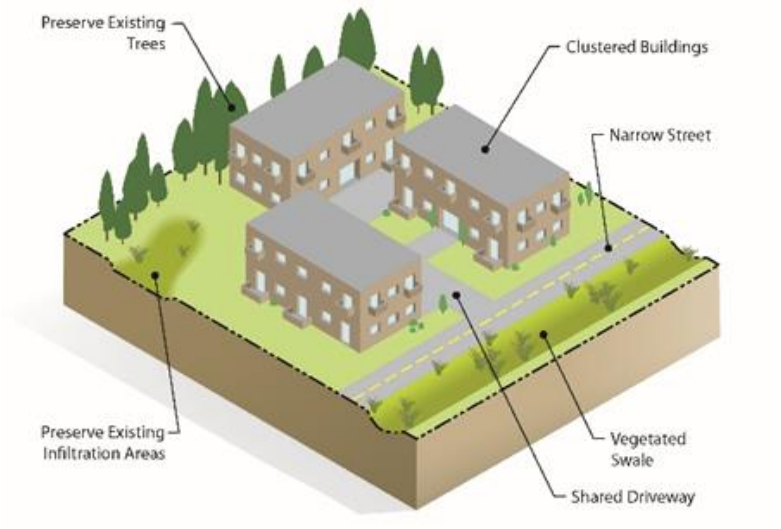
### 4.3.3 Minimize impervious area

- ☐ Construct streets, sidewalks or parking lots aisles to the minimum widths necessary, provided public safety is not compromised.
- ☐ Minimize the impervious footprint of the project.

One of the principal causes of environmental impacts by development is the creation of impervious surfaces. Imperviousness links urban land development to degradation of aquatic ecosystems in two ways:

- First, the combination of paved surfaces and piped runoff efficiently collects urban pollutants and transports them, in suspended or dissolved form, to surface waters. These pollutants may originate as airborne dust, be washed from the atmosphere during rains, or may be generated by automobiles and outdoor work activities.
- Second, increased peak flows and runoff durations typically cause erosion of stream banks and beds, transport of fine sediments, and disruption of aquatic habitat. Measures taken to control stream erosion, such as hardening banks with riprap or concrete, may permanently eliminate habitat.

Impervious cover can be minimized through identification of the smallest possible land area that can be practically impacted or disturbed during site development. Reducing impervious surfaces retains the permeability of the project site, allowing natural processes to filter and reduce sources of pollution.




Projects can conserve these features, by implementing the following planning and design phase techniques as applicable and feasible:

- Decrease the building footprint through the design of compact and taller structures when allowed by County zoning and design standards, and provided public safety is not compromised.
- Construct walkways, trails, patios, overflow parking lots, alleys, and other low-traffic areas with permeable surfaces. Refer to Appendix E for additional guidance on implementing SD-D Permeable Pavement as a Site Design BMP.
- Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and alternative transportation (e.g. pedestrians, bikes) are not compromised.
- Consider the implementation of shared parking lots and driveways where possible.
- Landscaped area in the center of a cul-de-sac can reduce impervious area depending on configuration. Design of a landscaped cul-de-sac must be coordinated with fire department personnel to accommodate turning radii and other operational needs.
- Design smaller parking lots with fewer stalls, smaller stalls, and more efficient lanes.
- Design parking indoors or underground.
- Minimize the use of impervious surfaces in the landscape design.

See Fact Sheets BL-2 (Outdoor Impervious Area), BL-3 (Rooftop Areas), and BL-4 (Landscaped Areas) in Appendix C for more information.

In addition, the following fact sheets provided in Appendix E describe ways to reduce impervious areas:

- SD-B – Impervious Area Dispersion;
- SD-C – Green Roofs; and
- SD-D – Permeable Pavement (Site Design).

## 4.3.4 Minimize soil compaction

☐ Minimize soil compaction in landscaped areas

The upper soil layers contain organic material, soil biota, and a configuration favorable for storing and slowly conveying storm water down gradient. By protecting native soils and vegetation in appropriate areas during clearing and grading the site can retain some of its existing beneficial hydrologic function. Soil compaction resulting from the movement of heavy construction equipment can reduce soil infiltration rates. It is important to recognize that areas adjacent to and under building foundations, roads and manufactured slopes must be compacted with minimum soil density requirements in compliance with County building and grading ordinances.

Projects can incorporate BMP SD-G (Conserve Natural Areas) and SD-K (Sustainable Landscaping) in Fact Sheets BL-1 and BL-4, respectively in Appendix C by implementing the following planning and design phase techniques as applicable and feasible:

- Avoid disturbance in planned green space and proposed landscaped areas where feasible. Areas that are planned for retaining their beneficial hydrological function should be protected during the grading and construction phase so that vehicles and construction equipment do not intrude and inadvertently compact the area.
- In areas planned for landscaping where compaction cannot be avoided, re-till the soil surface to allow for better infiltration capacity. Soil amendments are recommended and may be necessary to increase permeability and organic content. Soil stability, density requirements, and other geotechnical considerations associated with soil compaction must be reviewed by a qualified landscape architect or licensed geotechnical, civil or other professional engineer. Refer to fact sheet SD-F in Appendix E for additional guidance on implementing amended soils within the project footprint.

See Fact Sheets BL-1 (Existing Natural Site Features) and BL-4 (Landscaped Areas) in Appendix C for more information.

## 4.3.5 Disperse impervious areas

☐ Disconnect impervious surfaces through distributed pervious areas.

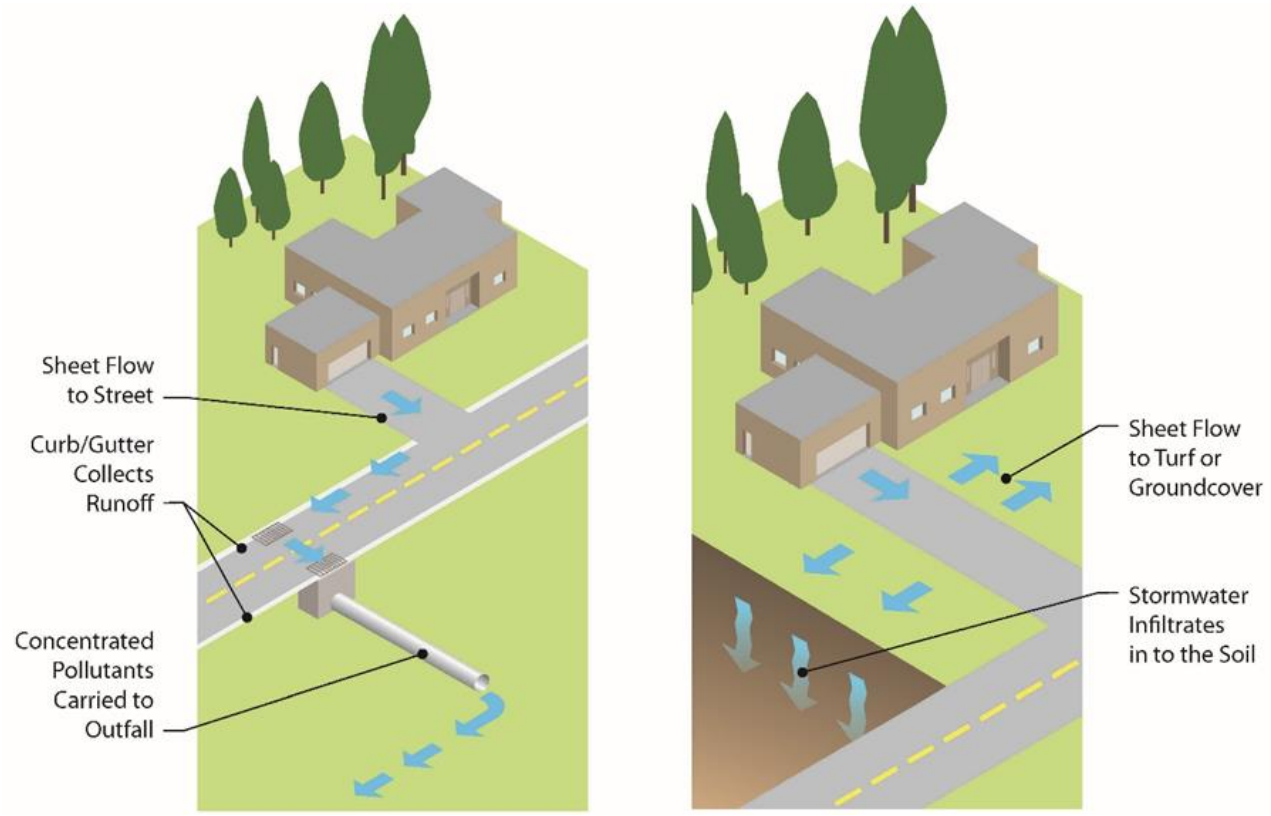
☐ Design and construct landscaped or other pervious areas to effectively receive and infiltrate, retain and/or treat runoff from impervious areas prior to discharging to the MS4

Impervious area dispersion (dispersion) refers to the practice of disconnecting impervious areas from directly draining to the storm drain system by routing runoff from impervious areas such as rooftops,

walkways, and driveways onto the surface of adjacent pervious areas. The intent is to slow runoff discharges, and to reduce volumes while achieving incidental treatment. Volume reduction from dispersion is dependent on the infiltration characteristics of the pervious area and the amount of impervious area draining to the pervious area. Treatment is achieved through filtration, shallow sedimentation, sorption, infiltration, evapotranspiration, biochemical processes and plant uptake.

The effects of imperviousness can be mitigated by disconnecting impervious areas from the drainage system and by encouraging detention and retention of runoff near the point where it is generated. Detention and retention of runoff reduces peak flows and volumes and allows pollutants to settle out or adhere to soils before they can be transported downstream. Disconnection practices may be applied in almost any location, but impervious surfaces must discharge into a suitable receiving area for the practices to be effective. Information gathered during the site assessment will help determine appropriate receiving areas.

Project designs should direct runoff from impervious areas to adjacent landscaping areas that have higher potential for infiltration and surface water storage. This will limit the amount of runoff generated, and therefore the size of the mitigation BMPs downstream. The design, including consideration of slopes and soils, must reflect a reasonable expectation that runoff will soak into the soil and produce no runoff of the DCV. On hillside sites, drainage from upper areas may be collected in conventional catch basins and piped to landscaped areas that have higher potential for infiltration. Or use low retaining walls to create terraces that can accommodate BMPs.



Projects can incorporate impervious area dispersion through the following planning and design phase techniques:

- Implement design criteria and considerations listed in the impervious area dispersion fact sheet (SD-B) presented in Appendix E.
- Drain rooftops into adjacent landscape areas.
- Drain impervious parking lots, sidewalks, walkways, trails, and patios into adjacent landscape areas.
- Reduce or eliminate curb and gutters or place curb openings from roadway sections, thus allowing roadway runoff to drain to adjacent pervious areas.
- Replace curbs and gutters with roadside vegetated swales or place curb openings and direct runoff from the paved street or parking areas to adjacent LID facilities. This can reduce the overall capital cost of the site development while improving the storm water quantity and quality issues and the site's aesthetics.
- Plan site layout and grading to allow for runoff from impervious surfaces to be directed into distributed permeable areas such as turf, landscaped or permeable recreational areas, medians, parking islands, planter boxes, etc.
- Detain and retain runoff throughout the site. On flatter sites, landscaped areas can be interspersed among the buildings and pavement areas. On hillside sites, drainage from upper areas may be collected in conventional catch basins and conveyed to landscaped areas in lower areas of the site.
- Pervious area that receives run on from impervious surfaces should have a minimum width of 10 feet and a maximum slope of 5%.

See Fact Sheets BL-2 (Outdoor Impervious Areas), BL-3 (Rooftop Areas) and BL-4 (Landscaped Areas) in Appendix C for more information.

In addition, the following fact sheet in Appendix E describes ways to reduce the impact of runoff from impervious areas:

- SD-B- Impervious area dispersion

## 4.3.6 Collect runoff

- Use small collection strategies located at, or as close to as possible to the sources (i.e. the point where storm water initially meets the ground) to minimize the transport of runoff and pollutants to the MS4 and receiving waters
- Use permeable material for projects with low traffic areas and appropriate soil conditions. Refer to Appendix E for additional guidance on implementing SD-D Permeable Pavement as a Site Design BMP.

Distributed control of storm water runoff from the site can be accomplished by applying small collection techniques (e.g. SD-C Green Roofs in Appendix E), or integrated management practices, on small sub-catchments or on residential lots. Small collection techniques foster opportunities to maintain the natural hydrology provide a much greater range of control practices. Integration of storm water management into landscape design and natural features of the site, reduce site development and

long-term maintenance costs, and provide redundancy if one technique fails. On flatter sites, it typically works best to intersperse landscaped areas and integrate small scale retention practices among the buildings and paving.

Permeable pavements contain small voids that allow water to pass through to a gravel base. They come in a variety of forms; they may be a modular paving system (concrete pavers, grass-pave, or gravel-pave) or poured in place pavement (porous concrete, permeable asphalt). Project applicants should identify locations where permeable pavements could be substituted for impervious concrete or asphalt paving. In areas where infiltration is not appropriate, permeable paving systems can be fitted with an under drain to allow filtration, storage, and evaporation, prior to drainage into the storm drain system.

Projects can incorporate runoff collection by implementing the following planning and design phase techniques:

- Implementing distributed small collection techniques to collect and retain runoff (see SD-E Rain Barrels in Appendix E)
- Installing permeable pavements (see SD-D Permeable Pavement in Appendix E)

See Fact Sheets BL-2 (Outdoor Impervious Areas) and BL-3 (Rooftop Areas) in Appendix C for more information.

## 4.3.7 Landscape with native or drought tolerant species

In accordance with the County's Watershed Protection Ordinance and Water Conservation in Landscaping Ordinance[5], applicants should select a landscape design and plant palette that minimizes required resources (irrigation, fertilizers and pesticides). Native plants require less fertilizer and pesticide use because they are already adapted to local rainfall patterns and soils conditions. Plants should be selected to be drought tolerant and to not require watering after establishment (2 to 3 years). After plants are established, watering should only be required during prolonged dry periods. Final selection of plant material should be made by a landscape architect experienced with LID techniques. Microclimates vary significantly throughout the region and consulting County resources (i.e., Water Efficient Landscape Design Manual[6]) will help to select plant material suitable for a specific geographic location.

See Fact Sheet BL-4 (Landscaped Areas) in Appendix C for more information.

*Note: For projects with bioretention facilities, applicants should consult Fact Sheet F.3 in Appendix F for a list of low water use plants able to withstand up to 96 hours of inundation.*

[5] Available online at https://www.sandiegocounty.gov/content/sdc/pds/LandscapeOrdinance.html
[6] Available online at https://www.sandiegocounty.gov/content/sdc/pds/LandscapeOrdinance.html.)

## 4.3.8 Harvest and use precipitation

Photograph Courtesy of Arid Solutions, Inc.

Harvest and use BMPs capture and store storm water runoff for later use. Harvest and use can be applied at smaller scales (Standard Projects) using rain barrels or at larger scales (PDPs) using cisterns. This harvest and use technique has been successful in reducing runoff discharged to the storm drain system conserving potable water and recharging groundwater.

Rain barrels are aboveground storage vessels that capture runoff from roof downspouts during rain events and detain that runoff for later reuse for irrigating landscaped areas. The temporary storage of roof runoff reduces the runoff volume from a property and may reduce the peak runoff velocity for small, frequently occurring storms. In addition, by reducing the amount of storm water runoff that flows overland into a storm water conveyance system (storm drain inlets and drain pipes), less pollutants are transported through the conveyance system into local creeks and the ocean. The reuse of the detained water for irrigation purposes leads to the conservation of potable water and the recharge of groundwater. SD-E fact sheet (Rain Barrels) in Appendix E provides additional detail for designing Harvest and Use BMPs. Projects can incorporate BMP SD-E by installing rain barrels or cisterns, as applicable.

*Note: Harvest and use BMPs proposed for indoor uses may require additional County approvals. Applicants should consult with staff for specific requirements.*

This page was intentionally left blank

# Building & Grounds Maintenance SC-41

## Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

## Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *General Pollution Prevention Protocols*

- Switch to non-toxic chemicals for maintenance to the maximum extent possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.
- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

| Objectives |
|---|
| ■ *Cover* |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |
| ■ *Product Substitution* |

| Targeted Constituents | |
|---|---|
| *Sediment* | ✓ |
| *Nutrients* | ✓ |
| *Trash* | |
| *Metals* | ✓ |
| *Bacteria* | ✓ |
| *Oil and Grease* | |
| *Organics* | |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | ✓ |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- Clean work areas at the end of each work shift using dry cleaning methods such as sweeping and vacuuming.

***Good Housekeeping***

*Pressure Washing of Buildings, Rooftops, and Other Large Objects*

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.

- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.

- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

*Landscaping Activities*

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.

- Use mulch or other erosion control measures on exposed soils. See also SC-40, Contaminated and Erodible Areas, for more information.

*Building Repair, Remodeling, and Construction*

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.

- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.

- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.

- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.

- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and

solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

*Mowing, Trimming, and Planting*

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- Use hand weeding where practical.

*Fertilizer and Pesticide Management*

- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- Apply pesticides only when wind speeds are low.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.

*Inspection*

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.

# Building & Grounds Maintenance SC-41

### *Spill Response and Prevention Procedures*

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- Clean up spills immediately.

### *Material Handling and Waste Management*

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- Dispose of empty pesticide containers according to the instructions on the container label.
- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

### *Employee Training Program*

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the needs of individual staff.

### *Quality Assurance and Record Keeping*

- Keep accurate logs that document maintenance activities performed and minimum BMP measures implemented.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

### *Facilities*

- Additional capital costs are not anticipated for building and grounds maintenance. Implementation of the minimum BMPs described above should be conducted as part of regular site operations.

### *Maintenance*

- Maintenance activities for the BMPs described above will be minimal, and no additional cost is anticipated.

## Supplemental Information

### *Fire Sprinkler Line Flushing*

Site fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

## References and Resources

City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual*.

Kennedy/Jenks Consultants, 2007. *The Truckee Meadows Industrial and Commercial Storm Water Best Management Practices Handbook*. Available online at: http://www.cityofsparks.us/sites/default/files/assets/documents/env-control/construction/TM-I-C_BMP_Handbook_2-07-final.pdf.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at:

http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

US EPA, 1997. *Best Management Practices Handbook for Hazardous Waste Containers*. Available online at: http://www.epa.gov/region6/6en/h/handbk4.pdf.

Ventura Countywide Stormwater Management Program Clean Business Fact Sheets. Available online at: http://www.vcstormwater.org/documents/programs_business/building.pdf.

# Drainage System Maintenance SC-44

## Description

As a consequence of its function, the stormwater drainage facilities on site convey stormwater that may contain certain pollutants either to the offsite conveyance system that collects and transports urban runoff and stormwater, or directly to receiving waters. The protocols in this fact sheet are intended to reduce pollutants leaving the site to the offsite drainage infrastructure or to receiving waters through proper on-site conveyance system operation and maintenance. The targeted constituents will vary depending on site characteristics and operations.

## Approach

Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *General Pollution Prevention Protocols*

- ☐ Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.
- ☐ Develop and follow a site specific drainage system maintenance plan that describes maintenance locations, methods, required equipment, water sources, sediment collection areas, disposal requirements, and any other pertinent information.

### *Good Housekeeping*

*Illicit Connections and Discharges*

- ☐ Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:

| Objectives |
|---|
| ■ *Cover* |
| ■ *Contain* |
| ■ *Educate* |
| ■ *Reduce/Minimize* |

| Targeted Constituents | |
|---|---|
| *Sediment* | ✓ |
| *Nutrients* | ✓ |
| *Trash* | ✓ |
| *Metals* | ✓ |
| *Bacteria* | ✓ |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | ✓ |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- ✓ Identify evidence of spills such as paints, discoloring, odors, etc.
- ✓ Record locations of apparent illegal discharges/illicit connections.
- ✓ Track flows back to potential discharges and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- ✓ Eliminate the discharge once the origin of flow is established.

- ☐ Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" or similar stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- ☐ Refer to fact sheet SC-10 Non-Stormwater Discharges for additional information.

*Illegal Dumping*

- ☐ Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- ☐ Establish a system for tracking incidents. The system should be designed to identify the following:
  - ✓ Illegal dumping hot spots;
  - ✓ Types and quantities (in some cases) of wastes;
  - ✓ Patterns in time of occurrence (time of day/night, month, or year);
  - ✓ Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills); and
  - ✓ Responsible parties.
- ☐ Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- ☐ Refer to fact sheet SC-10 Non-Stormwater Discharges for additional information.

***Preventative Maintenance***

*Catch Basins/Inlet Structures*

- ☐ Staff should regularly inspect facilities to ensure compliance with the following:
  - ✓ Immediate repair of any deterioration threatening structural integrity.
  - ✓ Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.

- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Prioritize storm drain inlets; clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

*Storm Drain Conveyance System*

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

*Pump Stations*

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

*Open Channel*

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Wildlife. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Army Corps of Engineers and USFWS.

***Spill Response and Prevention Procedures***

- Keep your spill prevention control plan up-to-date.

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.

***Employee Training Program***

- Educate employees about pollution prevention measures and goals.
- Train employees how to properly handle and dispose of waste using the source control BMPs described above.
- Train employees and subcontractors in proper hazardous waste management.
- Use a training log or similar method to document training.
- Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - ✓ OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).
  - ✓ OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).
  - ✓ Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

***Quality Assurance and Record Keeping***

- Keep accurate maintenance logs that document minimum BMP activities performed for drainage system maintenance, types and quantities of waste disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Keep accurate logs of illicit connections, illicit discharges, and illegal dumping into the storm drain system including how wastes were cleaned up and disposed.
- Establish procedures to complete logs and file them in the central office.

## Potential Limitations and Work-Arounds

Provided below are typical limitations and recommended "work-arounds" for drainage system maintenance:

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.

  - ✓ Perform all maintenance onsite and do not flush accumulated material downstream to private property or riparian habitats.

- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, and liquid/sediment disposal.

  - ✓ Develop and follow a site specific drainage system maintenance plan that describes maintenance locations, methods, required equipment, water sources, sediment collection areas, disposal requirements, and any other pertinent information.

- Regulations may include adoption of substantial penalties for illegal dumping and disposal.

  - ✓ Do not dump illegal materials anywhere onsite.

  - ✓ Identify illicit connections, illicit discharge, and illegal dumping.

  - ✓ Cleanup spills immediately and properly dispose of wastes.

- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the sanitary sewer system.

  - ✓ Collect all materials and pollutants accumulated in drainage system and dispose of according to local regulations.

  - ✓ Install debris excluders in areas with a trash TMDL.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

### *Facilities*

- Capital costs will vary substantially depending on the size of the facility and characteristics of the drainage system. Significant capital costs may be associated with purchasing water trucks, vacuum trucks, and any other necessary cleaning equipment or improving the drainage infrastructure to reduce the potential .

- Developing and implementing a site specific drainage system maintenance plan will require additional capital if a similar program is not already in place.

***Maintenance***

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.
- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

## Supplemental Information

*Storm Drain Flushing*

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing re-suspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used if allowed or that fire hydrant line flushing coincide with storm sewer flushing.

## References and Resources

City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual*.

Knox County Tennessee *Stormwater Management Manual* Chapter 5 Drainage System Maintenance, 2008. Available online at: http://www.knoxcounty.org/stormwater/manual/Volume%201/knoxco_swmm_v1_chap5_jan2008.pdf.

US EPA. Storm Drain System Cleaning, 2012. Available online at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=102.

# Appendix C – Structural Control BMPs

# E.21 BF-3 Proprietary Biofiltration Systems

The purpose of this fact sheet is to help explain the potential role of proprietary BMPs in meeting biofiltration requirements, when full retention of the DCV is not feasible. The fact sheet does not describe design criteria like the other fact sheets in this appendix because this information varies by BMP product model.

### *Criteria for Use of a Proprietary BMP as a Biofiltration BMP*

A proprietary BMP may be acceptable as a "biofiltration BMP" under the following conditions:

(1) The BMP meets the minimum design criteria listed in Appendix F, including the selection criteria (i.e. only allowed in No Infiltration Condition and where site-specific documentation demonstrates that the use of larger footprint biofiltration BMPs (i.e. 3 %) would be infeasible) and the pollutant treatment performance standard in Appendix F.1.1;

(2) The BMP is designed and maintained in a manner consistent with its performance certifications (See explanation in Appendix F.1.2); and

(3) The BMP is acceptable at the discretion of County staff. While the County has no obligation to accept the use of any proposed proprietary BMP, applicants will be provided a written explanation describing the rationale for the rejection of any proposed devices.

### *Guidance for Sizing a Proprietary BMP as a Biofiltration BMP*

Proprietary biofiltration BMPs must meet the same sizing guidance as non-proprietary BMPs. Sizing is typically based on capturing and treating 1.50 times the DCV not reliably retained. Guidance for sizing biofiltration BMPs to comply with requirements of this manual is provided in Appendix F.1.2.

### *Maintenance Overview*

Refer to manufacturer for maintenance information

Bio Clean

A Forterra Company

# Modular Wetlands® Linear

## A Stormwater Biofiltration Solution

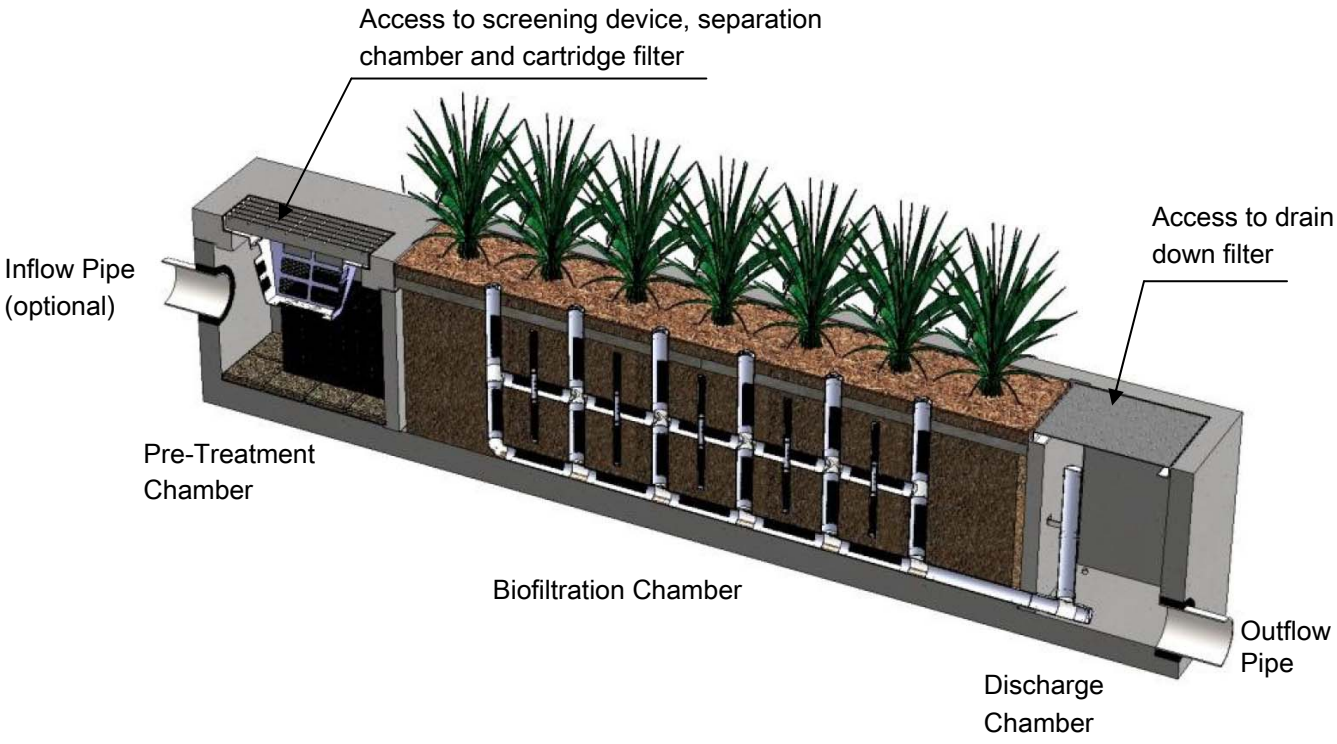
# OPERATION & MAINTENANCE MANUAL

# Maintenance Guidelines for Modular Wetlands 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.

Bio Clean
A Forterra Company

# Inspection Report
# Modular Wetlands Linear

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ___/___/___ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

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

## 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:

# Cleaning and Maintenance Report
# Modular Wetlands Linear

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

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

| Site Map # | GPS Coordinates of Insert | Manufacturer / Description / Sizing | Trash Accumulation | Foliage Accumulation | Sediment Accumulation | Total Debris Accumulation | Condition of Media 25/50/75/100 (will be changed @ 75%) | Operational Per Manufactures' Specifications (If not, why?) |
|---|---|---|---|---|---|---|---|---|
| | Lat:<br>Long: | MWS Catch Basins | | | | | | |
| | | MWS Sedimentation Basin | | | | | | |
| | | Media Filter Condition | | | | | | |
| | | Plant Condition | | | | | | |
| | | Drain Down Media Condition | | | | | | |
| | | Discharge Chamber Condition | | | | | | |
| | | Drain Down Pipe Condition | | | | | | |
| | | Inlet and Outlet Pipe Condition | | | | | | |

Comments:

Technical

# ACF R-Tank Operation, Inspection & Maintenance

## Operation

Your ACF R-Tank System has been designed to function in conjunction with the engineered drainage system on your site, the existing municipal infrastructure, and/or the existing soils and geography of the receiving watershed. Unless your site included certain unique and rare features, the operation of your ACF R-Tank System will be driven by naturally occurring systems and will function autonomously. However, upholding a proper schedule of Inspection & Maintenance is critical to ensuring continued functionality and optimum performance of the system.

## Inspection

Both the ACF R-Tank and all stormwater pre-treatment features incorporated into your site must be inspected regularly. Inspection frequency for your system must be determined based on the contributing drainage area, but should never exceed one year between inspections (six months during the first year of operation).

Inspections may be required more frequently for pre-treatment systems. You should refer to the manufacturer requirements for the proper inspection schedule.

With the right equipment your inspection and measurements can be accomplished from the surface without physically entering any confined spaces. If your inspection does require confined space entry, you MUST follow all local/regional requirements as well as OSHA standards.

ACF R-Tank Systems may incorporate Inspection Ports, Maintenance Ports, and/or adjoining manholes. Each of these features are easily accessed by removing the lid at the surface. With the cover removed, a visual inspection can be performed to identify sediment deposits within the structure. Using a flashlight, ALL access points should be examined to complete a thorough inspection.

***Inspection Ports***
Usually located centrally in the ACF R-Tank System, these perforated columns are designed to give the user a base-line sediment depth across the system floor.

***Maintenance Ports***
Usually located near the inlet and outlet connections, you'll likely find deeper deposits of heavier sediments when compared to the Inspection Ports.

***Manholes***
Most systems will include at least two manholes – one at the inlet and another at the outlet. There may be more than one location where stormwater enters the system, which would result in additional manholes to inspect.

Bear in mind that these manholes often include a sump below the invert of the pipe connecting to the ACF R-Tank. These sumps are designed to capture sediment before it reaches the ACF R-Tank, and they should be kept clean to ensure they function properly. However, existence of sediment in the sump does NOT necessarily mean sediment has accumulated in the ACF R-Tank.

After inspecting the bottom of the structure, use a mirror on a pole (or some other device) to check for sediment or debris in the pipe connecting to the ACF R-Tank.

ACF ENVIRONMENTAL

If sediment or debris is observed in any of these structures, you should determine the depth of the material. This is typically accomplished with a stadia rod, but you should determine the best way to obtain the measurement.

All observations and measurements should be recorded on an Inspection Log kept on file. We've included a form you can use at the end of this guideline.

## Maintenance

The ACF R-Tank System should be back-flushed once sediment accumulation has reached 6" or 15% of the total system height. Use the chart below as a guideline to determine the point at which maintenance is required on your system.

| R-Tank Unit | Height | Max Sediment Dept |
|---|---|---|
| Mini | 9.5" | 1.5" |
| Single | 17" | 3" |
| Double | 34" | 5" |
| Triple | 50" | 6" |
| Quad | 67" | 6" |
| Pent | 84" | 6" |

**Before any maintenance is performed on your system, be sure to plug the outlet pipe to prevent contamination of the adjacent systems.**

To back-flush the ACF R-Tank, water is pumped into the system through the Maintenance Ports as rapidly as possible. Water should be pumped into ALL Maintenance Ports. The turbulent action of the water moving through the ACF R-Tank will suspend sediments which may then be pumped out.

If your system includes an Outlet Structure, this will be the ideal location to pump contaminated water out of the system. However, removal of back-flush water may be accomplished through the Maintenance Ports, as well.

For systems with large footprints that would require extensive volumes of water to properly flush the system, you should consider performing your maintenance within 24 hours of a rain event. Stormwater entering the system will aid in the suspension of sediments and reduce the volume of water required to properly flush the system.

Once removed, sediment-laden water may be captured for disposal or pumped through a Dirtbag™ (if permitted by the locality).

ACF ENVIRONMENTAL
2831 Cardwell Road
Richmond, VA 23234
800-448-3636
www.acfenvironmental.com

## Step-By-Step Inspection & Maintenance Routine

1) Inspection
    a. Inspection Port
        i. Remove Cap
        ii. Use flashlight to detect sediment deposits
        iii. If present, measure sediment depth with stadia rod
        iv. Record results on Maintenance Log
        v. Replace Cap
    b. Maintenance Port/s
        i. Remove Cap
        ii. Use flashlight to detect sediment deposits
        iii. If present, measure sediment depth with stadia rod
        iv. Record results on Maintenance Log
        v. Replace Cap
        vi. Repeat for ALL Maintenance Ports
    c. Adjacent Manholes
        i. Remove Cover
        ii. Use flashlight to detect sediment deposits
        iii. If present, measure sediment depth with stadia rod, accounting for depth of sump (if present)
        iv. Inspect pipes connecting to ACF R-Tank
        v. Record results on Maintenance Log
        vi. Replace Cover
        vii. Repeat for ALL Manholes that connect to the ACF R-Tank
2) Maintenance
    a. Plug system outlet to prevent discharge of back-flush water
    b. Determine best location to pump out back-flush water
    c. Remove Cap from Maintenance Port
    d. Pump water as rapidly as possible (without over-topping port) into system until at least 1” of water covers system bottom
    e. Replace Cap
    f. Repeat at ALL Maintenance Ports
    g. Pump out back-flush water to complete back-flushing
    h. Vacuum all adjacent structures and any other structures or stormwater pre-treatment systems that require attention
    i. Sediment-laden water may be captured for disposal or pumped through a Dirtbag™.
    j. Replace any remaining Caps or Covers
    k. Record the back-flushing event in your Maintenance Log with any relevant specifics

# ACF R-Tank Maintenance Log

Site Name: _____

Location: _____

System Owner: _____

Company Responsible for Maintenance: _____

Contact: _____

Phone Number: _____

| Date | Location | Depth to Bottom | Depth to Sediment | Sediment Depth | Observations/Notes | Initials |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

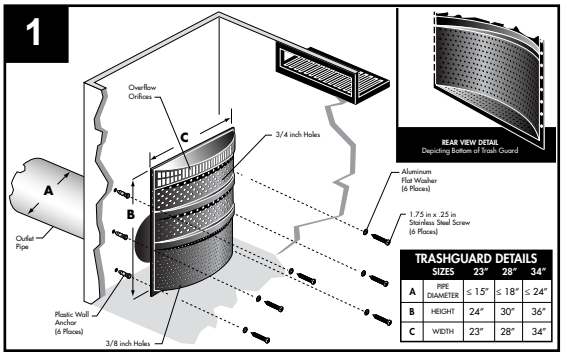
Technical

# ACF R-Tank$^{HD}$ Maintenance

With adequate pre-treatment of stormwater before it enters the ACF R-Tank$^{HD}$, heavy sediments, trash, and other debris will not enter the system. Systems like the TrashGuard (see image 1) are simple and inexpensive, but also highly effective. Therefore, most maintenance efforts should be directed at the pre-treatment structures to ensure they are functioning properly.

To monitor the accumulation of fine sediments that may enter the detention/retention area, ACF R-Tank$^{HD}$ systems should include maintanance ports.

1



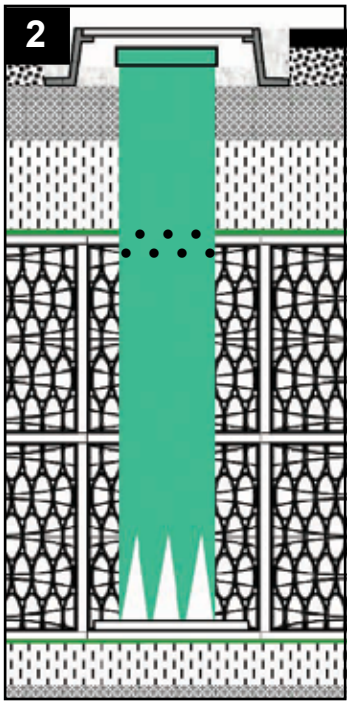

TRASHGUARD DETAILS

| SIZES | | 23" | 28" | 34" |
|---|---|---|---|---|
| A | PIPE DIAMETER | ≤ 15" | ≤ 18" | ≤ 24" |
| B | HEIGHT | 24" | 30" | 36" |
| C | WIDTH | 23" | 28" | 34" |

## Maintenance

Running from the bottom of the ACF R-Tank$^{HD}$ up to ground level, Maintenance Ports are made from solid PVC Pipe with notches cut into the bottom. As water is pumped into the port the notches will direct water throughout the bottom of the system to create turbulence, thereby re-suspending accumulated sediments.

2



After pumping water into the tanks, flushing is completed by vacuuming sediment laden water out of the system either through the outlet structure or through the flush port.

The diameter of the flush port is determined by a number of factors including the rate at which water will be pumped into the system, the number of flush ports incorporated, and the possible requirement of vacuuming through the port. Experience has shown that a 12" port is more than adequate for virtually any required use, with 6" ports more common when vacuuming will be performed at the outlet structure.


R TANK HD

2831 Cardwell Road
Richmond, VA 23234
800-448-3636
www.acfenvironmental.com

# ACF R-Tank$^{HD}$ Maintenance

## Installing the Maintenance System

To install the PCV Pipe, remove the center small plate and cut the top large plate between the remaining interior small plates. Before inserting the port into the Tank, install an anti-scour plate in the bottom of the Tank to prevent disturbance of the base materials.

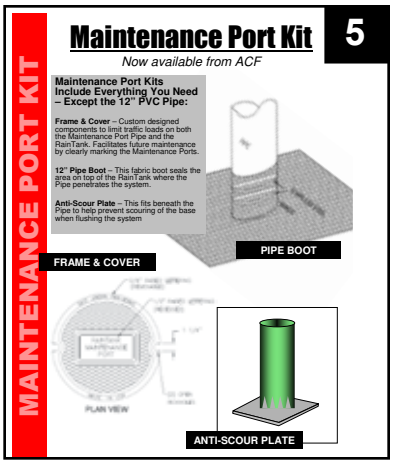
Maintenance ports should be capped at the surface. In landscaped areas, this may be accomplished with a simple pipe cap or plastic valve box (see image 4 lower inset). In paved areas, metal lids are more appropriate (see image 4).

## Maintenance Intervals

Maintenance Schedules for the ACF R-Tank$^{HD}$ System are a function of the contributing area and the type of pre-treatment specified. A standard maintenance schedule may include quarterly inspections through the first year of use, with yearly inspections thereafter. Flushing should be performed if sediment should the lesser of 6” or 15% of the system height.

## Availability

All system components, including caps, lids, anti-scour plates, frames and covers are available from ACF. In fact, we’ve created Maintenance Port Kids (see image 5) that include everything needed except for the pipe itself. Contact your local sales representative or our Sales Office at 800-448-3636 for assistance.




ENVIRONMENTAL

2831 Cardwell Road
Richmond, VA 23234
800-448-3636
www.acfenvironmental.com

# Appendix D – Employee Training Program

# TRAINED PERSONNEL LOG

| Name of Person Attending Training | Date of Training | Title of Training | Location of Training | Signature of Person Attending Training |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# Appendix E – Inspection Program

# BMP INSPECTION LOG

| Name of Person/Company Providing Maintenance | Date of Maintenance | BMP Maintained | Maintenance Performed | Signature of Person Providing Maintenance |
|---|---|---|---|---|
| | | Efficient Irrigation and Landscaping | | |
| | | Storm Drain Inlet Stenciling and Signage | | |
| | | Modular Wetland System | | |
| | | Street Sweeping | | |
| | | R Tank | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# Appendix F – Maintenance Program

# BMP MAINTENANCE LOG

| Name of Person/Company Providing Maintenance | Date of Maintenance | BMP Maintained | Maintenance Performed | Signature of Person Providing Maintenance |
|---|---|---|---|---|
| | | Efficient Irrigation and Landscaping | | |
| | | Storm Drain Inlet Stenciling and Signage | | |
| | | Modular Wetland System | | |
| | | Street Sweeping | | |
| | | R Tank | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# Appendix G – Cost Estimate

# COST ESTIMATE

| BMP | Quantity | Inspection Cost | Annual O&M Cost | Start Up Date | O&M Frequency (weekly/monthly/ quarterly) |
|---|---|---|---|---|---|
| Efficient Irrigation and Landscaping | 1 | $100 | $400 | Prior to Occupancy | Quarterly |
| Storm Drain Inlet Stenciling and Signage | 3 | $150 | $500 | Prior to Occupancy | Quarterly |
| Modular Wetland System | 4 | $200 | $5,600 | Prior to Occupancy | Annually |
| R Tank | 4 | | | Prior to Occupancy | Annually (1st year bi-annually) |
| Street Sweeping | 1 | $100 | $500 | Prior to Occupancy | After rain event or after visual inspection shows sediment accumulation |

**Total Annual / 10-year O&M Cost = $ / $**

# ATTACHMENT 3B – MAINTENANCE AGREEMENT

All projects are required to maintain designed functionality of structural BMPs in perpetuity. Privately-owned projects must record a *Storm Drain Maintenance Agreement* with the County of San Diego Assessor's Office. A template *Storm Drain Maintenance Agreement* is available at:

http://www.cityofvista.com/services/city-departments/community-development/building-planning-permits-applications/land-development-autocad-templates/storm-water-forms

# ATTACHMENT 4 - REQUIREMENTS FOR CONSTRUCTION PLANS

Section 8.2.2 of the *BMP Design Manual* identifies minimum requirements for storm drain construction plan sheets. Use this checklist to ensure project construction plans submitted for review include necessary information for storm drain improvements. Construction plans must include the following:

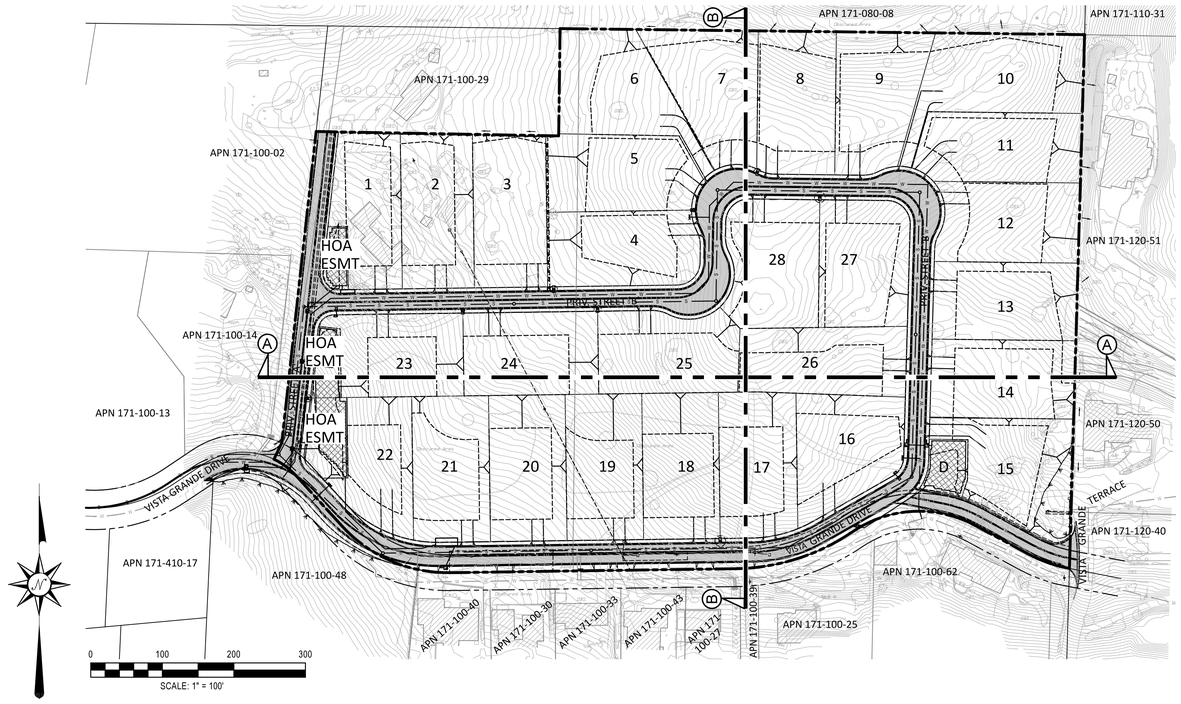
☐ All items identified in Section 8.2.2 of the *BMP Design Manual*.

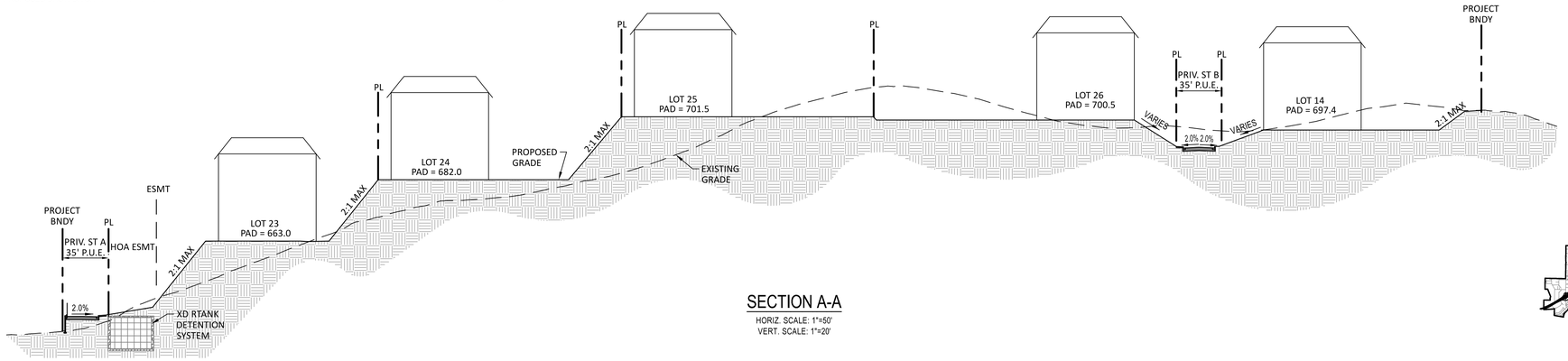
# TENTATIVE SUBDIVISION MAP FOR 2277 VISTA GRANDE DRIVE

PROJECT FILE NUMBER: P21-0114

## LEGEND

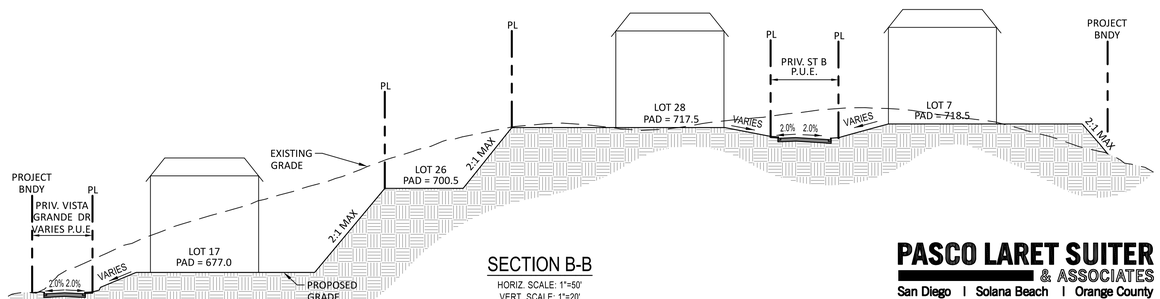
| ITEM | SYMBOL |
|---|---|
| PROJECT BOUNDARY | |
| LOT LINE | |
| EASEMENT LINE | |
| BUILDING SETBACK LINE | |
| CENTERLINE | |
| EXISTING CITY BOUNDARY | |
| EXISTING OVERHEAD ELECTRICAL | OE |
| EXISTING WATERLINE | W |
| EXISTING SEWER MAIN | S |
| EXISTING GAS LINE | G |
| EXISTING STORM DRAIN | |
| EXISTING FIRE HYDRANT | |
| EXISTING FENCE | X |
| DAYLIGHT LINE | |
| CUT/FILL LINE | C / F |
| FINISHED GROUND CONTOUR | 440 |
| EXISTING GROUND CONTOUR | 440 |
| PROPOSED CUT/FILL SLOPE | 2:1 |
| TOP/TOE GRADING LINE | |
| RETAINING WALL (PER SEPARATE PERMIT) | |
| EXISTING SPOT ELEV. | (400.50 FG) |
| FUTURE SPOT ELEVATIONS | 400.50 FG |
| PROPOSED 6" CURB & GUTTER | |
| PROPOSED 6" ROLLED CURB & GUTTER | |
| PROPOSED STORM DRAIN | SD |
| PROPOSED CURB INLET | |
| PROPOSED STORM DRAIN CLEANOUT | |
| PROPOSED MODULAR WETLAND SYSTEM | |
| PROPOSED RTANK | |
| PROPOSED CURB OUTLET | |
| PROPOSED SEWER MAIN | S |
| PROPOSED SEWER MANHOLE | |
| PROPOSED WATER MAIN | W |
| PROPOSED BROW DITCH | |




## SECTION A-A

HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=20'




## SECTION B-B

HORIZ. SCALE: 1"=50'
VERT. SCALE: 1"=20'

## OWNER/SUBDIVIDER

WE HEREBY CERTIFY THAT WE ARE THE RECORD OWNERS OF THE PROPERTY SHOWN ON THIS TENTATIVE SUBDIVISION MAP AND THAT SAID MAP SHOWS OUR ENTIRE CONTIGUOUS OWNERSHIP (EXCLUDING SUBDIVISION LOTS). WE UNDERSTAND THAT PROPERTY IS CONSIDERED CONTIGUOUS EVEN IF IT IS SEPARATED BY ROADS, STREETS, UTILITY EASEMENTS OR RAILROADS RIGHTS-OF-WAY.

## OWNER

OMNI FINANCIAL
1260 41ST STREET, SUITE O
CAPITOLA, CA 95010

## SUBDIVIDER

GREG PERRINE
1151 DURYEA AVENUE
IRVINE, CA 92614

## ENGINEER OF WORK

WILLIAM J. SUITER RCE 68964

REGISTERED PROFESSIONAL ENGINEER — WILLIAM J SUITER — No. RCE 68964 — EXP. 12-31-21 — Civil — STATE OF CALIFORNIA

## LEGAL DESCRIPTION

PARCEL 1: (APN: 171-100-05-00)
PORTION OF SECTION 8, TOWNSHIP 11 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO UNITIED STATES GOVERNMENT SURVEY APPROVED DECEMBER 14, 1885.

PARCEL 2: (APN: 171-100-28-00)
ALL THAT PORTION OF SECTION 8, TOWNSHIP 11 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO UNITIED STATES GOVERNMENT SURVEY APPROVED DECEMBER 14, 1885.

## PROJECT DESCRIPTION

GENERAL PLAN AMENDMENT, ZONE CHANGE, AND TENTATIVE SUBDIVISION MAP TO DEVELOP 28 LOTS.

## AERIAL TOPOGRAPHY

AERIAL TOPOGRAPHY SUPPLIED BY: INLAND AERIAL SURVEYS, INC.
7117 ARLINGTON AVENUE, SUITE A
RIVERSIDE, CA 92503
951-687-4252
FLOWN 12/24/2013

## ASSESSOR'S PARCEL NUMBER

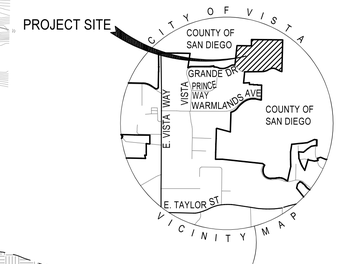
171-100-05, 171-100-28
TAX RATE AREA: 96-099

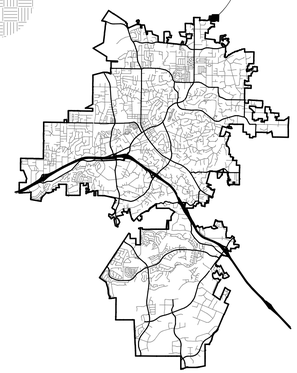
## EARTHWORK QUANTITIES

| | |
|---|---|
| CUT: | 69,532 CY |
| FILL: | 69,532 CY |
| EXPORT: | 0 CY |

## GENERAL NOTES:

1. APN: 171-100-05, 171-100-28
2. GROSS ACREAGE: 16.99 AC
3. NET ACREAGE: 15.12 AC
4. NUMBER OF LOTS: 28
5. NUMBER OF DWELLING UNITS: 28
6. EXISTING ZONING: A-1 (AGRICULTURAL)
   PROPOSED ZONING: E-1 ESTATE RESIDENTIAL
7. EXISTING GENERAL PLAN: RURAL RESIDENTIAL (1 DU/AC)
   PROPOSED GENERAL PLAN: LD - LOW DENSITY RESIDENTIAL (2 DU/AC)
8. FINISH GRADES SHOWN HEREON ARE APPROXIMATE AND ARE SUBJECT TO CHANGE IN FINAL DESIGN.
9. PROPOSED DENSITY: 2 DU/AC
10. CUT AND FILL SLOPES NO STEEPER THAN 2:1
11. PUBLIC SERVICES AND DISTRICTS:
    - GAS & ELECTRIC: SAN DIEGO GAS AND ELECTRIC
    - TELEPHONE: AT&T
    - WATER: VISTA IRRIGATION DISTRICT
    - SEWER: CITY OF VISTA
    - FIRE DISTRICT: CITY OF VISTA
    - SCHOOL DISTRICT: VISTA UNIFIED SCHOOL DISTRICT
12. NO SPECIAL DISTRICTS ARE PROPOSED
13. PROPOSED SETBACK: FRONT YARD = MINIMUM 50' FROM CL; SIDE YARD = MINIMUM 10'; REAR YARD= MINIMUM 20'
14. SEE STORM WATER MITIGATION PLAN PREPARED BY: PASCO LARET SUITER & ASSOCIATES DATED: MARCH 2021
15. SEE PRELIMINARY DRAINAGE STUDY PREPARED BY: PASCO LARET SUITER & ASSOCIATES DATED: MARCH 2021
16. SEE PRELIMINARY GEOTECHNICAL EVALUATION PREPARED BY: GEOSOILS, INC DATED: W.O. 5053-A1-SC FEBRUARY 23, 2006
17. SEE INFILTRATION TESTING RESULTS PREPARED BY: GEOSOILS, INC DATED: W.O. 7149-A-SC OCTOBER 18, 2016



SIGNATURES CONSTITUTE THAT ALL PLANS, SPECIFICATIONS, GUARANTEES, AND OTHER REQUIREMENTS NECESSARY FOR ISSUANCE OF A BUILDING PERMIT CONFORMING TO THIS SITE DEVELOPMENT PLAN HAVE BEEN COMPLETED AND APPROVED BY THE APPROPRIATE DEPARTMENT.

| | |
|---|---|
| PLANNING DEPARTMENT | DATE |
| ENGINEERING DEPARTMENT | DATE |
| FIRE DEPARTMENT | DATE |
| PUBLIC WORKS DEPARTMENT | DATE |

| SUBMITTAL NUMBER | DATE | CHANGES |
|---|---|---|
| 1 | MARCH 2021 | INITIAL SUBMITTAL |
| 2 | MAY 2021 | RESUBMITTAL |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |

**PASCO LARET SUITER & ASSOCIATES**
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

SHEET 1 — CITY of VISTA — OF 6

GEN PLAN AMEND (RR TO LDR), ZONE CHANGE (A1 TO E1), AND TSM (28 LOTS) - FILE # P21-0114

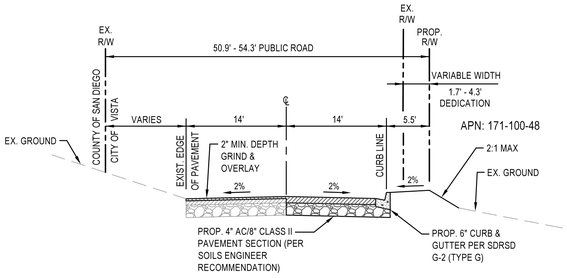
OWNER: OMNI FINANCIAL, LLC CONTACT: GREG PERRINE PHONE: (714) 600-8141
ADDRESS: 1151 DURYEA AVENUE, IRVINE, CA 92614
ARCHITECT, ENGINEER OR DESIGNER: PASCO LARET SUITER & ASSOCIATES, INC. PHONE: 949-661-6695
ADDRESS: 27127 CALLE ARROYO, SUITE 1904 SAN JUAN CAPISTRANO, CA 92675
TYPE OF DEVELOPMENT: 28 LOTS
EXIST. ZONE: A-1 PROP. ZONE: E-1 APN(S): 171-100-05, 171-100-28

| SITE DATA AREA (SQ. FT.) | | COVERAGE % | DWELLING UNITS | | COMMON OPEN SPACE | |
|---|---|---|---|---|---|---|
| | | | | | PROVIDED | REQUIRED |
| LOT: | 740,115 | 100% | 1 BDRM | | | |
| BLDG: | 69,300 | 9% | 2 BDRM | - | | |
| PARKING/PVMT: | 106,945 | 13% | 3 BDRM | | PRIVATE OPEN SPACE | |
| LANDSCAPE: | 563,870 | 78% | 4 BDRM | | PROVIDED | REQUIRED |
| | | | TOTAL UNITS | 28 | | |

| PARKING | | ORD. REQ. | | REC. VEH. STORAGE SPACES | DRIVEWAY (SIZE & SLOPE) | | SETBACKS | |
|---|---|---|---|---|---|---|---|---|
| GARAGE | 84 | LOADING | - | | 1 WAY 12' MIN. | FRONT 50' | REAR 20' | |
| GUEST | 112 | HANDICAP | - | | 2 WAY 24' MIN. | L. SIDE 10' | SPECIAL N/A | |
| OPEN | | TOTAL | | N/A | SLOPE VARIES | R. SIDE 10' | ACCES. BLDG N/A | |

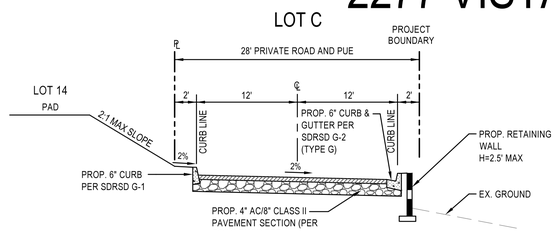
# TENTATIVE SUBDIVISION MAP FOR 2277 VISTA GRANDE DRIVE

PROJECT FILE NUMBER: P21-0114



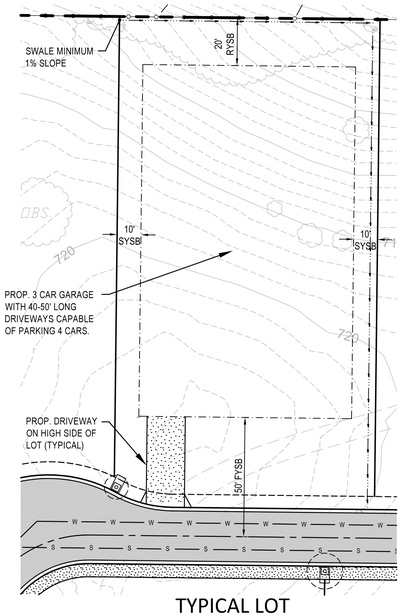

## TYPICAL SECTION - VISTA GRANDE DRIVE (PUBLIC)

STA. 13+83.09 - 14+83.09
SCALE: NTS



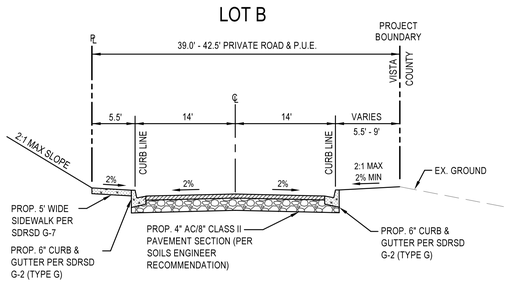

## TYPICAL SECTION - ACCESS ROAD

SCALE: NTS



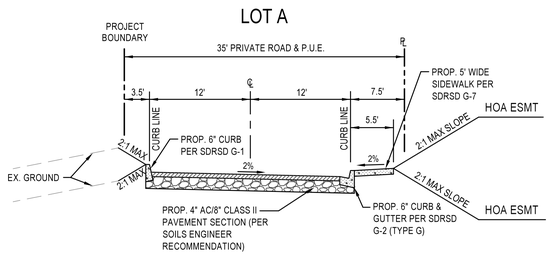

## TYPICAL LOT

SCALE: 1" = 30'



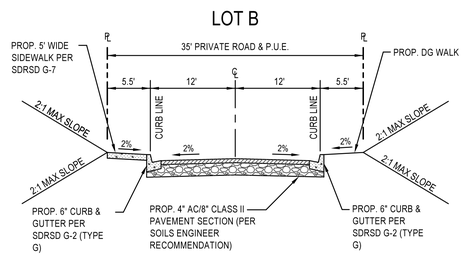

## TYPICAL SECTION - VISTA GRANDE DRIVE (PRIVATE)

STA. 14+83.09 - 24+27.35
SCALE: NTS



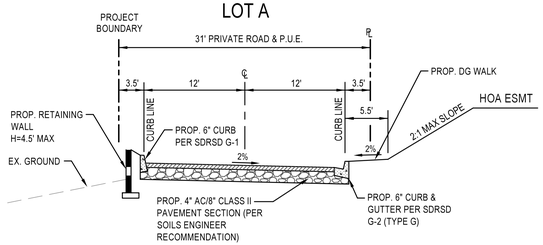

## TYPICAL SECTION - PRIVATE STREET A

STA. 10+00.00 - 12+37.93
SCALE: NTS



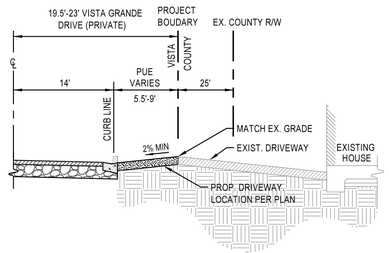

## TYPICAL SECTION - PRIVATE STREET 'B'

STA. 10+47.53 - 23+75.30
SCALE: NTS



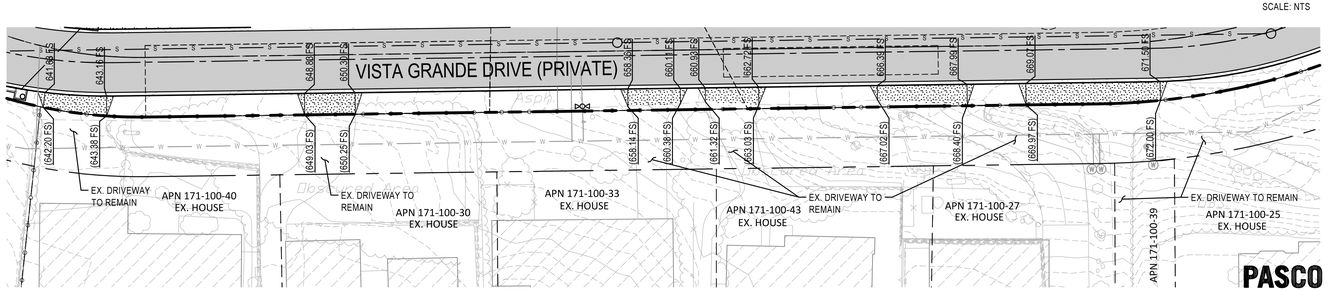

## TYPICAL SECTION - PRIVATE STREET A

STA. 12+37.93 - 14+78.32
SCALE: NTS



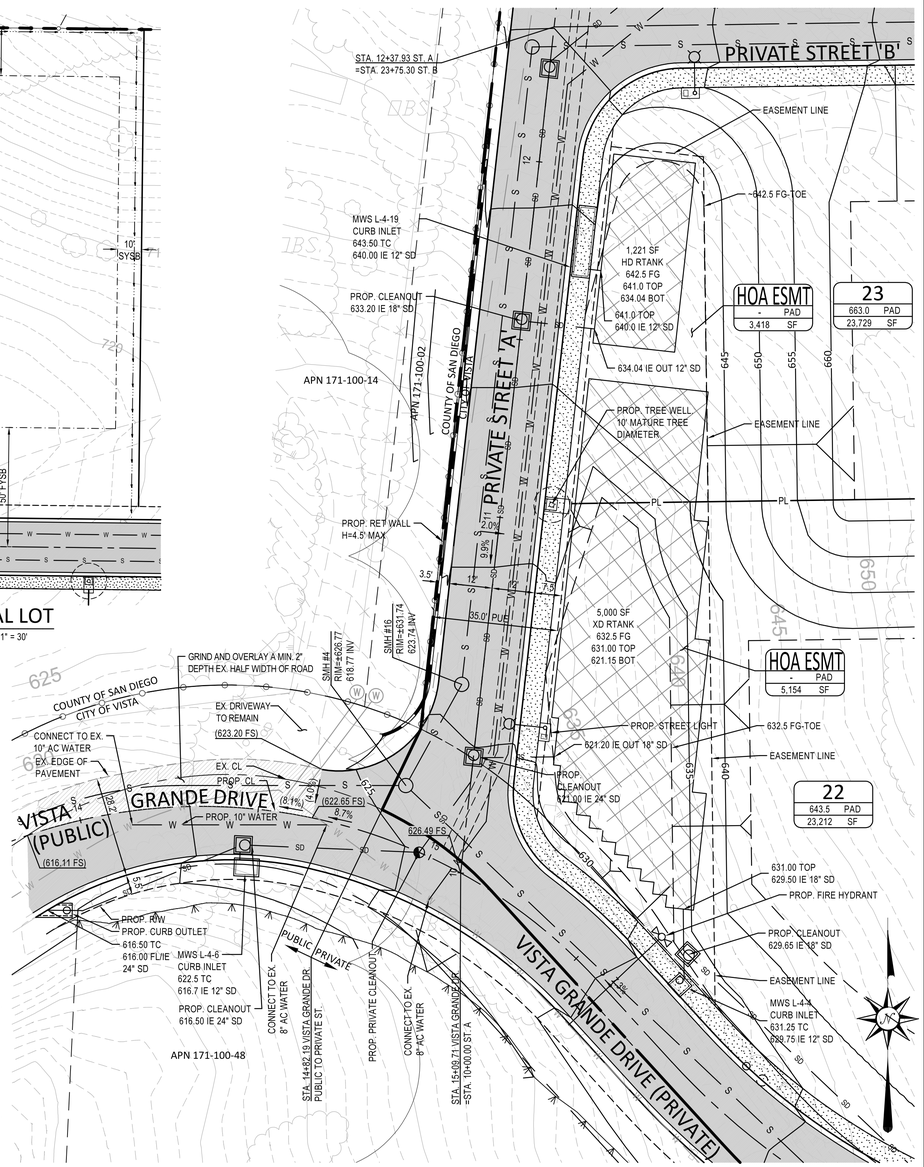

## TYPICAL DRIVEWAY SECTION - ADJOINING LOTS

SCALE: NTS




## DRIVEWAYS - ADJOINING LOTS

SCALE: 1"=30'




## DETAIL # 1

SCALE: 1" = 20'

SIGNATURES CONSTITUTE THAT ALL PLANS, SPECIFICATIONS, GUARANTEES, AND OTHER REQUIREMENTS NECESSARY FOR ISSUANCE OF A BUILDING PERMIT CONFORMING TO THIS SITE DEVELOPMENT PLAN HAVE BEEN COMPLETED AND APPROVED BY THE APPROPRIATE DEPARTMENT.

| | |
|---|---|
| PLANNING DEPARTMENT | DATE |
| ENGINEERING DEPARTMENT | DATE |
| FIRE DEPARTMENT | DATE |
| PUBLIC WORKS DEPARTMENT | DATE |

| SUBMITTAL NUMBER | DATE | CHANGES |
|---|---|---|
| 1 | MARCH 2021 | INITIAL SUBMITTAL |
| 2 | MAY 2021 | RESUBMITTAL |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |


**PASCO LARET SUITER & ASSOCIATES**
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com


SHEET 2 — **CITY of VISTA** — OF 6

GEN PLAN AMEND (RR TO LDR), ZONE CHANGE (A1 TO E1), AND TSM (28 LOTS) - FILE # P21-0114

OWNER: OMNI FINANCIAL, LLC CONTACT: GREG PERRINE PHONE: (714) 600-8141
ADDRESS: 1151 DURYEA AVENUE, IRVINE, CA 92614
ARCHITECT, ENGINEER OR DESIGNER: PASCO LARET SUITER & ASSOCIATES, INC. PHONE: 949-661-6695
ADDRESS: 27127 CALLE ARROYO, SUITE 1904 SAN JUAN CAPISTRANO, CA 92675
TYPE OF DEVELOPMENT: 28 LOTS
EXIST. ZONE: A-1 PROP. ZONE: E-1 APN(S): 171-100-05, 171-100-28

| SITE DATA AREA (SQ. FT.) | | COVERAGE % |
|---|---|---|
| LOT: | 740,115 | 100% |
| BLDG: | 69,300 | 9% |
| PARKING/PVMT: | 106,945 | 13% |
| LANDSCAPE: | 563,870 | 78% |

| DWELLING UNITS | | COMMON OPEN SPACE | |
|---|---|---|---|
| | | PROVIDED | REQUIRED |
| 1 BDRM | | | |
| 2 BDRM | - | | |
| 3 BDRM | | PRIVATE OPEN SPACE | |
| 4 BDRM | | PROVIDED | REQUIRED |
| TOTAL UNITS | 28 | | |

| PARKING | | ORD. REQ. | | |
|---|---|---|---|---|
| GARAGE | 84 | LOADING | - | REC. VEH. STORAGE SPACES N/A |
| GUEST | 112 | HANDICAP | - | |
| OPEN | | TOTAL | | |

| DRIVEWAY (SIZE & SLOPE) | | SETBACKS | |
|---|---|---|---|
| 1 WAY 12' MIN. | FRONT 50' | REAR 20' | |
| 2 WAY 24' MIN. | L. SIDE 10' | SPECIAL N/A | |
| SLOPE VARIES | R. SIDE 10' | ACCES. BLDG N/A | |


SAVE DATE: --- ~ PLOT DATE: --- ~ FILE NAME: J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\DRAWING\DISCRETIONARY PLANS\TENTATIVE MAP\3474-TM-TBLOCK.dwg

# PRELIMINARY GRADING PLAN FOR 2277 VISTA GRANDE DRIVE

PROJECT FILE NUMBER: **P21-0114**

## LEGEND

| ITEM | SYMBOL |
|---|---|
| PROJECT BOUNDARY | |
| LOT LINE | |
| EASEMENT LINE | |
| BUILDING SETBACK LINE | |
| CENTERLINE | |
| EXISTING CITY BOUNDARY | |
| EXISTING OVERHEAD ELECTRICAL | OE |
| EXISTING WATERLINE | W |
| EXISTING SEWER MAIN | S |
| EXISTING GAS LINE | G |
| EXISTING STORM DRAIN | |
| EXISTING FIRE HYDRANT | |
| EXISTING FENCE | X |
| DAYLIGHT LINE | |
| CUT/FILL LINE | C F |
| FINISHED GROUND CONTOUR | 440 |
| EXISTING GROUND CONTOUR | 440 |
| PROPOSED CUT\FILL SLOPE | 2:1 |
| TOP/TOE GRADING LINE | |
| RETAINING WALL (PER SEPARATE PERMIT) | |
| EXISTING SPOT ELEV. | (400.50 FG) |
| FUTURE SPOT ELEVATIONS | 400.50 FG |
| PROPOSED 6" CURB & GUTTER | |
| PROPOSED 6" ROLLED CURB & GUTTER | |
| PROPOSED STORM DRAIN | SD |
| PROPOSED CURB INLET | |
| PROPOSED STORM DRAIN CLEANOUT | |
| PROPOSED MODULAR WETLAND SYSTEM | |
| PROPOSED RTANK | |
| PROPOSED CURB OUTLET | |
| PROPOSED SEWER MAIN | S |
| PROPOSED SEWER MANHOLE | |
| PROPOSED WATER MAIN | W |
| PROPOSED BROW DITCH | |

SEWER NOTE: INSTALLATION OF PRIVATE SEWER LATERALS TO PROPERTIES OUTSIDE THE CITY OF VISTA JURISDICTIONAL BOUNDARY WILL NOT BE PERMITTED

**PASCO LARET SUITER & ASSOCIATES**
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com

| SUBMITTAL NUMBER | DATE | CHANGES |
|---|---|---|
| 1 | MARCH 2021 | INITIAL SUBMITTAL |
| 2 | MAY 2021 | RESUBMITTAL |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |

SIGNATURES CONSTITUTE THAT ALL PLANS, SPECIFICATIONS, GUARANTEES, AND OTHER REQUIREMENTS NECESSARY FOR ISSUANCE OF A BUILDING PERMIT CONFORMING TO THIS SITE DEVELOPMENT PLAN HAVE BEEN COMPLETED AND APPROVED BY THE APPROPRIATE DEPARTMENT.

| | |
|---|---|
| PLANNING DEPARTMENT | DATE |
| ENGINEERING DEPARTMENT | DATE |
| FIRE DEPARTMENT | DATE |
| PUBLIC WORKS DEPARTMENT | DATE |

SHEET 3 — CITY of VISTA — OF 6

GEN PLAN AMEND (RR TO LDR), ZONE CHANGE (A1 TO E1), AND TSM (28 LOTS) - FILE # P21-0114

OWNER: OMNI FINANCIAL, LLC CONTACT: GREG PERRINE PHONE: (714) 600-8141

ADDRESS: 1151 DURYEA AVENUE, IRVINE, CA 92614

ARCHITECT, ENGINEER OR DESIGNER: PASCO LARET SUITER & ASSOCIATES, INC. PHONE: 949-661-6695

ADDRESS: 27127 CALLE ARROYO, SUITE 1904 SAN JUAN CAPISTRANO, CA 92675

TYPE OF DEVELOPMENT: 28 LOTS

EXIST. ZONE: A-1 PROP. ZONE: E-1 APN(S): 171-100-05, 171-100-28

| SITE DATA AREA (SQ. FT.) | | COVERAGE % | DWELLING | UNITS | COMMON OPEN SPACE PROVIDED | REQUIRED |
|---|---|---|---|---|---|---|
| | | | 1 BDRM | | | |
| LOT: | 740,115 | 100% | 2 BDRM | - | | |
| BLDG: | 69,300 | 9% | 3 BDRM | | PRIVATE OPEN SPACE | |
| PARKING/PVMT: | 106,945 | 13% | 4 BDRM | | PROVIDED | REQUIRED |
| LANDSCAPE: | 563,870 | 78% | TOTAL UNITS | 28 | | |

| PARKING | | ORD. REQ. | | | DRIVEWAY (SIZE & SLOPE) | | SETBACKS | |
|---|---|---|---|---|---|---|---|---|
| GARAGE | 84 | LOADING | - | REC. VEH. STORAGE SPACES N/A | 1 WAY | 12' MIN. | FRONT 50' | REAR 20' |
| GUEST | 112 | HANDICAP | - | | 2 WAY | 24' MIN. | L. SIDE 10' | SPECIAL N/A |
| OPEN | | TOTAL | | | SLOPE | VARIES | R. SIDE 10' | ACCES. BLDG N/A |

# TENTATIVE SUBDIVISION MAP FOR 2277 VISTA GRANDE DRIVE

PROJECT FILE NUMBER: P21-0114

## PROPOSED EASEMENTS

1 INDICATES PRIVATE ROAD, PUBLIC UTILITY EASEMENT, AND PUBLIC SEWER EASEMENT TO THE CITY OF VISTA

2 INDICATES ACCESS AND PUBLIC UTILITY EASEMENT TO THE CITY OF VISTA

3 INDICATES EASEMENT TO THE HOMEOWNER'S ASSOCIATION

## LOT MATRIX

| LOT INFORMATION | | |
|---|---|---|
| LOT NO. | GROSS LOT AREA (S.F.) | NET LOT AREA (S.F.) |
| 6 | 23,128 | 21,900 |
| 10 | 26,116 | 24,459 |
| 15 | 23,454 | 21,809 |

## LEGEND

TRACT BOUNDARY

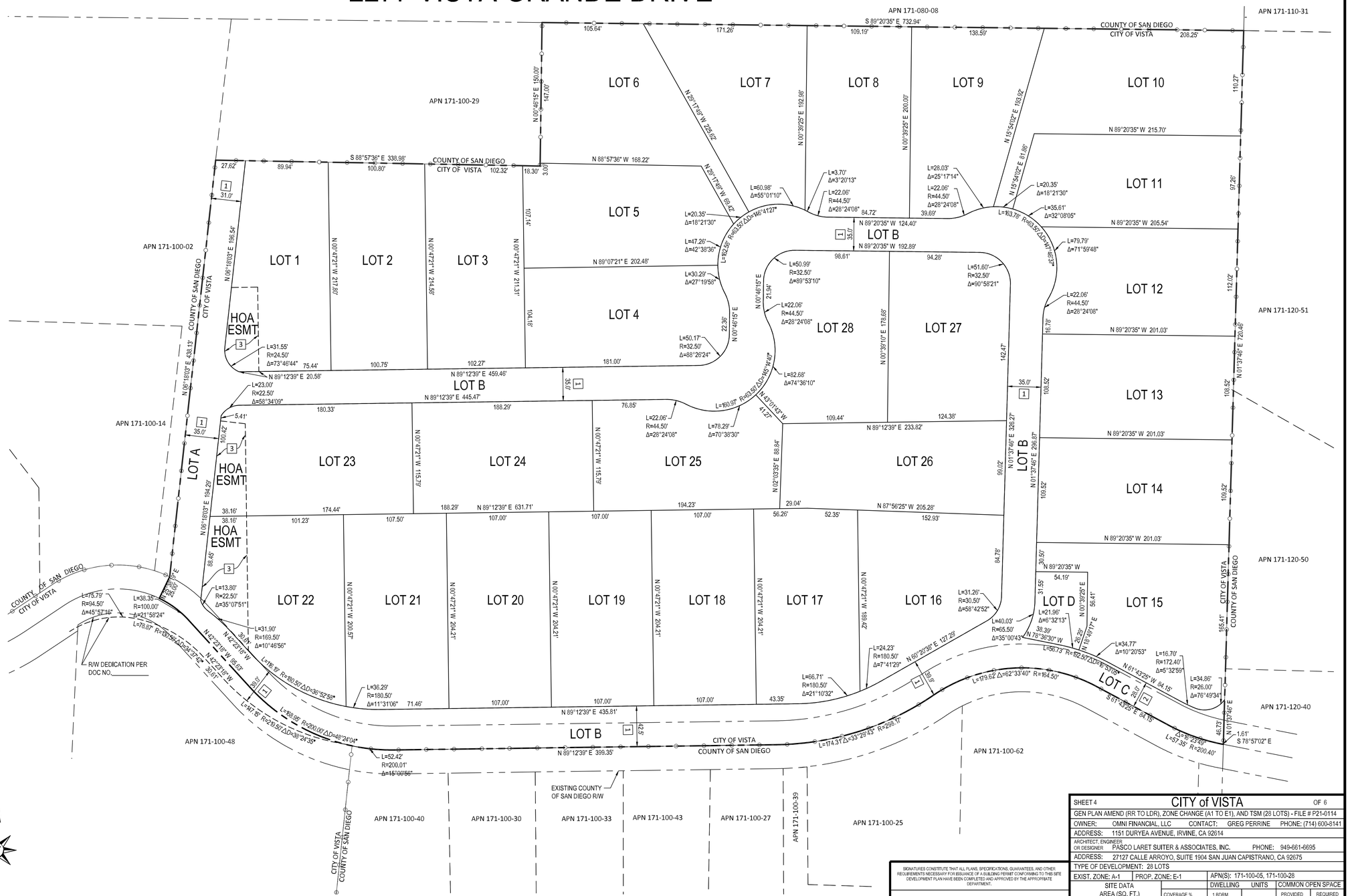
EXISTING RIGHT-OF-WAY

PROPOSED LOT LINE

PROPOSED EASEMENT LINE

ADJACENT PROPERTY LINE

EXISTING CITY BOUNDARY




NOTE: SEE SHEET 5 FOR EXISTING EASEMENTS

0 50 100 150

SCALE: 1" = 50'

**PASCO LARET SUITER & ASSOCIATES**

San Diego | Solana Beach | Orange County

Phone 858.259.8212 | www.plsaengineering.com

| SUBMITTAL NUMBER | DATE | CHANGES |
|---|---|---|
| 1 | MARCH 2021 | INITIAL SUBMITTAL |
| 2 | MAY 2021 | RESUBMITTAL |
| – | – | – |
| – | – | – |
| – | – | – |

SIGNATURES CONSTITUTE THAT ALL PLANS, SPECIFICATIONS, GUARANTEES, AND OTHER REQUIREMENTS NECESSARY FOR ISSUANCE OF A BUILDING PERMIT CONFORMING TO THIS SITE DEVELOPMENT PLAN HAVE BEEN COMPLETED AND APPROVED BY THE APPROPRIATE DEPARTMENT.

| | |
|---|---|
| PLANNING DEPARTMENT | DATE |
| ENGINEERING DEPARTMENT | DATE |
| FIRE DEPARTMENT | DATE |
| PUBLIC WORKS DEPARTMENT | DATE |

SHEET 4 — CITY of VISTA — OF 6

GEN PLAN AMEND (RR TO LDR), ZONE CHANGE (A1 TO E1), AND TSM (28 LOTS) - FILE # P21-0114

OWNER: OMNI FINANCIAL, LLC CONTACT: GREG PERRINE PHONE: (714) 600-8141

ADDRESS: 1151 DURYEA AVENUE, IRVINE, CA 92614

ARCHITECT, ENGINEER OR DESIGNER: PASCO LARET SUITER & ASSOCIATES, INC. PHONE: 949-661-6695

ADDRESS: 27127 CALLE ARROYO, SUITE 1904 SAN JUAN CAPISTRANO, CA 92675

TYPE OF DEVELOPMENT: 28 LOTS

EXIST. ZONE: A-1 | PROP. ZONE: E-1 | APN(S): 171-100-05, 171-100-28

| SITE DATA AREA (SQ. FT.) | | COVERAGE % |
|---|---|---|
| LOT: | 740,115 | 100% |
| BLDG: | 69,300 | 9% |
| PARKING/PVMT: | 106,945 | 13% |
| LANDSCAPE: | 563,870 | 76% |

| DWELLING UNITS | | COMMON OPEN SPACE | |
|---|---|---|---|
| | | PROVIDED | REQUIRED |
| 1 BDRM | | | |
| 2 BDRM | - | | |
| 3 BDRM | | PRIVATE OPEN SPACE | |
| 4 BDRM | | PROVIDED | REQUIRED |
| TOTAL UNITS | 28 | | |

| PARKING | | | | | |
|---|---|---|---|---|---|
| | | ORD. REQ. | | | |
| GARAGE | 84 | LOADING | - | REC. VEH. STORAGE SPACES N/A | |
| GUEST | 112 | HANDICAP | - | | |
| OPEN | | TOTAL | | | |

| DRIVEWAY (SIZE & SLOPE) | | SETBACKS | |
|---|---|---|---|
| 1 WAY | 12' MIN. | FRONT 50' | REAR 20' |
| 2 WAY | 24' MIN. | L. SIDE 10' | SPECIAL N/A |
| SLOPE | VARIES | R. SIDE 10' | ACCES. BLDG N/A |

SAVE DATE: — - PLOT DATE: — - FILE NAME: J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\DRAWING\DISCRETIONARY PLANS\TENTATIVE MAP\3474-TM-TBLOCK.dwg

# TENTATIVE SUBDIVISION MAP FOR 2277 VISTA GRANDE DRIVE

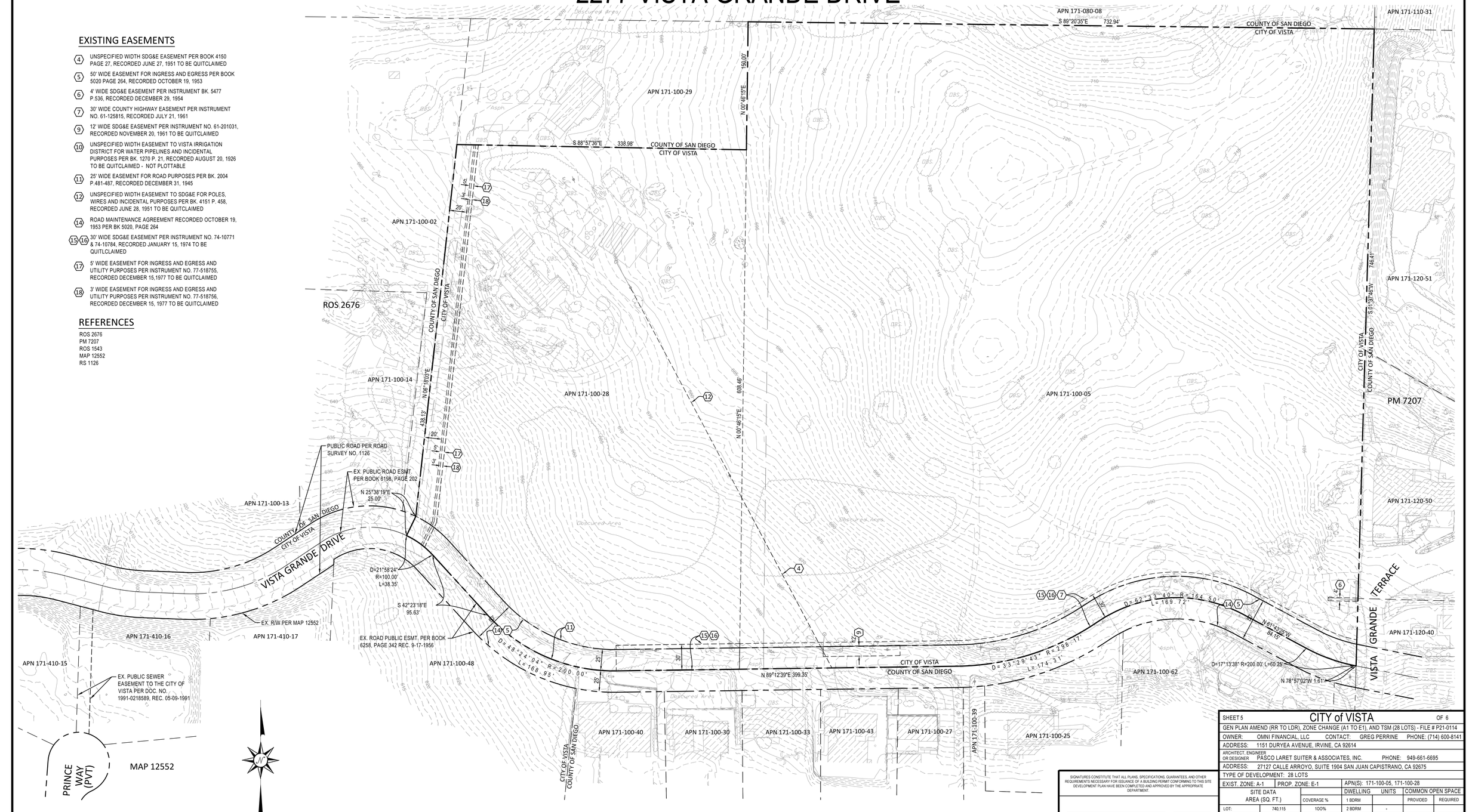
PROJECT FILE NUMBER: P21-0114

## EXISTING EASEMENTS

4. UNSPECIFIED WIDTH SDG&E EASEMENT PER BOOK 4150 PAGE 27, RECORDED JUNE 27, 1951 TO BE QUITCLAIMED
5. 50' WIDE EASEMENT FOR INGRESS AND EGRESS PER BOOK 5020 PAGE 264, RECORDED OCTOBER 19, 1953
6. 4' WIDE SDG&E EASEMENT PER INSTRUMENT BK. 5477 P.536, RECORDED DECEMBER 29, 1954
7. 30' WIDE COUNTY HIGHWAY EASEMENT PER INSTRUMENT NO. 61-125815, RECORDED JULY 21, 1961
9. 12' WIDE SDG&E EASEMENT PER INSTRUMENT NO. 61-201031, RECORDED NOVEMBER 20, 1961 TO BE QUITCLAIMED
10. UNSPECIFIED WIDTH EASEMENT TO VISTA IRRIGATION DISTRICT FOR WATER PIPELINES AND INCIDENTAL PURPOSES PER BK. 1270 P. 21, RECORDED AUGUST 20, 1926 TO BE QUITCLAIMED - NOT PLOTTABLE
11. 25' WIDE EASEMENT FOR ROAD PURPOSES PER BK. 2004 P.481-487, RECORDED DECEMBER 31, 1945
12. UNSPECIFIED WIDTH EASEMENT TO SDG&E FOR POLES, WIRES AND INCIDENTAL PURPOSES PER BK. 4151 P. 458, RECORDED JUNE 28, 1951 TO BE QUITCLAIMED
14. ROAD MAINTENANCE AGREEMENT RECORDED OCTOBER 19, 1953 PER BK 5020, PAGE 264
15, 16. 30' WIDE SDG&E EASEMENT PER INSTRUMENT NO. 74-10771 & 74-10784, RECORDED JANUARY 15, 1974 TO BE QUITLCLAIMED
17. 5' WIDE EASEMENT FOR INGRESS AND EGRESS AND UTILITY PURPOSES PER INSTRUMENT NO. 77-518755, RECORDED DECEMBER 15,1977 TO BE QUITCLAIMED
18. 3' WIDE EASEMENT FOR INGRESS AND EGRESS AND UTILITY PURPOSES PER INSTRUMENT NO. 77-518756, RECORDED DECEMBER 15, 1977 TO BE QUITCLAIMED

## REFERENCES

ROS 2676
PM 7207
ROS 1543
MAP 12552
RS 1126




SHEET 5 — CITY of VISTA — OF 6

GEN PLAN AMEND (RR TO LDR), ZONE CHANGE (A1 TO E1), AND TSM (28 LOTS) - FILE # P21-0114

OWNER: OMNI FINANCIAL, LLC CONTACT: GREG PERRINE PHONE: (714) 600-8141

ADDRESS: 1151 DURYEA AVENUE, IRVINE, CA 92614

ARCHITECT, ENGINEER OR DESIGNER: PASCO LARET SUITER & ASSOCIATES, INC. PHONE: 949-661-6695

ADDRESS: 27127 CALLE ARROYO, SUITE 1904 SAN JUAN CAPISTRANO, CA 92675

TYPE OF DEVELOPMENT: 28 LOTS

EXIST. ZONE: A-1 PROP. ZONE: E-1 APN(S): 171-100-05, 171-100-28

| SITE DATA AREA (SQ. FT.) | | COVERAGE % |
|---|---|---|
| LOT: | 740,115 | 100% |
| BLDG: | 69,300 | 9% |
| PARKING/PVMT: | 106,945 | 13% |
| LANDSCAPE: | 563,870 | 78% |

| DWELLING UNITS | | COMMON OPEN SPACE | |
|---|---|---|---|
| 1 BDRM | | PROVIDED | REQUIRED |
| 2 BDRM | - | | |
| 3 BDRM | | PRIVATE OPEN SPACE | |
| 4 BDRM | | PROVIDED | REQUIRED |
| TOTAL UNITS | 28 | | |

| PARKING | | ORD. REQ. | | | DRIVEWAY (SIZE & SLOPE) | | SETBACKS | |
|---|---|---|---|---|---|---|---|---|
| GARAGE | 84 | LOADING | - | REC. VEH. STORAGE SPACES N/A | 1 WAY 12' MIN. | FRONT 50' | REAR 20' | |
| GUEST | 112 | HANDICAP | - | | 2 WAY 24' MIN. | L. SIDE 10' | SPECIAL N/A | |
| OPEN | | TOTAL | | | SLOPE VARIES | R. SIDE 10' | ACCES. BLDG N/A | |

SIGNATURES CONSTITUTE THAT ALL PLANS, SPECIFICATIONS, GUARANTEES, AND OTHER REQUIREMENTS NECESSARY FOR ISSUANCE OF A BUILDING PERMIT CONFORMING TO THIS SITE DEVELOPMENT PLAN HAVE BEEN COMPLETED AND APPROVED BY THE APPROPRIATE DEPARTMENT.

| | |
|---|---|
| PLANNING DEPARTMENT | DATE |
| ENGINEERING DEPARTMENT | DATE |
| FIRE DEPARTMENT | DATE |
| PUBLIC WORKS DEPARTMENT | DATE |

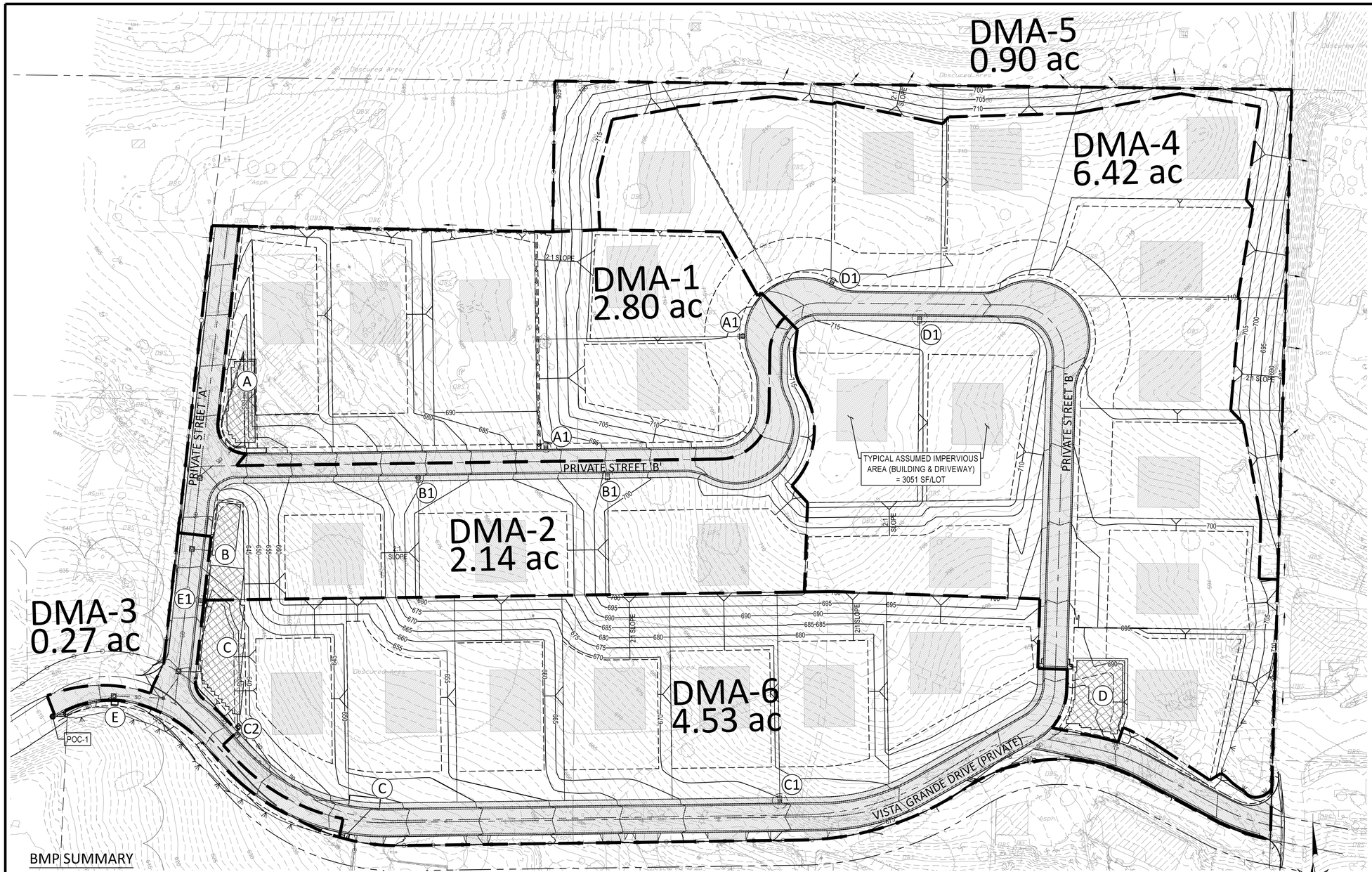
| SUBMITTAL NUMBER | DATE | CHANGES |
|---|---|---|
| 1 | MARCH 2021 | INITIAL SUBMITTAL |
| 2 | MAY 2021 | RESUBMITTAL |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |


**PASCO LARET SUITER & ASSOCIATES**
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com



SAVE DATE: ---- ~ PLOT DATE: ---- ~ FILE NAME: J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\DRAWING\DISCRETIONARY PLANS\TENTATIVE MAP\3474-TM-TBLOCK.dwg

PROJECT FILE NUMBER: P21-0114




## GENERAL INFORMATION

THE PROPOSED PROJECT IS LOCATED WITHIN THE SAN LUIS REY UNIT (HU) – LOWER SAN LUIS REY – MISSION, 903.11. STORM WATER THAT DISCHARGES THE PROJECT SITE ALONG THE EASTERN AND NORTHERN BORDERS FLOWS NORTHERLY TO THE SAN LUIS REY RIVER (LOWER) WHICH FLOWS WESTERLY. STORM WATER THAT DISCHARGES THE PROJECT SITE ALONG THE SOUTHERN AND SOUTHWESTERN BORDERS FLOWS WESTERLY TO GUAJOME LAKE WHICH FLOWS TO THE SAN LUIS REY RIVER (LOWER) WHICH FLOWS WESTERLY AND ULTIMATELY DISCHARGES TO THE PACIFIC OCEAN.

POLUTTANTS OF CONCERN - EUTROPHIC, BENTHIC COMMUNITY EFFECTS, BIFENTHRIN, CHLORIDE, NITROGEN, PHOSPHORUS, TOTAL DISSOLVED SOLIDS, TOXICITY AND INDICATOR BACTERIA

## LID SITE DESIGN BMP'S

1. MODULAR WETLAND SYSTEMS
2. DENTENTION VAULTS
3. ROOF DRAIN TO LANDSCAPING
4. MINIMIZE IMPERVIOUS SURFACES
5. PROTECT SLOPES AND CHANNELS
6. TREE WELLS

## SOURCE CONTROL BMP'S

1. STORM DRAIN STENCILING
2. EMPLOY INTEGRATED PEST MANAGEMENT PRACTICES
3. EMPLOY EFFICIENT IRRIGATION AND DROUGHT TOLERANT LANDSCAPE DESIGN

## SOIL INFORMATION

HYDROLOGIC SOIL GROUP: TYPE C

## GROUND WATER INFORMATION

GROUND WATER WAS NOT ENCOUNTERED AT THE SITE. SEE REPORT PREPARED BY: GEOSOILS, INC
DATED: W.O. 5053-A1-SC FEBRUARY 23, 2006

## COARSE SEDIMENT YIELD

REFER TO ATTACHEMENT 2B OF THIS REPORT FOR CRITICAL COARSE SEDIMENT YIELD AREAS WITHIN THIS PROJECT SITE.

## BMP NOTES

1. THESE BMPS AREA MANDATORY TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS OR THERE PLANS
2. NO CHANGES TO THE PROPOSED BMPS ON THIS SHEET WITHOUT PRIOR APPROVAL FORM THE CITY ENGINEERING DEPARTMENT
3. NO SUBSTITUTIONS TO THE MATERIAL TYPES OR PLANTING TYPES WITHOUT PRIOR APPROVAL FROM THE LAND DEVELOPMENT ENGINEER
4. NO OCCUPANCY WILL BE GRANTED UNTIL THE CITY INSPECTOR STAFF HAS INSPECTED THIS PROJECT FOR APPROPRIATE BMP CONSTRUCTION AND INSTALLATION.

## WATER QUALITY TECHNICAL REPOT

TITLE - PRIORITY DEVELOPMENT PROJECT STORM WATER QUALITY MANAGEMENT REPORT FOR 2277 VISTA GRANDE DRIVE
DATE - MARCH 2021
PREPARED BY - PASCO LARET SUITER & ASSOCIATES

## MAINTENANCE AGREEMENT DOCUMENT

TITLE -
DATE -
PREPARED BY -

## OPERATIONS AND MAINTENANCE PLAN

TITLE - STORM WATER OPERATIONS & MAINTENANCE PLAN FOR 2277 VISTA GRANDE DRIVE
DATE - MARCH 2021
PREPARED BY - PASCO LARET SUITER & ASSOCIATES

## RESPONSIBLE PARTY INFORMATION

GREG PERRINE

1151 DURYEA AVENUE

IRVINE, CA 92614

## BMP SUMMARY

| DMA # | BMP # | BMP TYPE | BMP AREA | BMP OUTLET | OULET PIPE |
|---|---|---|---|---|---|
| 1 | A | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT A | MWS L-4-19 / 2,000 SF, 5' HIGH R-TANK | 1.2-INCH ORIFICE / 6-FT WIDE WEIR @ 4.5-FT HIGH | 12" |
| | A1 | TREE WELL | 5 FT TREE AND 10 FT TREE | -- | -- |
| 2 | B | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT B | MWS L-4-19 / 1,200 SF, 7' HIGH R-TANK | 1.0-INCH ORIFICE / 8-FT WIDE WEIR @ 6.5-FT HIGH | 12" |
| | B1 | TREE WELL | 5 FT TREE AND 10 FT TREE | -- | -- |
| 3 | E | MODULAR WETLAND SYSTEM INLET | MWS L-4-6 | N/A | 12" |
| | E1 | TREE WELL | 10 FT TREE | -- | -- |
| 4 | D | DETENTION VAULT D | 3,400 SF, 5' HIGH R-TANK | 1.5-INCH ORIFICE / 12-FT WIDE WEIR @ 4.5-FT HIGH | 18" |
| | D1 | TREE WELL | 10 FT TREE AND 15 FT TREE | -- | -- |
| 5 | -- | SELF MITIGATING AREA | -- | -- | -- |
| 6 | C | MODULAR WETLAND SYSTEM INLET / DETENTION VAULT C | MWS L-10-30 / 5,000 SF, 10' HIGH R-TANK | 1.9-INCH ORIFICE / 18-FT WIDE WEIR @ 9.5-FT HIGH | 18" |
| | C1 | TREE WELL | 15 FT TREE | -- | -- |
| | C2 | MODULAR WETLAND SYSTEM INLET | MWS L-4-4 | N/A | 12" |

## GEOTECHNICAL NOTE

I HAVE REVIEWED THE SOIL AND GEOLOGIC CONDITIONS FOR THIS PROJECT AND CONFIRM THE SELECTED POST CONSTRUCTION BMPS HAVE BEEN DISCUSSED, COORDINATED AND JUSTIFIED AS REQUIRED BY THE C.O.V. BMP DESIGN MANUAL.

REGISTERED PROFESSIONAL ENGINEER — DAVID W. SKELLY — No. RCE 47857 — Exp. 12/31/21 — CIVIL — STATE OF CALIFORNIA

## LANDSCAPE NOTE

I HAVE REVIEWED THE BIOLFILTRATION BASIN LOCATION SHOWN ON THE CIVIL PLAN AND CONFIRM THAT THE CONCEPT LANDSCAPE PLANS ARE COORDINATED AND APPROATE PLANING AND IRRIGATION WILL BE DIESNG IN THOSE BIOFILTRATION BASINS.

REGISTERED LANDSCAPE ARCHITECT — JAMES R. HOWARD LIC. NO. 2497 — RENEWAL 03-31-21 — EXP. DATE — STATE OF CALIFORNIA

## ARCHITECT NOTE

MY ARCHITECT'S SEAL AND SIGNATURE IS TO VERIFY THAT THE KTGY ARCHITECTURAL PLANNING HAS REVIEWED THIS PLAN PREPARED BY THE CIVIL ENGINEER AND HARD COORDINATED THE SCHEMATIC DESIGN OF THE BUILDING ARCHITURE ACCORDINGLY.

## LEGEND

MAJOR BASIN BOUNDARY
HMP POINT OF COMPLIANCE — POC 1
IMPERVIOUS AREA — 4.25 AC (184,989 SF)
PERVIOUS AREA — 12.82 AC (558,506 SF)

**ASSUMED IMPERVIOUS AREA PER LOT 3,051 SF (BLDG + DWY)

## DMA HMP EXHIBIT

2277 VISTA GRANDE DRIVE
VISTA, CA
SCALE: 1" = 50'
DATE: AUGUST 2021
SHEET 1 OF 1


**PASCO LARET SUITER & ASSOCIATES**
San Diego | Solana Beach | Orange County
Phone 858.259.8212 | www.plsaengineering.com


| SUBMITTAL NUMBER | DATE | CHANGES |
|---|---|---|
| 1 | MARCH 2021 | INITIAL SUBMITTAL |
| 2 | MAY 2021 | RESUBMITTAL |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |

SIGNATURES CONSTITUTE THAT ALL PLANS, SPECIFICATIONS, GUARANTEES, AND OTHER REQUIREMENTS NECESSARY FOR ISSUANCE OF A BUILDING PERMIT CONFORMING TO THIS SITE DEVELOPMENT PLAN HAVE BEEN COMPLETED AND APPROVED BY THE APPROPRIATE DEPARTMENT.

| | |
|---|---|
| PLANNING DEPARTMENT | DATE |
| ENGINEERING DEPARTMENT | DATE |
| FIRE DEPARTMENT | DATE |
| PUBLIC WORKS DEPARTMENT | DATE |

SHEET 6 — CITY of VISTA — OF 6

GEN PLAN AMEND (RR TO LDR), ZONE CHANGE (A1 TO E1), AND TSM (28 LOTS) - FILE # P21-0114

OWNER: OMNI FINANCIAL, LLC CONTACT: GREG PERRINE PHONE: (714) 600-8141
ADDRESS: 1151 DURYEA AVENUE, IRVINE, CA 92614
ARCHITECT, ENGINEER OR DESIGNER: PASCO LARET SUITER & ASSOCIATES, INC. PHONE: 949-661-6695
ADDRESS: 27127 CALLE ARROYO, SUITE 1904 SAN JUAN CAPISTRANO, CA 92675
TYPE OF DEVELOPMENT: 28 LOTS
EXIST. ZONE: A-1 PROP. ZONE: E-1 APN(S): 171-100-05, 171-100-28

| SITE DATA AREA (SQ. FT.) | | COVERAGE % |
|---|---|---|
| LOT: | 740,115 | 100% |
| BLDG: | 69,300 | 9% |
| PARKING/PVMT: | 106,945 | 13% |
| LANDSCAPE: | 563,870 | 78% |

| DWELLING UNITS | | COMMON OPEN SPACE | |
|---|---|---|---|
| 1 BDRM | | PROVIDED | REQUIRED |
| 2 BDRM | - | | |
| 3 BDRM | | PRIVATE OPEN SPACE | |
| 4 BDRM | | PROVIDED | REQUIRED |
| TOTAL UNITS | 28 | | |

| PARKING | | ORD. REQ. | | |
|---|---|---|---|---|
| GARAGE | 84 | LOADING | - | REC. VEH. STORAGE SPACES |
| GUEST | 112 | HANDICAP | - | |
| OPEN | | TOTAL | | N/A |

DRIVEWAY (SIZE & SLOPE): 1 WAY 12' MIN. / 2 WAY 24' MIN. / SLOPE VARIES

SETBACKS: FRONT 50' / REAR 20' / L. SIDE 10' / R. SIDE 10' / SPECIAL N/A / ACCES. BLDG N/A


SAVE DATE: --- - PLOT DATE: --- - FILE NAME: J:\ACTIVE JOBS\3474 Vista Grande\CIVIL\DRAWING\DISCRETIONARY PLANS\TENTATIVE MAP\3474-TM-TBLOCK.dwg

# Attachment I – Acoustical Site Assessment

This page left intentionally blank.

HELIX Environmental Planning

# Vista Grande Project

## Acoustical Site Assessment Report

March 2021 | GPE-03

*Prepared for:*

**Greg Perinne**
1151 Duryea Avenue
Irvine, CA 92614

*Prepared by:*

**HELIX Environmental Planning, Inc.**
7578 El Cajon Boulevard
La Mesa, CA 91942

# Vista Grande Project

## Acoustical Site Assessment Report

*Prepared for:*

**Greg Perrine**
1151 Duryea Avenue
Irvine, CA 92614

*Prepared by:*

**HELIX Environmental Planning, Inc.**
7578 El Cajon Boulevard
La Mesa, CA 91942

March 2021 | GPE-03

# TABLE OF CONTENTS

**Section** **Page**


EXECUTIVE SUMMARY ..... 1

1.0 INTRODUCTION ..... 1

1.1 Purpose of the Report ..... 1
1.2 Project Location ..... 1
1.3 Project Description ..... 1
1.4 Noise and Sound Level Descriptors and Terminology ..... 1
1.4.1 Descriptors ..... 1
1.4.2 Terminology ..... 2
1.5 Noise-Sensitive Land Uses ..... 3
1.6 Regulatory Framework ..... 3
1.6.1 Code of Federal Regulations (30 CFR 816.61-816.68) ..... 3
1.6.2 California Noise Control Act ..... 3
1.6.3 City of Vista General Plan, Noise Element ..... 3
1.6.4 City of Vista Noise Ordinance (Municipal Code, Chapter 8.32, Noise Control) ..... 4

2.0 ENVIRONMENTAL SETTING ..... 6

2.1 Surrounding Land Uses ..... 6
2.2 Existing Noise Environment ..... 6
2.2.1 Ambient Noise Survey ..... 6

3.0 ANALYSIS, METHODOLOGY, AND ASSUMPTIONS ..... 7

3.1 Methodology ..... 7
3.1.1 Ambient Noise Survey ..... 7
3.1.2 Noise Modeling Software ..... 7
3.2 Assumptions ..... 8
3.2.1 Construction ..... 8
3.2.2 Operations ..... 9
3.3 Guidelines for the Determination of Significance ..... 10

4.0 IMPACTS ..... 11

4.1 Issue 1: Excessive Noise Levels ..... 11
4.1.1 Exposure to Excessive Noise ..... 11
4.1.2 Operational On-site Noise Generation ..... 11
4.1.3 Operational Off-site Transportation Noise Generation ..... 12
4.1.4 Construction Noise ..... 12
4.2 Issue 2: Excessive Vibration ..... 16
4.2.1 Construction Vibration ..... 16
4.2.2 Operational Vibration ..... 16
4.3 Issue 3: Airport Noise Exposure ..... 16
4.3.1 Aircraft Noise ..... 16

5.0 LIST OF PREPARERS ..... 17

6.0 REFERENCES ..... 18

## LIST OF APPENDICES

A On-Site Noise Measurement Sheets
B Carrier 38HDR060 Split System Condenser
C Roadway Segment Level of Service Summary
D Existing and Future Noise Levels

## LIST OF FIGURES

| No. | Title | Follows Page |
|---|---|---|
| 1 | Regional Location | 2 |
| 2 | Project Vicinity | 2 |
| 3 | Site Plan | 2 |
| 4 | Ambient Noise Measurement Locations | 6 |

## LIST OF TABLES

| No. | Title | Page |
|---|---|---|
| 1 | Interior And Exterior Noise Guidelines | 4 |
| 2 | Applicable Exterior Property Line Noise Limits | 5 |
| 3 | Maximum Sound Levels (Impulsive) | 6 |
| 4 | Noise Measurement Results | 7 |
| 5 | Carrier Hdr060 Condenser Noise | 9 |
| 6 | Existing Plus Project Traffic Volumes | 9 |
| 7 | Off-Site Traffic Noise Levels | 12 |
| 8 | Construction Equipment Noise Levels | 13 |
| 9 | Maximum Allowable Airblast Limits | 14 |
| 10 | Scaled Distance Factors | 15 |

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ADT | average daily traffic |
| ANSI | American National Standards Institute |
| CEQA | California Environmental Quality Act |
| CFR | Code of Federal Regulations |
| City | City of Vista |
| County | County of San Diego |
| CNEL | Community Noise Equivalent Level |
| dB | decibel |
| dBA | A-weighted decibels |
| EIR | Environmental Impact Report |
| HVAC | heating, ventilation, and air conditioning |
| Hz | Hertz |
| kHz | kilohertz |
| $L_{DN}$ | Day-Night level |
| $L_{EQ}$ | equivalent sound level |
| $L_{MAX}$ | maximum noise level |
| mPa | micro-Pascals |
| mph | miles per hour |
| NSLU | noise-sensitive land use |
| OSM | Office of Surface Mining Reclamation and Enforcement |
| PPV | peak particle velocity |
| RCNM | Roadway Construction Noise Model |
| SF | square feet |
| SPL | sound pressure level |
| STC | Sound Transmission Class |
| $S_{WL}$ | sound power level |
| TNM | Traffic Noise Model |
| USDOT | U.S. Department of Transportation |

This page intentionally left blank

# EXECUTIVE SUMMARY

This report presents an assessment of potential construction and operational noise impacts associated with the currently proposed Vista Grande Project (project). The noise study for the previously proposed project was completed in November 2015 by HELIX Environmental Planning. This report serves as an update to the original study.

At the writing of the original noise study in 2015, the approximately 17-acre project site was within unincorporated County of San Diego and has since annexed to the City of Vista. The revised project includes the development of 28 single-family residential units. The project would also create a private roadway within the project for access to residences. A single-family residence currently exists on the project's northwestern corner that would be removed as part of the project.

Construction of the project is not anticipated to exceed any regulatory noise or vibration levels and would therefore not cause significant noise impacts to surrounding residences. Blasting impacts would be less than significant with implementation of the blasting management plan (Mitigation Measure Noi-1) that was required as part of the previously proposed project.

Residential and commercial heating, ventilation and air conditioning (HVAC) noise from the condensers would not exceed allowable limits for operational sources.

Transportation noise from nearby roads would not generate any interior or exterior noise impacts to future residents, and the additional traffic from the project would not significantly increase noise levels on surrounding roadways, and therefore would not cause significant impacts to off-site noise-sensitive land uses.

In summary, the updated project would not result in any additional impacts or mitigation measures needed beyond those that were identified for the original project.

This page intentionally left blank

# 1.0 INTRODUCTION

## 1.1 PURPOSE OF THE REPORT

This report analyzes potential noise and vibration impacts associated with the currently proposed Vista Grande (project), which includes an evaluation of existing conditions in the project vicinity, an assessment of potential impacts associated with project construction, and an evaluation of project operational impacts. The noise study for the previously proposed project was completed in November 2015 by HELIX Environmental Planning. This report serves as an update to the original study. Analysis within this report addresses the relevant issues listed in Appendix G of the California Environmental Quality Act (CEQA) Guidelines.

## 1.2 PROJECT LOCATION

The project is located at 2277 Vista Grande Drive. It consists of two parcels totaling approximately 17 acres and is currently located in an area annexed to the City of Vista. See Figure 1, *Regional Location* for the project site. The project is located on two adjacent parcels north of Vista Grande Drive and west of Vista Grande Terrace. The site is depicted in Figure 2, *Project Location*.

## 1.3 PROJECT DESCRIPTION

The project includes the development of approximately 17 acres into 28 lots with one single-family dwelling unit on each lot. The project would create a private road within the project site connecting to Vista Grande Drive. An easement would connect Vista Grande Road to Vista Grande Terrace on the eastern edge of the project site. Refer to Figure 3, *Site Plan*. The site is currently undeveloped except for one single-family residence on the northwest corner of the site. This residence would be removed as part of the project. The City of Vista land use designation for the site is Low Density Residential with a planned land use designation of E-1 (Estates Residential).

## 1.4 NOISE AND SOUND LEVEL DESCRIPTORS AND TERMINOLOGY

### 1.4.1 Descriptors

All noise level or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol $L_{EQ}$, with a specified duration. The Community Noise Equivalent Level (CNEL) is a 24-hour average, where noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dBA weighting, and noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dBA weighting. This is similar to the Day Night sound level ($L_{DN}$), which is a 24-hour average with an added 10 dBA weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on dBA. These metrics are used to express noise levels for both measurement and municipal regulations, as well as for land use guidelines and enforcement of noise ordinances.

## 1.4.2 Terminology

### 1.4.2.1 Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

### 1.4.2.2 Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

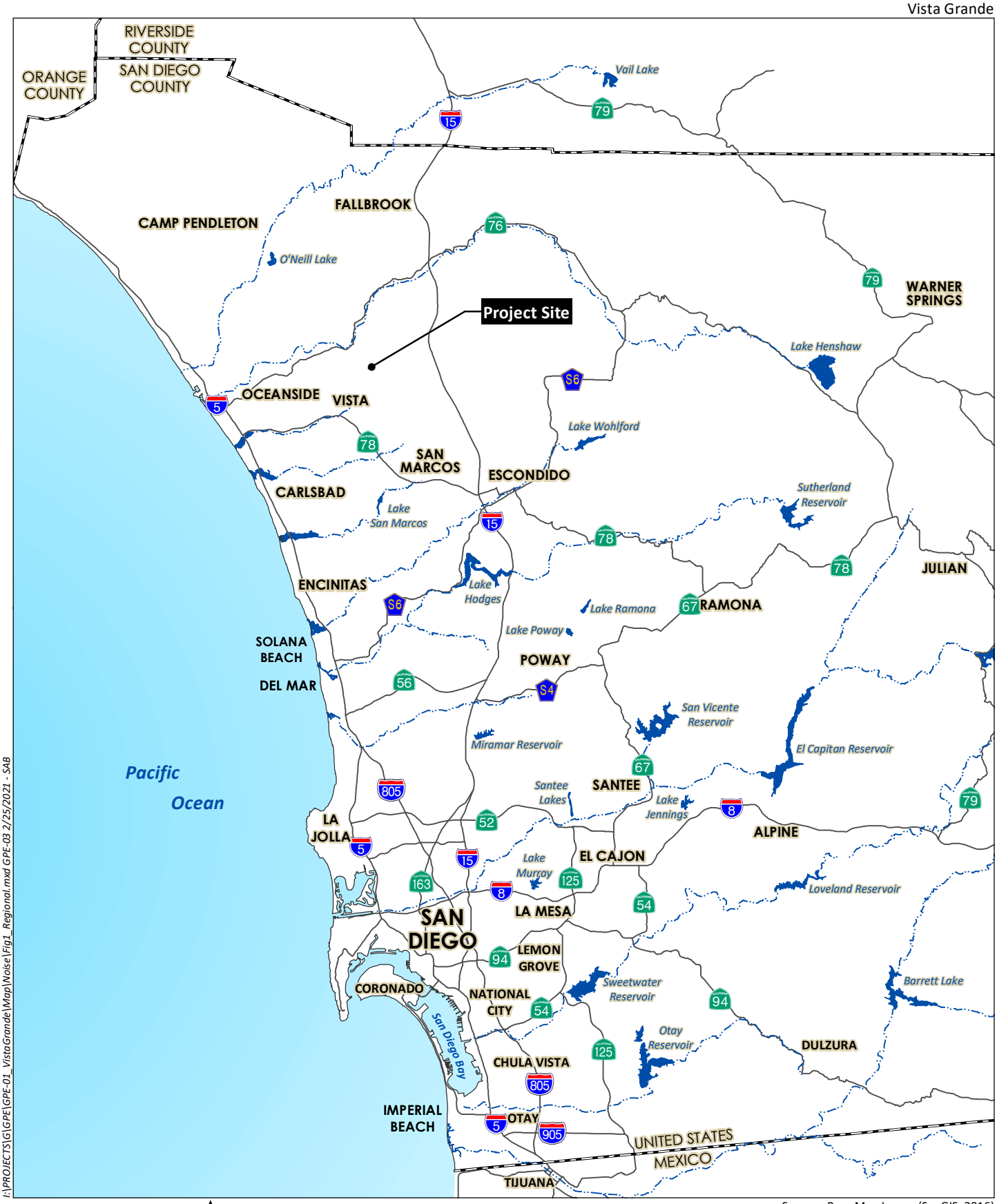
### Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this wide range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of dBA. The threshold of hearing for the human ear is about 0 dBA, which corresponds to 20 mPa.

### 1.4.2.3 Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through standard arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than from one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dBA—rather, they would combine to produce 73 dBA. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dBA louder than one source.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1 dBA changes in sound levels, when exposed to steady, single-frequency (“pure-tone”) signals in the mid-frequency (1,000 Hz–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dBA are generally not perceptible. It is widely accepted, however, that people begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dBA increase is generally perceived as a distinctly noticeable increase, and a 10 dBA increase is generally perceived as a doubling of loudness.




I:\PROJECTS\G\GPE\GPE-01_VistaGrande\Map\Noise\Fig1_Regional.mxd GPE-03 2/25/2021 - SAB

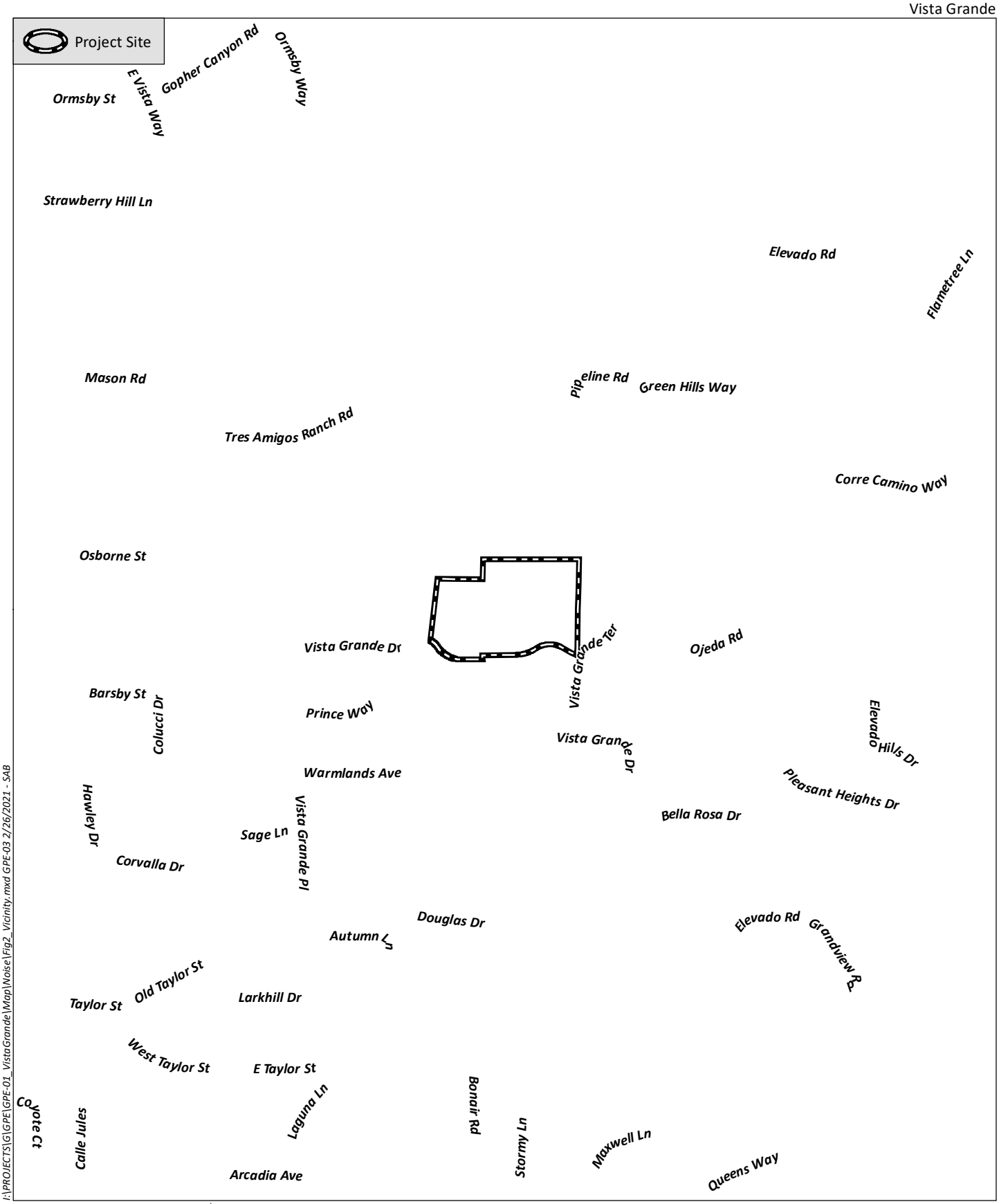
0 8 Miles

Source: Base Map Layers (SanGIS, 2016)

HELIX Environmental Planning

# Regional Location

Figure 1




Source: Aerial (SanGIS, 2017)

HELIX Environmental Planning

# Project Location

Figure 2

**SITE INFORMATION**

| | |
|---|---|
| Address: | Vista Grande Drive |
| Parcel No. | 171-100-05 and 171-100-28 |
| Site Area | 16.99 ac |
| City: | Vista |
| County: | San Diego |
| Existing Zoning: | A-1 (Agricultural) |
| Existing General Plan: | Rural Residential (1 du/ac) |
| Proposed Zoning: | E-1 Estate Residential (City of Vista) |
| Proposed General Plan: | LD - Low Density Residential (2du/ac) |

**E-1 Zone Standard**

| | |
|---|---|
| Front Yard Setback | 50 Feet from CL |
| Side Yard Setback | 10 Feet |
| Rear Yard setback | 20 Feet |
| Building Height | 35 Feet/2-Story |
| Min. Lot Size | Half-acre Lot |
| Lot Coverage | 60% |
| Common Open Space: | N/A |
| Private Open Space | N/A |
| Parking/du | 2 spaces + 2 spaces guest |

**SIte Plan Summary**

| | |
|---|---|
| Site Area | 16.99 ac |
| Net Area | 14.5 ac (excl. easement and ROW ) |
| Units | 28 du |
| Gross Density | 1.6 du/ac |
| Net Density | 1.9 du/ac |

Source: ktgy Architecture and Planning (2020)

I:\PROJECTS\G\GPE\GPE-01_VistaGrande\Map\Noise\Fig3_SitePlan.indd GPE-03 2/25/2021 - SAB

HELIX Environmental Planning

# Site Plan

Figure 3

No known studies have directly correlated the ability of a healthy human ear to discern specific levels of change in traffic noise over a 24-hour period. Many ordinances, however, specify a change of 3 CNEL as the significant impact threshold. This is based on the concept of a doubling in noise energy resulting in a 3 dBA change in noise, which is the amount of change in noise necessary for the increase to be perceptible to the average healthy human ear.

## 1.5 NOISE-SENSITIVE LAND USES

Noise-sensitive land uses (NSLUs) are land uses that may be subject to stress and/or interference from excessive noise, including residences, hospitals, schools, hotels, resorts, libraries, sensitive wildlife habitat, or similar facilities where quiet is an important attribute of the environment. Noise receptors are individual locations that may be affected by noise. NSLUs in the project vicinity are single-family residences. Residences are located adjacent to the property to the northwest, southeast, and east of the site. Residences are also located across Vista Grande Drive to the south.

## 1.6 REGULATORY FRAMEWORK

### 1.6.1 Code of Federal Regulations (30 CFR 816.61-816.68)

Various aspects of blasting, including flyrock and airblast, are regulated by the Code of Federal Regulations (30 CFR 816.61-816.68). Section 816.67(b) specifies maximum levels for airblast; Section 816.67(c) specifies allowable distances for flyrock.

### 1.6.2 California Noise Control Act

The California Noise Control Act is a section within the California Health and Safety Code that describes excessive noise as a serious hazard to the public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also finds that there is a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the State to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

### 1.6.3 City of Vista General Plan, Noise Element

The Noise Element of the City's General Plan includes a noise/land use compatibility matrix for assessing the suitability of different categories of planned land uses based on exterior noise level exposure (Table NE-3 from the City General Plan; City 2012). For the project's General Plan land use designation (Estates Residential), the Noise Element specifies exterior noise levels up to 60 CNEL as normally acceptable and up to 70 CNEL is conditionally acceptable. Noise levels exceeding 70 CNEL are generally unacceptable for single-family residential uses.

In addition, the City defines specific maximum noise levels that shall not be exceeded for both interior and exterior use areas. A proposed project shall not generate noise levels that exceed these standards. The City limits interior noise levels to 45 CNEL for single-family residential development. Table 1, *Interior and Exterior Noise Guidelines*, provides limits for various types of land uses.

**Table 1**
**INTERIOR AND EXTERIOR NOISE GUIDELINES**

| Land Use | Maximum Noise Level ($L_{DN}$ or CNEL, dBA) Interior[1,2] | Maximum Noise Level ($L_{DN}$ or CNEL, dBA) Exterior |
|---|---|---|
| Residential – Single Family, Multi-family, Duplex | 45 | 65[3] |
| Residential – Nursing Homes, Hospital | 45 | 65[3] |
| Private Offices, Church Sanctuaries, Libraries, Board Rooms, Conference Rooms, Theaters, Auditoriums, Concert Halls, Meeting Halls, etc. | 45 | - |
| Schools | 45 | 65[4] |
| General Offices, Reception, Clerical, etc. | 50 | - |
| Bank Lobby, Retail Store, Restaurant, Typing Pool, etc. | 60 | - |
| Manufacturing, Kitchen, Warehousing, etc. | 65 | - |
| Parks, Playgrounds, etc. | - | 65[4] |
| Golf Courses, Outdoor Spectator Sports, Amusement Parks, etc. | - | 70[4] |

Source: City 2012

1 Noise standard with windows closed. Mechanical ventilation shall be provided per UBC requirements to provide a habitable environment.

2 Indoor environment excluding bathrooms, toilets, closets, and corridors.

3 Outdoor environment limited to rear yard of single-family homes, multi-family patios and balconies (with a depth of 6 feet or more) and common recreation areas.

4 Outdoor environment limited to playground areas, picnic areas, and other areas of frequent human use.

$L_{DN}$=Day-Night Level; CNEL=Community Noise Equivalent Level; dBA=A-weighted decibel

### 1.6.4 City of Vista Noise Ordinance (Municipal Code, Chapter 8.32, Noise Control)

Sections 8.32.010 through 8.32.060 of the City of Vista Municipal Code pertain to City noise requirements and enforcement of violations. The City has adopted the County of San Diego Noise Ordinance for the purpose of controlling excessive noise levels, including noise from construction activities.

Table 2, *Applicable Exterior Property Line Noise Limits,* lists the applicable exterior property line noise limits. This table is specific to the City of Vista and replaces the table in Section 36.404 of the County of San Diego noise ordinance. It is unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level at any point on or beyond the boundaries of the property exceeds these limits. The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones.

**Table 2**
**APPLICABLE EXTERIOR PROPERTY LINE NOISE LIMITS**

| Zone | Time | Applicable Limit One-hour Average Sound Level (Decibels) |
|---|---|---|
| A-1, E-1, O, OSR<br>R-1B, MHP | 7:00 a.m. – 10:00 p. m.<br>10:00 p.m. – 7:00 a. m. | 50<br>45 |
| R-M | 7:00 a.m. – 10:00 p.m.<br>10:00 p.m. – 7:00 a.m. | 55<br>50 |
| C-1, C-2, O-3, C-T, OP, M-U and Downtown Specific Plan | 7:00 a.m. – 10:00 p.m.<br>10:00 p.m. – 7:00 a.m. | 60<br>55 |
| M-1, I-P, all areas of the Vista Business Park Specific Plan and Specific Plan 14 | Any time | 70 |

Source: City 2014
A-1 = Agricultural; C-1 and C-3 = Commercial; C-T = Commercial Transient; E-1 = Estate; I-P = Industrial; M-1 = Light Manufacturing; MHP = Mobile Home Park; M-U = Mixed Use; O = Open Space; O-3 = Office Park; OP = Office Professional; OSR = Open Space Residential; R-1 and R-1B = Single-family Residential; R-M = Multi-family Residential

The project site and neighboring parcels within the City are zoned E-1 (Estates Residential).

The adopted County of San Diego Noise Ordinance also stipulates controlling construction noise. San Diego County Code Sections 36.408 and 36.409, Construction Equipment, state that, except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

A. Between 7:00 p.m. and 7:00 a.m.

B. On Sunday or a holiday. For the purposes of this section, a holiday means January 1, the last Monday in May, July 4, the first Monday in September, December 25, and any day appointed by the President as a special national holiday or the Governor of the State as a special State holiday. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10:00 a.m. and 5:00 p.m. at the person's residence or for the purpose of construction of a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limits in Sections 36.409 and 36.410.

C. Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 dBA for an 8-hour period, between 7:00 a.m. and 7:00 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

Section 36.410 of the County of San Diego's ordinance provides additional limitation on construction equipment beyond Section 36.404 pertaining to impulsive noise. Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 3*, Maximum Sound Levels (Impulsive)*, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period.

**Table 3**
**MAXIMUM SOUND LEVELS (IMPULSIVE)**

| Occupied Property Use | Decibels (dBA) $L_{MAX}$ |
|---|---|
| Residential, village zoning or civic use | 82 |
| Agricultural, commercial or industrial use | 85 |

Source: County of San Diego Municipal Code Section 36.410

The minimum measurement period for any measurements is one hour. During the measurement period, a measurement must be conducted every minute from a fixed location on an occupied property. The measurements must measure the maximum sound level during each minute of the measurement period. If the sound level caused by construction equipment or the producer of the impulsive noise exceeds the maximum sound level for any portion of any minute, it will be deemed that the maximum sound level was exceeded during that minute.

# 2.0 ENVIRONMENTAL SETTING

## 2.1 SURROUNDING LAND USES

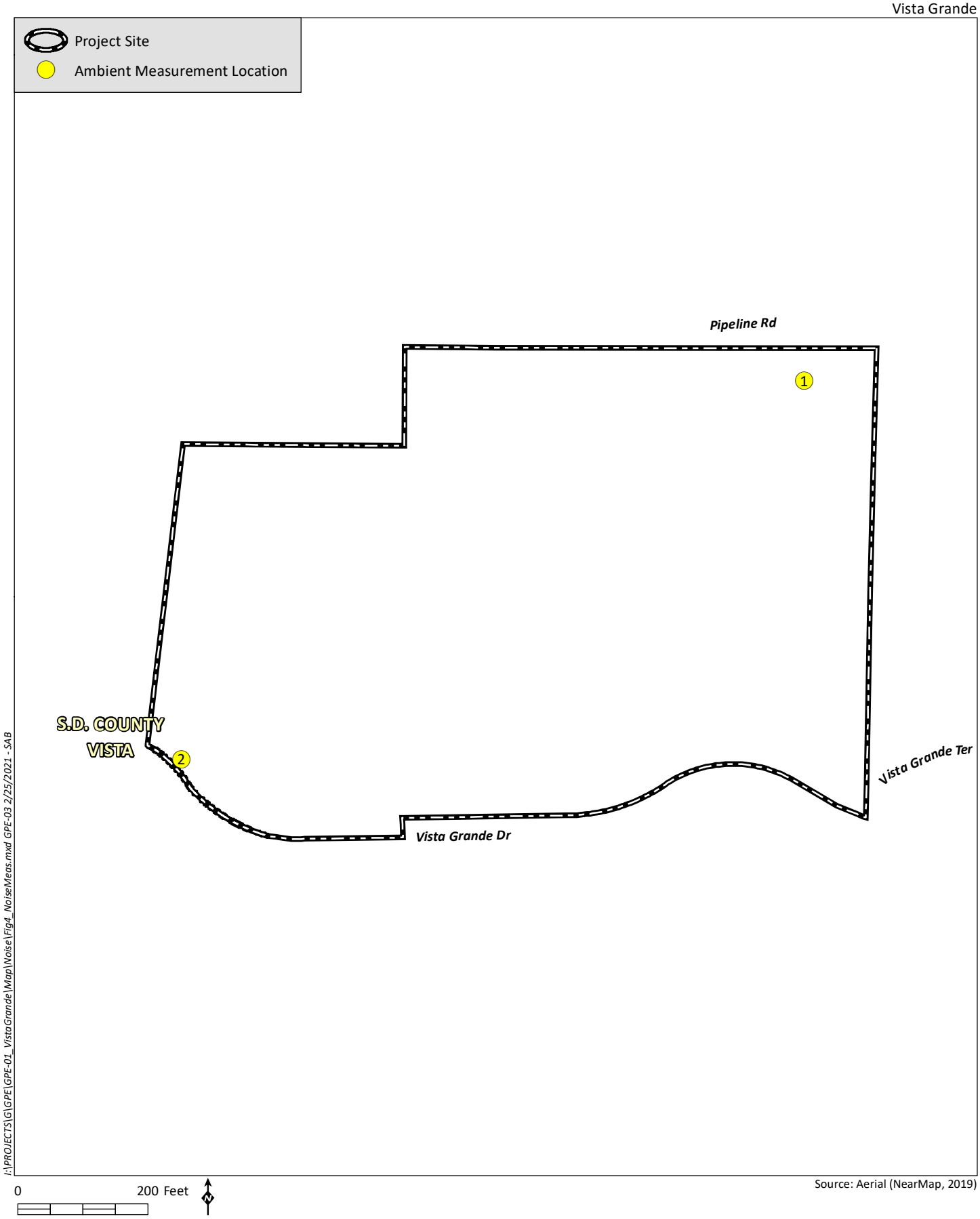
Single-family residences are located adjacent to the property to the northwest, southeast, and east of the site. Residences and vacant lots are also located across Vista Grande Drive to the south. Agricultural uses are located on a parcel adjacent to and directly north of the site.

## 2.2 EXISTING NOISE ENVIRONMENT

The existing noise environment consists of distant traffic noise from East Vista Way, as well as occasional vehicular noise on Vista Grande Drive and Vista Grande Terrace. Background noise from nearby residential areas such as barking dogs, lawnmowers, leaf blowers is also present. The project is subject to some distant aircraft noise, though the site is not located near any active airports. The nearest airport is McClellan-Palomar Airport, located 8 miles to the south, and Marine Corps Air Station Camp Pendleton, located 8.5 miles to the northwest.

### 2.2.1 Ambient Noise Survey

Two locations were measured for the original study's ambient noise survey: one at the southwest corner of the project site on Vista Grande Drive, and one at the northeast corner (see Figure 4, *Ambient Noise Measurement Locations*, and Appendix A, *On-site Noise Measurement Sheets*, for survey notes). The measured noise levels and related environmental conditions are shown in Table 4, *Noise Measurement Results*. The noise conditions of the original study are assumed to represent the current conditions, as neither the site nor surrounding parcels have been significantly developed.




Source: Aerial (NearMap, 2019)

HELIX Environmental Planning

# Ambient Noise Measurement Locations

Figure 4

**Table 4**
**NOISE MEASUREMENT RESULTS**

| | |
|---|---|
| **Measurement 1** | |
| Date: | October 20, 2015 |
| Conditions: | Partly cloudy skies. Slight breeze. Temperature approximately 74°F |
| Time: | 5:01 p.m. - 5:11 p.m. |
| Location: | Vista Grande Terrace (northwest corner of property) |
| Measured Noise Level: | 41.4 dBA $L_{EQ}$ |
| Notes: | Noise sources: distant propeller plane, dogs barking, lawn mower, birds |
| **Measurement 2** | |
| Date: | October 20, 2015 |
| Conditions: | Partly cloudy skies. Slight breeze, temperature approximately 73° F |
| Time: | 5:18 a.m. - 5:28 p.m. |
| Location: | Vista Grande Drive, southwest corner of property |
| Measured Noise Level: | 43.4 dBA $L_{EQ}$ |
| Notes: | Birds, distant traffic, jet flyover. |

# 3.0 ANALYSIS, METHODOLOGY, AND ASSUMPTIONS

## 3.1 METHODOLOGY

### 3.1.1 Ambient Noise Survey

The following equipment was used to measure existing noise levels at the project site:

- Larson Davis LxT Noise Meter
- Larson Davis Model CA2150 Calibrator
- Windscreen and tripod for the sound level meter

The sound level meter was field-calibrated immediately prior to the noise measurements to ensure accuracy. All sound level measurements conducted and presented in this report were made with a sound level meter that conforms to the American National Standards Institute (ANSI) specifications for sound level meters (ANSI SI.4-1983 R2006). All instruments were maintained with National Institute of Standards and Technology traceable calibration per the manufacturers' standards.

### 3.1.2 Noise Modeling Software

The exterior noise environment was modeled using the Traffic Noise Model (TNM) version 2.5, a computer based noise model. TNM was released in February 2004 by the U.S. Department of Transportation (USDOT) and calculates the daytime average hourly $L_{EQ}$ from three dimensional model inputs and traffic data (California Department of Transportation [Caltrans] 2004). Input variables included projected traffic volumes, estimated truck composition percentages, and vehicle speeds.

Peak-hour traffic volumes are estimated based on the assumption that approximately 10 percent of the average daily traffic would occur during a peak hour. The one-hour $L_{EQ}$ noise level is calculated utilizing

peak-hour traffic. Peak hour $L_{EQ}$ can be converted to CNEL using the following equation, where $L_{EQ}(h)pk$ is the peak hour $L_{EQ}$, *P* is the peak hour volume percentage of the average daily trips (ADT), *d* and *e* are divisions of the daytime fraction of ADT to account for daytime and evening hours, and *N* is the nighttime fraction of ADT:

$$CNEL = L_{EQ}(h)pk + 10log10\ 4.17/P + 10log10(d + 4.77e + 10N)$$

The model-calculated one-hour $L_{EQ}$ noise output is therefore approximately equal to the CNEL (Caltrans 2013).

Project construction noise was analyzed using the Roadway Construction Noise Model (RCNM; USDOT 2008), which utilizes estimates of sound levels from standard construction equipment.

## 3.2 ASSUMPTIONS

### 3.2.1 Construction

Construction would require the use of equipment throughout the site for the full term of construction. Construction activities would include grading, rock breaking, excavating, and road paving. Equipment used on site is assumed to include (but not be limited to) a dozer, excavator, loaders, dump trucks, breaker, and a rock driller.

Blasting may be required at the site during initial grading activity. Blasting operations would be conducted through the use of drilling and blasting to fracture rocks. Blasting operations would be conducted by a licensed blasting contractor, in strict compliance with pertinent federal, state, and county requirements. All blasting materials would be transported to the site for each blasting sequence and no explosives would be stored at the site. A single drill rig would be used to drill a pattern of bore holes each with a 3- to 6-inch diameter. A contractor then loads the holes with carefully metered explosives. The “shot” is timed to detonate each of the holes in sequence. This minimizes the ground vibration and noise of the blast, while maximizing fracture of the rock. Some dust is created as a result of the blast. However, the dust would be fully dissipated within 30 to 60 seconds following the shot. The rock would be broken up to sizes less than 18 inches in diameter.

Following blasting, the rock resource would be fractured and can be moved with conventional earthmoving equipment. A front-end loader would be used to spread the fractured rocks around the site for balanced cut/fill grading.

Blasting typically includes three components that can result in impacts: flyrock, vibration, and airblast, as described below.

Flyrock: Flyrock is debris (smaller and potentially larger chunks of rock) ejected from the blast. Outside the immediate area of the blast itself, flyrock is potentially the most dangerous portion of blasting; it has the ability to damage structures and maim or kill humans or other animals at great distances from the blast.

Vibration: Both air and ground vibrations create waves that disturb the material in which they travel. When these waves encounter a structure, they cause it to shake and may cause structural damage. Ground vibrations enter the house through the foundation.

Airblast: Airblast is a pressure wave that creates a push (positive pressure) and pull (negative pressure) effect; it may be audible (noise) or inaudible (concussion). A blast occurring outside of a residence may be heard inside because of the audible noise; however, noise has little impact on the structure. The concussion wave causes the structure to shake and rattle and can break windows at higher pressure levels.

### 3.2.2 Operations

Anticipated project site operational noise sources include residential heating, ventilation, and air conditioning (HVAC) systems and vehicular traffic.

#### 3.2.2.1 Heating, Ventilation, and Air Conditioning Units

Specific planning data for the future HVAC systems is not available at this stage of project design; however, analysis using a typical to larger-sized residential condenser mounted on ground level pads provides a reasonable basis for analysis. The unit used in this analysis is a Carrier 38HDR060 split system condenser (see Appendix B, *Carrier 38HDR060 Split System Condenser*). The manufacturer's noise data is provided below in Table 5, *Carrier HDR060 Condenser Noise.*

**Table 5**
**CARRIER HDR060 CONDENSER NOISE**

| Noise Levels in Decibels[1] (dB) Measured at Octave Frequencies | | | | | | | Overall Noise Level in A-weighted Scale (dBA)[1] |
|---|---|---|---|---|---|---|---|
| 125 Hz | 250 Hz | 500 Hz | 1 KHz | 2 KHz | 4 KHz | 8 KHz | |
| 63.0 | 61.5 | 64.0 | 66.5 | 66.0 | 64.5 | 55.5 | 72.0 |

[1] Sound Power Level ($S_{WL}$)

KHz = kilohertz

#### 3.2.2.2 Vehicular Traffic

Traffic data for roadways in the project vicinity (East Vista Way and Warmlands Avenue) and project trip generation for the current project are based on volumes from the project's traffic consultant (LSA 2021; Appendix C, *Roadway Segment Level of Service Summary*). Table 6, *Existing Plus Project Traffic Volumes*, summarizes the average daily trip (ADT) data for nearby roadways, both with and without the project.

**Table 6**
**EXISTING PLUS PROJECT TRAFFIC VOLUMES**

| Roadway Segment | ADT Existing | Project | Existing + Project |
|---|---|---|---|
| **East Vista Way** | | | |
| North of Warmlands Avenue | 31,000 | 140 | 31,140 |
| South of Warmlands Avenue | 31,000 | 140 | 31,140 |
| **Warmlands Avenue** | | | |
| East of East Vista Way | 3,000 | 280 | 3,280 |

Source: LSA 2021; Appendix C

TNM software was used to calculate the noise contour distances for both scenarios (refer to Section 4.4.2). Modeling was based upon the posted speed limits of 50 miles per hour (mph) for East Vista Way

north of Warmlands Avenue and 40 mph south of Warmlands Avenue. Warmlands Avenue's posted speed limit is 30 mph. For a conservative analysis, the percentage breakdown of vehicles for modeling traffic noise was assumed to be 97 percent automobiles, 2 percent medium trucks, and 1 percent heavy trucks.

## 3.3 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE

Based on Appendix G of the CEQA Guidelines, implementation of the project would result in a significant adverse impact if it would:

***Threshold 1:*** *Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the Vista General Plan or noise ordinance.*

Impacts would be significant if the project would expose proposed residential uses to exterior noise levels exceeding 65 CNEL or interior noise levels exceeding 45 CNEL, as described in the City General Plan Noise Element.

Per the Vista Noise Ordinance, impacts would be significant if the project would generate noise levels at a common property line with the adjacent single-family residential zone to the west that would exceed the following one-hour average exterior noise levels: 50 dBA from 7:00 a.m. to 10:00 p.m. and 45 dBA from 10:00 p.m. to 7:00 a.m. The adjacent single-family residential properties to the south of the project site are within unincorporated San Diego County. While the proposed project is not subject to the regulations of the County of San Diego, the same 50 dBA daytime limit and 45 dBA nighttime limit are considered at these property lines for analysis purposes.

For traffic-related noise, impacts are considered significant in areas where traffic noise at single-family residential uses exceeds 65 CNEL and implementation of the project would result in an increase of the noise level by 3 CNEL or more.

Construction activity would be considered significant for nearby residences if it exceeds an 8-hour average exterior noise level of 75 dBA, or a maximum impulsive noise level of 82 dBA on an occupied residential use. The ordinance prohibits construction and building work between the hours of 7:00 p.m. and 7:00 a.m. of the next day, on Sundays, or on a holiday.

***Threshold 2:*** *Generate excessive ground-borne vibration or ground-borne noise levels.*

Excessive ground-borne vibration would occur if construction-related ground-borne vibration exceeds the "strongly perceptible" vibration annoyance potential criteria for human receptors of 0.1 inch per second peak particle velocity (PPV) or the damage potential criteria to relatively old residential structures 0.5 inch per second PPV for continuous/frequent intermittent construction sources (such as impact pile drivers, vibratory pile drivers, and vibratory compaction equipment), as specific by Caltrans (2020).

***Threshold 3:*** *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 use airport or private airstrip, expose people residing or working in the project area to excessive noise.*

Excessive noise exposure is defined as noise levels that exceed the standards in the Vista General Plan Noise Element for the associated land use.

# 4.0 IMPACTS

## 4.1 ISSUE 1: EXCESSIVE NOISE LEVELS

*Would the project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the Vista General Plan or noise ordinance.*

### 4.1.1 Exposure to Excessive Noise

#### 4.1.1.1 Exterior Noise Levels

The nearest City roadways with traffic volumes substantial enough to affect the exterior noise levels at the project site are Warmlands Avenue to the south of the project, and East Vista Way to the west of the project site. East Vista Way is approximately 1,600 feet from the project site. Warmlands Avenue is approximately 550 feet away from the project site at its nearest point.

Anticipated exterior noise levels at the project site from traffic volumes (including project-added trips) on East Vista Way Avenue would be 46 CNEL, well below the any applicable exterior noise limits (65 CNEL). Traffic noise from Warmlands Avenue at 550 feet would be 42 CNEL, also below exterior noise limits. Therefore, impacts related to the exposure of proposed residential limits to exterior acceptable levels would be less than significant.

#### 4.1.1.2 Interior Noise Levels

Traditional architectural materials are normally able to reduce exterior to interior noise by up to 15 dBA. Because the project building façade noise levels will not exceed 60 CNEL, traditional architectural materials would be expected to attenuate interior noise to a level of 45 CNEL. Therefore, impacts related to interior noise limits are less than significant.

### 4.1.2 Operational On-site Noise Generation

Anticipated project stationary noise sources include the residential HVAC systems. Potential impacts from this noise source are discussed below.

Specific planning data for the future HVAC systems and exact building site locations are not available at this stage of project design; however, analysis using a typical to larger-sized residential condenser mounted on ground level pads provides a reasonable basis for analysis. The unit used in this analysis is a Carrier 38HDR060 split system condenser. As mentioned in Section 3.2.2, modeling assumed that the air conditioning condenser would be a Carrier 38HDR060 split system. This unit typically generates a noise level of 56 dBA at a distance of 7 feet. Based on the site plan shown in Figure 3, residential pads would be located approximately 25 feet from the project boundary. For single-family homes, it is anticipated

that the HVAC units would be installed adjacent to the house structure in the back yard. At 25 feet, a condenser would generate a noise level of 44.9 dBA, which does not exceed the City's nighttime allowable hourly limit of 45 dBA. Furthermore, the HVAC units are not likely to be located at the edge of the pad and are therefore likely be located beyond 25 feet from nearby residences. Impacts would be less than significant.

### 4.1.3 Operational Off-site Transportation Noise Generation

TNM software was used to calculate the noise contour distances for Existing and Existing + project conditions. The off-site roadway modeling represents a conservative analysis that does not take into account topography or attenuation provided by existing structures. The results of this analysis for the CNEL at 100 feet are shown below in Table 7, *Off-site Traffic Noise Levels.* Additional analysis for the 70, 65 and 60 CNEL distances are provided in Appendix D, *Existing and Future Traffic Noise Levels.*

As noted in Section 3.3, a significant direct impact would occur if existing conditions approach or exceed City standards and the project more than doubles (increases by more than 3 CNEL) the existing noise level. The project does not increase any of the noise levels by more than 3 CNEL. Therefore, exterior off-site direct transportation noise impacts would be less than significant.

**Table 7**
**OFF-SITE TRAFFIC NOISE LEVELS**

| Roadway Segment | Distance to Nearest NSLU | Existing CNEL | Existing + Project CNEL | Change from Existing | Direct Impact[1] |
|---|---|---|---|---|---|
| **East Vista Way** | | | | | |
| North of Warmlands Avenue | 100 | 66.7 | 66.7 | 0.0 | No |
| South of Warmlands Avenue | 100 | 66.7 | 66.7 | 0.0 | No |
| **Warmlands Avenue** | | | | | |
| East of East Vista Way | 50 | 55.6 | 56.0 | 0.4 | No |

[1] A direct impact to off-site uses would occur if existing noise levels exceed 65 CNEL at single family residences and the project more than doubles (increases by more than 3 CNEL) the existing noise level.

NSLU = noise sensitive land use; CNEL = Community Noise Equivalent Level

### 4.1.4 Construction Noise

Construction of the project would generate elevated noise levels that may disrupt nearby NSLUs such as nearby residences. The magnitude of the impact would depend on the type of construction activity, equipment, duration of each construction phase, distance between the noise source and receiver, and any intervening structures.

The nearest residences to the proposed grading areas are adjacent to the project site. Construction equipment is mobile and would be moving across the site throughout the construction period. For modeling purposes, the construction equipment was assumed to operate at a reasonably conservative distance of 150 feet from the nearest residence. Over the course of a day, a dozer or excavator may be closer or farther than 150 feet from the nearest residence.

Construction noise impact analysis includes hard rock handling, which is typically significantly louder than other activities and has the greatest potential to create impacts to off-site NSLUs. For hard rock handling, the project would require material excavation and/or fill. Blasting may be performed to assist

with grading given the underlying geology of the site. The necessity and extent of blasting would not be known until surface clearing is completed. The expected general construction equipment noise levels are shown in Table 8, *Construction Equipment Noise Levels*.

**Table 8**
**CONSTRUCTION EQUIPMENT NOISE LEVELS**

| Unit | Percent Operating Time | $L_{MAX}$ at 150 feet | dBA $L_{EQ}$ at 150 feet |
|---|---|---|---|
| Backhoe | 40 | 68.0 | 64.0 |
| Compactor | 20 | 73.7 | 66.7 |
| Compressor | 40 | 68.1 | 64.1 |
| Concrete Mixer Truck | 40 | 69.3 | 65.3 |
| Concrete Pump Truck | 20 | 71.9 | 64.9 |
| Dozer | 40 | 72.1 | 68.1 |
| Dump Truck | 50 | 66.9 | 62.9 |
| Drum Mixer | 40 | 75.5 | 71.5 |
| Excavator | 40 | 71.2 | 67.2 |
| Front End Loader | 40 | 69.6 | 65.6 |
| Generator | 50 | 71.1 | 68.1 |
| Paver | 50 | 67.7 | 64.7 |
| Roller | 20 | 70.5 | 63.5 |
| Scraper | 40 | 74.0 | 70.1 |
| Scraper/Dozer | 40 | 74.0 | 72.2 |

Source: RCNM
$L_{MAX}$ = maximum noise level; dBA = A-weighted decibel; $L_{EQ}$ = equivalent sound level

Construction equipment would not all operate at the same time or location and would not be in constant use during the 8-hour operating day. Further, not all the pieces of equipment included in Table 8 would be used within 150 feet of off-site residences. As shown, at 150 feet, construction equipment, including the combination of a scraper and dozer would not exceed the 75 dBA $L_{EQ}$ (8 hour) threshold. The project's most prominent noise-generating construction activities are anticipated to include grading and hard rock handling, rock crushing, and blasting. These activities are further analyzed below.

#### 4.1.4.1 Grading and Hard Rock Handling

Grading would occur across the project site and is anticipated to involve the simultaneous use of a scraper and dozer. At a distance of 150 feet, a scraper and dozer would together generate a noise level of 72.2 dBA $L_{EQ}$. This does not exceed the 75 dBA $L_{EQ}$ construction noise level limit and impacts are therefore less than significant.

A hydraulically operated impact hammer attached to a tracked excavator is commonly called a breaker. These units are used to reduce large granitic materials and pavement to a size where they can either be transported off site, buried on site for fill, or used as riprap or landscaping materials. If blasting is to occur (see below), leftover boulders may be large enough for a breaker to be used at the project site. The exact location(s) that a breaker would be used at the project site is unknown at this time. It is therefore assumed that a breaker would be used at the approximate center of the project site, at a distance of 350 feet from off-site residences.

Breakers create impulsive noise that is subject to the 8-hour average noise level limit of 75 dBA $L_{EQ}$ and the maximum impulsive noise level limit of 82 dBA $L_{MAX}$. A breaker generates an 8-hour average noise level of 80 dBA $L_{EQ}$ at a distance of 50 feet and a maximum noise level of 90 dBA $L_{MAX}$ at a distance of 350 feet. Assuming a noise attenuation rate of 6 dBA per doubling of distance, noise levels from the breaker would reduce to 75 dBA $L_{EQ}$ at a distance of 90 feet. The maximum noise level would be below 82 dBA $L_{MAX}$ at 125 feet. Therefore, construction noise from a breaker would be below the thresholds of 75 dBA $L_{EQ}$ and 82 dBA $L_{MAX}$ at 350 feet, or any distance over 125 feet. Impacts would be less than significant.

#### 4.1.4.2 Blasting

A full blasting analysis cannot be done until after the site is cleared of all surface material (including any rippable material) to expose the specific type of material to be blasted, and until the extent of the area of blasting and the required blasting charge type are known. Single-family residences would be located on adjacent lots. The highest elevation on the project site, and therefore potentially the area where blasting would be necessary, is near the center of the site. From this location, the closest off-site homes would be located approximately 350 feet from blasting operations. See Section 3.2.1 for general background information regarding blasting.

In accordance with the Code of Federal Regulations Section 816.67(b), flyrock is not allowed at this site beyond the direct area of the blast, under any circumstances. This analysis assumes that proper blast planning would be used, that all flyrock would be controlled with blast mats or other flyrock control techniques, and proper stemming materials for the charge hole would be utilized.

As with flyrock, control of airblast is dependent on the skill of the Blasting Supervisor, along with many factors including but not limited to the depth of the charge, the type of rock, the amount of fractures in the rock, and the length of correct stemming materials. Airblast is regulated by the limits from 30 CFR 816.61-68, which are provided below in Table 9, *Maximum Allowable Airblast Limit*s.

**Table 9**
**MAXIMUM ALLOWABLE AIRBLAST LIMITS**

| Lower Frequency Limit of Measuring System (Hz) | Maximum Level (±3 dB) |
|---|---|
| 0.1 Hz or lower | 134 peak |
| 2 Hz or lower | 133 peak |
| 6 Hz or lower | 128 peak |
| C-weighted noise level (dBC) | 105 dBC |

Hz = Hertz, dB = decibel

The following analysis is based on a general description of potential impacts that would result from blasting activities. The information is based on guidance for calculating the scaled distance in blasting provided by the Office of Surface Mining Reclamation and Enforcement (OSM; 2009).

Blasting operations would be conducted through the use of drilling and blasting to fracture rocks. Blasting operations would be conducted by a licensed blasting contractor, in strict compliance with pertinent federal, state, and county requirements. All blasting materials would be transported to the site for each blasting sequence and no explosives would be stored at the site.

A single drill rig would be used to drill a pattern of boreholes each with a 3- to 6-inch diameter. Several holes are drilled in an area that is typically at least 40,000 square feet. Typically, the pattern is laid out in a 10x10 to 20x20 grid spacing pattern between the holes depending on shot requirements, with up to approximately 25-foot deep holes. A contractor then loads the holes with carefully metered explosives. Each shot hole would be completely stemmed using fine gravel or dry sand. The shot is timed to detonate each hole(s) in sequence. This minimizes the ground vibration and noise of the blast, while maximizing fracture and controlling shot placement of the rock. The rock would be broken up to boulders less than 18 inches in diameter.

Based on an assumption of 0.5 pounds of explosive material required per ton of material removed and a typical granite weight of 166.5 pounds per cubic foot, or 2.25 tons per CY, a typical shot designed to break up 10 CY of material (typical truckload) would require about 11.25 pounds of explosive charge. The charge would typically consist of a 0.5-pound or less of detonation charge per hole, and the remainder of the charge would be provided by TOVEX or other similar water gel explosive slurry.

The following scaled distance factors in Table 10, *Scaled Distance Factors*, are based on the relationship between peak particle velocity and frequency. Analysis of scaled distance for the charge weight is based on the following:

**Table 10**
**SCALED DISTANCE FACTORS**

| Distance from the Blasting Site (feet) | Scaled Distance Factor |
|---|---|
| 0 to 300 | 50 |
| 300 to 5,000 | 55 |
| 5,001 and beyond | 65 |

The allowable charge weight is calculated by: $W = (D/D_S)^2$

W = Allowable charge weight in pounds
D = Distance to the nearest structure in feet
$D_S$ = Value from table based on D

A distance (D) of 200 feet was used in the calculation. Per Table 12, at a distance of 100 feet, the scaled distance factor ($D_s$) would be 50. Therefore, for the control of ground-borne vibration impacts to the closest off-site residence, the maximum charge weight would be 16 pounds at a minimum distance of 200 feet.[1]

Because project-specific details regarding blasting operations are not available at this time, impacts to off-site residences are conservatively assessed as significant. Implementation of measure NOI-1, which is

[1] This analysis is based on basic planning assumptions and does not provide final project-specific analysis for allowable blasting charges, nor is it intended to limit the blasting company to the minimum distance or maximum charge weight listed. This analysis is provided as general guidance and is not intended to provide final blasting planning for any specific blast nor does it imply acceptance of any liability for the proper or improper planning of any blasting and/or responsibility for any damages caused by the blaster. All blasting planning and impacts and/or damages that may occur are the sole responsibility of the owner and blasting planning company. The project applicant may also choose alternative options to blasting, such as the use of non-explosive chemical fracturing techniques.

the same measure that was required for the previously proposed project, would ensure that potential impacts are reduced to a less than significant level.

**NOI-1** **Blasting Management Plan**. Should blasting be required on the project site, the project applicant shall prepare a Blasting Management Plan that minimizes potential blasting effects to adjacent residences. All blast planning must be done by a City of Vista approved blaster and submitted to the City with the appropriate blasting permits, and all other applicable local, state, and federal permits, licenses, and bonding. The blasting contractor or owner must conduct all notifications, inspections, monitoring, and major or minor blasting requirements planning with seismograph reports, as necessary.

## 4.2 ISSUE 2: EXCESSIVE VIBRATION

*Would the project expose persons to or generate excessive ground-borne vibration or noise levels?*

### 4.2.1 Construction Vibration

An on-site source of vibration during project construction would be a vibratory roller (primarily used to achieve soil compaction as part of the foundation and paving construction), which is expected to be used within 40 feet of the nearest occupied residence. A vibratory roller creates approximately 0.210 in/sec PPV at a distance of 25 feet. Using the construction vibration damage criteria from the City of Vista General Plan Update EIR (2011), a vibratory roller would fall below the 0.2 in./sec PPV threshold for non-engineered buildings at 40 feet. Therefore, although vibration may be perceptible by nearby residences, temporary impacts associated with the vibratory roller (and other potential equipment) would be less than significant.

### 4.2.2 Operational Vibration

As a residential development, the project would not generate excessive ground-borne vibration during operations; therefore, no impacts would occur.

## 4.3 ISSUE 3: AIRPORT NOISE EXPOSURE

*Would the project expose people residing or working in the project area to excessive noise from a nearby public use airport or private airstrip?*

### 4.3.1 Aircraft Noise

The project is subject to some distant aircraft noise, though the site is not located near any active airports. The closest airport is McClellan-Palomar Airport, located 8 miles to the south. Fallbrook Community Airpark is located 8.1 miles to the north, and Marine Corps Air Station Camp Pendleton, located 8.5 miles to the northwest. Furthermore, no private airstrips are located in the vicinity of the project site. At these distances, no effects related to airport noise would occur at the project site, and impacts would be less than significant.

# 5.0 LIST OF PREPARERS

Jason Runyan, Noise Specialist
Joanne M, Dramko, AICP Principal Noise Specialist, QAQC review

HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, CA 91942

# 6.0 REFERENCES

California Building Standards Commission. 2019. California Building Code, California Code of Regulations, Title 24, Part 2.

California Department of Transportation (Caltrans). 2020. Transportation and Construction Vibration Guidance Manual. April.

2013. Technical Noise Supplement to the Traffic Noise Protocol. September.

2004. California Department of Transportation, Traffic Noise Model (TNM).

HELIX Environmental Planning. 2015. Vista Grande Project Acoustical Site Assessment Report. November

LSA. 2021. Roadway Segment Level of Service Summary.

Office of Surface Mining Reclamation and Enforcement (OSM). 2009. Controlling the Adverse Effects of Blasting (Presentation).

San Diego Association of Governments (SANDAG). 2020. Transportation Forecast Information Center (TFIC). Available at: www.tfic.sandag.org.

San Diego, County. 2020. Municipal Code.

U.S. Department of Transportation (USDOT). 2008. Roadway Construction Noise Model.

Vista, City of (City). 2014. City of Vista Municipal Code, Section 8.32, Noise Control. April.

2012. City of Vista General Plan, Noise Element.

2011. City of Vista General Plan 2030 Draft Program Environmental Impact Report. May.

# Appendix A

## On-Site  Measurement Sheets

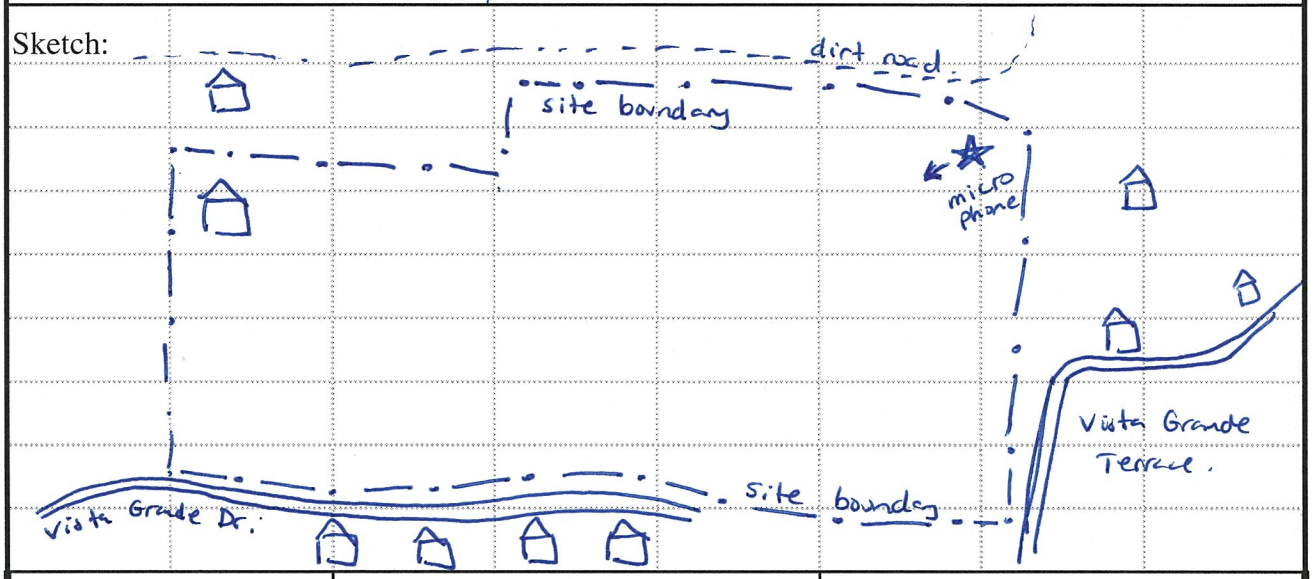
## Site Survey

| | | | |
|---|---|---|---|
| Job # PRW-01 | Project Name: Vista Grande | | |
| Date: 10/20/2015 | Site #: 1 | Engineer: *Jason Runyan* | |
| Address: 2277 Vista Grande Drive | 38° 14' 15.15" N 117° 13' 3.47" W | | |
| Meter: LD-LxT | Serial #: 1741 | Calibrator: CAL150 | Serial #: 3688 |

Notes: 10 mins. - partly cloudy skies.

Noise Sources: distant propeller plane, dogs barking, lawn mower, birds,

Sketch:




| | | |
|---|---|---|
| Temp: 74 F | Wind Spd: mph | Humidity: % |
| Start of Measurement: 1701 | End of Measurement: 1711 | 41.4 dBA $L_{EQ}$ |

| Cars (tally per 5 cars) | Medium Trucks (MT) | Heavy Trucks (HT) |
|---|---|---|
| | | |

Noise Measurement for Information Only

No Through Roadways

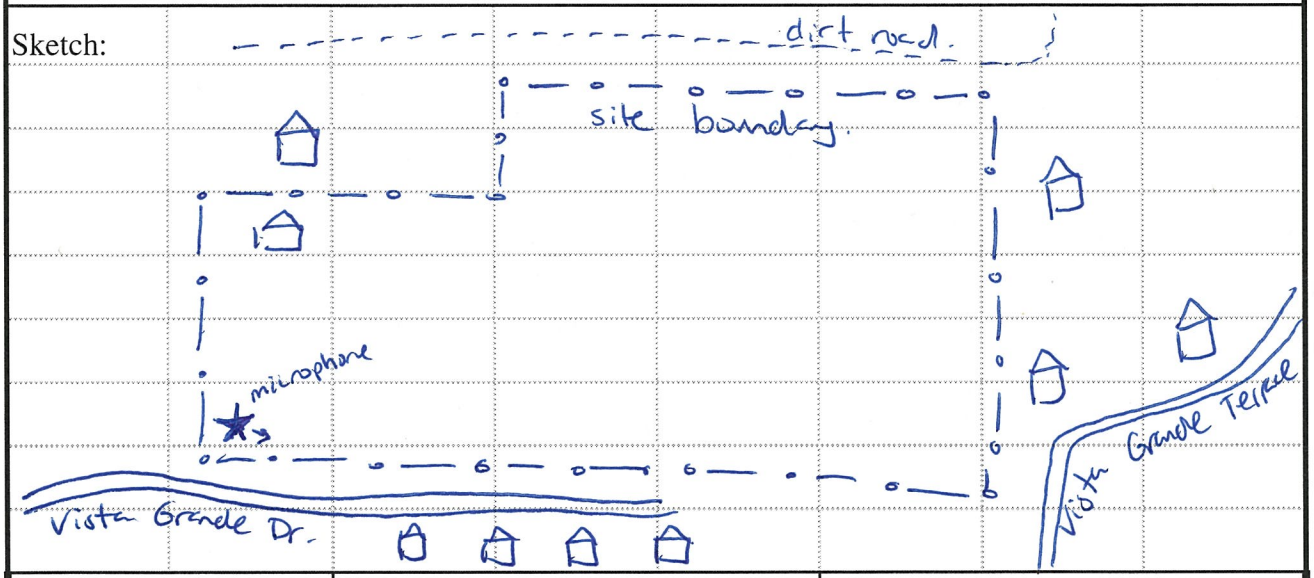
No Calibration Analysis Will Be Provided

## Site Survey

| | | | |
|---|---|---|---|
| Job # PRW-01 | Project Name: Vista Grande | | |
| Date: 10/20/2015 | Site #: 2 | Engineer: *Jason Runyan* | |
| Address: 2277 Vista Grande Drive | 33° 14' 9.31" N 117° 13' 4.68" W | | |
| Meter: LD-LxT | Serial #: 1741 | Calibrator: CAL150 | Serial #: 3688 |

Notes: 10 mins - partly cloudy skies
Noise - birds, distant traffic, jet flyover @ ~7:30 mark.

Sketch:




| | | |
|---|---|---|
| Temp: 73 F | Wind Spd: mph | Humidity: % |
| Start of Measurement: 1718 | End of Measurement: 1728 | 43.4 dBA $L_{EQ}$ |

| Cars (tally per 5 cars) | Medium Trucks (MT) | Heavy Trucks (HT) |
|---|---|---|
| | | |

Noise Measurement for Information Only

No Through Roadways

No Calibration Analysis Will Be Provided

# Appendix B

## Carrier 38HDR060 Split System Condenser

# ELECTRICAL DATA

| 38HDR UNIT SIZE | V–PH–Hz | VOLTAGE RANGE* | | COMPRESSOR | | OUTDOOR FAN MOTOR | | | MIN CKT AMPS | FUSE/ HACR BKR AMPS |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Min | Max | RLA | LRA | FLA | NEC Hp | kW Out | | |
| **018** | 208/230–1–60 | 187 | 253 | 9.0 | 48.0 | 0.80 | 0.125 | 0.09 | 12.1 | 20 |
| **024** | 208/230–1–60 | 187 | 253 | 12.8 | 58.3 | 0.80 | 0.125 | 0.09 | 16.8 | 25 |
| **030** | 208/230–1–60 | 187 | 253 | 14.1 | 73.0 | 1.45 | 0.25 | 0.19 | 19.1 | 30 |
| **036** | 208/230–1–60 | 187 | 253 | 14.1 | 77.0 | 1.45 | 0.25 | 0.19 | 19.1 | 30 |
| | 208/230–3–60 | 187 | 253 | 9.0 | 71.0 | 1.45 | 0.25 | 0.19 | 12.7 | 20 |
| | 460–3–60 | 414 | 506 | 5.6 | 38.0 | 0.80 | 0.25 | 0.19 | 7.8 | 15 |
| **048** | 208/230–1–60 | 187 | 253 | 21.8 | 117.0 | 1.45 | 0.25 | 0.19 | 28.7 | 50 |
| | 208/230–3–60 | 187 | 253 | 13.7 | 83.1 | 1.45 | 0.25 | 0.19 | 18.6 | 30 |
| | 460–3–60 | 414 | 506 | 6.2 | 41.0 | 0.80 | 0.25 | 0.19 | 8.6 | 15 |
| **060** | 208/230–1–60 | 187 | 253 | 26.4 | 134.0 | 1.45 | 0.25 | 0.19 | 34.5 | 60 |
| | 208/230–3–60 | 187 | 253 | 16.0 | 110.0 | 1.45 | 0.25 | 0.19 | 21.5 | 35 |
| | 460–3–60 | 414 | 506 | 7.8 | 52.0 | 0.80 | 0.25 | 0.19 | 10.6 | 15 |

* Permissible limits of the voltage range at which the unit will operate satisfactorily

**FLA** – Full Load Amps
**HACR** – Heating, Air Conditininng, Refrigeration
**LRA** – Locked Rotor Amps
**NEC** – National Electrical Code
**RLA** – Rated Load Amps (compressor)

**NOTE**: Control circuit is 24–V on all units and requires external power source. Copper wire must be used from service disconnect to unit.
All motors/compressors contain internal overload protection.

# SOUND LEVEL

| Unit Size | Standard Rating (dB) | Typical Octave Band Spectrum ( dBA ) (without tone adjustment) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| **018** | 68 | 52.0 | 57.5 | 60.5 | 63.5 | 60.5 | 57.5 | 46.5 |
| **024** | 69 | 57.5 | 61.5 | 63.0 | 61.0 | 60.0 | 56.0 | 45.0 |
| **030** | 72 | 56.5 | 63.0 | 65.0 | 66.0 | 64.0 | 62.5 | 57.0 |
| **036** | 72 | 65.0 | 61.5 | 63.5 | 65.0 | 64.5 | 61.0 | 54.5 |
| **048** | 72 | 58.5 | 61.0 | 64.0 | 67.5 | 66.0 | 64.0 | 57.0 |
| **060** | 72 | 63.0 | 61.5 | 64.0 | 66.5 | 66.0 | 64.5 | 55.5 |

# CHARGING SUBCOOLING (TXV-TYPE EXPANSION DEVICE)

| UNIT SIZE–VOLTAGE, SERIES | REQUIRED SUBCOOLING °F (°C) |
|---|---|
| **018** | 12 (6.7) |
| **024** | 12 (6.7) |
| **030** | 12 (6.7) |
| **036** | 12 (6.7) |
| **048** | 12 (6.7) |
| **060** | 12 (6.7) |

# Appendix C

## Roadway Segment Level of Service Summary

LSA

## Table C: Roadway Segment Level of Service Summary

| Study Area No. | Roadway | Segment | Capacity | Existing Baseline | | | Existing Plus Project | | | Δ V/C | Improvement Required? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ADT | V/C | LOS | ADT | V/C | LOS | | |
| 1 | East Vista Way | Gopher Canyon Road to Osborne Street | 15,000 | 27,200 | 1.81 | F | 27,298 | 1.82 | F | 0.01 | No |
| 2 | East Vista Way | Osborne Street to Warmlands Avenue | 15,000 | 31,000 | 2.07 | F | 31,140 | 2.08 | F | 0.01 | No |
| 3 | East Vista Way | Warmlands Avenue to Taylor Street | 15,000 | 31,000 | 2.07 | F | 31,140 | 2.08 | F | 0.01 | No |
| 4 | Warmlands Avenue | east of East Vista Way | 7,900 | 3,000 | 0.38 | A | 3,280 | 0.42 | A | 0.04 | No |
| 5 | Vista Grande Drive | north of Warmlands Avenue | 7,900 | 500 | 0.06 | A | 780 | 0.10 | A | 0.04 | No |

= exceeds City's level of service criteria

Δ = change

ADT = average daily trips

LOS = level of service

V/C = volume-to-capacity ratio

# Appendix D

## Existing and Future Noise Levels

| Existing and Future Traffic Volumes | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway /Segment | Existing | | | | Existing + Project | | | | Posted Speed (mph) |
| | Peak Hour Traffic | Traffic Breakdown | | | Peak Hour Traffic | Traffic Breakdown | | | |
| | | Cars 97.5% | MT 2.0% | HT 0.5% | | Cars 97.5% | MT 2.0% | HT 0.5% | |
| **East Vista Way** | | | | | | | | | |
| North of Warmlands Ave | 3100 | 3007 | 62 | 31 | 3114 | 3021 | 62 | 31 | 50 |
| South of Warmlands Ave | 3100 | 3007 | 62 | 31 | 3114 | 3021 | 62 | 16 | 40 |
| **Warmlands Avenue** | | | | | | | | | |
| East of East Vista Way | 300 | 291 | 6 | 3 | 328 | 318 | 7 | 3 | 25 |

| Existing and Future Traffic Noise Levels | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway/Segment | Existing | | | | Existing + Project | | | | |
| | CNEL @ dist. (dBA) | 70 CNEL (ft.) | 65 CNEL (ft.) | 60 CNEL (ft.) | CNEL @ dist. (dBA) | Δ at 100ft. (dBA) | 70 CNEL (ft.) | 65 CNEL (ft.) | 60 CNEL (ft.) |
| **East Vista Way** | **100 ft** | | | | | | | | |
| North of Warmlands Ave | 66.7 | 70 | 120 | 200 | 66.7 | 0.0 | 70 | 120 | 200 |
| South of Warmlands Ave | 66.7 | 70 | 120 | 200 | 66.7 | 0.0 | 70 | 120 | 200 |
| **East Vista Way** | **50 ft** | | | | | | | | |
| East of East Vista Way | 55.6 | - | - | 20 | 56.0 | 0.4 | - | - | 25 |

Source: Traffic Noise Model (TNM), version 2.5
Traffic Source Data: LSA 2021

# Attachment J – Water Supply Study and Sewer Flow Analysis

This page left intentionally blank.

# *2277 VISTA GRANDE DRIVE WATER SUPPLY STUDY*

*LN 2021-015*

May 27, 2021

Prepared By: Robert Scholl, P.E.

Approvals:_____

---

## GENERAL POLICY STATEMENT

This water supply study is based on current criteria. It is not a representation, expressed or implied, that the Vista Irrigation District (District) will furnish water at a future date. Applications for service are governed by separate rules and regulations, and are the subject of separate District proceedings, apart from this water supply study.

The location of existing improvements and the recommendations of this hydraulic analysis are presented in schematic form only. It is the responsibility of the Developer/Engineer to design the final improvements, including independent investigation of existing conditions.

This Study is based on the current adopted land use utilized in the City of Vista's General Plan 2030. The study addresses the incremental facility impacts of this Project only and does not include or consider any additional projects within District's service area that have deviated from General Plan land uses. Any land use changes within the vicinity of the Study area may necessitate a revision to the Study. The District shall determine if and when revisions to the Study are necessary. Costs for revising this Study shall be borne by the Developer.

## INTRODUCTION AND PURPOSE

The proposed Vista Grande development (Project) is a single-family residential subdivision consisting of 28 dwelling units on 16.99 acres that will be accessed from Vista Grande Drive in the City of Vista (APN 171-100-05 and -28). The Project property is located within the District's Sphere of Influence and water service boundary.

The purpose of this study is to serve as a nexus document for setting development conditions. It evaluates the configuration of the proposed water system, District service rights, and the ability of the existing water distribution system to serve the Project during peak hour and maximum day plus fire flow demand conditions. Evaluation includes:

- Water distribution system; including the need to upsize or install new pipelines and appurtenances.
- Access and utility easements; including evaluation of the adequacy of existing easements, and the need for new easements.

## SOURCE OF WATER, PROPOSED FACILITIES, AND EASEMENTS

The proposed Project lies completely within the District's 810 Pressure Zone, which is supplied by the 5.0 million gallon (mg) H Reservoir. The 810 Pressure Zone can also be served from San Diego County Water Authority (SDCWA) connection No. 11 (VID 11) to the west of the Project. Figures 1 through 3 show the development's location, existing water infrastructure within the vicinity of the development, and the proposed facilities.

Based on the Tentative Subdivision Map provided by the Developer, a looped public water system is proposed through the project; the water system would make connections to the District's existing system within Vista Grande Drive along the southern end of the Project. The District reviewed this configuration and finds it suitable for a single-family residential development of this size. The District will require full width (curb to curb) access and utility easements over any private roads within the development.

## WATER FLOW PROJECTIONS AND DESIGN CRITERIA

The Project's land use designation by the City of Vista's General Plan 2030 is Rural Residential, which allows up to one dwelling unit per acre. The Project developer is proposing to build 28 single-family residences on 16.99 acres, which equates to 1.6 dwelling units per acre. To meet the new density requirements, the developer is proposing a General Plan Amendment to adjust the land use to Low Density Residential, which would allow up to two dwelling units per acre.

Based on the unit demand factor of 1,100 gallons per day (gpd)/acre developed in the Master Plan for single-family residential land use and site size of 16.99 acres, the projected average annual water demand for the Project is 18,689 gpd.

The Master Plan outlines the District's water system design criteria, which are as follows:

*Peaking Factors*

- Maximum day demands: 200% of average annual demands
- Peak hour demands: 300% of average annual demands

*System Pressure*

- Peak hour demand conditions: 40 pounds per square inch (psi) minimum
- Maximum day demand plus fire flow: 20 psi minimum
- Static: 150 psi maximum

*Fire Flow*

- The City of Vista Fire Marshal has set the required fire demand at 2,000 gallons per minute (gpm) for the Project.

*Pipeline Fluid Velocity*

- Peak hour demand conditions: 8 feet per second (fps) maximum
- Maximum day demand plus fire flow: 16 fps maximum

*Pipeline Diameter*

- Short dead-end, no hydrants: 4-inch diameter minimum
- Feeding hydrants: 8-inch diameter minimum

**HYDRAULIC ANALYSIS**

A hydraulic analysis was performed on the District's distribution system with the proposed Project's water demands and facilities incorporated. The Project proposes a 1,680-foot, 8-inch diameter looped system within the development, connecting to the District's existing 10-inch steel (east side) and 8-inch asbestos cement (west side) water mains in Vista Grande Drive as shown in the Tentative Subdivision Map and Figure 3. Three fire hydrants are proposed within the development and Vista Grande Drive to provide fire protection.

The analysis was carried out using the District's InfoWater® v12.4 water distribution computer model. The modeled pressure results at each of the three proposed fire hydrants to be installed are summarized in the table below.

**Hydraulic Modeling Results – Existing System**

| Node Location | Elevation (ft) | Static Pressure (psi) | Peak Hour Pressure (psi) | Max Day + FF Pressure (psi)* |
|---|---|---|---|---|
| VID Pipe @ Fire Hydrant #1 | 630 | 78 | 72 | 65 |
| VID Pipe @ Fire Hydrant #2 | 714 | 42 | 35 | 23 |
| VID Pipe @ Fire Hydrant #3 | 685 | 54 | 48 | 40 |

*Simulated fire flows are within the distribution system water mains, analyses do not represent actual flow available through a fire hydrant assembly or fire sprinkler system.

No existing system deficiencies were identified in any pipe segments within the Project limits or in the vicinity of the development during any scenario. Results from the analysis shows that the required fire flow demand of 2,000 gpm can be met at all three proposed fire hydrants. However, results also show that the minimum desired peak hour pressure of 40 psi cannot be met throughout the development for pipeline and pad elevations above 702 feet. These low pressures result from the high elevations relative to the hydraulic grade line of the 810 Pressure Zone. If less than 40 psi pressure are considered too low by the developer, the installation of privately owned booster pumps (and backflows at the meters) will be required.

The District makes no guarantee that the available fire flow and pressures are presently available, nor guarantee that the flow and pressure will be available in the future due to continued growth that places additional demands for water on the water distribution system. Availability of flow and

pressure is also subject to shutdowns and variations required by the operation of the District's distribution system.

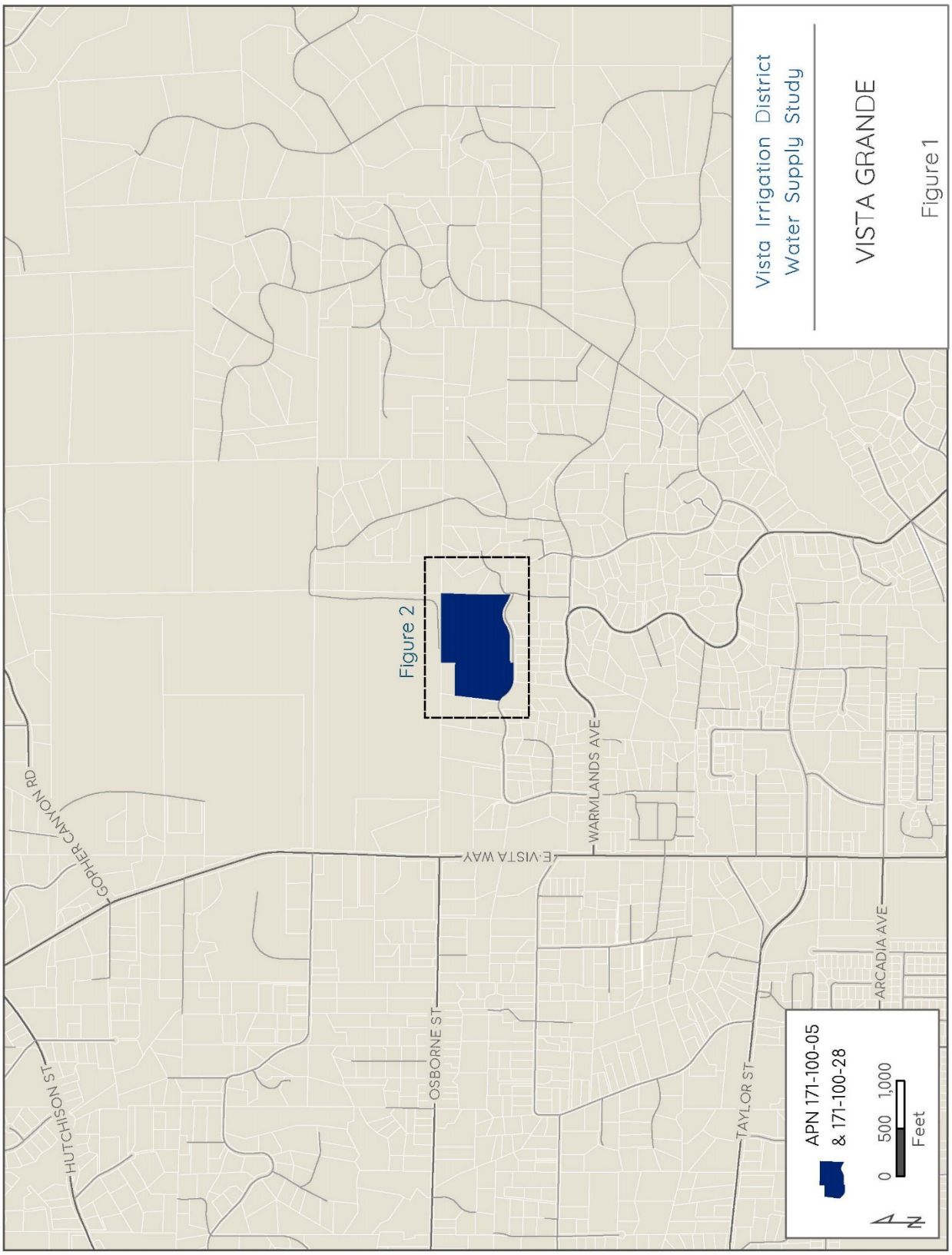
## CONCLUSION AND CONDITIONS

The proposed Project is proposing a General Plan Amendment to adjust the land use to allow up to two dwelling units per acre. Based on the unit demand factor of 1,100 gpd/acre for single-family residential land use and a site size of 16.99 acres, the projected average annual water demand for the Project is 18,689 gpd.

The Study did not identify any existing system deficiencies within the Project limits or in the vicinity of the development during a maximum day plus fire flow demand scenario. However, peak hour pressures are below 40 psi for pipeline/pad elevation above 702 feet. The developer may wish to install privately owned booster pumps with backflows for these areas.

The following improvements were assumed to be constructed as part of this development:

- The installation of 1,680-feet of public 8-inch pipeline within the Project that will tie into the District's existing 10-inch steel / 8-inch asbestos cement water main in Vista Grande Drive at two separate locations to create a looped system.


Vista Irrigation District
Water Supply Study
VISTA GRANDE
Figure 1
Figure 2
E. VISTA WAY
WARMLANDS AVE
GOPHER CANYON RD
HUTCHISON ST
OSBORNE ST
TAYLOR ST
ARCADIA AVE
APN 171-100-05
& 171-100-28
0 500 1,000
Feet

Vista Irrigation District
Water Supply Study
VISTA GRANDE
Figure 2
H107-1
H107-2
H107-3
H107-5
H107-6
PIPELINE RD
VISTA GRANDE DR
6"
8"
10"
10"
diameter
8"
Existing Pipe
APN 171-100-05
& 171-100-28
VID Boundary
0
100
200
Feet
N

Vista Irrigation District
Water Supply Study
VISTA GRANDE
Figure 3
PIPELINE RD
VISTA GRANDE DR
H107-1
H107-2
H107-3
H107-4
H107-5
H107-6
Hydrant #1
Hydrant #2
Hydrant #3
8"
10"
6"
Proposed Hydrant
Proposed Pipe
diameter
Existing Pipe
APN 171-100-05
& 171-100-28
VID Boundary
0
100
200
Feet
N

# Task 10- Vista Grande Development and Flow Analysis

City of Vista/ Buena Sanitation District

*Vista, California*

March 19, 2021

# Introduction

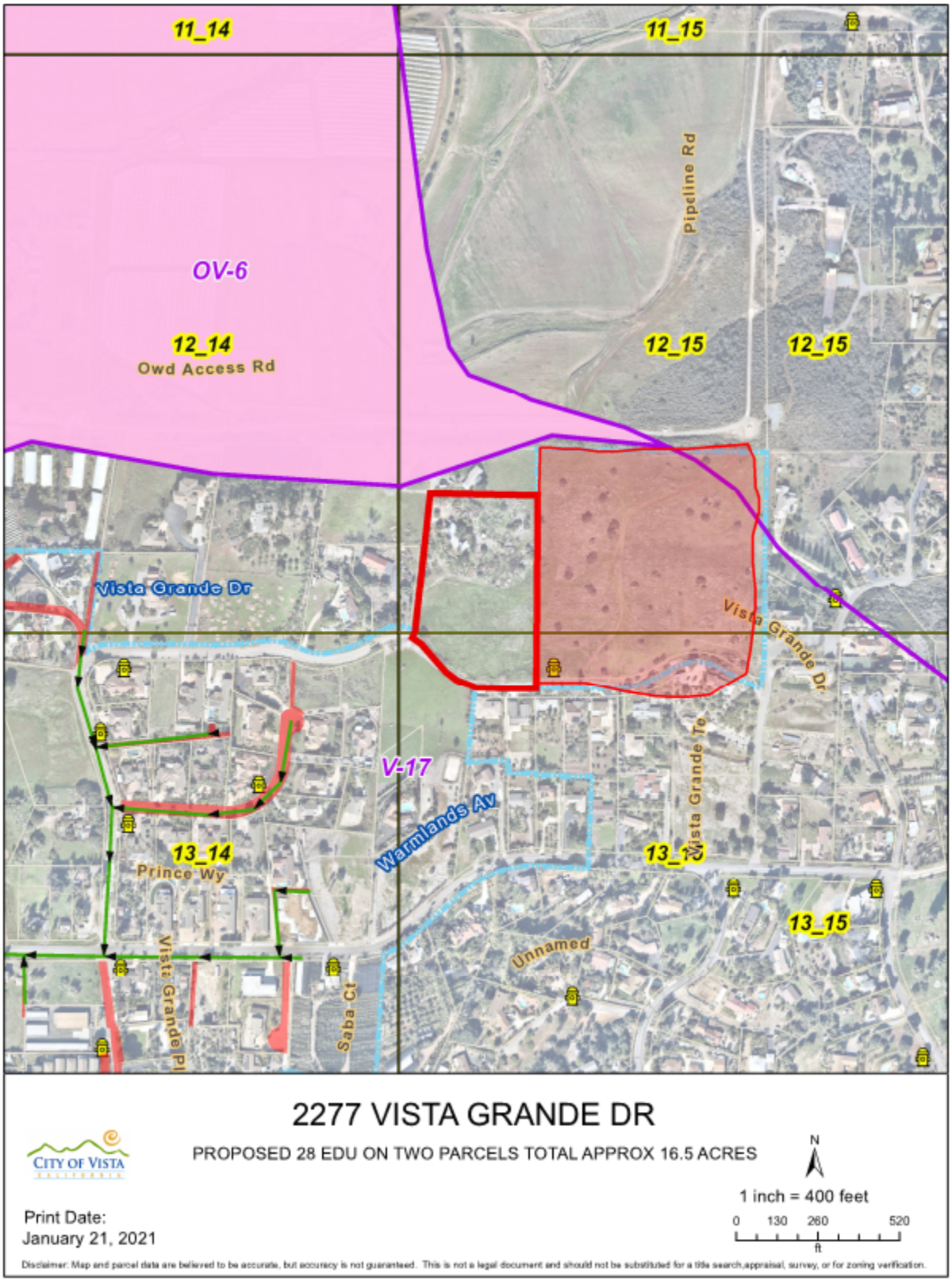
The City of Vista (City) is considering a General Plan Amendment for two City-annexed parcels (APN 171-100-05 & 171-100-28) along Vista Grande Drive that are planned for the Vista Grande Development (Development). Current zoning for the parcels is 1-acre lot minimum, which would allow for 14 single family homes. However, the developer has requested ½-acre lots, which would result in 28 single family homes. The City has commissioned HDR Engineering, Inc. (HDR) to complete hydraulic analyses using the City's InfoSWMM® hydraulic model to verify the proposed load intensification does not impact sewer pipelines downstream.

# Background

In early 2016, the City commissioned HDR to complete the Comprehensive Sewer Management Plan (CSMP) for the City of Vista and Buena Sanitation District which resulted in the 2017 Master Plan Update (Master Plan). As part of the Master Plan effort, HDR updated the City's InfoSWMM® hydraulic model to include updated flow and infrastructure information and recommend capital improvement projects (CIP).

For this task, the updated hydraulic model was used to verify the impacts of the proposed development along Vista Grande Drive, shown in Figure 1. Hydraulic analysis consisted of incorporating the land use changes into the model, running the model for buildout conditions, and evaluating downstream impacts of peak wet weather flows (PWWF) using the design and evaluation criteria from the Master Plan.

**Figure 1 - Proposed Vista Grande Development Location**



# Hydraulic Model Update & Analysis

Hydraulic model update and analysis consisted of the following:

- Calculating flows for the Development parcels based on the proposed dwelling unit count and incorporating the land use changes into the model flow loading
- Adding collection system infrastructure to the modeled system to convey Development flows to the existing collection system
- Evaluating downstream impacts of the proposed Development:
    - Existing System, Existing Flows + Development Flows
    - ~~Existing System + Existing CIP Recommendations, Existing Flows + Development Flows~~ (no Existing CIP Recommendations in the collection system downstream of the Development location)
    - Existing System, Buildout Flows + Development Flows
    - Existing System + Buildout CIP Recommendations, Buildout Flows + Development Flows
- Running the model for existing and buildout PWWF conditions based on a ten (10) year twenty-four (24) hour design storm and evaluating downstream impacts of the Development flows using the evaluation criteria from the Master Plan

The current hydraulic model was calibrated as part of the 2017 Master Plan Update and is assumed to be calibrated for the existing system and adequate for the buildout system analysis.

Additionally, since the model updated performed as part of the 2017 Master Plan Update, model invert elevations and connectivity were updated for the parallel 18-inch gravity mains in East Broadway between Citrus Avenue and South Santa Fe Avenue based on as built drawings as part of the Eucalyptus Avenue and Citrus Avenue Capacity Improvements on call modeling Task 8.

## Updated Flow Loading

Flow loading in the model was updated based on the proposed number of single family homes in the Development and sewer generation rates from the Master Plan. The proposed Development includes 28 single family homes, each representing an equivalent dwelling unit (EDU). The Master Plan recommends a sewer generation rate to 205 gallons per day per EDU (gpd/EDU) when calculating projected flows. Based on these values, the Development is projected to generate approximately 5,740 gallons per day (gpd) average dry weather flow (ADWF). Table 5 summarizes the projected development flow loading.

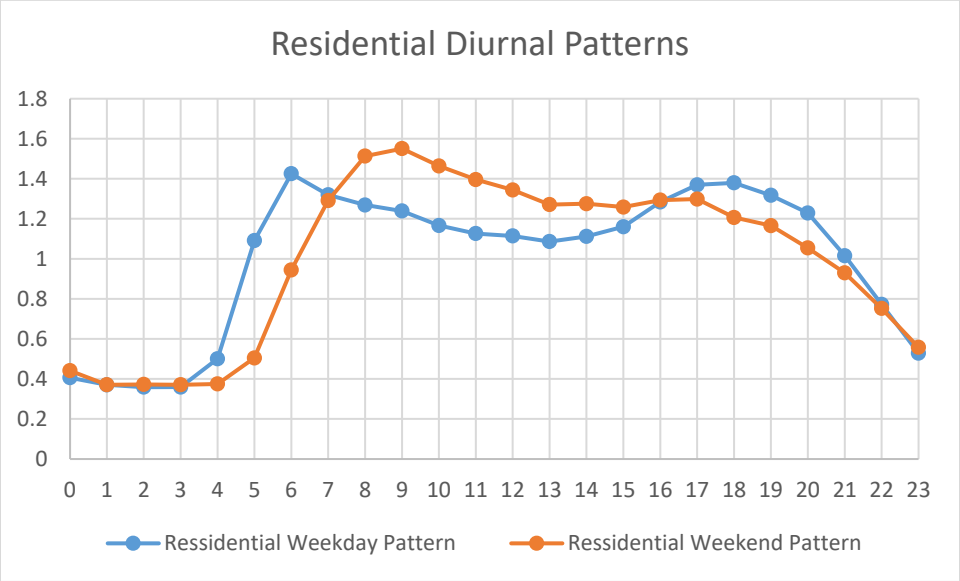
Figure 2 shows residential weekday and weekend diurnal patterns used in the Master Plan. These patterns were applied to the Development flow loading in the model.

**Table 1 – Projected Development Flow Loading**

| Development Size (EDUs) | Sewer Generation Rate [1] (gpd/EDU) | Average Dry Weather Flow | |
|---|---|---|---|
| | | (gpd) | (mgd) |
| 28 | 205 | 5,740 | 0.00574 |

[1] Source: 2017 Master Plan Update

**Figure 2 – Residential Diurnal Patterns**




## Updated Infrastructure

Modeled infrastructure was updated by adding an 8-inch gravity main in Vista Grande Drive to connect the proposed Development to the existing collection system. The new gravity main included in the model is approximately 1,080 feet and connects to an existing 8-inch gravity main in Vista Grande Drive. The gravity main added to the model is shown in plan view in Figure 3 and shown in profile view in Figure 4.

**Figure 3 – Updated Model Infrastructure Plan View**

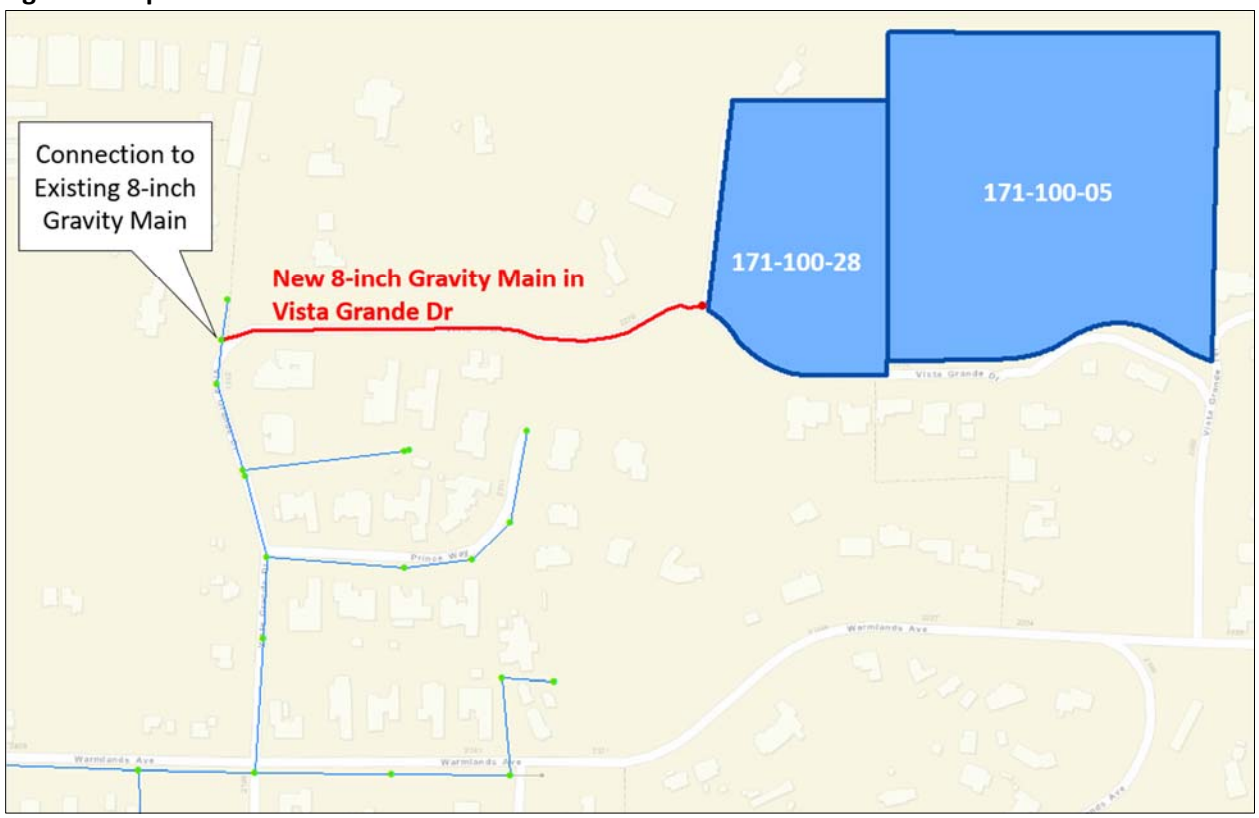
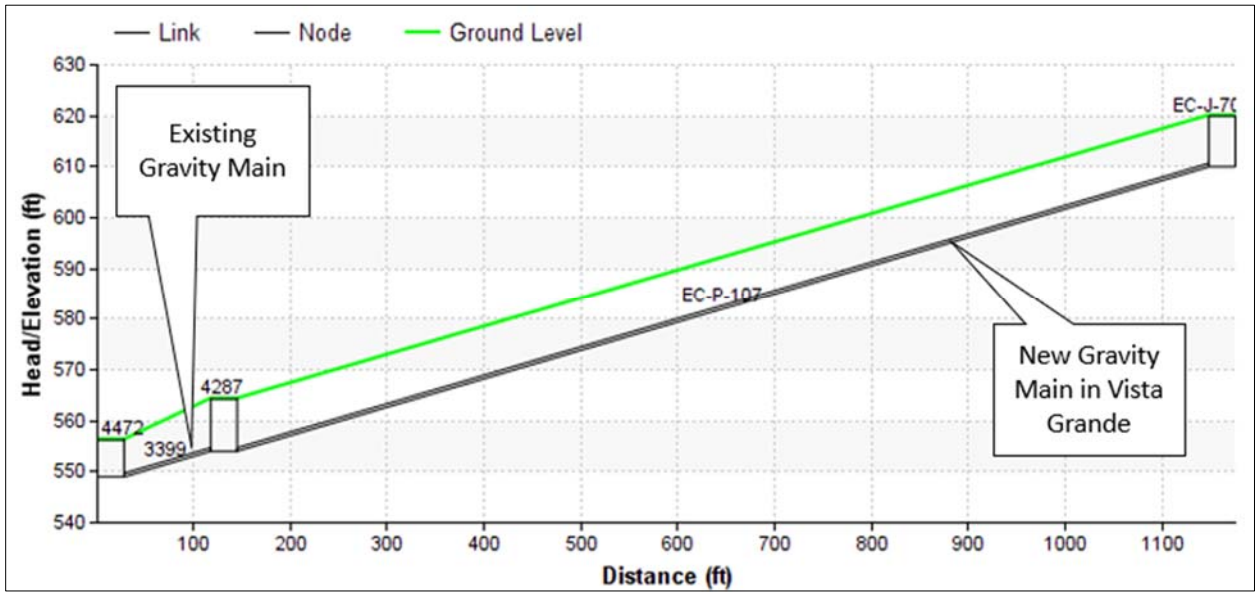



**Figure 4 – Updated Model Infrastructure Profile View**



## Model Analysis and Results

The model was updated with the revised flow loading and infrastructure previously discussed and model runs were performed focusing on the effects of the revised Development flows on the available capacity of the downstream collection system infrastructure.

### Model Analysis

For each of these scenarios, model runs were performed for existing and buildout wet weather flow conditions. Wet weather flow conditions were simulated using a 10 year, 24 hour design storm based on rainfall derived inflow and infiltration (RDII) data collected during a 2015 rainfall event. It should be noted that there are no planned near-term system capacity related CIP projects downstream of the Development location within the Vista collection system. Model scenarios run include the following scenarios.

- Existing System, Existing System Flows
    - Existing System, Existing Flows
    - Existing System, Existing Flows + Development Flows
- Existing System, Buildout Flows
    - Existing System, Buildout Flows
    - Existing System, Buildout Flows + Development Flows
- Buildout System CIP Improvements, Buildout Flows
    - Existing System + Buildout CIP Recommendations, Buildout Flows
    - Existing System + Buildout CIP Recommendations, Buildout Flows + Development Flows

The downstream flow path from the Development location through the Vista collection system that was included in this analysis is shown in Figure 5. The Development flows would travel through a new 8-inch main in Vista Grande Drive connecting to an existing 8-inch main also in Vista Grande Drive. The 8-inch collection system continues through Warmlands Avenue, shown as Reach 1 in Figure 5. The Development flows would then enter a 10-inch main in East Vista Way, shown as Reach 2. Reach 2 then intersects with a primary trunk main and conveys flow to the Vista Carlsbad Interceptor.

As shown in Figure 5, the trunk main flow path is divided into six reaches for the purposes of organizing the results of this analysis.

### Evaluation Criteria

Model results were evaluated using evaluation criteria from the 2017 Master Plan for PWWF conditions including:

- PWWF Depth to Diameter Ratio (d/D) < 0.80, and
- PWWF to Calculated Full Pipe Flow (q/Q) <= 1.00

According to the evaluation criteria in the Master Plan, both PWWF evaluation criteria would need to be exceeded in order for a system upgrade to be recommended.

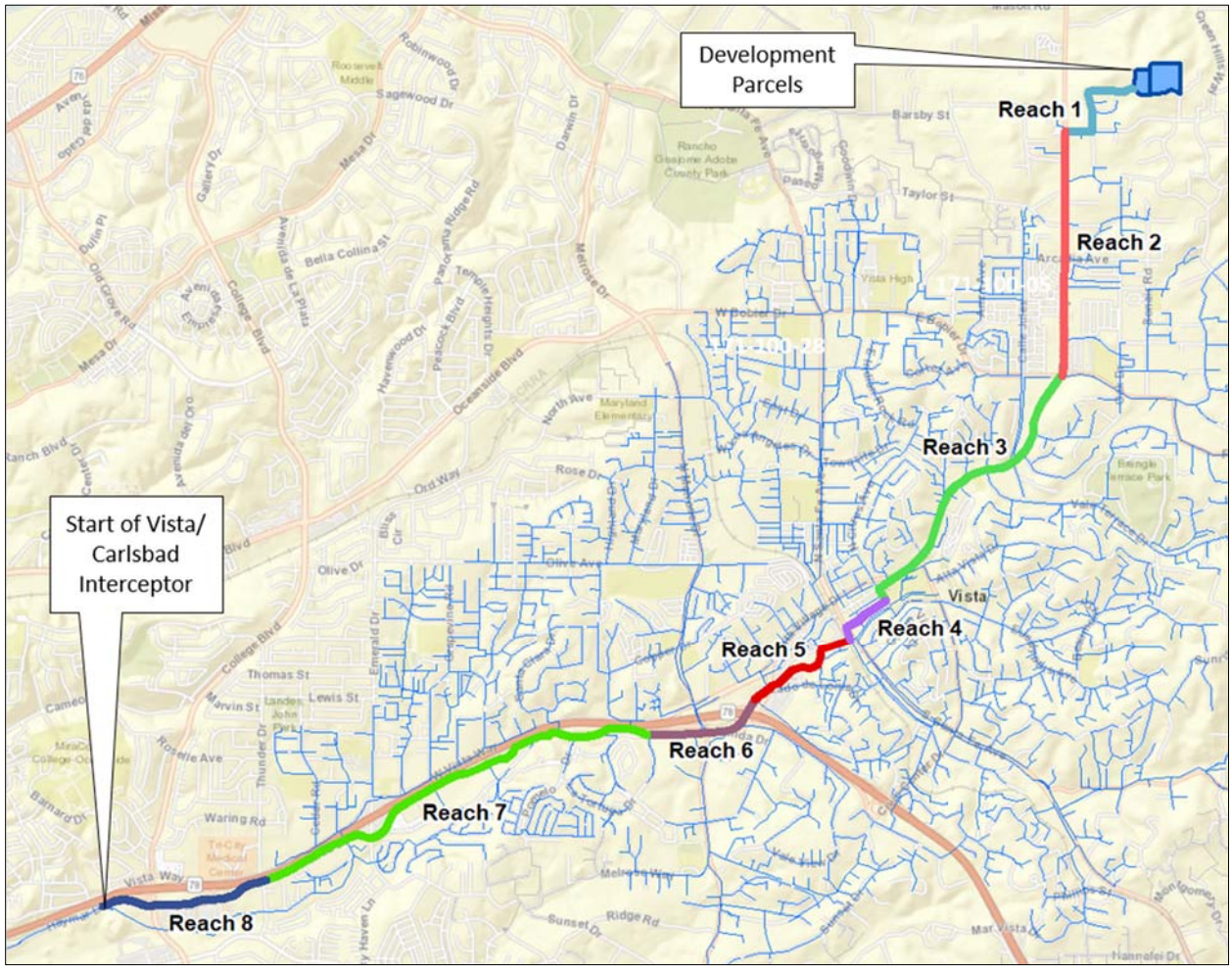
### Model Results

Model results indicate that the additional Development flows are not projected to significantly affect existing or buildout system capacity. Existing system conditions with the additional Development flows are not projected to result in deficiencies in the collection system downstream of the Development location. Projected buildout flow loading is projected to cause deficiencies in some gravity mains in Reach 6, as shown in Figure 5, with or without the additional Development flow loading. The additional

Development flow loading does not affect the recommended CIP addressing capacity constraints in this area of the system

Model results for the flow path from the Development location to the Vista Carlsbad Interceptor are detailed in Table 2 through Table 5. Hydraulic grade line (HGL) profiles of reach 6 for buildout PWWF conditions are shown in Figure 6 through Figure 9.

**Figure 5 – Modeled Infrastructure**



# Conclusion & Recommendations

Based on the model results, the additional Vista Grande Development flows do not result in additional recommended upgrades to the gravity mains in the flow path downstream of the project site to the Vista Carlsbad Interceptor beyond the CIP upgrades recommended in the 2017 Master Plan for either existing or buildout PWWF conditions.

The projected effects of the Vista Grande Development flows on the gravity collection system leading to the Vista Carlsbad Interceptor relative to the Master Plan criteria can be illustrated by comparing the results tables and HGL graphics below for projected flows with and without the addition of the increased flow loading from the Vista Grande Development.

Based on the model results, no additional upgrades are recommended beyond the improvements from the 2017 Master Plan.

**Table 2 - Existing Collection System, Existing Flow Loading, PWWF Model Results**

| Reach | Alignment | Asset ID | Diameter (in) | Existing Flows | | | Existing Flows + Development | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Maximum Flow (mgd) | Max.Flow/ Full Flow | Max.Depth/ Full Depth | Maximum Flow (mgd) | Max.Flow/Full Flow | Max.Depth/ Full Depth |
| 1 | Vista Grande Dr | New Gravity Main | 8 | N/A | N/A | N/A | 0.01 | 0.01 | 0.05 |
| | | V17002.EA-V17002.EB | 8 | 0.00 | 0.00 | 0.03 | 0.01 | 0.01 | 0.06 |
| | | V17002.EB-V17002.EE | 8 | 0.00 | 0.00 | 0.05 | 0.01 | 0.01 | 0.07 |
| | | V17002.EE-V17002.E0 | 8 | 0.01 | 0.01 | 0.06 | 0.02 | 0.01 | 0.09 |
| | | V17002.E0-V17002.F0 | 8 | 0.01 | 0.01 | 0.08 | 0.02 | 0.02 | 0.10 |
| | | V17002.F0-V17002.G0 | 8 | 0.02 | 0.01 | 0.10 | 0.03 | 0.02 | 0.12 |
| | | V17002.G0-V17002.M0 | 8 | 0.02 | 0.03 | 0.13 | 0.03 | 0.04 | 0.15 |
| | Warmlands Ave | V17002.M0-V17002 | 8 | 0.04 | 0.05 | 0.17 | 0.05 | 0.06 | 0.18 |
| | | V17002-V17004 | 8 | 0.04 | 0.07 | 0.17 | 0.05 | 0.08 | 0.18 |
| 2 | East Vista Way | V17004-V17010 | 10 | 0.05 | 0.03 | 0.11 | 0.05 | 0.03 | 0.12 |
| | | V17010-V17011 | 10 | 0.07 | 0.02 | 0.13 | 0.08 | 0.03 | 0.13 |
| | | V17011-V17012 | 10 | 0.08 | 0.05 | 0.18 | 0.09 | 0.05 | 0.19 |
| | | V17012-V17013 | 10 | 0.08 | 0.09 | 0.23 | 0.09 | 0.11 | 0.24 |
| | | V17013-V17014.I0 | 10 | 0.09 | 0.14 | 0.26 | 0.10 | 0.16 | 0.27 |
| | | V17014.I0-V17014 | 10 | 0.14 | 0.15 | 0.28 | 0.15 | 0.16 | 0.28 |
| | | V17014-V17015 | 10 | 0.14 | 0.16 | 0.22 | 0.15 | 0.17 | 0.23 |
| | | V17015-V17016 | 10 | 0.15 | 0.05 | 0.16 | 0.16 | 0.06 | 0.16 |
| | | V17016-V17018 | 10 | 0.15 | 0.05 | 0.16 | 0.16 | 0.06 | 0.16 |
| | | V17018-V17019 | 10 | 0.16 | 0.06 | 0.17 | 0.16 | 0.06 | 0.17 |
| | | V17019-V17036 | 10 | 0.16 | 0.07 | 0.26 | 0.17 | 0.07 | 0.26 |
| | | V17036-V17037 | 10 | 0.24 | 0.24 | 0.49 | 0.25 | 0.25 | 0.50 |
| | | V17037-V17049 | 10 | 0.27 | 1.47 | 0.51 | 0.28 | 1.52 | 0.52 |
| | | V17049-V17054 | 10 | 0.38 | 0.30 | 0.41 | 0.39 | 0.30 | 0.41 |
| | | V17054-V17055 | 10 | 0.46 | 0.40 | 0.44 | 0.47 | 0.40 | 0.44 |
| | | V17055-V17056 | 10 | 0.47 | 0.39 | 0.44 | 0.48 | 0.40 | 0.45 |
| | | V17056-V17057 | 10 | 0.47 | 0.39 | 0.40 | 0.48 | 0.40 | 0.40 |
| | | V17057-V17058 | 10 | 0.47 | 0.26 | 0.37 | 0.48 | 0.27 | 0.38 |
| | | V17058-V17068 | 10 | 0.48 | 0.32 | 0.45 | 0.48 | 0.32 | 0.45 |
| | | V17068-V17069 | 10 | 0.64 | 0.50 | 0.50 | 0.65 | 0.50 | 0.50 |
| | | V17069-V17070 | 10 | 0.66 | 0.49 | 0.52 | 0.67 | 0.50 | 0.53 |
| | | V17070-V17071 | 10 | 0.67 | 0.50 | 0.41 | 0.68 | 0.51 | 0.41 |
| | | V17071-V16041.A0 | 15 | 0.67 | 0.07 | 0.22 | 0.68 | 0.07 | 0.22 |
| 3 | | V16041.A0-V16041 | 15 | 1.49 | 0.15 | 0.31 | 1.49 | 0.15 | 0.31 |
| | | V16041-V16042 | 15 | 1.49 | 0.26 | 0.34 | 1.50 | 0.26 | 0.34 |
| | | V16042-V16043 | 15 | 1.49 | 0.24 | 0.36 | 1.50 | 0.24 | 0.36 |
| | | V16043-V16044 | 15 | 1.50 | 0.32 | 0.39 | 1.51 | 0.32 | 0.39 |
| | | V16044-V16045 | 15 | 1.50 | 0.31 | 0.37 | 1.51 | 0.31 | 0.37 |
| | | V16045-V16046 | 15 | 1.51 | 0.28 | 0.36 | 1.52 | 0.28 | 0.36 |
| | | V16046-V16047 | 15 | 1.51 | 0.26 | 0.34 | 1.52 | 0.26 | 0.34 |
| | | V16047-V16048 | 15 | 1.52 | 0.24 | 0.35 | 1.53 | 0.24 | 0.35 |
| | | V16048-V16049 | 15 | 1.60 | 0.30 | 0.37 | 1.61 | 0.30 | 0.37 |
| | | V16049-V16050 | 15 | 1.60 | 0.29 | 0.42 | 1.61 | 0.29 | 0.42 |
| | | V16050-V21192 | 18 | 2.47 | 0.32 | 0.47 | 2.48 | 0.32 | 0.47 |
| | | V21192-V21193 | 18 | 3.12 | 0.58 | 0.53 | 3.13 | 0.58 | 0.53 |
| | | V21193-V21194 | 18 | 3.12 | 0.52 | 0.46 | 3.13 | 0.52 | 0.46 |
| | | V21194-V21195 | 18 | 3.13 | 0.33 | 0.40 | 3.14 | 0.33 | 0.40 |
| | | V21195-V21196 | 18 | 3.25 | 0.34 | 0.53 | 3.26 | 0.34 | 0.53 |
| | | V21196-V22147 | 18 | 3.26 | 0.77 | 0.63 | 3.27 | 0.77 | 0.63 |
| | | V22147-V22148 | 18 | 3.27 | 0.65 | 0.54 | 3.28 | 0.66 | 0.54 |
| | | V22148-V22149 | 18 | 3.28 | 0.42 | 0.40 | 3.29 | 0.42 | 0.40 |
| | | V22149-V22155 | 18 | 3.29 | 0.24 | 0.37 | 3.30 | 0.24 | 0.37 |
| | | V22155-V22156 | 18 | 3.30 | 0.35 | 0.51 | 3.31 | 0.35 | 0.52 |
| | Vista Village Drive | V22156-V22157.C0 | 18 | 3.31 | 0.71 | 0.66 | 3.32 | 0.71 | 0.66 |
| | | V22157.C0-V22157 | 18 | 3.32 | 0.84 | 0.68 | 3.32 | 0.85 | 0.69 |
| | | V22157-V22158 | 18 | 3.32 | 0.78 | 0.69 | 3.33 | 0.78 | 0.69 |
| | Main Street | V22158-V22159 | 18 | 3.33 | 0.85 | 0.52 | 3.34 | 0.85 | 0.52 |
| | South Citrus Avenue | V22159-V22161 | 18 | 3.34 | 0.23 | 0.33 | 3.35 | 0.24 | 0.33 |
| | | V22161-V22162 | 18 | 3.34 | 0.24 | 0.34 | 3.35 | 0.24 | 0.34 |
| | | V22162-V24090 | 18 | 2.83 | 0.18 | 0.54 | 2.84 | 0.18 | 0.54 |
| 4 | E Broadway (north) | V12116-V12117 | 18 | 0.51 | 0.23 | 0.28 | 0.51 | 0.23 | 0.28 |
| | | V12117-V12118 | 18 | 0.52 | 0.10 | 0.23 | 0.52 | 0.10 | 0.23 |
| | | V12118-V12119 | 18 | 0.52 | 0.12 | 0.30 | 0.52 | 0.13 | 0.30 |
| | | V12119-V12120 | 18 | 0.85 | 0.26 | 0.24 | 0.85 | 0.26 | 0.24 |
| | | V12127-V24112 | 18 | 0.86 | 0.03 | 0.31 | 0.86 | 0.03 | 0.31 |
| | E Broadway (south) | V24090-V24091 | 18 | 4.06 | 0.87 | 0.72 | 4.07 | 0.87 | 0.72 |
| | | V24091-V24092 | 18 | 4.07 | 0.87 | 0.72 | 4.07 | 0.87 | 0.72 |
| | | V24092-V24093 | 18 | 4.07 | 0.86 | 0.70 | 4.08 | 0.86 | 0.70 |
| | | V24093-V24094 | 18 | 4.08 | 0.82 | 0.59 | 4.08 | 0.82 | 0.59 |
| | E Broadway | V24112-V24113 | 21 | 4.94 | 0.36 | 0.52 | 4.95 | 0.36 | 0.52 |
| | S Santa Fe Avenue | V24113-V24100 | 21 | 4.94 | 0.67 | 0.51 | 4.95 | 0.67 | 0.51 |
| 5 | Parking Lot | V24100-V24101 | 27 | 5.04 | 0.23 | 0.34 | 5.05 | 0.23 | 0.34 |
| | | V24101-V08163 | 27 | 5.04 | 0.27 | 0.39 | 5.05 | 0.27 | 0.39 |
| | | V08163-V08162 | 27 | 6.81 | 0.38 | 0.44 | 6.82 | 0.38 | 0.44 |
| | | V08162-V08161 | 27 | 6.82 | 0.38 | 0.45 | 6.83 | 0.38 | 0.45 |
| | Wave Drive | V08161-V08160 | 27 | 6.84 | 0.38 | 0.48 | 6.85 | 0.38 | 0.48 |
| | | V08160-V08159 | 27 | 6.84 | 0.47 | 0.52 | 6.85 | 0.47 | 0.52 |
| | | V08159-V08158 | 27 | 6.84 | 0.56 | 0.52 | 6.85 | 0.56 | 0.52 |
| | | V08158-V08157 | 27 | 6.85 | 0.53 | 0.51 | 6.86 | 0.53 | 0.51 |
| | | V08157-V08156 | 27 | 6.85 | 0.47 | 0.51 | 6.86 | 0.47 | 0.51 |
| | | V08156-V08155 | 27 | 6.86 | 0.54 | 0.53 | 6.87 | 0.54 | 0.53 |
| | | V08155-V08154 | 27 | 6.86 | 0.57 | 0.54 | 6.87 | 0.57 | 0.54 |

| Reach | Alignment | Asset ID | Diameter (in) | Existing Flows | | | Existing Flows + Development | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Maximum Flow (mgd) | Max.Flow/ Full Flow | Max.Depth/ Full Depth | Maximum Flow (mgd) | Max.Flow/Full Flow | Max.Depth/ Full Depth |
| | | V08154-V29142 | 27 | 6.87 | 0.57 | 0.54 | 6.88 | 0.57 | 0.54 |
| | W Broadway | V29142-V29141 | 27 | 6.87 | 0.56 | 0.53 | 6.88 | 0.56 | 0.53 |
| | Buena Vista Creek | V29141-V29143 | 27 | 6.96 | 0.54 | 0.53 | 6.97 | 0.54 | 0.53 |
| | | V29143-V29144 | 24 | 6.96 | 0.68 | 0.55 | 6.97 | 0.68 | 0.55 |
| | | V29144-V29140 | 21 | 6.97 | 0.44 | 0.70 | 6.98 | 0.44 | 0.70 |
| | | V29140-V29146 | 30 | 10.21 | 0.62 | 0.60 | 10.22 | 0.62 | 0.60 |
| | | V29146-V29145 | 30 | 10.22 | 0.71 | 0.61 | 10.23 | 0.71 | 0.61 |
| 6 | | V29145-V29139 | 30 | 10.28 | 0.67 | 0.67 | 10.29 | 0.67 | 0.67 |
| | | V29139-V30069 | 30 | 10.50 | 0.85 | 0.75 | 10.51 | 0.85 | 0.75 |
| | | V30069-V30071 | 30 | 10.50 | 11.79 | 0.70 | 10.51 | 11.80 | 0.70 |
| | Hacienda Drive | V30071-V30070 | 30 | 10.51 | 0.34 | 0.69 | 10.52 | 0.34 | 0.69 |
| | | V30070-V30072 | 30 | 11.23 | 0.87 | 0.72 | 11.24 | 0.87 | 0.72 |
| | | V30072-V30073 | 30 | 12.03 | 0.90 | 0.72 | 12.04 | 0.90 | 0.72 |
| | | V30073-V30079 | 30 | 12.45 | 0.85 | 0.71 | 12.46 | 0.85 | 0.71 |
| | | V30079-V30074 | 30 | 12.45 | 5.19 | 0.70 | 12.46 | 5.20 | 0.70 |
| | | V30074-V30078 | 30 | 12.45 | 0.66 | 0.79 | 12.46 | 0.66 | 0.79 |
| | | V30078-V30076 | 30 | 12.46 | 2.39 | 0.76 | 12.47 | 2.39 | 0.76 |
| | | V30076-V30075 | 30 | 12.47 | 0.34 | 0.72 | 12.48 | 0.34 | 0.72 |
| | | V30075-V30077 | 30 | 12.47 | 4.07 | 0.58 | 12.48 | 4.07 | 0.58 |
| | | V30077-V30068 | 30 | 12.48 | 0.26 | 0.37 | 12.49 | 0.26 | 0.37 |
| | | V30068-V32157 | 36 | 12.48 | 0.23 | 0.42 | 12.49 | 0.23 | 0.42 |
| | | V32157-V32181 | 36 | 12.52 | 0.52 | 0.53 | 12.53 | 0.52 | 0.53 |
| | | V32181-V32158 | 36 | 12.53 | 0.61 | 0.54 | 12.54 | 0.61 | 0.54 |
| | | V32158-V32159 | 36 | 12.64 | 0.56 | 0.53 | 12.65 | 0.56 | 0.53 |
| | | V32159-V32160 | 36 | 12.65 | 0.55 | 0.54 | 12.66 | 0.55 | 0.54 |
| | | V32160-V32161 | 36 | 12.86 | 0.59 | 0.53 | 12.87 | 0.59 | 0.53 |
| | | V32161-V32162 | 36 | 12.88 | 0.53 | 0.36 | 12.89 | 0.53 | 0.36 |
| | | V32162-V32163 | 36 | 13.07 | 0.11 | 0.27 | 13.08 | 0.11 | 0.27 |
| | | V32163-V32164 | 36 | 13.08 | 0.22 | 0.43 | 13.09 | 0.22 | 0.43 |
| | | V32164-V32165 | 36 | 13.09 | 0.57 | 0.54 | 13.10 | 0.57 | 0.54 |
| | Buena Vista Creek | V32165-V32166 | 36 | 13.14 | 0.57 | 0.51 | 13.15 | 0.57 | 0.51 |
| | | V32166-V32167 | 36 | 13.15 | 0.48 | 0.46 | 13.16 | 0.48 | 0.46 |
| | | V32167-V32168 | 36 | 13.16 | 0.37 | 0.39 | 13.17 | 0.37 | 0.39 |
| | | V32168-V32169 | 36 | 13.18 | 0.28 | 0.37 | 13.19 | 0.28 | 0.37 |
| | | V32169-V32170 | 36 | 13.18 | 0.29 | 0.38 | 13.19 | 0.29 | 0.38 |
| 7 | | V32170-V32171 | 36 | 13.46 | 0.30 | 0.32 | 13.47 | 0.30 | 0.32 |
| | | V32171-ABN_V32T068.0 | 36 | 13.46 | 0.15 | 0.41 | 13.47 | 0.15 | 0.41 |
| | | ABN_V32T068.00-V3217 | 36 | 13.48 | 0.60 | 0.55 | 13.49 | 0.60 | 0.55 |
| | Parking Lot | V32172-V32173 | 36 | 13.49 | 0.56 | 0.55 | 13.50 | 0.56 | 0.55 |
| | | V32173-V32183 | 36 | 13.57 | 0.62 | 0.55 | 13.58 | 0.62 | 0.55 |
| | | V32183-V32182 | 36 | 13.59 | 0.56 | 0.55 | 13.60 | 0.56 | 0.55 |
| | | V32182-V32174 | 36 | 13.61 | 0.61 | 0.54 | 13.62 | 0.61 | 0.54 |
| | | V32174-V32184 | 36 | 13.63 | 0.52 | 0.56 | 13.64 | 0.52 | 0.56 |
| | Hacienda Drive | V32184-V01062 | 36 | 13.65 | 0.79 | 0.49 | 13.66 | 0.79 | 0.49 |
| | | V01062-V32175 | 36 | 13.68 | 0.29 | 0.46 | 13.68 | 0.29 | 0.46 |
| | | V32175-V32176 | 36 | 13.69 | 0.60 | 0.64 | 13.70 | 0.60 | 0.64 |
| | | V32176-V32177 | 36 | 13.71 | 20.88 | 0.53 | 13.72 | 20.89 | 0.53 |
| | | V32177-V32178 | 36 | 13.72 | 0.26 | 0.38 | 13.73 | 0.26 | 0.38 |
| | | V32178-V32179 | 36 | 13.74 | 0.36 | 0.49 | 13.75 | 0.36 | 0.49 |
| | Plaza Drive | V32T056.00-V32T055.0 | 36 | 13.76 | 0.60 | 0.54 | 13.77 | 0.61 | 0.54 |
| | | V32T055.00-V32T054.0 | 36 | 13.78 | 0.60 | 0.43 | 13.79 | 0.60 | 0.43 |
| | | V32T054.00-V32T053.0 | 36 | 13.79 | 0.26 | 0.44 | 13.80 | 0.26 | 0.44 |
| | | V32T053.00-V32T052.0 | 36 | 13.80 | 0.56 | 0.49 | 13.81 | 0.56 | 0.49 |
| | | V32T052.00-V32T051.0 | 36 | 13.82 | 0.42 | 0.37 | 13.83 | 0.42 | 0.37 |
| 8 | | V32T051.00-V32T050.0 | 36 | 13.83 | 0.17 | 0.27 | 13.84 | 0.17 | 0.27 |
| | | V32T050.00-V32T049.0 | 36 | 13.85 | 0.15 | 0.41 | 13.86 | 0.15 | 0.41 |
| | | V32T049.00-V32T048.0 | 36 | 13.86 | 0.59 | 0.56 | 13.87 | 0.59 | 0.56 |
| | Haymar Drive | V32T048.00-V32T047.0 | 36 | 13.87 | 0.61 | 0.55 | 13.88 | 0.61 | 0.55 |
| | | V32T047.00-V32T046.0 | 36 | 13.89 | 0.60 | 0.42 | 13.90 | 0.60 | 0.42 |
| | | V32T046.00-V32T045.0 | 36 | 13.91 | 0.20 | 0.37 | 13.92 | 0.20 | 0.37 |
| Yellow Cells | | Indicate failure of at least one evaluation criteria including either q/Q > 1.00 and/or d/D > 0.50 (for DIA </= 12") OR q/Q > 1.00 and/or d/D > 0.80 (for DIA > 12"). Gravity main deficiency indicated by failure of both criteria. | | | | | | | |

**Table 3 - Existing Collection System, Buildout Flow Loading, PWWF Model Results**

| Reach | Alignment | Asset ID | Diameter (in) | Buildout Flows | | | Buildout Flows + Development | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Maximum Flow (mgd) | Max.Flow/ Full Flow | Max.Depth/ Full Depth | Maximum Flow (mgd) | Max.Flow/Full Flow | Max.Depth/ Full Depth |
| 1 | Vista Grande Dr | New Gravity Main | 8 | N/A | N/A | N/A | 0.01 | 0.01 | 0.06 |
| | | V17002.EA-V17002.EB | 8 | 0.00 | 0.00 | 0.04 | 0.01 | 0.01 | 0.07 |
| | | V17002.EB-V17002.EE | 8 | 0.01 | 0.00 | 0.06 | 0.01 | 0.01 | 0.08 |
| | | V17002.EE-V17002.E0 | 8 | 0.01 | 0.01 | 0.07 | 0.02 | 0.01 | 0.09 |
| | | V17002.E0-V17002.F0 | 8 | 0.01 | 0.01 | 0.09 | 0.02 | 0.02 | 0.10 |
| | | V17002.F0-V17002.G0 | 8 | 0.03 | 0.02 | 0.12 | 0.04 | 0.02 | 0.13 |
| | | V17002.G0-V17002.M0 | 8 | 0.03 | 0.04 | 0.16 | 0.04 | 0.05 | 0.17 |
| | Warmlands Ave | V17002.M0-V17002 | 8 | 0.06 | 0.07 | 0.21 | 0.07 | 0.08 | 0.22 |
| | | V17002-V17004 | 8 | 0.06 | 0.11 | 0.21 | 0.07 | 0.12 | 0.22 |
| 2 | East Vista Way | V17004-V17010 | 10 | 0.07 | 0.05 | 0.14 | 0.08 | 0.05 | 0.14 |
| | | V17010-V17011 | 10 | 0.10 | 0.03 | 0.15 | 0.11 | 0.04 | 0.16 |
| | | V17011-V17012 | 10 | 0.12 | 0.07 | 0.22 | 0.13 | 0.07 | 0.22 |
| | | V17012-V17013 | 10 | 0.13 | 0.14 | 0.28 | 0.13 | 0.15 | 0.29 |
| | | V17013-V17014.I0 | 10 | 0.13 | 0.21 | 0.31 | 0.14 | 0.22 | 0.32 |
| | | V17014.I0-V17014 | 10 | 0.19 | 0.20 | 0.32 | 0.20 | 0.21 | 0.33 |
| | | V17014-V17015 | 10 | 0.19 | 0.22 | 0.26 | 0.20 | 0.23 | 0.27 |
| | | V17015-V17016 | 10 | 0.20 | 0.08 | 0.19 | 0.21 | 0.08 | 0.19 |
| | | V17016-V17018 | 10 | 0.21 | 0.07 | 0.19 | 0.21 | 0.08 | 0.19 |
| | | V17018-V17019 | 10 | 0.22 | 0.08 | 0.20 | 0.23 | 0.08 | 0.20 |
| | | V17019-V17036 | 10 | 0.23 | 0.09 | 0.31 | 0.23 | 0.10 | 0.31 |
| | | V17036-V17037 | 10 | 0.36 | 0.35 | 0.58 | 0.36 | 0.36 | 0.58 |
| | | V17037-V17049 | 10 | 0.36 | 1.95 | 0.57 | 0.37 | 1.99 | 0.58 |
| | | V17049-V17054 | 10 | 0.45 | 0.35 | 0.44 | 0.45 | 0.35 | 0.44 |
| | | V17054-V17055 | 10 | 0.51 | 0.44 | 0.46 | 0.52 | 0.45 | 0.47 |
| | | V17055-V17056 | 10 | 0.52 | 0.44 | 0.47 | 0.53 | 0.45 | 0.48 |
| | | V17056-V17057 | 10 | 0.53 | 0.44 | 0.43 | 0.53 | 0.45 | 0.43 |
| | | V17057-V17058 | 10 | 0.53 | 0.30 | 0.40 | 0.54 | 0.30 | 0.40 |
| | | V17058-V17068 | 10 | 0.53 | 0.36 | 0.48 | 0.54 | 0.36 | 0.48 |
| | | V17068-V17069 | 10 | 0.71 | 0.55 | 0.53 | 0.72 | 0.56 | 0.53 |
| | | V17069-V17070 | 10 | 0.72 | 0.54 | 0.55 | 0.72 | 0.54 | 0.55 |
| | | V17070-V17071 | 10 | 0.72 | 0.54 | 0.43 | 0.73 | 0.55 | 0.43 |
| | | V17071-V16041.A0 | 15 | 0.72 | 0.08 | 0.23 | 0.73 | 0.08 | 0.24 |
| 3 | | V16041.A0-V16041 | 15 | 1.71 | 0.17 | 0.33 | 1.72 | 0.17 | 0.33 |
| | | V16041-V16042 | 15 | 1.71 | 0.30 | 0.37 | 1.72 | 0.30 | 0.37 |
| | | V16042-V16043 | 15 | 1.72 | 0.28 | 0.39 | 1.72 | 0.28 | 0.39 |
| | | V16043-V16044 | 15 | 1.72 | 0.36 | 0.42 | 1.73 | 0.37 | 0.42 |
| | | V16044-V16045 | 15 | 1.73 | 0.35 | 0.40 | 1.73 | 0.36 | 0.40 |
| | | V16045-V16046 | 15 | 1.73 | 0.32 | 0.39 | 1.74 | 0.32 | 0.39 |
| | | V16046-V16047 | 15 | 1.74 | 0.30 | 0.37 | 1.74 | 0.30 | 0.37 |
| | | V16047-V16048 | 15 | 1.75 | 0.27 | 0.38 | 1.75 | 0.27 | 0.38 |
| | | V16048-V16049 | 15 | 1.79 | 0.34 | 0.40 | 1.80 | 0.34 | 0.40 |
| | | V16049-V16050 | 15 | 1.79 | 0.33 | 0.44 | 1.80 | 0.33 | 0.44 |
| | | V16050-V21192 | 18 | 2.65 | 0.34 | 0.49 | 2.66 | 0.34 | 0.49 |
| | | V21192-V21193 | 18 | 3.30 | 0.62 | 0.55 | 3.31 | 0.62 | 0.55 |
| | | V21193-V21194 | 18 | 3.31 | 0.55 | 0.47 | 3.32 | 0.55 | 0.47 |
| | | V21194-V21195 | 18 | 3.32 | 0.35 | 0.41 | 3.32 | 0.35 | 0.41 |
| | | V21195-V21196 | 18 | 3.43 | 0.35 | 0.55 | 3.44 | 0.35 | 0.55 |
| | | V21196-V22147 | 18 | 3.44 | 0.81 | 0.66 | 3.44 | 0.81 | 0.66 |
| | | V22147-V22148 | 18 | 3.47 | 0.69 | 0.56 | 3.48 | 0.69 | 0.56 |
| | | V22148-V22149 | 18 | 3.48 | 0.44 | 0.42 | 3.48 | 0.44 | 0.42 |
| | | V22149-V22155 | 18 | 3.49 | 0.25 | 0.38 | 3.49 | 0.25 | 0.38 |
| | | V22155-V22156 | 18 | 3.51 | 0.37 | 0.53 | 3.51 | 0.37 | 0.53 |
| | Vista Village Drive | V22156-V22157.C0 | 18 | 3.51 | 0.75 | 0.69 | 3.52 | 0.75 | 0.69 |
| | | V22157.C0-V22157 | 18 | 3.52 | 0.90 | 0.72 | 3.53 | 0.90 | 0.72 |
| | | V22157-V22158 | 18 | 3.55 | 0.83 | 0.72 | 3.56 | 0.83 | 0.72 |
| | Main Street | V22158-V22159 | 18 | 3.56 | 0.91 | 0.55 | 3.57 | 0.91 | 0.55 |
| | South Citrus Avenue | V22159-V22161 | 18 | 3.57 | 0.25 | 0.34 | 3.58 | 0.25 | 0.34 |
| | | V22161-V22162 | 18 | 3.57 | 0.26 | 0.35 | 3.58 | 0.26 | 0.35 |
| | | V22162-V24090 | 18 | 3.05 | 0.19 | 0.57 | 3.06 | 0.19 | 0.57 |
| 4 | E Broadway (north) | V12116-V12117 | 18 | 0.53 | 0.24 | 0.29 | 0.53 | 0.24 | 0.29 |
| | | V12117-V12118 | 18 | 0.54 | 0.11 | 0.23 | 0.54 | 0.11 | 0.23 |
| | | V12118-V12119 | 18 | 0.54 | 0.13 | 0.31 | 0.55 | 0.13 | 0.31 |
| | | V12119-V12120 | 18 | 0.92 | 0.28 | 0.25 | 0.92 | 0.28 | 0.25 |
| | | V12127-V24112 | 18 | 0.92 | 0.03 | 0.33 | 0.93 | 0.03 | 0.33 |
| | E Broadway (south) | V24090-V24091 | 18 | 4.45 | 0.95 | 0.78 | 4.46 | 0.95 | 0.78 |
| | | V24091-V24092 | 18 | 4.46 | 0.95 | 0.77 | 4.46 | 0.95 | 0.77 |
| | | V24092-V24093 | 18 | 4.46 | 0.94 | 0.75 | 4.47 | 0.94 | 0.75 |
| | | V24093-V24094 | 18 | 4.47 | 0.90 | 0.63 | 4.48 | 0.90 | 0.63 |
| | E Broadway | V24112-V24113 | 21 | 5.40 | 0.39 | 0.55 | 5.41 | 0.39 | 0.55 |
| | S Santa Fe Avenue | V24113-V24100 | 21 | 5.40 | 0.74 | 0.54 | 5.41 | 0.74 | 0.54 |
| 5 | Parking Lot | V24100-V24101 | 27 | 5.61 | 0.26 | 0.36 | 5.61 | 0.26 | 0.36 |
| | | V24101-V08163 | 27 | 5.61 | 0.30 | 0.43 | 5.62 | 0.30 | 0.43 |
| | | V08163-V08162 | 27 | 8.36 | 0.47 | 0.49 | 8.37 | 0.47 | 0.49 |
| | | V08162-V08161 | 27 | 8.37 | 0.47 | 0.52 | 8.37 | 0.47 | 0.52 |
| | Wave Drive | V08161-V08160 | 27 | 8.40 | 0.46 | 0.55 | 8.41 | 0.46 | 0.55 |
| | | V08160-V08159 | 27 | 8.41 | 0.58 | 0.59 | 8.41 | 0.58 | 0.59 |
| | | V08159-V08158 | 27 | 8.41 | 0.69 | 0.60 | 8.42 | 0.69 | 0.60 |
| | | V08158-V08157 | 27 | 8.42 | 0.66 | 0.58 | 8.42 | 0.66 | 0.58 |
| | | V08157-V08156 | 27 | 8.43 | 0.58 | 0.58 | 8.44 | 0.58 | 0.58 |
| | | V08156-V08155 | 27 | 8.43 | 0.66 | 0.61 | 8.44 | 0.66 | 0.61 |
| | | V08155-V08154 | 27 | 8.44 | 0.70 | 0.62 | 8.45 | 0.70 | 0.62 |

| Reach | Alignment | Asset ID | Diameter (in) | Buildout Flows | | | Buildout Flows + Development | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Maximum Flow (mgd) | Max.Flow/ Full Flow | Max.Depth/ Full Depth | Maximum Flow (mgd) | Max.Flow/Full Flow | Max.Depth/ Full Depth |
| | | V08154-V29142 | 27 | 8.47 | 0.70 | 0.61 | 8.48 | 0.70 | 0.61 |
| | W Broadway | V29142-V29141 | 27 | 8.50 | 0.69 | 0.60 | 8.50 | 0.69 | 0.60 |
| | Buena Vista Creek | V29141-V29143 | 27 | 8.62 | 0.66 | 0.61 | 8.63 | 0.66 | 0.61 |
| | | V29143-V29144 | 24 | 8.63 | 0.84 | 0.64 | 8.63 | 0.84 | 0.64 |
| | | V29144-V29140 | 21 | 8.63 | 0.55 | 0.83 | 8.64 | 0.55 | 0.83 |
| | | V29140-V29146 | 30 | 12.68 | 0.77 | 0.76 | 12.69 | 0.77 | 0.76 |
| | | V29146-V29145 | 30 | 12.68 | 0.88 | 0.79 | 12.69 | 0.88 | 0.79 |
| 6 | | V29145-V29139 | 30 | 12.76 | 0.84 | 0.90 | 12.77 | 0.84 | 0.90 |
| | | V29139-V30069 | 30 | 12.99 | 1.06 | 1.00 | 13.00 | 1.06 | 1.00 |
| | | V30069-V30071 | 30 | 13.00 | 14.59 | 1.00 | 13.01 | 14.60 | 1.00 |
| | Hacienda Drive | V30071-V30070 | 30 | 13.01 | 0.42 | 1.00 | 13.01 | 0.42 | 1.00 |
| | | V30070-V30072 | 30 | 13.81 | 1.07 | 1.00 | 13.82 | 1.07 | 1.00 |
| | | V30072-V30073 | 30 | 14.56 | 1.09 | 1.00 | 14.57 | 1.09 | 1.00 |
| | | V30073-V30079 | 30 | 15.04 | 1.03 | 1.00 | 15.04 | 1.03 | 1.00 |
| | | V30079-V30074 | 30 | 15.05 | 6.27 | 1.00 | 15.06 | 6.28 | 1.00 |
| | | V30074-V30078 | 30 | 15.05 | 0.80 | 1.00 | 15.06 | 0.80 | 1.00 |
| | | V30078-V30076 | 30 | 15.04 | 2.89 | 0.97 | 15.05 | 2.89 | 0.97 |
| | | V30076-V30075 | 30 | 15.04 | 0.41 | 0.97 | 15.05 | 0.41 | 0.97 |
| | | V30075-V30077 | 30 | 15.04 | 4.91 | 0.69 | 15.05 | 4.91 | 0.69 |
| | | V30077-V30068 | 30 | 15.05 | 0.31 | 0.41 | 15.06 | 0.31 | 0.41 |
| | | V30068-V32157 | 36 | 15.05 | 0.28 | 0.47 | 15.06 | 0.28 | 0.47 |
| | | V32157-V32181 | 36 | 15.09 | 0.62 | 0.60 | 15.10 | 0.62 | 0.60 |
| | | V32181-V32158 | 36 | 15.10 | 0.74 | 0.61 | 15.11 | 0.74 | 0.61 |
| | | V32158-V32159 | 36 | 15.23 | 0.68 | 0.60 | 15.24 | 0.68 | 0.60 |
| | | V32159-V32160 | 36 | 15.24 | 0.66 | 0.61 | 15.25 | 0.66 | 0.61 |
| | | V32160-V32161 | 36 | 15.47 | 0.71 | 0.59 | 15.48 | 0.71 | 0.59 |
| | | V32161-V32162 | 36 | 15.49 | 0.64 | 0.40 | 15.49 | 0.64 | 0.40 |
| | | V32162-V32163 | 36 | 15.84 | 0.13 | 0.30 | 15.85 | 0.13 | 0.30 |
| | | V32163-V32164 | 36 | 15.85 | 0.26 | 0.48 | 15.85 | 0.26 | 0.48 |
| | | V32164-V32165 | 36 | 15.86 | 0.69 | 0.60 | 15.86 | 0.69 | 0.60 |
| | Buena Vista Creek | V32165-V32166 | 36 | 15.87 | 0.69 | 0.57 | 15.87 | 0.69 | 0.57 |
| | | V32166-V32167 | 36 | 15.87 | 0.58 | 0.51 | 15.88 | 0.59 | 0.51 |
| | | V32167-V32168 | 36 | 15.89 | 0.44 | 0.44 | 15.89 | 0.44 | 0.44 |
| | | V32168-V32169 | 36 | 15.90 | 0.34 | 0.41 | 15.91 | 0.34 | 0.41 |
| 7 | | V32169-V32170 | 36 | 15.90 | 0.35 | 0.41 | 15.91 | 0.35 | 0.41 |
| | | V32170-V32171 | 36 | 16.10 | 0.36 | 0.35 | 16.11 | 0.36 | 0.35 |
| | | V32171-ABN_V32T068.0 | 36 | 16.11 | 0.18 | 0.46 | 16.11 | 0.18 | 0.46 |
| | | ABN_V32T068.00-V3217 | 36 | 16.12 | 0.72 | 0.61 | 16.13 | 0.72 | 0.61 |
| | Parking Lot | V32172-V32173 | 36 | 16.13 | 0.67 | 0.62 | 16.14 | 0.67 | 0.62 |
| | | V32173-V32183 | 36 | 16.22 | 0.74 | 0.62 | 16.22 | 0.74 | 0.62 |
| | | V32183-V32182 | 36 | 16.24 | 0.67 | 0.61 | 16.24 | 0.67 | 0.61 |
| | | V32182-V32174 | 36 | 16.25 | 0.72 | 0.60 | 16.26 | 0.72 | 0.60 |
| | | V32174-V32184 | 36 | 16.29 | 0.62 | 0.62 | 16.29 | 0.62 | 0.62 |
| | Hacienda Drive | V32184-V01062 | 36 | 16.31 | 0.94 | 0.54 | 16.31 | 0.94 | 0.54 |
| | | V01062-V32175 | 36 | 16.33 | 0.35 | 0.52 | 16.34 | 0.35 | 0.52 |
| | | V32175-V32176 | 36 | 16.34 | 0.72 | 0.71 | 16.35 | 0.72 | 0.71 |
| | | V32176-V32177 | 36 | 16.36 | 24.92 | 0.59 | 16.37 | 24.93 | 0.59 |
| | | V32177-V32178 | 36 | 16.38 | 0.31 | 0.42 | 16.39 | 0.31 | 0.42 |
| | | V32178-V32179 | 36 | 16.40 | 0.43 | 0.54 | 16.40 | 0.43 | 0.54 |
| | Plaza Drive | V32T056.00-V32T055.0 | 36 | 16.41 | 0.72 | 0.60 | 16.42 | 0.72 | 0.60 |
| | | V32T055.00-V32T054.0 | 36 | 16.43 | 0.72 | 0.48 | 16.44 | 0.72 | 0.48 |
| | | V32T054.00-V32T053.0 | 36 | 16.44 | 0.31 | 0.48 | 16.45 | 0.31 | 0.48 |
| | | V32T053.00-V32T052.0 | 36 | 16.46 | 0.66 | 0.55 | 16.46 | 0.66 | 0.55 |
| | | V32T052.00-V32T051.0 | 36 | 16.47 | 0.50 | 0.41 | 16.48 | 0.50 | 0.41 |
| 8 | | V32T051.00-V32T050.0 | 36 | 16.49 | 0.20 | 0.29 | 16.49 | 0.20 | 0.29 |
| | | V32T050.00-V32T049.0 | 36 | 16.51 | 0.17 | 0.45 | 16.51 | 0.17 | 0.45 |
| | | V32T049.00-V32T048.0 | 36 | 16.52 | 0.71 | 0.63 | 16.53 | 0.71 | 0.63 |
| | Haymar Drive | V32T048.00-V32T047.0 | 36 | 16.53 | 0.73 | 0.61 | 16.53 | 0.73 | 0.61 |
| | | V32T047.00-V32T046.0 | 36 | 16.55 | 0.72 | 0.46 | 16.55 | 0.72 | 0.46 |
| | | V32T046.00-V32T045.0 | 36 | 16.56 | 0.24 | 0.42 | 16.57 | 0.24 | 0.42 |
| Yellow Cells | | Indicate failure of at least one evaluation criteria including either q/Q > 1.00 and/or d/D > 0.50 (for DIA </= 12") OR q/Q > 1.00 and/or d/D > 0.80 (for DIA > 12"). Gravity main deficiency indicated by failure of both criteria. | | | | | | | |
| Red Cells | | Model results indicate that gravity main is projected to be deficient under existing PWWF conditions for this scenario. | | | | | | | |

**Table 4 - Existing Collection System + Buildout CIP, Buildout Flow Loading, PWWF Model Results**

| Reach | Alignment | Asset ID | Diameter (in) | Buildout Flows | | | Buildout Flows + Development | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Maximum Flow (mgd) | Max.Flow/ Full Flow | Max.Depth/ Full Depth | Maximum Flow (mgd) | Max.Flow/Full Flow | Max.Depth/ Full Depth |
| 1 | Vista Grande Dr | New Gravity Main | 8 | N/A | N/A | N/A | 0.01 | 0.01 | 0.06 |
| | | V17002.EA-V17002.EB | 8 | 0.00 | 0.00 | 0.04 | 0.01 | 0.01 | 0.07 |
| | | V17002.EB-V17002.EE | 8 | 0.01 | 0.00 | 0.06 | 0.01 | 0.01 | 0.08 |
| | | V17002.EE-V17002.E0 | 8 | 0.01 | 0.01 | 0.07 | 0.02 | 0.01 | 0.09 |
| | | V17002.E0-V17002.F0 | 8 | 0.01 | 0.01 | 0.09 | 0.02 | 0.02 | 0.10 |
| | | V17002.F0-V17002.G0 | 8 | 0.03 | 0.02 | 0.12 | 0.04 | 0.02 | 0.13 |
| | | V17002.G0-V17002.M0 | 8 | 0.03 | 0.04 | 0.16 | 0.04 | 0.05 | 0.17 |
| | Warmlands Ave | V17002.M0-V17002 | 8 | 0.06 | 0.07 | 0.21 | 0.07 | 0.08 | 0.22 |
| | | V17002-V17004 | 8 | 0.06 | 0.11 | 0.21 | 0.07 | 0.12 | 0.22 |
| 2 | East Vista Way | V17004-V17010 | 10 | 0.07 | 0.05 | 0.14 | 0.08 | 0.05 | 0.14 |
| | | V17010-V17011 | 10 | 0.10 | 0.03 | 0.15 | 0.11 | 0.04 | 0.16 |
| | | V17011-V17012 | 10 | 0.12 | 0.07 | 0.22 | 0.13 | 0.07 | 0.22 |
| | | V17012-V17013 | 10 | 0.13 | 0.14 | 0.28 | 0.13 | 0.15 | 0.29 |
| | | V17013-V17014.I0 | 10 | 0.13 | 0.21 | 0.31 | 0.14 | 0.22 | 0.32 |
| | | V17014.I0-V17014 | 10 | 0.19 | 0.20 | 0.32 | 0.20 | 0.21 | 0.33 |
| | | V17014-V17015 | 10 | 0.19 | 0.22 | 0.26 | 0.20 | 0.23 | 0.27 |
| | | V17015-V17016 | 10 | 0.20 | 0.08 | 0.19 | 0.21 | 0.08 | 0.19 |
| | | V17016-V17018 | 10 | 0.21 | 0.07 | 0.19 | 0.21 | 0.08 | 0.19 |
| | | V17018-V17019 | 10 | 0.22 | 0.08 | 0.20 | 0.23 | 0.08 | 0.20 |
| | | V17019-V17036 | 10 | 0.23 | 0.09 | 0.31 | 0.23 | 0.10 | 0.31 |
| | | V17036-V17037 | 10 | 0.36 | 0.35 | 0.58 | 0.36 | 0.36 | 0.58 |
| | | V17037-V17049 | 10 | 0.36 | 1.95 | 0.57 | 0.37 | 1.99 | 0.58 |
| | | V17049-V17054 | 10 | 0.45 | 0.35 | 0.44 | 0.45 | 0.35 | 0.44 |
| | | V17054-V17055 | 10 | 0.51 | 0.44 | 0.46 | 0.52 | 0.45 | 0.47 |
| | | V17055-V17056 | 10 | 0.52 | 0.44 | 0.47 | 0.53 | 0.45 | 0.48 |
| | | V17056-V17057 | 10 | 0.53 | 0.44 | 0.43 | 0.53 | 0.45 | 0.43 |
| | | V17057-V17058 | 10 | 0.53 | 0.30 | 0.40 | 0.54 | 0.30 | 0.40 |
| | | V17058-V17068 | 10 | 0.53 | 0.36 | 0.48 | 0.54 | 0.36 | 0.48 |
| | | V17068-V17069 | 10 | 0.71 | 0.55 | 0.53 | 0.72 | 0.56 | 0.53 |
| | | V17069-V17070 | 10 | 0.72 | 0.54 | 0.55 | 0.72 | 0.54 | 0.55 |
| | | V17070-V17071 | 10 | 0.72 | 0.54 | 0.43 | 0.73 | 0.55 | 0.43 |
| | | V17071-V16041.A0 | 15 | 0.72 | 0.08 | 0.23 | 0.73 | 0.08 | 0.24 |
| 3 | | V16041.A0-V16041 | 15 | 1.71 | 0.17 | 0.33 | 1.72 | 0.17 | 0.33 |
| | | V16041-V16042 | 15 | 1.71 | 0.30 | 0.37 | 1.72 | 0.30 | 0.37 |
| | | V16042-V16043 | 15 | 1.72 | 0.28 | 0.39 | 1.72 | 0.28 | 0.39 |
| | | V16043-V16044 | 15 | 1.72 | 0.36 | 0.42 | 1.73 | 0.37 | 0.42 |
| | | V16044-V16045 | 15 | 1.73 | 0.35 | 0.40 | 1.73 | 0.36 | 0.40 |
| | | V16045-V16046 | 15 | 1.73 | 0.32 | 0.39 | 1.74 | 0.32 | 0.39 |
| | | V16046-V16047 | 15 | 1.74 | 0.30 | 0.37 | 1.74 | 0.30 | 0.37 |
| | | V16047-V16048 | 15 | 1.75 | 0.27 | 0.38 | 1.75 | 0.27 | 0.38 |
| | | V16048-V16049 | 15 | 1.79 | 0.34 | 0.40 | 1.80 | 0.34 | 0.40 |
| | | V16049-V16050 | 15 | 1.79 | 0.33 | 0.44 | 1.80 | 0.33 | 0.44 |
| | | V16050-V21192 | 18 | 2.65 | 0.34 | 0.49 | 2.66 | 0.34 | 0.49 |
| | | V21192-V21193 | 18 | 3.30 | 0.62 | 0.55 | 3.31 | 0.62 | 0.55 |
| | | V21193-V21194 | 18 | 3.31 | 0.55 | 0.47 | 3.32 | 0.55 | 0.47 |
| | | V21194-V21195 | 18 | 3.32 | 0.35 | 0.41 | 3.32 | 0.35 | 0.41 |
| | | V21195-V21196 | 18 | 3.43 | 0.35 | 0.55 | 3.44 | 0.35 | 0.55 |
| | | V21196-V22147 | 18 | 3.44 | 0.81 | 0.66 | 3.44 | 0.81 | 0.66 |
| | | V22147-V22148 | 18 | 3.47 | 0.69 | 0.56 | 3.48 | 0.69 | 0.56 |
| | | V22148-V22149 | 18 | 3.48 | 0.44 | 0.42 | 3.48 | 0.44 | 0.42 |
| | | V22149-V22155 | 18 | 3.49 | 0.25 | 0.38 | 3.49 | 0.25 | 0.38 |
| | | V22155-V22156 | 18 | 3.51 | 0.37 | 0.53 | 3.51 | 0.37 | 0.53 |
| | Vista Village Drive | V22156-V22157.C0 | 18 | 3.51 | 0.75 | 0.69 | 3.52 | 0.75 | 0.69 |
| | | V22157.C0-V22157 | 18 | 3.52 | 0.90 | 0.72 | 3.53 | 0.90 | 0.72 |
| | | V22157-V22158 | 18 | 3.55 | 0.83 | 0.72 | 3.56 | 0.83 | 0.72 |
| | Main Street | V22158-V22159 | 18 | 3.56 | 0.91 | 0.55 | 3.57 | 0.91 | 0.55 |
| | South Citrus Avenue | V22159-V22161 | 18 | 3.57 | 0.25 | 0.34 | 3.58 | 0.25 | 0.34 |
| | | V22161-V22162 | 18 | 3.57 | 0.26 | 0.35 | 3.58 | 0.26 | 0.35 |
| | | V22162-V24090 | 18 | 3.08 | 0.19 | 0.51 | 3.09 | 0.19 | 0.51 |
| 4 | E Broadway (north) | V12116-V12117 | 18 | 0.49 | 0.22 | 0.28 | 0.50 | 0.22 | 0.28 |
| | | V12117-V12118 | 18 | 0.51 | 0.10 | 0.22 | 0.51 | 0.10 | 0.22 |
| | | V12118-V12119 | 18 | 0.51 | 0.12 | 0.30 | 0.51 | 0.12 | 0.30 |
| | | V12119-V12120 | 18 | 0.89 | 0.27 | 0.25 | 0.89 | 0.27 | 0.25 |
| | | V12127-V24112 | 18 | 0.90 | 0.03 | 0.33 | 0.90 | 0.03 | 0.33 |
| | E Broadway (south) | V24090-V24091 | 21 | 4.48 | 0.63 | 0.58 | 4.49 | 0.64 | 0.58 |
| | | V24091-V24092 | 21 | 4.49 | 0.63 | 0.58 | 4.50 | 0.63 | 0.58 |
| | | V24092-V24093 | 21 | 4.50 | 0.63 | 0.57 | 4.50 | 0.63 | 0.57 |
| | | V24093-V24094 | 21 | 4.50 | 0.60 | 0.51 | 4.51 | 0.60 | 0.51 |
| | E Broadway | V24112-V24113 | 21 | 5.40 | 0.39 | 0.55 | 5.41 | 0.39 | 0.55 |
| | S Santa Fe Avenue | V24113-V24100 | 21 | 5.40 | 0.74 | 0.54 | 5.41 | 0.74 | 0.54 |
| 5 | Parking Lot | V24100-V24101 | 27 | 5.61 | 0.26 | 0.36 | 5.61 | 0.26 | 0.36 |
| | | V24101-V08163 | 27 | 5.61 | 0.30 | 0.43 | 5.62 | 0.30 | 0.43 |
| | | V08163-V08162 | 27 | 8.38 | 0.47 | 0.49 | 8.39 | 0.47 | 0.49 |
| | | V08162-V08161 | 27 | 8.39 | 0.47 | 0.52 | 8.40 | 0.47 | 0.52 |
| | Wave Drive | V08161-V08160 | 27 | 8.43 | 0.46 | 0.55 | 8.43 | 0.46 | 0.55 |
| | | V08160-V08159 | 27 | 8.43 | 0.58 | 0.59 | 8.44 | 0.59 | 0.59 |
| | | V08159-V08158 | 27 | 8.43 | 0.69 | 0.60 | 8.44 | 0.69 | 0.60 |
| | | V08158-V08157 | 27 | 8.44 | 0.66 | 0.58 | 8.45 | 0.66 | 0.58 |
| | | V08157-V08156 | 27 | 8.46 | 0.58 | 0.58 | 8.46 | 0.58 | 0.59 |
| | | V08156-V08155 | 27 | 8.46 | 0.67 | 0.61 | 8.47 | 0.67 | 0.61 |
| | | V08155-V08154 | 27 | 8.46 | 0.70 | 0.62 | 8.47 | 0.70 | 0.62 |

| Reach | Alignment | Asset ID | Diameter (in) | Buildout Flows | | | Buildout Flows + Development | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Maximum Flow (mgd) | Max.Flow/ Full Flow | Max.Depth/ Full Depth | Maximum Flow (mgd) | Max.Flow/Full Flow | Max.Depth/ Full Depth |
| | | V08154-V29142 | 27 | 8.49 | 0.70 | 0.61 | 8.50 | 0.70 | 0.61 |
| | W Broadway | V29142-V29141 | 27 | 8.52 | 0.69 | 0.61 | 8.53 | 0.69 | 0.61 |
| | Buena Vista Creek | V29141-V29143 | 27 | 8.65 | 0.67 | 0.61 | 8.65 | 0.67 | 0.61 |
| | | V29143-V29144 | 24 | 8.65 | 0.84 | 0.63 | 8.66 | 0.84 | 0.63 |
| | | V29144-V29140 | 21 | 8.66 | 0.55 | 0.81 | 8.67 | 0.55 | 0.82 |
| | | V29140-V29146 | 30 | 12.72 | 0.77 | 0.70 | 12.73 | 0.77 | 0.70 |
| | | V29146-V29145 | 30 | 12.72 | 0.88 | 0.71 | 12.73 | 0.88 | 0.71 |
| | | V29145-V29139 | 30 | 12.80 | 0.84 | 0.71 | 12.81 | 0.84 | 0.71 |
| | | V29139-V30069 | 36 | 13.04 | 0.65 | 0.61 | 13.05 | 0.65 | 0.61 |
| | | V30069-V30071 | 36 | 13.05 | 9.01 | 0.58 | 13.05 | 9.01 | 0.58 |
| 6 | Hacienda Drive | V30071-V30070 | 36 | 13.05 | 0.26 | 0.56 | 13.05 | 0.26 | 0.56 |
| | | V30070-V30072 | 36 | 13.87 | 0.66 | 0.59 | 13.87 | 0.66 | 0.59 |
| | | V30072-V30073 | 36 | 14.61 | 0.67 | 0.57 | 14.62 | 0.67 | 0.57 |
| | | V30073-V30079 | 36 | 15.08 | 0.64 | 0.57 | 15.09 | 0.64 | 0.57 |
| | | V30079-V30074 | 36 | 15.08 | 3.87 | 0.55 | 15.09 | 3.87 | 0.55 |
| | | V30074-V30078 | 36 | 15.08 | 0.49 | 0.63 | 15.09 | 0.49 | 0.63 |
| | | V30078-V30076 | 36 | 15.09 | 1.78 | 0.61 | 15.10 | 1.78 | 0.61 |
| | | V30076-V30075 | 36 | 15.10 | 0.25 | 0.58 | 15.11 | 0.25 | 0.58 |
| | | V30075-V30077 | 36 | 15.10 | 3.03 | 0.48 | 15.11 | 3.03 | 0.48 |
| | | V30077-V30068 | 36 | 15.11 | 0.19 | 0.33 | 15.12 | 0.19 | 0.33 |
| | | V30068-V32157 | 36 | 15.11 | 0.28 | 0.47 | 15.12 | 0.28 | 0.47 |
| | | V32157-V32181 | 36 | 15.15 | 0.62 | 0.60 | 15.16 | 0.62 | 0.60 |
| | | V32181-V32158 | 36 | 15.16 | 0.74 | 0.61 | 15.17 | 0.74 | 0.61 |
| | | V32158-V32159 | 36 | 15.30 | 0.68 | 0.60 | 15.30 | 0.68 | 0.60 |
| | | V32159-V32160 | 36 | 15.31 | 0.66 | 0.61 | 15.32 | 0.66 | 0.61 |
| | | V32160-V32161 | 36 | 15.54 | 0.72 | 0.59 | 15.54 | 0.72 | 0.59 |
| | | V32161-V32162 | 36 | 15.55 | 0.64 | 0.40 | 15.56 | 0.64 | 0.40 |
| | | V32162-V32163 | 36 | 15.91 | 0.13 | 0.30 | 15.92 | 0.13 | 0.30 |
| | | V32163-V32164 | 36 | 15.92 | 0.26 | 0.48 | 15.93 | 0.26 | 0.48 |
| | | V32164-V32165 | 36 | 15.93 | 0.69 | 0.60 | 15.94 | 0.69 | 0.60 |
| | Buena Vista Creek | V32165-V32166 | 36 | 15.94 | 0.69 | 0.57 | 15.94 | 0.69 | 0.57 |
| | | V32166-V32167 | 36 | 15.95 | 0.59 | 0.51 | 15.95 | 0.59 | 0.51 |
| | | V32167-V32168 | 36 | 15.96 | 0.45 | 0.44 | 15.96 | 0.45 | 0.44 |
| | | V32168-V32169 | 36 | 15.97 | 0.34 | 0.41 | 15.98 | 0.34 | 0.41 |
| 7 | | V32169-V32170 | 36 | 15.97 | 0.35 | 0.42 | 15.98 | 0.35 | 0.42 |
| | | V32170-V32171 | 36 | 16.18 | 0.36 | 0.35 | 16.18 | 0.36 | 0.36 |
| | | V32171-ABN_V32T068.0 | 36 | 16.18 | 0.18 | 0.46 | 16.19 | 0.18 | 0.46 |
| | | ABN_V32T068.00-V3217 | 36 | 16.20 | 0.72 | 0.61 | 16.20 | 0.72 | 0.61 |
| | Parking Lot | V32172-V32173 | 36 | 16.21 | 0.67 | 0.62 | 16.22 | 0.67 | 0.62 |
| | | V32173-V32183 | 36 | 16.29 | 0.75 | 0.62 | 16.30 | 0.75 | 0.62 |
| | | V32183-V32182 | 36 | 16.30 | 0.67 | 0.61 | 16.31 | 0.67 | 0.61 |
| | | V32182-V32174 | 36 | 16.32 | 0.73 | 0.60 | 16.33 | 0.73 | 0.60 |
| | | V32174-V32184 | 36 | 16.35 | 0.62 | 0.62 | 16.36 | 0.62 | 0.62 |
| | Hacienda Drive | V32184-V01062 | 36 | 16.38 | 0.95 | 0.54 | 16.38 | 0.95 | 0.54 |
| | | V01062-V32175 | 36 | 16.40 | 0.35 | 0.52 | 16.40 | 0.35 | 0.52 |
| | | V32175-V32176 | 36 | 16.41 | 0.72 | 0.71 | 16.42 | 0.72 | 0.71 |
| | | V32176-V32177 | 36 | 16.43 | 25.03 | 0.59 | 16.44 | 25.04 | 0.59 |
| | | V32177-V32178 | 36 | 16.45 | 0.31 | 0.42 | 16.45 | 0.31 | 0.42 |
| | | V32178-V32179 | 36 | 16.46 | 0.43 | 0.54 | 16.47 | 0.43 | 0.54 |
| | Plaza Drive | V32T056.00-V32T055.0 | 36 | 16.48 | 0.72 | 0.60 | 16.49 | 0.72 | 0.60 |
| | | V32T055.00-V32T054.0 | 36 | 16.50 | 0.72 | 0.48 | 16.51 | 0.72 | 0.48 |
| | | V32T054.00-V32T053.0 | 36 | 16.51 | 0.31 | 0.49 | 16.52 | 0.31 | 0.49 |
| | | V32T053.00-V32T052.0 | 36 | 16.52 | 0.66 | 0.55 | 16.53 | 0.67 | 0.55 |
| | | V32T052.00-V32T051.0 | 36 | 16.54 | 0.51 | 0.41 | 16.55 | 0.51 | 0.41 |
| 8 | | V32T051.00-V32T050.0 | 36 | 16.55 | 0.20 | 0.29 | 16.56 | 0.20 | 0.29 |
| | | V32T050.00-V32T049.0 | 36 | 16.57 | 0.17 | 0.45 | 16.58 | 0.17 | 0.45 |
| | | V32T049.00-V32T048.0 | 36 | 16.59 | 0.71 | 0.63 | 16.59 | 0.71 | 0.63 |
| | Haymar Drive | V32T048.00-V32T047.0 | 36 | 16.59 | 0.73 | 0.61 | 16.60 | 0.73 | 0.62 |
| | | V32T047.00-V32T046.0 | 36 | 16.61 | 0.72 | 0.46 | 16.62 | 0.72 | 0.46 |
| | | V32T046.00-V32T045.0 | 36 | 16.63 | 0.24 | 0.42 | 16.64 | 0.24 | 0.42 |
| Yellow Cells | | Indicate failure of at least one evaluation criteria including either q/Q > 1.00 and/or d/D > 0.50 (for DIA </= 12") OR q/Q > 1.00 and/or d/D > 0.80 (for DIA > 12"). Gravity main deficiency indicated by failure of both criteria. | | | | | | | |
| Orange Cells | | Indicate Buildout System CIP Upgrades from 2017 Master Plan Update (pipe upsized) | | | | | | | |

**Figure 6- Reach 6 HGL, Existing System, Buildout PWWF**

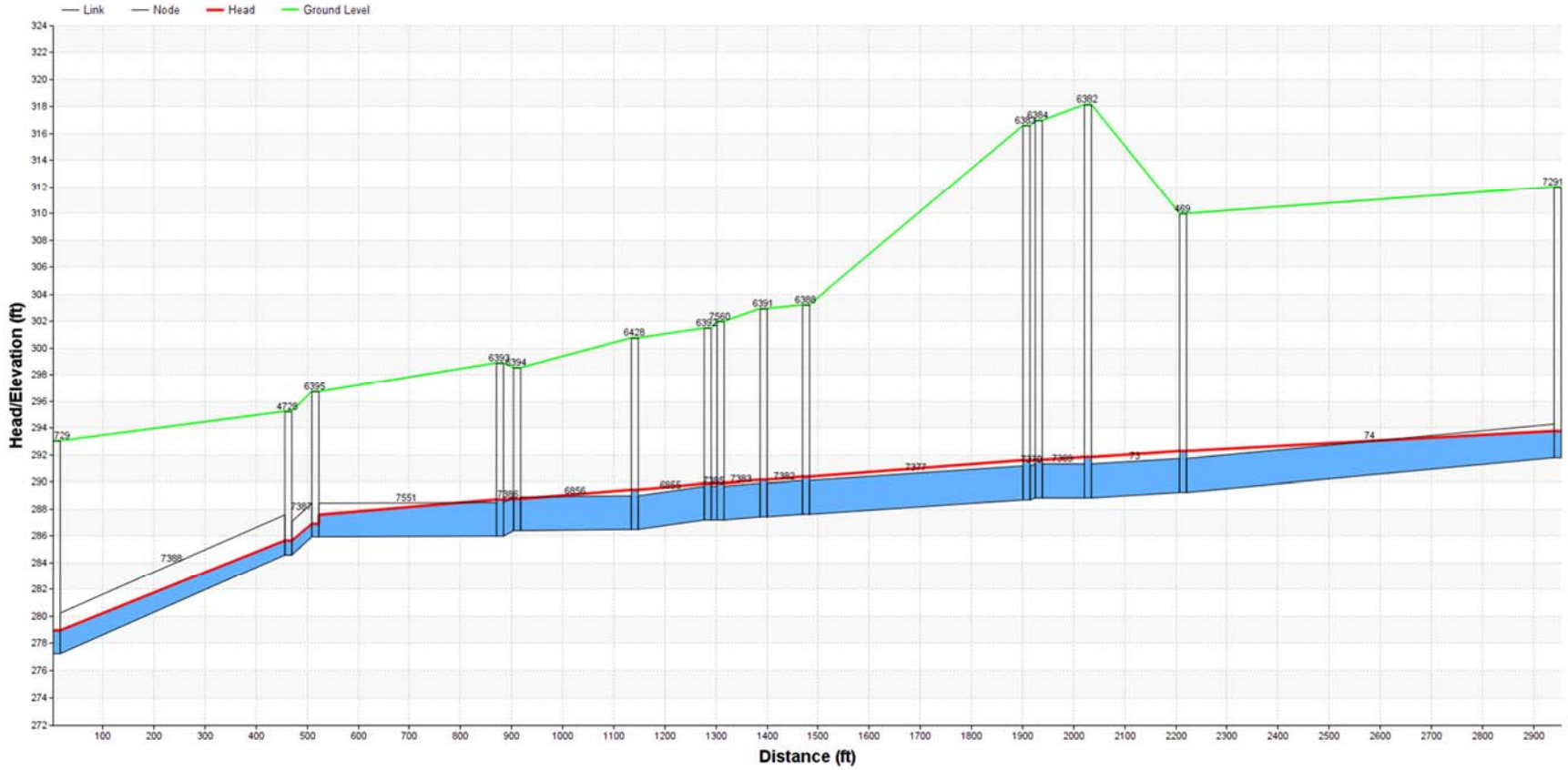


**Figure 7- Reach 6 HGL, Existing System, Buildout PWWF + Development Flows**

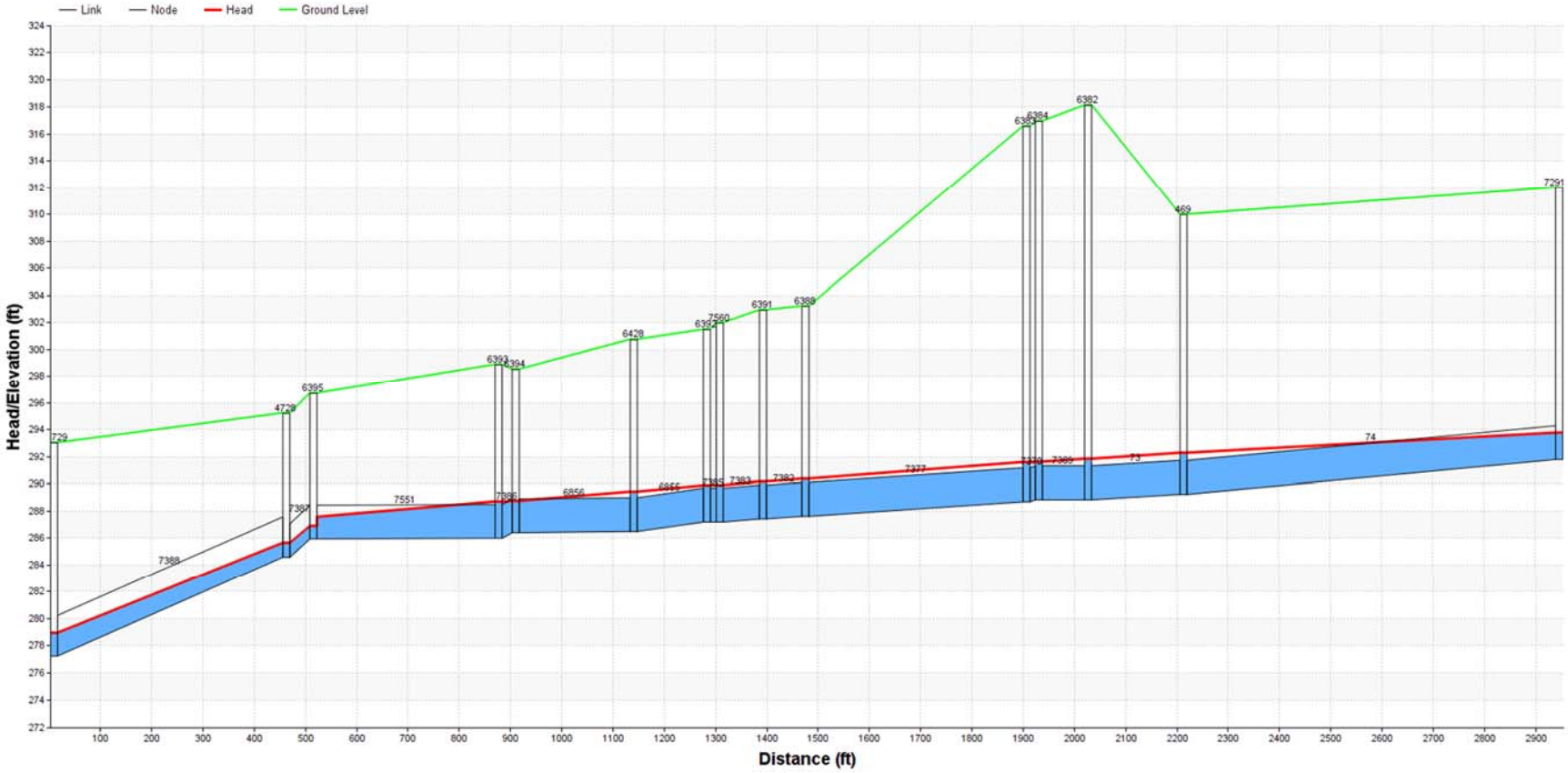


**Figure 8- Reach 6 HGL, Existing System + Buildout CIP, Buildout PWWF**

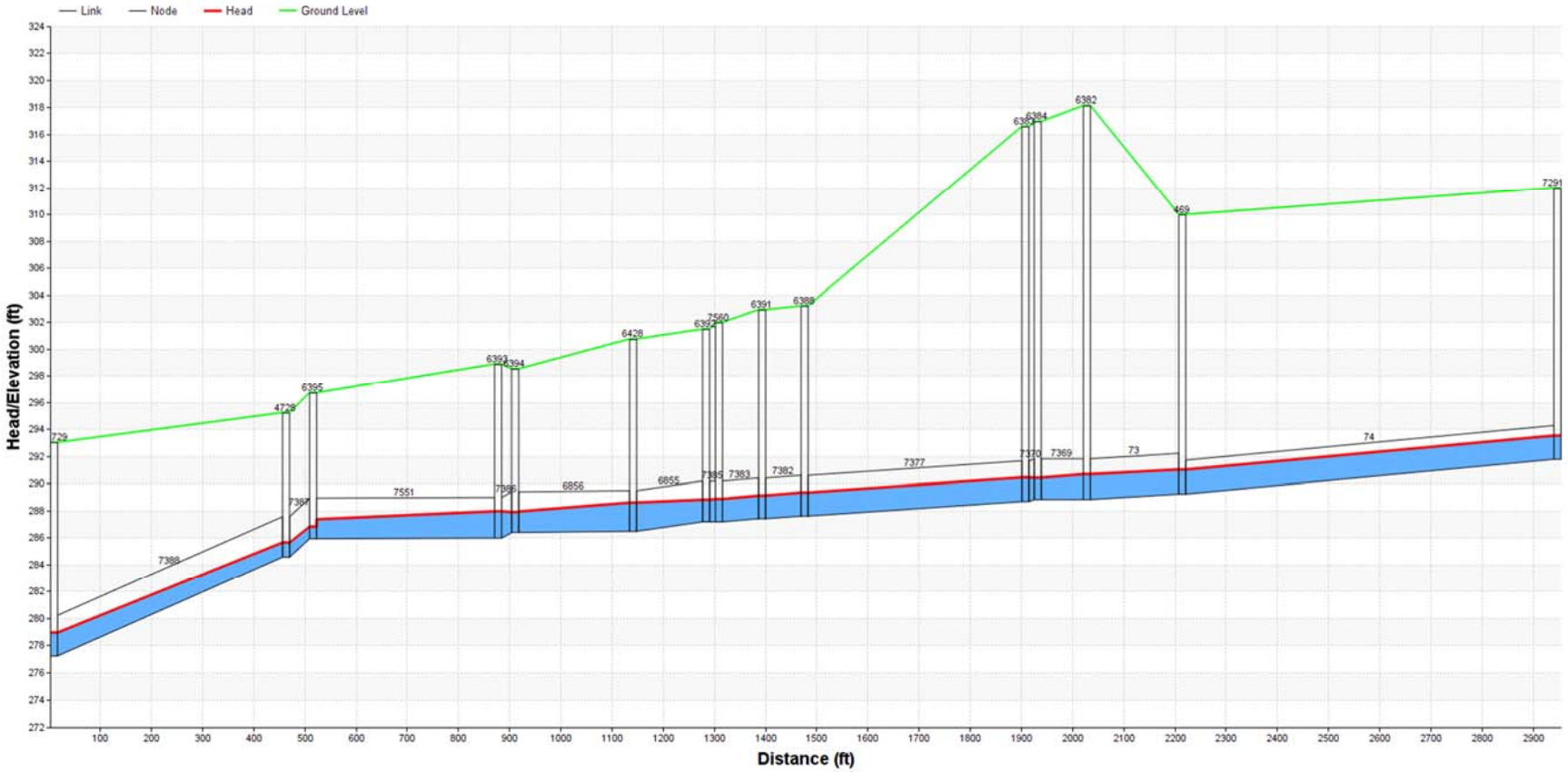


**Figure 9- Reach 6 HGL, Existing System + Buildout CIP, Buildout PWWF + Development Flows**