Envicom Corporation

City of Santa Clarita

Golden Valley Road Mixed Use Project (Master Case 21-036) Initial Study/ Mitigated Negative Declaration

Prepared for:

City of Santa Clarita

Community Development Department

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March 2026

GOLDEN VALLEY ROAD MIXED-USE PROJECT (MASTER CASE 21-036)

INITIAL STUDY/ MITIGATED NEGATIVE DECLARATION

Prepared for:

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March 2026

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1.0 INTRODUCTION

The purpose of this Initial Study/Mitigated Negative Declaration (IS/MND) is to disclose and evaluate the environmental impacts of Master Case 21-036, the Golden Valley Road Mixed-Use Project (project), to be located at the northwest corner of the intersection of Golden Valley Road and Sierra Highway, in the City of Santa Clarita (City).

PROJECT SUMMARY

The project proposes to consolidate the existing 10 parcels on the approximately 28.13-acre site into four lots to construct a 47,344 square-foot hotel with 60 rooms, a 98,389 square-foot senior assisted-living facility with 151 rooms, and 73 age-restricted (55+) residential condominiums over 25 buildings totaling approximately 162,129 square-feet, plus associated parking. The parcels are currently vacant except for an abandoned single-family house and associated accessory buildings. Lot 1 will be 3.76 acres in size, adjacent to Golden Valley Road, and developed with the hotel. Lot 2 will be 5.43 acres in size, directly behind (north of) Lot 1, and developed with the senior assisted housing facility. Lot 3 will be 13.09 acres in size, behind Lot 2, and developed with 73 townhouses. Lot 4 will be 5.11 acres and reserved as open space.

LEGAL AUTHORITY

As lead agency, the City prepared this Initial Study in accordance with the California Environmental Quality Act (CEQA) of 1970 (Public Resources Code §§ 21000–21189) and the *CEQA Guidelines* (14 California Code of Regulations §§15000–15387).

Initial Study. CEQA Guidelines Section 15063(c) identifies an Initial Study as the proper preliminary method of analyzing the potential environmental consequences of a project. To paraphrase from this Section, the relevant purposes of an Initial Study are:

(1) To provide the Lead Agency with the necessary information to decide whether to prepare an Environmental Impact Report (EIR) or a Negative Declaration (ND);

(2) To enable the Lead Agency to modify a project, mitigating adverse impacts before an EIR is prepared, thereby, enabling the project to qualify for an ND; and

(3) To provide sufficient technical analysis of the environmental effects of a project to permit a judgment based on the record as a whole, that the environmental effects of a project will not have a significant effect on the environment that would necessitate an EIR.

Negative Declaration or Mitigated Negative Declaration. CEQA Guidelines Section 15070 states a public agency shall prepare a negative declaration or mitigated negative declaration for a project subject to CEQA when:

(a) The initial study shows that there is no substantial evidence, in light of the whole record before the agency, that the project may have a significant effect on the environment, or

(b) The initial study identifies potentially significant effects, but:

1. Revisions in the project plans or proposals made by, or agreed to by the applicant before a proposed mitigated negative declaration and initial study are released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur, and
2. There is no substantial evidence, in light of the whole record before the agency, that the project as revised may have a significant effect on the environment.

A ND or MND may be used to satisfy the requirements of CEQA when a project would have no significant unmitigable effects on the environment.

2.0 FINDINGS OF THIS INITIAL STUDY

The analysis in this IS/MND finds that with the implementation of mitigation measures, the project would have a less than significant impact on the environment with regard to all CEQA Checklist issues. For each issue addressed in Section 4.0, the impacts associated with development of the project have been determined to be "Significant Unless Mitigation Incorporated," "Less than Significant," or "No Impact." For issues that were determined to be "Significant Unless Mitigation Incorporated," mitigation measures are identified that would reduce impacts to below a level of significance.

3.0 PROJECT DESCRIPTION

The project is proposed for a 28.13-acre site located at the northwest corner of the intersection of Golden Valley Road and Sierra Highway in the City of Santa Clarita, as shown on **Figure 3-1, Regional Location Map**. The project site is accessed from Golden Valley Road which borders the site to the south. A small corner of the site is adjacent to Sierra Highway where it intersects with Golden Valley Road. Golden Valley Road is a large five to nine-lane arterial, and Sierra Highway is a four to six-lane arterial. State Route 14 is approximately .75 miles southeast from the project site connecting from Golden Valley Road, and 1.3 miles south connecting from Sierra Highway. Adjacent to the east of the site are residential subdivisions, adjacent to the west is a strip of land 330 feet wide owned by the City of Los Angeles Department of Water and Power, occupied by high-voltage transmission lines, which is then bordered by residential subdivisions and the Golden Valley High School. Adjacent to the north is vacant land and residential subdivisions, and to the south, on the other side of Golden Valley Road, is vacant land and an oil extraction field.

The project site has a General Plan land use designation of Mixed Use – Neighborhood (MX-N) and is zoned MXN (Mixed Use Neighborhood) with a PD (Planned Development) overlay. It is currently vacant with the exception of an abandoned single-family house and accessory structures built close to Golden Valley Road. The house sits upon a hill that is roughly the same elevation as the road while the rest of the property is below the elevation of the road. The property is hilly and descends in elevation overall from south to north, with elevations ranging between roughly 1750 AMSL at the location of the house to 1570 ASML at the rear-most parcel. The project site and its immediate surroundings are shown in **Figure 3-2, Vicinity Map**.

PROJECT COMPONENTS AND OPERATIONS

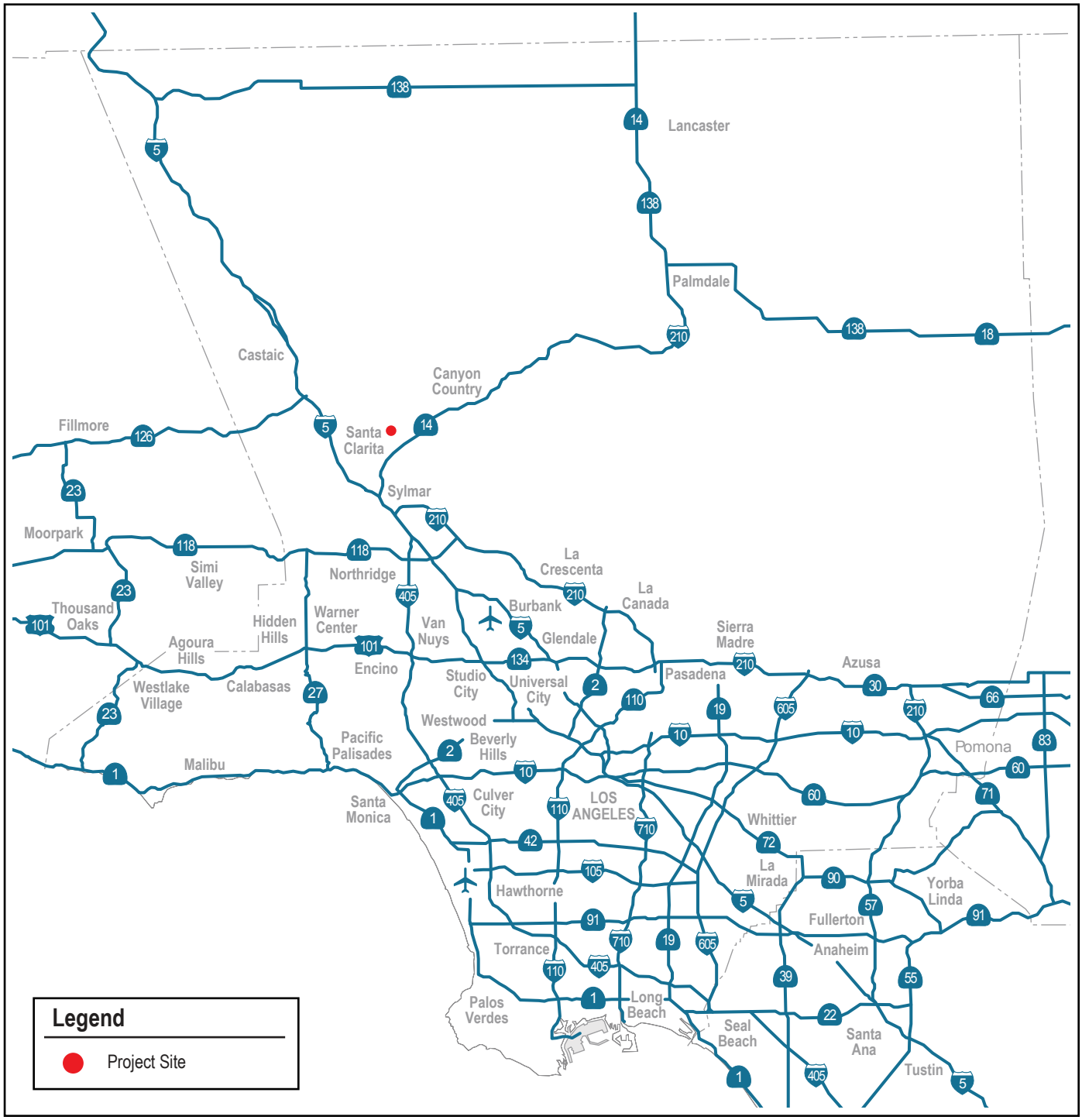
The project applicant proposes to consolidate the existing 10 parcels on the approximately 28.13-acre site into four lots, developing Lots 1 through 3 and reserving Lot 4 for recreational open space. Lot 1 will be 3.76 acres in size and developed with a hotel. Lot 2 will be 5.43 acres in size and developed with a senior assisted housing facility. Lot 3 will be 13.09 acres in size and developed with 73 residential condominiums. Lot 4 will be 5.11 acres and reserved as recreational open space for tenants. Approximately 0.74 acres will be dedicated as a public street. The project site plan is shown in **Figure 3-3, Proposed Site Plan**.

Lot 1

Lot 1 will host the proposed hotel which is a 47,828 square-foot, one and four-story building with 60 rooms, and a parking lot with 143 parking spaces, 32 of those located in a small subterranean parking area. The hotel will include a 2,360 square-foot restaurant, a 1,974 square-foot banquet facility, and 3,320 square-feet of retail space. The hotel will be sited adjacent to the intersection of Golden Valley Road and Sierra Highway with the parking lot behind it to the northwest. The site will be accessed from a new 64-foot-wide public street leading off of Golden Valley Road. The street curves behind the lot and ends in a cul-de-sac, at which point a private street leading to the rest of the project site begins.

Lot 2

Lot 2 will be developed with a senior assisted-living housing facility. The building will be a four-story large E-shaped building totaling 101,166 square-feet in size, containing 151 senior assisted-living housing units. The facility will include a commercial kitchen and community dining area, an on-site dental office and health clinic, and multiple smaller resident amenity spaces. The facility will have a parking lot with 92 spaces and include outdoor courtyards and a large water feature. The facility is accessed by a 58-foot-wide private street that connects to the public street that serves the hotel. The private street continues behind the assisted-living facility and ends in a cul-de-sac at Lot 3.



Date - 12/26/25

GOLDEN VALLEY ROAD MIXED-USE PROJECT

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Regional Location Map

Miles 0 10 20

FIGURE 3-1

Aerial Source: GoogleEarth Pro, November 11, 2025

Date - 12/26/25

GOLDEN VALLEY ROAD MIXED-USE PROJECT

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Vicinity Map

FEET 0 290 580

FIGURE 3-2

Source: Tentative Tract Map 068203, Land Design Consultants, Inc., May 27, 2025

Date - 12/26/25

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Proposed Site Plan

FEET 0 140 280

FIGURE 3-3

Lot 3

Lot 3 will be developed with 25 duplex, triplex, and quadplex townhouse-style buildings, plus one detached unit, for a total of 73 units, totaling approximately 162,129 square-feet. There are six models of condos ranging in size from 2,072 to 2,405 square-feet, each with three bedrooms and a two-car garage on the ground floor. These for-sale units will be age-restricted to people 55 years and older. The grounds will include common areas and 37 surface parking spaces. The northwest corner of Lot 3 will remain vacant and an approximately 12,000 square-foot portion of it developed into a park for residents.

Lot 4

Lot 4 will remain vacant of structures but a large underground stormwater detention basin will be installed in the southern portion of the lot, topped by an approximately 62,000 square-foot park, and the northern portion of the lot will remain in a natural state with the exception of the installation of a loop hiking trail and construction of two pedestrian bridges over the natural drainage which crosses through the site.

Landscaping

Project landscaping will include a mix of native and non-native shrubs and perennials, and 454 trees planted throughout the modified areas. The northwest corner of Lot 3 and portions of Lot 4 will remain undisturbed with their existing mix of native and non-native vegetation. **Figure 3-4, Proposed Landscaping,** provides an overall view of the areas that will be landscaped.

Architecture

The project utilizes earth tones and materials with a traditional appearance throughout the craftsman-inspired architecture of the development. Design elements common throughout the structures are gabled roofs, open eaves, exposed rafters and beams, and window casings, with stone and clapboard siding. **Figures 3-5a-c, Project Architecture**, provides views of the proposed structures.

The hotel has a large porte cochere at the entrance, tall shopfront windows wrapping around the ground floor of most of the building, balconies with painted wood railings on three sides, and a seamed metal roof with wide fascia in the gables. The assisted living facility is similar, using the same materials and similar styling, but on a larger scale and using a repeating fenestration pattern to define the composition. The townhouses come in two styles with one style used as the center of three or four attached units, and the other used on the sides in right or left orientation. The townhouses use only clapboard for siding and reserve stone for pedestal bases, and have metal-shingle roofs rather than seamed roofs.

CONSTRUCTION AND EARTHWORK

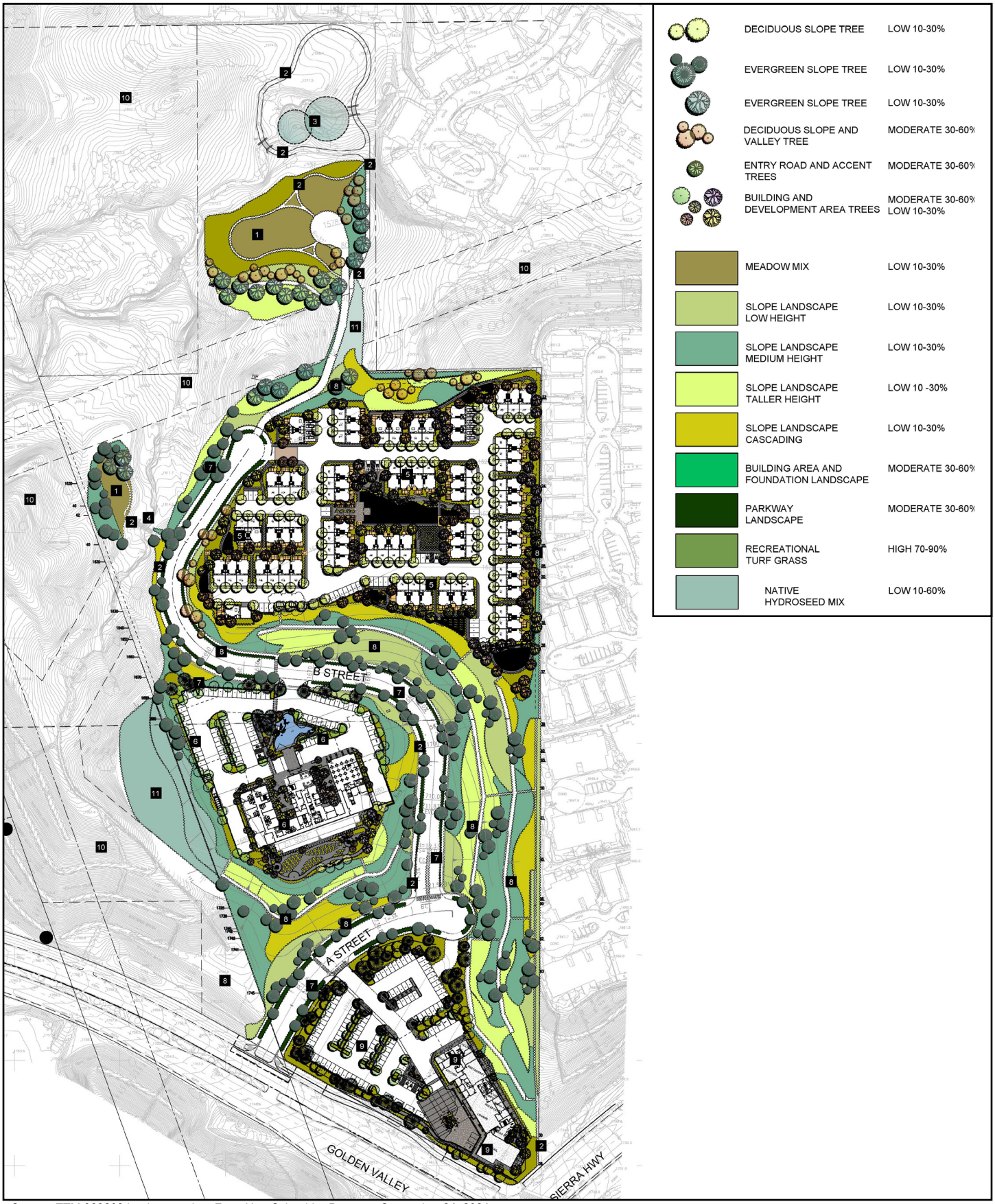
Construction activities are anticipated to begin in 2026 with the demolition of the house, and the project is expected to be operational by 2028. Soil excavation of between two to twenty feet, depending on the context, will be necessary wherever earthwork occurs. Removed material may be used for fill and the total amount of cut and fill is estimated at 360,000 cubic yards. No import or export of soil is proposed as it is anticipated that all excavated soils will be balanced onsite.

REQUIRED ENTITLEMENTS

The project seeks the following approvals from the City under Master Case 21-036:

- Tentative Map (TM): A Tentative Map is required for the subdivision of the project site.
- Conditional Use Permit (CUP): A CUP is required for the development within the Planned Development Overlay, and for the residential care facility in the zone.

- Minor Use Permit (MUP): A MUP is required for the hotel use in the zone, and for residential density and commercial floor area less than the minimum required by the zone.
- Hillside Development Review (HDR): A HDR is required for development on the property with average cross slopes greater than ten percent.
- Development Review Permit (DR): A DR is required to review the proposed development and site plan.
- Architectural Design Review Permit (ADR): An ADR is required to review the proposed architecture of a new building.



Source: TTM 068203 landscape plan, Fong Hart Schneider Partners, September 24, 2021

Date - 12/26/25

GOLDEN VALLEY ROAD MIXED-USE PROJECT

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Proposed Landscaping

FEET 0 175 250

FIGURE 3-4

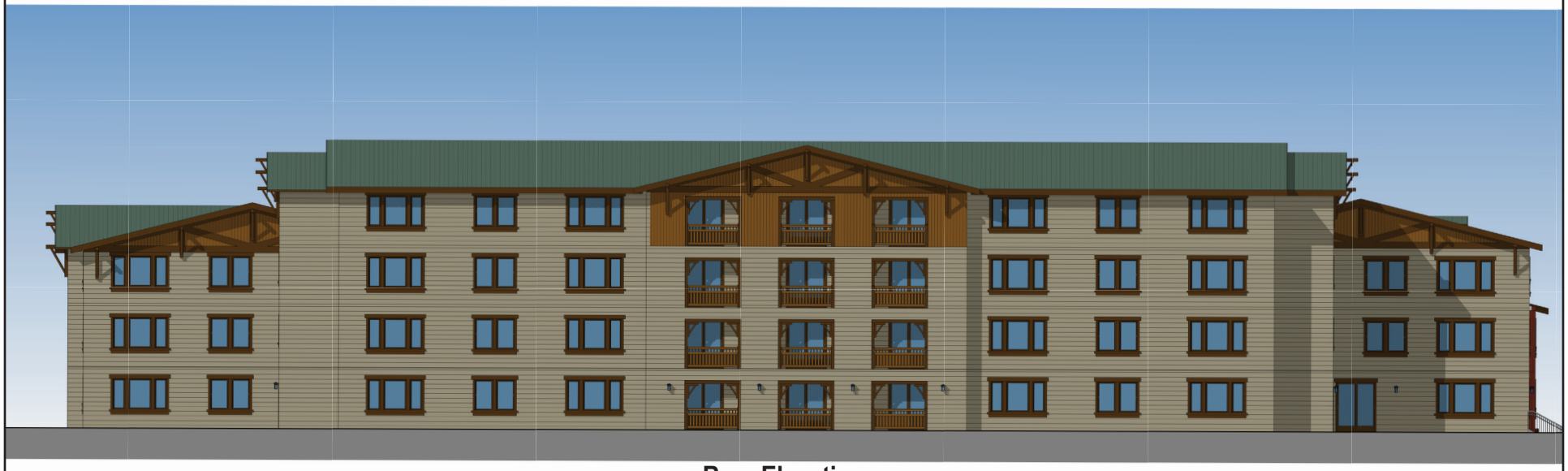
Front Elevation

Rear Elevation

Source: Golden Valley Road, Feng Xiao Architect, Inc. Planning Submission, August 11, 2022

Date - 12/22/25

Front Elevation



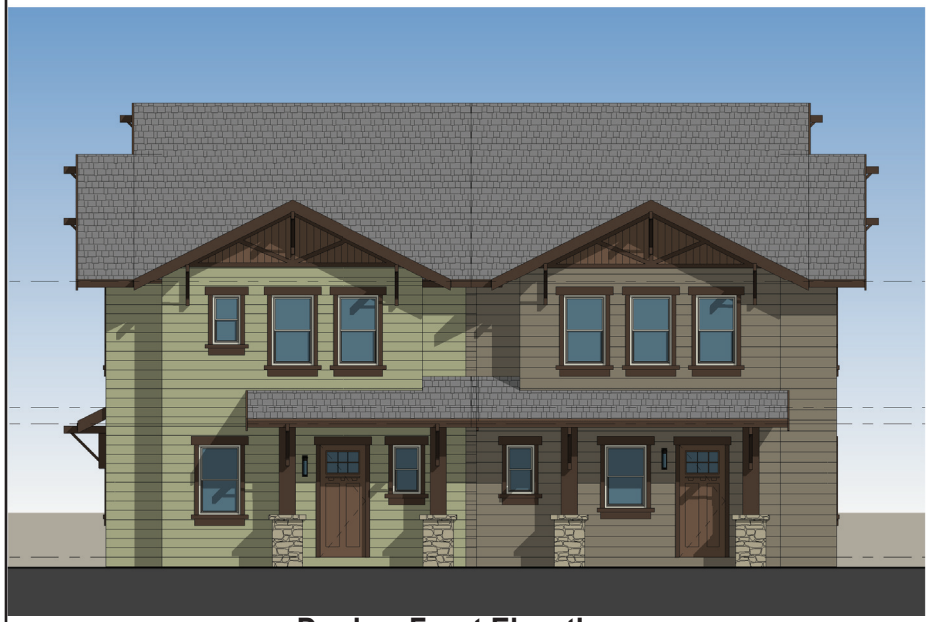
Rear Elevation

Source: Golden Valley Road, Feng Xiao Architect, Inc. Planning Submission, August 11, 2022

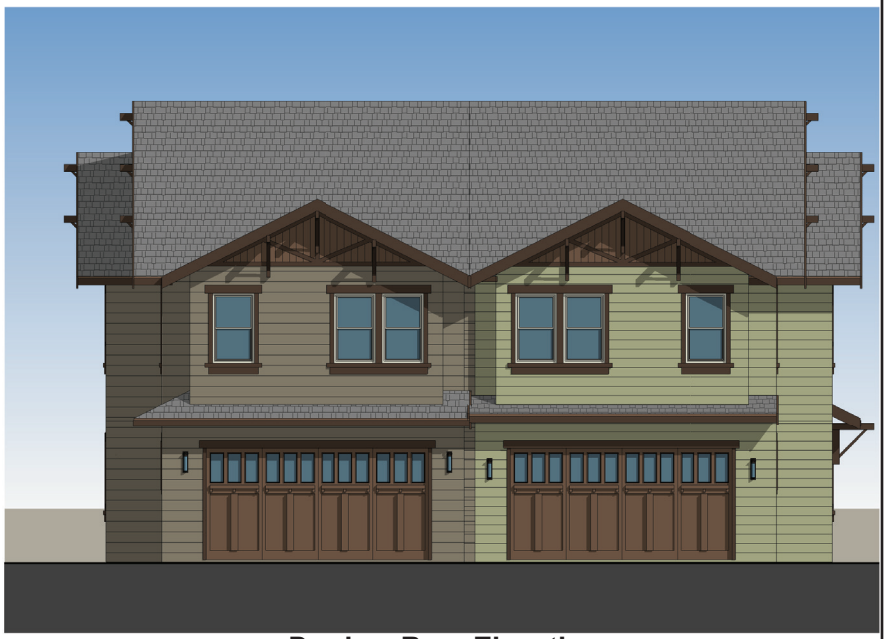
Date - 12/22/25

Triplex, Front Elevation

Triplex, Rear Elevation



Duplex, Front Elevation



Duplex, Rear Elevation

Source: Golden Valley Road, Feng Xiao Architect, Inc. Planning Submission, August 11, 2022

Date - 12/22/25

4.0 INITIAL STUDY/NEGATIVE DECLARATION

CALIFORNIA ENVIRONMENTAL QUALITY ACT
INITIAL STUDY AND CHECKLIST

1. **Project title:**
   Golden Valley Road Mixed Use Project (Master Case 21-036)
2. **Lead agency name and address:**
   City of Santa Clarita
   Community Development Department
   23920 W. Valencia Blvd. Suite 302
   Santa Clarita, CA 91355
3. **Contact person and phone number:**
   Ms. Erika Iverson, Senior Planner
   Email: eiverson@santa-clarita.com
   Tel: (661) 255-4330
4. **Project location:**
   The project is located at 20101 Golden Valley Road (Assessor's Parcel Numbers 2836-013-106, 2836-013-107, 2836-013-111, 2836-013-128, 2836-013-141, 2836-013-175, 2836-020-058, 2836-020-078, 2836-020-086, and 2836-020-087)
5. **Project sponsor's name and address:**
   Veluzat Productions
   24715 Oak Creek
   Newhall, CA 91321
6. **General Plan Land Use designation:**
   Mixed Use – Neighborhood (MX-N)
7. **Zoning designation:**
   Mixed Use Neighborhood (MXN)
8. **Project Description:**
   The project would consolidate 10 parcels on an approximately 28.13-acre site into four lots for the purpose of constructing a hotel, a senior assisted-living facility, and residential condominiums. Lot 1 will be 3.76 acres in size and developed with a hotel with 60 rooms. Lot 2 will be 5.43 acres in size and developed with a senior assisted housing facility with 151 units. Lot 3 will be 13.09 acres in size and developed with 73 townhouses. Lot 4 will be 5.11 acres and reserved as open space.
9. **Surrounding land uses and setting:**
   Adjacent to the east of the site are residential subdivisions, adjacent to the west is a strip of land 330 feet wide owned by the City of Los Angeles Department of Water and Power, occupied by high-voltage transmission lines, which is then bordered by residential subdivisions and the Golden Valley High School. Adjacent to the north is vacant land and residential subdivisions, and to the south, on the other side of Golden Valley Road, is vacant land and an oil extraction field.
10. **Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.):**
    CDFW, Streambed Alteration Agreement
    CalGEM, permit for well abandonment (potential)

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

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

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

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

☒ I find that although the proposed 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 proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "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 proposed 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 proposed project. Therefore, an EIR Addendum will be prepared.

Name: Erika Iverson
Title: Senior Planner, Planning Division, City of Santa Clarita

Signature: Erika Iverson Date: April 7, 2026

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
I. AESTHETICS. Except as provided in Public Resources Code Section 21099, would the project:				
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, or other locally recognized desirable aesthetic natural feature 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 publicly accessible vantage points). 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?	☐	☐	☒	☐

Impact Analysis

a. Less than Significant Impact. Would the project have a substantial adverse effect on a scenic vista?

The City does not have a specific definition of scenic vista, but the Aesthetics chapter from the City's One Valley One Vision General Plan EIR describes scenic vistas as including sweeping views of a valued landscape or simply just unobstructed views of attractive natural features. Scenic vistas in the context of CEQA would only include views from publicly accessible vantagepoints as private views would not be considerable. The project site can generally only be seen from Golden Valley Road and from a portion of Sierra Highway, and in order to have a significant impact upon a scenic vista the project would need to be within the view of a scenic vista.

The front of the project site, the southern end, abuts Golden Valley Road and is at a higher elevation than the rear of the project site (the north end). Under current conditions, looking north from Golden Valley Road where adjacent to the project site there are essentially no views of the valley or the hills to the north. This is because there is a tall berm and then a block wall at the southern border of the site which obscures any view. The only exception is a small area near the intersection with Sierra Highway where the block wall ends. From here one can see across the valley to the north with the mountains in the distance. This view could not reasonably be considered a scenic vista for passing motorists as it would only be visible for a brief moment. However, pedestrians would be able to see the view for an extended period if they chose to, and because the vantagepoint provides a view of a portion of the valley and the mountains it is reasonable to describe the view as a vista.

The project will place the hotel at this corner of the property and those views from Golden Valley Road will be blocked. This would not result in a significant impact, however, because although there is a long-range view available it would not be considered an important public resource or a scenic vista within the context of the criteria question. The existing view is only seen from adjacent to a busy intersection, and this location is not reasonably recognized nor valued for the views available from it. The view is somewhat constrained by Sierra Highway to the right, the topography to the left, and a powerline in the foreground, and it is not a particularly unique or exceptional view by any reasonable standard.

The project site can also be seen when looking west from the pedestrian overpass on Sierra Highway north of the intersection with Golden Valley Road, and from Sierra Highway for a short section north of the pedestrian overpass. From here one can see portions of the property between the subdivisions on either side of it. Post-construction rather than seeing a portion of vacant property between the subdivision the roof of the assisted living facility will be visible from the roadway and more visible from the overpass. The views to the west that include the project site within the field of vision would not be considered scenic vistas and the construction of the project would merely modify the character of the view.

The Conservation and Open Space Element of the General Plan defines particular mountains, canyons, water bodies, and woodlands as scenic resources, and obscuring or otherwise degrading the view of one of these features could result in an impact. The project does not interrupt any views of these resources except the view at the easternmost corner from Golden Valley Road as the Sierra Pelona mountains can be seen in the distance, but as discussed above this would not constitute a significant impact.

As the project will not interrupt, degrade, or otherwise obscure a scenic vista the project will have a less than significant impact to scenic vistas.

Mitigation Measures: No mitigation measures are required.

b. No Impact. Would the project Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings, or other locally recognized desirable aesthetic natural feature within a state scenic highway?

The project site is not located along a designated scenic highway or visible from a designated scenic highway, and therefore development of the site will not damage any scenic resources within a scenic highway. The nearest known scenic highway the portion of Interstate 5 west of the City, which is eligible for state designation, and is approximately 4 miles from the site at its nearest point.[1] Therefore, the project would result in no impact to scenic resources within a state-designated scenic highway.

Mitigation Measures: No mitigation measures are required.

c. Less than Significant Impact. Would the project, 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 publicly accessible vantage points). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

As described in I.a above the project site is not readily visible except from Golden Valley Road and a portion of Sierra Highway, plus the pedestrian overpass on Sierra Highway south of the intersection. The existing character of the project site where it can be viewed from these areas is that of a vacant lot, and the

[1] CalTrans California State Scenic Highway System Map, Accessed March 9, 2026 at: https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=465dfd3d807c46cc8e8057116f1aacaa

site itself would not be considered a visual resource. The character of the site will be changed but adherence to design guidelines would in some respects improve the existing character of the project site.

The City has Community Character and Design Guidelines published in 2009 which guides the creation of new development in the City. The Guidelines include provisions for multi-family development, commercial development, and mixed-use development, as well as more information regarding design philosophy. The project is a mixed-use development as there are three different uses proposed for the project site, but the uses are not integrated and therefore the commercial and multi-family design guidelines are more appropriate. In general terms the design guidelines strive to create people-oriented spaces wherever possible, with buildings placed toward public streets in an effort to create welcoming public spaces. Automobile and service oriented areas should be the least prominent spaces in new development, and softened with landscaping and pedestrian amenities whenever appropriate.

The hotel is oriented toward the intersection of Golden Valley Road and Sierra Highway which is the desired orientation according to the commercial guidelines. The retail suite and its courtyard are nearest to the intersection providing the most active component of the development at the most visible location. The hotel entryway is also readily visible from the street and further serves to activate that location. Per the commercial guidelines the auto-oriented portions of the hotel, namely the parking lot and driveway, are the most obscured components of the hotel. From the street the modern-rustic character of the hotel and its most active components will be showcased to the public street, providing a maximum amount of street activation in an area that is otherwise dominated by the large arterial roads. The character of the view will change

The assisted-living facility and residential condominiums would not be readily visible from any public vantagepoint, save for the pedestrian overpass and nominally from a short section of Sierra Highway north of the overpass. Nonetheless the assisted-living facility exhibits 360 degree architecture and provides large outdoor pedestrian spaces on the front and rear of the building, with the spaces in the front of the building integrated into the building itself, providing a welcoming, people-oriented design to visitors and residents. The residences are oriented toward common spaces including a large, central green in the middle of the development. This provides robust pedestrian-oriented circulation within the development, and east connection between the units. The garages of the units are oriented toward the street, however, the buildings still exhibit 360-degree design, and as this is a self-contained village the relationship between the units is more important for community-building than the relationship of the units to the street.

In each use the buildings present a modern building typology with traditional design elements that meet the goals of the Guidelines General Design Principles[2]:

- Richness of material surface and texture.
- Muted earth tone colors (such as off-whites, ochres, siennas, umbers, beiges, tans, browns, or other similar subdued colors) for primary building surfaces, with more intense colors limited to accents.
- Significant wall articulation (insets, canopies, wing walls, trellis features, arcades, colonnades).
- Full-sloped roofs, multi-planed roofs (combination of pitched and flat roofs).
- Roof overhangs, articulated eaves, parapets.
- Window configurations compatible with the design of the building.
- Articulated building mass and form.
- Landscape elements, which includes plantings and hardscape, that complement the style of architecture, enhance building and site design, and are integrated into the surrounding context.

[2] Santa Clarita Community Character and Design Guidelines, Chapter 2: Design Trends and Urban Form, General Design Principles, March 24, 2009

As the project's architectural design is in character with the City, and exhibits the qualities expressed in the Guidelines, impacts related to incompatible visual elements would be less than significant.

Mitigation Measures: No mitigation measures are required.

d. Less than Significant Impact. Would the project create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?

The project does not feature large expanses of reflective glass that would create substantial glare during the daytime, and project lighting is minimal and commensurate with the various uses. There are no large floodlights oriented toward streets or other properties, and the most visible lights from a public roadway would be coming from the interior of the hotel's retail suite, which would not be exceptionally bright. Therefore, impacts related to light or glare would be less than significant.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
II. AGRICULTURE AND FORESTRY RESOURCES. Would the project:				
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
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?	☐	☐	☐	☒

Impact Analysis

a-e. No Impact. The subject property is located in an area identified as "other land" on the Los Angeles County Important Farmland 2020 map prepared by the California Department of Conservation[3] for the Farmland Mapping and Monitoring Program (FMMP). It is not mapped as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The site is not used for agricultural purposes, has no agricultural zoning, and is not in conflict with a Williamson Act contract. The subject property is also not located within any private timberlands or public forestlands as identified by the CDFW.[4] As such, the project would have no impact on agricultural or forestry resources.

Mitigation Measures: No mitigation measures are required.

[3] California Department of Conservation, Division of Land Resource Protection, Los Angeles County Important Farmland 2020, Sheet 1 of 2, Accessed on March 9, 2026 at https://www.conservation.ca.gov/dlrp/fmmp/Pages/LosAngeles.aspx

[4] CA Department of Fish and Wildlife, California Forests and Timberlands in California Department of Fish and Wildlife Regions map, September, 28, 2015.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
III. AIR QUALITY. Would the project:				
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?	☐	☐	☒	☐

Impact Analysis

The following analysis is based upon the technical analysis found in the Air Quality and Greenhouse Gas Emissions Technical Report (AQ/GHG Report) prepared by Impact Sciences, dated July 2024, and attached as **Appendix A**.

Certain air pollutants have been recognized to cause notable health problems and damage to the environment either directly or in reaction with other pollutants and are regulated at the national and state levels. The Clean Air Act (CAA) is the federal law that regulates air emissions in order to protect public health. Implementation and enforcement of the CAA is the purview of the US Environmental Protection Agency (USEPA). To accomplish this the USEPA has established the National Ambient Air Quality Standards (NAAQS) which sets pollutant concentration levels considered safe, with an adequate margin of safety, to protect the public health and welfare of "sensitive receptors," which include the elderly, young children, the acutely and chronically ill (e.g., those with cardio-respiratory disease, including asthma), and persons engaged in strenuous work or exercise. The USEPA identifies areas in the country as either in attainment, nonattainment, or maintenance of the standards. States with areas in nonattainment, meaning they do not meet the NAAQS, must create a State Implementation Plan (SIP) for each criteria pollutant in nonattainment. The SIP includes pollution control measures that demonstrate how the standards for those pollutants will be met within a certain time period. California has its own California Clean Air Act and air quality standards (CAAQS), some of which are more stringent than the NAAQS.

California is divided geographically into 15 air basins that have similar meteorological and geographic conditions for the purpose of managing air resources on a regional basis. The state is also divided into 35 administrative air districts for the purpose of implementing the SIP. Each district represents a local air quality regulatory agency responsible regional air quality planning, monitoring, and stationary source and facility permitting. The City is located within the South Coast Air Basin (air basin) and the local air quality agency is the South Coast Air Quality Management District (SCAQMD). The air basin is bounded by the Pacific Ocean to the west, the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east, and San Diego County to the south. The SCAQMD regulates the South Coast Air Basin and parts of two neighboring basins to the east. The six principal pollutants for which national and state standards have been promulgated, the “criteria pollutants,” are ozone (O3), respirable and fine particulate matter (PM10

and PM2.5, respectively), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), and lead (Pb). The air basin is in nonattainment for O3 and PM-2.5, and Los Angeles County (outside of the Antelope Valley) is considered in nonattainment for lead, though this is specifically only related to point sources located in Vernon and the City of Industry. The SCAQMD's Air Quality Management Plan (AQMP) is the air quality regulatory document designed to bring the district into NAAQS and CAAQS attainment and fulfill the obligations of the SIP. The AQMP is developed in collaboration with the Southern California Association of Governments (SCAG) which is responsible for preparing the portion of the SIP that addresses transportation control measures, land use, and growth projections within nonattainment areas. The AQMP is based upon the demographic, population, and motor vehicle emission projections SCAG produces for their Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS).

a. Less than Significant Impact. Would the project conflict with or obstruct implementation of the applicable air quality plan?

The SCAQMD 2022 AQMP is the applicable air quality plan for the City. A project's consistency with the AQMP is primarily based upon its consistency with air quality significance thresholds established by the SCAQMD, which are discussed in threshold b, below. However, as the pollution control measures of the AQMP are based upon the growth estimates and land use assumptions of the SCAG RTP/SCS, a project that resulted in significant population or job increases beyond the projections of the RTP/SCS, or that significantly deviated from its land use assumptions, could conflict with it and by extension the AQMP.

The new 2024-2050 RTP/SCS was certified in 2025, but growth estimates used to prepare the 2022 AQMP are derived from the 2020-2045 RTP/SCS, so the project is compared to the 2020 version. The 2020-2045 RTP/SCS projects that between the years 2016 and 2045 the City would increase in population by 40,600 people and would add 14,000 new jobs within the same time period.[5] According to the project VMT Analysis (Appendix I) the project will create 66 new jobs and would house an estimated 308 people (157 people in the condominiums, 151 people in the assisted living facility). Averaged over 29 years SCAG's estimated population growth would amount to 1,400 people a year and the job growth to 483 jobs a year. The project's contribution to growth within the City would be well within the rates projected by SCAG. Therefore, the project does not conflict with the growth assumptions that underlie the AQMP's pollution control measures.

The project also does not conflict with the land use assumptions that underlie the AQMP. The land use assumptions of the 2020-2045 RTP/SCS are based upon existing land use designations plus the identification of Priority Growth Areas (PGAs) as areas within the SCAG region where job and housing growth should be concentrated for the purposes of realizing the plan's goals of reducing travel distances, increasing mobility options, improving access to workplaces, and conserving the region's resource areas. The project site is not within a PGA[6] which means development on the site within the parameters of the existing land use designation aligns with the land use assumptions of the RTP/SCS. Thus, as the project will not conflict with the growth or land uses assumptions of the 2020-2045 RTP/SCS, it will also not conflict with the AQMP, nor would it obstruct its implementation, and impacts would be less than significant.

b. Less than Significant Impact. Would the project 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?

[5] SCAG, 2020 Connect SoCal, Demographics and Growth Forecast Technical Report, September 3, 2020.
[6] SCAG, Regional Data Platform, Priority Growth Areas (PGA) - SCAG Region feature layer, updated February 14, 2022, available from: https://scag.ca.gov/RDP.

The SCAQMD provides significance thresholds for emissions of criteria pollutants, including: reactive organic gases (ROG), NO_X, carbon monoxide (CO), sulfur oxides (SO_X), and particulate matter (PM-10 and PM-2.5). Projects with daily emissions that exceed any of the following emission thresholds shown in **Table III-1, SCAQMD CEQA Daily Emissions Thresholds**, are recommended by the SCAQMD to be considered significant impacts under CEQA.

Table III-1
SCAQMD CEQA Daily Emissions Thresholds

Pollutant	Construction	Operations
Reactive Organic Gasses (ROG)	75	55
Oxides of Nitrogen (NO_X)	100	55
Carbon Monoxide (CO)	550	550
Particulate Matter (PM-10)	150	150
Particulate Matter (PM-2.5)	55	55
Sulphur Oxides (SO_X)	150	150
Source: SCAQMD CEQA Air Quality Significance Thresholds. Revision March 2023.		

The SCAQMD guidance for evaluation of cumulative impacts under CEQA states that "As Lead Agency, the AQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR."[7] Further, the SCAQMD guidance states that "Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant." SCAQMD recommends that public agencies perform cumulative impact analyses for air quality in the same manner as SCAQMD. As such, a project that does not exceed the emissions thresholds shown in Table III-1 would not have a cumulatively considerable net increase of any criteria pollutant.

Construction Emissions

The air quality model estimated that the Project would be constructed in approximately 18 months with construction beginning in 2025 and project operations commencing by 2026. Construction will actually begin at a later date, projected as sometime in 2026 or 2027, and will most likely take longer than 18 months. There is no need to update the air quality model, however, as it presents a conservative analysis. Emission factors are estimated to improve each year into the future, so the model's earlier construction and operational dates would result in slightly more conservative emissions estimates. In addition, a shorter construction period will result in more conservative emission estimates because more work is being accomplished on a per day basis, resulting in more daily emissions.

Demolition and removal of existing debris would occur for approximately one month. This phase would include the demolition of the single-family residence and accessory structures (approximately 8,770 sf) that are located near the southerly portion of the property near Golden Valley Road. Grading activities would occur for approximately 5 months and would involve the cut and fill of land to ensure the proper base and slope for the entire site, including building pads and foundations. The analysis assumes approximately 360,00 cubic yards (cy) of cut and fill to be balanced on site; no soil import or export is anticipated at this time. In total, structural building, finishing, and paving activities are expected to occur for approximately

[7] SCAQMD, White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution Appendix D, August 2003.

12 months. Upon completion of the building shells, finishing (coatings) and paving of parking areas and driveways would follow.

The analysis of regional daily construction emissions was prepared utilizing the CalEEMod computer model recommended by the SCAQMD. During construction, emissions of air pollutants would be generated from the use of heavy equipment on-site, including exhaust from internal combustion engines and dust from earth moving activities. Dust emissions generated during construction are called "fugitive emissions," because such emissions are not amenable to collection and discharge through a controlled source. SCAQMD Rule 403 provides regulatory dust control measures that would apply to the grading related to the project, because of the non-attainment status of the Air Basin for PM-10. The following dust control measures would be implemented during construction as needed to comply with Rule 403 regulations:

- Apply soil stabilizers or moisten inactive areas.
- Prepare a high wind dust control plan.
- Stabilize previously disturbed areas if subsequent construction is delayed.
- Water exposed surfaces as needed to avoid visible dust leaving the construction area (typically three times/day).
- Minimize in-out traffic from construction zone.
- Sweep streets daily if visible soil material is carried out from the construction area.

The project's maximum daily construction emissions as calculated by CalEEMod are shown in **Table III-2**, **Construction Activity Maximum Daily Emissions**.

Table III-2
Construction Activity Maximum Daily Emissions

	Maximum Construction Emissions					
	ROG	**NOx**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
2025	3.3	29.8	29.7	0.06	3.9	2.2
2026	45.3	20.0	37.4	0.05	4.1	1.5
SCAQMD Thresholds	75	100	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No

Source: Air Quality and Greenhouse Gas Emissions Technical Report Appendix A.
Maximum emissions reported for summer or winter season, whichever is greater.
Construction emissions are shown in pounds per day and reflect required compliance with SCAQMD Rule 403 for applying water during grading.

As shown in Table III-2, the peak daily emissions generated during the construction of the Project would not exceed any of the regional emission thresholds recommended by the SCAQMD. Therefore, Project construction would not result in a cumulatively considerable net increase of any criteria air pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard.

Operational Emissions

Project-generated emissions would be associated with motor vehicle use, energy use, and area sources, such as the use of natural-gas-fired appliances, landscape maintenance equipment, consumer cleaning products, and architectural coatings associated with the operation of the project. The project's maximum daily emissions of criteria pollutants during operations are shown in **Table III-3, Daily Operational Emissions**.

Table III-3
Daily Operational Emissions

Source	Operational Emissions (lbs/day)					
	ROG	**NOx**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Area	8.77	0.14	14.8	0.01	0.01	0.01
Energy	0.07	1.24	0.68	0.01	0.10	0.10
Mobile	0.99	2.74	32.2	0.09	8.77	2.27
Total	**9.83**	**4.12**	**47.68**	**0.11**	**8.88**	**2.38**
AQMD Threshold	55	55	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No

Source: Air Quality and Greenhouse Gas Emissions Technical Report Appendix A.
Maximum emissions are shown in pounds per day and reported for summer or winter season, whichever is greater.
Totals may appear not to sum due to rounding.

As shown in Table III-3, the project's operational emissions would be far below the SCAQMD maximum daily emission thresholds for criteria pollutants. Therefore, the project's potential to result in a cumulatively considerable net increase of any criteria pollutant during operations would be less than significant.

Mitigation Measures: No mitigation measures are required.

c. Less than Significant Impact. Would the project expose sensitive receptors to substantial pollutant concentrations?

The SCAQMD developed analysis parameters to evaluate ambient air quality on a local level in addition to the more regional emissions-based thresholds of significance. These analysis elements are called Localized Significance Thresholds (LSTs). LSTs were developed in response to the SCAQMD Governing Board's Environmental Justice Enhancement Initiative 1-4, and the LST methodology was provisionally adopted in October 2003 and formally approved by SCAQMD's Mobile Source Committee in February 2005. LSTs are only applicable to the following criteria pollutants: NOX, CO, PM-10, and PM-2.5. LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and they are developed based on the ambient concentrations of that pollutant for each source receptor area and distance to the nearest sensitive receptor.

The nearest sensitive receptors to the project site include residences approximately 15 feet to the north and to the east. In the case of this analysis, the project site is located within SRA 13 – Santa Clarita Valley with receptors located within 25 meters. The closest receptor distance in the SCAQMD's mass rate look-up tables is 25 meters. Projects that are located closer than 25 meters to the nearest receptor are directed to use the LSTs for receptors located within 25 meters. The CalEEMod User's Guide states the applicable LST should be based on the equipment list for each construction phase and calculated according to the anticipated maximum number of acres a given piece of equipment can pass over in an 8-hour workday.

Based on the project's construction assumptions approximately 1.0 acres per day would be disturbed during demolition and 4.0 acres per day would be disturbed during the grading phase. The LSTs for a 4.0-acre site in SRA 13 with sensitive receptors located within 25 meters were calculated per SCAQMD Linear Regression Methodology and utilized for the grading phase. With respect to building construction, architectural coatings, and paving activities, the 5.0-acre LST in SRA 13 with sensitive receptors located within 25 meters has been utilized to address the potential localized NOx, CO, PM10, and PM2.5 impacts. The application of a 5.0-acre threshold for building construction activities on a 28-acre site would be conservative as physical building construction emissions would likely be spread out more evenly on the 28-acre site compared to the condensed 5-acre threshold applied in this analysis. **Table III-4, Local**

Significance Thresholds and Peak Daily Onsite Emissions shows that the project would not exceed the applicable LSTs.

Table III-4
Local Significance Thresholds and Peak Daily Onsite Emissions

Santa Clarita Valley 25 meters	Emissions			
	NO_X	**CO**	**PM-10**	**PM-2.5**
Demolition (1 acre)	22.2	19.9	1.2	0.9
LST Threshold	**114**	**590**	**4**	**3**
Grading (4 acres)	29.7	28.3	3.6	2.1
LST Threshold	**216.7**	**1,385.9**	**10**	**5.3**
Construction (5 acres)	17.8	24.1	0.7	0.7
LST Threshold	**246**	**1,644**	**12**	**6**
Significant Impact? Yes/No	No	No	No	No
Source: Air Quality and Greenhouse Gas Emissions Technical Report Appendix A. Maximum emissions are shown in pounds per day and reported for summer or winter season, whichever is greater.				

As the project would not exceed any of the identified localized thresholds of significance during construction the project would not expose sensitive receptors to substantial air pollutant concentrations, and these impacts would be less than significant.

The LST methodology is applicable to operations as well but primarily to projects where emission sources occupy a fixed location such as a heavy industrial use or mining operation, or potentially a use where mobile sources may spend long periods queuing and idling at the site such as at warehouse/transfer facilities. As the Project would not include warehouse or transfer facilities, an operational analysis against the LST methodology is not directly applicable to the project. Nevertheless, **Table III-5, Local Significance Thresholds - Operations** has been included to illustrate potential on-site emissions during project operation.

Table III-5
Local Significance Thresholds - Operations

Santa Clarita Valley 5.0 acres/25 meters	Emissions			
	NO_X	**CO**	**PM-10**	**PM-2.5**
Peak Onsite Daily Emissions[(a)]	1.38	15.48	0.11	0.11
LST Threshold	**246**	**1,644**	**3**	**2**
Significant Impact? Yes/No	No	No	No	No
Source: Air Quality and Greenhouse Gas Emissions Technical Report Appendix A. Maximum emissions are shown in pounds per day and reported for summer or winter season, whichever is greater				

As shown in Table III-5, the Project would not exceed any of the identified localized thresholds of significance. Therefore, the Project's operation would not expose sensitive receptors to substantial air pollutant concentrations, and these impacts would be less than significant.

TACs

Construction would result in the generation of DPM emissions from the use of off-road diesel equipment required for demolition, grading and excavation, building construction, paving, and other construction activities. The amount to which the receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Health-related risks associated with diesel-exhaust emissions are primarily linked to long-term exposure and the associated risk of contracting cancer.

In 2015, the Office of Environmental Health Hazard Assessment (OEHHA) adopted revised guidelines that update previous guidance by incorporating advances in risk assessment with consideration of infants and children using Age Sensitivity Factors (ASF). The intent of the OEHHA 2015 guidance is to provide HRA procedures for use in the Air Toxics Hot Spots Program or for the permitting of existing, new, or modified stationary sources. As the project is not part of the Air Toxics Hot Spots Program and is considered an urban infill mixed-use development consisting primarily of mobile and area sources (i.e., non-stationary sources), the OEHHA 2015 guidance is not directly applicable. OEHHA 2015 offers limited information on conducting a short-term HRA, but the guidance acknowledges the many inherent uncertainties that may occur, and it does not identify the types of short-term projects or non-stationary projects subject thereto. Further, the SCAQMD has not opined on the application of OEHHA 2015 guidance to development projects such as the project. Nevertheless, in an effort to characterize the project's scope of DPM emissions upon nearby sensitive receptors, a quantified construction HRA was conducted for the project (see Appendix A). As demonstrated therein, under worst-case assumptions, the maximum impact at the nearest sensitive receptor (i.e., residences to the north and to the east of the project site) would be 9.3 per 1 million, or less than the risk threshold of 10.0 in 1 million. Impacts at locations farther than this receptor would be further reduced, and thus impacts would be less than significant.

Potential noncarcinogenic effects of chronic DPM exposures were evaluated using the Hazard Index approach as described in the OEHHA Guidance. A hazard index equal to or greater than 1.0 represents a significant chronic health hazard. As shown in greater detail in the HRA, non-carcinogenic effects at the nearest sensitive receptor (i.e., residences located north and east of the project site) would be 0.02, which is less than the 1.0 health hazard threshold. Impacts at locations farther than this receptor would be further reduced, and thus non-cancer effects would be less than significant.

CO Hotspots

Areas with high vehicle density, such as congested intersections, have the potential to create high concentrations of CO, known as CO hotspots. According to the SCAQMD CEQA Air Quality Handbook, a potential CO hotspot may occur at any location where the background CO concentration already exceeds 9.0 ppm, the CAAQS for 8-hour for CO. Within the most recent three years for which measurements are available, the highest CO concentration at the Santa Clarita-Placerita station was measured at 1.5 ppm in 2020 and thus a CO hotspot would not occur. Based on the analysis above, the project's potential to expose sensitive receptors to substantial pollutant concentrations would be less than significant.

Mitigation Measures: No mitigation measures are required.

d. Less than Significant Impact. Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The SCAQMD CEQA Air Quality Handbook (1993) identifies certain land uses as sources of odors. These land uses include agriculture (farming and livestock), wastewater treatment plants, food processing plants, chemical plants, composting facilities, refineries, landfills, dairies, and fiberglass molding. The proposed project would not include any of the land uses that have been identified by the SCAQMD as odor sources. Construction activities associated with the proposed project may generate detectable odors from heavy-duty equipment exhaust and architectural coatings. However, the nearest sensitive receptor is 700 feet away and construction-related odors would be short- term in nature and cease upon project completion The proposed project would be required to comply with the California Code of Regulations, Title 13, sections 2449(d)(3) and 2485, which minimizes the idling time of construction equipment either by shutting it off when not in use or by reducing the time of idling to no more than five minutes. This would reduce the detectable odors from heavy-duty equipment exhaust. The proposed project would also be required to comply with the SCAQMD Rule 1113 – Architectural Coating, which would minimize odor impacts from

ROG emissions during architectural coating. Any odor impacts to existing adjacent land uses would be short-term and not substantial. Accordingly, the project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. Impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES. Would the project:				
a. Have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in the City or regional plans, policies, regulations by the California Department of Fish and Game 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?	☐	☐	☐	☒

Impact Analysis

This analysis is based upon the project Biological Resources Assessment prepared in 2025 by South Environmental (Bio Report, **Appendix B-1**), the project Botanical Survey prepared in 2023 by South Environmental (Botanical Survey, **Appendix B-2**), the Jurisdictional Delineation prepared in 2025 by South Environmental (JD Report, **Appendix B-3**), the Oak Tree Report prepared in 2025 by South Environmental (Oak Tree Report, **Appendix B-4**), and the Focused Gnatcatcher Survey prepared in 2023 by Dudek (Gnatcatcher Survey, **Appendix B-5**. Final peer review comments concerning the biological reports prepared by Envicom Corporation are provided in **Appendix B-6** (Peer Review).

a. Potentially Significant Unless Mitigation Incorporated. Would the project have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate,

sensitive, or special status species in local or regional plans, policies, or regulations by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Special-status species are those plants and animals listed, proposed for listing, or candidates for listing as Threatened or Endangered by the USFWS under the Federal Endangered Species Act (FESA); those considered "Species of Concern" by the USFWS; those listed or candidates for listing as Rare, Threatened, or Endangered by the CDFW under the California Endangered Species Act (CESA); animals designated as "Fully Protected" by the California Fish and Game Code (CFGC); animals identified as "Species of Special Concern" (SSC) and "Watch List" (WL) by the CDFW, and; CDFW Special Plants, specifically those with California Rare Plant Ranks (CRPR) of 1B and 2 in the CNPS's Inventory of Rare and Endangered Plants of California (CNPS 2022).

Wildlife

Initial site surveys conducted in 2020 for the Bio Report observed one special-status wildlife species on site, a Cooper's Hawk (*Accipiter cooperii*). A search of the California Natural Diversity Database (CNDDB) for species that have been observed in the past within a broad study area around and including the project site contained nine special-status wildlife species. The potential for occurrence for each species, based upon the suitability of habitat present and the date and proximity of previous observations, is listed below.

- *Aimophila ruficeps canescens,* southern California rufous-crowned sparrow, medium potential
- *Artemisiospiza belli belli,* Bell's sage sparrow, high potential
- *Plioptila californica californica,* coastal California gnatcatcher, high potential
- *Bombus crotchii,* Crotch's bumble bee, medium potential
- *Eumops perotis californicus,* western mastiff bat, medium potential
- *Neotomoa lepida intermedia,* San Diego desert woodrat, medium potential
- *Helminthoglypta vasquezi,* Vasquez shoulderband snail, medium potential
- *Phrynosoma blainvillii,* coast horned lizard, medium potential
- *Aspidoscelis tigris stejnegeri,* coastal whiptail lizard, high potential

The California gnatcatcher (*Plioptila californica californica*) was observed within 1,000 feet of the project site and as such the Gnatcatcher Survey was prepared, which produced negative results. However, five bird species listed as USFWS Bird of Conservation Concern were observed during the gnatcatcher surveys, including:

- *Calypte costae*, Costa's hummingbird
- *Chamaea fasciata*, wrentit
- *Spinus lawrencei*, Lawrence's goldfinch
- *Toxostoma redivivum*, California thrasher
- *Dryobates nuttallii*, Nuttall's woodpecker

Plants

No special-status plant species were observed at the time of the Botanical Survey, however, one of the 92 plant species observed has recently been placed on the CNPS CRPR 4 list in September 2025, the horehound/Santa Clarita bush mallow (*Malacothamnus marrubioides*).

There are eleven special-status plant species that have been observed near the site in the past according to CNDDB that could have the potential to occur on site due to the presence of suitable habitat. These species and their potential for occurrence on site are listed below.

- *Calochortus catalinae,* Catalina mariposa lily, medium potential
- *Calochortus clavatus* var. *clavatus,* club-haired mariposa lily, medium potential
- *Calochortus clavatus* var. *gracilis,* slender mariposa lily, high potential
- *Calochortus plummerae,* Plummer's mariposa lily, high potential
- *Calystegia peirsonii,* Peirson's morning-glory, medium potential
- *Delphinium parryi* ssp. *purpurpeum,* Mt. Pinos larkspur, medium potential
- *Dodecahema leptoceras,* slender-horned spineflower, medium potential
- *Harpagonella palmeri,* Palmer's grapplinghook, high potential
- *Malacothamnus davidsonii,* Davidson's bush-mallow, medium potential
- *Optunia basilaris* var. *brachyclada,* short-joint beavertail, medium potential
- *Phacelia hubbyi,* Hubby's phacelia, medium potential

Impacts

The horehound/Santa Clarita bush mallow present on site was added to the CRPR 4 list. CNPS recommends CRPR 4 plants be evaluated for consideration during preparation of environmental documents where the locality of the plant may be important to its listing such as; populations at the periphery of a species' range; areas where the taxon is especially uncommon; areas where the taxon has sustained heavy losses; or populations exhibiting unusual morphology or occurring on unusual substrates. In this case, horehound bush mallow is relatively secure locally and does not meet the criteria to be considered locally significant. Therefore, project impacts to horehound bush mallow would be less than significant. In regard to the plant species with a potential to occur on site, as the Botanical Survey did not encounter any sign of these species potential impacts are considered less than significant.

Of the special-status wildlife species observed on site or with a potential to occur, the Bio Report considers construction of the project to have the potential to impact Crotch's bumble bee (*Bombus crotchii*), western mastiff bat (*Eumops perotis californicus*), coastal whiptail (*Aspidoscelis tigris stejnegeri*), coast horned lizard (*Phrynosoma blainvillii*), and San Diego dessert woodrat (*Neotomoa lepida intermedia*). To reduce potential impacts to less than significant the Bio Report recommended various mitigation measures. The Peer Review assessed these measures and determined they were appropriate but required modification. Mitigation measures include mitigation measure (MM) **BIO-1** which requires biological monitoring during construction activities. MM **BIO-2** requires protection measures to be put in place during construction to help minimize potential impacts. MM **BIO-3** requires a nesting bird survey to ensure there are no impacts to nesting birds. MM **BIO-4** requires pre-construction surveys and monitoring for Crotch's bumble bee, and appropriate compensatory mitigation if necessary. MM **BIO-5** requires roosting bat surveys and avoidance measures, and MM **BIO-6** requires pre-construction surveys and a salvage plan/salvage activities for any special-status lizards or mammals present on site.

This combination of surveys, avoidance measures, monitoring, and compensatory mitigation would reduce potential impacts to special-status species to less than significant.

Mitigation Measures:

MM BIO-1: Biological Monitoring

Before the City Engineer issues a grading permit, the Applicant must retain a qualified biologist as the lead biological monitor approved by the Community Development Director, or designee. The lead biological monitor must ensure that impacts to biological resources are avoided or minimized and conduct (or supervise) pre-construction field surveys for species that may be impacted by grading and construction activities as described in Mitigation Measures BIO-3 through BIO-6. The lead biological monitor must ensure that all surveys are conducted by qualified personnel (e.g., avian biologists for bird surveys, herpetologists for reptile surveys) and that they possess all permits and/or memoranda of understanding with the appropriate agencies for the handling of wildlife which are expected to be encountered as described in Mitigation Measures BIO-3 through BIO-6 and determined by the lead monitor. During grading, as well as other ground disturbing and vegetation removal activities, the lead biological monitor must be present to inspect and enforce all project biological mitigation requirements and to relocate any wildlife species that may come into harm's way to an appropriate safe location with similar habitat. In the instance a special-status or listed species is encountered during the pre-construction surveys or during construction monitoring and must be relocated the appropriate trustee agency (CDFW or USFWS) will be consulted and Incidental Take Permit(s) will be obtained for the task, if required. The biological monitor must be onsite daily throughout rough grading and other vegetation removal activities and then conduct periodic site visits as necessary throughout the remainder of project construction. The biological monitor is authorized to stop specific grading or construction activities to implement the mitigation measures, or if violations of any local, state, or federal laws are suspected.

The biological monitor must ensure that daily monitoring reports (e.g., survey results, protective actions, results of protective actions, adaptive measures) are prepared, which must be provided to the Community Development Director, or designee, and CDFW. The final report of monitoring activities must be filed within one month of completion of construction.

MM BIO-2: Protection Measures During Grading and Construction

The Applicant must implement the following measures during grading and construction to avoid and minimize potential impacts to native habitats and associated flora and fauna:

- Before initiating grading and construction activities, the permittee must demarcate the project limits of disturbance with temporary exclusionary fencing to prevent encroachment of project activities into adjacent native habitats and jurisdictional waterways, and to dissuade wildlife from entering the construction area. The fencing must be marked with highly visible flagging. Temporary signs must be posted or placed at regular intervals along the fencing prohibit access beyond the project limits. The temporary fencing must be routinely inspected and maintained in functional condition for the duration of project grading and construction.
- Tree protective fencing that is at least 6-feet tall chain-link fencing should be placed at the Tree Protection Zone of on-site oak trees near the proposed hiking trail. The fencing should be placed at least 5 feet from the dripline of the oaks and should be approved by a certified arborist approved by the Community Development Director, or designee, before start of project activities. The fencing should remain in place throughout project construction and should be monitored

by the certified arborist on at least a monthly basis to ensure its continued effectiveness.

- No construction and maintenance activities may occur during nighttime hours, except in an emergency or if authorized by the Community Development Director, or designee.
- If construction lighting is required, then lighting must be pointed away from native habitats and be pointed downward and shielded to the extent practicable.
- The permittee must implement standard measures to avoid excessive construction noise at the construction site.
- No pets are allowed on the project site.
- Trash must be disposed of in closed-containers, and all food-related trash must be disposed of in closed animal-proof containers. The permittee must provide sufficient containers on-site during construction.
- Standard measures to control fugitive dust must be implemented at the construction site, including sufficient watering of disturbed areas and reduced vehicle speeds below 15 m.p.h.
- All trenches must be filled within the same day or escape ramps for animals shall be constructed if trenches are to be left open overnight.
- All project related equipment and vehicles must be cleaned and decontaminated of weeds and soils before entering the project site to reduce the potential for the spread and introduction of invasive and noxious weeds.
- The project must obtain and implement a Stormwater Pollution Prevention Plan to prevent discharge and runoff of pollutants into streams and riparian habitats as well as the natural habitats adjacent to the construction footprint.

The permittee must implement the required measures throughout grading and construction. The lead biological monitor required by MM BIO-1 must maintain a record of monitoring notes including construction activities and observations related to the requirements of this mitigation measure and submit it to the Community Development Director, or designee, and CDFW. The final monitoring report shall be submitted within one month of completion of construction.

MM BIO-3: Nesting Birds

- If possible, ground disturbing activities and vegetation removal must be timed to occur between September 1 – January 31, which is outside the bird nesting season.
- If ground disturbing activities or vegetation removal (including tree trimming) are scheduled between February 1 – August 31, which is the bird nesting season, two preconstruction surveys for nesting birds must be conducted. One within 7 days before construction activity and the second within 72 hours before construction activities. The surveys must be conducted by a qualified biologist with prior experience conducting nesting bird surveys for construction projects. The survey area must include the area of ground disturbing activities and vegetation removal as well as suitable nesting habitat within a 300-foot buffer, or a buffer size determined by the qualified biologist based on level of proposed disturbance and access. A letter report summarizing the methods and results of the nesting bird surveys must be submitted to the Community Development Director, or designee,

before commencement of project activities. If no active nests are found, no additional measures are required.

- If active nests are found the biologist will map the location and document the species and nesting stage. A no-work buffer will be established around the active nest as determined by the qualified biologist and based on the species sensitivity to disturbance and the type and duration of the disturbance. No construction activities may occur within the no-work buffer until the biologist has determined the nest is no longer active.

MM BIO-4: Crotch's Bumble Bee

Pre-Project Habitat Assessment and Protocol Surveys

Before the City Engineer issues a grading permit, the permittee must retain a qualified biologist to conduct a habitat assessment to determine if the project site contains suitable habitat for Crotch's bumble bee. If it is determined that the project site contains suitable habitat, the qualified biologist must conduct a protocol survey of the project site for Crotch's bumble bee. The protocol survey must be conducted during the Colony Active Period (April 1 through August 31) and follow CDFW's *Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species* (June 6, 2023), or other survey protocol approved by California Department of Fish and Wildlife (CDFW). The qualified biologist must prepare and submit a report with the methods and results of the survey to the Community Development Director, or designee, and CDFW.

If Crotch's bumble bee(s) are not detected during the pre-project protocol survey, no additional mitigation is required provided the project commences within one year of completion of the survey. If the project does not commence within one year of completion of the survey, an additional protocol survey of the project site must be conducted and the survey results submitted to the Community Development Director, or designee and CDFW.

If a Crotch's bumble bee(s) is found during the protocol survey, the permittee must notify the Community Development Director, or designee, and initiate consultation with CDFW to determine if an Incidental Take Permit (ITP) for Crotch's bumble bee will be required for the project. If required, the permittee must obtain an ITP from CDFW before the City Engineer issues grading permit.

If a Crotch's bumble bee(s) is found at the project site during the protocol surveys, mitigation to avoid and minimize project impacts as well as to compensate for loss of habitat for the species must include the following, or as otherwise determined by CDFW:

Project Timing

To the extent feasible, initial ground-disturbing and vegetation removal activities must be scheduled after Crotch's bumble bee nectar sources have stopped blooming in the fall, as determined by the qualified biologist, and outside of the Queen Flight Season (February 1 through March 30) and the Colony Active Period (April 1 through August 31).

Pre-Construction Surveys

Before initial ground-disturbing or vegetation removal activities that would occur during the Queen Flight Season (February 1 through March 30) and the Colony Active Period (April 1 through August 31) including, without limitation, grading and fuel modification, a qualified biologist must conduct two visual surveys for Crotch's

bumble bee within the development and fuel modification areas, plus 50 feet. Surveys must occur not more than 10 days before commencement of ground-disturbing and vegetation removal activities. The surveys must be at least four days apart, with the second survey completed within two days of starting work. Surveys must be conducted at a minimum effort of one person-hour per three acres of habitat. Survey effort must focus on blooming nectar and pollen resources and potential nesting substrates (burrows, grasses, brush piles, old bird nests, dead trees, hollow logs). If the biologist detects any nesting Crotch's bumble bees during the pre-construction survey, a 50-foot exclusionary buffer in which no activities would be allowed to occur must be established around the nesting bee(s). All project personnel must be notified of the buffer, and the Community Development Director, or designee, and CDFW must be notified within 24 hours of detection of nesting Crotch's bumble bee(s). The exclusionary buffer must be maintained until the Crotch bumble bee(s) are no longer nesting, as determined by the biologist. Within 14 days of completion of the pre-construction surveys, the surveying biologist must prepare and submit a report documenting the methods and results of the pre-construction surveys to the Community Development Director, or designee, and CDFW.

Biological Monitoring

A qualified biologist must monitor initial ground disturbance and vegetation removal activities occurring at any time of year to ensure that the project does not result in take of Crotch's bumble bee. Biological monitoring during the Queen Flight Season (February 1 through March 30) and the Colony Active Period (April 1 through August 31) must include searches for nests, which includes observations of ground animal burrows, bunch grasses, thatched annual grasses, brush piles, old bird nests, dead trees, and hollow logs. Biological monitoring conducted during the Overwintering Season for Crotch's bumble bee (November 1 through January 31) must include searches of potential hibernacula. If the biological monitor detects any nesting or overwintering Crotch's bumble bees during monitoring activities, a 50-foot exclusionary buffer in which no activities would be allowed to occur must be established around the nesting or overwintering bee(s). All project personnel must be notified of the buffer, and the Community Development Director, or designee, and CDFW must be notified within 24 hours of detection of the nesting or overwintering Crotch's bumble bee(s). The exclusionary buffer must be maintained until the Crotch bumble bee(s) are no longer nesting or overwintering, as determined by the biologist. The monitoring biologist must maintain daily field notes, including the locations of nesting and overwintering bees and collect photographs and other appropriate information. Within one month of completion of all biological monitoring activities, the biological monitor must prepare and submit a monitoring report documenting the methods and outcome of monitoring activities to the Community Development Director, or designee, and CDFW. The biological monitor's field notes must be attached to the report.

Compensatory Mitigation for Loss of Habitat

If Crotch's bumble bees are found on the project site during the pre-project protocol surveys, the qualified biologist must identify the extent of suitable habitat for the species and quantify the extent of project impacts. The permittee must mitigate for permanent and temporary impacts to suitable habitat at a 1:1 ratio. Suitable habitats that are temporarily impacted must be restored to pre-project or better conditions and contain locally native nectar sources identified by the qualified biologist appropriate for Crotch's bumble bee. Suitable habitats that are permanently impacted must be

mitigated by restoration and/or enhancement of onsite habitats suitable for Crotch's bumble bee, as well as permanent preservation of the mitigation area(s) in a manner approved by the Community Development Director, or designee. If onsite restoration or enhancement is not feasible, offsite restoration or enhancement at a location acceptable to the Community Development Director, or designee, and CDFW is sufficient. Alternatively, the Applicant may mitigate for permanent impacts to suitable habitat via contribution to an in-lieu fee program or mitigation bank approved by the Community Development Director, or designee, and CDFW. In-lieu fees or mitigation bank credits shall be used for restoration and/or enhancement and permanent protection of suitable habitats for Crotch's bumble bee. A Mitigation and Monitoring Plan prepared for compensation of permanent and temporary impacts to suitable habitats for Crotch's bumble bee must be prepared by a qualified restoration ecologist and include the following:

1. Plant Palette: The permittee must compile a plant palette(s) of local native species that is appropriate for the habitats being restored or enhanced. The plant palette(s) must include a diverse assemblage of locally native nectar resources for Crotch's bumble bee that can be expected to be blooming during the Colony Active Period for Crotch's bumble bee. Nectar and pollen-producing plants for Crotch's bumble bee in the plant palette may include, without limitation, the genera *Chaenactis, Lupinus, Phacelia,* and *Salvia* and other suitable flowering plants in the families Fabaceae, Apocynaceae, Asteraceae, Lamiaceae, Hydrophyllaceae, Plantaginaceae, Onograceae, Papaveraceae, Polygonaceae, and Boraginaceae. Seeding may be utilized as a method of plant establishment given that seed mixes consist of only locally native species. Seeds to be used must be collected locally from the region.
2. Timing: The Mitigation and Monitoring Plan must be approved by the Community Development Director, or designee, and CDFW before the City Engineer issues a grading permit. Proper establishment of planted species requires planting activities to occur during or just prior to the rainy season (October to March) or the first expected rain event. The permittee must plan for implementation of restoration and/or enhancement activities to occur within this timeframe.
3. Performance Standards: The restoration and/or enhancement area must provide a minimum absolute cover of native plant species by the end of the required monitoring period that is not less than the absolute cover of native species found at high quality reference sites found onsite or in the surrounding area and approved by the Community Development Director, or designee, and CDFW. Species richness, diversity, abundance, and frequency/density within each restoration and enhancement area must be roughly proportionate to that of the reference sites. Non-native species cannot exceed 5% cover of the restoration and/or enhancement area by the end of the required monitoring period.
4. Monitoring and Maintenance: The permittee must monitor and maintain restoration and/or enhancement areas for a period of five years or until performance standards are met as determined by the Community Development Director, or designee. The permittee must perform periodic maintenance of the site including weeding, repairing irrigation or other associated components, and replanting or re-seeding dead plants. Monitoring involves qualitative and quantitative methods to document site conditions and success. The monitoring period begins immediately following initial implementation activities

including seeding, weeding, and establishment of appropriate irrigation and other restoration components. Replacement plantings must be monitored with the same survival and growth requirements for three years after planting.

5. Reporting: The permittee must submit annual reports to the Community Development Director, or designee, and CDFW documenting mitigation activities not later than January 31 of each year until performance standards are met as determined by the Community Development Director, or designee.
6. Adaptive Management: The permittee will implement adaptive management/contingency measures as needed throughout the duration of the monitoring period to ensure that performance standards are met, at the direction of the qualified restoration ecologist.

If impacts are mitigated by purchasing credits from a mitigation bank or by contribution to an in-lieu fee program, the permittee must provide written documentation to the Community Development Director, or designee, and CDFW of purchase of mitigation credits or payment of the in-lieu fee before the City Engineer issues a grading permit.

MM BIO-5: Roosting Bat Surveys and Avoidance Measures

- Construction activities including demolition, grading, and vegetation removal must occur outside the bat maternity season, which occurs between April 1 through August 31, as feasible. If the bat maternity season cannot be avoided, a bat habitat assessment survey must be conducted by a qualified biologist no more than 14 days before the start of construction activities. The habitat assessment survey must document the locations of potential bat roosting habitat as well as evidence of bat species that may occur in the proposed project limits through direct observation (e.g., roosting bats) and/or sign (e.g., bat guano).
- No more than five days before the start of construction activities, emergence bat surveys must be conducted during the bat maternity season in areas of suitable bat habitat identified during the habitat assessment survey (e.g., near vacant structures or suitable roosting trees) to document any bat species emerging from these features. Generally, the emergence survey(s) will be conducted approximately one hour before sunset and last a minimum of two hours after sunset. The exact timing, however, will be determined by the qualified biologist. Passive acoustic monitoring equipment will be utilized during the emergence surveys to identify bats to the species level. In the event multiple features were identified in the habitat assessment in which bats may occur, at the discretion of the qualified biologist, either multiple emergence surveys may be necessary or additional acoustic equipment may need to be set up to capture the acoustics of bats as they emerge at dusk.
- Before the permittee commences any project activities, the qualified biologist must prepare and submit a letter report documenting the methods and results of the habitat assessment and emergence surveys to the Community Development Director, or designee, and CDFW.
- If no bats are detected during the habitat assessment or emergence surveys, then construction activities may proceed. If roosting bats are detected during the habitat assessment or emergence surveys, the roost sites and roosting bats must be avoided during the maternity season. The qualified biologist must determine an appropriate buffer around the roost site where construction is prohibited. The buffer typically ranges in size, between 100 to 300 feet around the roost site, depending on potential

for project impacts and surrounding terrain. For example, if a project will result in high noise decibels and the roost site is exposed without surrounding trees or hills, the buffer may be increased to reduce disturbances to the roosting bats during breeding activities. CDFW must be consulted regarding the buffer distances around roosts containing special-status bat species. Features such as trees or structures determined to be active roosts must be left in place throughout the maternity season.

- If an active roost site cannot be avoided by the project, including within or outside of the maternity season, a bat mitigation and management plan must be developed by a qualified biologist for roost relocation. Roost relocation involves eviction by non-invasive means and only in exceptional circumstances should involve the direct capture and transfer of bats to appropriate natural or artificial bat roosting habitat in the surrounding area. Mitigation and management plans requires consultation with and approval from the Community Development Director, or designee, and CDFW.
- If confirmed occupied special-status bat roosting habitat is destroyed, artificial bat roosts of comparable size and quality must be constructed and maintained at a suitable undisturbed area, preferably on the subject property. The design and location of the artificial bat roosts will be determined by the qualified biologist in consultation with CDFW.
- Not more than one month following completion of all bat survey, monitoring, and mitigation activities, the qualified biologist must prepare and submit a summary report of the methods and results of these activities to the Community Development Director, or designee, and CDFW.

MM BIO-6: Pre-Construction Surveys and Salvage of Special-Status Lizards and Mammals

Before the City Engineer issues a grading permit, a salvage plan that includes the details of the methods to be used to capture and relocate special-status wildlife species occurring within the project area, including coastal whiptail, coast horned lizard, and San Diego desert woodrat, must be prepared by a qualified biologist and submitted to the Community Development Director, or designee, and CDFW for review and approval.

Pre-construction surveys for potentially occurring special-status wildlife species must be conducted by a qualified biologist within 48 hours before the permittee commences project activities that would result in ground disturbance or removal of vegetation. If a special-status wildlife species is found, avoidance is the preferred option (i.e., waiting for the animal(s) to leave the impact area). If avoidance is not feasible, the species will be captured (if possible) and released into a predetermined area containing appropriate habitat and at a location where they would not be harmed by project activities, as detailed in the salvage plan. The salvage program must continue throughout initial ground disturbance and vegetation removal activities and will conclude when all suitable habitat within the grading limits is removed. If a federal or state listed species is found, project activities must be delayed until USFWS and/or CDFW, as applicable, are consulted regarding the presence of the listed species. Within 14 days after completion of the pre-construction surveys and monitoring activities, a letter report summarizing the methods and results of the surveys and salvage efforts must be submitted to the Community Development Director, or designee, CDFW, and USFWS, as applicable.

b. Less than Significant Impact. Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in the City or regional plans, policies, regulations by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

According to the Bio Report plant communities present on site and/or within a 200-foot survey buffer include:

- California Sagebrush – Purple Sage Scrub, 16.71 acres
    - Comprised of *Artemisia californica - Salvia leucophylla* Association and *Artemisia californica – Eriogonum fasciculatum* Association
- Chamise Chaparral, 6.66 acres
- Installed Sage Scrub, 2.5 acres
- Ruderal, 13.44 acres

These plant communities are not considered sensitive and do not require mitigation for losses, and no riparian habitat was identified on site that would be impacted by the project. Therefore, impacts would be less than significant to sensitive plant communities.

Mitigation Measures: No mitigation measures are required.

c. Potentially Significant Unless Mitigation Incorporated. Would the project 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?

The JD Report identifies three ephemeral drainages within the survey areas which includes the project site plus a 200-foot buffer that would be under the jurisdiction of the CDFW and the RWQCB, each of which would be subject to potential temporary impacts and/or permanent impacts. No direct impacts to riparian habitat are identified where disturbance is proposed.

Ephemeral drainage No. 1 runs for 1,315 feet through the survey area, with a total area of 14,374.8 square-feet within the area. Less than half of the drainage runs through the project site. Drainage No. 2 runs for 1,015 feet through the survey area with a total area of 10,018.8 square-feet within the area, with approximately half running through the project site. Most of drainage No. 3 is within the 200-foot survey buffer and runs for a total of 350 feet through, with an area of 5,662.8 square-feet.

Potential temporary impacts include construction of three bridges over drainages No.1 and No.2. These bridges are proposed to allow residents to access recreation areas and to create walkable trails on site. The bridges will not result in permanent impacts as the bed and banks of the drainages will not be modified, but construction could potentially result in temporary impacts.

The two permanent impacts would include construction of a storm drain outlet from the detention basin to drainage No. 1 which would require 15 square feet of the stream to be modified (10 linear feet). Overflow water from the detention basin would exit into the stream at this point, though as explained in Section X would not result in increased flows or flow velocity. The second impact would modify 1,175 square-feet of drainage No. 3 (67 linear feet), which is the entire area located within the project site. This area will be modified with a proposed fire access road, rip-rap, and slope control features associated with development of the condominiums.

Although no riparian vegetation is altered the proposed streambed modifications are considered impacts, according to the JD Report, and Streambed Alteration permits from the CDFW must be obtained, and

potentially permits from the Regional Water Quality Control Board (RWQCB). MM **BIO-7** requires all necessary applications submitted and permits acquired before the City Engineer issues a grading permit, and MM **BIO-8** requires preparation of a Habitat Mitigation and Monitoring Program before the City Engineer issues grading permits, which will detail project mitigation for temporary and permanent impacts to jurisdictional waters features. With implementation of mitigation measures BIO-7 and BIO-8, all potential impacts to jurisdictional waters would be reduced to less than significant.

Mitigation Measures:

MM BIO-7: Resource Agency Permitting for Impacts to Jurisdictional Features

Before the City Engineer issues a grading permit, the permittee must obtain required permits, from USACE, RWQCB, and CDFW for any excavation, fill, or other land and vegetation disturbing activities within the streams at the site to ensure compliance with resource agency permitting requirements related to impacts to jurisdictional waters and riparian habitat. The permittee must provide written proof or documentation to the Community Development Director, or designee that the required permits from USACE, RWQCB, and/or CDFW were obtained or written verification from USACE, RWQCB, and CDFW stating a permit is not required.

MM BIO-8: Habitat Mitigation and Monitoring Program

To mitigate for permanent significant impacts to jurisdictional waters and riparian habitat, the project must prepare a Habitat Mitigation and Monitoring Program. The Program must be developed by a qualified restoration ecologist approved by the Community Development Director, or designee, RWQCB, CDFW, and USACE, as applicable. The Habitat Mitigation and Monitoring Program must be submitted and approved before the City Engineer issues a grading permit. The Habitat Mitigation and Monitoring Program must mitigate for permanent impacts to jurisdictional waters and habitats at a 2:1 ratio by the restoration or enhancement of degraded in-kind jurisdictional habitats. The project must also mitigate for temporary significant impacts to jurisdictional waters and habitat at a 1:1 ratio, which constitutes restoration of the habitats that are temporarily disturbed by the project to in-kind habitat. The Program may also mitigate impacts by purchase of mitigation bank credits or by contribution to an in-lieu fee program approved by the Community Development Director, or designee, RWQCB, CDFW, and USACE, as applicable.

To the extent feasible, mitigation must be accomplished on-site. If the mitigation will be performed off-site, to the extent feasible the mitigation sites should be implemented within the Santa Clara River watershed. Off-site mitigation must also be compensated for at a minimum 2:1 replacement ratio, or as recommended by RWQCB, CDFW, and USACE, as applicable. If impacts are mitigated by purchasing credits from a mitigation bank or by contribution to an in-lieu fee program, the Permittee must provide evidence of purchase of mitigation credits or payment of the in-lieu fee before the City Engineer issues a grading permit. To the extent feasible, in-lieu fees must be used for the creation and/or restoration of in-kind jurisdictional habitat within the Santa Clara River watershed.

The Habitat Mitigation and Monitoring Program (at a minimum) must include:

- Description of the project/impact and mitigation sites;
- Specific objectives;
- Success criteria;

- Plant palette;
- Implementation plan;
- Maintenance activities;
- Monitoring plan; and
- Contingency measures

The mitigation project must be implemented over a five-year period. To the extent feasible, the mitigation project must be initiated before development of the project. Success criteria are (at a minimum) evaluated based on appropriate survival rates and percent cover of planted native species, and eradication and control of invasive species within the restoration or enhancement areas. The target species and native plant palette, as well as the specific methods for evaluating whether the project was successful at meeting the above-mentioned success criteria is determined by the qualified restoration ecologist and included in the mitigation program.

Annual reports discussing the implementation, monitoring, and management of the mitigation project must be submitted to the Community Development Director, or designee, RWQCB, CDFW, and USACE, as applicable. The annual monitoring reports and the final monitoring report must be submitted by the month / day the mitigation project was first initiated. Five years after project start, a final report must be submitted to the Community Development Director, or designee, RWQCB, CDFW, and USACE, as applicable, which (at a minimum) discusses the implementation, monitoring and management of the mitigation project over the five-year period and indicate whether the mitigation project was successful based on the success criteria established in the Program. If the success criteria are not met at the end of the five-year period the mitigation project must be extended until the criteria are met, or to the satisfaction of the Community Development Director, or designee, RWQCB, CDFW, and USACE, as applicable.

d. Less than Significant Impact. Would the project 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?

Wildlife corridors are physical connections that allow wildlife to move between areas of suitable habitat within fragmented landscapes. These can exist at both the local and regional level. Wildlife corridors are necessary to access essential resources, such as food and water sources or breeding habitat, and also for dispersal and migration, to ensure the mixing of genes between populations which is critical for the long term survival of species. Wildlife corridors are features that are important on a species level, whether locally or regionally, so the mere use of a site by wildlife would not necessarily indicate the site is part of a wildlife corridor. For instance, a suburban back yard would not be considered a wildlife corridor merely because wildlife occasionally travel through it. A wildlife nursery site would be a location that is important to the breeding cycle of an entire species or specific population of a species, for example a seal rookery or a cave used by a large bat colony. There are no such places or features within the vicinity of the project site important for the continuation of a species.

According to the Bio Report the South Coast Missing Linkages project, which identifies important wildlife corridors, does not identify the survey area as within an important habitat linkage or wildlife migration corridor. The project site is approximately 1.5-miles north of the Santa Susana Mountains, which is an important linkage and migration corridor, but Antelope Valley Highway (SR 14), Sierra Highway, and Golden Valley Road south of the survey area sever the connection between the two habitat areas. In

addition, the survey area is surrounded by developments such as the Golden Valley High School to the west, residential neighborhoods to the north and east, and Golden Valley Road to the south which limit wildlife movement and isolate the survey area from open space in the Santa Susana Mountains to the south. For these reasons, the survey area is not considered an important habitat linkage or migration corridor for wildlife. Therefore, the project would not 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, and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

e. Potentially Significant Unless Mitigation Incorporated. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

The Oak Tree Report states there are two heritage oaks located on the property and eight oaks located offsite. There is no proposed project work that would encroach into the Tree Protected Zones of the oaks but there is a potential for accidental impacts through construction error. Therefore, the Report recommends implementation of MM **BIO-9** which requires temporary fencing to provide visibility to protected oaks and reduce the potential of accidental impacts. The report also recommends the project apply for an oak tree permit but the necessity of such a permit would be determined at the time the permitting for grading as there is no indication at this time there would be encroachment upon any oak that would require a permit. Inclusion of BIO-9 would ensure impacts to protected oak trees remain less than significant.

Mitigation Measures:

MM BIO-9: Oak Tree Safety Fencing

Before the permittee engages in ground disturbance activities near the two protected oak trees on the northern portion of the site, the permittee must establish a perimeter outside of the protected zone of the trees using highly visible safety fencing to avoid any potential disturbance within the zone. The perimeter must be not less than six feet outside of the drip line of the combined canopies of the oaks. Fencing should be erected with as minimal ground disturbance as is necessary to secure the fencing, and no work may be conducted within the perimeter.

f. No Impact. Would the project 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 site is not located within an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan. Accordingly, there would be no impacts.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
V. CULTURAL RESOURCES. Would the project:				
a. Cause a substantial adverse change in significance of a historical resource pursuant in CEQA Section 15064.5?	☐	☐	☒	☐
b. Cause a substantial adverse change in significance of an archaeological resource pursuant to CEQA Section 15064.5?	☐	☒	☐	☐
c. Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☐	☒	☐

Impact Analysis

This analysis is based on the Cultural Resources Technical Report (Cultural Report) prepared by South Environmental, dated December 2021 and attached as **Appendix C**.

a. Less than Significant Impact. Would the project cause a substantial adverse change in significance of a historical resource pursuant in CEQA Guidelines Section 15064.5?

The Cultural Report involved a SCCIC record search of the subject property plus a one mile radius ("study area"). The results of the SCCIC record search found no previously identified cultural resources within the boundaries of the subject property, and two previously identified resources eligible for historic designation. These two resources are the Los Angeles Aqueduct and the LA Aqueduct Olive-Power Plant Transmission Line. Both are at the edge of the one mile radius and would not be impacted by the project. The abandoned house is over 50 years old (built 1966) and was therefore its eligibility for listing as an historic resource at the local, state, or national was evaluated. The Cultural Report found that the owner of the house enjoyed a measure of local prominence for a period within the 60s and 70s, but this local notoriety would not amount to an historic status for the house.

The Cultural Report evaluates the property according to the City's historic resource criteria (Chapter 17.64 of the City Municipal Code) and the criteria for listing in the California Register of Historical Resources (CRHR) and finds the property does not meet either set of criteria. In both cases the owner was not found to meet the local criteria which requires a person to be "significant in the history of the City, State or nation," or the CRHR criteria which requires association with "the lives of persons important in our past." The house was also not found eligible according to criteria associated with value as an architectural specimen.

As the property was found not eligible for listing as an historic resource according to either the local or state criteria, project impacts to a historical resource as defined in CEQA Guidelines Section 15064.5 would be less than significant.

Mitigation Measures: No mitigation measures are required.

b. Potentially Significant Unless Mitigation Incorporated. Would the project cause a substantial adverse change in significance of an archaeological resource pursuant to CEQA Section 15064.5?

The pedestrian survey of the site on November 29, 2021 was negative for archaeological resources on the ground surface. Visibility, however, was quite low at 0-15% owing to dense ground vegetation. The results of the SCCIC record search found no previously identified cultural resources within the boundaries of the subject property, and as explained above in V.a there is no indication of previous historic development on the site. Results of a sacred lands file search by the NAHC were negative for Native American sites within the project area, as well.

While there are no known prehistoric archaeological resources on or near the project site archeological monitoring of initial excavation activity is recommended given that large areas of the site appear to consist of undisturbed native soils, and as ground visibility was low during the pedestrian survey it cannot be reliably determined there is no evidence of resources on site. Therefore, to ensure there are no significant impacts to archeological resources, Mitigation Measure **CUL-1**, identified below, is added to the project to require archeological monitoring during excavation activities. With addition of the mitigation measure impacts would be less than significant.

Mitigation Measures:

MM CUL-1: Archaeological Monitoring

An archaeological monitor that meets the Secretary of Interior qualifications approved by the Community Development Director, or designee, will be hired by the permittee to be on site during grading of the first seven feet of areas of native soil that have not been previously disturbed. This corresponds to the areas labeled Qal (quaternary alluvium) and Tsr (Saugus formation) in the Response to the City of Santa Clarita Review Sheet from LGC Valley Geotechnical Consulting, dated December 14, 2021 and attached as Appendix E-1 to the IS/MND. Areas of 30 percent slope or more are excluded. The archaeological monitor will provide Worker Environmental Awareness Program (WEAP) training to all construction crews engaged in subsurface activity at the project site. Archaeological monitoring will start with full-time monitoring, however, if no resources are encountered during excavation of the first seven feet of soil then monitoring can be reduced as determined appropriate. Each week, the archaeological principal, in consultation with the archaeological monitor and tribal monitor, will recommend whether full time monitoring or spot-check monitoring is the appropriate level of compliance coverage, based on project ground conditions and work schedule at the time. Disputes on coverage will be resolved through communication with the Community Development Director, or designee, who has the final say in compliance task requirements.

1. The archaeological monitor will collect any diagnostic prehistoric or older historical material uncovered through project excavation and can halt construction within 30-feet of a potentially significant cultural resource if necessary. Artifacts collected from a disturbed context or that do not warrant additional assessment can be collected without the need to halt grading. Discovery situations that do not lead to further assessment, survey, evaluation, or data recovery can be described in the monitor's daily monitoring log. However, if prehistoric features or older historical features are encountered, the project "discovery" protocol should be followed (see No. 3). A final Monitoring Report will be produced that discusses all monitoring activities and all artifacts recovered and features identified through monitoring of the project site. Discovery situations that do not lead to further assessment, survey, evaluation, or data recovery can be described in the final Monitoring Report.

2. All artifacts recovered that are determined to have historical information value, with diagnostic or location information that may be important to California history, will be cleaned, analyzed, and described within the Monitoring Report. All materials determined important will be curated at an appropriate depository or returned to the landowner for public display if possible. If important materials are found during monitoring, a Curation Plan may be needed that is reviewed by the City before the publication of the Monitoring Report. The costs of the Monitoring Report, the Curation Plan, and the processing, analysis, and curation of all artifacts will be the responsibility of the permittee.
3. Discovery Protocol: If older historical or prehistoric features, artifact concentrations, or prehistoric material is encountered within an undisturbed context, or in contexts that do not readily allow for expedient site removal, then all work in that area must be halted or diverted away from the discovery to a distance of 30-feet until a qualified senior archaeologist can evaluate the nature and/or significance of the find(s). If a senior archaeologist confirms that the discovery is potentially significant, then the City will be contacted and informed of the discovery immediately.

   Construction will not resume in the locality of the discovery until consultation between the senior archaeologist, the owner's representative, the City, and any other concerned parties (such as Native American Tribal Groups), takes place and reaches a conclusion approved by the City. If a significant archaeological resource is discovered during earth-moving, complete avoidance of the find is preferred, per CEQA Guidelines § 15126.4(b)(3)(A). However, if the discovery cannot be avoided, further survey work, evaluation tasks, or data recovery of the significant resource may be required by the City, according to CEQA Guidelines § 15126.4(b)(3). The City may also require changes to monitoring, based on the discovery. If prehistoric cultural resources are identified, Native American monitoring conducted by a monitor with cultural ties to the area must take place along with archaeological monitoring. All costs for the additional monitoring, discovery assessment, discovery evaluation, or data recovery of will be the responsibility of the permittee. All individual reports will be submitted to the SCCIC and/or the Native American monitoring organization at the conclusion of the Project. Curation agreements may also need to be made with appropriate depositories.

c. Less than Significant Impact. Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

The results of the SCCIC, and NAHC record searches were negative for cultural resources within the vicinity of the project site. However, there is always a possibility that human remains can be unexpectedly encountered during ground disturbing activities. If human remains are encountered unexpectedly during demolition, grading, and/or construction activities, adherence to Health and Safety Code Section 7050.5 would ensure impacts remain less than significant.

This code section states that in the event human remains are uncovered, no further disturbance shall occur until the County Coroner has made a determination as to the origin and disposition of the remains pursuant to California Public Resources Code Section 5097.98. The Coroner must be notified of the find immediately, together with the City and the property owner.

If the human remains are determined to be prehistoric, the Coroner will notify the NAHC, which will determine and notify a Most Likely Descendant (MLD). The MLD shall complete the inspection of the site

within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials and an appropriate re-internment site. City and a qualified archaeologist shall also establish additional appropriate mitigation measures for further site construction.

Adherence to these regulatory requirements will ensure potential impacts related to the disturbance of unknown human remains would be less than significant.

Mitigation Measures: No mitigation measures are required

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

Impact Analysis

The following analysis is based on the CalEEMod output sheets included as an attachment to the AQ/GHG Report provided in Appendix A, and the Fuel Consumption Worksheets provided in **Appendix D.**

a. Less than Significant Impact. Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Construction

During construction, the project would use heavy-duty equipment for demolition, grading, paving, and construction. Construction equipment used on the site would include graders, dozers, scrapers, cranes, forklifts, generators, pavers, and tractors equipped with front end loaders and/or backhoes. Construction also involves trucks for material and supplies delivery, as well as powered hand tools, including concrete saws. The majority of the equipment would likely be diesel-fueled. However, smaller equipment, such as welders and pumps, may be electric-, gasoline-, or natural gas-fueled. For the purposes of this analysis, the majority of construction activities were considered to be diesel-fueled, and activities associated with worker trips were assumed to be gasoline-fueled.

According to the CARB on-road vehicle emissions factor model EMFAC2021(v1.0.2), Emissions Inventory,[8] the average fuel economy for light duty vehicles operating in Los Angeles (SC) Sub-Area for the year 2025 (construction year) is approximately 24.98 miles per gallon for gasoline-fueled vehicles and approximately 8.64 miles per gallon for all categories of diesel-fueled vehicles except hauling vehicles. The average fuel economy for hauling vehicles is 6.12 miles per gallon. Based on these modeled emissions factors; worker, vendor, and hauling trips; and off-road construction equipment generated by CalEEMod, the project consumption of diesel and gasoline during construction was calculated and is shown in **Table V1-1, Total Fuel Consumption During Construction**.

[8] California Air Resources Board, EMFAC, Emissions Inventory, Accessed on March 6, 2025 at: https://arb.ca.gov/emfac/emissions-inventory/31a2aa46de8a1495d39c6a553cc8be9377195ee0

Table VI-1
Total Fuel Consumption During Construction

Energy Source	Quantity Demanded during Construction per Year
Transportation fuels [a]	
Gasoline	
On-road Worker Trips	37,975 gallons
Gasoline Total	37,975 gallons
Diesel	
On-Road Haul Trucks [b]	900 gallons
On-road Vendor Trucks [b]	13,710 gallons
Off-road Construction Equipment [c]	62,076 gallons
Diesel Total	76,686 gallons

Source: Air Quality and Greenhouse Gas Emissions Technical Report, Appendix A, and Fuel Consumption Worksheets, Appendix D.

[a] On-road mobile source fuel use based on VMT from CalEEMod and fleet-average fuel consumption in gallons per mile from EMFAC2021 web-based data for 2025 (construction year) for Los Angeles (SC) Sub-Area.
[b] Vendor and haul trucks are assumed to be diesel.
[c] All emissions from off-road construction equipment were assumed to be diesel. Off-road mobile source fuel usage based on a fuel usage rate of 0.05 gallons of diesel per horsepower (HP)-hour, based on the South Coast Air Quality Management District (SCAQMD) CEQA Air Quality Handbook, Table A9-3E.

As shown in Table VI-1, based on the CARB on-road vehicle emissions factor model EMFAC2021(v.1.0.2) and the CalEEMod output, project construction would consume a total of 76,686 gallons of diesel fuel and 37,975 gallons of gasoline. In 2023, 13.6 billion gallons of gasoline and 3.0 billion gallons of diesel, including off-road diesel, was sold in California.[9] Construction-related fuel use for the project would result in less than 0.01 percent of the fuel consumption in California. In addition, Title 13, Sections 2449 and 2485 of the CCR require drivers of off-road diesel-fueled vehicles and diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds not to idle the vehicle's primary diesel engine longer than five minutes at any location. Compliance with this regulation would prevent unnecessary consumption of energy from use of diesel fuel during construction.

Adherence to CCR Section 2485 and CARB anti-idling regulations for off-road diesel-fueled fleets would reduce the potential for wasteful or inefficient use of energy by construction equipment. Due to the temporary duration of construction and the necessity of fuel consumption inherent in construction, fuel consumption would not be excessive or substantial with respect to fuel supplies. The energy demands associated with fuel consumption during construction is typical for developments of similar size and would not necessitate the construction of additional energy facilities or distribution infrastructure. Therefore, project construction would not result in wasteful, inefficient, or unnecessary consumption of energy resources, and construction impacts would be less than significant.

Operations

During operations, the project would consume energy for vehicle trips, water conveyance, solid waste disposal systems, lighting, landscape maintenance equipment, electronic equipment and devices, and heating, ventilation and air conditioning (HVAC) systems. The project's estimated energy use during operations is summarized in **Table VI-2, Project Operations Energy Use**.

[9] California Department of Tax and Fee Administration, Fuel Taxes Statistics & Reports, Motor Vehicle Fuel 10 Year Report and Taxable Diesel Gallons 10 Year Report, Excels accessed on March 6, 2025 at: https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm

Table VI-2
Project Operations Energy Use

Energy Source	Quantity Demanded during Operations per Year
Electricity (SCE)	1,634,377 kWh
Natural Gas (SoCalGas)	4,812,225 kBtu / 48,122 therms
Transportation Fuels[a]	
Gasoline	162,554 gallons
Diesel	29,733 gallons

Source: Air Quality and Greenhouse Gas Emissions Technical Report, Appendix A, and Fuel Consumption Worksheets, Appendix D.

Notes:
kWh = kilowatt-hours
kBTU = kilo-British Thermal Units
SCE = Southern California Edison
SoCalGas = Southern California Gas

[a] Project gasoline and diesel use during operations are calculated based on the vehicle miles traveled (VMT) estimated by CalEEMod Annual Output. It is assumed that light-duty vehicles use gasoline, while heavy-duty (Gross Vehicle Weight Rating > 8,500 pounds) use diesel. CalEEMod estimates that light-duty vehicles account for approximately 94 percent of project VMT. Calculations shown in Fuel Consumption Worksheets, provided as Appendix D. Project gasoline and diesel use are calculated based on vehicle emissions factor model for the calendar year 2027 (operational year) from EMFAC2021(v1.0.2) (25.99 miles per gallon for gasoline-fueled vehicles and 8.87 miles per gallon for diesel-fueled vehicles).

As estimated by CalEEMod, and shown in Table VI-2, the project's total electricity demand would be approximately 1,634,377 kilowatt-hours per year (kWh/year) and the project's total natural gas demand would be approximately 48,122 therms. Southern California Edison (SCE) and Sothern California Gas (SoCalGas) provide electricity and natural gas to the City. In 2022, SCE provided 85,870 millions kWh of electricity[10] and the SoCalGas provided 5,026 millions of therms of natural gas[11] throughout their service areas which includes the project site. Therefore, the project would consume approximately 0.001 percent of SCE's recent deliveries and 0.0005 percent SoCalGas's recent deliveries. New buildings would be required to comply with California Energy Code and California Green Building Standards Code (CALGreen Code) which include solar power requirements, so actual electricity use would be less than estimated. As the new buildings will be substantially more efficient than building built according to previous energy codes, and the amount of estimated energy consumption is not excessive in total amount nor as a portion of total deliveries, operational energy impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. Would the project conflict with or obstruct a State or local plan for renewable energy or energy efficiency?

The project would be required to comply with the applicable portions of the California Energy Code and the CALGreen Code which establish planning and design standards for sustainable development, energy efficiency, water conservation, and material conservation. The project would be built to the code standards in effect at the time of permit issuance, which generally result in more efficiency with each successive code. As the project would comply with efficiency standards as a matter of regulatory compliance, the project

[10] California Energy Commissions, Electricity Consumption by Entity, Accessed on March 6, 2025 at: http://www.ecdms.energy.ca.gov/elecbyutil.aspx
[11] California Energy Commissions, Gas Consumption by Entity, March 6, 2025 at: http://www.ecdms.energy.ca.gov/gasbyutil.aspx

would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency, and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VII. GEOLOGY AND SOILS. Would the project:				
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii. Strong seismic ground shaking?	☐	☐	☒	☐
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv. Landslides?	☐	☐	☒	☐
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 geological features?	☐	☒	☐	☐

Impact Analysis

This analysis is based largely on the Geotechnical Report dated November 19, 2020, prepared by LGC Valley, Inc., attached as **Appendix E-1,** and the follow up Response to the City of Santa Clarita Review Sheet (Response) dated December 14, 2021, attached as **Appendix E-2**.

a. i. Less than Significant Impact. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving 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?

According to the Geotechnical Report the project site is not located within an Alquist-Priolo Earthquake Fault Zones and there are no known active or potentially active faults onsite. Therefore, ground rupture due to faulting is considered unlikely. The nearest fault is the San Gabriel Fault located within 1 mile south of the site. The proximity of this fault may result in ground shaking at the premises but would not result in rupture at the project site. Therefore, impacts related to potential fault rupture are less than significant.

Mitigation Measures: No mitigation measures are required.

a. ii. Less than Significant Impact. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving strong seismic ground shaking?

The Geotechnical Report explains that the site will likely be subject to strong ground shaking in the future, which is a very common hazard in Southern California. The Report classifies the site as Seismic Design Category Class E, based on the 2019 California Building Code (CBC), and thus the project will be subject to the applicable structural regulations in the CBC that address that classification. Seismic Design Categories range from A to F, and the requirements for foundation and structural design will change according to the class in order to compensate for less or more anticipated ground-shaking. The Report explains that soil excavation of between two to twenty feet, depending on the context, will be necessary throughout the site to remove all undocumented fills, alluvium, landslide debris, or any other unsuitable soils. The Report indicated reuse and recompaction of removed soil would be possible and would provide a proper substrate for building foundations if the soil meets certain requirements. This removal and recompaction will allow the use of standard foundations and building techniques to ensure proposed buildings are seismically stable according to CBC requirements. Because it has been determined that conformance with current building codes and engineering practices- including the specific requirements for Class E properties that address ground-shaking hazards- will ensure structural stability, potential impacts from ground shaking are less than significant.

Mitigation Measure: No mitigation measures are required.

a. iii. Less than Significant Impact. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving seismic-related ground failure, including liquefaction?

Liquefaction is a process by which sediments below the water table temporarily lose strength and behave as a viscous liquid rather than a solid. The types of sediments most susceptible are clay-free deposits of sand and silts, although liquefaction may occasionally occur in gravel deposits. Liquefaction can occur when seismic waves, primarily shear waves, pass through saturated granular layers and distort the granular structure, causing loosely packed groups of particles to collapse. These collapses increase the pore-water pressure between grains if drainage cannot occur. If the pore-water pressure rises to a level approaching the weight of the overlying soil, the granular layer temporarily behaves as a viscous liquid rather than a solid. The site is partially within a mapped liquefaction hazard zone according to the City's Seismic Hazard Zones map. As the Geotechnical Report explains, bedrock beneath the site is shallow, and there is a lack of shallow groundwater onsite. With removal and replacement of alluvium deposits with compacted fill, the liquefaction hazard potential will be very low to nil. The Report recommendations are CBC standards reiterated by the Report. Therefore, with regulatory compliance to CBC requirements, substantial adverse effects related to liquefaction will be less than significant.

Mitigation Measures: No mitigation measures are required.

a. iv. Less than Significant Impact. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving landslides?

Landslides are a mass wasting phenomenon in mountainous and hillside areas that include a wide range of movements and occur when the stability of the slopes change to an unstable condition resulting from a number of factors including physical and/or chemical weathering of earth materials, unfavorable geologic structures relative to the slope geometry, erosion at the toe of a slope, and precipitation. The Geotechnical Report and Response indicate that there is landslide material north of the existing single-family house and the northeast corner of the site where no structures will be placed. This material will be removed and replaced with compacted fill, which will result in stable soil for the development. Remediation of these areas, and all other areas with alluvium or other unsuitable soils, will ensure stable slopes wherever engineered for the project. Two small areas in the southern portion of the project site are within an earthquake-induced landslide hazard zone according to the City's Seismic Hazard Zones map. However, these zones reflect an historical condition as grading and construction of the Golden Valley Road removed these hazards in 2000, as mentioned in the Report. Because of this, and the removal and remediation of any old landslide material from the site during grading, potential impacts related to landslides would be less than significant.

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. Would the project result in substantial soil erosion or the loss of topsoil?

Development of the project has the potential to result in the erosion of exposed soils during site preparation and construction activities as substantial grading and earth movement will occur onsite. However, the project would be required to comply with SCAQMD Rule 403, Fugitive Dust, to minimize wind and water erosion at the site, and the City is a party to the Los Angeles County Municipal Separate Storm Sewer System (MS4) permit requirements, issued by the Los Angeles Regional Water Quality Control Board (LARWQCB) in accordance with the County's National Pollutant Discharge Elimination System (NPDES) permit. These requirements regulate stormwater and non-stormwater discharges, and constitute the water quality standards and discharge requirements the project is subject to during construction and after.

Compliance with MS4 permit requirements includes preparation of a Stormwater Pollution Prevention Plan (SWPPP) demonstrating implementation of Best Management Practices (BMPs) sufficient to minimize erosion and discharge of soil during construction activities. The plan must demonstrate which BMPs are to be employed to retain sediments from areas disturbed by construction; retain construction-related materials, wastes, spills, or residues; contain runoff from equipment and vehicle washing; and control any potential erosion. The project will be required to submit a SWPPP, to demonstrate code compliance to the satisfaction of the City prior to final plan approval, and inspection of the BMPs will be performed during project construction. Compliance with these regulatory measures would ensure potential impacts during construction activities would be less than significant.

Post-construction the project will be required to comply with Los Angeles County Low Impact Development (LID) Standards which require the site to be designed to retain or detain an 85th percentile rainfall event. The result of this will be for most storm events stormwater runoff generated by buildings or roads will be contained within the stormwater system and there will be no opportunity for erosion from those sources. Other areas subject to grading or earthmoving will be landscaped, and slopes will be stabilized with landscaping and temporary or permanent erosion control measures. Therefore, the potential for the project to result in substantial soil erosion or the loss of topsoil during operations is less than significant.

Mitigation Measures: No mitigation measures are required.

c. Less than Significant Impact. Would the project 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?

Lateral spreading is a term referring to landslides that form on gentle slopes and have a fluid-like flow movement. As discussed above, with removal of all undocumented fills, alluvium, landslide debris, or any other unsuitable soils, and replacement with new compacted fill or recompacted onsite soils, the site will be suitable for development, this includes the potential risk related to lateral spreads which should be less than significant with adherence to building standards. Risks related to liquefaction have already been discussed and are less than significant.

Subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas. Soils that are particularly subject to subsidence include those with high silt or clay content. No extraction of groundwater, gas, oil, or geothermal energy is occurring or planned at the site. The Geotechnical Report determined that onsite soils below recommended grading depths have a low potential for static settlement, and that by following the recommendations of the report the site is not anticipated to be susceptible to seismic-induced settlement. Therefore, potential impacts due to subsidence would be less than significant.

Therefore, by meeting the recommendations of the Report and requirements of the CBC, as will be permitted by the City via the grading permit process, project impacts related to site stability would be less than significant.

Mitigation Measures: No mitigation measures are required.

d. Less than Significant Impact. Would the project 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?

Expansive soils contain high amounts of clay particles that swell when wet and shrink when dry. Foundations constructed on these soils are subject to uplifting forces caused by the swelling. The Geotechnical Report states that onsite soils have a high expansion potential. However, with recommended remediation of soils it has been determined the site is suitable for development utilizing mat foundations or a post-tensioned slab-on-grade foundation system. The precise design of the hotel foundation has not yet been determined but the Report indicates there are no substantial impediments to its construction. The Report also specifies if any retaining walls are constructed that they are backfilled with engineered soils to compensate for the onsite expansive soils. With implementation of the recommendations of the Geotechnical Report to be confirmed by the City during plan check, the project would have a less than significant impact regarding expansive soils.

Mitigation Measures: No mitigation measures are required.

e. No Impact. Would the project 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?

The project site will be served by the municipal wastewater collection, conveyance, and treatment system. No septic tanks or alternative disposal systems are necessary, nor are they proposed. Therefore, no impact would occur.

Mitigation Measures: No mitigation measures are required.

f. Potentially Significant Unless Mitigation Incorporated. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological features?

Paleontological resources are fossilized remains of organisms preserved in a geologic context. Fossils are not found in all geologic units; usually they will only be found in sedimentary rocks and are not found in igneous or metamorphic rocks. Because of this the geologic units present on a project site will determine if there is the potential to encounter paleontological resources or not. In Envicom Corporation's peer-review of the Cultural Report (Appendix C) it was noted that the site contains geologic units with the potential to contain fossils.[12] These are shown on the project Geotechnical Report as quaternary alluvium and Saugus formation, denoted as Qal and Tsr on the provided geotechnical map. Project grading will occur in areas containing these geologic units, therefore, the project has the potential to destroy unique paleontological resources unless mitigation is applied. The peer review recommended paleontological monitoring during grading and excavation of these units.

To ensure impacts to paleontological resources remain less than significant **MM PAL-1** is applied which requires paleontological monitoring during grading of areas with Qal and Tsr geologic units, or areas where these units may be encountered beneath existing fill. Implementation of MM PAL-1 would ensure that the project's potential paleontological resources impacts would be less than significant.

Mitigation Measures:

MM PAL-1: Paleontological Monitoring

Before the City Engineer issues a grading permit, the applicant must retain a qualified paleontologist that meets the standards of the Society for Vertebrate Paleontology to provide monitoring services. The paleontological monitor will examine the project geotechnical report, the final project plan, and the site schedule to determine what subsurface activities may require paleontological monitoring of project site grading or excavation. Only areas listed in the geotechnical report as containing Qal (Quaternary Alluvium) and Tsr (Saugus Formation) geological units require investigation. However, monitoring may be required elsewhere if intact older alluvial soils or Saugus bedrock will be encountered under areas of fill.

The paleontological monitor will collect any fossil material that is uncovered through grading or excavating that is found within a disturbed or intact context if the fossil can easily be removed from the project site, and the paleontological monitor can halt construction within 30-feet of a potentially significant fossil resource that cannot readily be removed. Fossils collected from a disturbed context or that do not warrant additional assessment can be collected without the need to halt grading. If fossils are not present within the older alluvial or bedrock material, and the project conditions warrant reduced monitoring, then a daily or weekly spot-check system of monitoring can be arranged at the discretion of the paleontological monitor. However, if fossils are encountered that cannot be removed during grading and that the paleontological monitor believes will need further assessment, then project "discovery" protocol will be followed, as described in project mitigation measure CUL-1. Discovery situations that do not lead to further assessment, survey, evaluation, or data recovery can be described in the monitor's daily logs. The City must be informed of any monitoring scheduling changes by the monitoring team.

[12] Envicom Corporation, CEQA Services Golden Valley Project (Envicom Project #2022-105-01): Cultural Resource Technical Report Peer Review, dated September 12, 2022.

All fossils recovered that may be of importance to California paleontology will be cleaned, analyzed, and described within a final project Monitoring Report. All collected materials will be offered to the Natural History Museum of Los Angeles County (NHMLAC) to be curated at the end of the project. If the NHMLAC decides that the recovered fossils are worthy of curation, then a Curation Plan will be prepared by the paleontological monitor that is reviewed by the Lead Agency prior to the publication of the final Monitoring Report and prior to curation of the fossil materials. The costs of the paleontological Monitoring Report, the Curation Plan, and the processing, analysis, and curation of all fossils will be the responsibility of the permittee.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VIII. GREENHOUSE GAS EMISSIONS. Would the project:				
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?	☐	☐	☒	☐

Impact Analysis

Greenhouse gases (GHGs) emitted by human activity are implicated in global climate change. These GHGs contribute to an increase in the temperature of the earth's atmosphere by preventing long wavelength heat radiation in some parts of the infrared spectrum from leaving the atmosphere. For purposes of planning and regulation, Section 15364.5 of the California Code of Regulations (CCR) defines GHGs as including CO2, CO, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Carbon dioxide is the primary GHG emitted in California, accounting for 84 percent of total GHG emissions in 2015. Because the warming potential of the identified GHGs differ, GHG emissions are typically expressed in terms of CO2 equivalents (CO2e), providing a common expression for the combined volume and warming potential of the GHGs generated by a particular emitter. The total GHG emissions from individual sources are generally reported in metric tons (MT) and are expressed as MT of CO2 (MTCO2e).

Fossil fuel combustion in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of GHG emissions, accounting for approximately half of GHG emissions globally. The transportation sector, primarily on-road travel, is the single largest source of CO2 emissions in California. Additionally, about 50 percent of the industrial source emissions of CO2 are from the refinery and oil and gas sectors. When the industrial source emissions from the oil and gas sectors are attributed to the transportation sector, the emissions associated with transportation amount to approximately half of statewide GHG emissions.

A number of regulatory steps have been taken by the state in the past two decades. Most relevant to CEQA impact analysis are:

California Assembly Bill 32 (AB32), the California Global Warming Solutions Act of 2006, provided authorization to the California Air Resources Board (CARB) to develop regulations and market mechanisms to reach the GHG emissions goals established in 2005. Subsequently the first Climate Change Scoping Plan produced by CARB was adopted in December 2008. The 2022 Scoping Plan was finalized in December 2022 and is focused on the goal of obtaining carbon neutrality by 2045 or earlier. GHG emission targets set in the Scoping Plan are implemented in part through regional sustainable communities strategies developed by the metropolitan planning organizations.

Senate Bill 375, the Sustainable Communities and Climate Protection Act, passed in 2008, requires CARB to develop and set regional targets for GHG emission reductions from passenger vehicles. Targets are set regionally for each of the 18 metropolitan planning organization (MPO) regions. Each MPO is required to develop a Sustainable Communities Strategy (SCS) that will reduce GHG emissions to achieve the regional

targets. The SCS is a component to the Regional Transportation Plan (RTP), which regulates transportation financing in each region. The RTP and SCS must complement each other and accommodate the Regional Housing Needs Allocation (RHNA). The bill modified the RHNA requirements to align with production of the RTP/SCS. The purpose of this coordination is for each MPO to arrive at a mix of transportation and land use strategies that will direct the region's growth in such a way that emissions from car trips meet the GHG reduction targets.

SCAG is the MPO for the County of Los Angeles (along with the Counties of Imperial, San Bernardino, Riverside, Orange, and Ventura). The 2024-2050 RTP/SCS (aka 2024 Connect SoCal) is the current regional plan for integrating the transportation network and related strategies with an overall land use pattern to accommodate projected growth, housing needs, and transportation demands. On August 6, 2025 CARB announced they had determined the 2024 SCS, the component which fulfills SB 375's mandate, would, if implemented, achieve the 2035 GHG emission reduction target of 19 percent below 2005 per capita emissions.[13] This target, which was set by CARB in 2018, will remain in place until 2026, and therefore is shared by both the 2020-2045 and 2024-2050 RTP/SCS documents. The City produced a Climate Action Plan in 2012, however, it was only certified through to the year 2020.

a. Less than Significant Impact. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Because individual projects do not generate sufficient GHG emissions that would substantially affect climate change; the issue of climate change typically involves an analysis of whether a project's contribution toward an impact is cumulatively considerable. As defined by the CEQA Guidelines Section 15355, "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects.

The CEQA Guidelines Section 15064.4(a) states that a lead agency shall have discretion to determine, in the context of a particular project, whether to:

1) Quantify greenhouse gas emissions resulting from a project; and/or
2) Rely on a qualitative analysis or performance based standards.

Additionally, the Section 15064.4(b) states that "In determining the significance of a project's greenhouse gas emissions, the lead agency should focus its analysis on the reasonably foreseeable incremental contribution of the project's emissions to the effects of climate change," and that the following factors should be considered:

1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting.
2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions (see, e.g., section 15183.5(b)).

CEQA Guidelines Section 15064.4 does not establish a threshold of significance for GHG emissions. Lead agencies have the discretion to establish significance thresholds for their respective jurisdictions, and in establishing those thresholds, a lead agency may appropriately look to thresholds developed by other public

[13] CARB, Evaluation of SCAG 2024 SCS, Executed August 6, 2025.

agencies or suggested by other experts (see CEQA Guidelines Section 15064.7(c)). Pursuant to CEQA Guidelines Section 15064.7(b), "Thresholds of significance to be adopted for general use as part of the lead agency's environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence." Neither the City nor the SCAQMD have adopted a numeric threshold for the analysis of GHG impacts. In the absence of any applicable adopted numeric threshold, the significance of the Project's GHG emissions is evaluated consistent with CEQA Guidelines Section 15064.4(b)(3) by considering the "extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions (see, e.g., section 15183.5(b))." Section 15183.5(b) lists what elements a plan must contain in order to be used for the purposes of cumulative impacts analysis. Currently there is no state, regional, or local plan applicable to the project that meets all of the criteria. However, of the various policy and regulatory documents available, SCAG's 2024-2050 RTP/SCS most closely fulfills the necessary criteria.

Project GHG Emissions

Although there is no bright-line numeric threshold for determining the potential significance of GHG emissions that would be applicable to the proposed project, pursuant to CEQA Guidelines Section 15064.4(a), which states that "A lead agency shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of GHG emissions resulting from a project," the project's estimated annual GHG emissions were calculated using the same CalEEMod model used to determine the project's criteria air pollutant emissions and are found in the AQ/GHG Report attached as Appendix A. Consistent with SCAQMD recommendations, construction emissions were amortized over a thirty-year period and added to the annual operational emissions to determine the proposed project's annual GHG emissions.

Construction

Construction GHG emissions would come from off-road equipment usage, hauling vehicles, delivery, and worker trips to and from the site. The total GHG construction emissions during 2025 and 2026 calculated by CalEEMod would be 1,097 metric tons of carbon dioxide equivalent (MT CO2e). As GHG emissions impact from construction activities would occur over a relatively short time span, it would contribute a relatively small portion of the lifetime GHG emission impact of the project. The total construction GHG emissions were divided by 30 years to determine an annual construction emission rate to be amortized over the project's first 30 years of operations, consistent with SCAQMD recommendations. Amortized over a 30-year period, the project is anticipated to emit approximately 36.6 metric tons of carbon dioxide per year (MT CO2e/year).

Operations

The project would incorporate several design features to reduce GHG emissions and be consistent with local and regional regulations and polices that would reduce GHG emissions during operation of the project. The project's primary GHG reduction measures and design features include, but are not limited to, the following:

- Low-Flow Water Fixtures: The project will include low-flow and/or high efficiency water fixtures such as low-flow toilets, urinals, faucets, and high-efficiency dishwashers;
- Vegetation & Landscape Irrigation Systems: The project will include drought-tolerant landscaping and will implement efficient landscape irrigation techniques, such as "smart" irrigation technology, to reduce water use and its associated GHG emissions. "Smart" irrigation systems rely on weather, climate and soil moisture information to adjust watering frequency, hence maintaining the vegetation is adequately moist while conserving water;

- Energy Reduction: The project will include energy efficient appliances, high-efficiency lighting, and solar panels. The project will be built to meet and exceed the State's Green Building Standards (CALGreen Code); and,
- Alternative Fuel Vehicles: The project would provide on-site electric vehicle (EV) parking spaces, supporting and promoting the use of electric vehicles.

The operations of the Project would generate GHG emissions from the usage of on-road motor vehicles, electricity, natural gas, water, and generation of solid waste and wastewater. The total operational emissions plus the annualized construction emissions from the project as estimated by CalEEMod are shown in **Table VIII-1**, **Operational Greenhouse Gas Emissions**.

Table VIII-1
Operational Greenhouse Gas Emissions

Source	$MTCO_2e$
Amortized Construction	36.6
Area Sources	4.84
Energy Utilization	652
Mobile Source	1,532
Solid Waste Generation	65.7
Water Consumption	34.2
Water Consumption	12.8
Total	**2,338.14**
Source: AQ/GHG Report, Appendix A	

As shown in Table VIII-1, with the addition of amortized construction emissions, the project's total annual GHG emissions were estimated to be approximately 2,338.14 $MTCO_2e$. Because there are no established thresholds to compare the project to, this quantified illustration of the project's scope of GHG emissions is provided for informational purposes and the project's potential impacts will primarily be evaluated qualitatively in Section VIII.b below based on CEQA Guidelines Section 15064.4(b)(3).

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Consistency with the 2024-2050 RTP/SCS

As explained previously, SCAG is the MPO for Los Angeles County, and the SCAG RTP/SCS is the document that outlines the land use and transportation strategies necessary for the SCAG region to meet GHG emission reduction targets set by CARB in the 2022 Scoping Plan. Consistency with the RTP/SCS, in particular the SCS component, would therefore demonstrate consistency with the Scoping Plan and thus a lack of significant impacts.

The land use strategies of the 2024-2050 RTP/SCS consists essentially of identifying Priority Development Areas as places where an increase in population density, job density, or public transportation, or a combination thereof, would serve to reduce VMT and thus reduce GHG emissions. Areas not within a PDA are assumed by the plan to be developed according to their existing land use designation. Therefore, for a development project outside of a PDA conformance amounts to simply aligning with the land use designation in place at the time the SCS was drafted.

The project is not within a PDA[14] and is therefore assumed within the SCS to be developed (in terms of intensity of use) according to its current land use designation. Therefore, because the proposed intensity of use is not greater than what is assumed by the 2024-2050 RTP/SCS, the project does not conflict with it, nor by extension with the CARB Scoping Plan, and potential GHG emissions-related impacts that might arise from conflict with such plans, policies, or regulations would be less than significant.

The AQ/GHG Report also provides a broader project consistency discussion regarding the enumerated actions and strategies of the 2020-2045 RTP/SCS, which can be found in Table 12 of Appendix A.

Consistency with the 2022 Scoping Plan

According to the AQ/GHG Report the project would be consistent with Appendix D (Local Actions) of the 2022 Scoping Plan which encourages local governments to adopt a CEQA-qualified CAP addressing three priority areas, transportation electrification, VMT reduction, and building decarbonization. As the project VMT Analysis (Appendix I) concludes project VMT impacts would be less than significant, the project will provide on-site EV parking spaces, and the project will be built to meet CalGreen Code standards, the project is generally consistent with the three priority areas identified in the Scoping Plan.

Mitigation Measures: No mitigation measures are required.

[14] SCAG, 2024–2050 Regional Transportation Plan/Sustainable Communities Strategy, Map 3.4; and SCAG Regional Data Platform, Growth Prioritization Scale at TAZ-level -SCAG Region Feature Layer, Updated November 12, 2024.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IX. HAZARDS AND HAZARDOUS MATERIALS.				
Would the project:				
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
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 that 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?	☐	☐	☒	☐

Impact Analysis

a. Less than Significant Impact. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

The proposed uses are not of the type that would routinely transport, use, or dispose of hazardous materials. During operations standard cleansers and the like used for housekeeping and maintenance purposes will be used by staff, tenants, and residents. Some of these products in very large quantities may be considered hazardous on a technical basis (for example, chlorine bleach), but their use and storage will be commensurate with the need, and dangerous quantities will not be necessary for operation of any of the project components. Therefore, operation of the project components would not create a significant hazard

to the public or the environment through the routine transport, use, or disposal of hazardous materials, and impacts would be less than significant.

During construction, equipment will use diesel fuel and potentially machine lubricants or oil, however, use and care of all diesel worksite equipment is regulated by provisions within Title 8 of the California Code of Regulations, known as the Cal/OSHA Title 8 regulations. Compliance with these regulations will ensure proper use of worksite fuels and chemicals, which will only be in use during the construction period. If a worksite accident should occur, involving the release of hazardous materials, the project would be required to report it to the Los Angeles County Fire Department Health Hazardous Materials division, which would determine the proper response. In addition, prior to construction the project must prepare a stormwater pollution prevention plan that demonstrates which BMPs or series of BMPs will be used during construction to prevent construction-related discharges from leaving the project site. These would ensure if there was any accidental spill of hazardous materials they would be contained on site for proper collection and removal. As such, construction of the project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. Would the project 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?

As explained above operation of the project would not involve the use of large quantities of hazardous materials that could potentially be released into the environment. During construction hazardous materials such as diesel fuel would be present but adherence to regulatory handling requirements would ensure potential impacts from upset or accident conditions would be less than significant. The only other manner significant amounts of hazardous materials could be released into the environment from project upset or accident conditions is if there were hazardous materials on site encountered during construction activities.

California Government Code Section 65962.5 requires various state agencies to compile lists of hazardous waste disposal facilities, unauthorized release from underground storage tanks, contaminated drinking water wells, and solid waste facilities, and submit such information to the Secretary for Environmental Protection on at least an annual basis, and the project site has been compared to these lists. The search of the California Environmental Protection Agency's Cortese List Data Resources databases show that the project site is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.[15]

The search involved the following records:

- List of Hazardous Waste and Substances sites from Department of Toxic Substances Control (DTSC) EnviroStor database.
- List of Leaking Underground Storage Tank Sites from the State Water Board's GeoTracker database.
- List of solid waste disposal sites identified by Water Board with waste constituents above hazardous waste levels outside the waste management unit.
- List of "active" CDO and CAO from Water Board.
- List of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code, identified by DTSC.

[15] California Environmental Protection Agency, Cortese List Data Resources, available at: https://calepa.ca.gov/sitecleanup/corteselist/.

The project site is not included on any list compiled pursuant to Government Code Section 65962.5, and is not within 1,000 feet of any such site. Because the site was only previously developed with a single family house it would be unlikely for there to be any significant unknown hazards associated with that previous development. The house was constructed in 1966 according to assessor records, so there is the possibility that hazardous materials could have been used in its construction, such as asbestos. This potential is addressed by SCAQMD Rule 1403 (Asbestos Emissions from Demolition/Renovation Activities), which requires an asbestos survey prior to demolition. The investigation must be performed by a Certified Asbestos Consultant (CAC). If the CAC finds that asbestos-containing material is present a cleanup plan must be prepared by the CAC and a registered asbestos abatement contractor must be hired to clean up the material. These procedures must be performed to the satisfaction of the Building Official and submitted to the AQMD electronically using the Rule 1403 Notification Web Application.[16]

Lead paint could also be present and this potential is addressed by Cal/OSHA workplace safety standards. The Lead in Construction Standard (SB 460) requires employers to protect workers at job sites from lead exposure, which avoids environmental exposure, and because of the age of the building it would be presumed to contain lead-based paint. Therefore, provisions in Title 17 of the California Code of Regulations, Division 1, Chapter 8, Accreditation, Certification, and Work Practices for Lead-Based Paint and Lead Hazards apply, including Section 36050, Lead-Safe Work Practices, which requires containment of lead during activities. These requirements which protect workers from exposure also ensures there is no release of lead paint into the environment.

The project site also has an abandoned oil well located within its boundaries (API: 0403713340, Stabler Well #4), which appears to be owned by the Mobil Oil Corporation. The California Department of Conservation's Geological Energy Management Division (CalGEM) mapping application states the well is a "Dry Hole".[17] Historic records from CalGEM indicate the well was drilled between 1919 and 1920 as an exploratory wildcat well to a depth of 3,514 feet.[18] Signs of oil and gas were encountered but no "commercial showing of oil or gas," meaning there were no signs of hydrocarbons in enough quantity to allow for extraction. Specifically, showings of oil and gas were encountered in places between 735 and 3,497 feet but were so slight as to be "negligible."[19] According to records the well was plugged by removing the casing and placing cement plugs at six different intervals within the hole.

The closure of an oil well is referred to as an abandonment, and the procedures and requirements for proper abandonment of an oil well are detailed in the CCR, Title 14, Section 1723, Plugging and Abandonment - General Requirements.[20] Modern abandonment requirements differ from the requirements in place at the time the Stabler Well was plugged, but that does not necessarily mean the historic plugging and abandonment is inadequate. Section 117.5 of the Santa Clarita Municipal Code requires development to investigate the status of an abandoned oil well and prepare a report to be reviewed by the Building Official prior to development within 200 feet of an abandoned oil well. This investigation may determine that the well requires re-abandonment according to current standards, or it may require merely adjusting the height of the existing well plug as state law requires the top of an abandoned well plug to be located between five and ten feet below ground, and the existing grade of the site will be modified by the project. In either case, well abandonment is a heavily regulated, routine procedure that is undertaken through permitting procedures established at the local and state level, overseen by CalGEM regional offices. Abandonment of a well is a project subject to CEQA review but is usually categorically exempt except when activities related

[16] SCAQMD Advisory Notice, Important Notice to all Facility Owners and Contractors Performing Renovations or Demolitions Re: Asbestos, March 27, 2019
[17] California Department of Conservation, Well Finder CalGEM GIS; accessed on December 20, 2025 at: https://maps.conservation.ca.gov/doggr/wellfinder/
[18] CalGEM Well Record: 03713340_DATA_11-14-07. Available from: https://filerequest.conservation.ca.gov/WellRecord
[19] Ibid. Page 13 of the PDF, Report on Proposed Operations, dated September 7, 1920.
[20] Cal. Code Regs, Title 14, Division 2, Chapter 4, Subchapter 1, Article 3, Section 1723- 1723.9.

with the work may result in impacts, such as grading within native vegetation or culturally sensitive areas in order to reach the well.[21] For example, the City recently found the abandonment of six idle wells located within the Needham Ranch Open Space to be categorically exempt under the Class 1 and Class 4 exemptions.[22]

This IS/MND analyzes all of the grading that will take place on site, including in the location of the well, and mitigates impacts where necessary. Therefore, should a permit for well abandonment be necessary all impacts related to grading will already have been analyzed in this document which should allow, subject to review at the time of permitting, for the permit to be found categorically exempt or to "tier" off the analysis of this IS/MND. However, because a permit for well closure may be required for the project the process of abandonment is discussed fully here.

As detailed in CCR Title 14, section 1723, a well is plugged by placing cement in the wellbore or casing at certain intervals to isolate the hydrocarbon-bearing rock from water sources. Plugging and abandonment of a well requires permitting, review, and inspection by CalGEM to ensure standards are met. The specifics necessary for proper abandonment of the well, if required, would be detailed during the standard CalGEM permitting process; there is no need to produce those future plans for the purposes of this CEQA review. CalGEM is the regulatory authority for technical compliance of the work, and permits will not be granted, and abandonment not accepted, without full compliance of the law. The general process of well plug and abandonment consists of:[23]

1. The well site is inspected and prepared for plugging. Inspections may include, but are not limited to, assessments to ensure safe site conditions, verification of soil stability, testing for methane emissions, and identification and repair of well integrity issues. If the wells cannot be reached by existing roads, access roads must be graded to provide access for equipment.
2. Obstructions such as old tubes or other debris are removed from the well bore, and if there is a casing (the pipe inserted into the hole) it may be removed as well, if deemed appropriate. Residual pressure present in the well would be cleared prior to the work to ensure no material was ejected.
3. Cement plugs will be placed depending on the character of the bore hole or casing, if present, in order to isolate oil and/or water zones. To place the plug, cement is pumped into the wellbore at the required depth intervals. For example, in an uncased hole, cement would be placed to extend from the bottom of the hole to at least 100 feet above the top of each zone. CalGEM would witness the placement of the plug and sign off on acceptance of it.
4. A minimum of 25 feet of cement would be left in the top of the well. A gas test would be conducted and a steel plate welded on the top of the casing.

Because the well was considered "dry" there is a low likelihood of substantial amounts of oil present, but should oil or other fluids be present they would be collected by a vacuum truck and removed from the site. OSHA regulations, in particular Title 8, Section 5192, Hazardous Waste Operations and Emergency Response, will require a site-specific Health and Safety Plan to ensure the safety of the procedures. This includes a hazards assessment prior to commencing the work, preparation of a project-specific emergency response plan and spill containment plan, conducting emergency response and safety training prior to implementation, and notification to the appropriate agencies in case of a spill. This would include the LACoFD in their capacity as the Certified Unified Program Agency.

[21] Example NOEs available at https://ceqanet.lci.ca.gov, SCH Nos. 2018098455, 2018108047, 2024120428, 2024120301, 2025060084, 2025110270.

[22] Santa Clarita NOE, Needham Ranch Open Space Oil Wells Plugging and Abandonment Project, October 28, 2025

[23] Adapted from US EPA Well Plugging: https://www.epa.gov/natural-gas-star-program/well-plugging, and; US Department of the Interior, Orphaned Oil and Gas Wells 101: https://storymaps.arcgis.com/stories/92cf4a914be240bb9d72b2351b8d9960, Accessed December 6, 2024

Adherence to the strict regulatory requirements regarding the closure of oil wells, the proper handling and disposal of asbestos and lead paint, and other regulatory measures concerning workplace safety and the handling of hazardous materials during construction would ensure the potential for the project to create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions would be minimal, and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

c. Less than Significant Impact. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Golden Valley High School is less than one-quarter mile west of the project site. As explained in IX.a-b above the project will not employ the use, storage, or transport of any substantial quantities of hazardous materials, as the proposed uses- hotel, assisted-living facility, and residential condominiums- do not utilize such materials in their operation. Construction activities would involve the use of hazardous materials such as fuel and paints, but emissions associated with these activities would be temporary and not in the concentrations or quantities necessary to constitute hazardous emissions. Emissions related to construction, including TACs, are discussed in Section III, and the project would not exceed any relevant thresholds. Therefore, impacts associated with emitting hazardous emissions or substances within one-quarter mile of an existing or proposed school would be less than significant.

Mitigation Measures: No mitigation measures are required.

d. No Impact. Would the project be located on a site that 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?

As explained in IX.b the site is not associated with nor within 1,000 feet of a site listed in the Cortese database resources. Therefore, the project would not result in the creation of a significant hazard to the public or the environment as a result of previous uses being included in lists of hazardous materials sites compiled pursuant to Government Code Section 65962.5. No impact would occur.

Mitigation Measures: No mitigation measures are required.

e. No Impact. 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?

The nearest airport to the project site is Whiteman Airport in the community of Pacoima located approximately 10.5 linear miles southeast, and the project site is not located within the Airport Influence Area of Whiteman Airport.[24] Therefore, there would be no impacts in regard to airport proximity.

Mitigation Measures: No mitigation measures are required.

f. Less than Significant Impact. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

[24] County of Los Angeles, Airport Land Use Commission, Airports and Airport Influence Areas, August 18, 2018.

The City does not have an adopted emergency evacuation plan but does have various documents that concern emergency response including the 2022 General Plan Safety Element, the 2021 Local Hazard Mitigation Plan, the 2018 Inclement Weather Preparedness Plan, and the Emergency Operations Plan (EOP). The 2023 LA County Operational Area Emergency Operations Plan (OAEOP) would also be relevant as the City contracts with the LA County Fire Department (LACoFD) and Sheriff's Department (LASD) for fire protection and police services. Of these documents the EOP and QAEOP would be considered the adopted emergency response plans.

The Safety Element describes hazards that may affect existing and future residents and provides guidelines for protecting public health and safety. The Element details certain policies and programs in place that concern public safety, such as development standards which require sufficient peak water supply, road widths, structure clearance, and seismic design codes as conditions of development; the City's relationship with the LACoFD and LASD; fire prevention activities headed by the County Fire Marshall, including the preparation of codes, ordinances, and standards, plan checking for fire safety, sprinkler systems and fire alarms, fire inspections of structures, brush clearance compliance programs, etc.; hazardous material risks and response framework. Goals, Objectives, and Policies in Part 2 of the Safety Element are directives for the City itself to take and are not directly applicable to a development project. The proposed project would not interfere with any of the goals, objectives, or policies as each represents standards the City applies to development and as a matter of regulatory compliance the project is required to meet every safety standard promulgated by the City primarily through the municipal code.

The Hazard Plan outlines mitigation goals and actions to facilitate emergency evacuation proceedings, focusing on coordination with the LACoFD and LASD to enhance outreach activities and information dissemination, and to maximize the utility of the Public Alert and Warning Notification System, incorporating texting and social media into notification procedures. The goals and policies of the Hazard Plan are directed at City departments and are not directly applicable at the project level, and the project would not interfere with implementation of any of the plan's action items.

The Inclement Weather Preparedness Plan was prepared to review the City's inclement and emergency weather procedures and list proactive preparation methods to reduce potential impacts throughout the City. Particular areas of the City are identified as vulnerable locations where flooding or debris flows may be an ongoing concern. The project site is not within a vulnerable area.[25] The Plan lists Standard Practices and Procedures the City undertakes to maintain stormwater control and erosion, protect open space, maintain City landscaping to avoid hazards, ensure construction sites are secured during weather events, and other standard practices that address in part maintaining safety during excessive weather. The Plan also details the emergency protocols for possible flooding and mud/debris flow events. The Plan is a coordination effort that consolidates City practices, procedures, and standards concerned with stormwater hazards and is not directly applicable to a development project. The standards and practices that concern the construction and operation of development are all established with the municipal code and as a matter of regulatory compliance the project would be required to abide by all applicable measures. As such the project would not interfere with the Plan.

The City's EOP was prepared to ensure the effective allocation of resources for the protection of the population in an emergency.[26] The EOP was developed in accordance with the state's Standardized Emergency Management System (SEMS) and the federal National Incident Management System (NIMS). SEMS and NIMS are based on the Incident Command System and the Multiple Agency Coordination System, both of which are used by first responders and emergency managers throughout the state and the nation at-large. The City OEP therefore is designed to coordinate with the 2023 LA County OAEOP which

[25] City of Santa Clarita, Inclement Weather Preparedness Plan, Page 5 graphic.
[26] City of Santa Clarita, Safety Element, Part 1, H. Emergency Preparedness and Response, 2022

is also based upon the SEMS and NIMS systems. The EOP and the OAEOP both clarify each element of the emergency management organization and their responsibilities in the maintenance of appropriate and current Standard Operating Procedures resource lists and checklists that detail how assigned responsibilities are performed to support implementation of the plans to ensure an effective response during a major disaster. Broadly, the plans organize emergency response into four phases, Preparedness, Mitigation, Response, and Recovery, and then delineates the organization, framework, and command hierarchy for the City and County's responses to major disasters. By utilizing the same hierarchical framework and protocols agencies and jurisdictions are able to coordinate effectively with one another during emergency response. The LACoFD and the LASD both maintain their own versions of an EOP, as do all of the agencies with which the County has mutual and automatic aid agreements in place including the Angeles National Forest, Kern County, Ventura County, and Los Angeles City Fire Departments and law enforcement services. Because the OEP and OAEOP are organizational documents that direct operations of resources during an emergency, the proposed project would not impair implementation of the plan and have no impact upon it.

Basic evacuation routes are identified in the Safety Element as Interstate 5, State Route 14, and State Route 126 going west. The County identifies Interstate 5 and State Route 14 as evacuation routes as well.[27] No activities occurring on the site, either during construction or operation, would directly impact these routes. During construction the mix of construction vehicles will arrive and depart at different intervals and would not be great enough in numbers to cause substantial impairment of the routes. Evacuations are accommodated on a dynamic basis at the time of an emergency. In the area in and around the project site evacuation proceedings would be directed by either the LACoFD or the LA County Sherriff's Department Emergency Operations Bureau who are tasked with announcing and managing evacuations consistent with the OAEOP and SEMS in coordination with the LACoFD. In whichever case, each entity would operate according to the ICS and SEMS the purposes of which are to provide multi-agency or inter-agency coordination during emergencies. Evacuation warnings and orders may be made in a phased manner according to vulnerability, location, or other factors, which would enable traffic surges on roadways to be minimized over time allowing for a more an orderly flow of vehicles exiting an evacuation area. Once a warning or order is issued, it is important to note that the timely evacuation of residential properties depends upon timely cooperation from the individuals under evacuation orders.

The project site is accessed from Golden Valley Road, which is a large five to nine-lane arterial, and Sierra Highway is a four to six-lane arterial in the vicinity of the project site. These roads would likely be used by residents of the City during evacuation, or for access by emergency vehicles. Both roads are large enough to carry large numbers of vehicles and State Route 14 is approximately .75 miles southeast from the project site connecting from Golden Valley Road, and 1.3 miles south connecting from Sierra Highway. Construction of the project would not interfere with emergency use of these roads as construction traffic will be intermittent, and all construction activity will be contained onsite. During operations the project would place more people onto these roads if evacuation was necessary, however, during the development review process emergency access is evaluated for all projects. The Department of Public Works and the Los Angeles County Fire Department both review projects for adequate road and driveway widths which are required to provide access to fire trucks, along with turnouts and turnaround areas where deemed necessary. Review from the City and relevant County departments would ensure the project does not interfere with emergency response parameters, therefore, neither the project construction nor operations would physically interfere with an adopted emergency response plan or emergency evacuation plan, and impacts would be less than significant.

g. Less than Significant Impact. Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

[27] Los Angeles County, General Plan 2035, Safety Element, Figure 12.9: Evacuation Routes Map, August 2021.

The project site is located within a Very High Fire Hazard Severity Zone (VHFHSZ) so there is a risk of wildfire within unmaintained open spaces near the project site. However, the areas developed by the project will be far less susceptible to conflagration than under existing site conditions as structures will be surrounded by irrigated landscaping and hardscape, including access roads, vegetation will be maintained according to wildland fuel modification requirements, and structures will be fire hardened, equipped with fire sprinklers, and designed to provide adequate access for emergency response activities.

Because the project site is within a VHFHSZ buildings will be required to conform to Title 24, Part 7, the California Wildland-Urban Interface Code (CWUIC), which details project site access, water supply, and fire protection plan requirements; minimum standards for the location, design and construction of buildings and structures within a VHFHSZ; and defensible space requirements. The structures specifically will have class-A roof assemblies, which offer the highest resistance to fire, ignition-resistant cladding, non-combustible exterior doors and windows, and ember-proof exterior venting, which create a very fire-resistant exterior shell. The project will also be required to conform to Title 24, Part 9, the California Fire Code (CFC). Chapter 7 of the CFC regulates materials, systems and assemblies used for structural fire resistance and fire-resistant separation of adjacent spaces to safeguard against the spread of fire and smoke within a building, and the spread of fire to or from buildings. The chapter details requirements for structural members, walls, partitions, and horizontal assemblies. Chapter 9 specifies internal fire protection systems for building and occupancy types, and all project structures will be equipped with fire sprinklers. The combination of these requirements will result in structures designed to be very resistant to exterior fire and impervious to the intrusion of wind-borne embers, and designed to contain the spread of, and extinguish, a structural fire.

Surrounding landscaping will be irrigated which will significantly reduce combustibility and provide a buffer from wildfire burning in untended open space. Landscaping will also be required to conform to fuel modification requirements enforced by the Los Angeles County Fire Department (LACoFD) wherein landscaping is limited with the first 30 feet, all landscaping is irrigated within 100 feet, and all vegetation within 100 to 200 feet is maintained for fuel reduction purposes. Fire code standards include access roads which allow all structures to be reached by firefighters and adequate space to maneuver equipment, and fire hydrant, standpipe, and water-pressure standards to ensure adequate water on site for firefighting. During construction the project will observe the requirements of Chapter 33 of the CFC which outlines general fire safety precautions for all construction operations. The requirements seek to maintain required levels of fire protection, limit fire spread, establish the appropriate operation of equipment and promote prompt response to fire emergencies. This combination of requirements, which are expanded upon in Section XX below, which will be reviewed and approved by the LACoFD for adequacy, will substantially reduce the wildfire risk faced by the project, and the project's risk of structural fires resulting from nearby wildfire to the extent that risk of loss, injury or death involving wildland fires is reduced to less than significance.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
X. HYDROLOGY AND WATER QUALITY. Would the project:				
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 with groundwater recharge such that 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 on- or offsite erosion or siltation;	☐	☐	☒	☐
ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offside;	☐	☐	☒	☐
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?	☐	☐	☒	☐

Impact Analysis

This analysis is based upon the Hydrology Report for the project dated October 29, 2024, and prepared by Land Design Consultants, Inc., provided in **Appendix F**.

a. Less than Significant Impact. Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

As previously mentioned, Santa Clarita is a party to the Los Angeles County MS4 permit requirements issued by the LARWQCB in accordance with the County's NPDES permit, CAS004004. The permit requires control of post-construction related stormwater and non-stormwater discharges.

Prior to construction the project must prepare a SWPPP that demonstrates which BMPs or series of BMPs will be used during construction to prevent construction-related discharges from leaving the project site and minimize sediment transport and erosion. These requirements ensure compliance with the NPDES General Construction Storm Water Permit requirements (WQ 2009-0009-DWQ) which apply throughout the state, as implemented by LARWQCB Order No. 01-182. This serves to address potential discharges or leaks from construction equipment, and erosion and siltation created by earthmoving activities. These requirements are embedded in Chapter 17.90 of the Santa Clarita Municipal Code and the SWPPP will be reviewed and approved by the City prior to approval for any ground disturbance activities permits. Should grading not be completed before November 1st of a given year a Wet Weather Erosion Control Plan (WWECP) will be required which specifically addresses stormwater controls necessary during the rainy season.

Operationally, the project must incorporate low impact development (LID) strategies in its design so that stormwater runoff generated by the project is retained on site per Chapter 17.85 of the Municipal Code. The project must retain the amount of runoff generated during a 0.75 inch 24-hour storm event, or an 85th percentile 24-hour storm event, whichever is greater. Stormwater can be retained through infiltration, evapotranspiration, bioretention and/or rainfall harvest and use. For this project, the Hydrology Report states the site intersects with three major drainage basins and five minor basins. Post development one drainage area, minor basin No. 8, will remain unmodified, the remaining basins will be modified and consolidated into six drainage basins, with major basin No. 1 expanding in size and the rest diminishing in size. All of the basins will drain to existing facilities, though the expansion of basin No. 1 requires construction of a large detention basin. The basic pre- and post-development drainage modifications are delineated in **Table X-1, Project Site Hydrology Modifications**. The table shows the area comprised of the existing drainage basins, the area of the modified basins and the area they drain, and the stormwater facilities for each basin. Minor basins 6 and 7, which currently drain to existing storm drain facilities, will be consolidated completely. All of the new drainage areas will flow to existing inlets, with major basins 1 and 2 existing to the existing natural canyon on site before traveling to an existing stormwater inlet.

Table X-1
Project Site Hydrology Modifications

Drainage Basin	Existing Acres	Post Development Acres/Area	Post Development Stormwater Control
Major Basin 1	16.68 ac	26.32 ac – Assisted living, western condo area, and surrounding slopes	Storm drain system with underground detention facility with outlet to natural canyon and existing offsite inlet.
Major Basin 2	11.10 ac	4.48 ac – Eastern condo area	Storm drain system with outlet to natural canyon and existing offsite inlet.
Major Basin 3	5.35 ac	3.55 ac – Hotel and surrounding slopes	Storm drain system leading to realigned existing inlet.
Minor 4	0.58 ac	0.46 ac – "A" Street cul de sac	Slope drain leading to existing inlet.
Minor 5	0.45 ac	0.19 ac - "A" Street cul de sac	Slope drain leading to existing inlet.
Minor 6	0.42 ac	N/A, part of Major Basin 3	Major Basin 3 controls.
Minor 7	0.44 ac	N/A, part of Major Basin 2	Major Basin 2 controls.
Minor 8	0.63 ac	0.63 ac – Existing canyon	No modification, drains through canyon to existing inlet.
Source: Hydrology Report, Appendix F.			

The Hydrology Report demonstrates that post-development runoff flow rates and flow velocities would not be greater than under existing conditions and therefore would not result in an increase in downstream erosion. Flows directed to the existing canyon do not exceed current flows and the project therefore would not result in an increase in erosion in the remaining natural areas. Compliance with LID requirements,

which are reviewed and approved prior to permitting, will ensure any runoff from development areas will be retained on site as needed, and properly treated prior to existing the site, maintaining the quality of water that flows into the canyon and existing storm drain inlets.

Compliance with construction permitting requirements, adherence to the designs of the Hydrology Report, and compliance with operational LID requirements would reduce potential impacts related to the violation of water quality standards or waste discharge requirements or the degradation of surface or ground water quality to less than significant levels.

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. Would the project substantially decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

The project site is located within the Santa Clara River Valley East Groundwater Subbasin and water falling on the site would contribute some amount of recharge to the basin. Infiltration on the site will be modified by the addition of impervious surfaces, but the total amount of water allowed to infiltrate within the site boundaries will not be substantially different from current conditions as the project must retain the amount of runoff generated during a 0.75 inch 24-hour storm event, or an 85th percentile 24-hour storm event, whichever is greater, meaning for the majority of rain events all stormwater falling on new impermeable surfaces will remain on site. The proposed detention basin, which captures runoff from over 26 acres of newly developed area, will allow infiltration as well as slowly releasing water to the existing canyon. Existing and new permeable areas (landscaping, "natural" areas) will allow water to infiltrate during rain events, and newly irrigated areas will contribute to onsite infiltration during summer months. Although the project adds large amounts of impermeable surfaces to the project site, infiltration on site would not substantially decrease post-development, and the project would not significantly interfere with groundwater recharge, therefore, project impacts to sustainable groundwater management would be less than significant.

In addition, the project will not directly draw water from the subbasin, and as discussed in Section XIX.b the project falls within the anticipated growth rates of the Santa Clarita Valley Water Agency and within the City's projected water availability estimates. Because project demand is factored into the City's water planning, water use of the project would not substantially decrease groundwater supplies or impede sustainable groundwater management, and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

c.i. Less than Significant Impact. Would the project 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 result in substantial on- or offsite erosion or siltation?

As discussed in Section X.a, the project will add impervious surfaces and alter the existing drainage patterns on site. However, the Hydrology Report demonstrates that post-development runoff flow rates and flow velocities would not be greater than under existing conditions and therefore would not result in an increase in downstream erosion. In addition, flows directed to the existing canyon do not exceed current flows or velocities and the project therefore would not result in an increase in erosion in the remaining natural areas. Therefore, the project would not would substantially increase the rate or amount of surface runoff in a manner which would result in substantial on- or offsite erosion or siltation and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

c.ii. Less than Significant Impact. Would the project 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 substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?

As discussed, the Hydrology Report demonstrates that post-development runoff flow rates would not be greater than under existing conditions and therefore would not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite. Flows would be distributed to existing storm drain facilities or to the canyon (which flows to a storm drain) which are adequate for existing flows. Because the project will not increase these flows, impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

c.iii. Less than Significant Impact. Would the project 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 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?

As discussed, the Hydrology Report demonstrates that post-development runoff flow rates would not be greater than under existing conditions and therefore would not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite. Flows would be distributed to existing storm drain facilities or to the canyon (which flows to a storm drain) which are adequate for existing flows. Conformance to LID requirements would ensure that water released into storm drains would not violate the requirements of the County's NPDES permit which ensures that runoff from new development within the MS4 permit area does not contribute to an increase in stormwater pollution within the watershed. Impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

c.iv. Less than Significant Impact. Would the project 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 impede or redirect flood flows?

The project site is located within a Federal Emergency Management Agency (FEMA) flood zone designation of "Zone X, Area of Minimal Flood Hazard".[28] This is an area that is determined to be outside of the 0.2-percent-annual-chance floodplain, aka the 500-year flood zone (1 in 500 annual chance of flooding). This is the lowest risk mapped flood area. As the risk of flooding is exceptionally low, and post-development flow rates do not exist existing flow rates, the project would not significantly impede or redirect flood flows and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

d. No Impact. Would the project, in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

The project is not within a flood hazard zone, not near a coastline, and is not within a seiche zone, which is an area at risk of inundation if a water containment facility failed in some manner. As such, the project

[28] FEMA, National Flood Hazard Layer FIRM panel 06037C0840G, June 2, 2021 effective date.

would have no impact pertaining to the risk of release of pollutants due to location in flood hazard, tsunami, or seiche zones.

Mitigation Measures: No mitigation measures are required.

e. Less than Significant Impact. Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The project is required to produce a SWPPP, and these construction BMP requirements are applied to all projects of one acre or more within the jurisdiction of the LARWQCB through the CGP. Abiding to the requirements of the CGP, via permits reviewed and issued by the County, is in effect a determination a project will not conflict nor obstruct implementation of a water quality control plan because the purpose of the CGP is to ensure water quality is not degraded. In other words, the permitting requirements are designed to ensure construction activities throughout the LARWQCB basin do not result in a degradation of water quality.

MS4 permit requirements, implemented by the City for compliance with the NPDES, constitute the implementation of water quality control measures for the project post-development. In the same manner, compliance with these requirements ensures a development will not conflict with or obstruct implementation of a water quality control plan.

The Santa Clara River Valley East Groundwater Subbasin Groundwater Sustainability Plan (GSP) from the Santa Clarita Valley Groundwater Sustainability Agency is the applicable groundwater management plan for the area. The GSP creates quantitative methods for evaluating the sustainability of the basin, the need and efficacy of monitoring networks, and the projects and management actions needed to implement the plan and achieve sustainability. The GSP is a planning document and does not impose specific requirements on individual projects. The project could conflict with or obstruct implementation of the plan if it significantly impeded recharge or water quality of the basin, or if it required significant amounts of water that could not be accounted for in sustainability planning for the basin. As discussed, post-development infiltration will be similar to that of pre-development conditions, and project water use is accounted for in current growth and water availability estimates. Therefore, project conflicts with water quality control plans or sustainable groundwater management plans would be less than significant.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XI. LAND USE AND PLANNING. Would the project:				
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?	☐	☐	☒	☐

Impact Analysis

a. No Impact. Would the project physically divide an established community?

Development of the project would not physically divide an established community as it is not being placed within or between a cohesive, established, or connected neighborhood. The project site is vacant and the residential subdivisions on either side are not connected in any manner through the project site. Therefore, there would be no impact.

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. Would the project 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?

Regionally, the project site is located within the planning area of the SCAG, the federally designated metropolitan planning organization. SCAG is responsible for reviewing regionally significant local plans, projects, and programs for consistency with SCAG's adopted regional plans. The project does not meet the criteria for being regionally significant pursuant to the CEQA Guidelines, Section 15206; therefore, there would be no conflict with any SCAG policy adopted for the purpose of avoiding or mitigating an environmental effect, as explained in Section VIII. The project is also located within the planning area of the SCAQMD AQMP. As evaluated in Section III, Air Quality, the project is consistent with applicable regional plans, and no further analysis is required.

City of Santa Clarita General Plan Land Use Element

The General Plan is a comprehensive, long-range declaration of purposes, policies, and programs to guide development of the City. The Land Use Element is the long-term blueprint for development of property to meet the Santa Clarita Valley's future needs for new housing, retail, office, industrial, parks, open space, and other uses.

The General Plan Land Use Map identifies the project's land use designation as Mixed Use – Neighborhood (MXN). As stated in the General Plan, mixed-use development in the MXN zone will be encouraged to create neighborhoods that integrate residential uses with complementary commercial services. Additionally mixed-use neighborhoods should be designed in consideration of surrounding development patterns, proximity to public transit, providing roadway and trail linkages to adjacent development where appropriate. The residential density range in mixed-use neighborhoods shall be a minimum of six (6) to a

maximum of eighteen (18) dwelling units per acre, and maximum floor area ratio (FAR) for the non-residential portion of the development shall be 0.5. Building heights shall not exceed 50 feet.

The project includes age restricted residential condominiums, a 60-room hotel, and 151-room assisted living facility; a mix of uses which are consistent with the land use designation. The project will conform to the 50-foot height limitation and generally conforms to the MXN zone's density and FAR requirements, as discussed further in the zoning code analysis below. Given the project's consistency with the General Plan vision for the MXN zone, the project would not conflict with the City's General Plan, and impacts would be less than significant.

Santa Clarita Zoning Code and Property Development Standards

The project site is approximately 28 acres, with a 33-percent average cross slope, and located in the MXN zone which is intended for mixed-use development. The MXN zone establishes minimum and maximum density for residential units, and establishes minimum and maximum FAR for non-residential uses. The allowable densities and FAR are further informed by the Hillside Development regulations which establish limitation on densities and FAR, based on the average cross slope of the site.

Accounting for the reduction in allowable density and FAR based on the average cross slope of the project site, the project should provide between 90 and 271 residential units, and the non-residential uses should provide between 131,692 square feet and 329,235 square feet of floor area. The floor area for the hotel and the assisted living facility are attributed toward the non-residential FAR requirement. In sum, those uses provide a total of 148,994 square feet, meeting the required floor area in the zone. The 73 age restricted condominiums fall below the minimum density required in the zone, however, the applicant is seeking a MUP which would allow for the project that does not meet the minimum density required by the MXN zone.

The project's uses include age restricted residential condominiums, a 60-room hotel, and 151-room assisted living facility, which are all contemplated in the MXN zone. The age-restricted condominiums are permitted in the zone. The applicant is seeking approval of an MUP to allow the hotel use in the zone, and a CUP to allow the assisted living facility in the zone.

With approval of the requested entitlements, the project would not conflict with the applicable zoning regulations, and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XII. MINERAL RESOURCES. Would the project:				
a. Result in the loss of availability of a known mineral resource that would be of future 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?	☐	☐	☒	☐

Impact Analysis

a-b. Less than Significant Impact. A significant impact may occur if a project resulted in the loss of availability of a known mineral resource that would be of future value to the region and the residents of the State.

According to the Mineral Resources exhibit in the City's Conservation and Open Space Element the project site is not within a mineral resource zone, and appears to be outside of the oil and gas field which is active south of the project site on the other side of Golden Valley Road.[29] As explained in IX.b the project site has an abandoned oil well located within its boundaries. The well showed no signs of commercial quantities of oil or gas so it is unlikely it would produce useable quantities in the future as hydrocarbons are generally encased in rock. There is no guarantee this would be the case and it will be at the discretion of the City whether or not to allow any structures to be placed on top of the abandoned well, though typically this is not allowed. Because the precise location of the well requires surveying it will be determined at the time of permitting if a structure is proposed on the well, though typically such a condition is avoided and the well would be located in the place of landscaping or hardscape. If the well coincides with a structure only minor adjustments to the site plan would be necessary to avoid it. In either case, State law dictates that the developer, property owner, and/or local jurisdiction will incur the liability necessary to access the well if for some reason it is necessary to attain access in the future. Regardless, it is unlikely that the well would be capable of providing "future value to the region" or the "residents of the State," within the context of the criteria question, as a single dry well would not be expected to provide hydrocarbons in such quantity or quality as to meet this criteria.

According to the California Department of Conservation Special Report 254, the project site is located within a Mineral Resource Zone (MRZ)-3 which is defined as "Areas containing known or inferred PCC aggregate resources of undetermined mineral resource significance."[30] The special report is specifically concerned with Portland Cement Concrete Aggregate Resources. Regarding the MRZ-3 classification the report states: "A large portion of the San Fernando Valley P-C Region is classified as MRZ-3. These areas are underlain by Quaternary and Pleistocene alluvial deposits, Tertiary sedimentary and volcanic deposits, and crystalline basement rock. Little is known about the potential of these rock units for use as PCC aggregate, but pending further evaluation, these deposits could be a potential source of PCC aggregate in the future." The project site, therefore, cannot be said to definitively contain PCC aggregate, but rather the

[29] City of Santa Clarita General Plan, Conservation and Open Space Element, Exhibit CO-2 Mineral Resources, June 2011.
[30] California Department of Conservation, Special Report 254, Update of the Mineral Land Classification for Portland Cement Concrete Aggregate Resources in the San Fernando Valley and Saugus-Newhall Production-Consumption Regions, 2021.

general soil profile suggests there may be PCC aggregate deposits. However, boring logs from the Geotechnical Report (Appendix E-1) show that bedrock on the site is fairly close to the surface and alluvial deposits, which would contain PCC aggregate, are shallow. Therefore, the site would not be expected to have commercial quantities of oil or gas or PCC aggregate material present, and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIII. NOISE. Would the project result in:				
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?	☐	☐	☐	☒

Impact Analysis

The following discussion assesses the potential noise impacts of the project and provides a brief description of the key terms and concepts used in the analysis of noise impacts. This analysis is primarily based on the Noise and Vibration Technical Report (Noise Report), prepared by Impact Sciences, which is included as **Appendix G.**

Noise is unwanted sound. Sound is mechanical energy that is transmitted by pressure waves through a compressible medium such as air. The sound pressure level, expressed in decibels (dB), has become the most common descriptor used to characterize the loudness of an ambient sound level. A dB is a logarithmic unit of the ratio of sound pressure to a reference sound pressure level, standardized as 20 micropascals, the threshold of human hearing. Sound or noise can vary in intensity by over one million times within the range of human hearing, so a logarithmic loudness scale similar to the Richter Scale is used to keep sound intensity numbers manageable. The human ear is not equally sensitive to all sound frequencies within the entire spectrum, so noise levels at maximum human sensitivity are factored more heavily into sound descriptions in a process called A-weighting written as dB(A) or dBA. Subsequent references to decibels written as dB should be understood as A weighted dB(A).

Because decibels are logarithmic, the noise level of several sounds at once do not add together arithmetically to produce a louder noise. When two sounds of equal pressure come together, the result is a 3 dB increase in the noise level. For example, if traffic is producing 60 dB of noise and a lawnmower produces another 60 dB of noise, the resulting noise level will be 63 dB, not 120 dB. Humans cannot perceive an increase in noise less than 3 dB outside of a controlled laboratory environment. If an ambient background noise of 60 dB increases to 62 dB, there will be no perceptible increase in loudness. A 3 dB increase in noise is just perceptible and would generally not be noticeable in an urban environment. A 5 dB increase is considered readily perceptible, and an increase of 10 dB is perceived as the noise becoming twice as loud.

Time variations in noise exposure are typically expressed in Leq, a steady-state energy level equal to the energy content of the time varying period; essentially the average noise level during a noise measurement. Lmax is the maximum sound level over a particular time period. Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL), a weighted average of noise levels over time.

The Noise Report measured existing noise levels at four locations in the vicinity of the project site in order to establish ambient noise levels. Daytime ambient noise levels ranged from 42.5 dB Leq to 56.1 dB Leq and based on the data the calculated CNEL for Location 1 is 45.7 dB. Details of the measurements are found in Appendix G.

Existing roadway noise levels were calculated for locations on Golden Valley Road and Sierra Highway. The roadway segments selected for analysis are those nearest to the project site and would receive the most project-generated trips. Calculation of the existing roadway noise levels was based on the Federal Highway Administration Highway Noise Prediction Model and traffic volumes from the project's traffic analysis. The average vehicle noise rates (energy rates) utilized in the FHWA Model were modified to reflect average vehicle noise rates identified for California by Caltrans and range between 71.0 dB and 73.6 dB CNEL.

a. Less than Significant Impact. Would the project result in 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?

Construction

The City does not have specific limitations on construction noise levels. Rather, Section 11.44.080 of the SCMC limits the hours and days where construction can occur within 300 feet from a residentially zoned property. Specifically, the code states that construction is only allowed between the hours of seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday, and no work may be performed on New Year's Day, Independence Day, Thanksgiving, Christmas, Memorial Day or Labor Day. The project will not engage in construction outside of the allowed hours and thus would not create a noise impact according to City code. However, a noise impact could still occur if expected construction noise levels were considered excessive or harmful. As the City does not have an impact threshold for construction noise the Noise Report uses the Federal Transit Administration (FTA) general construction noise criteria of 90 dB Leq (1-hour) as an impact threshold, which is utilized by several jurisdictions in the state for assessing construction noise impacts.

Construction of the project would require the use of heavy equipment for demolition, grading/site preparation, installation of utilities, building fabrication, and finishing. Construction activities would also involve the use of smaller power tools, generators, and other sources of noise. During each stage of construction, several types of equipment potentially could be operating concurrently and noise levels would vary based on the amount of equipment in operation and the location of the activity. The Federal Highway Administration's (FHWA) Roadway Construction Noise Model has compiled data regarding the noise-generating characteristics of specific types of construction equipment and typical construction activities which are used to forecast construction noise levels in this analysis.

Noise levels would diminish notably with distance from the construction site at a rate of 6 dBA per doubling of distance (noise from stationary or point sources is reduced by about 6 dBA for every doubling of distance at acoustically hard locations). For example, a noise level of 86 dBA Leq measured at 50 feet from the noise source to the receptor would decline to 80 dBA Leq at 100 feet from the source to the receptor and fall by another 6 dBA Leq to 74 dBA Leq at 200 feet from the source to the receptor. These noise attenuation rates

assume a flat and unobstructed distance between the noise generator and the receptor. Intervening structures and vegetation would further attenuate (reduce) the noise. Furthermore, it should be noted that increases in noise levels at sensitive receptors during construction would be intermittent and temporary and would not generate continuously high noise levels. In addition, the construction noise experienced at sensitive receptors during the initial periods of construction (i.e., demolition and grading) typically would be reduced in the later construction periods (i.e., interior building construction). As the structures are built, the noise from interior construction work would be reduced at off-site locations because the proposed structures would break the line-of-sight noise transmission from the interior construction areas to the exterior areas of sensitive receptors.

Sensitive receptors near the project site include adjacent residences to the north, adjacent residences to the east, residences to the southeast (approximately 395 feet), and residences to the west (approximately 700 feet). **Table XIII-1, Outdoor Construction Noise Levels at Sensitive Receptors** shows the modeled worst-case construction noise levels at the three nearest groups of receptors. Figures are estimated for the phase of construction that would produce the most noise for each location.

Table XIII-1
Outdoor Construction Noise Levels at Sensitive Receptors

Receptor	Distance (feet)	Estimated Max Construction Noise Level (dB Leq)	Exceeds 90 dB FTA Threshold
North Residences	25	89.1	No
East Residences	25	89.1	No
Southeast Residences	395	65.9	No
Source: Noise Report, Appendix G.			

As shown, while construction activity would not exceed the FTA's general construction noise criteria of 90 dB Leq at any of the sensitive receptors. The worst-case estimated noise levels shown in Table XIII-1 do not represent noise levels as they would be experienced throughout the construction process. Equipment would operate some distance from other equipment and would only operate in one location for a limited time. Whenever equipment operated further from the receptors than as modeled in the table, which will be for the majority of the construction process, or not concurrently with other equipment, noise levels would be lower. As construction will only occur during allowed hours, and maximum levels would not exceed the FTA threshold, construction noise impacts would be less than significant and no mitigation is required.

Although it is not required for mitigation purposes, the project will voluntarily incorporate the following best practices as a Project Design Feature:

PDF-1: NOISE

1. Noise and groundborne vibration construction activities whose specific location on the project site may be flexible (e.g., operation of compressors and generators, cement mixing, general truck idling) shall be conducted as far as possible from the nearest off-site land uses.
2. When possible, construction activities shall be scheduled so as to avoid operating several pieces of equipment simultaneously, which causes high noise levels.
3. Flexible sound control curtains shall be placed around all drilling apparatuses, drill rigs, and jackhammers when in use.
4. The project contractor shall use power construction equipment with state-of-the-art noise shielding and muffling devices.

5. Barriers such as flexible sound control curtains shall be erected around heavy equipment to minimize the amount of noise on the surrounding land uses to the maximum extent feasible during construction.
6. All construction truck traffic shall be restricted to truck routes approved by the City, which shall avoid residential areas and other sensitive receptors to the extent feasible.
7. A construction notice shall be prepared and shall include the following information: job site address, permit number, name and phone number of the contractor and owner or owner's agent, hours of construction allowed by code or any discretionary approval for the site, and City telephone numbers where violations can be reported. The notice shall be posted and maintained at the construction site prior to the start of construction and displayed in a location that is readily visible to the public and approved by the City.

Operational Traffic Noise

The increase in traffic resulting from implementation of the project would increase ambient noise levels at off-site locations in the project vicinity. These concerns were addressed using the FHWA TNM model, which calculates the CNEL noise level for a particular reference set of input conditions, based on site-specific traffic volumes, distances, speeds and/or noise barriers. Based on the traffic analysis prepared for the project in combination with an analysis of the surrounding land uses, roadway noise levels were forecasted to determine if the project's vehicular traffic would result in a significant impact at off-site locations.

Off-site locations in the project vicinity would experience an increase in noise resulting from the additional traffic generated by the project. The project-related increases in noise levels at the primary roadway segments located in proximity to the project site are identified in **Table XIII-2, Project Roadway Noise Levels**.

Table XIII-2
Project Roadway Noise Levels

Roadway	Segment	Existing	Existing + Project	Future w/o Project	Future + Project	Cumulative Increase
Golden Valley	W of Sierra Hwy	73.6	73.7 (+0.1)	73.8	73.9 (+0.1)	0.3
	E of Sierra Hwy	71.0	71.1 (+ 0.1)	71.2	71.4 (+0.2)	0.4
Sierra Hwy	S of Golden Valley	73.0	73.1 (+0.1)	73.2	73.2 (--)	0.2
	N of Golden Valley	71.6	71.6 (--)	71.8	71.9 (+0.1)	0.3
Source: Noise Report, Appendix G. All figures in dB CNEL						

As shown in Table XIII-2, the project would increase local noise levels by a maximum of 0.2 dBA CNEL during project-level buildout scenarios and 0.4 dBA CNEL during cumulative buildout scenarios, which would be less than a 3 dBA increase which is the minimal amount necessary to result in a noticeable increase to traffic noise. As such, the Project's traffic-related noise level increases would be less than significant.

Operational On-Site Noise

As part of the project, new mechanical equipment, HVAC units, and exhaust fans could be installed on the roof or near the proposed new structures. Although the operation of this equipment would generate noise, the design of these on-site HVAC units and exhaust fans would be required to comply with the regulations of the SCMC. Specifically, Section 11.44.070 of the SCMC states any noise level from the use or operation of any machinery, equipment, pump, fan, air conditioning apparatus, refrigerating equipment, motor vehicle, or other mechanical or electrical device, or in repairing or rebuilding any motor vehicle, which

exceeds the noise limits as set forth in Section 11.44.040 at any property line, or, if a condominium or rental units, within any condominium unit or rental unit within the complex, shall be a violation of this chapter. Similarly, Section 11.44.060 of the SCMC states any noise level from the use or operation any radio receiving set, musical instrument, phonograph, television set, or other machine or device for the producing or reproducing of sound at any time in such a manner as to produce noise levels on residential land which would disturb the peace, quiet and comfort of neighboring residents or any reasonable person of normal sensitivity residing in the area shall be unlawful. In addition to these requirements, the project will screen mechanical equipment as feasible and necessary to meet City noise standards. As such, compliance with Section 11.44.070 of the SCMC would ensure noise from stationary sources would be less than significant

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. Would the project result in the generation of excessive groundborne vibration or groundborne noise levels?

The Federal Transit Administration (FTA) provides ground-borne vibration impact criteria with respect to building damage during construction activities, measured in PPV, expressed in inches per second (in/sec). Construction vibration damage criteria are assessed based on structural category (e.g., reinforced-concrete, steel, or timber). FTA guidelines consider 0.5 inch/sec PPV to be the significant impact level for reinforced concrete, steel, or timber buildings.[31] Vibration can also produce annoyance in humans, which is measured using vibration decibels (VdB). The FTA considers 72 VdB as the threshold for human annoyance at residences.

Vibration at nearby receptors resulting from construction activities was calculated by the Noise Report and the results are presented in **Table XIII-3, Construction Vibration Levels at Receptors**.

Table XIII-3
Construction Vibration Levels at Receptors

Receptor	Distance (feet)	Estimated PPV	PPV Threshold	Estimated VdB	VdB Threshold
North Residences	15	0.191 (in/sec)	0.5 (in/sec)	94	72
East Residences	15	0.191 (in/sec)	0.5 (in/sec)	94	72
Southeast Residences	395	0.001 (in/sec)	0.5 (in/sec)	51	72
Source: Noise Report, Appendix G.					

As shown in Table XIII-3 vibration levels at the nearest receptors would not impact structures but could surpass the 72 VdB threshold for human annoyance. However, the estimated 94 VdB is a worst-case estimate where a large bulldozer is operating 15 feet from a receptor. For the majority of the construction process equipment will be operating at greater distances, and while operating close to receptors vibration will be temporary and intermittent. PDF-1 would also serve to reduce construction vibration levels to the maximum extent feasible. Furthermore, the project would be consistent with Section 11.44.080 of the SCMC (Special Noise Sources— Construction and Building), which regulates construction activity in the City. While this section of the SCMC is applicable to construction noise, it would also ensure any annoyance impacts related to construction vibration would not occur during sensitive hours. Therefore, as there would be no noticeable vibration for the majority of the construction process, and annoyance vibration would only occur for a small portion of individual receptors for a brief period of time as equipment passes, and only during allowed days and hours, groundborne vibration impacts would be less than significant.

[31] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual. September 2018.

Mitigation Measures: No mitigation measures are required.

c. No Impact. If the project is 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?

There are no airports or airstrips within the City. The nearest airstrip is in Agua Dulce some 12 miles away. There would be no impacts.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIV. POPULATION AND HOUSING. Would the project:				
a. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Impact Analysis

a. No Impact. Would the project 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)?

The SCAG 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) forecasts for population and employment growth from 2016 through 2045 for the City are shown in **Table XIV-1, Population and Employment Growth Forecast**.

Table XIV-1
Population and Employment Growth Forecast

Year	City Population	City Employment
2016	218,200	91,200
2045	258,800	105,200
Net Growth	40,600	14,000
Source: SCAG 2020 RTP/SCS, Current Context: Demographics & Growth Forecast Appendix, Table 14, Jurisdictional-Level Growth Forecast, September 3, 2020.		

As shown in Table XIV-1, SCAG forecasts City population and employment to increase from 2016 to 2045 by 40,600 people and 14,000 jobs. The proposed project includes a 60-room hotel with a restaurant and retail space, a senior assisted-living facility with 151 units, and 73 residential condominium units. The land is zoned Mixed-Use Neighborhood and is intended to host residential units and some amount of commercial development which would create new jobs. According to the project VMT Analysis (Appendix I) the project will create 66 new jobs and would house an estimated 308 people (146 people in the condominiums, 151 people in the assisted living facility). Averaged over 29 years SCAG's estimated population growth would amount to 1,400 people a year and the job growth to 483 jobs a year. The project's contribution to City growth would be well within anticipated trends, even if all employees and all residents of the project moved from outside of the city to work/live on site, which is unlikely. In addition, the City has been allocated 10,031 housing units by the State through the Regional Housing Needs Assessment (RHNA). The RHNA is mandated by State Housing Law as part of the update of local housing elements every 8 years. In March 2020, SCAG adopted their 6th cycle RHNA Allocation plan and the City was allocated a total of 10,031 housing units that the City must prove it has adequate capacity for and substantive plans to

accommodate that many units.[32] By adding 73 housing units the project will help the City meet its required housing needs. Although the assisted living units would not be counted toward those requirements, the availability of senior housing is a key part of a City's housing profile and it is widely recognized that there is a nationwide shortage of senior oriented housing.[33] In addition, the project does not extend roads or infrastructure into areas that would otherwise be inaccessible or unbuilding without construction of the project. As such, the project would not result in substantial unplanned population growth and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

b. No Impact. Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

As the project site is vacant land, with the exception of an abandoned single-family house, the project would not displace persons or residential units or necessitate the construction of replacement housing elsewhere. Therefore, the project would have no impact related to displacement.

Mitigation Measures: No mitigation measures are required.

[32] City of Santa Clarita, City of Santa Clarita General Plan Draft 2021-2029 Housing Element, May 2022.
[33] Urban Institute, America's Housing Market Is Failing Older Adults, accessed December 15, 2025 at: https://www.urban.org/urban-wire/americas-housing-market-failing-older-adults

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XV. PUBLIC SERVICES.				
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:				
a. Fire protection?	☐	☐	☒	☐
b. Police protection?	☐	☐	☒	☐
c. Schools?	☐	☐	☒	☐
d. Parks?	☐	☐	☒	☐
e. Other public facilities?	☐	☐	☒	☐

Impact Analysis

a. Less than Significant Impact. Would the project result in substantial adverse physical impacts associated with the provision of 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 fire protection?

The LACoFD provides fire protection and emergency paramedic services to the project site. The nearest fire station is LACoFD Fire Station No. 150 located approximately 1.4 miles southeast of the project site located at 19190 Golden Valley Road. Two other fire stations are under three driving miles from the project site, Station 104 to the northwest, and Station 107 to the northeast. This distance is close enough for the LACoFD to be within the current standard response time for fire service, which is 8 minutes or less for suburban areas, as stated in Section 5.14.1.1 of the 2014 Los Angeles County General Plan Update Draft EIR.

The construction of Golden Valley Road and Golden Valley High School in 2000 opened up the land on either side of the road to new development that would have not otherwise been possible prior to the road's construction. The project is being built in an area intended for such development, and the expansion of new areas that require service from the LACoFD has been accounted for by the City and the LACoFD.

Because the project site is within a VHFHSZ it will be subject to the provisions of the CWUIC which will require class-A roof assemblies, ignition-resistant cladding, non-combustible exterior doors and windows, and ember-proof exterior venting, which create a fire-resistant exterior shell. The project will also be designed to resist the ignition and spread of structural fires through compliance with Chapters 7 and 9 of the CFC which require fire-rated interior separations and interior fire sprinklers which serve to contain and extinguish fires within the buildings. The site plan will be reviewed and approved by the LACoFD to ensure there is adequate street width and building access, the project will be required to have a fuel modification plan approved by the department, and the site must meet fire-flow availability standards and provide adequate fire hydrants or standpipes. These measures will ensure the project doesn't violate any fire safety

standard that could potentially create a situation where an inordinate increase in fire protection services would be necessary.

Given the close proximity of the existing LACoFD stations, and the regulatory requirements for enhanced fire protection, the project would not require new or physically expanded fire stations and potential impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. Would the project result in substantial adverse physical impacts associated with the provision of 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 police protection?

The City contracts police services from the Los Angeles County Sherriff's Department (LASD). The nearest Santa Clarita Valley Sherriff's station is located at 26201 Golden Valley Road approximately 1.3 driving miles northwest of the project site. Unlike fire protection services, police units are most often in a mobile state; hence, the distance between a headquarters facility and the location of a particular emergency generally does not determine response times. Instead, the number of police officers on the street is more directly related to the realized response time, and calls for police assistance are prioritized based on the nature of the emergency.

The project would introduce new services and households within the existing LASD service area; however pursuant to SCMC Section 17.51.010.B, the project developer would be required to pay a law enforcement facilities fee for providing additional law enforcement personnel and equipment. Therefore, potential impacts related to the expansion of police facilities would be less than significant.

Mitigation Measures: No mitigation measures are required.

c. Less than Significant Impact. Would the project result in substantial adverse physical impacts associated with the construction or expansion of schools?

As explained in XIV above, the project is of a size and scale that is normal and planned for in growth projections. In addition, the project provides age-restricted housing and will not house any school age children. Therefore, potential impacts regarding the demand for new school facilities is less than significant.

Mitigation Measures: No mitigation measures are required.

d-e. Less than Significant Impact. Would the project result in substantial adverse physical impacts associated with the construction of new or physically altered parks or other facilities?

The proposed project adds a hotel, a senior assisted-living facility, and age-restricted residences. The hotel will result in minimal public facility use since hotel visitors are not likely to use parks or other public facilities in large numbers. The assisted living facility is unlikely to have residents that use active public recreational facilities such as soccer or baseball fields and the like, and passive recreational facilities will be provided as part of the project. The residential units will be age restricted for tenants aged 55 or older. These residents will use parks and other public facilities more routinely. The 73 units represent a potential population increase of 146 people, which is not a threshold of growth that would overwhelm public facilities, as use of public facilities is occasional and intermittent for most people. In addition, the project will be required to pay impact fees assessed by the City that address incremental use of public facilities.

What incremental impacts the project may have on public services can be addressed by such fees and would not require the construction of new facilities or the expansion of existing facilities. Impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVI. RECREATION.				
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?	☐	☐	☒	☐

Impact Analysis

a. Less than Significant Impact. 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?

The proposed project adds a hotel, a senior assisted-living facility, and age-restricted. The hotel will result in minimal recreational use since hotel residents are not likely to use local or regional recreational facilities in large numbers. The assisted living facility is unlikely to have residents that routinely use park facilities in a manner and extent that would cause substantial deterioration. The residential units will be age restricted for tenants aged 55 or older. Use of local recreational facilities by these tenants is likely to be lower impact compared to families or minors. Therefore, the project would not result in a substantial increase in park usage such that substantial physical deterioration of the facility would occur or be accelerated, and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. 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?

The proposed project includes two small parks as part of the residential component, and an eight foot wide hiking trail through an undeveloped area. The construction of the park and hiking trail are evaluated as part of the overall project within this document, which has determined that there are no significant environmental impacts. Additionally, the project does not require the construction or physical expansion of existing recreational facilities, and therefore, impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVII. TRANSPORTATION. Would the project:				
a. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐
c. Substantially increase hazards 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?	☐	☐	☒	☐

Impact Analysis

The following analysis is based on the Santa Clarita Mixed Use Traffic Impact Analysis (Traffic Analysis) dated December 2, 2021, and the Golden Valley Road Mixed-Use Vehicle Miles Traveled Analysis (VMT Analysis) dated November 14, 2023, both prepared by TJW Engineering, and attached as **Appendix H** and **Appendix I**.

a. Less than Significant Impact. Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

The City's 2011 General Plan Circulation Element contains a Highway Plan and Bikeway Master Plan. The Highway Plan consists of the redesignation of certain roadways, planned modifications to those roadways to meet the designations, and right-of-way standards. The Bikeway Master Plan designates bike paths, bike lanes, and bike routes throughout the City. The project would not conflict with either plan as it will not interfere with the configuration of any existing roadway. The project proposes construction of a short public road extending from Golden Valley Road. The road will intersect with Golden Valley Road but will otherwise not require any modification of it or interfere with any potential improvement.

The Circulation Element also contains goals, objectives, and policies found in Part Two of the document, however, these are directives for City governance and are not applicable to a private development project.

In addition to the Circulation Element the City has the 2019 Transit Development Plan and 2020 Non-Motorized Transportation Plan. The Transit Development Plan outlines operations, performance, maintenance, and upgrades/expansions of the City's transit network. The Non-Motorized Transportation Plan identifies deficiencies in pedestrian and cycling infrastructure and identifies areas for expansion of facilities. The project would not conflict with these plans for the same reason it would not conflict with the Circulation Element; the project does not interfere with the circulation network and does not hinder the City's ability to implement transit or non-motorized facility improvements.

As the project does not conflict with any programs, plans, or policies related to the circulation system, and would be required to comply with any and all municipal code requirements related to circulation as a

condition of entitlement and permitting, the project would not conflict with a program, plan, ordinance or policy addressing the circulation system and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

The Golden Valley Road Mixed-Use Vehicle Miles Traveled Analysis (VMT Analysis) from TJW Engineering dated November 14, 2023 concludes that the project would have a less than significant impact on VMT, which has been confirmed by the City Traffic Engineering department.[34]

The VMT Analysis projects that the hotel will have 24 employees and the assisted living facility 42. Residents in the condominiums are projected to be 157 persons and the assisted living facility is projected to house 151 residents. According to City guidelines VMT is required to be reported as Home-Based VMT per Capita for residential projects and Home-Based Work VMT per Employee for office projects. Total VMT or VMT per Service Population can be reported for area plans, large-scale retail projects, or other project types, such as special event venues. This VMT Analysis was conducted based on the City's guidelines and direction from the Traffic Engineering department using the SCAG Regional Transportation Plan Model. As the project is mixed-use project each land use was analyzed separately as directed by City staff.

Per the guidelines a project would have a less than significant impact if the VMT per Capita figure was 19.0 or less, 15% lower than the calculated citywide baseline of 22.4, and the VMT per Employee figure was 16.9 or less, 15% lower than the calculated citywide baseline of 19.9. According to the VMT Analysis the project VMT per Capita is 14.3, below the 19.0 threshold, indicating that the project would have a less than significant impact on VMT per Capita.

The VMT Analysis calculates the VMT per Employee figure at 17.1, which is 0.2 above the 16.9 threshold which would indicate an impact. However, as the majority of city residents leave the city for work and the project is projected to create 66 jobs, the project is considered an employment generating use. In this case, as determined by the Traffic Engineering department, the project is evaluated according to whether it affects a net change in work VMT for the city. The baseline home-based work VMT for the city was calculated to be 1,692,308 miles under current (without project) conditions. With inclusion of the project this would decrease to 1,584,617 miles. Reducing citywide home-based work VMT indicates the project would have a less than significant impact on work VMT. In addition the project would decrease overall home-based VMT in the city. Under existing conditions home-based VMT was calculated to be 6,978,984 miles. This would decrease to 6,929,836 miles with inclusion of the project. Therefore, as the VMT per Capita of the project is below the City screening threshold, and the project will result in a net decrease of work VMT for the city, the project would not conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b) and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

c. Less than Significant Impact. Would the project substantially increase hazards to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The project would include one entry driveway from Golden Valley Road and construct a bus stop in front of the hotel. Both elements would be designed and constructed according to City standards without the need

[34] Email correspondence, Senior Planner Erika Iverson, January 16, 2024.

for any modification or deviation from the standards. The proposed uses are not incompatible with the area and are appropriate for the location located on a major commercial arterial. Internal driveways and private roads will also be built according to city standards. Impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

d. Less than Significant Impact. Would the project result in inadequate emergency access?

The adequacy of emergency access to the project site itself is assessed by the LACoFD ensuring that there is appropriate roadway width, building access, and turnaround points for emergency vehicles. The project is designed according to LACoFD standards and provides adequate emergency access to all proposed uses and buildings. The project does not impact emergency access for other sites or uses as it does not interfere with the operation of Golden Valley Road. The project driveway would conform to City standards and the planned bus stop in front of the hotel is being installed per direction from the City and will design according to City specifications. These features interface with the road but will not impact its use or interfere with emergency access to the site or elsewhere. Therefore, impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVIII. TRIBAL CULTURAL RESOURCES. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?	☐	☒	☐	☐
b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision "c" of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision "c" of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

Impact Analysis

a-b. Potentially Significant Unless Mitigation Incorporated. A significant impact could occur if a project would cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources (PRC 5020.1(k)), or that is determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to the criteria of the National Register of Historic Places criteria (PRC 5024.1(c)).

As discussed above in Section V, Cultural Resources, the Phase I Cultural Resource Assessment of the project site found no record of cultural resources on or adjacent to the site, and the NAHC record search returned no findings, and investigations of the site produced no evidence of habitation. However, large areas of the site appear to consist of undisturbed native soils and ground visibility was low during the pedestrian survey, so it cannot be reliably determined there is no evidence of resources on site.

As specified in AB 52, lead agencies must provide notice inviting consultation to California Native American tribes that are traditionally and culturally affiliated with the geographic area of a proposed project if the Tribe has submitted a request in writing to be notified of Proposed Projects. The Fernandeño Tataviam Band of Mission Indians responded indicating they wished to provide confidential information to the lead agency. Consultation with the Fernandeño-Tataviam Band of Mission Indians concluded with both parties in agreement to include mitigation measures to avoid or mitigate any potential significant effects to any unknown tribal cultural resources that may be present on the site.

As such, the project's potential to cause substantial adverse changes in the significance of a tribal cultural resource as defined in the PRC, Section 21074 that is listed or eligible for listing in the California Register, or in a local register of historical resources, or determined by the lead agency to be significant pursuant to the criteria of the National Register, would be less than significant.

Mitigation Measures:

MM TCR-1: Tribal Monitoring

The project applicant shall retain two professional tribal monitors procured by the Fernandeño Tataviam Band of Mission Indians to observe the following activities in native soil as described in the following paragraphs: clearing, grubbing, grading/excavating.

There shall be two tribal monitors present during all clearing, grubbing and mass grading activities in native soil, to an excavation depth of 7 feet. If Cultural Resources are encountered at any point, tribal monitors shall observe all remaining ground-disturbing activities, regardless of whether the soil has been previously observed, until all soil disturbing activities are complete. Each week the tribal monitors will consult with the archaeological monitor and/or archaeological principal to determine the appropriate level of compliance coverage per project mitigation measure CUL-1. Disputes on coverage will be resolved through communication with the Community Development Director, or designee, who has the final say in compliance task requirements. Tribal Monitoring shall continue until the permittee provides written confirmation to the Tribe that all scheduled monitoring activities are complete. If tribal monitors must leave the project temporarily and return, the permittee shall provide written confirmation of completion for each set of activities and, if possible, five days' notice prior to the start of each set.

Upon discovery of Cultural Resources, the Tribal Monitor shall have the authority to request that ground-disturbing activities cease within at least 30 feet and up to 60 feet of the discovery. The qualified archaeological monitor attached to the project per project mitigation measure CUL-1 and the Tribal Monitor shall assess the find.

MM TCR-2: Disposition and Treatment of Inadvertent Discoveries

The City and/or permittee shall, in good faith, consult with the FTBMI on the disposition and treatment of any Tribal Cultural Resource encountered during all ground disturbing activities.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIX. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water 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?	☐	☐	☒	☐

Impact Analysis

a. Less than Significant Impact. Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

The project does not require the construction or relocation of water, wastewater, storm water drainage, electric power, natural gas, or telecommunications facilities. The project will require new sewer and water connections, and one new water main. The project will install a new water main in Golden Valley Road connecting between existing mains in Sierra Highway to the east and Robert C Lee Parkway to the west. Two other water line connections will be made between the project site and existing water lines located in the Valle di Oro residential development to the east. Sewer connections will be made through three lines connecting to existing lines in the Valle di Oro development. Installation of new sewer and water lines will require underground boring to connect to existing lines. The new water main will be installed within the public right-of-way and may create temporary inconveniences as it is possible a travel lane could be temporarily blocked. These activities will not present any significant impact on the environment as the

installation of new service lines within the public right-of-way is common occurrence and the means by which development connects to existing utility systems and services. Impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?

The Newhall Water Division of the Santa Clarita Valley Water Agency (SCV Water) currently serves as the potable water purveyor to the project vicinity and would provide potable water to the project. SCV Water was created in 2018 through a merger of the Castaic Lake Water Agency, Newhall County Water Districts, and Valencia Water Company. According to its 2020 Urban Water Management Plan (UWMP), SCV Water has sufficient water supplies available for normal year water demands, as well as for dry and multiple dry years through the Year 2050 with existing supply, conjunctive use (coordinated use of surface water and groundwater), water conservation, water transfers, recycled water, and water banking.[35] Water supplies for 2050 for multiple dry years are projected by the UWMP to be 128,715 acre-feet per year (AFY) and demand with passive and active conservation is estimated at 102,870 AFY.

The UWMP assumes a population growth of 1.3 percent a year within the SCV Water service area over the 30-year planning period (2050). The population within the service area in 2045 is projected to be 422,100 people. The service area includes areas outside of City limits, which according to the UWMP accounts for approximately 30% of the number. Therefore, the UWMP's projected population in 2045- within City limits- would be 295,470, which is slightly higher than the SCAG 2045 projected City population of 258,800 people, as detailed in Section XIV.a. The combined population of the new assisted-living units and age-restricted condominium units would be in line with both SCAG and SCV Water growth estimates.

Estimates for total daily water demand of the project is detailed below in **Table XIX-1, Project Water Demand**.

Table XIX-1
Project Water Demand

Proposed Use	Units or Size	Demand Rate per Day	Estimated Water Demand per Day
Hotel	60 rooms	144 gal per room[1]	6,768 gal
Restaurant	36 seats	36 gal per seat	1,296 gal
Retail Suite	3,320 sf	30 gal per 1,000 sf	99.6 gal
Banquet Room	1,974 sf	420 gal per 1,000 sf[2]	118.1 gal
Assisted Living	151 rooms	84 gal per room[3]	12,684 gal
Condominiums	73 units	180 gal per unit[4]	13,140 gal
		Estimated average water demand per day	**34,105.7 gallons**

*Rates are based upon the City of L.A. Bureau of Engineering's Sewage Generation Factor chart, revised April 2019. Water consumption figured at 120% of sewage generation rate.

[1] Assumes an occupancy rate of 78%, the rounded occupancy average from Santa Clarita Valley Economic Development Corporation (SCVEDC), Q1 2025 Economic Snapshot, page 30, Occupancy Rate Q1 2025.

[2] Assumes the banquet room is used once a week on average: 1.974*420=829.08 per day. 829.08*52 = 43,112.16 gallons year / 365 = 118.1 gal day

[3] Calculated at Rest Home rate, includes water use of entire facility

[4] The three-bedroom condos are calculated at a two bedroom rate to account for the fact that 55+ only households would most likely consist of two people maximum.

[35] SCV Water, 2020 Urban Water Management Plan for Santa Clarita Valley Water Agency – Volume 1 Final, June 2021.

The total estimated increase in water demand per day of 34,042.1 gallons amounts to 38.1 acre-feet of water a year. According to the UWMP the City consumed 65,528 acre-feet of potable water in 2020. The 38.1 acre-foot increase in demand then would be a 0.06 percent increase over total water deliveries in 2020, and would be 0.05 percent of the projected 2025 deliveries of 76,400 acre-feet. This increase in water usage is well within the City's projected water availability estimates. Because the increase is factored into the City's water planning, the project's potential to result in a substantial environmental impact due to insufficient water supplies would be less than significant.

Mitigation Measures: No mitigation measures are required.

c. Less than Significant Impact. Would the project 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?

The project would be served by the Santa Clarita Valley Sanitation District, part of the Los Angeles County Sanitation District, after installing new sewer main lines in Golden Valley Road to connect to existing main lines located at the intersection of Golden Valley Road and Sierra Highway. Wastewater generated from the project site would be conveyed to the Saugus and Valencia Water Reclamation Plants (solids are only processed at Valencia. Combined, the Saugus and Valencia Water Reclamation Plants treat an average of 19.5 million gallons per day (mgd) of wastewater[36] and have a combined capacity to treat 28.1 mgd, and therefore currently have an excess capacity of approximately 8.6 mgd.[37] **Table XIX-2, Project Wastewater Generation per Day,** illustrates estimated wastewater generation for the project.

Table XIX-2
Project Wastewater Generation per Day

Proposed Use	Units or Size	Demand Rate per Day	Estimated Wastewater Generation per Day
Hotel	60 rooms	120 gal per room[1]	5,640 gal
Restaurant	36 seats	30 gal per seat	1,080 gal
Retail Suite	3,320 sf	25 gal per 1,000 sf	83 gal
Banquet Room	1,974 sf	350 gal per 1,000 sf[2]	29.3 gal
Assisted Living	151 rooms	70 gal per room[3]	10,570 gal
Condominiums	73 units	150 gal per unit[4]	10,950 gal
		Estimated average wastewater generation per day	**28,352.3 gallons**

* Rates are based upon the City of L.A. Bureau of Engineering's Sewage Generation Factor chart, revised April 2019.
[1] Assumes an occupancy rate of 78%, the rounded occupancy average from Santa Clarita Valley Economic Development Corporation (SCVEDC), Q1 2025 Economic Snapshot, page 30, Occupancy Rate Q1 2025.
[2] Assumes the banquet room is used once a week on average: 1.974*350=690.9 per day. 690.9*52 = 35,926.8 gallons year / 365 = 98.4 gal day
[3] Calculated at Rest Home rate, includes wastewater generation of entire facility
[4] The three-bedroom condos are calculated at a two bedroom rate to account for the fact that 55+ only households would most likely consist of two people maximum.

The total estimated increase in wastewater generation per day of 28,352.3 gallons would be 0.3 percent of the unused daily treatment capacity (8.6 mgd) of the JWPCP. Therefore**,** there would be adequate treatment capacity for the project and impacts to capacity would be less than significant.

[36] Email correspondence LAC Sanitation Districts: Saugus, 5.2 mgd, June 28, 2023, Valencia 14.3 mgd, February 21, 2024.
[37] LAC Sanitation Districts, Facilities, Saugus and Valencia profiles accessed February 21, 2024 at: https://www.app.lacsd.org/facilities/?tab=2

Mitigation Measures: No mitigation measures are required.

d. Less than Significant Impact. Would the project 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?

Burrtec Waste Industries provides solid waste management services to the City through a franchise agreement with the City. Solid waste is either diverted for recycling or repurposing, or disposed of at landfills. Prior to 2025 Chiquita Canyon Landfill, located near the City's northwesternmost boundary within unincorporated Los Angeles County, would have served the proposed project site. However, after numerous violations of its governing CUP, the landfill closed January 1, 2025. Burrtec has since entered into three year agreement with the Sun Valley Recycle Park Transfer Station operated by Waste Management to accept deliveries of waste.[38] This facility sorts and transfers waste with municipal solid waste from the City transferred to the Simi Valley Landfill.[39] Simi Valley Landfill has a remaining capacity of 79,783,835 tons as of February 2020, and is expected to operate until 2063.[40]

Solid waste generated during project operations is subject to certain state requirements for waste diversion and separation. The California Integrated Waste Management Act of 1989 has been followed by a series of assembly bills including AB 341, AB 1826, and AB 876, which results in the project being required to separate recyclables and organic waste, such as food waste, compostable paper, and landscaping waste, so that they will be diverted from landfills and directed to recycling or composting facilities. This is to meet the State requirement to divert 50 percent of solid waste away from landfills. Residents and businesses are provided with trash, recycling, and green waste bins to separate wastes. Wastes may be further sorted at the transfer station. The estimated solid waste generation rates for the project are detailed below in **Table XIX-3, Operational Solid Waste Generation.**

Table XIX-3
Operational Solid Waste Generation

Proposed Use	Units or Size	Generation Rate per Day	Proposed Solid Waste Generation per Day
Hotel			
Rooms	60 rooms	2.9 lbs per room [1]	136.3 lbs
Restaurant	36 seats	1 lb per seat	36 lbs
Retail suite	3,320 sf	2.5 lbs per 1,000 sf	8.3 lbs
Banquet room	1,974 sf	.005 lbs per sf [2]	1.4 lbs
Assisted Living			
Units, kitchen, dining, and common areas	151 residents	5 lbs per resident	755 lbs
Onsite clinic	4 patient capacity	16 lbs per patient [3]	64 lbs
Administrative offices	990 sf	0.006 lbs per sf	5.9 lbs
Residential Condominiums			
Units	73 units	5.3 lbs per unit	386.9 lbs
Estimated average solid waste generation per day			**1,393.8 lbs**

Source: Rates used reflect an average or best match of sample rates available from the CalRecycle Estimated Solid Waste Generation Rates, located at: https://www2.calrecycle.ca.gov/wastecharacterization/general/rates

[38] Santa Clarita, January 14, 2025 Agenda Reports, Burrtec Alternative Disposal Facility.
[39] Los Angeles County Public Works, December 9, 2025 letter to the Board of Supervisors, Solid Waste Collection Rate Increase Under The Santa Clarita Valley Exclusive Residential Franchise Contract.
[40] CalRecycle, SWIS Facility/Site Activity Details, Simi Valley Landfill & Recycling Center (56-AA-0007) accessed February 25, 2026 from: https://www2.calrecycle.ca.gov/SolidWaste/Site/Search

Proposed Use	Units or Size	Generation Rate per Day	Proposed Solid Waste Generation per Day

[1] Assumes 78% occupancy rate.
[2] Assumes the space is used once a week.
[3] The onsite clinic is presumed to be able to accommodate up to four people at one time. The 16 lbs per patient rate is based on the hospital rate of 16 lbs per bed. Since a hospital provides 24-hour care per bed, the estimate of 16 lbs per patient is better understood to represent the clinic at full capacity (four patients at once) all day.

The estimated average amount of solid waste generated per day is 1,393.8 pounds. Assuming a 50 percent diversion rate, an average of 696.9 pounds per day or 4,878.3 pounds per week of solid waste would be destined for the Simi Valley Landfill. The current daily excess capacity of the landfill is unknown, however, 4,878.3 pounds per week would be a small increase to the City's overall waste output, and Waste Management would not have accepted a three-year commitment if capacity could not account for minor growth within that time period. Also, although Simi Valley Landfill has been identified as the specific recipient landfill, it is not the only landfill where the transfer station could deliver waste to. In addition, the Los Angeles County Department of Public Works issued a report on the impacts of the closure of Chiquita Canyon Landfill and determined there was sufficient excess capacity in landfills within Los Angeles County to handle the 6,600 tons per day the Chiquita facility was accepting.[41] This assessment only considered landfills within Los Angeles County and not diversion of waste to other areas, such as the Simi Valley Landfill. Therefore, project operations would not substantially impact the capacity of local infrastructure or substantially impair the attainment of solid waste reduction goals, and impacts would be less than significant.

Construction Waste

The project intends to balance all excavated soil onsite, so there will be no need to dispose of soil offsite. Demolition of the abandoned house, its accessory structures and paving, will produce a minimal amount of debris that will be disposed at one or more landfills depending on the nature of the material. Other waste generated during construction would be unusable material from the construction process and vegetative material. Per California Green Building Standards Code (Section 5.408) 65 percent of construction waste must be diverted from landfills. This requirement is repeated in the City's Construction and Demolition Ordinance (05-09). The CalEEMod outputs from the Air Quality and Greenhouse Gas Emissions Technical Report (Appendix A) estimate a total of 101 laden demolition hauling trips, which amounts to 101 trucks carrying up to 20 tons each for a total of 2,020 tons of construction waste.[42] The total amount going to landfill facilities would be estimated at 707 tons, as 1,313 tons would be diverted. The estimated amount of debris going to landfills on a daily basis would then be 32.1 tons (707/22), though generally waste would not necessarily leave the site every day. Construction waste can only be handled by licensed haulers, and for this purpose the City has a list of approved haulers that must be used. Green waste, soil, contaminated soil, inert debris, and hazardous debris are all separated either at the project site or at transfer stations in order to meet the 65 percent diversion rate. The 35 percent that would reach a municipal landfill may be taken to the nearest facility, which is the Sunshine Canyon Landfill located at the northern edge of Los Angeles. This landfill is expected to operate until 2037 and receives approximately 8,300 tons of municipal solid waste per day and is permitted to receive up to 12,100 tons per day.[43,44] Therefore, there is sufficient capacity available for disposal of the project's construction waste and impacts would be less than significant.

[41] Los Angeles County Public Works, February 25, 2025, Board Motion of January 7, 2025, Agenda Item 11 Addressing the Closure of Chiquita Canyon Landfill
[42] CalEEMod section 5.3.1 estimates 4.59 trips per day for a demolition period of 22 days. The default truck size carries 20 tons.
[43] CalRecycle, SWIS Facility/Site Activity Details, Sunshine Canyon City/County Landfill (19-AA-2000), accessed February 25, 2026 from: https://www2.calrecycle.ca.gov/SolidWaste/Site/Search
[44] SCAQMD, Sunshine Canyon Landfill news webpage, accessed February 25, 2026 at: https://www.aqmd.gov/home/news-events/community-investigations/sunshine-canyon-landfill

Mitigation Measures: No mitigation measures are required.

e. Less than Significant Impact. Would the project comply with federal, State, and local management and reduction statutes and regulations related to solid waste?

As mentioned above construction waste can only be handled by approved haulers who must maintain proper licensing and individual manifests for individual projects. Landfills, whether they accept green waste, inert debris, hazardous waste, or municipal solid waste, must maintain licensing from the state, ensure proper handling of waste, submit to inspections, and inspect debris/manifests entering the facility. The waste hauler for operations of the project also must abide by state requirements which govern waste disposal, as does the transfer station waste will be delivered to, and the recipient landfills waste is then transferred to. There are no aspects of the project that could be presumed to result in noncompliance of solid waste regulations as each link in the waste disposal stream must be presumed to abide by the regulations that are in place. The project would generate solid waste typical of construction and then of residential and commercial uses, and the use of authorized, professional disposal services would result in routine compliance with all Federal, State, and local laws, statutes, and ordinances regarding the proper disposal of solid waste. Impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XX. WILDFIRE. If located in or near state responsibility areas or land classified as very high fire hazard severity zones, would the project:				
a. Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b. Due to slope, prevailing winds, and other factor, 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 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?	☐	☐	☒	☐

Impact Analysis

a. Less than Significant Impact. If located in or near a VHFHSV, would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

The project is located within a Very High Fire Hazard Severity Zone (VHFHSZ).[45] As explained in Section IX.f, the City does not have an adopted emergency evacuation plan but does have an EOP, and because the County provides fire protection and law enforcement services, the LA County OAEOP is also relevant to the project.

The EOP and OAEOP are not plans that are crafted to deal with specific emergencies at specific locations, rather, they organize and facilitate how agencies coordinate during an emergency which may include evacuation proceedings. The command and coordination network and hierarchy of the plans are based upon the SEMS, which itself is based upon the NIMS. It clarifies each element of the emergency management organization and the responsibilities of each party to ensure an organized and effective response during a major disaster, wherein each agency's actions are built upon the same ICS framework and processes for every stage of the response. This system-wide coordination constitutes the emergency response plan for whatever emergency is at hand. The plans are both organizational frameworks that coordinates the operations of public agencies during an emergency system, therefore, the project would not conflict with the EOP or OAEOP in any manner. However, an impact could exist if the project introduced conditions

[45] CAL FIRE, Fire Hazard Severity Zone Viewer, Accessed March 5, 2025, at: https://experience.arcgis.com/experience/03beab8511814e79a0e4eabf0d3e7247/

that placed a unique or undue burden on emergency responders which significantly impaired the execution of an emergency response.

The nearest evacuation route to the project site is State Route 14, approximately .75 miles southeast from the project site. No activities occurring on the site, either during construction or operation, would directly impact this route. During construction the mix of construction vehicles will arrive and depart at different intervals and would not be great enough in numbers to cause substantial impairment of the routes, and evacuations are accommodated on a dynamic basis at the time of an emergency. In the area in and around the project site evacuation proceedings would be directed by either the LACoFD or the LA County Sherriff's Department Emergency Operations Bureau who are tasked with announcing and managing evacuations consistent with the OAEOP and SEMS in coordination with the LACoFD. In whichever case, each entity would operate according to the ICS and SEMS, the purposes of which are to provide multi-agency or inter-agency coordination during emergencies. Evacuation warnings and orders may be made in a phased manner according to vulnerability, location, or other factors, which would enable traffic surges on roadways to be minimized over time allowing for a more an orderly flow of vehicles exiting an evacuation area. Once a warning or order is issued, it is important to note that the timely evacuation of residential properties depends upon timely cooperation from the individuals under evacuation orders.

To assist in public awareness and preparation for wildfires the Ready Set Go! (RSG) Program was developed within the state and is now utilized nationwide, managed by the International Association of Fire Chiefs. RSG is an educational and awareness campaign focused on helping residents living in high fire areas, and businesses located there, prepare for the eventuality of living through a wildfire. The LACoFD RSG program consists of outreach and information available from the department, and this information is promoted by the City. The RSG program emphasizes that practical limits on firefighting resources requires individual residents to take responsibility for their response to wildfire. The City maintains the santaclaritaemergency.com website which consolidates emergency updates, and residents can subscribe to the Everbridge Nixle service which allows the City to send text messages to residents besides those that might be sent via the Emergency Alert System. Provided employees, residents and visitors to the project respond to direction from authorities during a wildfire event, operation of the project would not substantially impair emergency response activities.

Because the project site is within a VHFHSZ buildings will be required to conform to Title 24, Part 7, the California Wildland-Urban Interface Code (CWUIC), which details project site access, water supply, and fire protection plan requirements; minimum standards for the location, design and construction of buildings and structures within a VHFHSZ; and defensible space requirements. The structures specifically will have class-A roof assemblies, which offer the highest resistance to fire, ignition-resistant cladding, non-combustible exterior doors and windows, and ember-proof exterior venting, which create a very fire-resistant exterior shell. The project will also be required to conform to Title 24, Part 9, the California Fire Code (CFC). Chapter 7 of the CFC regulates materials, systems and assemblies used for structural fire resistance and fire-resistant separation of adjacent spaces to safeguard against the spread of fire and smoke within a building, and the spread of fire to or from buildings. The chapter details requirements for structural members, walls, partitions, and horizontal assemblies. Chapter 9 of the CFC specifies internal fire protection systems for building and occupancy types, and all project structures will be equipped with fire sprinklers. The combination of these requirements will result in structures designed to be very resistant to exterior fire and impervious to the intrusion of wind-borne embers, and designed to contain the spread of, and extinguish, a structural fire.

Surrounding landscaping will be irrigated which will significantly reduce combustibility and provide a buffer from wildfire burning in untended open space. Landscaping will also be required to conform to fuel modification requirements enforced by the Los Angeles County Fire Department (LACoFD) wherein landscaping is limited with the first 30 feet, all landscaping is irrigated within 100 feet, and all vegetation

within 100 to 200 feet is maintained for fuel reduction purposes. These requirements create buffered spaces that reduce the likelihood of a nearby wildfire affecting structures, and provide adequate space for fire crews to fight encroaching wildfires before they seriously threaten structures. Fire code standards include access roads which allow all structures to be reached by firefighters and adequate space to maneuver equipment. Access roads must allow space for engines or other equipment to pass while another engine is engaged in firefighting on the same road. Fire code standards also mandate adequate fire hydrants and/or standpipes as need so that all structures are within an appropriate distance to provide water to engines, and water-pressure standards to ensure there is adequate flow available for firefighting. During construction the project will observe the requirements of Chapter 33 of the CFC which outlines general fire safety precautions for all construction operations. The requirements seek to maintain required levels of fire protection, limit fire spread, establish the appropriate operation of equipment and promote prompt response to fire emergencies.

Compliant site design provides adequate space for firefighting operations, irrigated landscaping and fuel modification requirements provide vegetative buffers from wildfire events, and fire hardening measures will make structural fires significantly less likely to occur or result in out of control fires within the development. This combination of requirements, which will be reviewed and approved by the LACoFD for adequacy, will substantially reduce the wildfire risk faced by the project, and the project's risk of structural fires resulting from nearby wildfire, to the extent that the project would not create a situation where an inordinate burden would be placed upon fire protection services during wildfire events, and impacts to emergency response or emergency planning would be less than significant.

Mitigation Measures: No mitigation measures are required.

b. Less than Significant Impact. If located in or near a VHFHSV, would the project, 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?

A development could exacerbate wildfire risk if the development was placed into a context, or created a context, which exposed its structures or occupants to an inordinate level of potential danger from a wildfire. For example, an increased risk of conflagration of structures due to their placement on or at the top of a naturally vegetated slope or at the mouth of a canyon where prevailing winds are naturally accelerated, or within a topography that creates ideal conditions for the spread of wildfire.

The existing topography of the project site is fairly complex with slopes of various aspects and grades throughout, with an overall rise in elevation from north to south. Most of the site (20.61 acres or 73 percent) averages between 21 and 24 percent grade slopes. The steepest slopes are along the most prominent ridge that runs through the center of the site, beginning behind the existing single-family house and running north until the ridge dips. In this 7.97 acre area slopes average from 30 to 63 percent. Fire moves more rapidly uphill because vegetation higher up a slope will be preheated by the fire below it. Therefore, development on top of the central ridge adjacent to the steepest slopes would exposure structures to significant risk. The proposed project essentially removes this feature by lowering and flattening the ridge and redistributing the soil to create level pads for the component parts of the project. There will be areas of steep slopes (50%) near structures, but in all cases these will be manufactured slopes with irrigated landscaping that conforms to LACoFD fuel modification requirements. The only structure adjacent to a vegetated slope will be the hotel, the rear of which (northeast side) will be near the eastern property line and above a constructed slope. Landscaping on the slope will be irrigated, and all landscaping contiguous to it will be irrigated as well. Adjacent to the east is an offsite irrigated, constructed slope, and all of the contiguous landscaping to the north is irrigated landscaping within the project. None of the other project structures are adjacent to a steep downward slope, and all landscaping that is near structures will be irrigated and as mentioned, compliant with LACoFD fuel modification requirements which requires landscaping to not create fuel ladders.

Therefore, the project would not significantly exacerbate wildfire risk due to the project's relationship to site topography.

The existing topography on site is complex, but the features present are not prominent enough to have a significant influence on wind speed or direction. Wind is generated primarily through differences in atmospheric pressure, which results from differences in temperatures. For example, mountain peaks will be significantly cooler than lower valleys during the evening causing air to descend into valleys creating a mountain wind. During the day air on the peaks is heated more rapidly than air in the valleys causing the valley air to rise, creating a valley breeze. Prevailing winds in the Santa Clarita Valley are generated in this manner, and by offshore winds reaching the valley travelling through and over the surrounding hills.[46] Large features such as mountain passes can constrict and increase the speed of winds, such as Soledad Pass to the northeast, which is large enough to constrict the flow of winds traveling south from the Great Basin to create the extreme gusts known as the Santa Ana winds in the area.[47] None of the features on site are large enough to influence wind is such a substantial manner, and the project will generally reduce the complexity of the terrain, so the project would not significantly exacerbate wildfire risk due to the project's relationship to the predominant winds experienced on site.

Santa Ana winds of course create wildfire conditions, and the project will experience these winds likely on a yearly basis. However, the site is not more exposed nor more susceptible to these conditions than elsewhere within the valley. The primary locational factor affecting the project site that could serve to exacerbate wildfire risk is the presence of open space to the northwest and south of the site. The project is placed within the wildland-urban interface (WUI) which creates more exposure to wildfire risk than a project constructed in an already developed area, but it is not an especially extreme case of this type of development, and it is required to conform to regulations designed to reduce risk in such situations. As discussed project buildings will be required to conform to the CWUIC which will require class-A roof assemblies, ignition-resistant cladding, non-combustible exterior doors and windows, and ember-proof exterior venting, which create a fire-resistant exterior shell. The project will also be designed to resist the ignition and spread of structural fires through compliance with Chapters 7 and 9 of the CFC which require fire-rated interior separations and interior fire sprinklers which serve to contain and extinguish fires within the buildings. In addition, because the project would comply with Title 24 Building Energy Efficiency Standards building air filters would be required to have Minimum Efficiency Reporting Value (MERV) 13 or higher air filters installed. MERV 13 filters are the highest rated filters that typical residential HVAC systems can accommodate and would be required for the hotel as well. These filters are recommended by the US EPA for the purposes of cleaning wildfire smoke from there air.[48] All of these combined measures, along with fire access standards, will result in a defensible development and ignition-resistant structures wherein the project will not significantly exacerbate wildfire risk despite its proximity to open space, and impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

c. Less than Significant Impact. If located in or near a VHFHSV, would the project require the installation 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?

[46] LA County Department of Regional Planning, Santa Clarita Valley Area Plan, One Valley One Vision, 2012, IX. Air Resources

[47] Cajon Pass and San Gorgonio Pass are the predominant features east of the valley accelerating winds for the rest of Southern California during Santa Ana conditions.

[48] US EPA website epa.gov, "Research on DIY Air Cleaners to Reduce Wildfire Smoke Indoors," and "Preparing for Fire Season," accessed August 14, 2025 at: www.epa.gov /air-research/research-diy-air-cleaners-reduce-wildfire-smoke-indoors and /wildfire-smoke-course/preparing-fire-season

The project will construct a new public road leading to the hotel, and private roads leading to the rest of the development, as well as a water detention facility to the north of the residences. The construction of this infrastructure has been accounted for in the analysis of the project's environmental impacts and has been found to not result in significant impacts, and the development will actually serve to overall decrease wildfire risk relative to existing conditions as the irrigated landscaping and fire-hardened structures will be far less likely to spread fire than the existing untended vegetation on site. The construction of this infrastructure will also not exacerbate wildfire risk as the necessary construction activities are no different than the activities that will take place for construction of the rest of the project. Impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

d. Less than Significant Impact. If located in or near a VHFHSV, would the project, 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?

If the stability of a development built upon a slope relies upon features that can be damaged or destroyed by wildfire, there may be a potential for a post-fire rain event to result in flooding or landslides which can expose people and other properties to risk. This could result from damage to features which stabilize the land, such as vegetation or retaining walls, or damage to a building's foundation or major structural elements, or stormwater control features, which could weaken a development's ability to withstand a post-fire rain event. Vegetative fires can also create hydrophobic soils which resist absorption of rainfall which can increase erosion and water runoff.

The stability of the development does not rely on features that are especially susceptible to failure from wildfire. The steeper manufactured slopes on the site, though irrigated, could potentially be burned during a wildfire. These slopes will be engineered for stability with or without groundcover, but in a situation where fire was intense enough to create hydrophobic soil, erosion could occur. This is accounted for in the engineering of the site and is addressed in the Hydrology Report (Appendix F). The "burned and bulked" discharge flows of the subbasins on site are analyzed both pre- and post-developed. The burned and bulked flow calculates the flow of a burned vegetated area wherein debris from the burn is increased the volume and velocity of flows and transports sediment and debris. Stormwater facilities must provide Capital Flood protection which is the burned and bulked runoff from a 50-year frequency design storm falling on a saturated watershed. In other words, the site must be designed to handle a 50-year storm event following an idealized vegetation fire that results in a loss of vegetative cover which produces an idealized quantity of debris. According to the Hydrology Report the slopes behind the hotel are not predicted to generate debris flow in such a scenario, whereas under existing conditions they would. In general only areas that retain natural landforms and vegetation would be expected to generate debris flows in such a scenario, but at rates that do not surpass County standards. The site is therefore protected from a Capital Flood scenario and would remain stable if vegetation on site were burned and immediately followed by a large storm event. The drainage terraces and stormwater conveyances provided by the roads and parking lots would adequately control erosion in a Capital Flood scenario such that the project would not significantly contribute to post-wildfire flooding or landslides that could impact the site or other developed areas. Therefore, impacts would be less than significant.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XXI. MANDATORY FINDINGS OF SIGNIFICANCE.				
a. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of 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 an individual 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 that cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

Impact Analysis

a. Less than Significant Impact. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of 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?

As explained in Section V there are no known prehistoric archaeological resources on the project site and archeological monitoring is required during initial grading by MM CUL-1 in order to reduce potential impacts to unknown archaeological resources to less than significance. As discussed above in Section IV the project does not have the potential to eliminate a plant or animal community, reduce the habitat of fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels or restrict the range of any plant or animal. Mitigation measures BIO-1 through BIO-9 are required to reduce all potential impacts to less than significance. The mitigation measures imposed in Sections V and IV are adequate to protect cultural and biological resources and no further impacts beyond those previously identified are anticipated, and there is no need for additional mitigation measures. Impacts would be less than significant.

Mitigation Measures: No additional mitigation measures are required.

b. Less than Significant Impact. Does the project have impacts that are individually limited, but cumulatively considerable?

The definition of a cumulatively considerable impact is provided in Guidelines section 15065(a)(3):

> "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

Areas adjacent to and near the project site are assumed to be developed in the future according to the land uses determined by the General Plan. The project could result in cumulatively considerable impacts if its individual impacts would contribute to a larger or more severe impact that results from successive individual impacts. As concluded in this analysis, the project's incremental contribution to each evaluated issue would be less than significant, mitigated to less than significant, or would have no impact. Assessment of air quality and greenhouse gas impacts are by nature cumulative analyses, and because the project results in less than significant impacts it would not contribute to any such cumulative impacts. In order to cumulatively contribute to other impacts the project would have to impact resources that would be successively impacted by future projects to the point of a significant effect, and there is no evidence in the record the project would result in impacts to any such resources. The project is developed according to the assumptions of the General Plan and as such would not cumulatively contribute to impacts related to anticipated growth, and the same can be assumed for successive planned development. As such, the project's contribution to cumulative impacts would be less than significant and no additional mitigation measures are required.

Mitigation Measures: No mitigation measures are required.

c. Less than Significant Impact. Does the project have environmental effects that cause substantial adverse effects on human beings, either directly or indirectly?

As discussed in the preceding analysis, the project would not produce any significant impacts upon the environment that cannot be mitigated. All relevant aspects of the project have been analyzed and there is no substantial evidence that the project would have additional environmental effects that cause substantial adverse effects on human beings, either directly or indirectly, therefore, impacts would be less than significant.

Mitigation Measures: No mitigation measures are required.

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APPENDIX A
Air Quality and Greenhouse Gas Emissions Technical Report

Golden Valley-Sierra Highway Mixed-Use Project

Air Quality and Greenhouse Gas Emissions Technical Report

July 2024

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1.0 INTRODUCTION

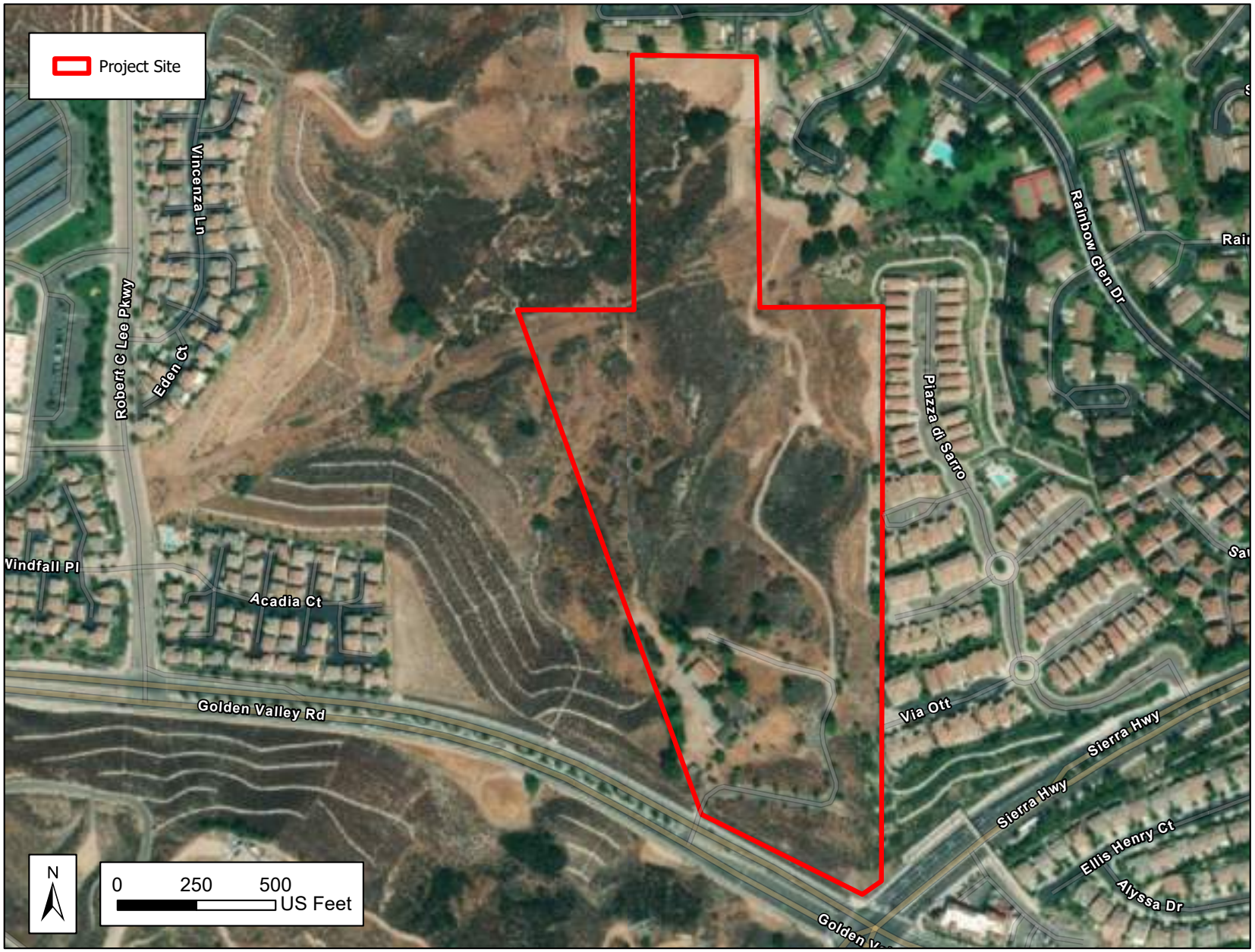
This Air Quality and Greenhouse Gas Technical Report evaluates air quality and greenhouse gas (GHG) emissions associated with the proposed Golden Valley-Sierra Highway Mixed-Use (Project) in the City of Santa Clarita (City). This report has been prepared by Impact Sciences, Inc., to support the Project's environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA) for the City. This analysis considers both the temporary air quality and GHG impacts from Project construction and long-term impacts associated with operation of the Project.

1.1 PROJECT LOCATION

The 28.13-acre Project Site is located at the northwest corner of Golden Valley Road and Sierra Highway, in the City. Currently, the majority of the site is vacant except for the single-family residence and accessory structures that are located near the southerly portion of the property near Golden Valley Road. The Project Site is designated as Mixed-Use Neighborhood Planned Development Overlay Zone (MX-N (PD)). The proposed uses are consistent with the City General Plan, Unified Development Code, and Zoning designations. Adjacent uses include residential uses to the immediate north and east, vacant land to the south, and residential uses/Golden Valley High School to the west. The surrounding uses along Golden Valley Road and Sierra Highway consist of mostly established residential uses, schools, and neighborhood commercial retail centers. See **Figure 1, Aerial Photograph of the Project Site**.

1.2 PROJECT DESCRIPTION

The Project involves the demolition of the existing single-family residence and associated debris, and development of a mixed-use project consisting of 151 senior assisted living units, 73 residential units, a 60-room hotel (with 2,544 square feet (sf) of banquet space, 3,315 sf of retail space, and 2,360 sf of restaurant space), and 5.83 acres of open space. See **Figure 2, Project Site Plan.** The Project Site would be graded with a volume totaling 360,000 cubic yards of cut and fill to be balanced on site. No soil import or export is anticipated at this time. This analysis assumes full operation by the year 2026.



SOURCE: Esri, 2022

FIGURE **1**

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Aerial Photo of the Project Site

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SOURCE: Land Design Consultants Inc., 2024

FIGURE **2**

IMPACT SCIENCES

Project Site Plan

1415.001•07/24

2.0 AIR QUALITY

2.1 AIR QUALITY SETTING

South Coast Air Basin

The Project Site is located within the Los Angeles County portion of the South Coast Air Basin (Basin). The Basin includes all of Orange County and the non-desert portions of Los Angeles, San Bernardino, and Riverside Counties. The regional climate within the Basin is considered semi-arid and is characterized by warm summers, mild winters, infrequent seasonal rainfall, moderate daytime onshore breezes, and moderate humidity. The air quality within the Basin is primarily influenced by meteorological conditions and a wide range of emissions sources – such as dense population centers, heavy vehicular traffic, and industry. The South Coast Air Quality Management District (SCAQMD) divides the Basin into source receptor areas (SRAs) in which monitoring stations operate to monitor the various concentrations of air pollutants in the region. As shown in **Figure 3, Source Receptor Area Location Map**, the Project Site is located within SRA 13, which covers the Santa Clarita Valley area.

In 2004, the SCAQMD provided an expanded air quality analysis of the Santa Clarita Valley subregion. The *Santa Clarita Subregional Analysis*[1] indicated that the Santa Clarita Valley is a relatively small contributor to the total emissions of the key pollutants in both Los Angeles County and the Basin. Emissions occurring in the Santa Clarita Valley typically comprise less than 3 percent of the County and 2 percent of the Basin, based on 2002 emissions inventory data. While the Santa Clarita Valley contributes a small amount of pollutants to the region, it experiences disproportionately high concentrations of ozone and particulate matter. The subregional analysis stated that the overwhelming contribution of pollution transport to the Santa Clarita Valley comes from the San Fernando Valley and metropolitan Los Angeles. This is evidenced by meteorological monitoring data for the Santa Clarita Valley that show the primary daytime wind vectors are from the southern and upwind emission source areas. The subregional analysis also indicated that, in general, average transport, which is characterized by a moderate-to-strong sea breeze through the Newhall Pass, occurs two-thirds of all days and, that in contrast, Santa Clarita is mostly impacted from local emissions under calm winds and weak offshore flow which occurs less than 10 percent of all days. Therefore, the disproportionate impact of air pollutants in the Santa Clarita Valley is caused by the regional and local climate.

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

21865 Copley Drive, Diamond Bar, CA 91765-4182
Information: 1-800-CUT-SMOG (1-800-288-7664)
Internet: http://www.aqmd.gov

Air Quality Reporting

Since 1977, the South Coast Air Quality Management District has served as the local government agency responsible for measuring, reporting and taking steps to improve air quality.

To inform the AQMD's 15 million residents about air quality conditions, the AQMD issues an air quality forecast each day and reports current air quality conditions for each numbered Monitoring Area and General Forecast Area depicted here.

This air quality information is transmitted to the public through newspapers, television, radio and pager services, through faxes to schools, through recorded messages on the AQMD's toll-free Smog Update telephone line, 1-800-CUT-SMOG, and on the AQMD's Internet Website http://www.aqmd.gov.

Newspapers, television and radio stations typically will report air quality information using the General Forecast Areas, shown in color below, which are larger groupings of the more specific Air Monitoring Areas.

The 1-800-CUT-SMOG (1-800-288-7664) line also provides smog forecast and current smog level information by ZIP code.

The AQMD's Internet Website provides both forecasts as well as smog levels for that day and the previous day. Forecasts for the next day normally are posted by noon.

General Forecast Areas & Air Monitoring Areas

Coastal
- Northwest Los Angeles County Coastal 2
- Southwest Los Angeles County Coastal 3
- South Los Angeles County Coastal 4
- North Orange County Coastal 18
- Central Orange County Coastal 20

Metropolitan
- Central Los Angeles County 1
- Southeast Los Angeles County 5
- South Central Los Angeles County 12
- North Orange County 16

San Fernando Valley
- West San Fernando Valley 6
- East San Fernando Valley 7
- Santa Clarita Valley 13

San Gabriel Valley
- West San Gabriel Valley 8
- East San Gabriel Valley 9
- Pomona/Walnut Valley 10
- South San Gabriel Valley 11

Inland Orange County
- Central Orange County 17
- Saddleback Valley 19
- Capistrano Valley 21

Riverside Valley
- Corona/Norco Area 22
- Metropolitan Riverside 23

San Bernardino Valley
- Northwest San Bernardino Valley 32
- Southwest San Bernardino Valley 33
- Central San Bernardino Valley 34
- East San Bernardino Valley 35

Hemet/Elsinore Area
- Perris Valley 24
- Lake Elsinore 25
- Hemet/San Jacinto Valley 28

Temecula/Anza Area
- Temecula Valley 26
- Anza Area 27

San Gabriel Mountains 15

San Bernardino Mountains
- West San Bernardino Mountains 36
- Central San Bernardino Mountains 37

Big Bear Lake 38

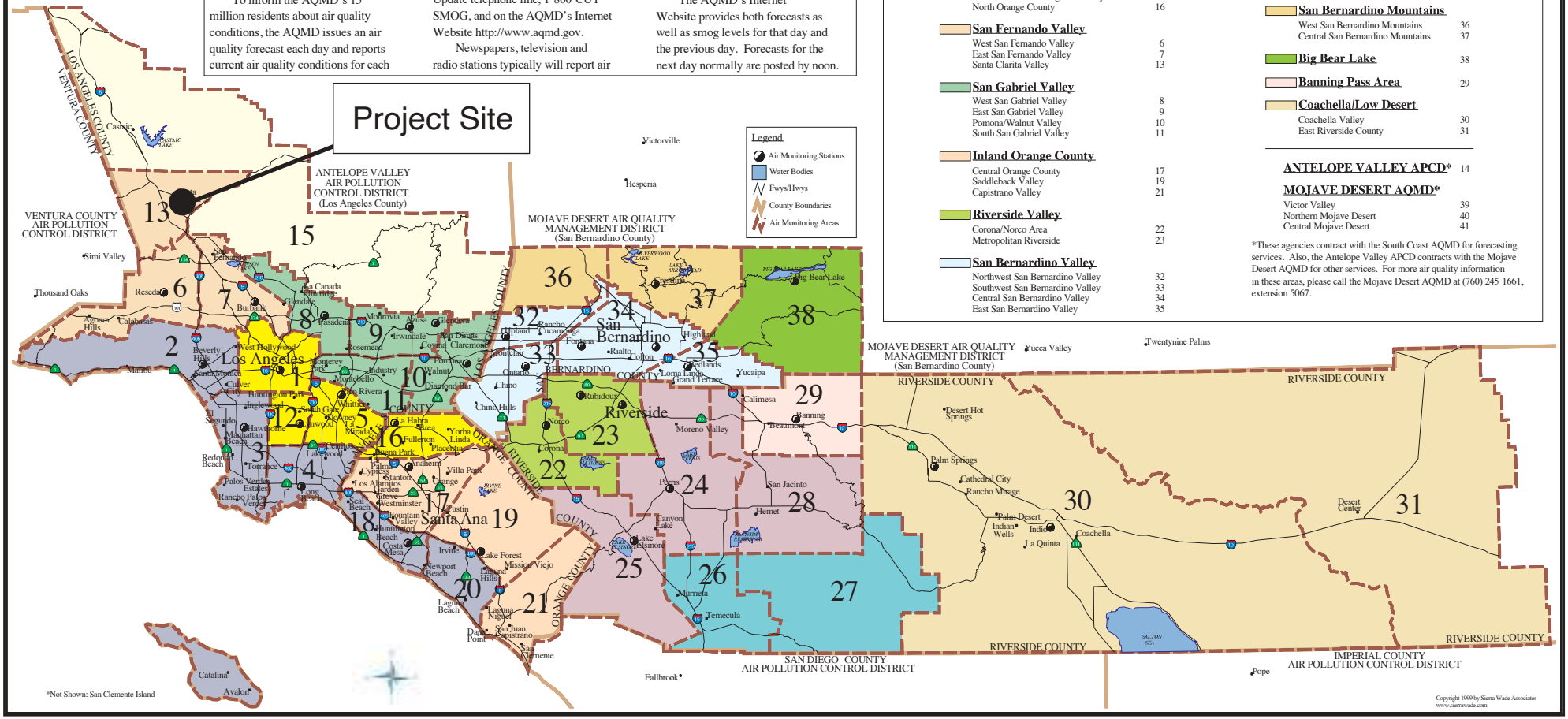
Banning Pass Area 29

Coachella/Low Desert
- Coachella Valley 30
- East Riverside County 31

ANTELOPE VALLEY APCD* 14

MOJAVE DESERT AQMD*
- Victor Valley 39
- Northern Mojave Desert 40
- Central Mojave Desert 41

*These agencies contract with the South Coast AQMD for forecasting services. Also, the Antelope Valley APCD contracts with the Mojave Desert AQMD for other services. For more air quality information in these areas, please call the Mojave Desert AQMD at (760) 245-1661, extension 5067.



SOURCE: SCQAMD, 2022

FIGURE 3

IMPACT SCIENCES

Source Receptor Area Map

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Air Pollutants of Concern

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards for outdoor concentrations. The federal and state standards have been set at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons such as children, pregnant women, and the elderly, from illness or discomfort. Criteria air pollutants include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter 2.5 microns or less in diameter (PM2.5), particulate matter ten microns or less in diameter (PM10), and lead (Pb). Note that reactive organic gases (ROGs), which are also known as reactive organic compounds (ROCs) or volatile organic compounds (VOCs), and nitrogen oxides (NOx) are not classified as criteria pollutants. However, ROGs and NOx are widely emitted from land development projects and participate in photochemical reactions in the atmosphere to form O_3; therefore, NOx and ROGs are relevant to the proposed Project and are of concern in the air basin. As such, they are listed below along with the criteria pollutants. Sources and health effects commonly associated with criteria pollutants are summarized in **Table 1, Criteria Pollutants Summary of Common Sources and Effects**.

Table 1
Criteria Pollutants Summary of Common Sources and Effects

Pollutant	Major Man-Made Sources	Human Health & Welfare Effects
Carbon Monoxide (CO)	An odorless, colorless gas formed when carbon in fuels is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
Nitrogen Dioxide (NO_2)	A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Sources include moto vehicles, electric utilities, and other sources that burn fuel.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Contributes to global warming and nutrient overloading which deteriorates water quality. Causes brown discoloration of the atmosphere.
Ozone (O_3)	Formed by a chemical reaction between volatile organic compounds (VOC) and nitrous oxides (NOx) in the presence of sunlight. VOCs are also commonly referred to as reactive organic gases (ROGs). Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, gasoline storage and transport, solvents, paints, and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing, and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield. Damages rubber, some textiles, and dyes.
Particulate Matter (PM10 & PM2.5)	Produced by power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles, and others.	Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).

Pollutant	Major Man-Made Sources	Human Health & Welfare Effects
Sulfur Dioxide (SO_2)	A colorless, nonflammable gas formed when fuel containing sulfur is burned; when gasoline is extracted from ore. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships.	Respiratory irritant; aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid which can damage marble, iron, and steel. Damages crops and natural vegetation. Impairs visibility. Precursor to acid rain.

Source: CAPCOA, Health Effects. Available: http://www.capcoa.org/health-effects/

2.2 AMBIENT AIR QUALITY

Criteria Air Pollutant Monitoring Data

Ambient air quality in Santa Clarita can be inferred from ambient air quality measurements conducted at nearby air quality monitoring stations. Existing levels of ambient air quality and historical trends and projections are documented by measurements made by the SCAQMD, the air pollution regulatory agency in the Basin. The SCAQMD maintains air quality monitoring stations which process ambient air quality measurements throughout the Basin.

The purpose of the monitoring station is to measure ambient concentrations of pollutants and determine whether ambient air quality meets the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS). Ozone and particulate matter (PM10 and PM2.5) are pollutants of particular concern in the Basin. The monitoring station located closest to the Project Site and most representative of air quality is the Santa Clarita-Placerita station, located at 22224 Placerita Canyon Road (SCAQMD Station No. 090). Ambient emission concentrations vary due to localized variations in emissions sources and climate and should be considered "generally" representative of ambient concentrations near the Project Site. The Santa Clarita-Placerita station monitors O_3, NO_2, CO, and PM10. Particulate matter 2.5 microns in diameter or less (PM2.5) is not measured at the Santa Clarita-Placerita station. The nearest station to the Project Site measuring PM2.5 is the Reseda station (SCAQMD Station No. 074). The air quality data monitored at the Santa Clarita-Placerita and Reseda stations are presented in **Table 2, Air Monitoring Station Ambient Pollutant Concentrations**.

Table 2
Air Monitoring Station Ambient Pollutant Concentrations

Pollutant	Standards[1]	Year		
		2020	2021	2022
OZONE (O_3)				
Maximum 1-hour concentration monitored (ppm)		0.148	0.125	0.129
Maximum 8-hour concentration monitored (ppm)		0.122	0.103	0.114
Number of days exceeding state 1-hour standard	0.09 ppm	44	30	28
Number of days exceeding federal/state 8-hour standard	0.070 ppm	73	63	68
NITROGEN DIOXIDE (NO_2)				
Maximum 1-hour concentration monitored (ppm)		0.046	0.057	0.052
Annual average concentration monitored (ppm)		0.009	0.009	0.009
Number of days exceeding state 1-hour standard	0.18 ppm	0	0	0
CARBON MONOXIDE (CO)				
Maximum 1-hour concentration monitored (ppm)		1.2	1.0	1.0
Maximum 8-hour concentration monitored (ppm)		0.8	0.7	0.6
Number of days exceeding state 1-hour standard	20 ppm	0	0	0
Number of days exceeding federal 1-hour standard	35 ppm	0	0	0
RESPIRABLE PARTICULATE MATTER (PM10)				
Maximum 24-hour concentration monitored ($\mu g/m^3$)		48.0	47	36
Annual average concentration monitored ($\mu g/m^3$)		22.5	19.9	18.5
Number of samples exceeding state standard	50 $\mu g/m^3$	0	0	0
Number of samples exceeding federal standard	150 $\mu g/m^3$	0	0	0`
FINE PARTICULATE MATTER (PM2.5)				
Maximum 24-hour concentration monitored ($\mu g/m^3$)		27.6	55.5	20.5
Annual average concentration monitored ($\mu g/m^3$)		10.1	10.0	8.8
Number of samples exceeding federal standard	35 $\mu g/m^3$	0	9	0

Source: California Air Resources Board, "Air Quality Data Statistics," http://www.arb.ca.gov/adam/. 2023.
SCAQMD. 2023. Air Quality South Coast Air Quality Management District, https://www.aqmd.gov/home/air-quality/historical-air-quality-data/historical-data-by-year, accessed February 1, 2024.,
NA = not available
[1] *Parts by volume per million of air (ppm), micrograms per cubic meter of air ($\mu g/m^3$), or annual arithmetic mean (aam).*

The attainment status for the Basin region is included in **Table 3, Attainment Status of Criteria Pollutants in the South Coast Air Basin**. Areas that meet ambient air quality standards are classified as attainment areas, while areas that do not meet these standards are classified as nonattainment areas. The Basin region is designated as a nonattainment area for federal ozone, PM2.5, and lead standards and is designated as nonattainment for state ozone, PM10, and PM2.5 standards.

Table 3
Attainment Status of the South Coast Air Basin

Pollutant	State	Federal
Ozone (O_3)	Non-Attainment	Non-Attainment
Particulate Matter (PM10)	Non-Attainment	Attainment
Particulate Matter (PM2.5)	Non-Attainment	Non-Attainment
Carbon Monoxide (CO)	Attainment	Attainment
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Lead	Attainment	Non-Attainment (Partial)[1]

Source: SCAQMD. 2016. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) Attainment Status for South Coast Air Basin. Available online at: https://ww2.arb.ca.gov/resources/documents/ambient-air-quality-standards-0, accessed February 1, 2024.[1] The Los Angeles County portion of the Basin is designated as a non-attainment area for the federal lead standard on the basis of source-specific monitoring at two locations as determined by U.S. EPA using 2007-2009 data. However, all stations in the Basin, including the near-source monitoring in Los Angeles County, have remained below the lead NAAQS for the 2012 through 2015 period. The SCAQMD will request that the U.S. EPA re-designated the Los Angeles County portion of the Basin as attainment for lead.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. TACs are considered either carcinogenic or noncarcinogenic based on the nature of the health effects associated with exposure to the pollutant. For regulatory purposes, carcinogenic TACs are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes, such as petroleum refining and chrome-plating operations; commercial operations, such as gasoline stations and dry cleaners; and motor vehicle exhaust. Public exposure to TACs can result from emissions from normal operations, as well as from accidental releases of hazardous materials during upset conditions. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage, or short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches.

To date, CARB has designated 244 compounds as TACs. Additionally, CARB has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risks from TACs can be attributed to a relatively few compounds.[2]

CARB identified diesel particulate matter (DPM) as a TAC. DPM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Diesel exhaust is a complex mixture of particulates and gases produced when an engine burns diesel fuel. DPM is a concern because it causes lung cancer; many compounds found in diesel exhaust are carcinogenic. DPM includes the particle-phase constituents in diesel exhaust. The chemical composition and particle sizes of DPM vary between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), fuel formulations (high/low sulfur fuel), and the year of the engine. Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and diesel exhaust can cause coughs, headaches, light-headedness, and nausea. DPM poses the greatest health risk among the TACs. Almost all diesel exhaust particle mass is 10 microns or less in diameter. Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardiovascular diseases.[3]

Residential areas are considered sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Children are considered more susceptible to health effects of air pollution due to their immature immune systems and developing organs.[4] As such, schools are also considered sensitive receptors, as children are present for extended durations and engage in regular outdoor activities. Recreational land uses are considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. The closest

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2 California Air Resources Board. *CARB Identified Toxic Air Contaminants*. Available online at: https://ww2.arb.ca.gov/resources/documents/carb-identified-toxic-air-contaminants.

3 California Air Resources Board. *Sensitive Receptor Assessment*. Available online at: https://ww2.arb.ca.gov/capp-resource-center/community-assessment/sensitive-receptor-assessment.

4 Office of Environmental Health Hazard Assessment and The American Lung Association of California. *Air Pollution and Children's Health*. Available online at: https://oehha.ca.gov/air/air-pollution-and-childrens-health-fact-sheet-oehha-and-american-lung-association.

sensitive receptors are residences located approximately 15 feet to the north and to the east of the Project Site.

2.3 REGULATORY FRAMEWORK

Federal

Clean Air Act

The Clean Air Act (CAA) of 1970 and the CAA Amendments of 1971 required the U.S. Environmental Protection Agency (EPA) to establish NAAQS, with states retaining the option to adopt more stringent standards or to include other specific pollutants. On April 2, 2007, the Supreme Court found that carbon dioxide is an air pollutant covered by the CAA; however, no NAAQS have been established for carbon dioxide.

These standards are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare. They are designed to protect those "sensitive receptors" most susceptible to further respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

The EPA has classified air basins (or portions thereof) as being in attainment, nonattainment, or unclassified for each criteria air pollutant, based on whether or not the NAAQS have been achieved. If an area is designated unclassified, it is because inadequate air quality data were available as a basis for a nonattainment or attainment designations. **Table 3** lists the federal attainment status of the Basin for the criteria pollutants.

National Emissions Standards for Hazardous Air Pollutants Program

Under federal law, 187 substances are currently listed as hazardous air pollutants (HAPs). Major sources of specific HAPs are subject to the requirements of the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) program. The EPA is establishing regulatory schemes for specific source categories and requires implementation of the Maximum Achievable Control Technologies (MACT) for major sources of HAPs in each source category. State law has established the framework for California's TAC identification and control program, which is generally more stringent than the federal program and is aimed at HAPs that are a problem is California. The state has formally identified 244 substances as TACs

and is adopting appropriate control measures for each. Once adopted at the state level, each air district will be required to adopt a measure that is equally or more stringent.

National Ambient Air Quality Standards

The federal CAA required the U.S. EPA to establish NAAQS. The NAAQS set primary standards and secondary standards for specific air pollutants**.** Primary standards define limits for the intention of protecting public health, which include sensitive populations such as asthmatics, children, and the elderly. Secondary Standards define limits to protect public welfare to include protection against decreased visibility, damage to animals, crops, vegetation, and buildings. A summary of the federal ambient air quality standards is shown in **Table 4, National Ambient Air Quality Standards**.

Table 4
National Ambient Air Quality Standards

Pollutant		Primary/Secondary	Averaging Time	Level
Carbon Monoxide		Primary	8 hours	9 ppm
			1 hour	35 ppm
Lead		Primary and secondary	Rolling 3-month average	0.15 μg/m^3
Nitrogen dioxide		Primary	1 hour	100 ppb
		Primary and secondary	Annual	0.053 ppm
Ozone		Primary and secondary	8 hours	0.070 ppm
Particulate Matter	PM2.5	Primary	Annual	12 μg/m^3
		Secondary	Annual	15 μg/m^3
		Primary and secondary	24 hours	35 μg/m^3
	PM10	Primary and secondary	24 hours	150 μg/m^3
Sulfur dioxide		Primary	1 hour	75 ppb
		Secondary	3 hours	0.5 ppm

Source: California Air Resources Board. May 2016. Ambient Air Quality Standards. Available online at: https://www.arb.ca.gov/research/aaqs/aaqs2.pdf, accessed February 1, 2024.

State

California Clean Air Act of 1988

The California CAA of 1988 (CCAA) allows states to adopt ambient air quality standards and other regulations provided that they are at least as stringent as federal standards. The California Air Resources Board (CARB), a part of the California Environmental Protection Agency (Cal EPA), is responsible for the coordination and administration of both federal and state air pollution control programs within California,

including setting the CAAQS. The CCAA, amended in 1992, requires all air quality management districts (AQMDs) in the state to achieve and maintain the CAAQS. The CAAQS are generally stricter than national standards for the same pollutants and has also established state standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles, for which there are no national standards. CARB also conducts research, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB also has primary responsibility for the development of California's State Implementation Plan (SIP), for which it works closely with the federal government and the local air districts.

California Ambient Air Quality Standards

The federal CAA permits states to adopt additional or more protective air quality standards if needed. California has set standards for certain pollutants, such as particulate matter and ozone, which are more protective of public health than respective federal standards. California has also set standards for some pollutants that are not addressed by federal standards. The state standards for ambient air quality are summarized in **Table 5, California Ambient Air Quality Standards**.

Table 5
California Ambient Air Quality Standards

Pollutant		Averaging Time	Level
Carbon monoxide		8 hours	9 ppm
		1 hour	20 ppm
Lead		30-day average	1.5 μg/m^3
Nitrogen dioxide		1 hour	0.180 ppm
		Annual	0.030 ppm
Ozone		8 hours	0.070 ppm
		1 hour	0.09 ppm
Particulate matter	PM2.5	Annual	12 μg/m^3
	PM10	24 hours	50 μg/m^3
		Annual	20 μg/m^3
Sulfur dioxide		1 hour	0.25 ppm
		24 hours	0.04 ppm
Sulfates		24 hours	25 μg/m^3
Hydrogen sulfide		1 hour	0.03 ppm
Vinyl chloride		24 hours	0.01 ppm

Source: California Air Resources Board. May 2016. Ambient Air Quality Standards. Available online at: https://www.arb.ca.gov/research/aaqs/aaqs2.pdf, accessed February 1, 2024.

California State Implementation Plan

The federal CAA (and its subsequent amendments) requires each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The SIP is a living document that is periodically modified to reflect the latest emissions inventories, plans, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The CAA Amendments dictate that states containing areas violating the NAAQS revise their SIPs to include extra control measures to reduce air pollution. The SIP includes strategies and control measures to attain the NAAQS by deadlines established by the CAA. The EPA has the responsibility to review all SIPs to determine if they conform to the requirements of the CAA.

State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to CARB for review and approval. CARB then forwards SIP revisions to the U.S. EPA for approval and publication in the Federal Register. The 2022 Air Quality Management Plan (2022 AQMP) is the SIP for the Basin. The AQMP identifies the control measures that will be implemented to reduce major sources of pollutants. Implementation of control measures established in the previous AQMPs has substantially decreased the population's exposure to unhealthful levels of pollutants, even while population growth has occurred in the SCAB.

On December 2, 2022, the SCAQMD Governing Board approved the 2022 AQMP that lays a path for improving air quality and meeting federal air pollution standards by 2037. The AQMP aims to, among other goals, reduce almost 70 percent of smog forming emissions by 2037 beyond existing regulations, require zero-emission technologies across all sectors, and lay out specific actions needed from the federal government to reduce emissions from ships, trains, aircraft, and other sources primarily under federal regulatory authority. The 2022 AQMP also focuses on communities disproportionately impacted by air pollution with a dedicated chapter on environmental justice.[5]

The future air quality levels forecast in the 2022 AQMP are based on the most recent assumptions provided by both CARB and the Southern California Association of Governments (SCAG) for motor vehicle emissions and demographic updates and includes updated transportation conformity budgets.[6] For example, future growth projections were based on demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry) developed by SCAG for their 2020 RTP/SCS.[7] The 2022 AQMP also assumes that development projects will include strategies

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5 South Coast Air Quality Management District. *South Coast AQMD Finalizes Most Ambitious Strategy to Cut Pollution*, 2022. Available online at: http://www.aqmd.gov/docs/default-source/news-archive/2022/aqmp-adopted-dec2-2022.pdf, accessed February 1, 2024.

6 *Ibid.*

7 *Ibid.*

(mitigation measures) to reduce emissions generated during construction and operation in accordance with SCAQMD and local jurisdiction regulations, which are designed to address air quality impacts and pollution control measures. The 2022 AQMP acknowledges that the most significant air quality challenge in the Basin is to reduce NOX emissions sufficiently to meet the upcoming ozone standard deadlines. The 2022 AQMP incorporates the latest scientific and technical information and planning assumptions, including SCAG's 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (Connect SoCal) (RTP/SCS), updated emission inventory methodologies for various source categories, and SCAG's latest growth forecasts. The 2022 AQMP includes integrated strategies and measures to meet the NAAQS.

California Air Toxics "Hot Spots" Information and Assessment Act (AB 2588)

The California Air Toxics Program is supplemented by the Air Toxics "Hot Spots" program, which became law (AB 2588, Statutes of 1987) in 1987. In 1992, the AB 2588 program was amended by Senate Bill 1731 to require facilities that pose a significant health risk to the community to perform a risk reduction audit and reduce their emissions through implementation of a risk management plan. Under this program, which is required under the Air Toxics "Hot Spots" Information and Assessment Act (Section 44363 of the California Health and Safety Code), facilities are required to report their air toxics emissions, assess health risks, and notify nearby residents and workers of significant risks when present.

Typically, land development projects generate diesel emissions from construction vehicles during the construction phase, as well as some diesel emissions from small trucks during the operational phase. Diesel exhaust is mainly composed of particulate matter and gases, which contain potential cancer-causing substances. Emissions from diesel engines currently include over 40 substances that are listed by EPA as hazardous air pollutants and by CARB as TACs. On August 27, 1998, CARB identified particulate matter in diesel exhaust as a TAC, based on data linking diesel particulate emissions to increased risks of lung cancer and respiratory disease.[8]

In March 2015, the OEHHA adopted "The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments" in accordance with the Health and Safety Code, Section 44300. The Final Guidance Manual incorporates the scientific basis from three earlier developed Technical Support Documents to assess risk from exposure to facility emissions. The 2015 OEHHA Final Guidance has key changes including greater age sensitivity in particular for children, decreased exposure durations, and higher breathing rate profiles. Because cancer risk could be up to three times greater using this new guidance, it may result in greater mitigation requirements, more agency backlog, and increased difficulty

[8] Diesel exhaust is included within pollutants subject to the hotspot program. Please refer to OEHHA's Air Toxics Hot Spot Program Risk Assessment Guidelines. https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0

in getting air permits. Regardless of the change in calculation methodology, actual emissions and cancer risk within South Coast Air Basin has declined by more than 50% since 2005.

The CARB provides a computer program, the Hot Spots Analysis and Reporting Program (HARP), to assist in a coherent and consistent preparation of an HRA. HARP2, an update to HARP, was released in March 2015. HARP2 has a more refined risk characterization in HRA and CEQA documents and incorporates the 2015 OEHHA Final Guidance.

Regional

South Coast Air Quality Management District

The SCAQMD is the air pollution control district for Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The agency's primary responsibility is ensuring that the Basin region meets attainment for the federal and state standards. The SCAQMD is responsible for preparing an air quality management plan in order to meet federal attainment status. The SCAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, and conducting public education campaigns, as well as many other activities. All projects are subject to SCAQMD rules and regulations in effect at the time of construction.

SCAQMD Rules and Regulations

The following is a list of noteworthy SCAQMD rules that are required of construction activities associated with the proposed Project:

- **Rule 402 (Nuisance)** – This rule prohibits the discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. This rule does not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.

- **Rule 403 (Fugitive Dust)** – This rule requires fugitive dust sources to implement best available control measures for all sources, and all forms of visible particulate matter are prohibited from crossing any property line. This rule is intended to reduce PM10 emissions from any transportation, handling,

construction, or storage activity that has the potential to generate fugitive dust. PM10 suppression techniques are summarized below.

- Portions of a construction site to remain inactive longer than a period of three months will be seeded and watered until grass cover is grown or otherwise stabilized.
- All on-site roads will be paved as soon as feasible or watered periodically or chemically stabilized.
- All material transported off-site will be either sufficiently watered or securely covered to prevent excessive amounts of dust.
- The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized at all times.
- Where vehicles leave a construction site and enter adjacent public streets, the streets will be swept daily or washed down at the end of the work day to remove soil tracked onto the paved surface.

- **Rule 1113 (Architectural Coatings)** – This rule requires manufacturers, distributors, and end-uses of architectural and industrial maintenance coatings to reduce ROG emissions from the use of these coatings, primarily by placing limits on the ROG content of various coating categories.

- **Rule 445 (Wood-Burning Devices)** – The purpose of this rule is to reduce the emission of particulate matter from wood-burning devices and establish contingency measures for applicable ozone standards for the reduction of volatile organic compounds.

  The rule requires that any new residential or commercial development that begins construction on or after March 9, 2009, only install gaseous-fueled fireplaces and stoves.[9]

- **Rule 1168 Adhesive and Sealant Applications** – This rule reduces emissions of VOCs and eliminates emissions of chloroform, ethylene dichloride, methylene chloride, perchlorethylene, and trichloroethylene from the application of adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, or any other primers.

- **Regulation XIII New Source Review** – This regulation contains Rules 1300 through 1325, which set forth pre-construction review requirements for new, modified, or relocated facilities, to ensure that the operation of such facilities does not interfere with progress in attainment of the NAAQS, and that future growth within SCAQMD is not unnecessarily restricted. The specific air quality goal of this

9 South Coast Air Quality Management District. 2019. *Rule 445 – Wood Burning Devices Local Government, Builder, Contractor, Architect Answers to Frequently Asked Questions (FAQs).* Available online at: http://www.aqmd.gov/docs/default-source/rule-book/support-documents/rule-445/detailed-rule-445-information.pdf.

regulation is to achieve no net increases from new or modified permitted sources of nonattainment air contaminants or their precursors.

Local

City of Santa Clarita General Plan

Applicable goals and policies related to air quality from the City of Santa Clarita General Plan (General Plan) Land Use and Conservation and Open Space Element are listed below:

- Clean air to protect human health and support healthy ecosystems.
  - Reduce air pollution from mobile sources.
    - Through the mixed land use patterns and multi-modal circulation policies set forth in the Land Use and Circulation Elements, limit air pollution from transportation sources.
    - Support the use of alternative fuel vehicles.
    - Support alternative travel modes and new technologies, including infrastructure to support alternative fuel vehicles, as they become commercially available.
  - Apply guidelines to protect sensitive receptors from sources of air pollution as developed by the CARB, where appropriate.
    - Ensure adequate spacing of sensitive land use from the following sources of air pollution: high traffic freeways and roads; distribution centers; truck stops; chrome plating facilities; dry cleaners using perchloroethylene; and large gas stations, as recommended by CARB.
  - Coordinate with other agencies to plan for and implement programs for improving air quality in the South Coast Air Basin.
    - Coordinate with local, regional, state, and federal agencies to develop and implement regional air quality policies and programs.

2.4 THRESHOLDS AND METHODOLOGY

Thresholds of Significance

The impact analysis provided below is based on the application of the following *California Environmental Quality Act (CEQA) Guidelines* Appendix G, which indicates that a Project would have a significant impact on air quality if it would:

1. Conflict with or obstruct implementation of any applicable air quality plan.

2. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.

3. Expose sensitive receptors to substantial pollutant concentrations.

4. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Consistency with the Applicable AQMP

The SCAQMD has adopted criteria for consistency with regional plans and the regional AQMP in its CEQA Air Quality Handbook. Specifically, the indicators of consistency are: 1) whether the project would increase the frequency or severity of existing air quality violations or cause or contribute to new air quality violations; and 2) whether the project would exceed the assumptions utilized in preparing the AQMP.

Violation of Standards or Substantial Contribution to Air Quality Violations

As the agency principally responsible for comprehensive air pollution control in the Basin, the SCAQMD recommends that projects should be evaluated in terms of air pollution control thresholds established by the SCAQMD and published in the CEQA *Air Quality Handbook*. These thresholds were developed by the SCAQMD to provide quantifiable levels to which projects can be compared. The most current significance thresholds, shown in **Table 6, South Coast AQMD Regional Significance Thresholds**, are used in this analysis.

Table 6
South Coast AQMD Air Quality Significance Thresholds

Mass Daily Thresholds [a]		
Pollutant	**Construction [b]**	**Operation [c]**
NOx	100 lbs/day	55 lbs/day

VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants (TACs), Odor, and GHG Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index ≥ 1.0 (Project increment)	
Odor	Project creates an odor nuisance pursuant to South Coast AQMD Rule 402	
GHG	10,000 MT/yr CO_2eq for industrial facilities	
Ambient Air Quality Standards for Criteria Pollutants [d]		
NO_2 1-hour average annual arithmetic mean	South Coast AQMD is in attainment; Project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)	
PM10 24-hour average annual average	10.4 μg/m^3 (construction) [e] & 2.5 μg/m^3 (operation) 1.0 μg/m3	
PM2.5 24-hour average	10.4 μg/m^3 (construction) [e] & 2.5 μg/m^3 (operation)	
SO_2 1-hour average 24-hour average	0.25 ppm (state) & 0.075 ppm (federal - 99th percentile) 0.04 ppm (state)	
Sulfate 24-hour average	25 μg/m^3 (state)	
CO 1-hour average 8-hour average	South Coast AQMD is in attainment; Project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)	
Ambient Air Quality Standards for Criteria Pollutants [d] (continued)		
Lead 30-day Average Rolling 3-month average	1.5 μg/m^3 (state) 0.15 μg/m^3 (federal)	

[a] *Source: South Coast AQMD CEQA Handbook (South Coast AQMD, 1993, updated in March 2023 to reflect the U.S. EPA's redesignation of the Coachella Valley from Severe-15 to Extreme non-attainment for the 2008 ozone NAAQS. Available online at: https://www.aqmd.gov/docs/default-source/ceqa/handbook/south-coast-aqmd-air-quality-significance-thresholds.pdf?sfvrsn=25, accessed February 1, 2024.*

[b] *Construction thresholds apply to both the South Coast Air Basin and Coachella Valley (Salton Sea and Mojave Desert Air Basins).*

[c] *For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.*

[d] *Ambient air quality thresholds for criteria pollutants based on South Coast AQMD Rule 1303, Table A-2 unless otherwise stated.*

[e] *Ambient air quality threshold based on South Coast AQMD Rule 403.*

Cumulatively Considerable Increase of Criteria Pollutants

The SCAQMD's *CEQA Air Quality Handbook* identifies several methods to determine the cumulative significance of land use projects (i.e., whether the contribution of a project is cumulatively considerable).

However, the SCAQMD no longer recommends the use of these methodologies. Instead, the SCAQMD recommends that any construction-related emissions and operational emissions from individual development projects that exceed the project-specific mass daily emissions thresholds identified above also be considered cumulatively considerable.[10] The SCAQMD neither recommends quantified analyses of the emissions generated by a set of cumulative development projects nor provides thresholds of significance to be used to assess the impacts associated with these emissions.

Exposure of Sensitive Receptors to Substantial Pollutant Concentrations

The SCAQMD currently recommends that impacts to sensitive receptors be considered significant when a project generates localized pollutant concentrations of NO_2, CO, PM10, or PM2.5 at sensitive receptors near a project site that exceed the localized pollutant concentration thresholds listed above or when a project's traffic causes CO concentrations at sensitive receptors located near congested intersections to exceed the national or state ambient air quality standards. The roadway CO thresholds would also apply to the contribution of emissions associated with cumulative development. Additionally, the SCAQMD recommends impacts to sensitive receptors be considered significant if a project exceeds the TAC thresholds detailed in **Table 6** above.

In addition, the SCAQMD has established localized significance criteria in the form of ambient air quality standards for criteria pollutants. To minimize the need for detailed air quality modeling to assess localized impacts, SCAQMD developed mass-based localized significance thresholds (LSTs) that are the amount of pounds of emissions per day that can be generated by a project that would cause or contribute to adverse localized air quality impacts. These localized thresholds, are found in the mass rate look-up tables in the "Final Localized Significance Threshold Methodology" document prepared by the SCAQMD.[11] LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standards, and are developed based on the ambient concentrations of that pollutant for each SRA.

Exposure to Objectionable Odors

A significant impact may occur if objectionable odors occur that would adversely impact sensitive receptors. Odors are typically associated with industrial projects involving the use of chemicals, solvents,

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10 White Paper on Regulatory Options for Addressing Cumulative Impacts from Air Pollution Emissions, SCAQMD Board Meeting, September 5, 2003, Agenda No. 29, Appendix D, p. D-3.

11 SCAQMD, Final Localized Significance Threshold Methodology, June 2003, Revised July 2008. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf

petroleum products, and other strong-smelling elements used in manufacturing processes, as well as sewage treatment facilities and landfills.

Methodology

This analysis focuses on the nature and magnitude of the change in the air quality environment due to implementation of the Project. Air pollutant emissions associated with the Project would result from Project operations and from Project-related traffic volumes. Construction activities would also generate air pollutant emissions at the Project Site and on roadways resulting from construction-related traffic. The net increase in Project Site emissions generated by these activities and other secondary sources have been quantitatively estimated and compared to thresholds of significance recommended by the SCAQMD (see **Project Impacts** subheading, below).

Construction Emissions

The regional construction emissions associated with the Project were calculated using the California Emissions Estimator Model (CalEEMod) recommended by the SCAQMD. CalEEMod was developed in collaboration with the air districts of California as a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects.

Construction activities associated with demolition, grading and building construction would generate pollutant emissions. Specifically, these construction activities would temporarily create emissions of dusts, fumes, equipment exhaust, and other air contaminants. These construction emissions were compared to the thresholds established by the SCAQMD.

In addition to the SCAQMD's regional significance thresholds, the SCAQMD has established localized significance criteria in the form of ambient air quality standards for criteria pollutants. For the purposes of a CEQA analysis, the SCAQMD considers a sensitive receptor to be to be a receptor such as residence, hospital, or convalescent facility where it is possible that an individual could remain for 24 hours. Thus, according to the SCAQMD, the LSTs for PM10 and PM2.5, which are based on a 24-hour averaging period, would be appropriate to evaluate the localized air quality impacts of a project on nearby sensitive receptors. Additionally, since a sensitive receptor is considered to be present onsite for 24 hours, LSTs based on shorter averaging times, such as the one-hour NO_2 or the one-hour and eight-hour CO ambient air quality standards, would also apply when evaluating localized air quality impacts on sensitive receptors. However, LSTs based on shorter averaging periods, such as the NO_2 and CO LSTs, are applied to receptors such as industrial or commercial facilities since it is reasonable to assume that workers at these sites could

be present for periods of one to eight hours.[12] Therefore, this analysis evaluates localized air quality impacts from construction activities associated with the Project on sensitive receptors for NO_2, CO, PM10, and PM2.5, and on "non-sensitive" receptors (e.g., industrial or commercial facilities) for NO_2 and CO.

Operational Emissions

Operational emissions associated with the Project were also calculated using CalEEMod and the information provided in the traffic study prepared for the Project. Operational emissions associated with the Project would be comprised of mobile source emissions, energy demand, and other area source emissions. Mobile source emissions are generated by the increase in motor vehicle trips to and from the Project Site associated with operation of the Project. Area source emissions are generated by natural gas consumption for space and water heating, landscape maintenance equipment, application of architectural coatings, and consumer products. To determine if a regional air quality impact would occur, the increase in emissions is compared with the SCAQMD's recommended regional thresholds for operational emissions.

As discussed above, the SCAQMD has developed LSTs that are based on the amount of pounds of emissions per day that can be generated by a project that would cause or contribute to adverse localized air quality impacts. However, because the LST methodology is applicable to projects where emission sources occupy a fixed location, LST methodology would typically not apply to the operational phase of the Project because emissions are primarily generated by mobile sources traveling on local roadways over potentially large distances or areas. LSTs would apply to the operational phase of a project, if the project includes stationary sources or attracts mobile sources that may spend long periods queuing and idling at the site. For example, the LST methodology applies to operational projects such as warehouse/transfer facilities.[13] As the Project would include a mix of residential and hotel uses, an operational analysis against the LST methodology is not directly applicable.

2.5 PROJECT IMPACTS

AQ Impact 1 **Would implementation of the proposed Project conflict with or obstruct implementation of any applicable air quality plan? *(Less than Significant).***

As part of its enforcement responsibilities, the EPA requires each state with nonattainment areas to prepare and submit a SIP that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution

12 Ibid.

13 SCAQMD, Sample Construction Scenarios for Projects Less than Five Acres in Size, February 2005, page 1-3.

in nonattainment areas, using a combination of performance standards and market-based programs. Similarly, under state law, the CCAA requires an air quality attainment plan to be prepared for areas designated as nonattainment with regard to the federal and state ambient air quality standards. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date.

Drafted by the SCAQMD, the 2022 AQMP was developed in coordination with CARB, SCAG, and the U.S. EPA to establish a program of rules and regulations to reduce air pollutant emissions to achieves CAAQS and NAAQS. The AQMP's pollutant control strategies are based on SCAG's 2020-2045 Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS).

Criteria for determining consistency with the AQMP are defined in Chapter 12, Section 12.2 and Section 12.3 of the SCAQMD's *1993 CEQA Air Quality Handbook*, and include the following:

- **Consistency Criterion No. 1**: The proposed Project will not result in an increase in the frequency or severity of an existing air quality violation, or cause or contribute to new violations, or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.

- **Consistency Criterion No. 2**: The proposed Project will not exceed the assumptions in the AQMP or increments based on the years of the Project build-out phase.

With respect to the first criterion, area air quality planning, including the AQMP, assumes that there will be emissions from new growth, but that such emissions may not impede the attainment and may actually contribute to the attainment of applicable air quality standards within the Basin. As discussed herein, the Project would not result in construction air quality emissions that exceed the SCAQMD thresholds of significance. Construction-related emissions would be temporary in nature, lasting only for the duration of the construction period, and would not have a long-term impact on the region's ability to meet state and federal air quality standards. Furthermore, the Project will be required to comply with applicable SCAQMD rules and regulations for new or modified sources. For example, the Project must comply with SCAQMD Rule 403 for the control of fugitive dust during construction. By meeting SCAQMD rules and regulations, project construction activities will be consistent with the goals and objectives of the AQMP to improve air quality in the Basin. Also discussed herein, the Project would not result in operational air quality emissions that exceed the SCAQMD thresholds of significance. Moreover, the thresholds of significance developed by the SCAQMD are not sensitive to property or project size, or the type of use proposed by a project. And, as discussed in more detail herein, projects, land uses, and activities that are consistent with the applicable assumptions used in the development of the AQMP would not necessarily

jeopardize attainment of the air quality levels identified in the AQMP if they exceed the SCAQMD's recommended daily emissions thresholds. Thus, the Project would be consistent with first criterion.

With respect to the second criterion, the AQMP was prepared to achieve national and state air pollution standards within the region. A project that is considered to be consistent with the AQMP would not interfere with attainment of AQMP goals because the growth from the Project is included in the regional projections used to formulate the AQMP. Therefore, projects, land uses, and activities that are consistent with the applicable assumptions used in the development of the AQMP (i.e., the RTP/SCS) would not jeopardize attainment of the air quality levels identified in the AQMP, even if they exceed the SCAQMD's project-level daily emissions thresholds. The Project Site is designated as Mixed-Use Neighborhood Planned Development Overlay Zone (MX-N (PD)), and thus, the proposed uses are consistent with the City General Plan, Unified Development Code, and Zoning designations. Therefore, although the Project would increase housing, population and employment, such increases would be consistent with the planned growth assumptions utilized in preparing the AQMP. As such, the Project would not have the potential to conflict with regional growth projections identified in SCAG's RTP/SCS and the AQMP. Thus, the Project is also consistent with the second criterion. As the Project is consistent with Criterion Nos. 1 and 2, the Project would not conflict with or obstruct implementation of any applicable air quality plan, and this impact is less than significant.

AQ Impact 2 **Would implementation of the proposed Project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard? *(Less than Significant).***

A project may have a significant impact if project-related emissions would result in a cumulatively considerable net increase for a criteria pollutant for which the region is in nonattainment under applicable federal or state ambient air quality standards. The cumulative analysis of air quality impacts follows the SCAQMD's guidance such that construction or operational project emissions will be considered cumulatively considerable if project-specific emissions exceed an applicable SCAQMD recommended daily threshold.

Regional Construction Significance Analysis

For purposes of this analysis, it is estimated that the Project would be constructed in approximately 18 months with construction beginning in 2025 and project operations commencing by 2026. While construction may begin at a later date and/or take place over a longer period, these assumptions represent the earliest and fastest build-out potential resulting in a worst-case daily impact scenario for purposes of

this analysis. As emission factors improve each year into the future, construction and operation occurring in years beyond those assumed herein would result in reduced air quality emissions. This analysis assumes construction would be undertaken with the following primary construction phases: (1) Demolition/Debris Removal, (2) Grading; and (3) Structural Building, Finishing and Paving. Each primary construction phase has been further detailed below.

Demolition and removal of existing debris would occur for approximately one month. This phase would include the demolition of the single-family residence and accessory structures (approximately 8,770 sf) that are located near the southerly portion of the property near Golden Valley Road. Grading activities would occur for approximately 5 months and would involve the cut and fill of land to ensure the proper base and slope for the entire site, including building pads and foundations. This analysis assumes approximately 360,00 cubic yards (cy) of cut and fill to be balanced on site. No soil import or export is anticipated at this time. In total, structural building, finishing, and paving activities are expected to occur for approximately 12 months. Upon completion of the building shells, finishing (coatings) and paving of parking areas and driveways would follow.

The analysis of regional daily construction emissions has been prepared utilizing the CalEEMod computer model recommended by the SCAQMD. Predicted maximum daily construction-generated emissions for the Project are summarized in **Table 7, Construction-Related Criteria Pollutant and Precursor Emissions – Maximum Pounds per Day.** These calculations assume that appropriate dust control measures would be implemented as part of the Project during each phase of development, as specified by SCAQMD Rule 403 (Fugitive Dust). Rule 403 control requirements include, but are not limited to: applying water in sufficient quantities to prevent the generation of visible dust plumes; applying soil binders to uncovered areas; reestablishing ground cover as quickly as possible; utilizing a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the Project Site; and maintaining effective cover over exposed areas. In addition, these calculations assume construction activities would be consistent with SCAQMD Rule 1113 (Architectural Coatings), which regulates the amount of VOC per liter of coating. As shown in Table 7, the peak daily emissions generated during the construction of the Project would not exceed any of the regional emission thresholds recommended by the SCAQMD. Therefore, Project construction would not result in a cumulatively considerable net increase of any criteria air pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard.

Table 7
Construction-Related Criteria Pollutant and Precursor Emissions – Maximum Pounds per Day

Construction Year	ROG	NOx	CO	SO2	PM10	PM2.5
2025	3.28	29.8	29.7	0.06	3.89	2.15
2026	45.3	20.0	37.4	0.05	4.05	1.46
Regional Threshold	**75**	**100**	**550**	**150**	**150**	**55**
Exceed?	*No*	*No*	*No*	*No*	*No*	*No*

Source: Impact Sciences, CalEEMod modeling, 2024. See Appendix A to this report.
Note: Project emissions account for the reductions from SCAQMD Rule 403 (Fugitive Dust).

Regional Operational Significance Analysis

Project-generated emissions would be associated with motor vehicle use, energy use, and area sources, such as the use of natural-gas-fired appliances, landscape maintenance equipment, consumer cleaning products, and architectural coatings associated with the operation of the Project. The operational emissions from the Project were calculated within CalEEMod and the operational emissions were compared against SCAQMD regional thresholds to determine Project significance. Long-term operational emissions attributable to the Project are summarized in **Table 8, Long-Term Operational Emissions – Maximum Pounds per Day**. As shown, the operational emissions generated by the Project would not exceed the regional thresholds of significance set by the SCAQMD.

Table 8
Long-Term Operational Emissions – Maximum Pounds per Day

Source	ROG	NOx	CO	SO2	PM10	PM2.5
Area Source	8.77	0.14	14.8	0.01	0.01	0.01
Energy Use	0.07	1.24	0.68	0.01	0.10	0.10
Mobile Source	0.99	2.74	32.2	0.09	8.77	2.27
Total	9.83	4.12	47.68	0.11	8.88	2.38
Regional Threshold	**55**	**55**	**550**	**150**	**150**	**55**
Exceed?	*No*	*No*	*No*	*No*	*No*	*No*

Source: Impact Sciences, CalEEMod modeling, 2024. See Appendix A to this report.

As shown in **Table 7** and **Table 8**, the Project's construction and operational emissions would not exceed the SCAQMD's thresholds for any criteria air pollutants. Therefore, regional construction and operation operational emissions would not result in a significant regional air quality impact. Thus, the proposed

Project would also not result in a cumulatively considerable net increase of any criteria air pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard. These impacts are less than significant.

Air Quality Health Impacts

On December 24, 2018, the California Supreme Court published its opinion on the *Sierra Club et al. v. County of Fresno et. Al.* (Case No. S219783) which determined that an environmental review must adequately analyze a project's potential impacts and inform the public how its bare numbers translate to potential adverse health impacts or explain how existing scientific constraints cannot translate the emissions numbers to the potential health impacts.

Criteria air pollutants are defined as those pollutants for which the federal and state governments have established air quality standards for outdoor or ambient concentrations to protect public health. The national and state ambient air quality standards have been set at levels to protect human health with a determined margin of safety.[14] As discussed previously, the Basin is in state non-attainment for PM2.5, PM10, and Ozone (O_3) and federal non-attainment for PM2.5 and O_3. Therefore, an increase in emissions of particulate matter or ozone precursors (ROG and NOx) has the potential to push the region further from reaching attainment status and, as a result, are the pollutants of greatest concern in the region. As noted in **Table 7** and **Table 8** above, the Project will emit criteria air pollutants during construction and operation**.** However, the Project will not exceed SCAQMD thresholds for ozone precursors (ROG and NOx), PM2.5, PM10, or any other criteria air pollutants, and will not result in a cumulatively significant impact for which the region is in non-attainment. Thus, with respect to the Project's increase in criteria pollutant emissions, the Project would not have the potential cause significant air quality health impacts. With respect to the Project's potential TAC and DPM impacts upon sensitive receptors, please refer to the discussion under **AQ Impact 3**.

AQ Impact 3 **Would implementation of the proposed Project expose sensitive receptors to substantial air pollutant concentrations? (*Less than Significant).***

Localized Construction Significance Analysis

As detailed in the methodology section of this report, the SCAQMD has developed localized significance thresholds (LST) for construction areas that are one, two, and five acres in size to simplify the evaluation of localized emissions. LSTs represent the maximum emissions from a project that are not expected to cause

14 SCAQMD, Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning, May 6, 2005.

or contribute to an exceedance of the applicable federal or State ambient air quality standard. LSTs are provided for each source receptor area (SRA) and various distances from the source of emissions. As described previously, the nearest air quality sensitive receptors to the Project Site include residences approximately 15 feet to the north and to the east.

In the case of this analysis, the Project Site is located within SRA 13 – Santa Clarita Valley with receptors located within 25 meters.[15] The closest receptor distance in the SCAQMD's mass rate look-up tables is 25 meters. Projects that are located closer than 25 meters to the nearest receptor are directed to use the LSTs for receptors located within 25 meters. The CalEEMod User's Guide states the applicable LST should be based on the equipment list for each construction phase and calculated according to the anticipated maximum number of acres a given piece of equipment can pass over in an 8-hour workday.

Based on the Project's construction assumptions outlined previously and further disclosed in Appendix A to this report, approximately 1.0 acres per day would be disturbed during demolition and 4.0 acres per day would be disturbed during the grading phase.[16] The LSTs for a 4.0-acre site in SRA 13 with sensitive receptors located within 25 meters were calculated per SCAQMD Linear Regression Methodology and utilized for the grading phase. With respect to building construction, architectural coatings, and paving activities, the 5.0-acre LST in SRA 13 with sensitive receptors located within 25 meters has been utilized to address the potential localized NOx, CO, PM10, and PM2.5 impacts. The application of a 5.0-acre threshold for building construction activities on a 28-acre site would be conservative as physical building construction emissions would likely be spread out more evenly on the 28-acre site compared to the condensed 5-acre threshold applied in this analysis. See **Appendix A** to this report for more details. As shown in **Table 9, Localized Significance of Construction Emissions – Maximum Pounds per Day**, the Project would not exceed any of the identified localized thresholds of significance during construction. Therefore, the Project's construction would not expose sensitive receptors to substantial air pollutant concentrations and these impacts would be less than significant.

15 As discussed previously under 'Methodology,' LSTs based on shorter averaging periods, such as the NO_2 and CO LSTs, are applied to receptors such as industrial or commercial facilities since it is reasonable to assume that workers at these sites could be present for periods of one to eight hours. Therefore, this analysis evaluates localized air quality impacts from construction activities associated with the Project on sensitive receptors for NO_2, CO, PM10, and PM2.5, and on "non-sensitive" receptors (e.g., industrial or commercial facilities) for NO_2 and CO.

16 Per CalEEMod, tractors, graders and dozers would pass over 0.5 acres per day each, and scrapers would pass over 1.0 acre per day each. As the Project would include two dozers during demolition, a 1.0-acre LST is appropriate for demolition. And, as the Project would include two scrapers, two tractors/loaders/backhoes, one grader, and one dozer during grading, a 4.0-acre LST is appropriate for grading.

Table 9
Localized Significance of Construction Emissions – Maximum Pounds per Day

Construction Phase	NOx	CO	PM10	PM2.5
Demolition	**22.2**	**19.9**	**1.17**	**0.88**
SCAQMD Localized Thresholds	*114.00*	*590.00*	*4.00*	*3.00*
Grading	**29.7**	**28.3**	**3.62**	**2.09**
SCAQMD Localized Thresholds	*216.69*	*1,385.92*	*10.00*	*5.31*
Building Construction	**17.83**	**24.07**	**0.72**	**0.66**
SCAQMD Localized Thresholds	*246.00*	*1,644.00*	*12.00*	*6.00*
Exceed?	***No***	***No***	***No***	***No***

Source: Impact Sciences, CalEEMod modeling, 2024. See Appendix A.
Notes: Calculations assume compliance with SCAQMD Rule 403 – Fugitive Dust. Based on the Project's construction assumptions outlined previously, the applicable LST for demolition is 1.0 acre, grading is 4.0 acres, and building construction is 5.0 acres. The localized thresholds for each phase are based on a receptor distance of 25 meters (82 feet) in SCAQMD's SRA 13. Where necessary, LST calculated per SCAQMD Linear Regression Methodology. The building construction emission total includes architectural coating and paving emissions.

Localized Operational Significance Analysis

As discussed previously, because the LST methodology is applicable to projects where emission sources occupy a fixed location, LST methodology would typically not apply to the operational phase of a mixed-use project because emissions for these projects are primarily generated by mobile sources traveling on local roadways over generally large distances or areas. LSTs would apply to the operational phase of a project if the project includes stationary sources or attracts mobile sources that may spend long periods queuing and idling at the site. For example, the LST methodology applies to operational projects such as warehouse/transfer facilities.[17] As the Project would not include warehouse or transfer facilities, an operational analysis against the LST methodology is not directly applicable to the Project. Nevertheless, **Table 10, Localized Significance of On-Site Operational Emissions – Maximum Pounds per Day**, has been included to illustrate the potential on-site emissions during Project operation. As shown in **Table 11**, the Project would not exceed any of the identified localized thresholds of significance. Therefore, the Project's operation would not expose sensitive receptors to substantial air pollutant concentrations and these impacts would be less than significant.

17 SCAQMD, Sample Construction Scenarios for Projects Less than Five Acres in Size, February 2005, page 1-3.

Table 10
Localized Significance of On-Site Operational Emissions – Maximum Pounds per Day

Emissions Source	NOx	CO	PM10	PM2.5
Area Sources	0.14	14.8	0.01	0.01
Energy Demand	1.24	0.68	0.10	0.10
Total On-Site Emissions	**1.38**	**15.48**	**0.11**	**0.11**
SCAQMD Localized Thresholds	*246.00*	*1,644.00*	*3.00*	*2.00*
Exceed?	***No***	***No***	***No***	***No***

Source: Impact Science, CalEEMod modeling, 2024. See Appendix A.
Notes: Although the Project Site is approximately 28.13 acres, this analysis conservatively applies the operational LST for a 5-acre site in SRA 13.

The Project would not result in potentially significant CO "hot spots" and a Project-specific CO hotspots analysis is not required to reach this conclusion. It has long been recognized that CO exceedances ("hot spots") are caused by vehicular emissions, primarily when idling at intersections. Vehicle emissions standards have become increasingly more stringent in the last twenty years. With the turnover of older vehicles, introduction of cleaner fuels and implementation of control technology on industrial facilities, CO concentrations for the Project vicinity have historically met state and federal attainment status for the air quality standards. As noted previously in **Table 2**, in SRA 13 (Santa Clarita Valley) the maximum 8-hour CO concentration over the past three years was 1.5 ppm in 2020, and the 1-hour CO concentration was 1.2 ppm in 2020. Based on these measured concentrations, CO concentrations in SRA 13 are substantially below the California one-hour or eight-hour CO standards of 20 or 9.0 ppm, respectively. Accordingly, with the steadily decreasing CO emissions from vehicles, even very busy intersections do not result in exceedances of the CO standard. Therefore, the Project would not have the potential to cause or contribute to an exceedance of the California one-hour or eight-hour CO standards of 20 or 9.0 ppm, respectively. Impacts with respect to localized CO concentrations would be less than significant.

Diesel Particulate Matter

Construction would result in the generation of DPM emissions from the use of off-road diesel equipment required for demolition, grading and excavation, building construction, paving, and other construction activities. The amount to which the receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Health-related risks associated with diesel-exhaust emissions are primarily linked to long-term exposure and the associated risk of contracting cancer.

In March 2015, the Office of Environmental Health Hazard Assessment (OEHHA) adopted revised guidelines that update previous guidance by incorporating advances in risk assessment with consideration of infants and children using Age Sensitivity Factors (ASF). The intent of the OEHHA 2015 guidance is to provide HRA procedures for use in the Air Toxics Hot Spots Program or for the permitting of existing, new, or modified stationary sources. As the Project is not part of the Air Toxics Hot Spots Program and is considered an urban infill mixed-use development consisting primarily of mobile and area sources (i.e., non-stationary sources), the OEHHA 2015 guidance is not directly applicable. OEHHA 2015 offers limited information on conducting a short-term HRA, but the guidance acknowledges the many inherent uncertainties that may occur, and it does not identify the types of short-term projects or non-stationary projects subject thereto. Further, the SCAQMD has not opined on the application of OEHHA 2015 guidance to development projects such as the Project. Nevertheless, in an effort to characterize the Project's scope of DPM emissions upon nearby sensitive receptors, a quantified construction HRA was conducted for the Project (see Appendix A to this report for more information). As demonstrated therein, under worst-case assumptions, the maximum impact at the nearest sensitive receptor (i.e., residences to the north and to the east of the Project Site) would be 9.3 per 1 million, or less than the risk threshold of 10.0 in 1 million. Impacts at locations farther than this receptor would be further reduced, and thus impacts would be less than significant.

Potential noncarcinogenic effects of chronic DPM exposures were evaluated using the Hazard Index approach as described in the OEHHA Guidance. A hazard index equal to or greater than 1.0 represents a significant chronic health hazard. As shown in greater detail in Appendix A to this report, non-carcinogenic effects at the nearest sensitive receptor (i.e., residences located north and east of the Project Site) would be 0.02, which is less than the 1.0 health hazard threshold. Impacts at locations farther than this receptor would be further reduced, and thus non-cancer effects would be less than significant.

AQ Impact 4 **Would the proposed Project include sources that could create other emissions (such as those leading to odors) adversely affecting a substantial number of people? (*Less than Significant).***

The SCAQMD *CEQA Air Quality Handbook* (1993) identifies certain land uses as sources of odors. These land uses include agriculture (farming and livestock), wastewater treatment plants, food processing plants, chemical plants, composting facilities, refineries, landfills, dairies, and fiberglass molding. The Project would not include any of the land uses that have been identified by the SCAQMD as odor sources.

Construction activities associated with the Project may generate detectable odors from heavy-duty equipment exhaust and architectural coatings. However, construction-related odors would be short-term in nature and cease upon Project completion. In addition, the Project would be required to comply with the

California Code of Regulations, Title 13, sections 2449(d)(3) and 2485, which minimizes the idling time of construction equipment either by shutting it off when not in use or by reducing the time of idling to no more than five minutes. This would reduce the detectable odors from heavy-duty equipment exhaust. The Project would also be required to comply with the SCAQMD Rule 1113 – Architectural Coating, which would minimize odor impacts from ROG emissions during architectural coating. Any odor impacts to existing adjacent land uses would be short-term and not substantial. As such, the Project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. Impacts would be less than significant.

3.0 GREENHOUSE GAS

3.1 GREENHOUSE GAS SETTING

Global climate change refers to any significant change in climate measurements, such as temperature, precipitation, or wind, lasting for an extended period (i.e., decades or longer).[18] Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- Natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of GHG and other gases to the atmosphere from volcanic eruptions); and
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

In recent decades, changes in climate have caused impacts on natural and human systems on all continents and across the oceans. Impacts are due to observed climate change, irrespective of its cause, indicating the sensitivity of natural and human systems to changing climate.[19] Continuing changes to the global climate system and ecosystems, and to California, are projected to include:

- Rapidly diminishing sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures;[20]
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and ice sheets;
- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones;

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18 US EPA. 2013. Overview of Greenhouse Gases. Available online at: https://www.epa.gov/ghgemissions/overview-greenhouse-gases. Accessed on February 1, 2024.

19 Intergovernmental Panel on Climate Change. 2013. "Climate Change 2013: The Physical Science Basis." Available online at: https://www.ipcc.ch/report/ar5/wg1/, accessed February 1, 2024.

20 *Ibid.*

- Changing levels in snowpack, river flow and sea levels indicating that climate change is already affecting California's water resources;[21]
- Dry seasons that start earlier and end later, evoking more frequent and intense wildland fires;[22] and
- Increasing demand for electricity due to rising temperatures.[23]

The natural process through which heat is retained in the troposphere[24] is called the "greenhouse effect." Various gases in the Earth's atmosphere, classified as atmospheric greenhouse gases, play a critical role in determining the Earth's surface temperature. Solar radiation enters Earth's atmosphere as short-wave radiation. It travels through the atmosphere without warming it and is absorbed by the Earth's surface. When the Earth re-emits this radiation back toward space, the radiation changes to long wave radiation. GHGs are transparent to incoming short wave solar radiation but absorb outgoing long wave radiation. As a result, radiation that otherwise would escape back into space is now retained, warming the atmosphere. This phenomenon is known as the greenhouse effect.

Greenhouse Gas Compounds

Global warming potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO_2). CO_2, by definition, has a GWP of 1 regardless of the time period used, because it is the gas being used as the reference. CO_2 remains in the climate system for a very long time: CO_2 emissions cause increases in atmospheric concentrations of CO_2 that will last thousands of years. Methane (CH_4) is estimated to have a GWP of 28–36 over 100 years. CH_4 emitted today lasts about a decade on average, which is much less time than CO_2. But CH_4 also absorbs much more energy than CO_2. The net effect of the shorter lifetime and higher energy absorption is reflected in the GWP. Nitrous Oxide (N_2O) has a GWP 265–298 times that of CO_2 for a 100-year timescale. N_2O emitted today remains in the atmosphere for more than 100 years, on average. Chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) are sometimes called high-GWP gases because, for

21 California Environmental Protection Agency (Cal EPA). 2010. Climate Action Team Report to Governor Schwarzenegger and the Legislature.

22 Ibid.

23 California Environmental Protection Agency (Cal EPA). 2010. Climate Action Team Report to Governor Schwarzenegger and the Legislature.

24 The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface from 6 to 7 miles.

a given amount of mass, they trap substantially more heat than CO_2. (The GWPs for these gases can be in the thousands or tens of thousands.)[25]

California State law defines GHGs to include the following six compounds:

- **Carbon Dioxide** (CO_2) is released to the atmosphere when solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products are burned. CO_2 emissions from motor vehicles occur during operation of vehicles and operation of air conditioning systems.

- **Methane** (CH_4) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from the decomposition of organic waste in solid waste landfills, raising livestock, natural gas and petroleum systems, stationary and mobile combustion, and wastewater treatment.

- **Nitrous Oxide** (N_2O) is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels. N_2O is also emitted from motor vehicles generally occurring from operation of vehicles.

- **Hydrofluorocarbons** (HFCs) are one of several GWP gases that are not naturally occurring and are generated from industrial processes. HFC (refrigerant) emissions from vehicle air conditioning systems occur due to leakage, losses during recharging, or release from scrapping vehicles at end of their useful life.

- **Perfluorocarbons** (PFCs) are another high GWP gas that are not naturally occurring and are generated in a variety of industrial processes. Emissions of PFCs are generally negligible from motor vehicles.

- **Sulfur Hexafluoride** (SF_6) is another high GWP gas that is not naturally occurring and is generated in a variety of industrial processes. Emissions of SF_6 are generally negligible from motor vehicles.

3.2 EXISTING SETTING

The 28.13-acre Project Site is located at the northwest corner of Golden Valley Road and Sierra Highway, in the City. Currently, the majority of the site is vacant except for the single-family residence and accessory structures that are located near the southerly portion of the property near Golden Valley Road. Thus, the existing Project Site generates a very small volume of GHG emissions. The Project Site is designated as Mixed-Use Neighborhood Planned Development Overlay Zone (MX-N (PD)). Adjacent uses include residential uses to the immediate north and east, vacant land to the south, and residential uses/Golden

[25] U.S. Environmental Protection Agency. Understanding Global Warming Potentials. Available online at: https://www.epa.gov/ghgemissions/understanding-global-warming-potentials

Valley High School to the west. The surrounding uses along Golden Valley Road and Sierra Highway consist of mostly established residential uses, schools, and neighborhood commercial retail centers.

3.3 REGULATORY FRAMEWORK

Federal

Paris Climate Agreement

The Paris Climate Agreement is an international treaty on climate change adopted on December 12, 2015. The goal of the agreement is to limit global warming to 1.5 degrees Celsius as compared to pre-industrial levels. Countries will aim to reach global peaking of GHG emissions as soon as possible to achieve a climate neutral world by mid-century. In order to achieve these reductions, the Paris Climate Agreement works on a 5-year cycle of increasingly ambitious climate action carried out by countries. Therefore, by 2020, countries were required to submit their plans for climate action, known as nationally determined contributions. Additionally, the Agreement provides a framework for financial, technical and capacity building support to those countries who need it. Developed counties will take a lead in providing financial assistance to other countries since large scale investments are required for GHG mitigation and climate adaptation.[26]

The United States joined 190 other countries in the Paris Climate Agreement under the Obama administration in September 2016.[27] Under the Trump administration, the former President announced his intention to withdraw from the Agreement in June 2017 and formally notified the United Nations in November 2019. However, the Agreement requires a year-long waiting period before a formal withdrawal will be recognized. As a result, the United States officially withdrew the Agreement in November 2020.[28] However, on January 20, 2021, President Biden accepted and rejoined the Paris Climate Agreement.[29]

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26 United Nations. *The Paris Agreement*. Available online at https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

27 The White House. *President Obama: The United States Formally Entered the Paris Agreement*. Available online at: https://obamawhitehouse.archives.gov/blog/2016/09/03/president-obama-united-states-formally-enters-paris-agreement.

28 NPR. *U.S. Officially Leaving Paris Climate Agreement*. Available online at: https://www.npr.org/2020/11/03/930312701/u-s-officially-leaving-paris-climate-agreement

29 The White House. 2021. *Paris Climate Agreement*. Available online at: https://www.npr.org/2020/11/03/930312701/u-s-officially-leaving-paris-climate-agreement.

State

The state of California has implemented a series of greenhouse gas plans and policies aimed at reducing state greenhouse gas emissions. Measures applicable to the Project are summarized below:

Executive Order (EO) S-03-05

On June 1, 2005, EO S-03-05 was issued by Governor Schwarzenegger in order to set statewide emissions reduction standards. The order required the state to reduce GHG emissions to 1990 levels by 2020 and reduce GHG emissions to 80% below 1990 levels by 2050. EO S-3-05 also calls for the Secretary of California Environmental Protection Agency (Cal/EPA) to be responsible for coordination of state agencies and progress reporting.

Assembly Bill (AB) 32

AB 32 (California Global Warming Solutions Act of 2006) was codified into law in 2006 and codified into law the 2020 GHG emissions targets set by EO S-03-05. AB 32 represents the first enforceable statewide program to limit GHG emissions from all major sectors with penalties for noncompliance.

Senate Bill (SB) 32

SB 32 was signed into law in 2015 and sets into law the mandated reduction targets set in EO B-30-15, which required a reduction in GHG emissions to 40% below the 1990 levels by 2030.

Assembly Bill (AB) 1279

On September 16, 2022, California signed into law AB 1279 (The California Climate Crisis Act) which establishes the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045; to maintain net negative GHG emissions thereafter; and to ensure that by 2045 statewide anthropogenic GHG emissions are reduced at least 85% below 1990 levels. The bill requires CARB to ensure that Scoping Plan updates (see below) identify and recommend measures to achieve carbon neutrality, and to identify and implement policies and strategies that enable CO2 removal solutions and carbon capture, utilization, and storage (CCUS) technologies.

2022 Scoping Plan Update

The Scoping Plan is a GHG reduction roadmap developed and updated by CARB at least once every five years, as initially required by AB 32. It lays out the transformations needed across various sectors to reduce GHG emissions and reach the State's climate targets. CARB adopted the Final 2022 Scoping Plan for

Achieving Carbon Neutrality (2022 Scoping Plan Update) in December 2022 as the third update to the initial plan that was adopted in 2008. The initial 2008 Scoping Plan laid out a path to achieve the AB 32 target of returning to 1990 levels of GHG emissions by 2020, a reduction of approximately 15% below business-as-usual activities.[30] The 2008 Scoping Plan included a mix of incentives, regulations, and carbon pricing, laying out the portfolio approach to addressing climate change and clearly making the case for using multiple tools to meet California's GHG targets. The 2013 Scoping Plan Update (adopted in 2014) assessed progress toward achieving the 2020 target and made the case for addressing short-lived climate pollutants (SLCPs).[31] The 2017 Scoping Plan Update,[32] shifted focus to the newer SB 32 goal of a 40% reduction below 1990 levels by 2030 by laying out a detailed cost-effective and technologically feasible path to this target, and also assessed progress towards achieving the AB 32 goal of returning to 1990 GHG levels by 2020. The 2020 goal was ultimately reached in 2016, four years ahead of the schedule called for under AB 32.

The 2022 Scoping Plan Update is the most comprehensive and far-reaching Scoping Plan developed to date. It identifies a technologically feasible, cost-effective, and equity-focused path to achieve new targets for carbon neutrality by 2045 and to reduce anthropogenic GHG emissions to at least 85% below 1990 levels, while also assessing the progress California is making toward reducing its GHG emissions by at least 40% below 1990 levels by 2030, as called for in SB 32 and laid out in the 2017 Scoping Plan.[33] The 2030 target is an interim but important stepping stone along the critical path to the broader goal of deep decarbonization by 2045. The relatively longer path assessed in the 2022 Scoping Plan Update incorporates, coordinates, and leverages many existing and ongoing efforts to reduce GHGs and air pollution, while identifying new clean technologies and energy. Given the focus on carbon neutrality, the 2022 Scoping Plan Update also includes discussion for the first time of the natural and working lands sectors as sources for both sequestration and carbon storage, and as sources of emissions as a result of wildfires.

Regional

SCAQMD Draft Guidance Regarding Interim CEQA GHG Significance Thresholds

SCAQMD released draft guidance regarding interim CEQA GHG significance thresholds. In its October 2008 document, the SCAQMD proposed a 30% emission reduction target to determine significance for commercial/residential projects that emit greater than 3,000 metric tons per year. On December 5, 2008, the

30 CARB, 2008, *Climate Change Scoping Plan*.

31 CARB, 2014, *First Update to the Climate Change Scoping Plan*.

32 CARB, 2017, *California's 2017 Climate Change Scoping Plan*. Available online at: https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf. accessed February 1, 2024.

33 Ibid.

SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for stationary source/industrial projects where the SCAQMD is lead agency. However, SCAQMD has yet to adopt a GHG significance threshold for land use development projects (e.g., residential/commercial projects) and has formed a GHG Significance Threshold Working Group to further evaluate potential GHG significance thresholds.

SCAG 2020 Connect SoCal Plan RTP/SCS

On September 3, 2020, the Southern California Association of Governments (SCAG) Regional Council unanimously voted to approve and fully adopt Connect SoCal (2020-2045 Regional Transportation Plan/Sustainable Communities Strategy [RTP/SCS]).

Connect SoCal is a long-range visioning plan that builds upon and expands land use and transportation strategies established over several planning cycles to increase mobility options and achieve a more sustainable growth pattern. It charts a path toward a more mobile, sustainable and prosperous region by making connections between transportation networks, between planning strategies and between the people whole collaboration can improve the quality of life for Southern Californians. In addition, Connect SoCal is supported by a combination of transportation and land use strategies that outline how the region can achieve California's greenhouse gas emission reduction goals and federal CAA requirements. The plan also strives to achieve broader regional objectives, such as the preservation of natural lands, improvement of public health, increased roadway safety, support for the region's vital goods movement industries and more efficient use of resources.

Local

City of Santa Clarita General Plan

The City's Conservation and Open Space Element of the 2011 Santa Clarita General Plan (General Plan) has identified the following goals, objectives, and policies aimed at greenhouse gas reduction in private development projects in the City. Applicable goals and policies from the General Plan's Conservation and Open Space Elements are listed below:

- **Goal CO 8:** Development designed to improve energy efficiency, reduce energy and natural resource consumption, and reduce emissions of greenhouse gases.
  - **Objective CO 8.1:** Comply with the requirements of State law, including AB 32, SB 375 and implementing regulations, to reach targeted reductions of greenhouse gas (GHG) emissions.

- **Objective CO 8.3:** Encourage the following green building and sustainable development practices on private development projects, to the extent reasonable and feasible.

  - **Policy CO 8.3.2:** Promote construction of energy efficient buildings through requirements for LEED certification or through comparable alternative requirements as adopted by local ordinance.

  - **Policy CO 8.3.7:** Encourage the use of trees and landscaping to reduce heating and cooling energy loads, through shading of buildings and parking lots.

  - **Policy CO 8.3.8:** Encourage energy-conserving heating and cooling systems and appliances, and energy-efficiency in windows and insulation, in all new construction.

City of Santa Clarita Climate Action Plan

The State of California requires all cities that create a new general plan or update their general plan document to consider its impacts on GHG emissions. In order to do so, cities must complete a CAP. The CAP must achieve the emission reduction goals outlined by the Global Warming Solutions Act of 2006 (AB 32). AB 32 requires that statewide GHG emissions must be reduced to 1990 levels by 2020. Measures identified in the City's CAP will not only meet but exceed the state's AB 32 GHG emission reduction mandate.[34]

In June 2011, the City Council adopted a new General Plan (referred to as One Valley One Vision), which is intended to guide growth and development within all portions of the Santa Clarita Valley. As noted above, Policy CO 8.1.1 of the City's General Plan states the City shall create and adopt a CAP within 18 months of the adoption of the City's General Plan Update that meets state requirements. Consistent with this policy, in January 2011, the City began the process of developing a CAP, with the Final CAP published in August 2012. The CAP, part of the General Plan, serves as a component of the general plan document for the City to address GHG emissions. Using the goals, objectives, and policies of the General Plan as a starting point, the CAP identifies mitigation measures that can be quantified and translated into significant reductions in the GHG emissions by the year 2020. The development of a CAP begins with a premise that establishing a complete GHG emissions inventory within the City's boundary is the critical foundation for the remainder of the project.

The CAP also defines a local threshold of significance for GHG emissions for project level submittals that trigger review by the CEQA. Because goals, objectives, and policies approved under the General Plan are

[34] City of Santa Clarita. 2012. Climate Action Plan. Available online at: https://greensantaclarita.com/files/2012/10/APPROVED-CAP-AUGUST-2012.pdf

forecast to meet the GHG emission reduction targets mandated by AB 32, development projects that are able to demonstrate consistency with the General Plan and zoning ordinance will by association demonstrate consistency with the CAP. However, the CAP is only certified through 2020.

Santa Clarita Building Standards Code

Section 25.01.010 in the Santa Clarita Municipal Code adopts by reference that certain code known and designated as the California Code of Regulations, Title 24, Part 11, further described as the 2022 California Green Building Standards Code, also referred to as the 2022 CalGreen Code, published by the California Building Standards Commission. Such code shall be and become the City of Santa Clarita Green Building Standards Code, regulating the planning, design, operation, construction, use and occupancy of every new building or structure to ensure buildings have a more positive environmental impact and encourage sustainable construction practices as specifically provided for therein.

3.4 THRESHOLDS AND METHODOLOGY

Thresholds of Significance

The impact analysis provided below is based on the application of the following *CEQA Guidelines* Appendix G, which indicates that a proposed Project would have a significant impact on GHG emissions if it would:

1) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

2) Conflict with an applicable plan, policy or regulations adopted for the purpose of reducing the emissions of greenhouse gas emissions.

SCAQMD Draft Thresholds of Significance

As stated previously, the SCAQMD released draft guidance regarding interim CEQA GHG significance thresholds. In December 2008, the SCAQMD adopted an interim 10,000 metric tons CO_2e ($MTCO_2e$) per year screening level threshold for stationary source/industrial projects for which the SCAQMD is the lead agency. The SCAQMD continues to consider adoption of significance thresholds for non-industrial development projects. The most recent proposal issued in September 2010 uses the following tiered approach to evaluate potential GHG impacts from various uses:

- **Tier 1:** Determine if CEQA categorical exemptions are applicable. If not, move to Tier 2.

- **Tier 2:** Consider whether or not the proposed project is consistent with a locally adopted GHG reduction plan (i.e., a Climate Action Plan) that has gone through public hearings and CEQA review, that has an approved inventory, includes monitoring, etc. If not, move to Tier 3.

- **Tier 3:** Consider whether the project generates GHG emissions in excess of screening thresholds for individual land uses. The 10,000 $MTCO_2e$/year threshold for industrial uses would be recommended for use by all lead agencies. Under option 1, separate screening thresholds are proposed for residential projects (3,500 $MTCO_2e$/year), commercial projects (1,400 $MTCO_2e$/year), and mixed-use projects (3,000 $MTCO_2e$/year). Under option 2 a single numerical screening threshold of 3,000 $MTCO_2e$/year would be used for all non-industrial projects. If the project generates emissions in excess of the applicable screening threshold, move to Tier 4.

- **Tier 4:** Consider whether the project generates GHG emissions in excess of applicable performance standards for the project service population (population plus employment). The efficiency targets were established based on the goal of AB 32 to reduce statewide GHG emissions to 1990 levels by 2020. The 2020 efficiency targets are 4.8 $MTCO_2e$ per service population for project level analyses and 6.6 $MTCO_2e$ per service population for plan level analyses. If the project generates emissions in excess of the applicable efficiency targets, move to Tier 5.

- **Tier 5:** Consider the implementation of CEQA mitigation (including the purchase of GHG offsets) to reduce the project efficiency target to Tier 4 levels.

The thresholds identified above are not adopted by the SCAQMD or distributed for widespread public review and comment, and the working group tasked with developing the thresholds has not met since September 2010. The future schedule and likelihood of threshold adoption is uncertain.

Methodology

GHG emissions and climate change were evaluated in accordance with Appendix G of the *CEQA Guidelines*. *CEQA Guidelines* Section 15064.4 states that, when making a determination with respect to the significance of a Project's GHG emissions, a lead agency shall have discretion to determine whether to: (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use; and/or (2) Rely on a qualitative analysis or performance-based standards. Section 15064.4 also states that a lead agency should consider the following factors when assessing the significance of the impact of GHG emissions on the environment: (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting; (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies

to the project; and (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

GHG emissions were calculated in the same CalEEMod model used to determine the Project's criteria air pollutant emissions. Consistent with SCAQMD recommendations, construction emissions were amortized over a thirty-year period and added to the annual operational emissions to determine the proposed Project's annual GHG emissions. Consistent with *CEQA Guidelines* Section 15064(h)(3), Project significance was determined based on the proposed Project's consistency with an approved plan or mitigation program that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area of the Project. The relevant adopted regulatory plans include CARB's 2022 Scoping Plan Update, CALGreen, California Energy Code, SCAG's 2020 Connect SoCal Plan, and the City's General Plan. Although the City's CAP is only a qualified plan through the year 2020, the following consistency analysis with the City's CAP is included for informational purposes.

3.5 PROJECT IMPACTS

GHG Impact 1 **Would implementation of the proposed Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? *(Less than Significant).***

Construction Emissions

For purposes of this analysis, it is estimated that the Project would be constructed in approximately 18 months with construction beginning in 2025 and project operations commencing by 2026. This analysis assumes construction would be undertaken with the following primary construction phases: (1) Demolition/Debris Removal, (2) Grading; and (3) Structural Building, Finishing and Paving. Each primary construction phase has been further detailed below.

Demolition and removal of existing debris would occur for approximately one month. This phase would include the demolition of the single-family residence and accessory structures (approximately 8,770 sf) that are located near the southerly portion of the property near Golden Valley Road. Grading activities would occur for approximately 5 months and would involve the cut and fill of land to ensure the proper base and slope for the entire site, including building pads and foundations. This analysis assumes approximately 360,00 cubic yards (cy) of cut and fill to be balanced on site. No soil import or export is anticipated at this time. In total, structural building, finishing, and paving activities are expected to occur for approximately 12 months. Upon completion of the building shells, finishing (coatings) and paving of parking areas and driveways would follow.

With the use of CalEEMod, GHG emissions throughout Project construction were calculated from off-road equipment usage, hauling vehicles, delivery, and worker trips to and from the site. The total GHG construction emissions during 2025 and 2026 would be 1,097 metric tons of carbon dioxide equivalent (MT CO_2e). As GHG emissions impact from construction activities would occur over a relatively short time span, it would contribute a relatively small portion of the lifetime GHG emission impact of the Project. The total construction GHG emissions were divided by 30 years to determine an annual construction emission rate to be amortized over the Project's first 30 years of operations, consistent with SCAQMD recommendations. Amortized over a 30-year period, the Project is anticipated to emit approximately 36.6 metric tons of carbon dioxide per year (MT CO2e/year).

Operational Emissions

The Project would incorporate several design features to reduce GHG emissions and be consistent with local and regional regulations and polices that would reduce GHG emissions during operation of the Project.[35] The Project's primary GHG reduction measures and design features include, but are not limited to, the following:

- **Low-Flow Water Fixtures:** The Project will include low-flow and/or high efficiency water fixtures such as low-flow toilets, urinals, faucets, and high-efficiency dishwashers;
- **Vegetation & Landscape Irrigation Systems**: The Project will include drought-tolerant landscaping and will implement efficient landscape irrigation techniques, such as "smart" irrigation technology, to reduce water use and its associated GHG emissions. "Smart" irrigation systems rely on weather, climate and soil moisture information to adjust watering frequency, hence maintaining the vegetation is adequately moist while conserving water;
- **Energy Reduction:** The Project will include energy efficient appliances, high-efficiency lighting, and solar panels. The Project will be built to meet and exceed the State's Green Building Standards (CALGreen Code);
- **Alternative Fuel Vehicles:** The Project would provide on-site electric vehicle (EV) parking spaces, supporting and promoting the use of electric vehicles.

The operations of the Project would generate GHG emissions from the usage of on-road motor vehicles, electricity, natural gas, water, and generation of solid waste and wastewater. Emissions of operational

35 The estimation of Project GHG emissions included herein are considered to be worst-case as the analysis discloses CalEEMod results without the incorporation of any special GHG reduction measures beyond those assumed in CalEEMod.

GHGs are shown in **Table 11, Project Greenhouse Gas Emissions**. As shown, the GHG emissions generated by the Project would be approximately 2,338.14 CO_2e MTY.

This quantified illustration of the Project's scope of GHG emissions is provided for informational purposes, and significance under CEQA is based on the Project's consistency with statewide and regional policies and plans to meet the state reduction goals set in AB 32, SB 32, and AB 1279 including CARB's 2022 Scoping Plan Update, SCAG's 2020 Connect SoCal RTP/SCS, and the City's General Plan. See **GHG Impact 2**.

Table 11
Project Greenhouse Gas Emissions

Emissions Source	Metric Tons of Carbon Dioxide Equivalent (per year)
Amortized Construction	36.6
Area Sources	4.84
Energy Sources	652
Mobile Sources	1,532
Waste Sources	65.7
Water Sources	34.2
Refrigerant Sources	12.8
Total GHG Emissions	**2,338.14**

Source: Impact Sciences, 2024. See Appendix A to this report.

GHG Impact 2 **Would implementation of the proposed Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? *(Less than Significant).***

A proposed Project would have a significant impact with respect to GHG emissions and global climate change if it would substantially conflict with the provisions of Section 15064.4(b) of the *State CEQA Guidelines*.

Pursuant to Appendix G of the *CEQA Guidelines*, a significant GHG impact is identified if a project could conflict with applicable GHG reduction plans, policies, or regulations. The relevant adopted regulatory plans include CARB's 2022 Scoping Plan Update, CALGreen, California Energy Code, SCAG's 2020 Connect SoCal Plan, and the City's General Plan. As previously discussed, the City has an adopted CAP; however, it is only a qualified plan through the year 2020. Nevertheless, the following analysis evaluates the Project for consistency with the City's CAP for informational purposes.

Consistency with AB 32, SB 32, & AB 1279

The Project would be consistent with applicable statewide regulatory programs designed to reduce GHG emissions consistent with AB 32, SB 32, and AB 1279. During construction, the Project will utilize equipment in compliance with CARB. Mobile sources during construction and operation would be subject to the requirements of California Assembly Bill 1493 (Pavley Standards), the Advanced Clean Cars Program, and the Low Carbon Fuel Standard Regulation. Additionally, the Project would be designed, constructed, and operated consistent with California Title 24 and CALGreen (2022). These regulations require projects to comply with specific standards related to building energy efficiency and green building.

Consistency with the 2022 Scoping Plan Update

The Project would be consistent with CARB's 2022 Scoping Plan Update. In response to the passage of AB 1279 and the identification of the 2045 GHG reduction target, CARB published the 2022 Scoping Plan Update for Achieving Carbon Neutrality on November 16, 2022 and it was approved on December 15, 2022.[36] The 2022 Scoping Plan Update lays out the sector-by-sector roadmap for California, the world's fifth largest economy, to achieve carbon neutrality by 2045 or earlier, outlining a technologically feasible, cost-effective, and equity-focused path to achieve the state's climate target. The 2022 Scoping Plan Update includes policies to achieve a significant reduction in fossil fuel combustion, further reductions in short-lived climate pollutants, support for sustainable development, increased action on natural and working lands (NWL) to reduce emissions and sequester carbon, and the capture and storage of carbon.

The 2022 Scoping Plan Update discusses the role of local governments in meeting the State's GHG reductions goals because local governments have jurisdiction and land use authority related to: community-scale planning and permitting processes, local codes and actions, outreach and education programs, and municipal operations. Furthermore, local governments may have the ability to incentivize renewable energy, energy efficiency, and water efficiency measures. As discussed in detail in Appendix D (Local Actions) of the 2022 Scoping Plan Update, local jurisdictions can do much to enable statewide priorities, such as taking local action to help the state develop the housing, transport systems, and other tools we all need. Indeed, state tools—such as the Cap-and-Trade Program or zero-emission vehicle programs—do not substitute for these local efforts. Multiple legal tools are open to local jurisdictions to support this approach, including development of a climate action plan (CAP), sustainability plan, or

[36] California Air Resources Board, 2022 Scoping Plan Documents, *Notice of Decision*, https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp-appendix-b-notice-of-decision.pdf; accessed February 1, 2024.

inclusion of a plan for reduction of GHG emissions and climate actions within a jurisdiction's general plan. Any of these can help to align zoning, permitting, and other local tools with climate action.

The Scoping Plan encourages local governments to adopt a CEQA-qualified CAP addressing three priority areas (transportation electrification, VMT reduction, and building decarbonization). However, the State recognizes that almost 50 percent of jurisdictions do not have an adopted CAP, among other reasons because they are costly, requiring technical expertise, staffing, funding. Additionally, CAPs need to be monitored and updated as State targets change and new data is available. Jurisdictions that wish to take meaningful climate action (such as preparing a non-CEQA-qualified CAP or as individual measures) aligned with the State's climate goals in the absence of a CEQA-qualified CAP are advised to look to the three priority areas when developing local climate plans, measures, policies, and actions: (transportation electrification, VMT reduction, and building decarbonization). "By prioritizing climate action in these three priority areas, local governments can address the largest sources of GHGs within their jurisdiction." (Page 9 of Appendix D.) The Project would generate less-than-significant VMT impacts,[37] the Project will provide on-site EV parking spaces, and the Project will be built to meet CalGreen Code standards. Thus, the Project is generally consistent with the three priority areas identified in the Scoping Plan. In addition, the Project would comply with all regulations adopted in furtherance of the Scoping Plan to the extent required by law and to the extent that they are applicable to the Project. Lastly, as demonstrated herein, the Project would be consistent with the City's CAP and Conservation and Open Space Element of the 2011 Santa Clarita General Plan (General Plan) which identify goals, objectives, and policies aimed at greenhouse gas reduction in private development projects in the City. As such, the Project is consistent with Appendix D (Local Actions) of the 2022 Scoping Plan Update.

Consistency with SCAG's Connect SoCal Plan

At the regional level, SCAG's Connect SoCal Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) represent the region's Climate Action Plan that defines strategies for reducing GHGs. In order to assess the Project's potential to conflict with the RTP/SCS, this section analyzes the Project's land use profile for consistency with those in the RTP/SCS. Generally, projects are considered consistent with the provisions and general policies of applicable City and regional land use plans and regulations, such as SCAG's RTP/SCS, if they are compatible with the general intent of the plans and would not preclude the attainment of their primary goals.

As shown in **Table 12**, **Project Consistency with SCAG's RTP/SCS,** the Project would be consistent with the applicable strategies set forth in the RTP/SCS's "A Path to Greater Access, Mobility, & Sustainability"

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37 TJW Engineering, Inc., Golden Valley Road Mixed-Use Vehicle Miles Traveled (VMT) Analysis, November 14, 2023.

chapter. Therefore, the Project would be consistent with the applicable GHG reduction related actions and strategies contained in Connect SoCal.

Table 12
Project Consistency with SCAG's RTP/SCS

Actions and Strategies	Consistency Analysis
Focus Growth Near Destinations & Mobility Options	
Emphasize land use patterns that facilitate multimodal access to work, educational and other destinations	No Conflict: The proposed project involves the demolition of the existing single-family residence and associated debris, and development of a mixed-use project consisting of 151 senior assisted living units, 73 residential units, a 60-room hotel (with 2,544 square feet (sf) of banquet space, 3,315 sf of retail space, and 2,360 sf of restaurant space), and 5.83 acres of open space. The majority of the site is currently vacant except for the single-family residence and accessory structures. The Project Site is designated as Mixed-Use Neighborhood Planned Development Overlay Zone (MX-N (PD)). The proposed uses are consistent with the City General Plan, Unified Development Code, and Zoning designations. Therefore, the project would emphasize a land use pattern that would not conflict with the Mixed-Use Neighborhood Planned Development Overlay Zone providing a mix of uses.
Focus on job/housing balance to reduce commute times and distances and expand job opportunities near transit and along center-focused main streets	No Conflict: The proposed project involves the development of a mixed-use project consisting of 151 senior assisted living units, 73 residential units, a 60-room hotel (with 2,544 square feet (sf) of banquet space, 3,315 sf of retail space, and 2,360 sf of restaurant space), and 5.83 acres of open space. The project would be located at the intersection of Golden Valley Road and Sierra Highway, which provide access to existing residential uses, schools, and neighborhood commercial retail centers. The project would add job opportunities along main streets in the City and would not conflict with this strategy.
Plan for growth near transit investments and support implementation of first/last mile strategies	Consistent: The proposed project would implement the designated Mixed-Use Neighborhood Planned Development Overlay Zone (MX-N (PD)). The Project Site would be located near the intersection of Golden Valley Road and Sierra Highway, which provide access to existing residential uses, schools, and neighborhood commercial retail centers. Existing bus stops located at the intersection of Golden Valley Road and Sierra Highway would also provide nearby residents, customers, and employees with access to public transit.
Promote the redevelopment of underperforming retail developments and other outmoded nonresidential uses	Not Applicable: The Project does not include the redevelopment of underperforming retail or other outmoded nonresidential uses.
Prioritize infill and redevelopment of underutilized land to accommodate new growth, increase amenities and connectivity in existing neighborhoods	No Conflict: The majority of the site is currently vacant except for the single-family residence and accessory structures. The proposed project involves the development of a mixed-use project consisting of 151 senior assisted living units, 73 residential units, a 60-room hotel (with 2,544 square feet (sf) of banquet space, 3,315 sf of retail space, and 2,360 sf of restaurant space), and 5.83 acres of open space. The project would be located at near the intersection of Golden Valley Road and Sierra Highway, which provide access to existing residential uses, schools, and neighborhood commercial retail centers. While the Project is not considered infill, the Project would add

Actions and Strategies	Consistency Analysis
	new growth and increased amenities to underutilized land in the City and would not conflict with this strategy.
Encourage design and transportation options that reduce the reliance on and number of solo car trips (this could include mixed uses or locating and orienting close to existing destinations)	Consistent: The Project Site is designated as Mixed-Use Neighborhood Planned Development Overlay Zone (MX-N (PD)). The proposed project involves the development of a mixed-use project consisting of 151 senior assisted living units, 73 residential units, a 60-room hotel (with 2,544 square feet (sf) of banquet space, 3,315 sf of retail space, and 2,360 sf of restaurant space), and 5.83 acres of open space. The proposed project would also connect to existing uses such as access to schools and neighborhood commercial retail centers along Golden Valley Road and Sierra Highway.
Promote Diverse Housing	
Preserve and rehabilitate affordable housing and prevent displacement	Not Applicable: The proposed project would provide 151 senior assisted living facilities as well as 73 residential units. The proposed project would not conflict with such policymaking.
Identify opportunities for new workforce and affordable housing development	Not Applicable: The proposed project would provide 151 senior assisted living facilities (i.e., not workforce housing) as well as 73 residential units. The proposed project would not conflict with such policymaking.
Leverage Technology Innovations	
Promote low emission technologies such as neighborhood electric vehicles, shared rides hailing, car sharing, bike sharing and scooters by providing supportive and safe infrastructure such as dedications lanes, charging and parking/drop-off space	Not Applicable: This strategy calls on local government to promote low emission technologies. That said, the proposed project would provide on-site electric vehicle (EV) parking spaces, supporting and promoting the use of electric vehicles. The proposed Project would not conflict with such policymaking.
Identify ways to incorporate "micro-power grids" in communities, for example solar energy, hydrogen fuel cell power storage and power generation	Not Applicable: This strategy is aimed at local government to identify ways to incorporate “micro-power grids.” The proposed Project would not conflict with such policymaking.
Support Implementation of Sustainability Policies	
Pursue funding opportunities to support local sustainable development implementation projects that reduce GHG emissions	Not Applicable: While this strategy calls on local governments to adopt policies for sustainable infrastructure and development projects, the proposed project would not conflict with such policymaking.
Support statewide legislation that reduces barriers to new construction and that incentivizes development near transit corridors and stations	Not Applicable: While this strategy calls on the state to adopt policies to new construction near transit corridors and stations, the proposed project would not conflict with such policymaking.
Support cities in the establishment of Enhanced Infrastructure Financing Districts (EIFDs), Community Revitalization and Investment Authorities (CRIAs), or other tax increment or value capture tools to finance sustainable infrastructure and development projects	Not Applicable: While this strategy calls on cities to establish tax incentive or other value capture tools to finance sustainable infrastructure, the proposed project would not conflict with such policymaking.
Work with local jurisdictions/communities to identify opportunities and assess barriers to implement sustainability strategies	Not Applicable: While this strategy calls on SCAG to work with local jurisdictions to identify ways to implement sustainable strategies, the proposed project would not conflict with such policymaking.
Enhance partnerships with other planning organizations to promote resources and best practices in the SCAG region	Not Applicable: While this strategy calls on planning organizations to promote resources and best practices in SCAG, the proposed project would not conflict with such policymaking.

Actions and Strategies	Consistency Analysis
Continue to support long range planning efforts by local jurisdictions	Not Applicable: While this strategy calls on local jurisdictions to support long range planning, the proposed project would not conflict with such policymaking.
Provide educational opportunities to local decisions makers and staff on new tools, best practices and policies related to implementing the Sustainable Communities Strategy	Not Applicable: While this strategy calls on local jurisdictions to provide educational opportunities on new tools and practices to promote the Sustainable Communities Strategy, the proposed project would not conflict with such policymaking.
Promote a Green Region	
Support development of local climate adaptation and hazard mitigation plans, as well as Project implementation that improves community resiliency to climate change and natural hazards.	Not Applicable: This strategy calls on local governments to support the development
Support local policies for renewable energy production, reduction of urban heat islands and carbon sequestration.	Not Applicable: While this strategy calls on local governments to adopt policies for renewable energy production, the proposed project would not conflict with such policymaking.
Integrate local food production into the regional landscape	Not Applicable: While this strategy calls on local governments to integrate local food into the regional landscape, the proposed project would not conflict with such policymaking.
Promote more resource efficient development focused on conservation, recycling and reclamation	Consistent. The proposed project will be required to adhere to the latest CALGreen Building Codes and Title 24.
Preserve, enhance and restore regional wildlife connectivity	Consistent: The proposed project would not interfere with any known wildlife corridors.
Reduce consumption of resource areas, including agricultural land	Consistent. The proposed project will not consume any resource areas or agricultural land.
Identify ways to improve access to public park space	Not Applicable. This strategy calls on local governments to improve access to public park space. The proposed project would not conflict with this goal. It should be noted the Project would have on-site park space, which would potentially alleviate the demand on existing off-site public parks in the City.

Source: Impact Sciences, 2022.
SCAG. 2019. Connect SoCal – The 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy, Chapter 3: A Path to Greater Access, Mobility, & Sustainability. Available online at: https://scag.ca.gov/connect-socal, accessed February 1, 2024.

Consistency with Santa Clarita General Plan & CAP

Because goals, objectives and policies approved under the General Plan are forecast to meet the GHG emission reduction targets mandated by AB 32 and SB 32, development projects that are able to demonstrate consistency with the General Plan and zoning ordinance will by association demonstrate consistency with the CAP.

The Project Site is designated as Mixed-Use Neighborhood Planned Development Overlay Zone (MX-N (PD)). The proposed mix of uses are consistent with the City General Plan, Unified Development Code,

and Zoning designations, and thus the Project would also be consistent with the CAP. Furthermore, the Project is consistent with the following goals, objectives, and policies of the City's General Plan.

Goal CO 8: Development designed to improve energy efficiency, reduce energy and natural resource consumption, and reduce emissions of greenhouse gases.

> **Objective CO 8.1:** Comply with the requirements of State law, including AB 32, SB 375 and implementing regulations, to reach targeted reductions of greenhouse gas (GHG) emissions.
>
> > **Policy CO 8.1.1:** Create and adopt a Climate Action Plan within 18 months of the OVOV adoption date of the City's General Plan Update that meets State requirements and includes the following components:
> >
> > a. Plans and programs to reduce GHG emissions to State-mandated targets, including enforceable reduction measures;
> >
> > i. The CAP may establish goals beyond 2020, which are consistent with the applicable laws and regulations referenced in this paragraph and based on current science;
> >
> > ii. The CAP shall include specific and general tools and strategies to reduce the City's current and projected 2020 inventory and to meet the CAPs target for GHG reductions by 2020;
> >
> > iii. The CAP shall consider, among other GHG reduction strategies, the feasibility of development fees; incentive and rebate programs; and, voluntary and mandatory reduction strategies in areas of energy efficiency, renewable energy, water conservation and efficiency, solid waste, land use and transportation.
> >
> > b. Mechanisms to ensure regular review of progress towards the emission reduction targets established by the Climate Action Plan;
> >
> > c. Procedures for reporting on progress to officials and the public;
> >
> > d. Procedures for revising the plan as needed to meet GHG emissions reduction targets; and,
> >
> > e. Allocation of funding and staffing for Plan implementation;

Policy CO 8.1.2: Participate in the preparation of a regional Sustainable Communities Strategy (SCS) Plan to meet regional targets for greenhouse gas emission reductions, as required by SB 375.

Policy CO 8.1.3: Revise codes and ordinances as needed to address energy conservation, including but not limited to the following:

a. Strengthen building codes for new construction and renovation to achieve a higher level of energy efficiency, with a goal of exceeding energy efficiency beyond that required by Title 24;

b. Adopt a Green Building Program to encourage green building practices and materials, along with appropriate ordinances and incentives;

c. Require orientation of buildings to maximize passive solar heating during cool seasons, avoid solar heat gain during hot periods, enhance natural ventilation, promote effective use of daylight, and optimize opportunities for on-site solar generation;

d. Encourage mitigation of the "heat island" effect through use of cool roofs, light-colored paving, and shading to reduce energy consumption for air conditioning.

Policy CO 8.1.4: Provide information and education to the public about energy conservation and local strategies to address climate change.

Policy CO 8.1.5: Coordinate various activities within the community and appropriate agencies related to GHG emissions reduction activities.

Objective CO 8.3: Encourage the following green building and sustainable development practices on private development projects, to the extent reasonable and feasible.

Policy CO 8.3.1: Evaluate site plans proposed for new development based on energy efficiency pursuant to LEED (Leadership in Energy and Environmental Design) standards for New Construction and Neighborhood Development, including the following: a) location efficiency; b) environmental preservation; c) compact, complete, and connected neighborhoods; and d) resource efficiency, including use of recycled materials and water.

Policy CO 8.3.2: Promote construction of energy efficient buildings through requirements for LEED certification or through comparable alternative requirements as adopted by local ordinance.

Policy CO 8.3.5: Encourage on-site solar generation of electricity in new retail and office commercial buildings and associated parking lots, carports, and garages, in concert with other significant energy conservation efforts.

Policy CO 8.3.6: Require new development to use passive solar heating and cooling techniques in building design and construction, which may include but are not limited to building orientation, clerestory windows, skylights, placement and type of windows, overhangs to shade doors and windows, and use of light colored roofs, shade trees, and paving materials.

Policy CO 8.3.7: Encourage the use of trees and landscaping to reduce heating and cooling energy loads, through shading of buildings and parking lots.

Policy CO 8.3.8: Encourage energy-conserving heating and cooling systems and appliances, and energy-efficiency in windows and insulation, in all new construction.

Policy CO 8.3.9: Limit excessive lighting levels and encourage a reduction of lighting when businesses are closed to a level required for security.

Policy CO 8.3.10: Provide incentives and technical assistance for installation of energy-efficient improvements in existing and new buildings.

Policy CO 8.3.12: Reduce extensive heat gain from paved surfaces through development standards wherever feasible.

Conclusion

Given the Project's consistency with all relevant adopted regulatory plans, the Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. Moreover, the Project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases and these impacts would be less than significant.

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APPENDIX A

Air Quality Data

Golden Valley-Sierra Hwy July 2024 Custom Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Golden Valley-Sierra Hwy July 2024
Construction Start Date	7/1/2025
Operational Year	2026
Lead Agency	Santa Clarita
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.50
Precipitation (days)	19.6
Location	34.39966904249752, -118.48644360718563
County	Los Angeles-South Coast
City	Santa Clarita
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	3618
EDFZ	7
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.26

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Parking Lot	223	Space	2.00	0.00	0.00	—	—	—

City Park	5.83	Acre	5.83	0.00	100,000	100,000	—	—
Hotel	60.0	Room	3.76	47,828	5,000	—	—	—
Condo/Townhouse	73.0	Dwelling Unit	13.1	162,129	10,000	—	157	—
Congregate Care (Assisted Living)	151	Dwelling Unit	5.43	101,166	7,500	—	151	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.90	3.28	29.8	29.7	0.06	1.23	2.65	3.89	1.14	1.01	2.15	—	6,875	6,875	0.28	0.25	11.0	6,902
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	45.8	45.3	29.8	37.4	0.06	1.23	3.31	4.05	1.14	1.01	2.15	—	8,021	8,021	0.34	0.28	0.35	8,115
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	6.57	6.31	10.3	18.0	0.02	0.43	1.92	2.22	0.39	0.46	0.73	—	4,251	4,251	0.18	0.18	3.47	4,313
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.20	1.15	1.89	3.29	< 0.005	0.08	0.35	0.40	0.07	0.08	0.13	—	704	704	0.03	0.03	0.58	714

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	3.90	3.28	29.8	29.7	0.06	1.23	2.65	3.89	1.14	1.01	2.15	—	6,875	6,875	0.28	0.08	1.50	6,902
2026	2.11	1.77	11.7	25.2	0.03	0.39	2.64	3.04	0.36	0.63	0.99	—	5,845	5,845	0.24	0.25	11.0	5,936
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	3.90	3.28	29.8	29.5	0.06	1.23	2.65	3.89	1.14	1.01	2.15	—	6,861	6,861	0.28	0.06	0.03	6,887
2026	45.8	45.3	20.0	37.4	0.05	0.74	3.31	4.05	0.67	0.79	1.46	—	8,021	8,021	0.34	0.28	0.35	8,115
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	1.35	1.14	10.3	10.2	0.02	0.43	0.83	1.26	0.39	0.31	0.70	—	2,306	2,306	0.09	0.02	0.17	2,316
2026	6.57	6.31	8.95	18.0	0.02	0.30	1.92	2.22	0.27	0.46	0.73	—	4,251	4,251	0.18	0.18	3.47	4,313
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.25	0.21	1.89	1.86	< 0.005	0.08	0.15	0.23	0.07	0.06	0.13	—	382	382	0.02	< 0.005	0.03	383
2026	1.20	1.15	1.63	3.29	< 0.005	0.05	0.35	0.40	0.05	0.08	0.13	—	704	704	0.03	0.03	0.58	714

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	10.4	9.83	3.87	47.6	0.10	0.16	8.72	8.88	0.16	2.21	2.37	132	13,531	13,663	13.8	0.35	110	14,224
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	8.80	8.35	3.98	28.1	0.10	0.15	8.72	8.87	0.15	2.21	2.36	132	13,081	13,213	13.8	0.37	78.1	13,746

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	9.87	9.36	4.13	39.5	0.10	0.16	8.61	8.77	0.15	2.19	2.34	132	13,219	13,352	13.8	0.37	91.3	13,899
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.80	1.71	0.75	7.21	0.02	0.03	1.57	1.60	0.03	0.40	0.43	21.9	2,189	2,211	2.29	0.06	15.1	2,301

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.36	0.99	2.49	32.2	0.09	0.05	8.72	8.77	0.05	2.21	2.27	—	9,439	9,439	0.27	0.29	32.7	9,563
Area	8.86	8.77	0.14	14.8	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	42.5	42.5	< 0.005	< 0.005	—	42.7
Energy	0.14	0.07	1.24	0.68	0.01	0.10	—	0.10	0.10	—	0.10	—	3,924	3,924	0.28	0.02	—	3,938
Water	—	—	—	—	—	—	—	—	—	—	—	18.9	125	144	1.95	0.05	—	207
Waste	—	—	—	—	—	—	—	—	—	—	—	113	0.00	113	11.3	0.00	—	397
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	77.2	77.2
Total	10.4	9.83	3.87	47.6	0.10	0.16	8.72	8.88	0.16	2.21	2.37	132	13,531	13,663	13.8	0.35	110	14,224
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.35	0.98	2.74	27.5	0.09	0.05	8.72	8.77	0.05	2.21	2.27	—	9,031	9,031	0.27	0.30	0.85	9,128
Area	7.30	7.30	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Energy	0.14	0.07	1.24	0.68	0.01	0.10	—	0.10	0.10	—	0.10	—	3,924	3,924	0.28	0.02	—	3,938
Water	—	—	—	—	—	—	—	—	—	—	—	18.9	125	144	1.95	0.05	—	207
Waste	—	—	—	—	—	—	—	—	—	—	—	113	0.00	113	11.3	0.00	—	397
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	77.2	77.2
Total	8.80	8.35	3.98	28.1	0.10	0.15	8.72	8.87	0.15	2.21	2.36	132	13,081	13,213	13.8	0.37	78.1	13,746

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.35	0.98	2.79	28.7	0.09	0.05	8.61	8.66	0.05	2.19	2.24	—	9,141	9,141	0.27	0.30	14.1	9,252
Area	8.37	8.31	0.10	10.1	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	29.1	29.1	< 0.005	< 0.005	—	29.2
Energy	0.14	0.07	1.24	0.68	0.01	0.10	—	0.10	0.10	—	0.10	—	3,924	3,924	0.28	0.02	—	3,938
Water	—	—	—	—	—	—	—	—	—	—	—	18.9	125	144	1.95	0.05	—	207
Waste	—	—	—	—	—	—	—	—	—	—	—	113	0.00	113	11.3	0.00	—	397
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	77.2	77.2
Total	9.87	9.36	4.13	39.5	0.10	0.16	8.61	8.77	0.15	2.19	2.34	132	13,219	13,352	13.8	0.37	91.3	13,899
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.25	0.18	0.51	5.24	0.02	0.01	1.57	1.58	0.01	0.40	0.41	—	1,513	1,513	0.04	0.05	2.33	1,532
Area	1.53	1.52	0.02	1.85	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	4.82	4.82	< 0.005	< 0.005	—	4.84
Energy	0.03	0.01	0.23	0.12	< 0.005	0.02	—	0.02	0.02	—	0.02	—	650	650	0.05	< 0.005	—	652
Water	—	—	—	—	—	—	—	—	—	—	—	3.13	20.7	23.8	0.32	0.01	—	34.2
Waste	—	—	—	—	—	—	—	—	—	—	—	18.8	0.00	18.8	1.88	0.00	—	65.7
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12.8	12.8
Total	1.80	1.71	0.75	7.21	0.02	0.03	1.57	1.60	0.03	0.40	0.43	21.9	2,189	2,211	2.29	0.06	15.1	2,301

3. Construction Emissions Details

3.1. Demolition (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	2.86	2.40	22.2	19.9	0.03	0.92	—	0.92	0.84	—	0.84	—	3,425	3,425	0.14	0.03	—	3,437
Demolition	—	—	—	—	—	—	0.25	0.25	—	0.04	0.04	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.17	0.14	1.34	1.20	< 0.005	0.06	—	0.06	0.05	—	0.05	—	206	206	0.01	< 0.005	—	207
Demolition	—	—	—	—	—	—	0.02	0.02	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.24	0.22	< 0.005	0.01	—	0.01	0.01	—	0.01	—	34.2	34.2	< 0.005	< 0.005	—	34.3
Demolition	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	1.04	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	207	207	0.01	0.01	0.76	210
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.02	< 0.005	0.39	0.15	< 0.005	< 0.005	0.09	0.09	< 0.005	0.02	0.03	—	318	318	0.02	0.05	0.74	334
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.0	12.0	< 0.005	< 0.005	0.02	12.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	19.2	19.2	< 0.005	< 0.005	0.02	20.1
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.99	1.99	< 0.005	< 0.005	< 0.005	2.02
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.17	3.17	< 0.005	< 0.005	< 0.005	3.33

3.3. Grading (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.80	3.20	29.7	28.3	0.06	1.23	—	1.23	1.14	—	1.14	—	6,599	6,599	0.27	0.05	—	6,622
Dust From Material Movement	—	—	—	—	—	—	2.39	2.39	—	0.95	0.95	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.80	3.20	29.7	28.3	0.06	1.23	—	1.23	1.14	—	1.14	—	6,599	6,599	0.27	0.05	—	6,622
Dust From Material Movement	—	—	—	—	—	—	2.39	2.39	—	0.95	0.95	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.15	0.96	8.94	8.53	0.02	0.37	—	0.37	0.34	—	0.34	—	1,989	1,989	0.08	0.02	—	1,996
Dust From Material Movement	—	—	—	—	—	—	0.72	0.72	—	0.29	0.29	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	0.18	1.63	1.56	< 0.005	0.07	—	0.07	0.06	—	0.06	—	329	329	0.01	< 0.005	—	330
Dust From Material Movement	—	—	—	—	—	—	0.13	0.13	—	0.05	0.05	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.09	1.39	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	277	277	0.01	0.01	1.01	281
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.10	1.18	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	262	262	0.01	0.01	0.03	265
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.37	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	80.2	80.2	< 0.005	< 0.005	0.13	81.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	13.3	13.3	< 0.005	< 0.005	0.02	13.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	0.76	6.99	9.20	0.02	0.27	—	0.27	0.25	—	0.25	—	1,701	1,701	0.07	0.01	—	1,707
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.17	0.14	1.28	1.68	< 0.005	0.05	—	0.05	0.05	—	0.05	—	282	282	0.01	< 0.005	—	283
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.75	0.67	0.70	11.7	0.00	0.00	2.37	2.37	0.00	0.56	0.56	—	2,457	2,457	0.10	0.09	8.31	2,494
Vendor	0.07	0.03	1.09	0.53	0.01	0.01	0.27	0.29	0.01	0.08	0.08	—	991	991	0.04	0.14	2.68	1,037
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.75	0.66	0.79	10.00	0.00	0.00	2.37	2.37	0.00	0.56	0.56	—	2,330	2,330	0.11	0.09	0.22	2,358
Vendor	0.07	0.03	1.14	0.54	0.01	0.01	0.27	0.29	0.01	0.08	0.08	—	991	991	0.04	0.14	0.07	1,035
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.53	0.47	0.61	7.42	0.00	0.00	1.66	1.66	0.00	0.39	0.39	—	1,677	1,677	0.08	0.06	2.55	1,700
Vendor	0.05	0.02	0.82	0.38	0.01	0.01	0.19	0.20	0.01	0.05	0.06	—	703	703	0.03	0.10	0.82	735
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.11	1.35	0.00	0.00	0.30	0.30	0.00	0.07	0.07	—	278	278	0.01	0.01	0.42	281
Vendor	0.01	< 0.005	0.15	0.07	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	116	116	< 0.005	0.02	0.14	122
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Paving (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	0.76	7.12	9.94	0.01	0.32	—	0.32	0.29	—	0.29	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.25	0.25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.41	0.57	< 0.005	0.02	—	0.02	0.02	—	0.02	—	86.9	86.9	< 0.005	< 0.005	—	87.2
Paving	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.10	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	14.4	14.4	< 0.005	< 0.005	—	14.4
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.07	0.83	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	193	193	0.01	0.01	0.02	195
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.2	11.2	< 0.005	< 0.005	0.02	11.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.86	1.86	< 0.005	< 0.005	< 0.005	1.89
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Architectural Coating (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	42.2	42.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.10	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.7	15.7	< 0.005	< 0.005	—	15.8
Architectural Coatings	4.97	4.97	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.60	2.60	< 0.005	< 0.005	—	2.61
Architectural Coatings	0.91	0.91	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.15	0.13	0.16	2.00	0.00	0.00	0.47	0.47	0.00	0.11	0.11	—	466	466	0.02	0.02	0.04	472
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.25	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	55.7	55.7	< 0.005	< 0.005	0.08	56.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.22	9.22	< 0.005	< 0.005	0.01	9.35
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Mobile source emissions results are presented in Sections 2.6. No further detailed breakdown of emissions is available.

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	—	111	111	0.01	< 0.005	—	112
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	975	975	0.06	0.01	—	979
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	489	489	0.03	< 0.005	—	490
Congregate Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	—	807	807	0.05	0.01	—	810
Total	—	—	—	—	—	—	—	—	—	—	—	—	2,382	2,382	0.15	0.02	—	2,391
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Parking Lot	—	—	—	—	—	—	—	—	—	—	—	—	111	111	0.01	< 0.005	—	112
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	975	975	0.06	0.01	—	979
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	489	489	0.03	< 0.005	—	490
Congregate Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	—	807	807	0.05	0.01	—	810
Total	—	—	—	—	—	—	—	—	—	—	—	—	2,382	2,382	0.15	0.02	—	2,391
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	—	18.4	18.4	< 0.005	< 0.005	—	18.5
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	162	162	0.01	< 0.005	—	162
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	80.9	80.9	0.01	< 0.005	—	81.2
Congregate Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	—	134	134	0.01	< 0.005	—	134
Total	—	—	—	—	—	—	—	—	—	—	—	—	394	394	0.02	< 0.005	—	396

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Hotel	0.04	0.02	0.37	0.31	< 0.005	0.03	—	0.03	0.03	—	0.03	—	443	443	0.04	< 0.005	—	444
Condo/Townhouse	0.05	0.03	0.44	0.19	< 0.005	0.04	—	0.04	0.04	—	0.04	—	562	562	0.05	< 0.005	—	564
Congregate Care (Assisted Living)	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	537	537	0.05	< 0.005	—	539
Total	0.14	0.07	1.24	0.68	0.01	0.10	—	0.10	0.10	—	0.10	—	1,542	1,542	0.14	< 0.005	—	1,547
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Hotel	0.04	0.02	0.37	0.31	< 0.005	0.03	—	0.03	0.03	—	0.03	—	443	443	0.04	< 0.005	—	444
Condo/Townhouse	0.05	0.03	0.44	0.19	< 0.005	0.04	—	0.04	0.04	—	0.04	—	562	562	0.05	< 0.005	—	564
Congregate Care (Assisted Living)	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	537	537	0.05	< 0.005	—	539
Total	0.14	0.07	1.24	0.68	0.01	0.10	—	0.10	0.10	—	0.10	—	1,542	1,542	0.14	< 0.005	—	1,547
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Hotel	0.01	< 0.005	0.07	0.06	< 0.005	0.01	—	0.01	0.01	—	0.01	—	73.3	73.3	0.01	< 0.005	—	73.5
Condo/Townhouse	0.01	< 0.005	0.08	0.03	< 0.005	0.01	—	0.01	0.01	—	0.01	—	93.1	93.1	0.01	< 0.005	—	93.3
Congregate Care (Assisted Living)	0.01	< 0.005	0.08	0.03	< 0.005	0.01	—	0.01	0.01	—	0.01	—	89.0	89.0	0.01	< 0.005	—	89.2
Total	0.03	0.01	0.23	0.12	< 0.005	0.02	—	0.02	0.02	—	0.02	—	255	255	0.02	< 0.005	—	256

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	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	6.72	6.72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.58	0.58	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landscape Equipment	1.56	1.47	0.14	14.8	< 0.005	0.01	—	0.01	0.01	—	0.01	—	42.5	42.5	< 0.005	< 0.005	—	42.7
Total	8.86	8.77	0.14	14.8	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	42.5	42.5	< 0.005	< 0.005	—	42.7
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	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	6.72	6.72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.58	0.58	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	7.30	7.30	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	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	1.23	1.23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.11	0.11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.19	0.18	0.02	1.85	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.82	4.82	< 0.005	< 0.005	—	4.84
Total	1.53	1.52	0.02	1.85	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	4.82	4.82	< 0.005	< 0.005	—	4.84

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	24.1	24.1	< 0.005	< 0.005	—	24.2
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.92	15.6	18.6	0.30	0.01	—	28.2
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	5.21	28.3	33.5	0.54	0.01	—	50.8
Congregate Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	10.8	56.8	67.6	1.11	0.03	—	103
Total	—	—	—	—	—	—	—	—	—	—	—	18.9	125	144	1.95	0.05	—	207
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	24.1	24.1	< 0.005	< 0.005	—	24.2
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.92	15.6	18.6	0.30	0.01	—	28.2
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	5.21	28.3	33.5	0.54	0.01	—	50.8

Congregate Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	10.8	56.8	67.6	1.11	0.03	—	103
Total	—	—	—	—	—	—	—	—	—	—	—	18.9	125	144	1.95	0.05	—	207
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	3.99	3.99	< 0.005	< 0.005	—	4.01
Hotel	—	—	—	—	—	—	—	—	—	—	—	0.48	2.59	3.07	0.05	< 0.005	—	4.67
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	0.86	4.69	5.55	0.09	< 0.005	—	8.41
Congregate Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	1.79	9.41	11.2	0.18	< 0.005	—	17.1
Total	—	—	—	—	—	—	—	—	—	—	—	3.13	20.7	23.8	0.32	0.01	—	34.2

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.27	0.00	0.27	0.03	0.00	—	0.95

Hotel	—	—	—	—	—	—	—	—	—	—	—	17.7	0.00	17.7	1.77	0.00	—	61.9
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	21.1	0.00	21.1	2.11	0.00	—	74.0
Congregate Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	74.3	0.00	74.3	7.43	0.00	—	260
Total	—	—	—	—	—	—	—	—	—	—	—	113	0.00	113	11.3	0.00	—	397
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.27	0.00	0.27	0.03	0.00	—	0.95
Hotel	—	—	—	—	—	—	—	—	—	—	—	17.7	0.00	17.7	1.77	0.00	—	61.9
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	21.1	0.00	21.1	2.11	0.00	—	74.0
Congregate Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	74.3	0.00	74.3	7.43	0.00	—	260
Total	—	—	—	—	—	—	—	—	—	—	—	113	0.00	113	11.3	0.00	—	397
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.04	0.00	0.04	< 0.005	0.00	—	0.16
Hotel	—	—	—	—	—	—	—	—	—	—	—	2.93	0.00	2.93	0.29	0.00	—	10.3
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	3.50	0.00	3.50	0.35	0.00	—	12.2

Congreg Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	12.3	0.00	12.3	1.23	0.00	—	43.0
Total	—	—	—	—	—	—	—	—	—	—	—	18.8	0.00	18.8	1.88	0.00	—	65.7

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	74.8	74.8
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16
Congregate Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.28	1.28
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	77.2	77.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	74.8	74.8

Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16
Congregate Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.28	1.28
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	77.2	77.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12.4	12.4
Condo/Townhouse	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19
Congregate Care (Assisted Living)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.21	0.21
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12.8	12.8

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	7/1/2025	7/30/2025	5.00	22.0	—
Grading	Grading	7/31/2025	12/31/2025	5.00	110	—
Building Construction	Building Construction	1/2/2026	12/30/2026	5.00	259	—
Paving	Paving	12/2/2026	12/30/2026	5.00	21.0	—
Architectural Coating	Architectural Coating	11/2/2026	12/30/2026	5.00	43.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Rubber Tired Dozers	Diesel	Average	2.00	8.00	367	0.40
Demolition	Excavators	Diesel	Average	3.00	8.00	36.0	0.38
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41

Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	18.5	LDA,LDT1,LDT2
Demolition	Vendor	—	10.2	HHDT,MHDT
Demolition	Hauling	4.59	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT

Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	181	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	31.8	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	36.3	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	453,600	151,200	130,680	43,560	1,934

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (Building Square Footage)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	8,770	—
Grading	—	—	330	0.00	—
Paving	0.00	0.00	0.00	0.00	2.00

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	3	74%	74%
Water Demolished Area	2	36%	36%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Parking Lot	2.00	100%
City Park	0.00	0%
Hotel	0.00	0%
Condo/Townhouse	—	0%
Congregate Care (Assisted Living)	—	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2025	0.00	532	0.03	< 0.005
2026	0.00	532	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Total all Land Uses	0.00	0.00	0.00	0.00	12,297	12,297	12,297	4,488,405

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

Hearth Type	Unmitigated (number)
Condo/Townhouse	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	0
Conventional Wood Stoves	0
Catalytic Wood Stoves	0
Non-Catalytic Wood Stoves	0
Pellet Wood Stoves	0
Congregate Care (Assisted Living)	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	0

Conventional Wood Stoves	0
Catalytic Wood Stoves	0
Non-Catalytic Wood Stoves	0
Pellet Wood Stoves	0

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
533172.375	177,724	71,742	23,914	5,227

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Parking Lot	76,317	532	0.0330	0.0040	0.00
City Park	0.00	532	0.0330	0.0040	0.00
Hotel	669,291	532	0.0330	0.0040	1,380,876
Condo/Townhouse	335,228	532	0.0330	0.0040	1,754,216
Congregate Care (Assisted Living)	553,541	532	0.0330	0.0040	1,677,133

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Parking Lot	0.00	0.00
City Park	0.00	3,116,574
Hotel	1,522,006	70,123
Condo/Townhouse	2,720,987	171,412
Congregate Care (Assisted Living)	5,628,344	128,559

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Parking Lot	0.00	—
City Park	0.50	—
Hotel	32.9	—
Condo/Townhouse	39.2	—
Congregate Care (Assisted Living)	138	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
City Park	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
City Park	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00

Hotel	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
Hotel	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
Hotel	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Condo/Townhouse	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Condo/Townhouse	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00
Congregate Care (Assisted Living)	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Congregate Care (Assisted Living)	Household refrigerators and/or freezers	R-134a	1,430	0.22	0.60	0.00	1.00

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

8. User Changes to Default Data

Screen	Justification
Land Use	Project Site totals 28.13 acres; acreage breakdown by land use estimated by applicant. It is noted the acre total assumed here is slightly overestimated to ensure the parking-related paving emissions are accounted for. Hotel use includes 2,544 sf banquet space 3,315 sf of retail, and 2,360 sf restaurant space. City park use reflects Project's open space lot plus riding/hiking trail. Population estimates reflect the total population of 308 identified in Project's Traffic VMT analysis.
Construction: Construction Phases	construction schedule per applicant
Construction: Architectural Coatings	Low VOC per SCAQMD
Operations: Hearths	Assumes no wood/gas/propane fireplaces or wood stoves.

SRA 13 **Localized Significance Thresholds***
Construction At 25 Meters

CO	
x-value Area of Site (acerage)	**y-value LST (mass/day)**
1	590.00
2	877.00
5	1644.00
4.00	**1385.92**

NOx	
x-value Area of Site (acerage)	**y-value LST (mass/day)**
1	114.00
2	163.00
5	246.00
4.00	**216.69**

PM_{10}	
x-value Area of Site (acerage)	**y-value LST (mass/day)**
1	4
2	6
5	12
4.00	**10.00**

$PM_{2.5}$	
x-value Area of Site (acerage)	**y-value LST (mass/day)**
1	3
2	4
5	6
4.00	**5.31**

**based on SCAQMD localized signifcance thresholds (LST)*

Construction Health Risk Assessment

Golden Valley-Sierra Highway Mixed-Use Project

March 2022

Toxic Air Contaminants (TACs) Background

TACs refer to a diverse group of air pollutants that include both organic and inorganic chemical substances that may be emitted from a variety of common sources including gasoline stations, motor vehicles, dry cleaners, industrial operations, painting operations, and research and teaching facilities. TACs are typically found in low concentrations in ambient air, especially in urban areas. TACs are different than "criteria" pollutants in that ambient air quality standards have not been established for them, largely because there are hundreds of air toxics and their effects on health tend to be felt on a local scale rather than on a regional basis. TACs are regulated at the regional, state, and federal level, however, because chronic exposure can result in adverse health effects. TACs are known to cause or contribute to cancer or non-cancer health effects such as birth defects, genetic damage, and other adverse health effects. Effects from TACs may be both chronic (i.e., of long duration) and acute (i.e., severe but of short duration) on human health. Acute health effects are attributable to sudden exposure to high quantities of air toxics. These effects include nausea, skin irritation, respiratory illness, and, in some cases, death. Chronic health effects result from low-dose, long-term exposure from routine releases of air toxics. Diesel exhaust, or Diesel Particulate matter (DPM), is the predominant TAC in urban air and is estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average). According to the California Air Resources Board (CARB), diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, including benzene, formaldehyde, acrolein, butadiene, and acetaldehyde have been previously identified as TACs by the CARB, and are listed as carcinogens either under the state's Proposition 65 or under the federal Hazardous Air Pollutants programs.

Methodology

The greatest potential for TAC emissions during Project construction would be related to diesel particulate matter emissions associated with heavy-duty equipment. Construction activities associated with the Project would be short term in nature (i.e., 18 months). Although construction would be temporary, construction impacts associated with TACs have been estimated herein. In March 2015, the Office of Environmental Health Hazard Assessment (OEHHA) adopted revised guidelines that update previous guidance by incorporating advances in risk assessment with consideration of infants and children using Age Sensitivity Factors (ASF). The construction HRA was performed in accordance with the revised OEHHA Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2015). The analysis utilizes dispersion modeling using the United States Environmental Protection Agency (USEPA) AERMOD model with meteorological data from the closest South Coast Air Quality Management District (SCAQMD) monitoring station located at the Santa Clarita station.

See attachments herein for additional information related to the assumptions of the construction HRA.

Based on the Project's construction assumptions and California Emissions Estimator Model (CalEEMod) the worst-case daily DPM emissions were utilized to assess potential health risks to the nearest off-site sensitive receptors. Note, this assessment focuses on the project construction and the maximum impact to the nearest sensitive receptors.

The American Meteorological Society (AMS)/USEPA Regulatory Model (AERMOD) was utilized to quantify the concentrations of DPM at the nearest sensitive receptors, and a worst-case receptor location was analyzed. AERMOD is steady-state plume modeling system specially designed to support the USEPA's regulatory modeling programs. AERMOD allows the user to conduct site-specific modeling with the use of various inputs including source types, receptor locations, terrain data, meteorological conditions, and much more. Discrete receptors were placed at the sensitive receptor locations to represent ground-level receptors (worst-case). The terrain data for the Project area was applied from the USGS online database.

Based on OEHHA (2015) methodology for residential receptors, the cancer risk for a particular chemical of interest is based on the following:

RISK inh-res = DOSEair × CPF × ASF × ED/AT × FAH

Where:

RISK inh-res = Residential inhalation cancer risk

DOSEair = Daily inhalation dose (mg/kg-day)

CPF = Inhalation cancer potency factor ($mg/kg\text{-}day^{-1}$)

ASF = Age sensitivity factor for a specified age group

ED = Exposure duration (in years) for a specified age group

AT = Averaging time for lifetime cancer risk (years)

FAH = Fraction of time spent at home

The attached carcinogenic calculation sheets illustrate the assumptions and calculations utilized in this HRA.

Noncancer chronic inhalation impacts are calculated by dividing the annual average concentration by the Reference Exposure Level (REL or REF) for that substance. The REL is defined as the concentration at which no adverse noncancer health effects are anticipated.

For a single substance, this result is called the Hazard Quotient (HQ). The following equation is used to calculate the HQ:

$HQ = C_i/REL_i$

Where:

C_i = Concentration in the air of substance i

REL_i = Chronic noncancer Reference Exposure Level for substance i

For multiple substances, the Hazard Index (HI) is calculated. The HI is calculated by summing the HQs from all substances that affect the same organ system.

Carcinogenic and Chronic Noncarcinogenic Risk Results

The construction activities associated with the project would result in the generation of TACs, including diesel particulate matter. Potential health risks associated with construction of the Project were performed based on the OEHHA guidance and incorporation of the results from the AERMOD dispersion model. It should be noted that the calculated cancer risk is conservative as it is estimated for outdoor exposure over the entire construction period (i.e., 18 months), which assumes that sensitive receptors (residential uses) would not have any mitigation such as mechanical filtration and that residential uses would have continuously open windows and the receptor would be home and outside for all hours. This HRA also assumes that all construction equipment would operate at full-time use (i.e., load factor). The max day for $PM_{2.5}$ (diesel exhaust) emissions was assumed to occur each day for all 18 months of construction days; this is conservative to assume the peak day would occur all day and every day during construction. The most harmful DPM is classified as ultrafine particulates as a subset of $PM_{2.5}$ (the most harmful DPM is classified as 0.1 microns in diameter). This report assumes all $PM_{2.5}$ exhaust would be considered the most harmful class of ultrafine diesel particulate, thereby resulting in likely overstated effects of DPM exhaust. Under these worst-case assumptions, the maximum impact at the nearest sensitive receptor (i.e., residences to the north and to the east of the Project Site) would be 9.3 per 1 million, or less than the risk threshold of 10.0 in 1 million. Impacts at locations farther than this receptor would be further reduced, and thus impacts would be less than significant.

Potential noncarcinogenic effects of chronic (i.e., long term – DPM does not have an acute REL) DPM exposures were evaluated using the Hazard Index approach as described in the OEHHA Guidance. A hazard index equal to or greater than 1.0 represents a significant chronic health hazard. As shown in greater detail the following attachments, non-carcinogenic effects at the nearest sensitive receptor (i.e., residences located north and east of the Project Site) would be 0.02, which is less than the 1.0 health hazard threshold. Impacts at locations farther than this receptor would be further reduced, and thus non-cancer effects would be less than significant.

REFERENCES

AMS/USEPA Regulatory Model (AERMOD)

California Air Pollution Control Officers Association (CAPCOA)

Health Risk Assessments for Proposed Land Use Project, Guidance Document, July 2009

California Air Resources Board (CARB)

Air Quality and Land Use Handbook, April 2005

California Office of Environmental Health Hazard Assessment (OEHHA)
Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk, 2015
Hot Spots Unit Risk and Cancer Potency Values
(http://www.oehha.ca.gov/air/hot_spots/2009/AppendixA.pdf)
Chronic REL Summary (http://www.oehha.ca.gov/air/allrels.html)
Google Earth, 2022
South Coast Air Quality Management District (SCAQMD)
Air Quality Significance Thresholds
California Emissions Estimator Model (CalEEMod) and User Guide
CEQA Air Quality Handbook, 1993
Meteorological Data for AERMOD
Modeling Guidance for AERMOD
District Staff

ATTACHMENTS

1. Cancer and Health Calculations
2. Emissions Summary
3. AERMOD Output File

Carcinogenic Risks - 3rd Trimester to Birth

Source	Concentration		Weight Fraction	Contaminant	Carcinogenic Risk		
	(ug/m3)	(mg/m3)			URF[a] (ug/m3)	CPF[a] (mg/kg/day)	RISK (per million)
Construction	1.00E-01	1.00E-04	1.00E+00	DPM	3.00E-04	1.10E+00	6.24E-01
						Totals	6.24E-01

[a] http://www.oehha.ca.gov/air/hot_spots/2009/AppendixA.pdf (updated 2011)

Assumptions (per OEHHA Guidance Manual for Preparation of HRAs, Appendix I, February 2015)

Daily Breathing Rate	273 L/kg-day (80th percentile)
Inhalation Absorbtion	1
Exposure Frequency	250 construction days/yr
Age Sensitivity Factor	10
Fraction At Home	0.85
Exposure Duration	0.25 years (1st 3 months of construction)
Averaging Time	70 years (25,550 days)

Carcinogenic Risks - 0<2

Source	Concentration		Weight Fraction	Contaminant	Carcinogenic Risk		
	(ug/m3)	(mg/m3)			URF[a] (ug/m3)	CPF[a] (mg/kg/day)	RISK (per million)
Construction	1.00E-01	1.00E-04	1.00E+00	DPM	3.00E-04	1.10E+00	8.67E+00
						Totals	8.67E+00

[a] http://www.oehha.ca.gov/air/hot_spots/2009/AppendixA.pdf (updated 2011)

Assumptions (per OEHHA Guidance Manual for Preparation of HRAs, Appendix I, February 2015)

Daily Breathing Rate	758 L/kg-day (80th percentile)
Inhalation Absorbtion	1
Exposure Frequency	250 construction days/year
Age Sensitivity Factor	10
Fraction At Home	0.85
Exposure Duration	1.25 construction years (last 15 months of construction)
Averaging Time	70 years (25,550 days)

Chronic Noncarcinogenic Hazards

Source	Concentration		Weight Fraction	Contaminant	Chronic Noncarcinogenic Hazards/Toxicological Endpoints								
	(ug/m3)	(mg/m3)			REL[a] (ug/m3)	RESP	CNS/PNS	CV/BL	IMMUN	KIDN	GI/LV	REPRO	EYES
Construction	1.00E-01	1.00E-04	1.00E+00	DPM	5.00E+00	2.00E-02							
					Totals	2.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

[a] http://www.oehha.ca.gov/air/allrels.html

Toxicological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System
EYES	Eye irritation

Emission Rate Summary

Maximum Daily DPM (see max exhaust from attached CalEEMod Sheets)

Construction Phase	Demo (1 mo 18)	Grading (5 mos of 18)	Bldg (12 mos of 18)
Total (pounds/day)	1.15	1.5	0.66

Composite (pounds/day) **0.92**

Maximum DPM Emission Rate

Construction Phase	Avg
Total (grams/sec)	0.004800

It is noted that CalEEMod data was updated in July 2024 to reflect a more realistic buildout timeline for the Project (adjusted construction from 2024 and 2025 to construction in 2025 and 2026, assuming full operations by 2026). As the CalEEMod data indicates, DPM exhaust emissions are reduced compared to those used in this construction HRA. As such, construction related health risk impacts would be lower than those shown herein.

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** AERMOD View Ver. 10.2.1
** Lakes Environmental Software Inc.
** Date: 3/16/2022
** File: C:\Lakes\AERMOD View\Golden Valley\Golden Valley.ADI
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** AERMOD Control Pathway
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   AVERTIME ANNUAL
   URBANOPT 9818605
   POLLUTID DPM
   RUNORNOT RUN
   ERRORFIL "Golden Valley.err"
CO FINISHED
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** AERMOD Source Pathway
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SO STARTING
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** Source ID - Type - X Coord. - Y Coord. **
** ----------------------------------------------------------
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** DESCRSRC
** PREFIX
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0.93
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   SRCPARAM L0000496     0.000008233      0.00      0.93
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   SRCPARAM L0000497     0.000008233      0.00      0.93
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   SRCPARAM L0000499     0.000008233      0.00      0.93
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   SRCPARAM L0000500     0.000008233      0.00      0.93
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   SRCPARAM L0000501     0.000008233      0.00      0.93
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0.93
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   SRCPARAM L0000510     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000511     0.000008233      0.00      0.93
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   SRCPARAM L0000512     0.000008233      0.00      0.93
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0.93
   SRCPARAM L0000513     0.000008233      0.00      0.93
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   SRCPARAM L0000514     0.000008233      0.00      0.93
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0.93
   SRCPARAM L0000531     0.000008233      0.00      0.93
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0.93
   SRCPARAM L0000536     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000537     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000538     0.000008233      0.00      0.93
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0.93
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0.93
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0.93
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0.93
   SRCPARAM L0000549     0.000008233      0.00      0.93
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   SRCPARAM L0000550     0.000008233      0.00      0.93
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   SRCPARAM L0000551     0.000008233      0.00      0.93
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   SRCPARAM L0000552     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000553     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000554     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000555     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000556     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000557     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000558     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000559     0.000008233      0.00      0.93
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   SRCPARAM L0000560     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000561     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000562     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000563     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000564     0.000008233      0.00      0.93
```



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0.93
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   SRCPARAM L0000567     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000568     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000569     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000570     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000571     0.000008233      0.00      0.93
0.93
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0.93
   SRCPARAM L0000573     0.000008233      0.00      0.93
0.93
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0.93
   SRCPARAM L0000576     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000577     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000578     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000579     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000580     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000581     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000582     0.000008233      0.00      0.93
0.93
   SRCPARAM L0000583     0.000008233      0.00      0.93
0.93
** ------------------------------------------------------------
-------
   URBANSRC ALL
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED "Golden Valley.rou"
```



```
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE sclr8.sfc
   PROFFILE sclr8.PFL
   SURFDATA 0 2008
   UAIRDATA 3190 2008
   SITEDATA 99999 2008
   PROFBASE 1100.0 FEET
ME FINISHED
**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
** Auto-Generated Plotfiles
   PLOTFILE ANNUAL ALL "Golden Valley.AD\AN00GALL.PLT" 31
   SUMMFILE "Golden Valley.sum"
OU FINISHED

 ***********************************
 *** SETUP Finishes Successfully ***
 ***********************************
```

```
 *** AERMOD - VERSION 21112  ***   *** C:\Lakes\AERMOD View
\Golden Valley\Golden Valley.isc                  ***
03/16/22
 *** AERMET - VERSION  14134 ***   ***
***        16:20:06

PAGE   1
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN

                                          ***     MODEL SETUP
OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration
Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses URBAN Dispersion Algorithm for the SBL for   583
Source(s),
   for Total of    1 Urban Area(s):
   Urban Population =   9818605.0 ;  Urban Roughness Length =
1.000 m

 **Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Urban Roughness Length of 1.0 Meter Assumed.

 **Other Options Specified:
        TEMP_Sub - Meteorological data includes TEMP
substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  DPM

 **Model Calculates ANNUAL Averages Only

 **This Run Includes:    583 Source(s);       1 Source Group(s);
and       5 Receptor(s)

               with:      0 POINT(s), including
                          0 POINTCAP(s) and      0 POINTHOR(s)
```



```
                          and:    583 VOLUME source(s)
                          and:      0 AREA type source(s)
                          and:      0 LINE source(s)
                          and:      0 RLINE/RLINEXT source(s)
                          and:      0 OPENPIT source(s)
                          and:      0 BUOYANT LINE source(s) with a total
of     0 line(s)


 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs External File(s) of High Values for
Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked
Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:
c for Calm Hours

m for Missing Hours

b for Both Calm and Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =
335.28 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                  Emission Units =
GRAMS/SEC                           ;  Emission Rate Unit
Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.7 MB of
RAM.

 **Input Runstream File:          aermod.inp
 **Output Print File:             aermod.out

 **Detailed Error/Message File:   Golden Valley.err
 **File for Summary of Results:   Golden Valley.sum
```



```
 *** AERMOD - VERSION 21112  ***   *** C:\Lakes\AERMOD View
\Golden Valley\Golden Valley.isc                  ***
03/16/22
 *** AERMET - VERSION  14134 ***   ***
***        16:20:06

PAGE   2
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  URBAN


                                                *** VOLUME
SOURCE DATA ***

               NUMBER EMISSION RATE                    BASE
RELEASE    INIT.    INIT.   URBAN  EMISSION RATE
   SOURCE       PART.  (GRAMS/SEC)     X        Y      ELEV.
HEIGHT      SY       SZ     SOURCE  SCALAR VARY
     ID          CATS.                (METERS) (METERS) (METERS)
(METERS) (METERS) (METERS)            BY
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 L0000001         0   0.82330E-05  363348.4 3807663.6   480.4
0.00     0.93     0.93     YES
 L0000002         0   0.82330E-05  363348.4 3807661.6   480.4
0.00     0.93     0.93     YES
 L0000003         0   0.82330E-05  363348.5 3807659.6   480.3
0.00     0.93     0.93     YES
 L0000004         0   0.82330E-05  363348.5 3807657.6   480.3
0.00     0.93     0.93     YES
 L0000005         0   0.82330E-05  363348.6 3807655.6   480.2
0.00     0.93     0.93     YES
 L0000006         0   0.82330E-05  363348.6 3807653.6   480.2
0.00     0.93     0.93     YES
 L0000007         0   0.82330E-05  363348.7 3807651.6   480.1
0.00     0.93     0.93     YES
 L0000008         0   0.82330E-05  363348.7 3807649.6   480.1
0.00     0.93     0.93     YES
 L0000009         0   0.82330E-05  363348.8 3807647.6   480.0
0.00     0.93     0.93     YES
 L0000010         0   0.82330E-05  363348.8 3807645.6   480.0
0.00     0.93     0.93     YES
 L0000011         0   0.82330E-05  363348.9 3807643.6   480.1
0.00     0.93     0.93     YES
 L0000012         0   0.82330E-05  363348.9 3807641.6   480.2
0.00     0.93     0.93     YES
 L0000013         0   0.82330E-05  363349.0 3807639.6   480.3
0.00     0.93     0.93     YES
 L0000014         0   0.82330E-05  363349.0 3807637.6   480.4
0.00     0.93     0.93     YES
 L0000015         0   0.82330E-05  363349.1 3807635.6   480.5
0.00     0.93     0.93     YES
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 L0000016         0   0.82330E-05  363349.1 3807633.6   480.6
0.00     0.93     0.93     YES
 L0000017         0   0.82330E-05  363349.2 3807631.6   480.7
0.00     0.93     0.93     YES
 L0000018         0   0.82330E-05  363349.2 3807629.6   480.8
0.00     0.93     0.93     YES
 L0000019         0   0.82330E-05  363349.3 3807627.6   480.8
0.00     0.93     0.93     YES
 L0000020         0   0.82330E-05  363349.3 3807625.6   480.9
0.00     0.93     0.93     YES
 L0000021         0   0.82330E-05  363349.4 3807623.6   481.0
0.00     0.93     0.93     YES
 L0000022         0   0.82330E-05  363349.4 3807621.6   481.1
0.00     0.93     0.93     YES
 L0000023         0   0.82330E-05  363349.5 3807619.6   481.2
0.00     0.93     0.93     YES
 L0000024         0   0.82330E-05  363349.6 3807617.6   481.3
0.00     0.93     0.93     YES
 L0000025         0   0.82330E-05  363349.6 3807615.6   481.5
0.00     0.93     0.93     YES
 L0000026         0   0.82330E-05  363349.7 3807613.6   481.9
0.00     0.93     0.93     YES
 L0000027         0   0.82330E-05  363349.7 3807611.6   482.2
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 L0000028         0   0.82330E-05  363349.8 3807609.6   482.5
0.00     0.93     0.93     YES
 L0000029         0   0.82330E-05  363349.8 3807607.6   482.9
0.00     0.93     0.93     YES
 L0000030         0   0.82330E-05  363349.9 3807605.6   483.2
0.00     0.93     0.93     YES
 L0000031         0   0.82330E-05  363349.9 3807603.6   483.6
0.00     0.93     0.93     YES
 L0000032         0   0.82330E-05  363350.0 3807601.6   483.9
0.00     0.93     0.93     YES
 L0000033         0   0.82330E-05  363350.0 3807599.6   484.2
0.00     0.93     0.93     YES
 L0000034         0   0.82330E-05  363350.1 3807597.6   484.6
0.00     0.93     0.93     YES
 L0000035         0   0.82330E-05  363350.1 3807595.6   484.9
0.00     0.93     0.93     YES
 L0000036         0   0.82330E-05  363350.2 3807593.6   485.2
0.00     0.93     0.93     YES
 L0000037         0   0.82330E-05  363350.2 3807591.6   485.6
0.00     0.93     0.93     YES
 L0000038         0   0.82330E-05  363350.3 3807589.6   485.9
0.00     0.93     0.93     YES
 L0000039         0   0.82330E-05  363350.3 3807587.6   486.2
0.00     0.93     0.93     YES
 L0000040         0   0.82330E-05  363350.4 3807585.6   486.5
0.00     0.93     0.93     YES
```

*** VOLUME
SOURCE DATA ***

RELEASE HEIGHT	SOURCE ID	INIT. SY	PART. CATS.	NUMBER EMISSION RATE (GRAMS/SEC)	INIT. SZ	URBAN SOURCE	EMISSION RATE SCALAR VARY BY	X (METERS)	Y (METERS)	BASE ELEV. (METERS)
	L0000041	0.00	0.93	0.82330E-05	0.93	YES		363350.4	3807583.6	486.7
	L0000042	0.00	0.93	0.82330E-05	0.93	YES		363350.5	3807581.6	486.9
	L0000043	0.00	0.93	0.82330E-05	0.93	YES		363350.5	3807579.6	487.1
	L0000044	0.00	0.93	0.82330E-05	0.93	YES		363350.6	3807577.6	487.4
	L0000045	0.00	0.93	0.82330E-05	0.93	YES		363350.6	3807575.6	487.6
	L0000046	0.00	0.93	0.82330E-05	0.93	YES		363350.7	3807573.6	487.8
	L0000047	0.00	0.93	0.82330E-05	0.93	YES		363350.7	3807571.6	488.0
	L0000048	0.00	0.93	0.82330E-05	0.93	YES		363350.8	3807569.6	488.2
	L0000049	0.00	0.93	0.82330E-05	0.93	YES		363350.8	3807567.6	488.4
	L0000050	0.00	0.93	0.82330E-05	0.93	YES		363350.9	3807565.6	488.7
	L0000051	0.00	0.93	0.82330E-05	0.93	YES		363351.0	3807563.6	488.9
	L0000052	0.00	0.93	0.82330E-05	0.93	YES		363351.0	3807561.6	489.1
	L0000053	0.00	0.93	0.82330E-05	0.93	YES		363351.1	3807559.6	489.3
	L0000054	0.00	0.93	0.82330E-05	0.93	YES		363351.1	3807557.6	489.5
	L0000055	0.00	0.93	0.82330E-05	0.93	YES		363351.2	3807555.6	489.8

	L0000056	0.00	0.93	0.82330E-05	0.93	YES		363351.2	3807553.6	490.2
	L0000057	0.00	0.93	0.82330E-05	0.93	YES		363351.3	3807551.6	490.5
	L0000058	0.00	0.93	0.82330E-05	0.93	YES		363351.3	3807549.6	490.9
	L0000059	0.00	0.93	0.82330E-05	0.93	YES		363351.4	3807547.6	491.2
	L0000060	0.00	0.93	0.82330E-05	0.93	YES		363351.4	3807545.6	491.5
	L0000061	0.00	0.93	0.82330E-05	0.93	YES		363351.5	3807543.6	491.9
	L0000062	0.00	0.93	0.82330E-05	0.93	YES		363351.5	3807541.6	492.2
	L0000063	0.00	0.93	0.82330E-05	0.93	YES		363351.6	3807539.6	492.6
	L0000064	0.00	0.93	0.82330E-05	0.93	YES		363351.6	3807537.6	492.9
	L0000065	0.00	0.93	0.82330E-05	0.93	YES		363351.7	3807535.6	493.2
	L0000066	0.00	0.93	0.82330E-05	0.93	YES		363351.7	3807533.6	493.6
	L0000067	0.00	0.93	0.82330E-05	0.93	YES		363351.8	3807531.6	493.9
	L0000068	0.00	0.93	0.82330E-05	0.93	YES		363351.8	3807529.6	494.2
	L0000069	0.00	0.93	0.82330E-05	0.93	YES		363351.9	3807527.6	494.6
	L0000070	0.00	0.93	0.82330E-05	0.93	YES		363351.9	3807525.6	494.9
	L0000071	0.00	0.93	0.82330E-05	0.93	YES		363352.0	3807523.6	495.2
	L0000072	0.00	0.93	0.82330E-05	0.93	YES		363352.0	3807521.6	495.5
	L0000073	0.00	0.93	0.82330E-05	0.93	YES		363352.1	3807519.6	495.9
	L0000074	0.00	0.93	0.82330E-05	0.93	YES		363352.1	3807517.6	496.2
	L0000075	0.00	0.93	0.82330E-05	0.93	YES		363352.2	3807515.6	496.5
	L0000076	0.00	0.93	0.82330E-05	0.93	YES		363352.3	3807513.6	496.8
	L0000077	0.00	0.93	0.82330E-05	0.93	YES		363352.3	3807511.6	497.1
	L0000078	0.00	0.93	0.82330E-05	0.93	YES		363352.4	3807509.6	497.4
	L0000079	0.00	0.93	0.82330E-05	0.93	YES		363352.4	3807507.6	497.7
	L0000080	0.00	0.93	0.82330E-05	0.93	YES		363352.5	3807505.6	498.0

*** VOLUME
SOURCE DATA ***

RELEASE HEIGHT	SOURCE ID	INIT. SY	PART. CATS.	NUMBER EMISSION RATE (GRAMS/SEC)	INIT. SZ	URBAN SOURCE	EMISSION RATE SCALAR VARY BY	X (METERS)	Y (METERS)	BASE ELEV. (METERS)
	L0000081	0.00	0.93	0.82330E-05	0.93	YES		363352.5	3807503.6	498.3
	L0000082	0.00	0.93	0.82330E-05	0.93	YES		363352.6	3807501.6	498.6
	L0000083	0.00	0.93	0.82330E-05	0.93	YES		363352.6	3807499.6	498.9
	L0000084	0.00	0.93	0.82330E-05	0.93	YES		363352.7	3807497.6	499.2
	L0000085	0.00	0.93	0.82330E-05	0.93	YES		363352.7	3807495.6	499.4
	L0000086	0.00	0.93	0.82330E-05	0.93	YES		363351.8	3807494.5	499.3
	L0000087	0.00	0.93	0.82330E-05	0.93	YES		363349.8	3807494.5	499.2
	L0000088	0.00	0.93	0.82330E-05	0.93	YES		363347.8	3807494.5	498.9
	L0000089	0.00	0.93	0.82330E-05	0.93	YES		363345.8	3807494.5	498.8
	L0000090	0.00	0.93	0.82330E-05	0.93	YES		363343.8	3807494.4	498.6
	L0000091	0.00	0.93	0.82330E-05	0.93	YES		363341.8	3807494.4	498.4
	L0000092	0.00	0.93	0.82330E-05	0.93	YES		363339.8	3807494.4	498.2
	L0000093	0.00	0.93	0.82330E-05	0.93	YES		363337.8	3807494.3	497.9
	L0000094	0.00	0.93	0.82330E-05	0.93	YES		363335.8	3807494.3	497.4
	L0000095	0.00	0.93	0.82330E-05	0.93	YES		363333.8	3807494.3	496.9

	L0000096	0.00	0.93	0.82330E-05	0.93	YES		363331.8	3807494.2	496.5
	L0000097	0.00	0.93	0.82330E-05	0.93	YES		363329.8	3807494.2	496.0
	L0000098	0.00	0.93	0.82330E-05	0.93	YES		363327.8	3807494.2	495.6
	L0000099	0.00	0.93	0.82330E-05	0.93	YES		363325.8	3807494.2	495.1
	L0000100	0.00	0.93	0.82330E-05	0.93	YES		363323.8	3807494.1	494.7
	L0000101	0.00	0.93	0.82330E-05	0.93	YES		363321.8	3807494.1	494.2
	L0000102	0.00	0.93	0.82330E-05	0.93	YES		363319.8	3807494.1	493.8
	L0000103	0.00	0.93	0.82330E-05	0.93	YES		363317.8	3807494.0	493.3
	L0000104	0.00	0.93	0.82330E-05	0.93	YES		363315.8	3807494.0	492.9
	L0000105	0.00	0.93	0.82330E-05	0.93	YES		363313.8	3807494.0	492.4
	L0000106	0.00	0.93	0.82330E-05	0.93	YES		363311.8	3807493.9	492.0
	L0000107	0.00	0.93	0.82330E-05	0.93	YES		363309.8	3807493.9	491.5
	L0000108	0.00	0.93	0.82330E-05	0.93	YES		363307.8	3807493.9	491.3
	L0000109	0.00	0.93	0.82330E-05	0.93	YES		363305.8	3807493.9	491.3
	L0000110	0.00	0.93	0.82330E-05	0.93	YES		363303.8	3807493.8	491.3
	L0000111	0.00	0.93	0.82330E-05	0.93	YES		363301.8	3807493.8	491.3
	L0000112	0.00	0.93	0.82330E-05	0.93	YES		363299.8	3807493.8	491.3
	L0000113	0.00	0.93	0.82330E-05	0.93	YES		363297.8	3807493.7	491.3
	L0000114	0.00	0.93	0.82330E-05	0.93	YES		363295.8	3807493.7	491.3
	L0000115	0.00	0.93	0.82330E-05	0.93	YES		363293.8	3807493.7	491.3
	L0000116	0.00	0.93	0.82330E-05	0.93	YES		363291.8	3807493.6	491.3
	L0000117	0.00	0.93	0.82330E-05	0.93	YES		363289.8	3807493.6	491.3
	L0000118	0.00	0.93	0.82330E-05	0.93	YES		363287.8	3807493.6	491.3
	L0000119	0.00	0.93	0.82330E-05	0.93	YES		363285.8	3807493.6	491.3
	L0000120	0.00	0.93	0.82330E-05	0.93	YES		363283.8	3807493.5	491.3

*** VOLUME
SOURCE DATA ***

RELEASE HEIGHT	SOURCE ID	INIT. PART. CATS.	INIT. SY	URBAN SZ	NUMBER EMISSION RATE (GRAMS/SEC) SOURCE	X (METERS)	Y (METERS)	BASE ELEV. SCALAR VARY (METERS) BY
	L0000121	0	0.82330E-05		363281.8	3807493.5	491.3	
0.00		0.93	0.93	YES				
	L0000122	0	0.82330E-05		363279.8	3807493.5	491.3	
0.00		0.93	0.93	YES				
	L0000123	0	0.82330E-05		363277.8	3807493.4	491.3	
0.00		0.93	0.93	YES				
	L0000124	0	0.82330E-05		363275.8	3807493.4	491.3	
0.00		0.93	0.93	YES				
	L0000125	0	0.82330E-05		363273.8	3807493.4	491.4	
0.00		0.93	0.93	YES				
	L0000126	0	0.82330E-05		363271.8	3807493.3	491.4	
0.00		0.93	0.93	YES				
	L0000127	0	0.82330E-05		363269.8	3807493.3	491.4	
0.00		0.93	0.93	YES				
	L0000128	0	0.82330E-05		363267.8	3807493.3	491.4	
0.00		0.93	0.93	YES				
	L0000129	0	0.82330E-05		363265.8	3807493.3	491.4	
0.00		0.93	0.93	YES				
	L0000130	0	0.82330E-05		363263.8	3807493.2	491.4	
0.00		0.93	0.93	YES				
	L0000131	0	0.82330E-05		363261.8	3807493.2	491.5	
0.00		0.93	0.93	YES				
	L0000132	0	0.82330E-05		363259.8	3807493.2	491.5	
0.00		0.93	0.93	YES				
	L0000133	0	0.82330E-05		363257.8	3807493.1	491.5	
0.00		0.93	0.93	YES				
	L0000134	0	0.82330E-05		363255.8	3807493.1	491.5	
0.00		0.93	0.93	YES				
	L0000135	0	0.82330E-05		363253.8	3807493.1	491.6	
0.00		0.93	0.93	YES				

	L0000136	0	0.82330E-05		363251.8	3807493.0	491.6
0.00		0.93	0.93	YES			
	L0000137	0	0.82330E-05		363249.8	3807493.0	491.6
0.00		0.93	0.93	YES			
	L0000138	0	0.82330E-05		363247.8	3807493.0	491.6
0.00		0.93	0.93	YES			
	L0000139	0	0.82330E-05		363245.8	3807493.0	491.7
0.00		0.93	0.93	YES			
	L0000140	0	0.82330E-05		363243.8	3807492.9	491.7
0.00		0.93	0.93	YES			
	L0000141	0	0.82330E-05		363241.8	3807492.9	491.7
0.00		0.93	0.93	YES			
	L0000142	0	0.82330E-05		363239.8	3807492.9	491.7
0.00		0.93	0.93	YES			
	L0000143	0	0.82330E-05		363237.8	3807492.8	491.8
0.00		0.93	0.93	YES			
	L0000144	0	0.82330E-05		363235.8	3807492.8	491.8
0.00		0.93	0.93	YES			
	L0000145	0	0.82330E-05		363233.8	3807492.8	491.8
0.00		0.93	0.93	YES			
	L0000146	0	0.82330E-05		363231.8	3807492.8	491.9
0.00		0.93	0.93	YES			
	L0000147	0	0.82330E-05		363229.8	3807492.7	491.9
0.00		0.93	0.93	YES			
	L0000148	0	0.82330E-05		363227.8	3807492.7	491.9
0.00		0.93	0.93	YES			
	L0000149	0	0.82330E-05		363225.8	3807492.7	492.0
0.00		0.93	0.93	YES			
	L0000150	0	0.82330E-05		363223.8	3807492.6	492.0
0.00		0.93	0.93	YES			
	L0000151	0	0.82330E-05		363221.8	3807492.6	492.0
0.00		0.93	0.93	YES			
	L0000152	0	0.82330E-05		363219.8	3807492.6	492.1
0.00		0.93	0.93	YES			
	L0000153	0	0.82330E-05		363217.8	3807492.5	492.1
0.00		0.93	0.93	YES			
	L0000154	0	0.82330E-05		363215.8	3807492.5	492.0
0.00		0.93	0.93	YES			
	L0000155	0	0.82330E-05		363213.8	3807492.5	491.9
0.00		0.93	0.93	YES			
	L0000156	0	0.82330E-05		363211.8	3807492.5	491.9
0.00		0.93	0.93	YES			
	L0000157	0	0.82330E-05		363209.8	3807492.4	491.8
0.00		0.93	0.93	YES			
	L0000158	0	0.82330E-05		363207.8	3807492.4	491.8
0.00		0.93	0.93	YES			
	L0000159	0	0.82330E-05		363205.8	3807492.4	491.7
0.00		0.93	0.93	YES			
	L0000160	0	0.82330E-05		363205.2	3807491.4	491.9
0.00		0.93	0.93	YES			

*** VOLUME
SOURCE DATA ***

RELEASE HEIGHT	SOURCE ID	INIT. PART. CATS.	INIT. SY	URBAN SZ	NUMBER EMISSION RATE (GRAMS/SEC) SOURCE	X (METERS)	Y (METERS)	BASE ELEV. SCALAR VARY (METERS) BY
	L0000161	0	0.82330E-05		363206.0	3807489.6	492.4	
0.00		0.93	0.93	YES				
	L0000162	0	0.82330E-05		363206.8	3807487.8	493.0	
0.00		0.93	0.93	YES				
	L0000163	0	0.82330E-05		363207.6	3807485.9	493.5	
0.00		0.93	0.93	YES				
	L0000164	0	0.82330E-05		363208.4	3807484.1	494.0	
0.00		0.93	0.93	YES				
	L0000165	0	0.82330E-05		363209.2	3807482.3	494.5	
0.00		0.93	0.93	YES				
	L0000166	0	0.82330E-05		363210.1	3807480.4	495.0	
0.00		0.93	0.93	YES				
	L0000167	0	0.82330E-05		363210.9	3807478.6	495.6	
0.00		0.93	0.93	YES				
	L0000168	0	0.82330E-05		363211.7	3807476.8	496.1	
0.00		0.93	0.93	YES				
	L0000169	0	0.82330E-05		363212.5	3807474.9	496.6	
0.00		0.93	0.93	YES				
	L0000170	0	0.82330E-05		363213.3	3807473.1	497.1	
0.00		0.93	0.93	YES				
	L0000171	0	0.82330E-05		363214.1	3807471.3	497.6	
0.00		0.93	0.93	YES				
	L0000172	0	0.82330E-05		363214.9	3807469.5	498.1	
0.00		0.93	0.93	YES				
	L0000173	0	0.82330E-05		363215.7	3807467.6	498.6	
0.00		0.93	0.93	YES				
	L0000174	0	0.82330E-05		363216.5	3807465.8	499.1	
0.00		0.93	0.93	YES				
	L0000175	0	0.82330E-05		363217.3	3807464.0	499.5	
0.00		0.93	0.93	YES				

	L0000176	0	0.82330E-05		363218.1	3807462.1	499.9
0.00		0.93	0.93	YES			
	L0000177	0	0.82330E-05		363218.9	3807460.3	500.2
0.00		0.93	0.93	YES			
	L0000178	0	0.82330E-05		363219.7	3807458.5	500.5
0.00		0.93	0.93	YES			
	L0000179	0	0.82330E-05		363220.5	3807456.6	500.8
0.00		0.93	0.93	YES			
	L0000180	0	0.82330E-05		363221.3	3807454.8	501.1
0.00		0.93	0.93	YES			
	L0000181	0	0.82330E-05		363222.1	3807453.0	501.3
0.00		0.93	0.93	YES			
	L0000182	0	0.82330E-05		363222.9	3807451.1	501.5
0.00		0.93	0.93	YES			
	L0000183	0	0.82330E-05		363223.7	3807449.3	501.8
0.00		0.93	0.93	YES			
	L0000184	0	0.82330E-05		363224.5	3807447.5	502.0
0.00		0.93	0.93	YES			
	L0000185	0	0.82330E-05		363225.3	3807445.6	502.2
0.00		0.93	0.93	YES			
	L0000186	0	0.82330E-05		363226.1	3807443.8	502.5
0.00		0.93	0.93	YES			
	L0000187	0	0.82330E-05		363226.9	3807442.0	502.7
0.00		0.93	0.93	YES			
	L0000188	0	0.82330E-05		363227.7	3807440.2	502.9
0.00		0.93	0.93	YES			
	L0000189	0	0.82330E-05		363228.5	3807438.3	503.1
0.00		0.93	0.93	YES			
	L0000190	0	0.82330E-05		363229.3	3807436.5	503.3
0.00		0.93	0.93	YES			
	L0000191	0	0.82330E-05		363230.2	3807434.7	503.4
0.00		0.93	0.93	YES			
	L0000192	0	0.82330E-05		363231.0	3807432.8	503.5
0.00		0.93	0.93	YES			
	L0000193	0	0.82330E-05		363231.8	3807431.0	503.6
0.00		0.93	0.93	YES			
	L0000194	0	0.82330E-05		363232.6	3807429.2	503.7
0.00		0.93	0.93	YES			
	L0000195	0	0.82330E-05		363233.4	3807427.3	503.8
0.00		0.93	0.93	YES			
	L0000196	0	0.82330E-05		363234.2	3807425.5	503.9
0.00		0.93	0.93	YES			
	L0000197	0	0.82330E-05		363235.0	3807423.7	504.0
0.00		0.93	0.93	YES			
	L0000198	0	0.82330E-05		363235.8	3807421.8	504.0
0.00		0.93	0.93	YES			
	L0000199	0	0.82330E-05		363236.6	3807420.0	504.0
0.00		0.93	0.93	YES			
	L0000200	0	0.82330E-05		363237.4	3807418.2	504.1
0.00		0.93	0.93	YES			

*** VOLUME SOURCE DATA ***

RELEASE HEIGHT	SOURCE ID	INIT. PART.	NUMBER EMISSION RATE (GRAMS/SEC) SY	SZ	INIT. SOURCE CATS.	URBAN SCALAR VARY BY	EMISSION RATE X (METERS)	Y (METERS)	BASE ELEV. (METERS)
	L0000201	0	0.82330E-05		363238.2	3807416.3			504.1
0.00		0.93	0.93		YES				
	L0000202	0	0.82330E-05		363239.0	3807414.5			504.1
0.00		0.93	0.93		YES				
	L0000203	0	0.82330E-05		363239.8	3807412.7			504.1
0.00		0.93	0.93		YES				
	L0000204	0	0.82330E-05		363240.6	3807410.8			504.0
0.00		0.93	0.93		YES				
	L0000205	0	0.82330E-05		363241.4	3807409.0			504.0
0.00		0.93	0.93		YES				
	L0000206	0	0.82330E-05		363242.2	3807407.2			503.9
0.00		0.93	0.93		YES				
	L0000207	0	0.82330E-05		363243.0	3807405.4			503.7
0.00		0.93	0.93		YES				
	L0000208	0	0.82330E-05		363243.8	3807403.5			503.4
0.00		0.93	0.93		YES				
	L0000209	0	0.82330E-05		363244.6	3807401.7			503.2
0.00		0.93	0.93		YES				
	L0000210	0	0.82330E-05		363245.4	3807399.9			502.9
0.00		0.93	0.93		YES				
	L0000211	0	0.82330E-05		363246.2	3807398.0			502.6
0.00		0.93	0.93		YES				
	L0000212	0	0.82330E-05		363247.0	3807396.2			502.2
0.00		0.93	0.93		YES				
	L0000213	0	0.82330E-05		363247.8	3807394.4			501.9
0.00		0.93	0.93		YES				
	L0000214	0	0.82330E-05		363248.6	3807392.5			501.6
0.00		0.93	0.93		YES				
	L0000215	0	0.82330E-05		363249.4	3807390.7			501.4
0.00		0.93	0.93		YES				

	L0000216	0	0.82330E-05		363250.3	3807388.9			501.3
0.00		0.93	0.93		YES				
	L0000217	0	0.82330E-05		363251.1	3807387.0			501.2
0.00		0.93	0.93		YES				
	L0000218	0	0.82330E-05		363251.9	3807385.2			501.1
0.00		0.93	0.93		YES				
	L0000219	0	0.82330E-05		363252.7	3807383.4			501.0
0.00		0.93	0.93		YES				
	L0000220	0	0.82330E-05		363253.5	3807381.5			500.9
0.00		0.93	0.93		YES				
	L0000221	0	0.82330E-05		363254.3	3807379.7			500.9
0.00		0.93	0.93		YES				
	L0000222	0	0.82330E-05		363255.1	3807377.9			500.8
0.00		0.93	0.93		YES				
	L0000223	0	0.82330E-05		363255.9	3807376.1			500.8
0.00		0.93	0.93		YES				
	L0000224	0	0.82330E-05		363256.7	3807374.2			500.8
0.00		0.93	0.93		YES				
	L0000225	0	0.82330E-05		363257.5	3807372.4			500.8
0.00		0.93	0.93		YES				
	L0000226	0	0.82330E-05		363258.3	3807370.6			500.8
0.00		0.93	0.93		YES				
	L0000227	0	0.82330E-05		363259.1	3807368.7			500.9
0.00		0.93	0.93		YES				
	L0000228	0	0.82330E-05		363259.9	3807366.9			500.9
0.00		0.93	0.93		YES				
	L0000229	0	0.82330E-05		363260.7	3807365.1			501.0
0.00		0.93	0.93		YES				
	L0000230	0	0.82330E-05		363261.5	3807363.2			501.1
0.00		0.93	0.93		YES				
	L0000231	0	0.82330E-05		363262.3	3807361.4			501.2
0.00		0.93	0.93		YES				
	L0000232	0	0.82330E-05		363263.1	3807359.6			501.3
0.00		0.93	0.93		YES				
	L0000233	0	0.82330E-05		363263.9	3807357.7			501.5
0.00		0.93	0.93		YES				
	L0000234	0	0.82330E-05		363264.7	3807355.9			501.6
0.00		0.93	0.93		YES				
	L0000235	0	0.82330E-05		363265.5	3807354.1			501.8
0.00		0.93	0.93		YES				
	L0000236	0	0.82330E-05		363266.3	3807352.2			502.0
0.00		0.93	0.93		YES				
	L0000237	0	0.82330E-05		363267.1	3807350.4			502.2
0.00		0.93	0.93		YES				
	L0000238	0	0.82330E-05		363267.9	3807348.6			502.4
0.00		0.93	0.93		YES				
	L0000239	0	0.82330E-05		363268.7	3807346.8			502.7
0.00		0.93	0.93		YES				
	L0000240	0	0.82330E-05		363269.5	3807344.9			503.2
0.00		0.93	0.93		YES				

*** VOLUME SOURCE DATA ***

RELEASE HEIGHT	SOURCE ID	INIT. PART.	NUMBER EMISSION RATE (GRAMS/SEC) SY	SZ	INIT. SOURCE CATS.	URBAN SCALAR VARY BY	EMISSION RATE X (METERS)	Y (METERS)	BASE ELEV. (METERS)
	L0000241	0	0.82330E-05		363270.4	3807343.1			503.7
0.00		0.93	0.93		YES				
	L0000242	0	0.82330E-05		363271.2	3807341.3			504.3
0.00		0.93	0.93		YES				
	L0000243	0	0.82330E-05		363272.0	3807339.4			504.9
0.00		0.93	0.93		YES				
	L0000244	0	0.82330E-05		363272.8	3807337.6			505.6
0.00		0.93	0.93		YES				
	L0000245	0	0.82330E-05		363273.6	3807335.8			506.3
0.00		0.93	0.93		YES				
	L0000246	0	0.82330E-05		363274.4	3807333.9			507.0
0.00		0.93	0.93		YES				
	L0000247	0	0.82330E-05		363275.2	3807332.1			507.8
0.00		0.93	0.93		YES				
	L0000248	0	0.82330E-05		363276.0	3807330.3			508.6
0.00		0.93	0.93		YES				
	L0000249	0	0.82330E-05		363276.8	3807328.4			509.4
0.00		0.93	0.93		YES				
	L0000250	0	0.82330E-05		363277.6	3807326.6			510.3
0.00		0.93	0.93		YES				
	L0000251	0	0.82330E-05		363278.4	3807324.8			511.2
0.00		0.93	0.93		YES				
	L0000252	0	0.82330E-05		363279.2	3807322.9			511.9
0.00		0.93	0.93		YES				
	L0000253	0	0.82330E-05		363280.0	3807321.1			512.6
0.00		0.93	0.93		YES				
	L0000254	0	0.82330E-05		363280.8	3807319.3			513.2
0.00		0.93	0.93		YES				
	L0000255	0	0.82330E-05		363281.6	3807317.5			513.8
0.00		0.93	0.93		YES				

	L0000256	0	0.82330E-05		363282.4	3807315.6			514.2
0.00		0.93	0.93		YES				
	L0000257	0	0.82330E-05		363283.2	3807313.8			514.5
0.00		0.93	0.93		YES				
	L0000258	0	0.82330E-05		363284.0	3807312.0			514.8
0.00		0.93	0.93		YES				
	L0000259	0	0.82330E-05		363284.8	3807310.1			515.1
0.00		0.93	0.93		YES				
	L0000260	0	0.82330E-05		363285.6	3807308.3			515.4
0.00		0.93	0.93		YES				
	L0000261	0	0.82330E-05		363286.4	3807306.5			515.7
0.00		0.93	0.93		YES				
	L0000262	0	0.82330E-05		363287.2	3807304.6			516.0
0.00		0.93	0.93		YES				
	L0000263	0	0.82330E-05		363288.0	3807302.8			516.4
0.00		0.93	0.93		YES				
	L0000264	0	0.82330E-05		363288.8	3807301.0			516.8
0.00		0.93	0.93		YES				
	L0000265	0	0.82330E-05		363289.6	3807299.1			517.2
0.00		0.93	0.93		YES				
	L0000266	0	0.82330E-05		363290.5	3807297.3			517.6
0.00		0.93	0.93		YES				
	L0000267	0	0.82330E-05		363291.3	3807295.5			518.0
0.00		0.93	0.93		YES				
	L0000268	0	0.82330E-05		363292.1	3807293.6			518.4
0.00		0.93	0.93		YES				
	L0000269	0	0.82330E-05		363292.9	3807291.8			518.9
0.00		0.93	0.93		YES				
	L0000270	0	0.82330E-05		363293.7	3807290.0			519.4
0.00		0.93	0.93		YES				
	L0000271	0	0.82330E-05		363294.5	3807288.2			519.9
0.00		0.93	0.93		YES				
	L0000272	0	0.82330E-05		363295.3	3807286.3			520.3
0.00		0.93	0.93		YES				
	L0000273	0	0.82330E-05		363296.1	3807284.5			520.5
0.00		0.93	0.93		YES				
	L0000274	0	0.82330E-05		363296.9	3807282.7			520.8
0.00		0.93	0.93		YES				
	L0000275	0	0.82330E-05		363297.7	3807280.8			521.1
0.00		0.93	0.93		YES				
	L0000276	0	0.82330E-05		363298.5	3807279.0			521.4
0.00		0.93	0.93		YES				
	L0000277	0	0.82330E-05		363299.3	3807277.2			521.8
0.00		0.93	0.93		YES				
	L0000278	0	0.82330E-05		363300.1	3807275.3			522.2
0.00		0.93	0.93		YES				
	L0000279	0	0.82330E-05		363300.9	3807273.5			522.6
0.00		0.93	0.93		YES				
	L0000280	0	0.82330E-05		363301.7	3807271.7			523.0
0.00		0.93	0.93		YES				

*** VOLUME
SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY	X (METERS)	Y (METERS)	BASE ELEV. (METERS)
L0000281	0	0.82330E-05	0.00	0.93	0.93	YES	363302.5	3807269.8	523.5
L0000282	0	0.82330E-05	0.00	0.93	0.93	YES	363303.3	3807268.0	524.0
L0000283	0	0.82330E-05	0.00	0.93	0.93	YES	363304.1	3807266.2	524.5
L0000284	0	0.82330E-05	0.00	0.93	0.93	YES	363304.9	3807264.3	525.1
L0000285	0	0.82330E-05	0.00	0.93	0.93	YES	363305.7	3807262.5	525.7
L0000286	0	0.82330E-05	0.00	0.93	0.93	YES	363306.5	3807260.7	526.3
L0000287	0	0.82330E-05	0.00	0.93	0.93	YES	363307.3	3807258.9	526.9
L0000288	0	0.82330E-05	0.00	0.93	0.93	YES	363308.1	3807257.0	527.6
L0000289	0	0.82330E-05	0.00	0.93	0.93	YES	363308.9	3807255.2	527.8
L0000290	0	0.82330E-05	0.00	0.93	0.93	YES	363309.7	3807253.4	527.6
L0000291	0	0.82330E-05	0.00	0.93	0.93	YES	363310.6	3807251.5	527.5
L0000292	0	0.82330E-05	0.00	0.93	0.93	YES	363311.4	3807249.7	527.4
L0000293	0	0.82330E-05	0.00	0.93	0.93	YES	363312.2	3807247.9	527.3
L0000294	0	0.82330E-05	0.00	0.93	0.93	YES	363313.0	3807246.0	527.2
L0000295	0	0.82330E-05	0.00	0.93	0.93	YES	363313.8	3807244.2	527.2

L0000296	0	0.82330E-05	0.00	0.93	0.93	YES	363314.6	3807242.4	527.3
L0000297	0	0.82330E-05	0.00	0.93	0.93	YES	363315.4	3807240.5	527.4
L0000298	0	0.82330E-05	0.00	0.93	0.93	YES	363316.2	3807238.7	527.5
L0000299	0	0.82330E-05	0.00	0.93	0.93	YES	363317.0	3807236.9	527.6
L0000300	0	0.82330E-05	0.00	0.93	0.93	YES	363317.8	3807235.0	527.8
L0000301	0	0.82330E-05	0.00	0.93	0.93	YES	363318.6	3807233.2	528.1
L0000302	0	0.82330E-05	0.00	0.93	0.93	YES	363319.4	3807231.4	528.3
L0000303	0	0.82330E-05	0.00	0.93	0.93	YES	363320.2	3807229.6	528.7
L0000304	0	0.82330E-05	0.00	0.93	0.93	YES	363321.0	3807227.7	529.0
L0000305	0	0.82330E-05	0.00	0.93	0.93	YES	363321.8	3807225.9	529.2
L0000306	0	0.82330E-05	0.00	0.93	0.93	YES	363322.6	3807224.1	529.0
L0000307	0	0.82330E-05	0.00	0.93	0.93	YES	363323.4	3807222.2	528.9
L0000308	0	0.82330E-05	0.00	0.93	0.93	YES	363324.2	3807220.4	528.8
L0000309	0	0.82330E-05	0.00	0.93	0.93	YES	363325.0	3807218.6	528.7
L0000310	0	0.82330E-05	0.00	0.93	0.93	YES	363325.8	3807216.7	528.6
L0000311	0	0.82330E-05	0.00	0.93	0.93	YES	363326.6	3807214.9	528.6
L0000312	0	0.82330E-05	0.00	0.93	0.93	YES	363327.4	3807213.1	528.6
L0000313	0	0.82330E-05	0.00	0.93	0.93	YES	363328.2	3807211.2	528.5
L0000314	0	0.82330E-05	0.00	0.93	0.93	YES	363329.0	3807209.4	528.5
L0000315	0	0.82330E-05	0.00	0.93	0.93	YES	363329.8	3807207.6	528.5
L0000316	0	0.82330E-05	0.00	0.93	0.93	YES	363330.7	3807205.7	528.6
L0000317	0	0.82330E-05	0.00	0.93	0.93	YES	363331.5	3807203.9	528.6
L0000318	0	0.82330E-05	0.00	0.93	0.93	YES	363332.3	3807202.1	528.7
L0000319	0	0.82330E-05	0.00	0.93	0.93	YES	363333.1	3807200.3	528.7
L0000320	0	0.82330E-05	0.00	0.93	0.93	YES	363333.9	3807198.4	528.8

*** VOLUME
SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY	X (METERS)	Y (METERS)	BASE ELEV. (METERS)
L0000321	0	0.82330E-05	0.00	0.93	0.93	YES	363334.7	3807196.6	528.9
L0000322	0	0.82330E-05	0.00	0.93	0.93	YES	363335.5	3807194.8	529.1
L0000323	0	0.82330E-05	0.00	0.93	0.93	YES	363336.3	3807192.9	529.3
L0000324	0	0.82330E-05	0.00	0.93	0.93	YES	363337.1	3807191.1	529.4
L0000325	0	0.82330E-05	0.00	0.93	0.93	YES	363337.9	3807189.3	529.4
L0000326	0	0.82330E-05	0.00	0.93	0.93	YES	363338.7	3807187.4	529.4
L0000327	0	0.82330E-05	0.00	0.93	0.93	YES	363339.5	3807185.6	529.4
L0000328	0	0.82330E-05	0.00	0.93	0.93	YES	363340.3	3807183.8	529.3
L0000329	0	0.82330E-05	0.00	0.93	0.93	YES	363341.1	3807181.9	529.2
L0000330	0	0.82330E-05	0.00	0.93	0.93	YES	363341.9	3807180.1	529.1
L0000331	0	0.82330E-05	0.00	0.93	0.93	YES	363342.7	3807178.3	529.1
L0000332	0	0.82330E-05	0.00	0.93	0.93	YES	363343.5	3807176.4	529.0
L0000333	0	0.82330E-05	0.00	0.93	0.93	YES	363344.3	3807174.6	528.9
L0000334	0	0.82330E-05	0.00	0.93	0.93	YES	363345.1	3807172.8	528.9
L0000335	0	0.82330E-05	0.00	0.93	0.93	YES	363345.9	3807171.0	528.8

L0000336	0	0.82330E-05	0.00	0.93	0.93	YES	363346.7	3807169.1	528.8
L0000337	0	0.82330E-05	0.00	0.93	0.93	YES	363347.5	3807167.3	528.7
L0000338	0	0.82330E-05	0.00	0.93	0.93	YES	363348.3	3807165.5	529.1
L0000339	0	0.82330E-05	0.00	0.93	0.93	YES	363349.1	3807163.6	529.6
L0000340	0	0.82330E-05	0.00	0.93	0.93	YES	363349.9	3807161.8	530.0
L0000341	0	0.82330E-05	0.00	0.93	0.93	YES	363350.8	3807160.0	530.4
L0000342	0	0.82330E-05	0.00	0.93	0.93	YES	363351.6	3807158.1	530.8
L0000343	0	0.82330E-05	0.00	0.93	0.93	YES	363352.4	3807156.3	531.1
L0000344	0	0.82330E-05	0.00	0.93	0.93	YES	363353.2	3807154.5	531.3
L0000345	0	0.82330E-05	0.00	0.93	0.93	YES	363354.0	3807152.6	531.4
L0000346	0	0.82330E-05	0.00	0.93	0.93	YES	363354.8	3807150.8	531.5
L0000347	0	0.82330E-05	0.00	0.93	0.93	YES	363355.6	3807149.0	531.6
L0000348	0	0.82330E-05	0.00	0.93	0.93	YES	363356.4	3807147.1	531.6
L0000349	0	0.82330E-05	0.00	0.93	0.93	YES	363357.2	3807145.3	531.5
L0000350	0	0.82330E-05	0.00	0.93	0.93	YES	363358.0	3807143.5	531.3
L0000351	0	0.82330E-05	0.00	0.93	0.93	YES	363358.8	3807141.7	531.2
L0000352	0	0.82330E-05	0.00	0.93	0.93	YES	363359.6	3807139.8	530.9
L0000353	0	0.82330E-05	0.00	0.93	0.93	YES	363360.4	3807138.0	530.6
L0000354	0	0.82330E-05	0.00	0.93	0.93	YES	363361.2	3807136.2	530.2
L0000355	0	0.82330E-05	0.00	0.93	0.93	YES	363362.0	3807134.3	529.7
L0000356	0	0.82330E-05	0.00	0.93	0.93	YES	363362.8	3807132.5	529.2
L0000357	0	0.82330E-05	0.00	0.93	0.93	YES	363363.6	3807130.7	528.6
L0000358	0	0.82330E-05	0.00	0.93	0.93	YES	363365.2	3807129.6	528.0
L0000359	0	0.82330E-05	0.00	0.93	0.93	YES	363367.0	3807128.7	527.2
L0000360	0	0.82330E-05	0.00	0.93	0.93	YES	363368.8	3807127.8	526.5

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER CATS.	EMISSION RATE PART. (GRAMS/SEC)	X (METERS)	Y (METERS)	ELEV. (METERS)	HEIGHT (METERS)	SY (METERS)	SZ BY	URBAN SOURCE	BASE SCALAR VARY
L0000361	0	0.82330E-05	363370.6	3807127.0	526.0	0.00	0.93	0.93	YES	
L0000362	0	0.82330E-05	363372.4	3807126.1	525.4	0.00	0.93	0.93	YES	
L0000363	0	0.82330E-05	363374.2	3807125.2	524.8	0.00	0.93	0.93	YES	
L0000364	0	0.82330E-05	363376.0	3807124.3	524.3	0.00	0.93	0.93	YES	
L0000365	0	0.82330E-05	363377.8	3807123.5	523.8	0.00	0.93	0.93	YES	
L0000366	0	0.82330E-05	363379.6	3807122.6	523.3	0.00	0.93	0.93	YES	
L0000367	0	0.82330E-05	363381.4	3807121.7	522.8	0.00	0.93	0.93	YES	
L0000368	0	0.82330E-05	363383.2	3807120.8	522.3	0.00	0.93	0.93	YES	
L0000369	0	0.82330E-05	363385.0	3807120.0	521.8	0.00	0.93	0.93	YES	
L0000370	0	0.82330E-05	363386.8	3807119.1	521.3	0.00	0.93	0.93	YES	
L0000371	0	0.82330E-05	363388.6	3807118.2	520.9	0.00	0.93	0.93	YES	
L0000372	0	0.82330E-05	363390.4	3807117.3	520.4	0.00	0.93	0.93	YES	
L0000373	0	0.82330E-05	363392.2	3807116.5	520.0	0.00	0.93	0.93	YES	
L0000374	0	0.82330E-05	363394.0	3807115.6	519.5	0.00	0.93	0.93	YES	
L0000375	0	0.82330E-05	363395.8	3807114.7	519.1	0.00	0.93	0.93	YES	

SOURCE ID	NUMBER CATS.	EMISSION RATE PART. (GRAMS/SEC)	X (METERS)	Y (METERS)	ELEV. (METERS)	HEIGHT (METERS)	SY (METERS)	SZ BY	URBAN SOURCE	BASE SCALAR VARY
L0000376	0	0.82330E-05	363397.6	3807113.8	518.7	0.00	0.93	0.93	YES	
L0000377	0	0.82330E-05	363399.4	3807113.0	518.3	0.00	0.93	0.93	YES	
L0000378	0	0.82330E-05	363401.2	3807112.1	518.0	0.00	0.93	0.93	YES	
L0000379	0	0.82330E-05	363403.0	3807111.2	517.8	0.00	0.93	0.93	YES	
L0000380	0	0.82330E-05	363404.8	3807110.3	517.5	0.00	0.93	0.93	YES	
L0000381	0	0.82330E-05	363406.6	3807109.5	517.3	0.00	0.93	0.93	YES	
L0000382	0	0.82330E-05	363408.4	3807108.6	517.1	0.00	0.93	0.93	YES	
L0000383	0	0.82330E-05	363410.2	3807107.7	516.9	0.00	0.93	0.93	YES	
L0000384	0	0.82330E-05	363412.0	3807106.8	516.7	0.00	0.93	0.93	YES	
L0000385	0	0.82330E-05	363413.8	3807106.0	516.7	0.00	0.93	0.93	YES	
L0000386	0	0.82330E-05	363415.6	3807105.1	516.8	0.00	0.93	0.93	YES	
L0000387	0	0.82330E-05	363417.4	3807104.2	516.8	0.00	0.93	0.93	YES	
L0000388	0	0.82330E-05	363419.2	3807103.3	516.9	0.00	0.93	0.93	YES	
L0000389	0	0.82330E-05	363421.0	3807102.5	516.9	0.00	0.93	0.93	YES	
L0000390	0	0.82330E-05	363422.8	3807101.6	517.0	0.00	0.93	0.93	YES	
L0000391	0	0.82330E-05	363424.5	3807100.7	517.0	0.00	0.93	0.93	YES	
L0000392	0	0.82330E-05	363426.3	3807099.8	517.1	0.00	0.93	0.93	YES	
L0000393	0	0.82330E-05	363428.1	3807099.0	517.1	0.00	0.93	0.93	YES	
L0000394	0	0.82330E-05	363429.9	3807098.1	517.2	0.00	0.93	0.93	YES	
L0000395	0	0.82330E-05	363431.7	3807097.2	517.2	0.00	0.93	0.93	YES	
L0000396	0	0.82330E-05	363433.5	3807096.3	517.3	0.00	0.93	0.93	YES	
L0000397	0	0.82330E-05	363435.3	3807095.5	517.3	0.00	0.93	0.93	YES	
L0000398	0	0.82330E-05	363437.1	3807094.6	517.4	0.00	0.93	0.93	YES	
L0000399	0	0.82330E-05	363438.9	3807093.7	517.4	0.00	0.93	0.93	YES	
L0000400	0	0.82330E-05	363440.7	3807092.8	517.5	0.00	0.93	0.93	YES	

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER CATS.	EMISSION RATE PART. (GRAMS/SEC)	X (METERS)	Y (METERS)	ELEV. (METERS)	HEIGHT (METERS)	SY (METERS)	SZ BY	URBAN SOURCE	BASE SCALAR VARY
L0000401	0	0.82330E-05	363442.5	3807092.0	517.5	0.00	0.93	0.93	YES	
L0000402	0	0.82330E-05	363444.3	3807091.1	517.6	0.00	0.93	0.93	YES	
L0000403	0	0.82330E-05	363445.3	3807091.3	517.4	0.00	0.93	0.93	YES	
L0000404	0	0.82330E-05	363445.0	3807093.2	517.0	0.00	0.93	0.93	YES	
L0000405	0	0.82330E-05	363444.7	3807095.2	516.5	0.00	0.93	0.93	YES	
L0000406	0	0.82330E-05	363444.3	3807097.2	516.0	0.00	0.93	0.93	YES	
L0000407	0	0.82330E-05	363444.0	3807099.1	515.5	0.00	0.93	0.93	YES	
L0000408	0	0.82330E-05	363443.6	3807101.1	515.0	0.00	0.93	0.93	YES	
L0000409	0	0.82330E-05	363443.3	3807103.1	514.5	0.00	0.93	0.93	YES	
L0000410	0	0.82330E-05	363442.9	3807105.0	514.0	0.00	0.93	0.93	YES	
L0000411	0	0.82330E-05	363442.6	3807107.0	513.6	0.00	0.93	0.93	YES	
L0000412	0	0.82330E-05	363442.3	3807109.0	513.4	0.00	0.93	0.93	YES	
L0000413	0	0.82330E-05	363441.9	3807111.0	513.2	0.00	0.93	0.93	YES	
L0000414	0	0.82330E-05	363441.6	3807112.9	513.1	0.00	0.93	0.93	YES	
L0000415	0	0.82330E-05	363441.2	3807114.9	512.9	0.00	0.93	0.93	YES	

SOURCE ID	NUMBER CATS.	EMISSION RATE PART. (GRAMS/SEC)	X (METERS)	Y (METERS)	ELEV. (METERS)	HEIGHT (METERS)	SY (METERS)	SZ BY	URBAN SOURCE	BASE SCALAR VARY
L0000416	0	0.82330E-05	363440.9	3807116.9	512.8	0.00	0.93	0.93	YES	
L0000417	0	0.82330E-05	363440.5	3807118.8	512.6	0.00	0.93	0.93	YES	
L0000418	0	0.82330E-05	363440.2	3807120.8	512.4	0.00	0.93	0.93	YES	
L0000419	0	0.82330E-05	363439.9	3807122.8	512.3	0.00	0.93	0.93	YES	
L0000420	0	0.82330E-05	363439.5	3807124.8	512.1	0.00	0.93	0.93	YES	
L0000421	0	0.82330E-05	363439.2	3807126.7	511.9	0.00	0.93	0.93	YES	
L0000422	0	0.82330E-05	363438.8	3807128.7	511.8	0.00	0.93	0.93	YES	
L0000423	0	0.82330E-05	363438.5	3807130.7	511.6	0.00	0.93	0.93	YES	
L0000424	0	0.82330E-05	363438.2	3807132.6	511.5	0.00	0.93	0.93	YES	
L0000425	0	0.82330E-05	363437.8	3807134.6	511.3	0.00	0.93	0.93	YES	
L0000426	0	0.82330E-05	363437.5	3807136.6	511.1	0.00	0.93	0.93	YES	
L0000427	0	0.82330E-05	363437.1	3807138.5	511.6	0.00	0.93	0.93	YES	
L0000428	0	0.82330E-05	363436.8	3807140.5	512.2	0.00	0.93	0.93	YES	
L0000429	0	0.82330E-05	363436.4	3807142.5	512.7	0.00	0.93	0.93	YES	
L0000430	0	0.82330E-05	363436.1	3807144.5	513.3	0.00	0.93	0.93	YES	
L0000431	0	0.82330E-05	363435.8	3807146.4	513.9	0.00	0.93	0.93	YES	
L0000432	0	0.82330E-05	363435.4	3807148.4	514.5	0.00	0.93	0.93	YES	
L0000433	0	0.82330E-05	363435.1	3807150.4	515.1	0.00	0.93	0.93	YES	
L0000434	0	0.82330E-05	363434.7	3807152.3	515.7	0.00	0.93	0.93	YES	
L0000435	0	0.82330E-05	363434.4	3807154.3	516.3	0.00	0.93	0.93	YES	
L0000436	0	0.82330E-05	363434.0	3807156.3	517.0	0.00	0.93	0.93	YES	
L0000437	0	0.82330E-05	363433.7	3807158.2	517.6	0.00	0.93	0.93	YES	
L0000438	0	0.82330E-05	363433.4	3807160.2	518.3	0.00	0.93	0.93	YES	
L0000439	0	0.82330E-05	363433.0	3807162.2	519.0	0.00	0.93	0.93	YES	
L0000440	0	0.82330E-05	363432.7	3807164.2	519.7	0.00	0.93	0.93	YES	

*** MODELOPTs: RegDFAULT CONC ELEV URBAN

*** VOLUME SOURCE DATA ***

RELEASE HEIGHT	SOURCE ID	INIT. PART. CATS.	NUMBER EMISSION RATE (GRAMS/SEC)	SOURCE SY	INIT. SZ	URBAN SOURCE	EMISSION RATE SCALAR VARY BY	X (METERS)	Y (METERS)	BASE ELEV. (METERS)
L0000441	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363432.3	3807166.1	520.4
L0000442	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363432.0	3807168.1	520.9
L0000443	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363431.6	3807170.1	521.3
L0000444	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363431.3	3807172.0	521.7
L0000445	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363431.0	3807174.0	522.1
L0000446	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363430.6	3807176.0	522.5
L0000447	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363430.3	3807178.0	522.9
L0000448	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363429.9	3807179.9	523.3
L0000449	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363429.6	3807181.9	523.7
L0000450	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363429.2	3807183.9	524.1
L0000451	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363428.9	3807185.8	524.5
L0000452	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363428.6	3807187.8	524.9
L0000453	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363428.2	3807189.8	525.2
L0000454	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363427.9	3807191.7	525.5
L0000455	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363427.5	3807193.7	525.9

RELEASE HEIGHT	SOURCE ID	INIT. PART. CATS.	NUMBER EMISSION RATE (GRAMS/SEC)	SOURCE SY	INIT. SZ	URBAN SOURCE	EMISSION RATE SCALAR VARY BY	X (METERS)	Y (METERS)	BASE ELEV. (METERS)
L0000456	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363427.2	3807195.7	526.2
L0000457	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363426.8	3807197.7	526.1
L0000458	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363426.5	3807199.6	525.8
L0000459	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363426.2	3807201.6	525.4
L0000460	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363425.8	3807203.6	525.0
L0000461	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363425.5	3807205.5	524.6
L0000462	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363425.1	3807207.5	524.2
L0000463	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363424.8	3807209.5	523.9
L0000464	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363424.4	3807211.5	523.5
L0000465	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363424.1	3807213.4	523.1
L0000466	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363423.8	3807215.4	522.7
L0000467	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363423.4	3807217.4	522.4
L0000468	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363423.1	3807219.3	522.0
L0000469	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363422.7	3807221.3	521.6
L0000470	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363422.4	3807223.3	521.2
L0000471	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363422.0	3807225.2	520.9
L0000472	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363421.7	3807227.2	520.5
L0000473	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363421.4	3807229.2	520.2
L0000474	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363421.0	3807231.2	519.9
L0000475	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363420.7	3807233.1	519.5
L0000476	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363420.3	3807235.1	519.2
L0000477	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363420.0	3807237.1	518.8
L0000478	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363419.6	3807239.0	518.4
L0000479	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363419.3	3807241.0	518.1
L0000480	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363419.0	3807243.0	517.7

*** MODELOPTs: RegDFAULT CONC ELEV URBAN

*** VOLUME SOURCE DATA ***

RELEASE HEIGHT	SOURCE ID	INIT. PART. CATS.	NUMBER EMISSION RATE (GRAMS/SEC)	SOURCE SY	INIT. SZ	URBAN SOURCE	EMISSION RATE SCALAR VARY BY	X (METERS)	Y (METERS)	BASE ELEV. (METERS)
L0000481	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363418.6	3807244.9	517.3
L0000482	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363418.3	3807246.9	516.9
L0000483	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363417.9	3807248.9	516.5
L0000484	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363417.6	3807250.9	516.1
L0000485	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363417.2	3807252.8	515.6
L0000486	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363416.9	3807254.8	515.2
L0000487	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363416.6	3807256.8	514.8
L0000488	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363416.2	3807258.7	514.2
L0000489	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363415.9	3807260.7	513.7
L0000490	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363415.5	3807262.7	513.2
L0000491	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363415.2	3807264.7	512.7
L0000492	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363414.8	3807266.6	512.2
L0000493	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363414.5	3807268.6	511.7
L0000494	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363414.2	3807270.6	511.2
L0000495	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363413.8	3807272.5	510.8

RELEASE HEIGHT	SOURCE ID	INIT. PART. CATS.	NUMBER EMISSION RATE (GRAMS/SEC)	SOURCE SY	INIT. SZ	URBAN SOURCE	EMISSION RATE SCALAR VARY BY	X (METERS)	Y (METERS)	BASE ELEV. (METERS)
L0000496	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363413.5	3807274.5	510.3
L0000497	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363413.1	3807276.5	509.8
L0000498	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363412.8	3807278.4	509.4
L0000499	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363412.5	3807280.4	508.9
L0000500	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363412.1	3807282.4	508.4
L0000501	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363411.8	3807284.4	508.0
L0000502	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363411.4	3807286.3	507.6
L0000503	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363411.1	3807288.3	507.1
L0000504	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363410.7	3807290.3	506.7
L0000505	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363410.4	3807292.2	506.2
L0000506	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363410.1	3807294.2	505.8
L0000507	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363409.7	3807296.2	505.3
L0000508	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363409.4	3807298.1	504.9
L0000509	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363409.0	3807300.1	504.4
L0000510	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363408.7	3807302.1	503.9
L0000511	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363408.3	3807304.1	503.4
L0000512	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363408.0	3807306.0	502.9
L0000513	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363407.7	3807308.0	502.4
L0000514	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363407.3	3807310.0	501.8
L0000515	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363407.0	3807311.9	501.3
L0000516	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363406.6	3807313.9	500.8
L0000517	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363406.3	3807315.9	500.2
L0000518	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363405.9	3807317.9	499.9
L0000519	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363405.6	3807319.8	499.8
L0000520	0.00	0.93	0	0.93	0.93	YES		0.82330E-05	363405.3	3807321.8	499.7

*** VOLUME
SOURCE DATA ***

SOURCE ID	PART.	NUMBER EMISSION RATE (GRAMS/SEC) SCALAR VARY BY	X (METERS)	Y (METERS)	ELEV. (METERS)	HEIGHT (METERS)	SY (METERS)	SZ (METERS)	URBAN SOURCE	BASE EMISSION RATE
L0000521	0	0.82330E-05	363404.9	3807323.8	499.6	0.00	0.93	0.93	YES	
L0000522	0	0.82330E-05	363404.6	3807325.7	499.5	0.00	0.93	0.93	YES	
L0000523	0	0.82330E-05	363404.2	3807327.7	499.4	0.00	0.93	0.93	YES	
L0000524	0	0.82330E-05	363403.9	3807329.7	499.3	0.00	0.93	0.93	YES	
L0000525	0	0.82330E-05	363403.5	3807331.6	499.2	0.00	0.93	0.93	YES	
L0000526	0	0.82330E-05	363403.2	3807333.6	499.0	0.00	0.93	0.93	YES	
L0000527	0	0.82330E-05	363402.9	3807335.6	498.9	0.00	0.93	0.93	YES	
L0000528	0	0.82330E-05	363402.5	3807337.6	498.8	0.00	0.93	0.93	YES	
L0000529	0	0.82330E-05	363402.2	3807339.5	498.7	0.00	0.93	0.93	YES	
L0000530	0	0.82330E-05	363401.8	3807341.5	498.5	0.00	0.93	0.93	YES	
L0000531	0	0.82330E-05	363401.5	3807343.5	498.4	0.00	0.93	0.93	YES	
L0000532	0	0.82330E-05	363401.1	3807345.4	498.2	0.00	0.93	0.93	YES	
L0000533	0	0.82330E-05	363400.8	3807347.4	498.1	0.00	0.93	0.93	YES	
L0000534	0	0.82330E-05	363400.5	3807349.4	498.0	0.00	0.93	0.93	YES	
L0000535	0	0.82330E-05	363400.1	3807351.4	497.9	0.00	0.93	0.93	YES	

SOURCE ID	PART.	NUMBER EMISSION RATE (GRAMS/SEC) SCALAR VARY BY	X (METERS)	Y (METERS)	ELEV. (METERS)	HEIGHT (METERS)	SY (METERS)	SZ (METERS)	URBAN SOURCE	BASE EMISSION RATE
L0000536	0	0.82330E-05	363399.8	3807353.3	497.8	0.00	0.93	0.93	YES	
L0000537	0	0.82330E-05	363399.4	3807355.3	497.7	0.00	0.93	0.93	YES	
L0000538	0	0.82330E-05	363399.1	3807357.3	497.6	0.00	0.93	0.93	YES	
L0000539	0	0.82330E-05	363398.7	3807359.2	497.6	0.00	0.93	0.93	YES	
L0000540	0	0.82330E-05	363398.4	3807361.2	497.6	0.00	0.93	0.93	YES	
L0000541	0	0.82330E-05	363398.1	3807363.2	497.6	0.00	0.93	0.93	YES	
L0000542	0	0.82330E-05	363397.7	3807365.1	497.6	0.00	0.93	0.93	YES	
L0000543	0	0.82330E-05	363397.4	3807367.1	497.6	0.00	0.93	0.93	YES	
L0000544	0	0.82330E-05	363397.0	3807369.1	497.6	0.00	0.93	0.93	YES	
L0000545	0	0.82330E-05	363396.7	3807371.1	497.6	0.00	0.93	0.93	YES	
L0000546	0	0.82330E-05	363396.3	3807373.0	497.6	0.00	0.93	0.93	YES	
L0000547	0	0.82330E-05	363396.0	3807375.0	497.6	0.00	0.93	0.93	YES	
L0000548	0	0.82330E-05	363395.7	3807377.0	497.6	0.00	0.93	0.93	YES	
L0000549	0	0.82330E-05	363395.3	3807378.9	497.6	0.00	0.93	0.93	YES	
L0000550	0	0.82330E-05	363395.0	3807380.9	497.6	0.00	0.93	0.93	YES	
L0000551	0	0.82330E-05	363394.6	3807382.9	497.6	0.00	0.93	0.93	YES	
L0000552	0	0.82330E-05	363394.3	3807384.8	497.6	0.00	0.93	0.93	YES	
L0000553	0	0.82330E-05	363393.9	3807386.8	497.6	0.00	0.93	0.93	YES	
L0000554	0	0.82330E-05	363393.6	3807388.8	497.6	0.00	0.93	0.93	YES	
L0000555	0	0.82330E-05	363393.3	3807390.8	497.6	0.00	0.93	0.93	YES	
L0000556	0	0.82330E-05	363392.9	3807392.7	497.6	0.00	0.93	0.93	YES	
L0000557	0	0.82330E-05	363392.6	3807394.7	497.6	0.00	0.93	0.93	YES	
L0000558	0	0.82330E-05	363392.2	3807396.7	497.6	0.00	0.93	0.93	YES	
L0000559	0	0.82330E-05	363391.9	3807398.6	497.6	0.00	0.93	0.93	YES	
L0000560	0	0.82330E-05	363391.5	3807400.6	497.6	0.00	0.93	0.93	YES	

*** VOLUME
SOURCE DATA ***

SOURCE ID	PART.	NUMBER EMISSION RATE (GRAMS/SEC) SCALAR VARY BY	X (METERS)	Y (METERS)	ELEV. (METERS)	HEIGHT (METERS)	SY (METERS)	SZ (METERS)	URBAN SOURCE	BASE EMISSION RATE
L0000561	0	0.82330E-05	363391.2	3807402.6	497.7	0.00	0.93	0.93	YES	
L0000562	0	0.82330E-05	363390.9	3807404.6	497.7	0.00	0.93	0.93	YES	
L0000563	0	0.82330E-05	363390.5	3807406.5	497.7	0.00	0.93	0.93	YES	
L0000564	0	0.82330E-05	363390.2	3807408.5	497.8	0.00	0.93	0.93	YES	
L0000565	0	0.82330E-05	363389.8	3807410.5	497.9	0.00	0.93	0.93	YES	
L0000566	0	0.82330E-05	363389.5	3807412.4	498.1	0.00	0.93	0.93	YES	
L0000567	0	0.82330E-05	363389.1	3807414.4	498.2	0.00	0.93	0.93	YES	
L0000568	0	0.82330E-05	363388.8	3807416.4	498.3	0.00	0.93	0.93	YES	
L0000569	0	0.82330E-05	363388.5	3807418.3	498.4	0.00	0.93	0.93	YES	
L0000570	0	0.82330E-05	363388.1	3807420.3	498.6	0.00	0.93	0.93	YES	
L0000571	0	0.82330E-05	363387.8	3807422.3	498.7	0.00	0.93	0.93	YES	
L0000572	0	0.82330E-05	363387.4	3807424.3	498.8	0.00	0.93	0.93	YES	
L0000573	0	0.82330E-05	363387.1	3807426.2	498.9	0.00	0.93	0.93	YES	
L0000574	0	0.82330E-05	363386.7	3807428.2	499.0	0.00	0.93	0.93	YES	
L0000575	0	0.82330E-05	363386.4	3807430.2	499.1	0.00	0.93	0.93	YES	

SOURCE ID	PART.	NUMBER EMISSION RATE (GRAMS/SEC) SCALAR VARY BY	X (METERS)	Y (METERS)	ELEV. (METERS)	HEIGHT (METERS)	SY (METERS)	SZ (METERS)	URBAN SOURCE	BASE EMISSION RATE
L0000576	0	0.82330E-05	363386.1	3807432.1	499.2	0.00	0.93	0.93	YES	
L0000577	0	0.82330E-05	363385.7	3807434.1	499.2	0.00	0.93	0.93	YES	
L0000578	0	0.82330E-05	363385.4	3807436.1	499.3	0.00	0.93	0.93	YES	
L0000579	0	0.82330E-05	363385.0	3807438.0	499.4	0.00	0.93	0.93	YES	
L0000580	0	0.82330E-05	363384.7	3807440.0	499.4	0.00	0.93	0.93	YES	
L0000581	0	0.82330E-05	363384.3	3807442.0	499.4	0.00	0.93	0.93	YES	
L0000582	0	0.82330E-05	363384.0	3807444.0	499.4	0.00	0.93	0.93	YES	
L0000583	0	0.82330E-05	363383.7	3807445.9	499.4	0.00	0.93	0.93	YES	

*** SOURCE IDs
DEFINING SOURCE GROUPS ***

SRCGROUP ID SOURCE
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*** SOURCE IDs
DEFINING SOURCE GROUPS ***

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*** SOURCE IDs
DEFINING SOURCE GROUPS ***

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*** SOURCE IDs
DEFINING SOURCE GROUPS ***

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*** SOURCE IDs DEFINED
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URBAN ID	URBAN POP	SOURCE IDs
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*** SOURCE IDs DEFINED
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URBAN ID	URBAN POP	SOURCE IDs
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*** SOURCE IDs DEFINED
AS URBAN SOURCES ***

URBAN ID	URBAN POP	SOURCE IDs

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*** SOURCE IDs DEFINED
AS URBAN SOURCES ***

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*** MODELOPTs: RegDFAULT CONC ELEV URBAN

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(363346.5, 3807759.3, 482.2, 587.0, 0.0);
(363466.6, 3807637.3, 476.9, 605.0, 0.0);
(363537.9, 3807346.4, 495.6, 605.0, 0.0);
(363536.0, 3807273.2, 499.4, 605.0, 0.0);
(363534.1, 3807186.9, 505.0, 605.0, 0.0);

*** MODELOPTs: RegDFAULT CONC ELEV URBAN

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING *** (1=YES; 0=NO)

1 1 1

*** THE ANNUAL AVERAGE CONCENTRATION VALUES
AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S):
L0000001 , L0000002 , L0000003 , L0000004 ,
L0000005 ,
L0000006 , L0000007 , L0000008 ,
L0000009 , L0000010 , L0000011 , L0000012 ,
L0000013 ,
L0000014 , L0000015 , L0000016 ,
L0000017 , L0000018 , L0000019 , L0000020 ,
L0000021 ,
L0000022 , L0000023 , L0000024 ,
L0000025 , L0000026 , L0000027 ,
L0000028 , . . . ,

*** DISCRETE
CARTESIAN RECEPTOR POINTS ***

** CONC OF DPM IN
MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC
363346.45	3807759.27	0.06453
363466.56	3807637.29	0.07193
363537.87	3807346.41	0.09006
363535.99	3807273.23	0.09820
363534.12	3807186.90	0.10481

*** THE SUMMARY OF MAXIMUM
ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF DPM IN
MICROGRAMS/M**3 **

NETWORK
GROUP ID AVERAGE CONC
RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID
- - - -

IMPACT
SCIENCES

APPENDIX B-1
Biological Resources Assessment

Biological Resources Assessment

Santa Clarita TTM 68203

August 2025

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Appendix A: Photograph Log and Site Plan
Appendix B: Special-Status Species Analysis

1. Introduction

This report includes the findings of a Biological Resources Assessment (BRA) conducted by South Environmental for a proposed mixed-use development on Tentative Tract Map (TTM) 68203 in the City of Santa Clarita, California. The purpose of this report is to identify and characterize biological resources that occur on the project site and surrounding 200-feet (survey area), quantify and assess potential impacts to protected biological resources, and propose regulatory compliance measures, mitigation, and avoidance measures to reduce impacts to a less than significant level. The scope of this report includes a description of the proposed development, methods used to assess the biological resources, the environmental setting including technical characterizations and maps of vegetation communities and jurisdictional features, an assessment of the potential for special-status plants and animals to occur on the survey area, a description of the regulatory setting, an analysis of the potential for the project to impact biological resources according to the thresholds in Appendix G of the California Environmental Quality Act (CEQA), and detailed recommendations for avoiding or mitigating impacts. Representative photographs of the survey area are in Appendix A.

1.1 Project Description

Location and Setting

The property proposed for development (project site) includes 28.13-acres consisting of 10 parcels located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita (see Figure 1 and Figure 2 below). The project site is on the United State Geologic Service (USGS) Mint Canyon 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North (T04N) and Range 15 West (R15W).

- Assessor's Parcel Numbers (APNs): 2836-013-106, 2836-013-107, 2836-013-111, 2836-013-128, 2836-013-133, 2836-013-141, 2836-020-058, 2836-020-078, 2836-020-086, 2836-020-087

Most of the property is undeveloped except for a single-family home and accessory structures with a street address 20101 Golden Valley Road. A windy paved driveway exists off Golden Valley Road provide access to the home, and a series of dirt roads provide access to the remaining undeveloped hills on the property. Adjacent uses include residential uses to the immediate north and east, vacant land to the south, and residential uses/Golden Valley High School to the west.

Source: ESRI USA Topo Maps 2020

Santa Clarita TTM 68203

Figure 1. Project Location

Project Site is on the USGS Mint Canyon 7.5-minute quadrangle map in the southeast corner of Township 04 North (T04N) and Range 15 West (R15W) Section 30 (S30).

Center Coordinate (decimal degrees):
Latitude: 34.3985N Longitude: -118.4861W

SOUTH ENVIRONMENTAL

Source: BING Aerial Basemap 2020

Santa Clarita TTM 68203

Figure 2. Survey Area

SOUTH ENVIRONMENTAL

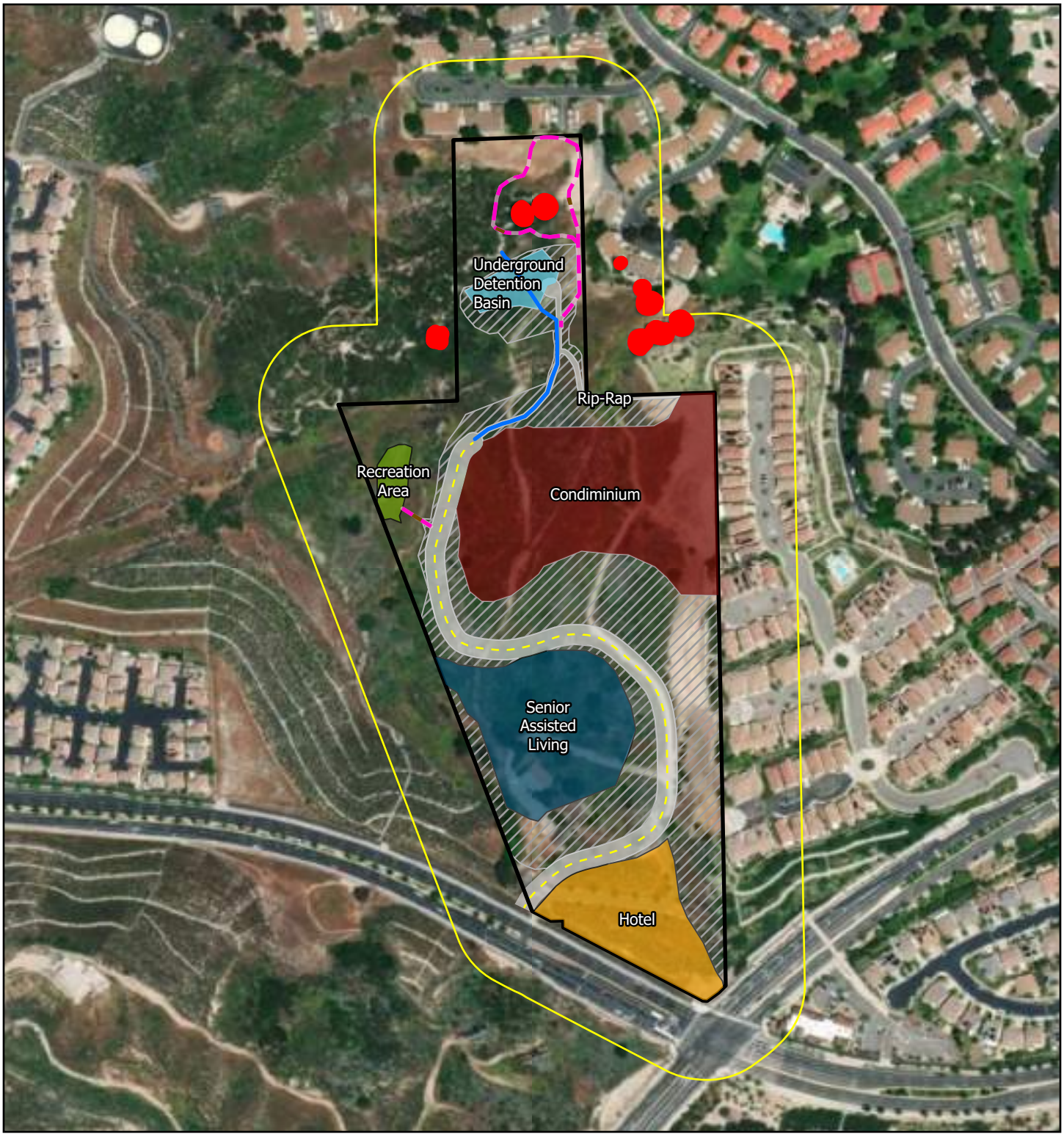
Proposed Development

The proposed development seeks to merge the 10 parcels and entitle a Tentative Tract Map 68203 for a four (4) lot subdivision consisting of the following (shown in Figure 3 below):

- One (1) 5.04-acre lot for a four (4) story building consisting of 154-unit senior assisted living units; the proposed four (4) story building will be 50-foot maximum height.
- One (1) 5.04-acre lot for a 100-room commercial hotel and retail building.
- One (1) 11.48-acre lot for 73 residential Condominium units consisting two, three, and four-plex buildings.
- One (1) 5.83-acre open space lot for L.I.D. storm water treatment with two discharge pipes, and an eight-foot wide riding and hiking trial.
- Proposed streets and circulations will result in approximately 0.73 acres of development.
- A Proposed Recreation Area and foot bridge access is proposed west of the condominium units.
- The project will require slope control surrounding all developments as shown in the Site Plan.

1.2 Methodology

This biological resource assessment is based on information compiled through a field reconnaissance, focused oak tree survey, jurisdictional delineation, and a review of appropriate reference materials and literature regarding the biological resources of the region. A general biological field reconnaissance and separate oak tree survey (South Environmental 2020a) and jurisdictional delineation (South Environmental 2020b) was conducted by South Environmental Certified Wildlife Biologist and Certified Arborist Matthew South. A botanical survey to identify the presence of any rare plants was conducted by South Environmental botanist Scott Altmann and South Environmental biologists AJ Samra and Dana Briggs between May and August of 2023. A coastal California gnatcatcher protocol survey was conducted by Dudek between May and June of 2023. The sources and literature referenced in this assessment are provided below in Section 6. Bibliography.



Source: ESRI Aerial Imagery 2025

Santa Clarita VTTM 68203 Project

Figure 3. Proposed Development

0 215 430 Feet

N

- Project Boundary
- Survey Area - 200-foot Buffer
- Oak Tree Protected Zone

Proposed Development

- Riding/Hiking Trail
- Drainage Pipe
- Road Centerline
- Hikinig Trail
- Condiminium
- Underground Detention Basin
- Hotel
- Senior Assisted Living
- Recreation Area
- Rip-Rap
- Bridge
- Road
- Slope Control

SOUTH ENVIRONMENTAL

Literature Review

The assessment of the project began with a review of literature relating to the biological resources that are known to occur in the vicinity of the parcel that included the following resources:

- The California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) was reviewed to identify special-status plants, animals, and natural communities that have previously recorded in the United State Geologic Service (USGS) Mint Canyon 7.5"quad in which the project site is located, and the eight surrounding USGS 7.5"quads: Warm Springs Mountain, Green Valley, Sleepy Valley, Newhall, Agua Dulce, Oat Mountain, San Fernando, and Sunland (CDFW 2020a).
- CDFW California Wildlife Habitat Relationships (CWHR) life history accounts and range maps (CDFW 2020b)
- United States Fish and Wildlife Service (USFWS) Environmental Conservation Online System (ECOS) Information for Planning and Consultation (IPaC) (USFWS 2020a)
- USFWS Designated and Proposed Critical Habitat GIS data (USFWS 2020b)
- California Native Plant Society (CNPS) online Inventory of Rare and Endangered Plants of California (CNPS 2020a).
- US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soils Database (USDA 2020)
- National Hydrography Dataset (USGS 2020a)
- National Wetlands Inventory (USFWS 2020c)
- California Protected Areas Database (CPAD 2020)
- South Coast Missing Linkages Project: A Linkage Design for the Santa Monica-Sierra Madre Connection (Penrod et al. 2006)
- Oak Tree Report prepared for the project (South Environmental 2020a)
- Jurisdictional Delineation Report prepared for the project (South Environmental 2020b)

Field Reconnaissance, Oak Tree Survey, & Jurisdictional Delineation

South Environmental biologist Matthew South conducted a field reconnaissance on October 10, 2020 to record plants and animals observed on the site, characterize and map plant communities according to A Manual of California Vegetation Online (CNPS 2020b), and assess the potential for special-status species to occur. A focused survey for oak trees was conducted on the project parcels on October 10, 2020 and within a 200-foot buffer surrounding the parcels on November 4, 2020. An Oak Tree Report was prepared that details the methods and results of the survey and a formal jurisdictional delineation of "waters of the U.S." and or wetlands and waters of the state was conducted on November 21, 2020, and a Jurisdictional Delineation report detailing the methods and results was completed that details the methods and results.

Focused Rare Plant Survey

The survey to identify special-status plants identified in the literature search — including federal and state rare, threatened, and endangered species — was conducted by South Environmental in the spring in May and the summer in August of 2023. The survey dates with the weather conditions and South Environmental biologists that conducted the surveys are below:

- May 8 and 9, 2023. Temperature 56-63° F, light air to light breeze (3-10 mph), fair to cloudy, no precipitation (Scott Altmann & AJ Samra)

- August 3 and 4, 2023. Temperature 70-95° F, calm to light breeze (0-10 mph), fair to clear, no precipitation (Scott Altmann and Dana Briggs)

During the surveys all plant species encountered were either identified at the time or in the case of unknown species a sample was collected and the species were identified using *The Jepson Manual of Vascular Plants of California* (Baldwin et al. 2012) and by comparing them with taxonomically-related species from the area using I-Naturalist and other online digital photo sources.

Whenever possible the survey was conducted according to the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* developed by the California Department of Fish and Wildlife (CDFW 2018) and the *Botanical Survey Guidelines* developed by the California Native Plant Society (CNPS 2001). The survey followed the standard botanical protocol for rare, threatened, or endangered plant species surveys of identifying all plant species encountered. Although the goal was to identify all plant species, field surveyors placed a special emphasis on discovery of the special-status species identified in the literature search with the potential to occur on the site.

2. Environmental Setting

2.1 Topography and Climate

The project site is a steeply sloping group of hills that is at an elevation of 1750-feet at the home site and 1560-feet in the northern tip. There is a hilltop that is at the northwest edge of the homesite and extends northeast through the project site and is steeply sloped on the east and west sides. Climate in the region is hot and dry, with average summer high temperatures in the mid-90s and average winter lows in the mid-30s. Average yearly rainfall is 14-inches (less than half the national average) and the wettest months are January – March, and almost no precipitation between May-August.

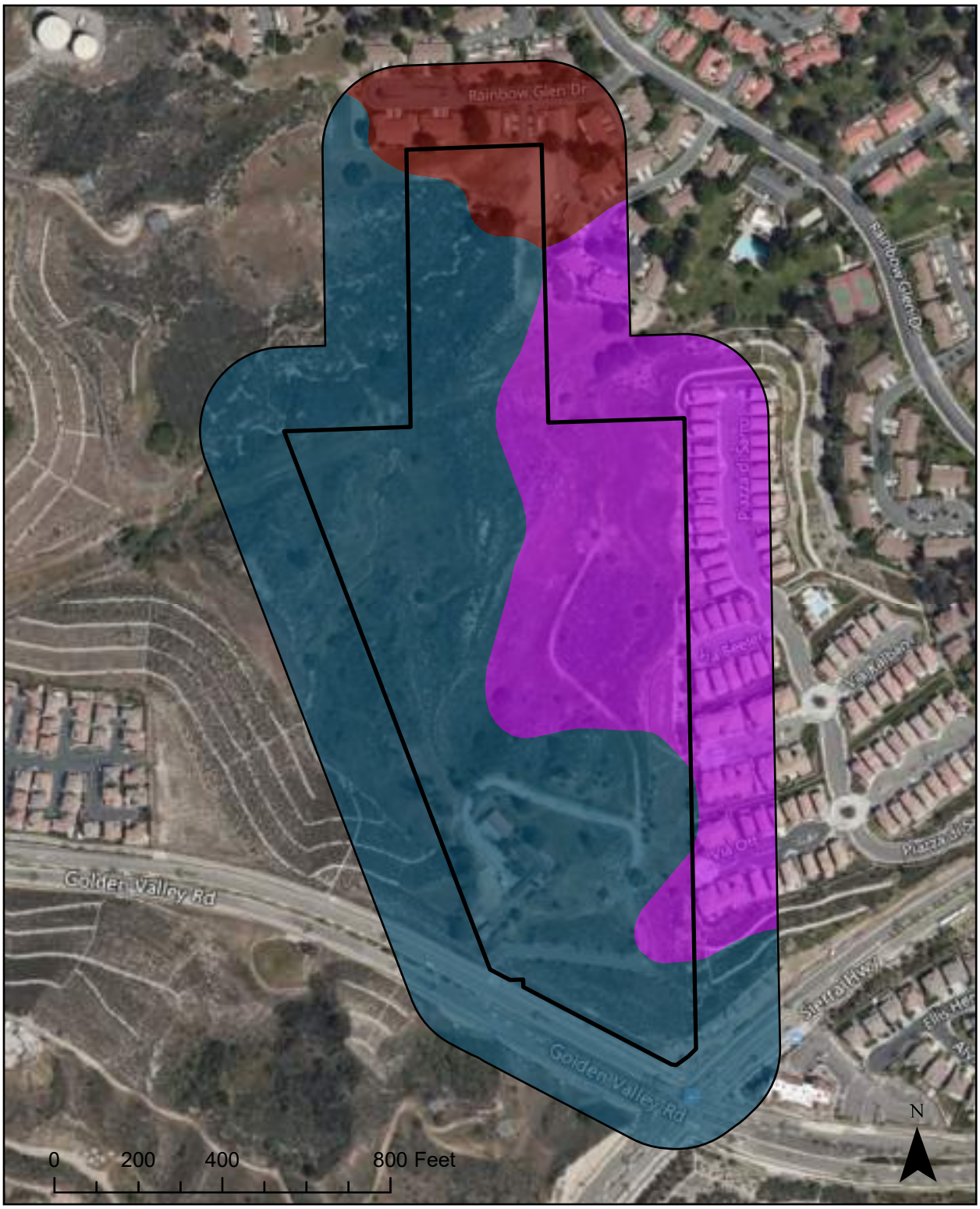
2.2 Geology

The geology in the survey area is dominated by Saugus Formation terrestrial fluviatile, weakly indurated, which is comprised in Pliocene and Pleistocene age geologic units (USGS 2020b, USGS 2020c). The primary rock type in this geologic unit is QTp light gray to light reddish-brown pebble-cobble conglomerate, sandstone, and siltstone; conglomerate composed of granitic, gneissic, metavolcanic, quartzitic gabbroic, anorthositic and volcanic detritus; deposited by westward flowing streams; probably mostly of Pleistocene age. A minor amount of alluvial gravel, sand and clay of valley areas (Qa) and landslide debris (Qls) also occurs in the survey area.

2.3 Soils

Three soils occur on the project site as shown in Figure 4:

- **Saugus loam, 30 to 50 percent slopes, eroded** is the most abundant soil type and occurs in the western half of the project site. This is an upland soil found on backslope of hills, and is well drained.
- **Castaic-Balcom silty clay loams, 15 to 30 percent slopes** is on the eastern portions of the project site. This soil type largely includes (99%) upland hills and backslopes and includes 1% of drainageways. This is a well-drained soil.
- **Zmora loam, 2 to 9 percent slopes** is on the northern tip of the project site. This soil type is typically found on terraces and backslopes and is well drained.



Source: BING Aerial Basemap 2020, USDA NRCS Soils GIS

Santa Clarita TTM 68203

Figure 4. Soils

Survey Area (200-foot Buffer)

Project Boundary

Soils

Castaic-Balcom silty clay loams, 15 to 30 % slopes

Saugus loam, 30 to 50 % slopes, eroded

Zamora loam, 2 to 9 % slopes

SOUTH ENVIRONMENTAL

2.3 Plant Communities

As shown in Figure 5, there are five plant communities or cover types in a 200-foot buffer surrounding the project site, and they are summarized in Table 1 below.

Table 1. Summary of Plant Communities in Survey Area

Plant Community	Acres	Global Rank (G) /State Rank (S)
California Sagebrush – (Purple Sage) Scrub	16.71	G5/S5
Chamise Chaparral	6.66	G5/S5
Installed Sage Scrub	2.50	G5/S5
Ruderal	13.44	not ranked
Developed	17.21	not ranked
Total	56.52	

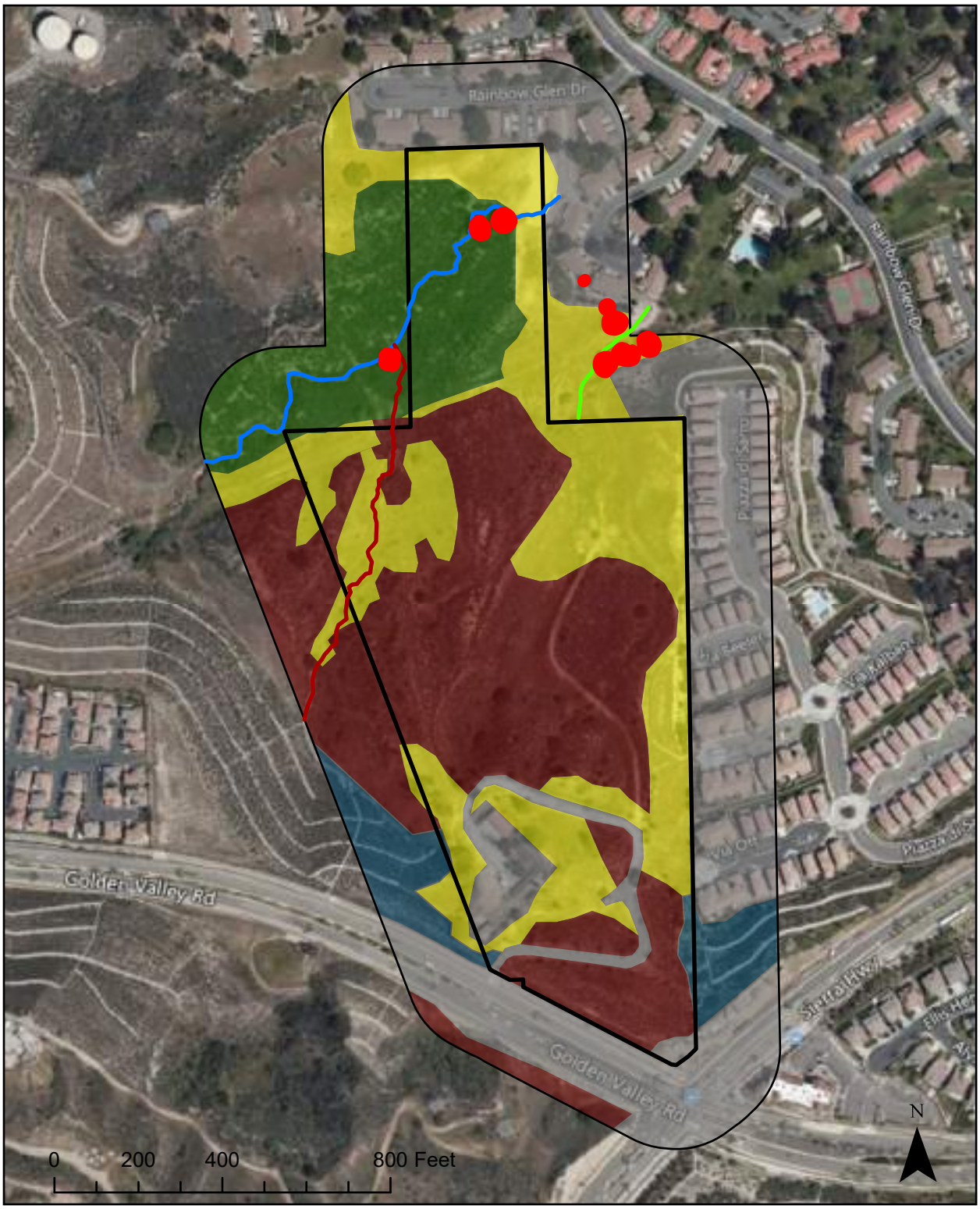
California Sagebrush – (Purple Sage) Scrub

California sagebrush – (purple sage) scrub [*Artemisia californica* – (*Salvia leucophylla*) Shrubland Alliance] as described by the Manual of California Vegetation Online occurs on 16.71-acres of the survey area. This community occurs in two Associations described by the Manual:

- ***Artemisia californica – Salvia leucophylla* Association** occurs on the central portions of the survey area and on the areas south of Golden Valley Road. This community is dominated by California sagebrush (*Artemisia californica*) and purple sage (*Salvia leucophylla*) is a sub-dominant species. Other prominent shrubs include California buckwheat (*Eriogonum fasciculatum*), black elderberry (Sambucus nigra), toyon (*Heteromeles arbutifolia*), and chaparral yucca (*Hesperoyucca whipplei*).
- ***Artemisia californica – Eriogonum fasciculatum* Association** occurs on the southern portions of the survey area between the house and the installed sage scrub. This community is co-dominated by California sagebrush and California buckwheat.

Chamise Chaparral

Chamise chaparral (*Adenostoma fasciculatum* Shrubland Alliance) as described by the Manual occurs in the northern portion of the survey area. Specifically, the *Adenostoma fasciculatum* – (*Ceanothus crassifolius*) Association occurs on the survey area and is dominated by chamise (*Adenostoma fasciculatum*) and hoary leaved ceanothus (*Ceanothus crassifolius*) is sub-dominant. Purple sage, coast live oak (*Quercus agrifolia*), and coast prickly pear (*Opuntia littoralis*) occur occassioinaly.



Source: BING Aerial Basemap 2020

Santa Clarita TTM 68203

Figure 5. Plant Communities, Oaks, and Drainages

- Ephemeral Drainage #1
- Ephemeral Drainage #2
- Ephemeral Drainage #3
- Survey Area (200-foot Buffer)
- Project Boundary
- Protected Oak Tree
- California Sagebrush - (Purple Sage) Scrub
- Chamise Chaparral
- Installed Sage Scrub
- Ruderal
- Developed

SOUTH ENVIRONMENTAL

Installed Sage Scrub

Installed sage scrub occurs on hillsides adjacent to existing developments and are dominated by California buckwheat and have a variety of other landscaped species. These are managed areas that have a series of concrete drainage channels that direct surface water on the slopes away from the houses.

Ruderal

Ruderal areas occur throughout the survey area surrounding the house, on the hillsides adjacent to neighborhoods, and along the gas company easement. These areas are dominated by black mustard (Brassica nigra) and has a variety of other plants associated with disturbed area and landscaped species such as telegraph weed (*Heterotheca grandiflora*), California pepper tree (*Schinus molle*), olive tree (*Olea europaea*), Mexican fan palm (*Washingtonia robusta*), Canary Island date palm (*Phoenix canariensis*), blue gum eucalyptus (*Eucalyptus globulus*), and Aleppo pine (*Pinus halepensis*).

Developed

Developed areas include Golden Valley Road, Sierra Highway, paved driveway, the single-family residence on the project site, and the surrounding homes in the neighborhoods.

2.4 Wildlife

The following animals were detected on the parcel during the surveys: Anna's hummingbird (*Calypte anna*), Nuttall's woodpecker (*Picoides nuttallii*), California scrub-jay (*Aphelocoma californica*), northern mockingbird (*Mimus polyglotto*), spotted towhee (*Pipilo maculatus*), California towhee (*Melozone crissalis*), house finch (*Haemorhous mexicanus*), oak titmouse (*Baeolophus inornatus*), mourning dove (*Zenaida macroura*), white-crowned sparrow (*Zonotrichia leucophrys*), black phoebe (*Sayornis nigricans*), Eurasian collared dove (*Streptopelia decaocto*), bushtit (*Psaltriparus minimus*), western kingbird (*Tyrannus verticalis*), American crow (*Corvus brachyrhynchos*), California quail (*Callipepla californica*), lesser goldfinch (*Spinus psaltria*), red-tailed hawk (*Buteo jamaicensis*), European house sparrow (*Passer domesticus*), dark-eyed junco (*Junco hyemalis*), Audubon's cottontail (Sylvilagus audubonii), California ground squirrel (*Otospermophilus beecheyi*), and coyote (*Canis latrans*). Numerous other animals are anticipated to use the parcel throughout the year.

2.5 Special-Status Species

The survey area is not within any designated or proposed USFWS Critical Habitat units (USFWS 2020) and Cooper's hawk (*Accipiter cooperii*), a state watchlist species, is the only special-status species observed during the survey and none have been recorded to the CNDDB on the survey area

previously. According to the analysis presented in Appendix B there are 92 special-status species known to occur in the region, including 44-plants and 48-animals. A total of 9 special-status plants and 9 special-status animals are present or have a high or medium potential to occur in the survey area based on habitat suitability.

Special-Status Plants

A total of 92 plant species were observed in the study area during the focused rare plant survey conducted by South Environmental and are listed in Table 2 below. None of these species are considered special-status plants. Of these, 59 species (64.1%) were native to California and 33 species (35.9%) were non-native to California or the southern region of California. Of the non-native species, 22 (66.7%) are classified as invasive or are on invasive "watch" or "alert" by the California Invasive Plant Council (2023). Based on the habit classification system used by Calflora (2023) and other sources, the habit of the plants observed included tree, shrub, shrub (succulent), perennial, perennial herb, annual herb, annual grasslike herb, perennial grasslike herb, and vine. Important genera for which more than one species was observed included *Artemisia, Avena, Bromus, Camissoniopsis, Lupinus, Salvia, and Washingtonia.*

Table 2. List of plant species for Santa Clarita TTM 68203 Project in Santa Clarita, California

(CRPR = California Rare Plant Ranking, 2023; *invasive species per the California Invasive Plant Council, 2023.

Scientific name	Common name	Native/Non-native	Habit	CRPR
Acacia redolens	vanilla-scented wattle	Non-native	tree/shrub	--
Acmispon glaber	deerweed	Native	perennial herb	--
Acourtia microcephala	sacapellote	Native	perennial herb	--
Adenostoma fasciculatum	chamise	Native	tree or shrub	--
Agave attenuata	swan-neck agave	Non-native	shrub	--
Amsinckia menziesii	Menzies fiddleneck	Native	annual herb	--
Artemisia californica	California sagebrush	Native	shrub	--
Artemisia tridentata	big sagebrush	Native	shrub	--
Arundo donax	giant reed	*Non-native	perennial grasslike herb	--
Asclepias fascicularis	narrowleaf milkweed	Native	perennial herb	--
Astragalus trichopodus	Santa Barbara milkvetch	Native	perennial herb	--
Avena barbata	slender wild oat	*Non-native	annual grasslike herb	--
Avena fatua	wild oat	*Non-native	annual grasslike herb	--
Blitum californicum	California goosefoot	Native	perennial herb	--

Scientific name	Common name	Native/Non-native	Habit	CRPR
Bromus diandrus	ripgut brome	*Non-native	annual grasslike herb	--
Bromus hordeaceus	common soft brome	*Non-native	annual grasslike herb	--
Bromus rubens	red brome	*Non-native	annual grasslike herb	--
Calystegia macrostegia	coast morning glory	Native	perennial herb/vine	--
Camissoniopsis bistorta	California sun cup	Native	annual herb	--
Camissoniopsis micrantha	miniature suncup	Native	annual herb	--
Carduus tenuflorus	slender thistle	*Non-native	annual herb	--
Carya Illinoinensis	pecan	*Non-native	tree	--
Castilleja exserta	purple owl's clover	Native	annual herb	--
Ceanothus crassifolius	hoaryleaf ceanothus	Native	shrub	--
Chaenactis artemisiifolia	white pincushion	Native	annual herb	--
Cirsium occidentale	cobweb thistle	Native	perennial herb	--
Corethrogyne filaginifolia	California aster	Native	perennial herb	--
Cryptantha intermedia	clearwater cryptantha	Native	annual herb	--
Cupressus sempervirens	Mediterannean cypress	Non-native	tree	--
Deinandra fasciculata	clustered tarweed	Native	annual herb	--
Delphinium cardinale	scarlet larkspur	Native	perennial herb	--
Dipterostemon capitatus	blue dicks	Native	perennial herb	--
Emmenanthe penduliflora	whispering bells	Native	annual herb	--
Encelia californica	bush sunflower	Native	shrub	--
Encelia farinosa	brittlebush	Native	shrub	--
Eriodictyon crassifolium	thick-leaved yerba santa	Native	shrub	--
Eriogonum fasciculatum	California buckwheat	Native	shrub	--
Eriophyllum confertiflorum	golden yarrow	Native	shrub	--
Erodium cicutarium	redstem stork's bill	*Non-native	annual herb	--
Eschscholzia californica	California poppy	Native	annual herb	--
Eucalyptus camaldulensis	river redgum	*Non-native	tree	--
Eulobus californicus	California primrose	Native	annual herb	--
Eucrypta chrysanthemifolia	common eucrypta	Native	annual herb	--
Festuca myuros	rattail sixweeks grass	*Non-native	annual grasslike herb	--
Grevillea robusta	silk oak	*Non-native	tree	--
Hazardia squarrosa	saw-toothed goldenbush	Native	shrub	--
Heteromeles arbutifolia	toyon	Native	shrub	--
Heterotheca grandiflora	telegraphweed	Native	annual/perennial herb	--
Hesperoyucca whipplei	chaparral yucca	Native	shrub	--

Scientific name	Common name	Native/Non-native	Habit	CRPR
Hirschfeldia incana	shortpod mustard	*Non-native	perennial herb	--
Hordeum murinum	wall barley	*Non-native	annual grasslike herb	--
Juniperus californica	California juniper	Native	shrub	--
Lepidospartum squamatum	California broomsage	Native	shrub	--
Lonicera subspicata	southern honeysuckle	Non-native	shrub	--
Lupinus bicolor	miniature lupine	Native	perennial herb	--
Lupinus succulentus	arroyo lupine	Native	annual herb	--
Lysimachia arvensis	scarlet pimpernel	Non-native	annual herb	--
Marah macrocarpa	chilicothe	Native	perennial herb/vine	--
Malacothamnus marrubioides	horehound bush-mallow	Native	shrub	--
Marrubium vulgare	white horehound	*Non-native	perennial herb	--
Melaleuca citrina	crimson bottlebrush	Non-native	tree	--
Myoporum parvifolium	creeping myoporum	Non-native	tree/shrub	--
Nerium oleander	oleander	Non-native	shrub	--
Nicotiana glauca	tree tobacco	*Non-native	tree/shrub	
Olea europaea	European olive	*Non-native	tree	--
Opuntia basilaris var. *basilaris*	beavertail cactus	Native	shrub (stem succulent)	--
Paeonia californica	California peony	Native	perennial herb	--
Phacelia cicutaria	caterpillar phacelia	Native	annual herb	--
Phoenix canariensis	Canary Island date palm	*Non-native	Tree	--
Pinus halepensis	Aleppo pine	Non-native	tree	--
Pseudognaphalium californicum	California cudweed	Native	annual or perennial herb	--
Pyracantha angustifolia	narrowleaf firethorn	*Non-native	shrub	--
Quercus agrifolia	coast live oak	Native	Tree	--
Rhamnus crocea	redberry buckthorn	Native	shrub	--
Rhus aromatica	fragrant sumac	Native	shrub	--
Ribes aureum	golden currant	Native	shrub	--
Salvia leucophylla	purple sage	Native	shrub	--
Salvia mellifera	black sage	Native	shrub	--
Sambucus nigra ssp. *caerulea*	blue elderberry	Native	shrub or tree	--
Schinus molle	Peruvian peppertree	*Non-native	tree	--
Scrophularia californica	California beeplant	Native	perennial herb	--
Senecio flaccidus	shrubby ragwort	Native	shrub	--
Sisyrinchium bellum	western blue-eyed grass	Native	perennial herb	--

Scientific name	Common name	Native/Non-native	Habit	CRPR
Solanum xanti	purple nightshade	Native	perennial herb/shrub	--
Sonchus oleraceus	common sow thistle	Non-native	annual herb	--
Tetradymia comosa	hairy horsebrush	Native	shrub	--
Toxicoscordion fremontii	common star lily	Native	perennial herb	--
Trifolium hirtum	rose clover	*Non-native	annual herb	--
Uropappus lindleyi	silverpuffs	Native	annual herb	--
Verbena lasiostachys	western vervain	Native	perennial herb	--
Washingtonia filifera	California fan palm	Non-native (to coastal, southern California)	tree	--
Washingtonia robusta	Mexican fan palm	*Non-native	tree	--

No special-status plants occur on the survey area. A botanical survey of the vascular plants conducted in the spring (May) and in the summer (August) of 2023 on the site resulted in the observance and identification of 92 native and non-native plant species. Of these there was a dominance of native species (59 species; 64.1% of all species) although non-native species had an important presence (33 species; 35.9%). Of the non-native plants, 22 (66.7%), are classified as invasive, some of which have substantial cover at the ground level enough to restrict native plant colonization. Over the course of the botanical survey conducted in 2023, no special-status plants were observed and they are considered absent from the survey area.

Special-Status Animals

Table 3 shows a summary of the special-status animals that are present or have a high or medium potential to occur on the survey area.

Table 3. Special-Status Animals with a High or Medium Potential to Occur on the Survey Area

Species Name	Federal/State Status	Other Status	Habitat
Cooper's hawk (*Accipiter cooperii*)	--/--	WL	Woodland, chiefly of open, interrupted marginal type. Observed in large oak trees in north of survey area.
southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*)	--/--	WL	Resident in Southern California coastal sage scrub and sparse mixed chaparral. Chaparral and coastal sage scrub habitats occur on the survey area.
Bell's sage sparrow (*Artemisiospiza belli belli*)	--/--	WL, BCC	Nests in chaparral dominated by fairly dense stands of chamise, similar to that found in the north end of the survey area. Dense chamise chaparral occurs in the northern portions of the survey area.
coastal California gnatcatcher (*Polioptila californica californica*)	FT/--	SSC	Obligate and permanent resident of coastal sage scrub below 2,500-feet in Southern California. This species was recorded to the CNDDB 1,000-feet to the south of

			the survey area. Sage scrub habitat occurs on the survey area.
crotch bumblebee (*Bombus crotchii*)	--/CE	--	Coastal California where food plants occur, genera such as *Eriogonum*, such as California buckwheat, which is abundant on the survey area.
western mastiff bat (*Eumops perotis californicus*)	--/--	SSC, BLMS	Many open, semi-arid to arid habitats, including conifer/deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in cliff faces, high buildings, trees, and tunnels. The building and trees on the survey area provide suitable roosting sites for this species.
Vasquez shoulderband snail (*Helminthoglypta vasquezi*)	--/--	--	Little information is available regarding the life history of this species except that it is a terrestrial species, and is known to occur in the vicinity of the survey area.
coastal whiptail (*Aspidoscelis tigris stejnegeri*)	--/--	SSC	This species was observed on the site during a survey conducted in 2013 by LDC (LDC 2013)
coast horned lizard (*Phrynosoma blainvillii*)	--/--	SSC, BLMS	Frequents a wide variety of habitats, most common on lowlands along sandy washes with scattered low bushes. The areas surrounding Ephemeral Drainage #1 provide suitable habitat for this species.
San Diego desert woodrat (*Neotoma lepida intermedia*)	--/--	SSC	Typically found in coastal scrub.
BCC – USFWS Bird of Conservation Concern BLMS – Bureau of Land Management Sensitive SSC – California species of special concern WL – California watchlist species _____ FT – Federal threatened species CE – candidate for endangered species in California			

Coastal California Gnatcatcher

A focused survey for coastal California gnatcatcher was conducted by Dudek in 2023 (Dudek 2023). No California gnatcatchers were observed during the surveys and they are considered absent from the site.

2.6 Sensitive Natural Communities

CDFW 2018 *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* defines sensitive natural communities as those that are "of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects." CDFW considers a natural community sensitive if it has a Global or State rarity rank of 1-3, which includes communities that are vulnerable (G3/S3), imperiled (G2/S2), and critically imperiled (G1/S1). CDFW uses the alliances and groups described in the Manual of California Vegetation Online to characterize California's natural communities, and provides the California Natural Communities List online (most current is dated September 9, 2020) to list the current global and state rarity rank for each natural community characterized in the

Manual. The native chamise chaparral, California sagebrush – purple sage scrub, and installed sage scrub habitats on the survey area are ranked G5/S5 and are not considered sensitive.

2.7 Protected Oak Trees

According to the Oak Tree Report prepared for the project there are two (2) heritage oaks on the property and eight (8) off-property protected oaks (including 2 heritage oaks) within the 200-foot survey buffer. The location of the protected oaks Tree Protective Zones is in Figure 5.

2.8 Hydrology and Jurisdictional Features

According to the Jurisdictional Delineation report for the project, the project site is located within the Santa Clara watershed (HUC8) and within the Sand Canyon – Santa Clara River sub-watershed (HUC12). As shown in Figure 5, there are three ephemeral drainages in the survey area, two of which cross through the northern portion of the project site and one of which occurs in the 200-foot buffer surrounding the project site in the northeast. These drainages are named Ephemeral Drainages #1, #2, and #3 and Table 2 below summarizes the size of these drainages in the survey area.

Table 2. Summary of Jurisdictional Features in the Survey Area

Feature	Linear Feet	Wetlands (acres)	Non-Wetland Waters of the State RWQCB/CDFW (acres)	Permanent Impacts (square feet/linear feet)	Temporary Impacts (square feet/linear feet)
Ephemeral Drainage #1	1,315	0	0.33	15/10	206/20
Ephemeral Drainage #2	1,015	0	0.23	0	105/10
Ephemeral Drainage #3	350	0	0.13	1,175/67	0
Total	2,680	0	0.69	1190/77	311/30

These drainages flow into underground culverts at the northeastern portion of the survey area and outlet into a concrete-lined drainage channel just north of Avenue of the Oak and just east of Green Terrace Drive. The channel flows east along Avenue of the Oaks and then bends northeast through Friendly Valley Golf Course, and finally flows through a culvert under Via Princessa and into the Santa Clara River. This path is shown as a blue line by the National Wetland Inventory data shown in Figure 6. The Santa Clara River outlets to the Pacific Ocean approximately 45-miles to the southwest of the survey area. All three ephemeral drainages are considered non-wetland waters of the state under the jurisdiction of the Regional Water Quality Control Board (RWQCB) and the CDFW.

2.9 Habitat Linkages and Wildlife Migration Corridors

According to the South Coast Missing Linkages project, the survey area is not within an important habitat linkage or wildlife migration corridor. The survey area is approximately 1.5-miles north of the Santa Susana Mountains, which is an important linkage and migration corridor, but Antelope Valley Highway (14), Sierra Highway, and Golden Valley Road south of the survey area sever the connection between the two habitat areas. In addition, the survey area is surrounded by developments such as the Golden Valley High School to the west, residential neighborhoods to the north and east, and Golden Valley Road to the south which limit wildlife movement and isolate the survey area from open space in the Santa Susana Mountains to the south. For these reasons, the survey area is not considered an important habitat linkage or migration corridor for wildlife.

3. Impacts Analysis and Recommendations

For the purposes of this report, impacts to protected biological resources are analyzed within the context of the regulatory setting. Below is an overview of the federal, state, and local regulations pertaining to protected biological resources on the survey area, and an analysis of impacts to those resources that may occur as a result of the proposed development follows.

3.1 Regulatory Setting

Federal Regulations

Endangered Species Act

The Federal Endangered Species Act (FESA) of 1973 defines an endangered species as "any species which is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any species which is likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range." Under provisions of Section 9(a)(1)(B) of the FESA, unless properly permitted, it is unlawful to "take" any listed species. "Take" is defined in Section 3(18) of FESA: "...harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Further, the USFWS, through regulation, has interpreted the terms "harm" and "harass" to include certain types of habitat modification as forms of "take." These interpretations, however, are generally considered and applied on a case-by-case basis and often vary from species to species. In a case where a property owner seeks permission from a federal agency for an action which could affect a federally listed plant or animal species, the property owner and agency are required to consult with USFWS pursuant to Section 7 of the FESA if there is a federal nexus, or pursuant to Section 10 of the FESA. Section 9(a)(2)(b) of the FESA addresses the protections afforded to listed plants.

Clean Water Act Sections 404 and 401

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged and fill material into Waters of the United States, including wetlands. Activities in Waters of the US or wetlands regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into Waters of the US or wetlands.

Section 401 of the CWA requires that any person applying for a federal permit or license which may result in a discharge of pollutants into waters of the United States (such as a Clean Water Act Permit

under Section 404), must obtain a state water quality certification stating that the activity complies with all applicable water quality standards, limitations, and restrictions. No license or permit may be issued by a federal agency until certification required by section 401 has been granted. Further, no license or permit may be issued if certification has been denied.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) protects individuals as well as any part, nest, or eggs of any bird listed as migratory. In practice, federal permits issued for activities that potentially impact migratory birds typically have conditions that require pre-disturbance surveys for nesting birds. In the event nesting is observed, a buffer area with a specified radius must be established, within which no disturbance or intrusion is allowed until the young have fledged and left the nest, or it has been determined that the nest has failed. If not otherwise specified in the permit, the size of the buffer area varies with species and local circumstances (e.g., presence of busy roads, intervening topography, etc.), and is based on the professional judgment of a monitoring biologist. A list of migratory bird species protected under the MBTA is published by USFWS.

California Regulations

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA applies to certain activities of state and local public agencies. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project." A project is an activity undertaken by a public agency or a private activity which must receive some discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government agency which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment.

An Initial Study (IS) is prepared when a proposed action is determined to be a "project" under CEQA. The IS is a checklist that asks specific questions about the project's level of environmental impacts in many categories, including biological resources. The checklist includes a series of questions to determine the projects level of potential impacts in each of the categories. The CEQA Checklist includes the following questions regarding biological resources:

- *Would the project:*
    - *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 Game or U.S. Fish and Wildlife Service?*

- *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 Game or US Fish and Wildlife Service?*
- *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*
- *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?*
- *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance*
- *Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?*

Potential level of impact choices includes: No Impacts, Less Than Significant Impact, Less Than Significant with Mitigation Incorporated, and Potentially Significant Impact. For projects that have no impact or less than significant impact a Negative Declaration is prepared, for those with Less Than Significant with Mitigation Incorporated prepare a Mitigated Negative Declaration, and for those with a Potentially Significant Impact prepare an Environmental Impact Report (EIR).

State of California Fish and Game Code Section 1600

Fish and Game Code Section 1602 outlines the Lake and Streambed Alteration Agreement (LSAA) permitting process, and states:

- An entity shall not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake*, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake

Fish and Game Code Section 1602 requires any entity (defined as any person, State or local governmental agency, or public utility) to notify the CDFW before beginning any activity that will do one or more of the following:

- substantially divert or obstruct the natural flow of and river, stream, or lake, or
- substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake*, or
- deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

A permit, known as a Lake or Streambed Alteration Agreement, from CDFW is required to conduct any of the activities described above.

State of California Fish and Game Code Section 3500

Section 3503.5 of the California Fish and Game Code states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Activities that result in the abandonment of an active bird of prey nest may also be considered in violation of this code. In addition, California Fish and Game Code, Section 3511 prohibits the taking of any bird listed as fully protected, and California Fish and Game Code, Section 3515 states that is it unlawful to take any non-game migratory bird protected under the MBTA.

California Migratory Bird Protection Act

The California Migratory Bird Protect Act (MBPA) was enacted in September 2019 to reinforce the MBTA at the state level. The Act states:

- "It is unlawful to take or possess any migratory nongame bird as designated in the federal Migratory Bird Treaty Act (16 U.S.C. Sec. 703 et seq.) before January 1, 2017, any additional migratory nongame bird that may be designated in that federal act after that date, or any part of a migratory nongame bird described in this section, except as provided by rules and regulations adopted by the United States Secretary of the Interior under that federal act before January 1, 2017, or subsequent rules or regulations adopted pursuant to that federal act, unless those rules or regulations are inconsistent with this code." This section is inactive on January 20, 2025 and the following language below will be adopted.

- "It is unlawful to take or possess any migratory nongame bird as designated in the federal Migratory Bird Treaty Act (16 U.S.C. Sec. 703 et seq.), or any part of a migratory nongame bird described in this section, except as provided by rules and regulations adopted by the United States Secretary of the Interior under that federal act." This section is operative starting on January 20, 2025.

Local Regulations

City of Santa Clarita General Plan

The City of Santa Clarita General Plan Conservation and Open Space Element requires conservation, development, and utilization of natural resources including water and its hydraulic force, forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals, and other natural resources; and includes provisions for preservation of open space. The plan includes measures to minimize impacts to new development on biological resources that includes siting the project away from wetlands,

streams, and other sensitive resources as well as limiting night lighting, and avoiding developing wildlife movement corridors and habitat linkages, as well as other measures to preserve the value of biological resources.

City of Santa Clarita Oak Tree Preservation Ordinance

According to the City of Santa Clarita Oak Tree Preservation Ordinance no person "shall cut, prune, remove, relocate, endanger, damage or encroach into the protected zone of any oak tree" that is 6-inches in circumference when measured at a point 4.5-feet above the tree's natural grade "except in accordance with the conditions of a valid oak tree permit issued by the City". An oak tree report conforming to the City of Santa Clarita Oak Tree Preservation and Protection Guidelines is required for a permit application. Heritage oaks are further protected by the ordinance, which is defined as an oak with a circumference of 108-inches for one stem or 72-inches for each stem of a multi-stem tree.

3.2 Project Impacts and Recommended Mitigation

Plant Community Impacts

The impacts to plant communities are summarized in **Table 3**. The proposed development would impact 12.7-acres of California sagebrush-(purple sage) scrub, 1.10-acres of chamise chaparral, 0.38-acre of installed sage scrub, 8.49-acres of ruderal areas, and 1.88-acres of developed areas. Special-status plants and animals are known to occur or have the potential to occur on the native chaparral and scrub habitats, and the trees on the survey area.

Table 3. Summary of Impacts to Plant Communities

Plant Community	Structures & Buildings (acres)	Roads (acres)	Slope Control (acres)	Hiking Trail (acres)	Total Impacts (acres)
California sagebrush – (purple sage) scrub	6.31	1.31	5.08	0	12.70
Chamise Chaparral	0.51	0	0.53	0.06	1.10
Installed Sage Scrub	0	0.04	0.34	0	0.38
Ruderal	3.88	0.71	3.81	0.09	8.49
Developed	0.98	0.15	0.75	0	1.88
Total	11.68	2.21	10.51	0.15	24.55

According to the City of Santa Clarita General Plan developments impact biological resources by reducing habitat and foraging grounds, increasing nighttime lighting and noise, causing air and water pollution, changing ambient air and water temperatures, introducing invasive species and household pets into native habitats, and generating off-road vehicle use, all of which would result from constructing the proposed project. The following Recommended Mitigation Measure #1

includes measures recommended in the General Plan (CO-35 *Development Impacts on Biological Resources* section) and recommended by the US Green Building Council as part of its LEED program that will minimize impacts of the project on biological resources. These design measures are meant to generally lower the biological impacts of the project and are a requirement of the General Plan, and are not to mitigate significant impacts to a specific resource per CEQA.

Recommended Mitigation Measure #1: Project Design Measures to Reduce Impacts to Biological Resources

- Provide a high ratio of open space to development footprint to promote biodiversity. LEED recommends vegetated open space equal to 20 percent of the project's site area, which may include vegetated roof areas ("green roofs"). Pedestrian-oriented hardscape areas may also be included, provided they use permeable paving or include vegetated open space. Wetlands, vegetated swales, and ponds may also be included to meet open space requirements. Open space provides habitat for vegetation, which in turn provides habitat for local wildlife. Even small open spaces in urban areas can provide refuges for wildlife populations, which have become increasingly marginalized. Plants that specifically support local species such as insects and other pollinators can help sustain populations up the food chain.

- Use vegetated open space to reduce the urban heat island effect, increase stormwater infiltration, and provide the human population on the site with a connection to the outdoors.

- Provide connections between vegetated open space areas within a site and between adjacent sites; avoid isolated landscaped areas surrounded by paving to the extent possible.

- Minimize nighttime lighting to the extent possible, while maintaining adequate security lighting. Outdoor lighting is necessary for illuminating connections between buildings and support facilities such as sidewalks, parking lots, and roadways. However, light trespass can affect the nocturnal ecosystem and light pollution limits night sky access. Establishing time limits and maximum illumination levels for nighttime hours when businesses are closed is recommended to cut light pollution.

- When possible, prohibit new development within 100 feet of any wetlands as defined by federal, state or local regulations, or within 50 feet of a water body, including lakes, rivers and streams; or within any areas identified as habitat for threatened or endangered species, including wildlife corridors.

- For new development proposed on previously undeveloped sites ("greenfields"), perform a site survey to identify biological resources, and plan for resource protection in the site design. On sites where habitat areas are to be protected, establish disturbance boundaries

during construction; delineate stockpiles, lay- down, recycling and disposal areas. Use paved areas for staging, and erect construction fencing around the drip line of existing trees to protect them from soil compaction by construction vehicles.

- Minimize site disturbance to the extent feasible and restore previously degraded areas to their natural state. Preserve and enhance natural site elements, including water courses, trees and native vegetation, where possible.

- Choose appropriate native or adapted plant materials, and prohibit invasive or noxious weed species. Native and adapted plants require minimal or no irrigation following establishment, do not require active maintenance such as mowing or chemical inputs such as fertilizers, pesticides or herbicides, and provide habitat value and promote biodiversity through avoidance of monoculture plantings. Replace turf-grass with native or adapted plantings to promote biodiversity and habitat.

- Reduce the amount of site area devoted to paving when not functional or necessary, and replace paving with landscaped areas.

- Use landscaping to shade buildings and impervious areas, decrease cooling loads and energy expenditures, and reduce the heat-island effect. The term heat island refers to urban air and surface temperatures higher than nearby rural areas. Many cities have air temperatures up to 10 degrees (Fahrenheit) warmer than the surrounding natural landscape. Heat islands form as cities replace natural landscape with pavement, buildings, and other infrastructure. The heat island effect can be lowered by reducing the amount of surface parking lots and by replacing heat-absorbing surfaces with plants, groundcover, small trees, and green roofs. Some cities have developed parking areas below green space to reduce the overall heat island effect and provide for greater pedestrian connectivity.

- Minimize erosion to protect habitats and reduce stress on natural water systems by preserving vegetation and limiting development on any slopes greater than 15 percent.

Nesting Birds

The proposed development would require removal of trees, shrubs, and herbaceous plants that provide potential nesting habitat for birds protected by the MBTA, MBPA, and the Fish and Game Code. If present at the time of vegetation removal, active nests, eggs, or young could be destroyed or otherwise disturbed to a point at which the young do not survive, which would be a violation of the MBTA, MBPA, and the Fish and Game Code. In addition, indirect impacts from noise or vibration has the potential to disturb an active bird nest to the point of failure if the nest is within immediate proximity to project activities, and this would also be a violation of the MBTA and Fish and Game

Code. To avoid impacts to active bird nests, eggs, or young, preconstruction nesting bird surveys and monitoring is required as described in Regulatory Compliance Measure #2 below.

Regulatory Compliance Measure #2: Preconstruction Nesting Bird Survey

- If possible, ground disturbing activities and vegetation removal should be timed to occur between September 1 – January 31, which is outside the bird nesting season.

- If ground disturbing activities or vegetation removal (including tree trimming) are scheduled between February 1 – August 31, which is the bird nesting season, two preconstruction surveys for nesting birds should be conducted. One within 7 days prior to construction activity and the second within 72 hours prior to construction activities. The surveys should be conducted by a qualified biologist with prior experience conducting nesting bird surveys for construction projects. The survey area should include the affected area and suitable habitat within a 300-foot buffer, or a buffer size determined by the qualified biologist based on level of proposed disturbance and access. If no active nests are found, no additional measures are required.

- If active nests are found the biologist will map the location and document the species and nesting stage. A no-work buffer will be established around the active nest as determined by the qualified biologist and based on the species sensitivity to disturbance and the type and duration of the disturbance. No construction activities shall occur within the no-work buffer until the biologist has determined the nest is no longer active.

Special-Status Plants

Based on the findings of a focused rare plant survey no special-status plants occur on the project site and none would be impacted by the project.

Special-Status Animals

Cooper's Hawk, Southern California Rufous-Crowned Sparrow, & Bell's Sage Sparrow

Cooper's Hawk, southern California rufous-crowned sparrow, and Bell's sage sparrow are all California watchlist bird species, and Bell's sage sparrow is also a USFWS bird of conservation concern. Cooper's hawk has been observed using the oak trees in the northern areas on the project site during surveys conducted there for this report, and the sparrows both have a high potential to occur on the scrub habitats on the survey area. These habitats have a Global and State Rarity Ranking of 5, indicating that they area widespread, abundant, and secure. Therefore, similar habitat is available and abundant in other surrounding areas and in the region, and no significant impacts would occur to the these species from loss of habitat.

However, these birds are considered vulnerable during nesting season. If present at the time of vegetation removal, active nests, eggs, or young could be destroyed or otherwise disturbed to a point at which the young do not survive, which would be a violation of the MBTA, MBPA, and the Fish and Game Code. In addition, indirect impacts from noise or vibration has the potential to disturb an active bird nest to the point of failure if the nest is within immediate proximity to project activities, and this would also be a violation of the MBTA and Fish and Game Code. To avoid impacts to active nests, eggs, or young, preconstruction nesting bird surveys and monitoring described in Regulatory Compliance Measure #2 above is sufficient to avoid impacts to Cooper's hawk, southern California rufous-crowned sparrow, and Bell's sage sparrow.

Coastal California Gnatcatcher

A focused survey for coastal California gnatcatcher was conducted for the project and the species was determined to be absent from the project site and impact areas. Therefore, the project would have no impact to coastal California gnatcatcher.

Crotch Bumble Bee

Crotch bumble bee is a candidate for listing as endangered in California, and the species' food plants in the genera *Eriogonum*, such as California buckwheat, occur in the native habitats on the survey area, and therefore the species has a high potential to occur. If present during construction of the project this species would fly away to areas away from construction and no direct impacts would occur. The habitats that this species could use on the project site have a Global and State Rarity Ranking of 5, indicating that they area widespread, abundant, and secure. Therefore, similar habitat is available and abundant in other surrounding areas and in the region, and loss of this habitat would not be a significant impact to crotch bumble bee as a result. There is a potential for Crotch's bumblebee nests in the ground near foraging habitat. These nests are occupied and bumblebee colonies are active from April to August. If construction is occurring in these months impacts to Crotch' s bumblebee nests could occur. Protocol-level surveys and measure to avoid or mitigate potential impacts to Crotch's bumblebee are required as described in Mitigation Measure #3, which would reduce potential impacts to a less than significant level.

<u>Mitigation Measure #3: Crotch's Bumblebee Surveys and Avoidance</u>

- A qualified biologist shall conduct a habitat assessment to determine if the Project site or its immediate vicinity contains habitat suitable to support CBB. Potential nesting sites, which include all small mammal burrows, perennial bunch grasses, thatched annual grasses, brush piles, old bird nests, dead trees, and hollow logs would need to be documented as part of the assessment. If potentially suitable habitat is identified, a qualified biologist conduct focused surveys for CBB, and their requisite habitat features following the methodology

outlined in the Survey Considerations for California Endangered Species Act Candidate Bumble Bee Species (CDFW,2023).

- If CBB is detected, then all small mammal burrows and thatched/bunch grasses will be avoided by a minimum of 50 feet to avoid take and potentially significant impacts. If ground-disturbing activities will occur during the overwintering period (October through February), consultation with CDFW is warranted to discuss how to implement Project activities and avoid take. Any detection of CBB prior to or during Project implementation warrants consultation with CDFW to discuss how to avoid take.
- If CBB is detected, either during surveys or during Project construction, and take cannot be avoided, take authorization through the acquisition of an ITP, pursuant to Fish and Game Code section 2081 subdivision (b) is necessary to comply with CESA.

Western Mastiff Bat

Western mastiff bat is a California species of special concern and is a BLM Sensitive species. Preferred roosting habitat includes rock crevices, buildings, and trees, and the species need surrounding open habitats for foraging. This species is known to occur in a variety of habitats in California, and the house and tall trees surrounding the house provide potential roosting habitat for this species. If maternity roosts are disturbed during construction of the project that would be a significant impact according to CEQA. Preconstruction surveys for roosting bats and avoidance buffers are proposed in Mitigation Measure #4 to avoid or reduce impacts to western mastiff bat to a less than significant level.

Mitigation Measure #4: Roosting Bat Surveys and Avoidance Measures

- Construction activities shall occur outside the bat maternity season which occurs between April 1 through August 31, as feasible. Should construction timing not allow for it, a special-status bat habitat assessment survey shall be conducted by a qualified biologist no more than 5 days prior to any construction activities during the bat maternity season. The survey will document any evidence of special-status bat species that may occur in proposed work areas through direct observation (e.g., roosting bats) and/or sign (e.g., bat guano).

- If no observance and/or sign of special-status bats are detected during these surveys, then construction-related activities may proceed. If observance or sign of special-status bat species are detected during the survey, and construction activities occur during the bat maternity season (April 1 through August 31), special-status bat species emergence survey(s) will be conducted. Emergence surveys will be conducted in areas of suitable bat habitat (e.g., near buildings or trees) during the bat maternity season to document any special-status bat species emerging from features identified during the habitat assessment survey. Generally,

the emergence survey(s) will be conducted approximately one hour prior to sunset and last a minimum of two hours after sunset; however, the timing will be determined by the qualified biologist.

- Passive acoustic monitoring equipment will be utilized during the emergence surveys to identify bats to the species level. In the event multiple features were identified in the habitat assessment in which bats may occur, at the discretion of the qualified biologist, either multiple emergency surveys may be necessary or additional acoustic equipment may need to be set up in order to capture the acoustics of bats as they emerge at dusk.

- Roosting sites documented within or adjacent to a project site during the maternity season shall be avoided. Specifically, the qualified biologist will determine an appropriate buffer around the roost site where construction shall be avoided. The buffer typically ranges in size, between 100 to 300 feet around the roost site, depending on potential resulting project impacts and surrounding terrain. For example, if a project will result in high noise decibels and the roost site is exposed without surrounding trees or hills, the buffer may be increased to reduce disturbances to the roosting bats during breeding activities. Buffer distances may also be at the discretion of the USFWS and/or CDFW if special-status bat species are present in the maternity roost.

- Should special-status bat species be documented within a project site, and the roost site cannot be avoided by the project, a bat mitigation and/or management plan shall be developed for roost relocation. Mitigation and management plans will require consultation with and approval from the USFWS and/or CDFW prior to the commencement of construction.

Vasquez Shoulderband Snail

Vasquez shoulderband snail is tracked by the CDFW in the CNDDB at that is why it is in this project's analysis, but little is known about the life history of this species and it does not have a federal, state, or other protected status. Therefore, Vasquez shoulderband snail is not yet considered rare, threatened, or endangered, and impacts to this species would not be considered significant according to CEQA.

Coastal Whiptail, Coast Horned Lizard, and San Diego Desert Woodrat

Coastal whiptail, coast horned lizard, and San Diego desert woodrat are California species of special concern. Coastal whiptail was observed in the survey area during surveys conducted by LDC biologists in 2013, and coast horned lizard and San Diego desert woodrat have a high potential to occur on the native habitats there. If these species are present during construction, they could be

crushed or injured. To reduce the impacts to these lizards to a less than significant level, preconstruction surveys for terrestrial wildlife is proposed in Mitigation Measure #5 below.

Mitigation Measure #5: Preconstruction Surveys and Salvage of Special-Status Lizards and Mammals

- Surveys for coastal whiptail, coast horned lizard, and San Diego desert woodrat should be conducted within 48-hours prior to initiation of construction activities that would remove native vegetation. During the survey, individual lizards and woodrats will be captured (if possible) and removed from the impact area, and will be released into a predetermined area outside of construction and in the vicinity. The salvage program will continue while a biologist is monitoring the initial ground disturbance activities and will conclude when all of the habitat areas in the grading limits have been graded.
- A salvage plan that includes details of the methods used during the preconstruction salvage shall be prepared and submitted to CDFW for review prior to implementation of the project.

Jurisdictional Resources

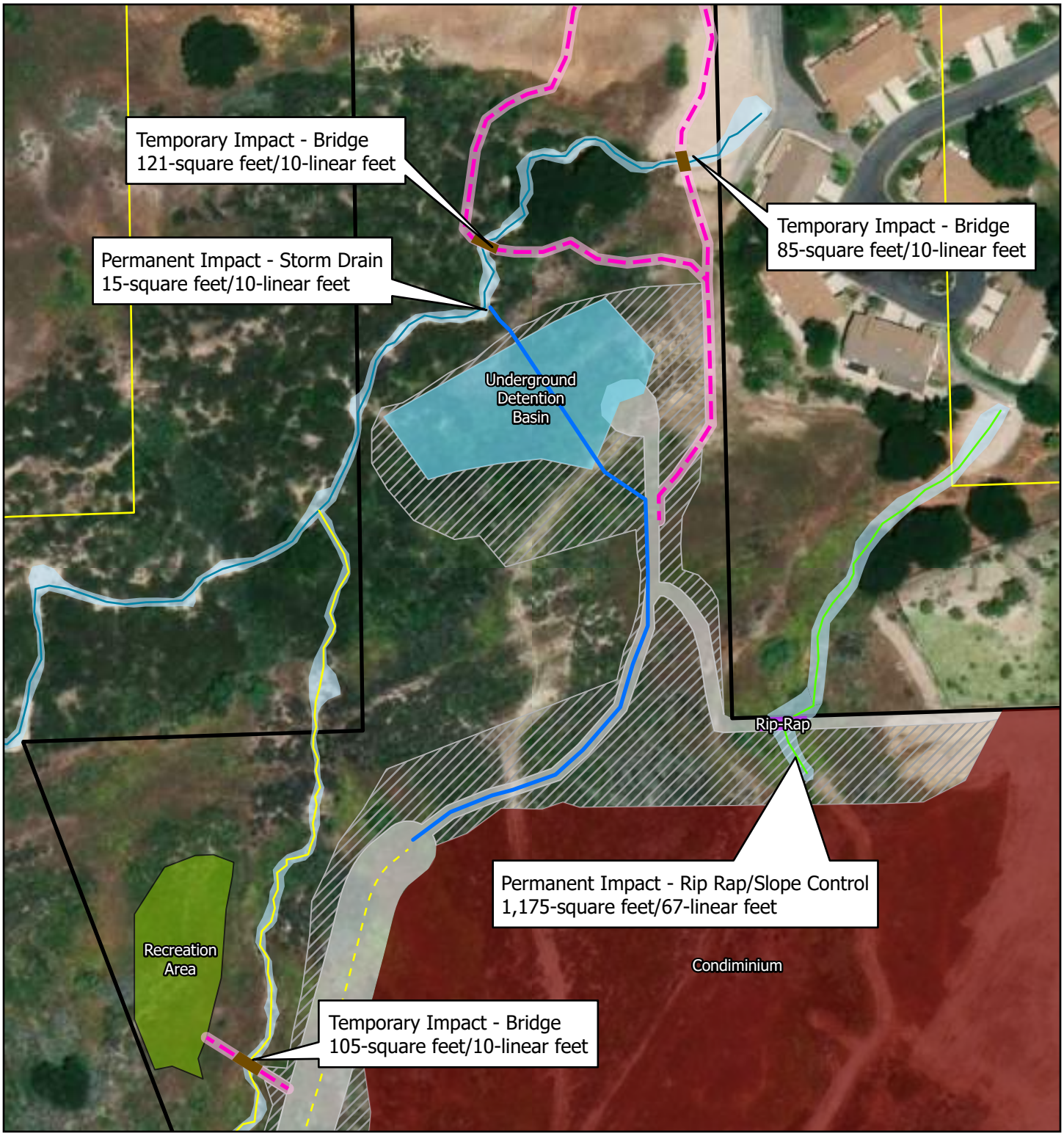
Permanent Impacts: As shown in Figure 6 and summarized in Table 2 above, the proposed development would result in a total permanent impact to 1,190-square feet (77-linear feet) of CDFW and RWQCB features from construction as follows:

- 15-square feet (10-linear feet) of Drainage #1 where the proposed storm drain outlet would be placed within the drainage. This drain may also outlet overflow water into the drainage.

- 1,175-square feet (67-linear feet) of Drainage #3 where the proposed fire access road, rip rap, and slope control associated with the new condominiums would be permanently developed at the south end of the drainage.

Temporary Impacts: As shown in Figure 8 and summarized in Table 2 above, the proposed development would result in a total of 311-square feet (30-linear feet) of temporary impacts to CDFW and RWQCB features from construction as follows:

- 105-square feet (10-linear feet) of pedestrian bridge will be constructed over the top of Drainage #2 between the proposed road and recreation area. The bridge would not fill the stream, and the stream would remain entirely intact beneath the bridge with no obstruction of the flow during construction or operation of the project.



Source: ESRI Aerial Imagery 2025

Santa Clarita VTTM 68203 Project

Figure 8. Impacts to Jurisdictional Features

0 75 150 Feet

N

- Project Boundary
- Survey Area - 200-foot Buffer

Proposed Development

- Riding/Hiking Trail
- Drainage Pipe
- Road Centerline
- Hikinig Trail
- Condiminium
- Underground Detention Basin
- Hotel
- Senior Assisted Living
- Recreation Area
- Rip-Rap
- Bridge
- Road
- Slope Control

Jurisdictional Features

- Ephemeral Drainage #1
- Ephemeral Drainage #2
- Ephemeral Drainage #3
- Streambed / OHWM

SOUTH ENVIRONMENTAL

- 121-square feet (10-linear feet) of pedestrian/horse bridge will be constructed over the top of Drainage #1 immediately north of the proposed underground detention basin.. The bridge would not fill the stream, and the stream would remain entirely intact beneath the bridge with no obstruction of the flow during construction or operation of the project.
- 85-square feet (10-linear feet) of pedestrian/horse bridge will be constructed over the top of Drainage #1 northeast of the proposed underground detention basin. The bridge would not fill the stream, and the stream would remain entirely intact beneath the bridge with no obstruction of the flow during construction or operation of the project.

The impacts from construction of the bridges would be temporary and only occur during construction. Following construction, the drainages would be unaffected by the new development and will function exactly as they do now. The bed and bank would not be altered as the footings for the bridge would be outside of the bank in upland areas that would not alter drainages in any way The discharged water from the underground detention basin will be treated prior to discharge which will reduce the potential for contaminants in the water, and the amount of discharged water would be similar to pre-construction runoff that would naturally runoff into the drainages. Nonetheless, these temporary and permanent impacts would be considered significant according to Porter Cologne Act and Section 1600 of the Fish and Game Code and permits and mitigations will be required to construct the project to reduce the impacts to a less than significant level.

<u>Regulatory Compliance Measure #6. RWQCB and CDFW Permitting Impacts to Jurisdictional Features</u>

- Report of Waste Discharge under California Water Code Section 13260 from the RWQCB, and a Streambed Alteration Agreement from the CDFW should be obtained prior to start of project activities.

- Permit conditions that may be required to compensate for impacts to jurisdictional features may include one or more of the following:

    - Restoration of temporarily impacted drainages.

    - On-site creation of jurisdictional areas of equal size and quality to what is impacted.

    - Enhancement of habitat in remaining jurisdictional areas at a ratio of 2:1 or greater.

    - Creation of jurisdictional habitat offsite where none currently exists.

    - Preservation of offsite jurisdictional habitat of similar size and quality through the direct purchase of credits from an approved conservation bank.

- A Storm Water Pollution Prevention Plan (SWPPP) will be prepared for the project and approved by the County prior to initiating project activities. Monitoring of the SWPPP measures by a qualified individual should be done monthly during the summer and weekly during the winter, and after each rain event. A monitoring report will be prepared and submitted to the County bi-annually or when measures are not being adequately implemented, as determined during monitoring.

Recommended Best Management Practices (BMPs)

- To prevent downstream impacts from residential runoff, onsite rainfall (the first 0.75-inches) must be captured and treated prior to release into the Santa Clara River watershed in accordance with Santa Clarita City Code Chapter 17.95: Standard Urban Stormwater Mitigation Plan Implementation. To achieve this, the following BMPs should be implemented:

    - Direct rooftop runoff to the yards or vegetated areas.
    - Lot runoff shall be infiltrated from the graded pad areas through on-site permeable soils in natural canyons and drainages.
    - Provide one-foot wide by one-foot deep gravel strip between back of driveway and sidewalk.
    - Use permeable materials for private sidewalks, private driveways, and private parking lots.
    - Convey runoff from the tops of slopes and stabilize disturbed slopes with landscaping per County standards.
    - Revegetate slopes with native drought tolerant plants to minimize erosion.
    - Infiltrate the runoff from off-site tracts through on-site debris basin bottoms.
    - Use extended detention facilities, which are dry between storms. During a storm, the basin fills and a bottom outlet releases the storm water slowly to provide time for sediments to settle.
    - Use biofilters such as a swale or a vegetated strip, where feasible. A swale is a vegetated channel that treats concentrated flow. A street strip (e.g. a parkway) treats flow and is placed parallel to the contributing surface.
    - Use infiltration systems on-site to capture and filter the first 0.75 inch of rainfall and all regular "nuisance" runoff. Infiltration refers to a family of systems in which the majority of the runoff from small storms is infiltrated into the ground rather than discharged to a surface water body. Infiltration methods include ponds, vaults, trenches, dry wells, porous pavement, concrete grids, and bioswales.
    - Street runoff shall be collected into catch basins with filtration units that remove floating debris, solids, and soluble/insoluble pollutants; such as deflection separator

units, oil/water separators, and/or media filters prior to outlet onto natural alluvial areas for infiltration.
- All catch basins and inlets shall be stenciled with "Warning! Drains to Ocean" notes and symbols per NPDES BMP standards, as approved by the Department of Public Works.
- Utilize riprap at the outlets of storm drains, culverts, and conduits to minimize erosion.

Protected Oak Trees

The Tree Protected Zones (TPZs) for all the oaks in the survey area are outside of the proposed construction and no impacts are expected to occur from construction. All the oaks would remain in place following the project. TPZs of two large oaks in the north area of the project site (shown in Figure 5 above) are 15-feet north of the proposed hiking and riding trail and 75-feet north of the underground detention basin and these trees could be endangered by project equipment if it goes outside of the proposed construction area. The proposed hiking and riding trail would be 8-feet wide and would remain 15-feet from onsite oaks TPZs, and therefore, no direct impacts are anticipated. To avoid impacts to on-site protected oaks the tree protective fencing in Mitigation Measure #7 shall be implemented, and to avoid impacts to off-site oak trees Mitigation Measure #7 that requires fencing at the limits of grading would result in avoidance of impacts to protected oak trees.

Mitigation Measure #7: Tree Protective Fencing

- Tree protective fencing that is at least 6-feet tall chain-link fencing should be placed at the TPZ of on-site oak trees near the proposed hiking trail. The fencing should be placed at least 5-feet from the dripline of the oaks and should be approved by a certified arborist prior to start of project activities. The fencing should remain in place throughout project construction, and should be monitored by a certified arborist on at least a monthly basis to ensure its continued effectiveness.

- The limits of grading shall be fenced so that construction equipment does not impact areas outside the approved grading limits.

Wildlife Movement Corridors and Habitat Linkages

As described in Section 2.9, the survey area is not considered an important habitat linkage or migration corridor for wildlife. Therefore, no impacts to wildlife movement corridors or habitat linkages will occur from the project construction or operation.

Cumulative Impacts

The project site is sited in between existing developments in an urbanized area, and the onsite native habitats have a Global and State Rarity Ranking of 5, indicating that they are widespread, abundant, and secure. Therefore, similar habitat is available and abundant in other surrounding areas and in the region. In addition, implementation of Mitigation and Regulatory Compliance Measures described in this section would result in the avoidance, minimization, or mitigation of impacts to nesting birds, special-status species, jurisdictional features, and protected oak trees to a less than significant level when considered alone or cumulatively.

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Appendix A

Photograph Log and Site Plan

Image 1: Depicts the California sagebrush-(purple sage) scrub habitat and slopes in the center of the survey area. Taken from the N part of the driveway facing N.

Image 2: Depicts the installed sage scrub in the SE portion of the survey area. Photo taken from the E point of the driveway facing SE.

Image 3: Depicts the house, driveway, and landscaped trees. Photo taken from the W end of the driveway near the house facing E.

Image 4: Depicts the chamise chaparral (dark plant community in back) surrounding the ephemeral drainage in the northern portion of the site. Taken from a dirt road near the N end of the survey area facing NW.

Image 5: Depicts the ruderal areas and sage scrub habitat surrounding Ephemeral Drainage #2 in the western edge of the survey area. Photo taken from the center of the survey are a facing SW.

Image 6: Depicts Ephemeral Drainage #1 where it flows away from the coast live oaks (on left) in the north end of the survey area and enters an underground culvert. Photo taken from the northern end of the survey area facing N.

TENTATIVE TRACT MAP No. 68

LOCATED IN THE CITY OF SANTA CLARITA
STATE OF CALIFORNIA

LEGEND
-APPROXIMATE OVER-EXCAVATION
-APPROXIMATE REMEDIAL REMOVAL DEPTH
Afu -ARTIFICIAL FILL-UNDOCUMENTED
Cf -CERTIFIED FILL
Qal -QUATERNARY ALLUVIUM (REMOVE ALL)
Qls? -LANDSLIDE DEBRIS, QUERIED WHERE UNCERTAIN
Qols -OLDER LANDSLIDE DEBRIS, CIRCLED WHERE BURIED
Tsr -SAUGUS FORMATION, SUNSHINE RANCH MEMBER
-APPROXIMATE GEOLOGIC CONTACT
-APPROXIMATE DESIGN KEYWAY LOCATION
-LOCATION OF RESTRICTED USE AREA
TRACT 30787
TRACT No. 061811-03
TR. BOUNDARY
LOT 1 CONDOMINIUM PURPOSES
LOT 2 SENIOR ASSISTANT LOT
LOT 3 CONDOMINIUM PURPOSES
HOTEL LOT "A"
PRIVATE ST.
"B" ST.
100' SCE EASEMENT
ROBERT C. LEE PARKWAY
GOLDEN VALLEY RD
GOLDEN VALLEY ROAD
RAINBOW
DE SABRO
PIAZZA
VIA BERLER
VIA KALDAN
VIA OTT
SIERRA
HIGH
2:1 SLOPE
APN 2836-013-106
APN 2836-013-126
APN 2836-013-157
APN 2836-013-158
APN 2836-013-159
APN 2836-013-918 WILLIAM S. HART UNION HIGH SCHOOL DISTRICT
APN 2836-013-180 DWP
APN 2836-013-129
APN 2836-013-111
APN 2836-013-181
APN 2836-014-055
APN 2836-014-078
APN 2836-013-904 CITY OF SANTA CLARITA
APN 2836-013-905 TRACT 52294
APN 2836-013-906 TRACT 52294
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APN 2836-013-928 TRACT 52294
APN

Appendix B

Special-Status Species Analysis

Special-Status Species

Special-status species are those plants and animals that, because of their recognized rarity or vulnerability to various causes of habitat loss or population decline, are recognized by federal, state, or other agencies as under threat from human-associated developments. Some of these species receive specific protection that is defined by federal or state endangered species legislation. Others have been designated as special-status based on adopted policies and expertise of state resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. Special-status species include:

- Plants or wildlife listed or proposed for listing as threatened or endangered, or are candidates for possible future listing as threatened or endangered, under the federal Endangered Species Act or the California Endangered Species Act;
- Plants or wildlife that meet the definitions of rare or endangered under CEQA Guidelines Section 15380.
- Plants or wildlife covered under an adopted NCCP/HCP;
- Plants considered by the California Native Plant Society (CNPS) to be rare, threatened, or endangered (List 1A, 1B and 2 plants) in California;
- Plants listed by the CNPS as plants in which there is limited information about distribution (List 3);
- Plants listed as rare under the California Native Plant Protection Act (Fish and Game Code 1900 et seq.);
- Wildlife designated by CDFW as species of special concern;
- Wildlife "fully protected" in California (California Fish and Game Code Sections 3511, 4700, and 5050); and
- Wildlife protected by the Migratory Bird Treaty Act (MTBA).

Federally-Protected Status

All references to Federally-protected species in this BRA include the most current published status or candidate category to which each species has been assigned by USFWS. For purposes of this assessment the following acronyms are used for Federal status species, as applicable:

FE Federally-listed as Endangered
FT Federally-listed as Threatened
FPE Federally proposed for listing as Endangered
FPT Federally proposed for listing as Threatened
FPD Federally proposed for delisting
FC Federal candidate species (former C1 species)

State-Protected Status

For the purposes of this BRA, the following acronyms are used for State status species, as applicable:

SE State-listed as Endangered
ST State-listed as Threatened
SR State-listed as Rare
SCE State candidate for listing as Endangered
SCT State candidate for listing as Threatened
SFP State Fully Protected
SSC California Species of Special Concern

California Rare Plant Rank

The CNPS is a private plant conservation organization dedicated to the monitoring and protection of special-status species in California. CNPS has compiled an inventory comprised of the information focusing on geographic distribution and qualitative characterization of Rare, Threatened, or Endangered vascular plant species of California (CNPS 2018). The list serves as the candidate list for listing as Threatened and Endangered by CDFW. CNPS has developed six categories of rarity known as the California Rare Plant Rank (CRPR), of which Ranks 1A, 1B, 2A, and 2B are particularly considered sensitive:

Rank 1A Presumed extinct in California.
Rank 1B Plants Rare, Threatened, or Endangered in California and elsewhere.
Rank 2A Presumed extinct in California, but more common elsewhere.
Rank 2B Plants Rare, Threatened, or Endangered in California, but more common elsewhere.
Rank 3 Plants about which we need more information – a review list.
Rank 4 Plants of limited distribution – a watch list.

The CNPS recently added "threat ranks" which parallel the ranks used by the CNDDB. These ranks are added as a decimal code after the CNPS List (e.g., Rank 1B.1). The threat codes are as follows:

.1 Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat);
.2 Moderately threatened in California (20-80% occurrences threatened);
.3 Not very threatened in California (<20% of occurrences threatened or no current threats known).

Potential to Occur Assessment

Special-status species that **present** or are **likely** (high or medium potential) to occur within the parcel are a based on one or more of the following:

- the direct observation of the species within the parcel during any field surveys;
- a record reported in the CNDDB; and
- the parcel is within known distribution of a species and contains appropriate habitat.

Special-status species that are **unlikely** (low potential) to occur are based on one of the following:

- the parcel has the general habitat types but lacks necessary habitat elements such as suitable microhabitat or soils; or
- the parcel is outside the known elevation range or distribution of the species, and has otherwise suitable habitats;

Special-status species that have no potential to occur on the parcel are labeled as **none** due to the absence of suitable habitat.

Special-Status Plants

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Allium howellii var. clokeyi	Mt. Pinos onion	1B.3	None	None	Apr-Jun	4265	6070	Great Basin scrub, Meadows and seeps (edges), Pinyon and juniper woodland		None. No habitat for this species occurs on the survey area and the survey area is outside the known elevation for this species.
Astragalus brauntonii	Braunton's milk-vetch	1B.1	None	FE	Jan-Aug	10	2100	Chaparral, Coastal scrub, Valley and foothill grassland	recent burns or disturbed areas, usually sandstone with carbonate layers	Low. There are no recently burned areas on the survey area.
Berberis nevinii	Nevin's barberry	1B.1	CE	FE	(Feb)Mar-Jun	225	2705	Chaparral, Cismontane woodland, Coastal scrub, Riparian scrub	sandy or gravelly	Low. This conspicuous species was not observed during site surveys.
Calochortus catalinae	Catalina mariposa lily	4.2	None	None	(Feb)Mar-Jun	45	2295	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland		Medium. This species is has the potential to occur on the chaparral and coastal scrub on the project site.
Calochortus clavatus var. clavatus	club-haired mariposa lily	4.3	None	None	(Mar)May-Jun	245	4265	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland	usually serpentinite, clay, rocky	Medium. Suitable chaparral and scrub habitat for this species occur on the survey area.
Calochortus clavatus var. gracilis	slender mariposa lily	1B.2	None	None	Mar-Jun(Nov)	1045	3280	Chaparral, Coastal scrub, Valley and foothill grassland		High. Suitable chaparral and scrub habitat for this species occur on the survey area and the species was recorded nearby to the CNDDB.
Calochortus palmeri var. palmeri	Palmer's mariposa lily	1B.2	None	None	Apr-Jul	2325	7840	Chaparral, Lower montane coniferous forest, Meadows and seeps	mesic	None. The survey area is outside the known elevation for this species.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Calochortus plummerae	Plummer's mariposa lily	4.2	None	None	May-Jul	325	5575	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland	granitic, rocky	High. Suitable chaparral and scrub habitat for this species occur on the survey area and the species was recorded nearby to the CNDDB.
Calystegia peirsonii	Peirson's morning-glory	4.2	None	None	Apr-Jun	95	4920	Chaparral, Chenopod scrub, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland		Medium. Suitable chaparral habitat for this species occur on the survey area.
Canbya candida	white pygmy-poppy	4.2	None	None	Mar-Jun	1965	4790	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland	gravelly, sandy, granitic	None. No suitable habitat for this species occurs in the survey area.
Centromadia parryi ssp. australis	southern tarplant	1B.1	None	None	May-Nov	0	1575	Marshes and swamps (margins), Valley and foothill grassland (vernally mesic), Vernal pools		None. No suitable habitat for this species occurs in the survey area.
Cercocarpus betuloides var. blancheae	island mountain-mahogany	4.3	None	None	Feb-May	95	1970	Closed-cone coniferous forest, Chaparral		Low. Although chaparral habitats occur on the survey area, this shrub was not observed on the survey area during surveys.
Chorizanthe parryi var. fernandina	San Fernando Valley spineflower	1B.1	CE	FC	Apr-Jul	490	4005	Coastal scrub (sandy), Valley and foothill grassland		None. No suitable habitat for this species occurs in the survey area.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Chorizanthe parryi var. parryi	Parry's spineflower	1B.1	None	None	Apr-Jun	900	4005	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland	sandy or rocky, openings	Low. This species is typically found in the San Gabriel Mountains to the southeast and at higher elevations to the north.
Deinandra minthornii	Santa Susana tarplant	1B.2	CR	None	Jul-Nov	915	2495	Chaparral, Coastal scrub	rocky	Low. This species is not known to occur in this specific region and is more isolated to areas to the west of I-5.
Deinandra paniculata	paniculate tarplant	4.2	None	None	(Mar)Apr-Nov(Dec)	80	3085	Coastal scrub, Valley and foothill grassland, Vernal pools	usually vernally mesic, sometimes sandy	None. No suitable habitat for this species occurs in the survey area.
Delphinium parryi ssp. purpureum	Mt. Pinos larkspur	4.3	None	None	May-Jun	3280	8530	Chaparral, Mojavean desert scrub, Pinyon and juniper woodland		Medium. Chaparral habitat on the survey area is suitable for this species.
Dodecahema leptoceras	slender-horned spineflower	1B.1	CE	FE	Apr-Jun	655	2495	Chaparral, Cismontane woodland, Coastal scrub (alluvial fan)	sandy	Medium. Chaparral habitat at the edges of drainages on the survey area is suitable for this species.
Galium grande	San Gabriel bedstraw	1B.2	None	None	Jan-Jul	1390	4920	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest		Low. This species is typically found in the San Gabriel Mountains to the southeast.
Harpagonella palmeri	Palmer's grapplinghook	4.2	None	None	Mar-May	65	3135	Chaparral, Coastal scrub, Valley and foothill grassland	Clay; open grassy areas within shrubland	High. Suitable chaparral occurs on the survey area and the species was recorded nearby to the cnddb.
Helianthus inexpectatus	Newhall sunflower	1B.1	None	None	Aug-Oct	1000	1000	Marshes and swamps, Riparian woodland	freshwater, seeps	None. No suitable habitat for this species occurs in the survey area.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Heuchera caespitosa	urn-flowered alumroot	4.3	None	None	May-Aug	3785	8695	Cismontane woodland, Lower montane coniferous forest, Riparian forest (montane), Upper montane coniferous forest	rocky	None. No suitable habitat for this species occurs in the survey area and the survey area is outside the known elevation range for this species.
Horkelia cuneata var. puberula	mesa horkelia	1B.1	None	None	Feb-Jul(Sep)	225	2655	Chaparral (maritime), Cismontane woodland, Coastal scrub	sandy or gravelly	Low. This species is not known to occur this far north and is more likely found in the San Gabriel Mountains and Santa Monica Mountains.
Hulsea vestita ssp. gabrielensis	San Gabriel Mountains sunflower	4.3	None	None	May-Jul	4920	8200	Lower montane coniferous forest, Upper montane coniferous forest	rocky	None. No suitable habitat for this species occurs in the survey area and the survey area is outside the known elevation range for this species.
Hulsea vestita ssp. parryi	Parry's sunflower	4.3	None	None	Apr-Aug	4490	9500	Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest	granitic or carbonate, rocky, openings	None. No suitable habitat for this species occurs in the survey area and the survey area is outside the known elevation range for this species.
Juglans californica	Southern California black walnut	4.2	None	None	Mar-Aug	160	2955	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland	alluvial	Low. This species was not observed during a survey of the site and it is very conspicuous species.
Lepechinia fragrans	fragrant pitcher sage	4.2	None	None	Mar-Oct	65	4300	Chaparral		Low. This species is not known to occur this far north (aside from a few occurrences at higher elevatioins far to the north, and is more likely found in the San Gabriel Mountains and Santa Monica Mountains.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Lepechinia rossii	Ross' pitcher sage	1B.2	None	None	May-Sep	1000	2590	Chaparral		Low. This species is only known to occur at higher elevations north of Castaic and not in the vicinity of the survey area.
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	4.3	None	None	Jan-Jul	0	2905	Chaparral, Coastal scrub		Low. This species is typically found in the San Gabriel Mountains to the southeast.
Lilium humboldtii ssp. ocellatum	ocellated Humboldt lily	4.2	None	None	Mar-Jul(Aug)	95	5905	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Riparian woodland	openings	Low. This species is not known to occur this far north (aside from a few occurrences at higher elevatioins far to the north, and is more likely found in the San Gabriel Mountains and Santa Monica Mountains.
Lupinus paynei	Payne's bush lupine	1B.1	None	None	Mar-Apr(May-Jul)	720	1380	Coastal scrub, Riparian scrub, Valley and foothill grassland	Sandy	None. No suitable habitat for this species occurs in the survey area.
Malacothamnus davidsonii	Davidson's bush-mallow	1B.2	None	None	Jun-Jan	605	3740	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland		Medium. Chaparral habitat on the survey area is suitable for this species.
Navarretia fossalis	spreading navarretia	1B.1	None	FT	Apr-Jun	95	2150	Chenopod scrub, Marshes and swamps (assorted shallow freshwater), Playas, Vernal pools		None. No suitable habitat for this species occurs in the survey area.
Navarretia setiloba	Piute Mountains navarretia	1B.1	None	None	Apr-Jul	935	6890	Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland	clay or gravelly loam	None. No suitable habitat for this species occurs in the survey area.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Opuntia basilaris var. brachyclada	short-joint beavertail	1B.2	None	None	Apr-Jun(Aug)	1390	5905	Chaparral, Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland		Medium. Chaparral habitat on the survey area is suitable for this species.
Orcuttia californica	California Orcutt grass	1B.1	CE	FE	Apr-Aug	45	2165	Vernal pools		None. No suitable habitat for this species occurs in the survey area.
Phacelia hubbyi	Hubby's phacelia	4.2	None	None	Apr-Jul	0	3280	Chaparral, Coastal scrub, Valley and foothill grassland	gravelly, rocky, talus	Medium. Chaparral habitat on the survey area is suitable for this species.
Phacelia mohavensis	Mojave phacelia	4.3	None	None	Apr-Aug	4590	8200	Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Pinyon and juniper woodland	sandy or gravelly	None. No suitable habitat for this species occurs in the survey area and the survey area is outside the known elevation range for this species.
Pseudognaphalium leucocephalum	white rabbit-tobacco	2B.2	None	None	(Jul)Aug-Nov(Dec)	0	6890	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland	sandy, gravelly	Low. This species is typically found near the Santa Clara River and Castaic, as well as in some areas of the San Gabriel Mountains, and not in the vicinity of the survey area.
Quercus durata var. gabrielensis	San Gabriel oak	4.2	None	None	Apr-May	1475	3280	Chaparral, Cismontane woodland		None. This species was not observed during a focused oak tree survey conducted on the survey area.
Senecio aphanactis	chaparral ragwort	2B.2	None	None	Jan-Apr(May)	45	2625	Chaparral, Cismontane woodland, Coastal scrub	sometimes alkaline	Low. This species is only known to occur in the region from a few populations on the Santa Clara River, and is not likely to occur on the survey area due to a lak of alkaline habitat.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Streptanthus campestris	southern jewelflower	1B.3	None	None	(Apr)May-Jul	2950	7545	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland	rocky	None. The survey area is outside the known elevation for this species.
Symphyotrichum greatae	Greata's aster	1B.3	None	None	Jun-Oct	980	6595	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Riparian woodland	mesic	Low. This species typically is found in forest or woodland habitats.

Special-Status Animals

SciName	ComName	FedList	CalList	OthrStatus	GenHab	MicroHab	Potential to Occur
Anaxyrus californicus	arroyo toad	Endangered	None	CDFW_SSC-Species of Special Concern | IUCN_EN-Endangered	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash, etc.	Rivers with sandy banks, willows, cottonwoods, and sycamores; loose, gravelly areas of streams in drier parts of range.	None. No suitable river habitat is on the survey area.
Rana draytonii	California red-legged frog	Threatened	None	CDFW_SSC-Species of Special Concern | IUCN_VU-Vulnerable	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation.	Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	None. No suitable water source or deep water habitat is present.
Rana muscosa	southern mountain yellow-legged frog	Endangered	Endangered	CDFW_WL-Watch List | IUCN_EN-Endangered | USFS_S-Sensitive	Federal listing refers to populations in the San Gabriel, San Jacinto and San Bernardino mountains (southern DPS). Northern DPS was determined to warrant listing as endangered, Apr 2014, effective Jun 30, 2014.	Always encountered within a few feet of water. Tadpoles may require 2 - 4 yrs to complete their aquatic development.	None. No suitable water source is present for this species on the survey area.
Spea hammondii	western spadefoot	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_NT-Near Threatened	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands.	Vernal pools are essential for breeding and egg-laying.	None. No suitable vernal pools or other habitat is on the survey area.
Taricha torosa	Coast Range newt	None	None	CDFW_SSC-Species of Special Concern	Coastal drainages from Mendocino County to San Diego County.	Lives in terrestrial habitats & will migrate over 1 km to breed in ponds, reservoirs & slow moving streams.	None. No suitable breeding habitat is on or near the survey area.
Accipiter cooperii	Cooper's hawk	None	None	CDFW_WL-Watch List | IUCN_LC-Least Concern	Woodland, chiefly of open, interrupted or marginal type.	Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	Present. This species was observed on the survey area during a survey.

SciName	ComName	FedList	CalList	OthrStatus	GenHab	MicroHab	Potential to Occur
Agelaius tricolor	tricolored blackbird	None	Threatened	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_EN-Endangered | NABCI_RWL-Red Watch List | USFWS_BCC-Birds of Conservation Concern	Highly colonial species, most numerous in Central Valley & vicinity. Largely endemic to California.	Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	None. No open water habitat is present on the survey area.
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	None	None	CDFW_WL-Watch List	Resident in Southern California coastal sage scrub and sparse mixed chaparral.	Frequents relatively steep, often rocky hillsides with grass and forb patches.	Medium. Suitable chaparral and scrub habitats occur on the survey area for this species.
Ammodramus savannarum	grasshopper sparrow	None	None	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Dense grasslands on rolling hills, lowland plains, in valleys and on hillsides on lower mountain slopes.	Favors native grasslands with a mix of grasses, forbs and scattered shrubs. Loosely colonial when nesting.	None. No native grasslands occur on the survey area.
Artemisiospiza belli belli	Bell's sage sparrow	None	None	CDFW_WL-Watch List | USFWS_BCC-Birds of Conservation Concern	Nests in chaparral dominated by fairly dense stands of chamise. Found in coastal sage scrub in south of range.	Nest located on the ground beneath a shrub or in a shrub 6-18 inches above ground. Territories about 50 yds apart.	High. Suitable dense chamise chaparral occurs on the survey area.
Athene cunicularia	burrowing owl	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation.	Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	None. No suitable open areas or areas with appropriate burrowing mammals is on the survey area.
Buteo swainsoni	Swainson's hawk	None	Threatened	BLM_S-Sensitive | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, & agricultural or ranch lands with groves or lines of trees.	Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	None. No suitable habitat for this species occurs on the survey area.

SciName	ComName	FedList	CalList	OthrStatus	GenHab	MicroHab	Potential to Occur
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Threatened	Endangered	BLM_S-Sensitive | NABCI_RWL-Red Watch List | USFS_S-Sensitive | USFWS_BCC-Birds of Conservation Concern	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems.	Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	None. No suitable habitat for this species occurs on the survey area.
Elanus leucurus	white-tailed kite	None	None	BLM_S-Sensitive | CDFW_FP-Fully Protected | IUCN_LC-Least Concern	Rolling foothills and valley margins with scattered oaks & river bottomlands or marshes next to deciduous woodland.	Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	None. No suitable habitat for this species occurs on the survey area.
Empidonax traillii extimus	southwestern willow flycatcher	Endangered	Endangered	NABCI_RWL-Red Watch List	Riparian woodlands in Southern California.		None. No suitable habitat for this species occurs on the survey area.
Eremophila alpestris actia	California horned lark	None	None	CDFW_WL-Watch List | IUCN_LC-Least Concern	Coastal regions, chiefly from Sonoma County to San Diego County. Also main part of San Joaquin Valley and east to foothills.	Short-grass prairie, "bald" hills, mountain meadows, open coastal plains, fallow grain fields, alkali flats.	None. No suitable habitat for this species occurs on the survey area.
Falco mexicanus	prairie falcon	None	None	CDFW_WL-Watch List | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Inhabits dry, open terrain, either level or hilly.	Breeding sites located on cliffs. Forages far afield, even to marshlands and ocean shores.	None. No suitable breeding habitat occurs for this species.
Lanius ludovicianus	loggerhead shrike	None	None	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub & washes.	Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	None. No suitable habitat for this species occurs on the survey area.
Polioptila californica californica	coastal California gnatcatcher	Threatened	None	CDFW_SSC-Species of Special Concern | NABCI_YWL-Yellow Watch List	Obligate, permanent resident of coastal sage scrub below 2500 ft in Southern California.	Low, coastal sage scrub in arid washes, on mesas and slopes. Not all areas classified as coastal sage scrub are occupied.	High. This species was recorded to the CNDDB within 1000-feet south of the survey area.

SciName	ComName	FedList	CalList	OthrStatus	GenHab	MicroHab	Potential to Occur
Vireo bellii pusillus	least Bell's vireo	Endangered	Endangered	IUCN_NT-Near Threatened | NABCI_YWL-Yellow Watch List	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft.	Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	None. No suitable habitat for this species occurs on the survey area.
Branchinecta lynchi	vernal pool fairy shrimp	Threatened	None	IUCN_VU-Vulnerable	Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools.	Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	None. No suitable habitat for this species occurs on the survey area.
Catostomus santaanae	Santa Ana sucker	Threatened	None	AFS_TH-Threatened | IUCN_VU-Vulnerable	Endemic to Los Angeles Basin south coastal streams.	Habitat generalists, but prefer sand-rubble-boulder bottoms, cool, clear water, and algae.	None. No suitable habitat for this species occurs on the survey area.
Gasterosteus aculeatus williamsoni	unarmored threespine stickleback	Endangered	Endangered	AFS_EN-Endangered | CDFW_FP-Fully Protected	Weedy pools, backwaters, and among emergent vegetation at the stream edge in small Southern California streams.	Cool (<24 C), clear water with abundant vegetation.	None. No suitable habitat for this species occurs on the survey area.
Gila orcuttii	arroyo chub	None	None	AFS_VU-Vulnerable | CDFW_SSC-Species of Special Concern | USFS_S-Sensitive	Native to streams from Malibu Creek to San Luis Rey River basin. Introduced into streams in Santa Clara, Ventura, Santa Ynez, Mojave & San Diego river basins.	Slow water stream sections with mud or sand bottoms. Feeds heavily on aquatic vegetation and associated invertebrates.	None. No suitable habitat for this species occurs on the survey area.
Rhinichthys osculus ssp. 3	Santa Ana speckled dace	None	None	AFS_TH-Threatened | CDFW_SSC-Species of Special Concern | USFS_S-Sensitive	Headwaters of the Santa Ana and San Gabriel rivers. May be extirpated from the Los Angeles River system.	Requires permanent flowing streams with summer water temps of 17-20 C. Usually inhabits shallow cobble and gravel riffles.	None. No suitable habitat for this species occurs on the survey area.

SciName	ComName	FedList	CalList	OthrStatus	GenHab	MicroHab	Potential to Occur
Bombus crotchii	Crotch bumble bee	None	Candidate Endangered		Coastal California east to the Sierra-Cascade crest and south into Mexico.	Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.	Medium. Suitable chaparral and scrub habitats with Eriogonum spp. occur on the survey area for this species.
Danaus plexippus pop. 1	monarch - California overwintering population	None	None	USFS_S-Sensitive	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico.	Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	None. No suitable rooting locations occur on the survey area.
Euphydryas editha quino	quino checkerspot butterfly	Endangered	None		Sunny openings within chaparral & coastal sage shrublands in parts of Riverside & San Diego counties.	Hills and mesas near the coast. Need high densities of food plants Plantago erecta, P. insularis, and Orthocarpus purpurescens.	None. The survey area is outside the known range for this species.
Antrozous pallidus	pallid bat	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFS_S-Sensitive | WBWG_H-High Priority	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting.	Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Low. No rocky areas for roosting occur and the site is subject to significant disturbance from nearby roads and developments.
Corynorhinus townsendii	Townsend's big-eared bat	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFS_S-Sensitive | WBWG_H-High Priority	Throughout California in a wide variety of habitats. Most common in mesic sites.	Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	Low. The site lacks mesic areas for the majority of the year and the survey area is subject to human disturbances from the adjacent roads and developments.
Euderma maculatum	spotted bat	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | WBWG_H-High Priority	Occupies a wide variety of habitats from arid deserts and grasslands through mixed conifer forests.	Feeds over water and along washes. Feeds almost entirely on moths. Needs rock crevices in cliffs or caves for roosting.	Low. The survey area lacks rock crevices and caves this species needs for roosting, and has water only seasonally.

SciName	ComName	FedList	CalList	OthrStatus	GenHab	MicroHab	Potential to Occur
Eumops perotis californicus	western mastiff bat	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | WBWG_H-High Priority	Many open, semi-arid to arid habitats, including conifer & deciduous woodlands, coastal scrub, grasslands, chaparral, etc.	Roosts in crevices in cliff faces, high buildings, trees and tunnels.	Medium. The house and tall trees on the survey area provide suitable roosting sites.
Lasiurus cinereus	hoary bat	None	None	IUCN_LC-Least Concern | WBWG_M-Medium Priority	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding.	Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	Low. The lack of a permanent water source limits this species ability to persist on the survey area.
Lepus californicus bennettii	San Diego black-tailed jackrabbit	None	None	CDFW_SSC-Species of Special Concern	Intermediate canopy stages of shrub habitats & open shrub / herbaceous & tree / herbaceous edges.	Coastal sage scrub habitats in Southern California.	Low. The survey area has mature and dense scrub and chaparral and lacks the open areas this species prefers.
Macrotus californicus	California leaf-nosed bat	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | WBWG_H-High Priority	Desert riparian, desert wash, desert scrub, desert succulent scrub, alkali scrub and palm oasis habitats.	Needs rocky, rugged terrain with mines or caves for roosting.	None. No suitable habitat for this species occurs on the survey area.
Neotamias speciosus speciosus	lodgepole chipmunk	None	None		Summits of isolated Piute, San Bernardino, & San Jacinto mountains. Usually found in open-canopy forests.	Habitat is usually lodgepole pine forests in the San Bernardino Mts & chinquapin slopes in the San Jacinto Mts.	None. No suitable habitat for this species occurs on the survey area.
Neotoma lepida intermedia	San Diego desert woodrat	None	None	CDFW_SSC-Species of Special Concern	Coastal scrub of Southern California from San Diego County to San Luis Obispo County.	Moderate to dense canopies preferred. They are particularly abundant in rock outcrops, rocky cliffs, and slopes.	Medium. This species has the potential to be found on the project site within the coastal scrub habitats.
Onychomys torridus ramona	southern grasshopper mouse	None	None	CDFW_SSC-Species of Special Concern	Desert areas, especially scrub habitats with friable soils for digging. Prefers low to moderate shrub cover.	Feeds almost exclusively on arthropods, especially scorpions and orthopteran insects.	None. No suitable desert habitat for this species occurs on the survey area.

SciName	ComName	FedList	CalList	OthrStatus	GenHab	MicroHab	Potential to Occur
Taxidea taxus	American badger	None	None	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	Low. The survey area lacks open stage haitats and has more dense, mature stage habitat than this species prefers.
Helminthoglypta vasquezi	Vasquez shoulderband	None	None		Terrestrial		Medium. This species is known to occur in the region, however, little information is available about habitat preference.
Anniella spp.	California legless lizard	None	None	CDFW_SSC-Species of Special Concern	Contra Costa County south to San Diego, within a variety of open habitats.This element represents California records of Anniella not yet assigned to new species within the Anniella pulchra complex.	Variety of habitats; generally in moist, loose soil. They prefer soils with a high moisture content.	Low. The survey area is typically dry and lack moist areas this species prefers, except seasonally within the drainages.
Anniella stebbinsi	Southern California legless lizard	None	None	CDFW_SSC-Species of Special Concern | USFS_S-Sensitive	Generally south of the Transverse Range, extending to northwestern Baja California. Occurs in sandy or loose loamy soils under sparse vegetation. Disjunct populations in the Tehachapi and Piute Mountains in Kern County.	Variety of habitats; generally in moist, loose soil. They prefer soils with a high moisture content.	Low. The survey area is typically dry and lack moist areas this species prefers, except seasonally within the drainages.
Arizona elegans occidentalis	California glossy snake	None	None	CDFW_SSC-Species of Special Concern	Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular ranges, south to Baja California.	Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils.	Low. The survey area lacks loos or sandy soils for this species.
Aspidoscelis tigris stejnegeri	coastal whiptail	None	None	CDFW_SSC-Species of Special Concern	Found in deserts and semi-arid areas with sparse vegetation and open areas. Also found in woodland & riparian areas.	Ground may be firm soil, sandy, or rocky.	Present. This species was observed on the survey area during a survey conducted in 2013. (LDC 2013)

SciName	ComName	FedList	CalList	OthrStatus	GenHab	MicroHab	Potential to Occur
Emys marmorata	western pond turtle	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_VU-Vulnerable | USFS_S-Sensitive	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation.	Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	None. No suitable habitat for this species occurs on the survey area.
Phrynosoma blainvillii	coast horned lizard	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes.	Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Medium. The areas surrounding Ephemeral drainage #1 are suitable for this species to occur.
Thamnophis hammondii	two-striped gartersnake	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFS_S-Sensitive	Coastal California from vicinity of Salinas to northwest Baja California. From sea to about 7,000 ft elevation.	Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.	None. No suitable habitat for this species occurs on the survey area.

APPENDIX B-2
Botanical Survey

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

August 24, 2023

Renaud & Sue Veluzat
24715 Oak Creek Road
Newhall, California 91321

RE: Botanical Survey for Santa Clarita TTM 68203 Project in the City of Santa Clarita, California

Dear Renaud and Sue:

This letter includes the results of a botanical survey on a 28.13-acres project site which is mostly undeveloped native plant communities in the City of Santa Clarita, California (Figure 1 and 2). There is an uninhabited single family home development on the southern edge of the site that has associated parking areas and paved driveway, and the remaining areas of the site are undeveloped native plant communities. The project site located at the northwest corner of Golden Valley Road and Sierra Highway has a proposed development in which 10 parcels will be merged into 4 lot subdivisions on which infrastructure is planned made up of an assisting living building; commercial hotel and retail building; residential condominium building; storm water treatment area; and; riding and hiking trail. The project site is located on private property, and the focus of the botanical survey was to identify special-status species as classified by the California Department of Fish and Wildlife (CDFW) and the California Native Plant Society (CNPS) with the potential to exist on the site.

The survey was conducted to assess potential impacts to special-status plants in the area of development. The plant survey involved first identifying the potential special-status plants with potential to occur on the site and then conducting the survey. Nine (9) special-status plant species were assessed with a medium to high potential to occur on the site based on habitat and past occurrences in the area: **club-haired mariposa-lily**, **slender mariposa-lily**, **Plummer's mariposa lily**, **Peirson's morning-glory**, **Mt. Pinos larkspur**, **slender-horned spineflower**, **Palmer's grapplinghook**, **short-joint beavertail**, and **Hubby's phacelia**. The site was surveyed on four dates in May and August corresponding with coverage of the blooming period of the 9 special-status species. The report includes a complete list of the species observed on the site indicating their habit, providence (native vs non-native), and California Rare Plant Rank (CRPR). It also relates data relevant to potential special-status species occurring at the site based on Jepson Manual analysis (Baldwin et al. 2012).

Source: ESRI USA Topo Maps 2020

Santa Clarita TTM 68203

Figure 1. Project Location

Project Site is on the USGS Mint Canyon 7.5-minute quadrangle map in the southeast corner of Township 04 North (T04N) and Range 15 West (R15W) Section 30 (S30).

Center Coordinate (decimal degrees):
Latitude: 34.3985N Longitude: -118.4861W

SOUTH ENVIRONMENTAL

Source: BING Aerial Basemap 2020

Santa Clarita TTM 68203

Figure 2. Survey Area

SOUTH ENVIRONMENTAL

Background

Project Site Description

The property proposed for development (project site) includes 28.13-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita (Figures 1 and 2). The project site is on the United States Geological Survey (USGS) Mint Canyon 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North (T04N) and Range 15 West (R15W). The associated APNs are: 2836-013-106, 2836-013-107, 2836-013-111, 2836-013-128, 2836-013-133, 2836-013-141, 2836-020-058, 2836-020-078, 2836-020-086, 2836-020-087.

Most of the project site is undeveloped except for a single-family home and accessory structures. The street address is recorded as 20101 Golden Valley Road with an Assessor's address of 25800 Sierra Highway. A windy paved driveway exists off Golden Valley Road provides access to the home, and a series of dirt roads provide access to the remaining undeveloped hills on the property. Adjacent uses include residential uses to the immediate north and east, vacant land to the south, and residential uses/Golden Valley High School to the west.

Proposed Development

The proposed development (Figure 3) seeks to merge the 10 parcels and entitle a Tentative Tract Map 68203 for a four (4) lot subdivision consisting of the following:

- One (1) 5.04-acre lot for a four (4) story building consisting of 154-unit senior assisted living units; the proposed four (4) story building will be 50-foot maximum height.
- One (1) 5.04-acre lot for a 100-room commercial hotel and retail building.
- One (1) 11.48-acre lot for 73 residential Condominium units consisting of two, three, and four-plex buildings.
- One (1) 5.83-acre open space lot for L.I.D. storm water treatment with two discharge pipes, and an eight-foot wide riding and hiking trial.
- Proposed streets and circulations will result in approximately 0.73 acres of development.

Topography and Climate

The project site is a steeply sloping group of hills that is at an elevation of 1750-feet at the home site and 1560-feet in the northern tip. There is a hilltop that is at the northwest edge of the

Source: BING Aerial Basemap 2020

Santa Clarita TTM 68203

Figure 3. Proposed Development

SOUTH ENVIRONMENTAL

homesite and extends northeast through the project site and is steeply sloped on the east and west sides. Climate in the region is hot and dry, with average summer high temperatures in the mid-90s and average winter lows in the mid-30s. Average yearly rainfall is 14-inches (less than half the national average) and the wettest months are January – March, and there is almost no precipitation between May-August.

Soils

Three soils occur on the project site as shown in Figure 4:

- **Saugus loam, 30 to 50 percent slopes, eroded** is the most abundant soil type and occurs in the western half of the project site. This is an upland soil found on backslope of hills, and is well drained.
- **Castaic-Balcom silty clay loams, 15 to 30 percent slopes** is on the eastern portions of the project site. This soil type largely includes (99%) upland hills and backslopes and includes 1% of drainageways. This is a well-drained soil.
- **Zmora loam, 2 to 9 percent slopes** is on the northern tip of the project site. This soil type is typically found on terraces and backslopes and is well drained.

Plant Communities

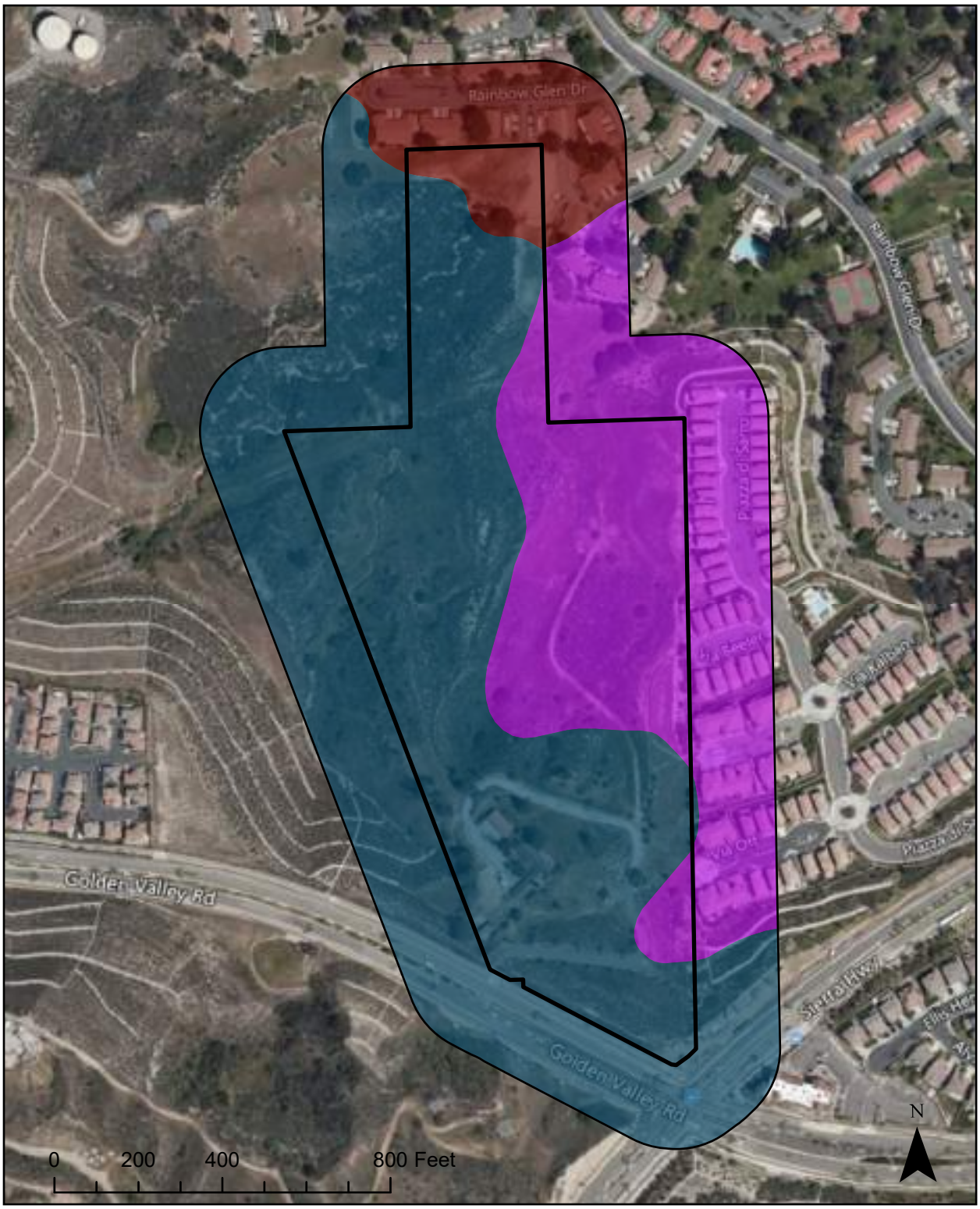
As shown in Figure 5, there are five plant communities or cover types on the project site and within a 200-ft buffer surrounding the project site, and they are summarized in Table 1 below.

Table 1. Summary of Plant Communities in Survey Area

Plant Community	Acres Project Site and 200-ft buffer	Acres Project Site	Global Rank (G) /State Rank (S)
California Sagebrush – (Purple Sage) Scrub	16.71	12.87	G5/S5
Chamise Chaparral	7.64	1.37	G5/S5
Installed Sage Scrub	2.50	0.19	G5/S5
Ruderal	13.44	11.73	not ranked
Developed	17.21	1.97	not ranked
Total	56.52	28.13	

California Sagebrush – (Purple Sage) Scrub

California sagebrush – (purple sage) scrub [*Artemisia californica* – (*Salvia leucophylla*) Shrubland Alliance] as described by the Manual of California Vegetation Online occurs on 16.71-acres of the survey area. This community occurs in two Associations described by the Manual:



Source: BING Aerial Basemap 2020, USDA NRCS Soils GIS

Santa Clarita TTM 68203

Figure 4. Soils

Survey Area (200-foot Buffer)

Project Boundary

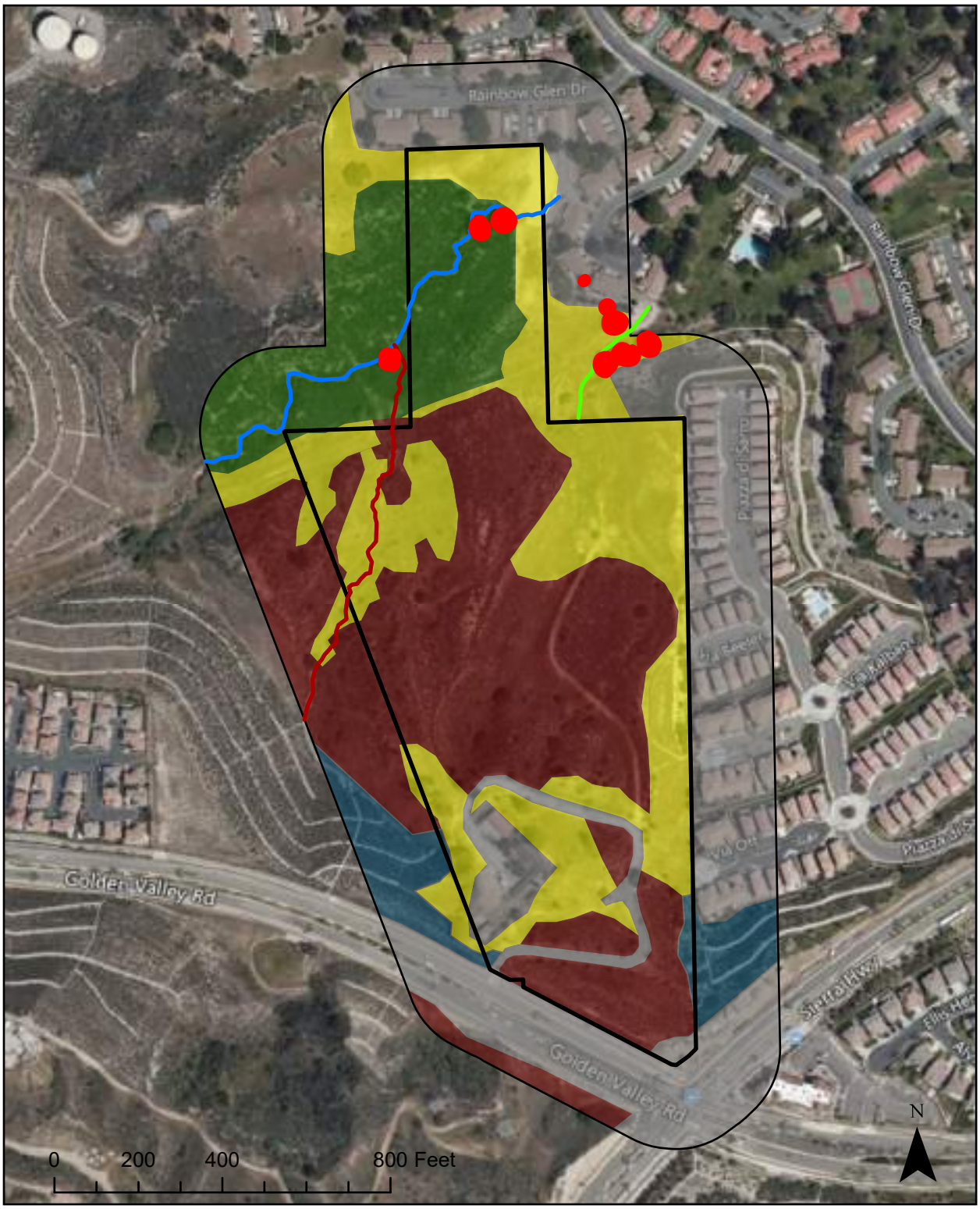
Soils

Castaic-Balcom silty clay loams, 15 to 30 % slopes

Saugus loam, 30 to 50 % slopes, eroded

Zamora loam, 2 to 9 % slopes

SOUTH ENVIRONMENTAL



Source: BING Aerial Basemap 2020

Santa Clarita TTM 68203

Figure 5. Plant Communities, Oaks, and Drainages

- Ephemeral Drainage #1
- Ephemeral Drainage #2
- Ephemeral Drainage #3
- Survey Area (200-foot Buffer)
- Project Boundary
- Protected Oak Tree
- California Sagebrush - (Purple Sage) Scrub
- Chamise Chaparral
- Installed Sage Scrub
- Ruderal
- Developed

SOUTH ENVIRONMENTAL

- ***Artemisia californica – Salvia leucophylla* Association** occurs on the central portions of the survey area and on the areas south of Golden Valley Road. This community is dominated by California sagebrush (*Artemisia californica*) and purple sage (*Salvia leucophylla*) is a sub-dominant species. Other prominent shrubs include California buckwheat (*Eriogonum fasciculatum*), black elderberry (*Sambucus nigra ssp. caerulea*), toyon (*Heteromeles arbutifolia*), and chaparral yucca (*Hesperoyucca whipplei*).

- ***Artemisia californica – Eriogonum fasciculatum* Association** occurs on the southern portions of the survey area between the house and the installed sage scrub. This community is co-dominated by California sagebrush and California buckwheat.

Chamise Chaparral

Chamise chaparral (*Adenostoma fasciculatum* Shrubland Alliance) as described by the Manual occurs in the northern portion of the survey area. Specifically, the *Adenostoma fasciculatum* – (*Ceanothus crassifolius*) Association occurs on the survey area and is dominated by chamise (*Adenostoma fasciculatum*) and hoary leaved ceanothus (*Ceanothus crassifolius*) is sub-dominant. Purple sage, coast live oak (*Quercus agrifolia*), and beavertail cactus (*Opuntia basilaris var. basilaris*) occur occasionally.

Installed Sage Scrub

Installed sage scrub occurs on hillsides adjacent to existing developments and are dominated by California buckwheat and have a variety of other landscaped species. These are managed areas that have a series of concrete drainage channels that direct surface water on the slopes away from the houses.

Ruderal

Ruderal areas occur throughout the survey area surrounding the house, on the hillsides adjacent to neighborhoods, and along the gas company easement. These areas are dominated by black mustard (*Brassica nigra*) and has a variety of other plants associated with disturbed area and landscaped species such as telegraph weed (*Heterotheca grandiflora*), Peruvian pepper tree (*Schinus molle*), European olive (*Olea europaea*), Mexican fan palm (*Washingtonia robusta*), Canary Island date palm (*Phoenix canariensis*), blue gum eucalyptus (*Eucalyptus globulus*), and Aleppo pine (*Pinus halepensis*).

Developed

Developed areas include Golden Valley Road, Sierra Highway, paved driveway, the single-family residence on the project site, and the surrounding homes in the neighborhoods.

Methodology

Literature Review

The California Native Plant Society (CNPS) and the California Department of Fish and Wildlife (CDFW) are the primary authorities in the State of California for recording and tracking endangered, threatened, and rare plants (i.e., special-status) in the state. The CNPS "Inventory of Rare Plants" online (CNPS 2023) and the CDFW California Natural Diversity Database (CNDDB) online (CDFW 2023) are query tools that identify rare, endangered, and threatened plants and their occurrence based on the U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles for the state. Basic information is provided for each special-status plant species including conservation status, local areas of occurrence, macro and micro habitat, elevation range, and blooming period. Plants considered by the CNPS and CDFW to be rare, threatened, and endangered species are based on specific criteria of state and federal legislation and are summarized in **Appendix A**. The geographic location of occurrences of special-status plants can also be queried directly through the Biogeographic Information and Observation System (BIOS) online (CDFW 2023a).

For the survey, both databases were queried for special-status plants that have previously been recorded in the Mint Canyon 7.5" quad in which the project site is located, and the eight surrounding USGS 7.5"quads: Warm Springs Mountain, Green Valley, Sleepy Valley, Newhall, Agua Dulce, Oat Mountain, San Fernando, and Sunland. Following the online queries, the rare, threatened, and endangered species identified in each query were combined into a comprehensive list for the region. These species were considered as potential special-status species to occur on the survey site. Next, an additional assessment was conducted to determine their potential to occur on the survey area based on specific habitat and micro-habitat requirements for the species and their occurrences in the area in relation to the survey area. Based on this assessment, the special-status species were designated a "none", "low", "medium", or "high" potential to occur on the project site (**Appendix A**).

Using the nine 7.5" quads a total of 43 special-status plant species were identified for the area (Appendix B). Of these species, nine (9) were assessed with a medium to high potential to occur on the project site: **club-haired mariposa-lily**, **slender mariposa-lily**, **Plummer's mariposa lily**, **Peirson's morning-glory**, **Mt. Pinos larkspur**, **slender-horned spineflower**, **Palmer's grapplinghook**, **short-joint beavertail**, and **Hubby's phacelia** (Table 2). Plants were assessed with the potential to occur on the project site based primarily on their habitat requirements and past occurrences in the immediate area.

Table 2. Special-status plants including rare, threatened, and endangered species with the potential to occur on the project site

(CRPR = California Rare Plant Ranking)

Scientific name	Common name	Life Form	Federal/State Listing	CRPR
Calochortus clavatus var. *clavatus*	club-haired mariposa lily	perennial herb	--/--	4.3
Calochortus clavatus var. *gracilis*	slender mariposa-lily	perennial herb	--/--	1B.2
Calochortus plummerae	Plummer's mariposa lily	perennial herb	--/--	4.2
Calystegia peirsonii	Peirson's morning glory	perennial herb	--/--	4.2
Delphinium parryi ssp. *pupureum*	Mt. Pinos larkspur	perennial herb	--/--	4.3
Dodecahema leptoceras	slender-horned spineflower	annual herb	FE/SE	1B.1
Harpagonella palmeri	Palmer's grapplinghook	annual herb	--/--	4.2
Opuntia basilaris var. *brachyclada*	short-joint beavertail	shrub (succulent)	--/--	1B.2
Phacelia hubbyi	Hubby's phacelia	annual herb	--/--	4.2

1B.1 – plants rare, threatened, or endangered in California and elsewhere, seriously threatened in California
1B.2 – plants rare, threatened, or endangered in California and elsewhere, fairly threatened in California
4.2 – plants of limited distribution; fairly threatened in California (Watchlist plant)
4.3 – plants of limited distribution; not very threatened in California (Watchlist plant)
FE – Federal endangered species
SE – California endangered species

Field Survey

The survey to identify special-status plants identified in the literature search — including federal and state rare, threatened, and endangered species — was conducted by South Environmental in the spring in May and the summer in August of 2023. The survey dates with the weather conditions and South Environmental biologists that conducted the surveys are below:

- May 8 and 9, 2023. Temperature 56-63° F, light air to light breeze (3-10 mph), fair to cloudy, no precipitation (Scott Altmann & AJ Samra)

- August 3 and 4, 2023. Temperature 70-95° F, calm to light breeze (0-10 mph), fair to clear, no precipitation (Scott Altmann and Dana Briggs)

During the surveys all plant species encountered were either identified at the time or in the case of unknown species a sample was collected and the species were identified using *The Jepson Manual of Vascular Plants of California* (Baldwin et al. 2012) and by comparing them with

taxonomically-related species from the area using I-Naturalist and other online digital photo sources.

Whenever possible the survey was conducted according to the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* developed by the California Department of Fish and Wildlife (CDFW 2018) and the *Botanical Survey Guidelines* developed by the California Native Plant Society (CNPS 2001). The survey followed the standard botanical protocol for rare, threatened, or endangered plant species surveys of identifying all plant species encountered. Although the goal was to identify all plant species, field surveyors placed a special emphasis on discovery of the special-status species identified in the literature search with the potential to occur on the site.

Results

A total of 92 plant species were observed in the study area. None of these species are considered special-status plants. Of these, 59 species (64.1%) were native to California and 33 species (35.9%) were non-native to California or the southern region of California. Of the non-native species, 22 (66.7%) are classified as invasive or are on invasive "watch" or "alert" by the California Invasive Plant Council (2023). Based on the habit classification system used by Calflora (2023) and other sources, the habit of the plants observed included tree, shrub, shrub (succulent), perennial, perennial herb, annual herb, annual grasslike herb, perennial grasslike herb, and vine. Important genera for which more than one species was observed included *Artemisia, Avena, Bromus, Camissoniopsis, Lupinus, Salvia, and Washingtonia.* A list of the species observed on the site is presented below in Table 3.

Table 3. List of plant species for Santa Clarita TTM 68203 Project in Santa Clarita, California

(CRPR = California Rare Plant Ranking, 2023; *invasive species per the California Invasive Plant Council, 2023.

Scientific name	Common name	Native/Non-native	Habit	CRPR
Acacia redolens	vanilla-scented wattle	Non-native	tree/shrub	--
Acmispon glaber	deerweed	Native	perennial herb	--
Acourtia microcephala	sacapellote	Native	perennial herb	--
Adenostoma fasciculatum	chamise	Native	tree or shrub	--
Agave attenuata	swan-neck agave	Non-native	shrub	--
Amsinckia menziesii	Menzies fiddleneck	Native	annual herb	--
Artemisia californica	California sagebrush	Native	shrub	--
Artemisia tridentata	big sagebrush	Native	shrub	--

Scientific name	Common name	Native/Non-native	Habit	CRPR
Arundo donax	giant reed	*Non-native	perennial grasslike herb	--
Asclepias fascicularis	narrowleaf milkweed	Native	perennial herb	--
Astragalus trichopodus	Santa Barbara milkvetch	Native	perennial herb	--
Avena barbata	slender wild oat	*Non-native	annual grasslike herb	--
Avena fatua	wild oat	*Non-native	annual grasslike herb	--
Blitum californicum	California goosefoot	Native	perennial herb	--
Bromus diandrus	ripgut brome	*Non-native	annual grasslike herb	--
Bromus hordeaceus	common soft brome	*Non-native	annual grasslike herb	--
Bromus rubens	red brome	*Non-native	annual grasslike herb	--
Calystegia macrostegia	coast morning glory	Native	perennial herb/vine	--
Camissoniopsis bistorta	California sun cup	Native	annual herb	--
Camissoniopsis micrantha	miniature suncup	Native	annual herb	--
Carduus tenuflorus	slender thistle	*Non-native	annual herb	--
Carya Illinoinensis	pecan	*Non-native	tree	--
Castilleja exserta	purple owl's clover	Native	annual herb	--
Ceanothus crassifolius	hoaryleaf ceanothus	Native	shrub	--
Chaenactis artemisiifolia	white pincushion	Native	annual herb	--
Cirsium occidentale	cobweb thistle	Native	perennial herb	--
Corethrogyne filaginifolia	California aster	Native	perennial herb	--
Cryptantha intermedia	clearwater cryptantha	Native	annual herb	--
Cupressus sempervirens	Mediterannean cypress	Non-native	tree	--
Deinandra fasciculata	clustered tarweed	Native	annual herb	--
Delphinium cardinale	scarlet larkspur	Native	perennial herb	--
Dipterostemon capitatus	blue dicks	Native	perennial herb	--
Emmenanthe penduliflora	whispering bells	Native	annual herb	--
Encelia californica	bush sunflower	Native	shrub	--
Encelia farinosa	brittlebush	Native	shrub	--
Eriodictyon crassifolium	thick-leaved yerba santa	Native	shrub	--
Eriogonum fasciculatum	California buckwheat	Native	shrub	--
Eriophyllum confertiflorum	golden yarrow	Native	shrub	--
Erodium cicutarium	redstem stork's bill	*Non-native	annual herb	--
Eschscholzia californica	California poppy	Native	annual herb	--
Eucalyptus camaldulensis	river redgum	*Non-native	tree	--

Scientific name	Common name	Native/Non-native	Habit	CRPR
Eulobus californicus	California primrose	Native	annual herb	--
Eucrypta chrysanthemifolia	common eucrypta	Native	annual herb	--
Festuca myuros	rattail sixweeks grass	*Non-native	annual grasslike herb	--
Grevillea robusta	silk oak	*Non-native	tree	--
Hazardia squarrosa	saw-toothed goldenbush	Native	shrub	--
Heteromeles arbutifolia	toyon	Native	shrub	--
Heterotheca grandiflora	telegraphweed	Native	annual/perennial herb	--
Hesperoyucca whipplei	chaparral yucca	Native	shrub	--
Hirschfeldia incana	shortpod mustard	*Non-native	perennial herb	--
Hordeum murinum	wall barley	*Non-native	annual grasslike herb	--
Juniperus californica	California juniper	Native	shrub	--
Lepidospartum squamatum	California broomsage	Native	shrub	--
Lonicera subspicata	southern honeysuckle	Non-native	shrub	--
Lupinus bicolor	miniature lupine	Native	perennial herb	--
Lupinus succulentus	arroyo lupine	Native	annual herb	--
Lysimachia arvensis	scarlet pimpernel	Non-native	annual herb	--
Marah macrocarpa	chilicothe	Native	perennial herb/vine	--
Malacothamnus marrubioides	horehound bush-mallow	Native	shrub	--
Marrubium vulgare	white horehound	*Non-native	perennial herb	--
Melaleuca citrina	crimson bottlebrush	Non-native	tree	--
Myoporum parvifolium	creeping myoporum	Non-native	tree/shrub	--
Nerium oleander	oleander	Non-native	shrub	--
Nicotiana glauca	tree tobacco	*Non-native	tree/shrub	
Olea europaea	European olive	*Non-native	tree	--
Opuntia basilaris var. *basilaris*	beavertail cactus	Native	shrub (stem succulent)	--
Paeonia californica	California peony	Native	perennial herb	--
Phacelia cicutaria	caterpillar phacelia	Native	annual herb	--
Phoenix canariensis	Canary Island date palm	*Non-native	Tree	--
Pinus halepensis	Aleppo pine	Non-native	tree	--
Pseudognaphalium californicum	California cudweed	Native	annual or perennial herb	--
Pyracantha angustifolia	narrowleaf firethorn	*Non-native	shrub	--
Quercus agrifolia	coast live oak	Native	Tree	--
Rhamnus crocea	redberry buckthorn	Native	shrub	--
Rhus aromatica	fragrant sumac	Native	shrub	--
Ribes aureum	golden currant	Native	shrub	--

Scientific name	Common name	Native/Non-native	Habit	CRPR
Salvia leucophylla	purple sage	Native	shrub	--
Salvia mellifera	black sage	Native	shrub	--
Sambucus nigra ssp. *caerulea*	blue elderberry	Native	shrub or tree	--
Schinus molle	Peruvian peppertree	*Non-native	tree	--
Scrophularia californica	California beeplant	Native	perennial herb	--
Senecio flaccidus	shrubby ragwort	Native	shrub	--
Sisyrinchium bellum	western blue-eyed grass	Native	perennial herb	--
Solanum xanti	purple nightshade	Native	perennial herb/shrub	--
Sonchus oleraceus	common sow thistle	Non-native	annual herb	--
Tetradymia comosa	hairy horsebrush	Native	shrub	--
Toxicoscordion fremontii	common star lily	Native	perennial herb	--
Trifolium hirtum	rose clover	*Non-native	annual herb	--
Uropappus lindleyi	silverpuffs	Native	annual herb	--
Verbena lasiostachys	western vervain	Native	perennial herb	--
Washingtonia filifera	California fan palm	Non-native (to coastal, southern California)	tree	--
Washingtonia robusta	Mexican fan palm	*Non-native	tree	--

Conclusion

No special-status plants occur on the survey area. A botanical survey of the vascular plants conducted in the spring (May) and in the summer (August) of 2023 on the site resulted in the observance and identification of 92 native and non-native plant species. Of these there was a dominance of native species (59 species; 64.1% of all species) although non-native species had an important presence (33 species; 35.9%). Of the non-native plants, 22 (66.7%), are classified as invasive, some of which have substantial cover at the ground level enough to restrict native plant colonization. Over the course of the botanical survey conducted in 2023, no special-status plants were observed and they are considered absent from the survey area.

If you have any questions regarding the information in this report, please contact Matthew South by email: msouth@southenvironmental.com or by mobile phone: 303-818-3632.

Sincerely,

Matthew R. South
Principal Biologist

List of Attachments

1. **Attachment A**. Special-Status Species Analysis

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Appendix A:
Special-Status Species Analysis

Special-Status Species Analysis

Special-status plant species are those plants that, because of their recognized rarity or vulnerability to various causes of habitat loss or population decline, are recognized by federal, state, or other agencies as under threat from human-associated developments. Some of these species receive specific protection that is defined by federal or state endangered species legislation. Others have been designated as special-status based on adopted policies and expertise of state resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. Special-status species include:

- Plants or wildlife listed or proposed for listing as threatened or endangered, or are candidates for possible future listing as threatened or endangered, under the federal Endangered Species Act or the California Endangered Species Act;

- Plants or wildlife that meet the definitions of rare or endangered under CEQA Guidelines Section 15380.

- Plants or wildlife covered under an adopted NCCP/HCP;

- Plants considered by the California Native Plant Society (CNPS) to be rare, threatened, or endangered (List 1A, 1B and 2 plants) in California;

- Plants listed by the CNPS as plants in which there is limited information about distribution (List 3);

- Plants listed as rare under the California Native Plant Protection Act (Fish and Game Code 1900 et seq.);

Federally-Protected Status

All references to Federally-protected species in this BRA include the most current published status or candidate category to which each species has been assigned by USFWS. For purposes of this assessment the following acronyms are used for Federal status species, as applicable:

FE Federally-listed as Endangered
FT Federally-listed as Threatened
FPE Federally proposed for listing as Endangered
FPT Federally proposed for listing as Threatened
FPD Federally proposed for delisting
FC Federal candidate species (former C1 species)

State-Protected Status

For the purposes of this BRA, the following acronyms are used for State status species, as applicable:

SE State-listed as Endangered
ST State-listed as Threatened
SR State-listed as Rare
SCE State candidate for listing as Endangered
SCT State candidate for listing as Threatened
SFP State Fully Protected
SSC California Species of Special Concern

California Rare Plant Rank

The CNPS is a private plant conservation organization dedicated to the monitoring and protection of special-status species in California. CNPS has compiled an inventory comprised of information focusing on geographic distribution and qualitative characterization of Rare, Threatened, or Endangered vascular plant species of California (CNPS 2018). The list serves as the candidate list for listing as Threatened and Endangered by CDFW. CNPS has developed six categories of rarity known as the California Rare Plant Rank (CRPR), of which Ranks 1A, 1B, 2A, and 2B are particularly considered sensitive:

Rank 1A Presumed extinct in California.
Rank 1B Plants Rare, Threatened, or Endangered in California and elsewhere.
Rank 2A Presumed extinct in California, but more common elsewhere.
Rank 2B Plants Rare, Threatened, or Endangered in California, but more common elsewhere.
Rank 3 Plants about which we need more information – a review list.
Rank 4 Plants of limited distribution – a watch list.

The CNPS recently added "threat ranks" which parallel the ranks used by the CNDDB. These ranks are added as a decimal code after the CNPS List (e.g., Rank 1B.1). The threat codes are as follows:

.1 Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat);
.2 Moderately threatened in California (20-80% occurrences threatened);
.3 Not very threatened in California (<20% of occurrences threatened or no current threats known).

Potential to Occur Assessment

Special-status species that are **present** or are **high** or **medium** potential to occur within the parcel are a based on one or more of the following:

- the direct observation of the species within the parcel during any field survey;
- a record reported in the CNDDB; and
- the parcel is within known distribution of a species and contains appropriate habitat.
- present means the species is known to occur, high potential indicates the habitat is ideal and near known occurrences of the species, and medium indicates that the habitat may be less than ideal due to some lacking element but still usable by the species and within the known range.

Special-status species that are **low** potential) to occur are based on one of the following:

- the parcel has the general habitat types but lacks necessary habitat elements such as suitable microhabitat or soils; or
- the parcel is outside the known elevation range or distribution of the species, and has otherwise suitable habitats;

Special-status species that have no potential to occur on the parcel are labeled as **none** due to the absence of suitable habitat.

Special-status species with a potential to occur on the survey area are listed below.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Allium howellii var. clokeyi	Mt. Pinos onion	1B.3	None	None	Apr-Jun	4265	6070	Great Basin scrub, Meadows, and seeps (edges), Pinyon and juniper woodland		None. No habitat for this species occurs on the survey area and the survey area is outside the known elevation for this species.
Astragalus brauntonii	Braunton's milk-vetch	1B.1	None	FE	Jan-Aug	10	2100	Chaparral, Coastal scrub, Valley and foothill grassland	recent burns or disturbed areas, usually sandstone with carbonate layers	Low. There are no recently burned areas on the survey area.
Berberis nevinii	Nevin's barberry	1B.1	CE	FE	(Feb)Mar-Jun	225	2705	Chaparral, Cismontane woodland, Coastal scrub, Riparian scrub	sandy or gravelly	Low. This conspicuous species was not observed during site surveys.
Calochortus catalinae	Catalina mariposa lily	4.2	None	None	(Feb)Mar-Jun	45	2295	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland		Low. This species is typically found on Catalina Island.
Calochortus clavatus var. clavatus	club-haired mariposa lily	4.3	None	None	(Mar)May-Jun	245	4265	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland	usually serpentinite, clay, rocky	Medium. Suitable chaparral and scrub habitat for this species occur on the survey area.
Calochortus clavatus var. gracilis	slender mariposa lily	1B.2	None	None	Mar-Jun(Nov)	1045	3280	Chaparral, Coastal scrub, Valley and foothill grassland		High. Suitable chaparral and scrub habitat for this species occur on the survey area and the species was recorded nearby to the CNDDB.
Calochortus palmeri var. palmeri	Palmer's mariposa lily	1B.2	None	None	Apr-Jul	2325	7840	Chaparral, Lower montane coniferous forest, Meadows and seeps	mesic	None. The survey area is outside the known elevation for this species.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Calochortus plummerae	Plummer's mariposa lily	4.2	None	None	May-Jul	325	5575	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland	granitic, rocky	High. Suitable chaparral and scrub habitat for this species occur on the survey area and the species was recorded nearby to the CNDDB.
Calystegia peirsonii	Peirson's morning-glory	4.2	None	None	Apr-Jun	95	4920	Chaparral, Chenopod scrub, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland		Medium. Suitable chaparral habitat for this species occur on the survey area.
Canbya candida	white pygmy-poppy	4.2	None	None	Mar-Jun	1965	4790	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland	gravelly, sandy, granitic	None. No suitable habitat for this species occurs in the survey area.
Centromadia parryi ssp. australis	southern tarplant	1B.1	None	None	May-Nov	0	1575	Marshes and swamps (margins), Valley and foothill grassland (vernally mesic), Vernal pools		None. No suitable habitat for this species occurs in the survey area.
Cercocarpus betuloides var. blancheae	island mountain-mahogany	4.3	None	None	Feb-May	95	1970	Closed-cone coniferous forest, Chaparral		Low. Although chaparral habitats occur on the survey area, this shrub was not observed on the survey area during surveys.
Chorizanthe parryi var. fernandina	San Fernando Valley spineflower	1B.1	CE	FC	Apr-Jul	490	4005	Coastal scrub (sandy), Valley and foothill grassland		None. No suitable habitat for this species occurs in the survey area.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Chorizanthe parryi var. parryi	Parry's spineflower	1B.1	None	None	Apr-Jun	900	4005	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland	sandy or rocky, openings	Low. This species is typically found in the San Gabriel Mountains to the southeast and at higher elevations to the north.
Deinandra minthornii	Santa Susana tarplant	1B.2	CR	None	Jul-Nov	915	2495	Chaparral, Coastal scrub	rocky	Low. This species is not known to occur in this specific region and is more isolated to areas to the west of I-5.
Deinandra paniculata	paniculate tarplant	4.2	None	None	(Mar)Apr-Nov(Dec)	80	3085	Coastal scrub, Valley and foothill grassland, Vernal pools	usually vernally mesic, sometimes sandy	None. No suitable habitat for this species occurs in the survey area.
Delphinium parryi ssp. purpureum	Mt. Pinos larkspur	4.3	None	None	May-Jun	3280	8530	Chaparral, Mojavean desert scrub, Pinyon and juniper woodland		Medium. Chaparral habitat on the survey area is suitable for this species.
Dodecahema leptoceras	slender-horned spineflower	1B.1	CE	FE	Apr-Jun	655	2495	Chaparral, Cismontane woodland, Coastal scrub (alluvial fan)	sandy	Medium. Chaparral habitat at the edges of drainages on the survey area is suitable for this species.
Galium grande	San Gabriel bedstraw	1B.2	None	None	Jan-Jul	1390	4920	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest		Low. This species is typically found in the San Gabriel Mountains to the southeast.
Harpagonella palmeri	Palmer's grapplinghook	4.2	None	None	Mar-May	65	3135	Chaparral, Coastal scrub, Valley and foothill grassland	Clay; open grassy areas within shrubland	High. Suitable chaparral occurs on the survey area and the species was recorded nearby to the cnddb.
Helianthus inexpectatus	Newhall sunflower	1B.1	None	None	Aug-Oct	1000	1000	Marshes and swamps, Riparian woodland	freshwater, seeps	None. No suitable habitat for this species occurs in the survey area.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Heuchera caespitosa	urn-flowered alumroot	4.3	None	None	May-Aug	3785	8695	Cismontane woodland, Lower montane coniferous forest, Riparian forest (montane), Upper montane coniferous forest	rocky	None. No suitable habitat for this species occurs in the survey area and the survey area is outside the known elevation range for this species.
Horkelia cuneata var. puberula	mesa horkelia	1B.1	None	None	Feb-Jul(Sep)	225	2655	Chaparral (maritime), Cismontane woodland, Coastal scrub	sandy or gravelly	Low. This species is not known to occur this far north and is more likely found in the San Gabriel Mountains and Santa Monica Mountains.
Hulsea vestita ssp. gabrielensis	San Gabriel Mountains sunflower	4.3	None	None	May-Jul	4920	8200	Lower montane coniferous forest, Upper montane coniferous forest	rocky	None. No suitable habitat for this species occurs in the survey area and the survey area is outside the known elevation range for this species.
Hulsea vestita ssp. parryi	Parry's sunflower	4.3	None	None	Apr-Aug	4490	9500	Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest	granitic or carbonate, rocky, openings	None. No suitable habitat for this species occurs in the survey area and the survey area is outside the known elevation range for this species.
Juglans californica	Southern California black walnut	4.2	None	None	Mar-Aug	160	2955	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland	alluvial	Low. This species was not observed during a survey of the site and it is very conspicuous species.
Lepechinia fragrans	fragrant pitcher sage	4.2	None	None	Mar-Oct	65	4300	Chaparral		Low. This species is not known to occur this far north (aside from a few occurrences at higher elevatioins far to the north, and is more likely found in the San Gabriel Mountains and Santa Monica Mountains.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Lepechinia rossii	Ross' pitcher sage	1B.2	None	None	May-Sep	1000	2590	Chaparral		Low. This species is only known to occur at higher elevations north of Castaic and not in the vicinity of the survey area.
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	4.3	None	None	Jan-Jul	0	2905	Chaparral, Coastal scrub		Low. This species is typically found in the San Gabriel Mountains to the southeast.
Lilium humboldtii ssp. ocellatum	ocellated Humboldt lily	4.2	None	None	Mar-Jul(Aug)	95	5905	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Riparian woodland	openings	Low. This species is not known to occur this far north (aside from a few occurrences at higher elevatioins far to the north, and is more likely found in the San Gabriel Mountains and Santa Monica Mountains.
Lupinus paynei	Payne's bush lupine	1B.1	None	None	Mar-Apr(May-Jul)	720	1380	Coastal scrub, Riparian scrub, Valley and foothill grassland	Sandy	None. No suitable habitat for this species occurs in the survey area.
Malacothamnus davidsonii	Davidson's bush-mallow	1B.2	None	None	Jun-Jan	605	3740	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland		Medium. Chaparral habitat on the survey area is suitable for this species.
Navarretia fossalis	spreading navarretia	1B.1	None	FT	Apr-Jun	95	2150	Chenopod scrub, Marshes and swamps (assorted shallow freshwater), Playas, Vernal pools		None. No suitable habitat for this species occurs in the survey area.
Navarretia setiloba	Piute Mountains navarretia	1B.1	None	None	Apr-Jul	935	6890	Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland	clay or gravelly loam	None. No suitable habitat for this species occurs in the survey area.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Opuntia basilaris var. brachyclada	short-joint beavertail	1B.2	None	None	Apr-Jun(Aug)	1390	5905	Chaparral, Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland		Medium. Chaparral habitat on the survey area is suitable for this species.
Orcuttia californica	California Orcutt grass	1B.1	CE	FE	Apr-Aug	45	2165	Vernal pools		None. No suitable habitat for this species occurs in the survey area.
Phacelia hubbyi	Hubby's phacelia	4.2	None	None	Apr-Jul	0	3280	Chaparral, Coastal scrub, Valley and foothill grassland	gravelly, rocky, talus	Medium. Chaparral habitat on the survey area is suitable for this species.
Phacelia mohavensis	Mojave phacelia	4.3	None	None	Apr-Aug	4590	8200	Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Pinyon and juniper woodland	sandy or gravelly	None. No suitable habitat for this species occurs in the survey area and the survey area is outside the known elevation range for this species.
Pseudognaphalium leucocephalum	white rabbit-tobacco	2B.2	None	None	(Jul)Aug-Nov(Dec)	0	6890	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland	sandy, gravelly	Low. This species is typically found near the Santa Clara River and Castaic, as well as in some areas of the San Gabriel Mountains, and not in the vicinity of the survey area.
Quercus durata var. gabrielensis	San Gabriel oak	4.2	None	None	Apr-May	1475	3280	Chaparral, Cismontane woodland		None. This species was not observed during a focused oak tree survey conducted on the survey area.
Senecio aphanactis	chaparral ragwort	2B.2	None	None	Jan-Apr(May)	45	2625	Chaparral, Cismontane woodland, Coastal scrub	sometimes alkaline	Low. This species is only known to occur in the region from a few populations on the Santa Clara River, and is not likely to occur on the survey area due to a lak of alkaline habitat.

Scientific Name	Common Name	CRPR	CESA	FESA	Blooming Period	Low (ft)	High (ft)	Habitat	Micro Habitat	Potential to Occur
Streptanthus campestris	southern jewelflower	1B.3	None	None	(Apr)May-Jul	2950	7545	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland	rocky	None. The survey area is outside the known elevation for this species.
Symphyotrichum greatae	Greata's aster	1B.3	None	None	Jun-Oct	980	6595	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Riparian woodland	mesic	Low. This species typically is found in forest or woodland habitats.

APPENDIX B-3
Jurisdictional Delineation

August 13, 2025

Renaud & Sue Veluzat
24715 Oak Creek Road
Newhall, California 91321

RE: Jurisdictional Delineation for Tentative Tract Map (TTM) 68203 in Santa Clarita, California

Dear Mr. & Mrs. Veluzat,

This letter includes results of a Jurisdictional Delineation and an assessment of impacts to jurisdictional features from a proposed mixed-use development on Tentative Tract Map (TTM) 68203 in the City of Santa Clarita, California. The scope of this letter report includes a description of the project, methodology, results of the survey, a delineation of the jurisdictional resources on the survey area, and an assessment of potential impacts to jurisdictional features.

Project Description

Project Location and Setting

The property proposed for development (project site) includes 28.13-acres consisting of 10 parcels located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita (see Figure 1 and Figure 2 below). The project site is on the United State Geologic Service (USGS) Mint Canyon 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North (T04N) and Range 15 West (R15W).

- Assessor's Parcel Numbers (APNs): 2836-013-106, 2836-013-107, 2836-013-111, 2836-013-128, 2836-013-133, 2836-013-141, 2836-020-058, 2836-020-078, 2836-020-086, 2836-020-087

Source: ESRI USA Topo Maps 2020

Santa Clarita TTM 68203

Figure 1. Project Location

Project Site is on the USGS Mint Canyon 7.5-minute quadrangle map in the southeast corner of Township 04 North (T04N) and Range 15 West (R15W) Section 30 (S30).

Center Coordinate (decimal degrees):
Latitude: 34.3985N Longitude: -118.4861W

SOUTH ENVIRONMENTAL

Source: BING Aerial Basemap 2020

Santa Clarita TTM 68203

Figure 2. Survey Area

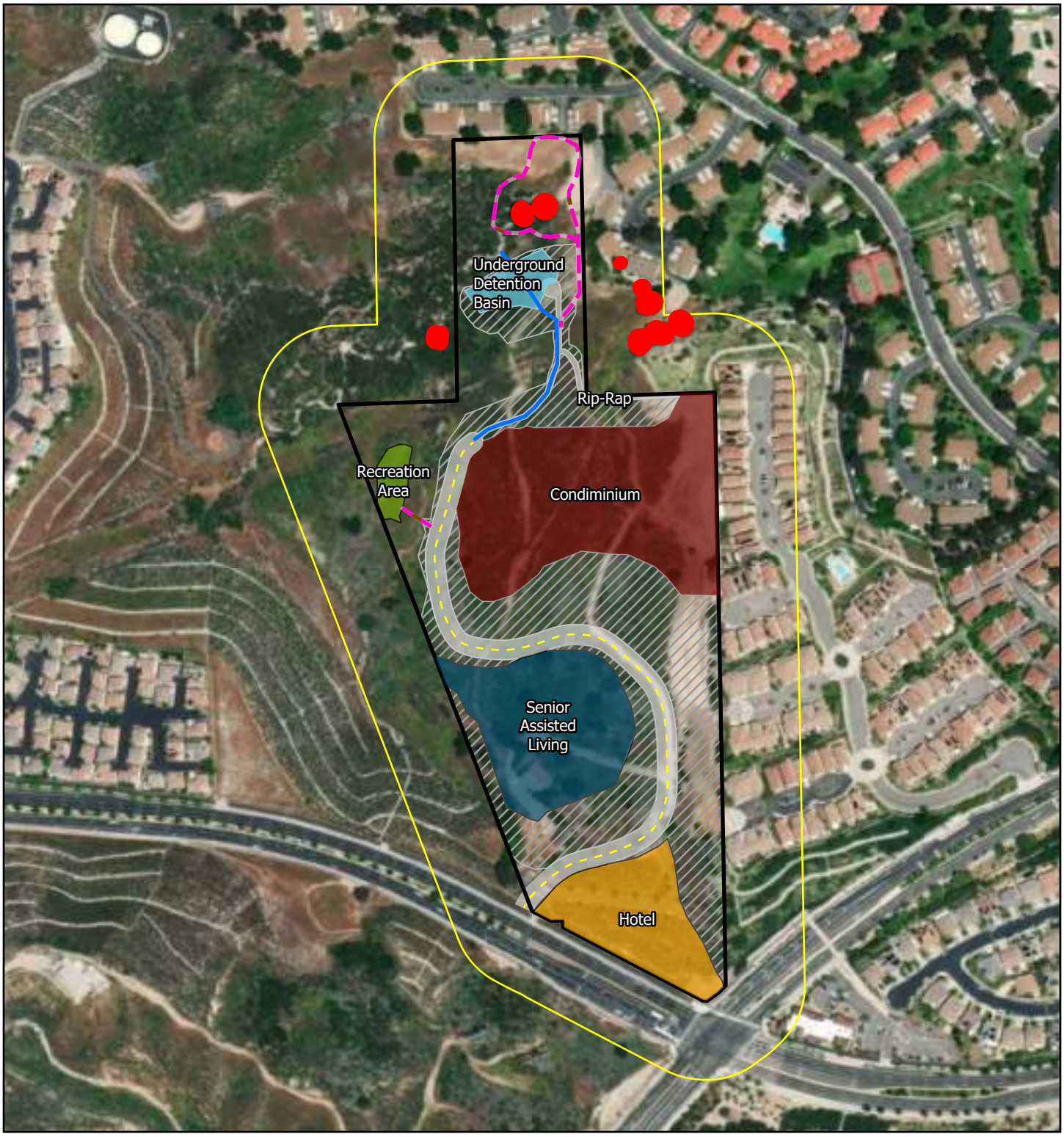
SOUTH ENVIRONMENTAL

Most of the property is undeveloped except for a single-family home and accessory structures with a street address 20101 Golden Valley Road. A windy paved driveway exists off Golden Valley Road provide access to the home, and a series of dirt roads provide access to the remaining undeveloped hills on the property. Adjacent uses include residential uses to the immediate north and east, vacant land to the south, and residential uses/Golden Valley High School to the west.

Proposed Development

The proposed development seeks to merge the 10 parcels and entitle a Tentative Tract Map 68203 for a four (4) lot subdivision consisting of the following (shown in Figure 3 below):

- One (1) 5.04-acre lot for a four (4) story building consisting of 154-unit senior assisted living units; the proposed four (4) story building will be 50-foot maximum height.
- One (1) 5.04-acre lot for a 100-room commercial hotel and retail building.
- One (1) 11.48-acre lot for 73 residential Condominium units consisting two, three, and four-plex buildings.
- One (1) 5.83-acre open space lot for L.I.D. storm water treatment and an eight-foot wide riding and hiking trial.
- Proposed streets and circulations will result in approximately 0.73 acres of development.
- A Proposed Recreation Area and foot bridge access is proposed west of the condominium units.
- The project will require slope control surrounding all developments as shown in the Site Plan.



Source: ESRI Aerial Imagery 2025

Santa Clarita VTTM 68203 Project

Figure 3. Proposed Development

0 215 430 Feet

N

- Project Boundary
- Survey Area - 200-foot Buffer
- Oak Tree Protected Zone

Proposed Development

- Riding/Hiking Trail
- Drainage Pipe
- Road Centerline
- Hikinig Trail
- Condiminium
- Underground Detention Basin
- Hotel
- Senior Assisted Living
- Recreation Area
- Rip-Rap
- Bridge
- Road
- Slope Control

SOUTH ENVIRONMENTAL

Regulatory Setting

Federal Regulations

Clean Water Act Sections 404 and 401

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged and fill material into Waters of the United States, including wetlands. Activities in Waters of the US or wetlands regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into Waters of the US or wetlands.

Section 401 of the CWA requires that any person applying for a federal permit or license which may result in a discharge of pollutants into waters of the United States (such as a Clean Water Act Permit under Section 404), must obtain a state water quality certification stating that the activity complies with all applicable water quality standards, limitations, and restrictions. No license or permit may be issued by a federal agency until certification required by section 401 has been granted. Further, no license or permit may be issued if certification has been denied.

California Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act requires the adoption of water quality control plans (basin plans) that give direction to managing water pollution in California. The basin plans get adopted and administered by the Regional Water Quality Control Board (RWQCB). The plans incorporate the beneficial uses of the waters of the State and then provide objectives that should be met to maintain and protect these uses. Along with the Regional Water Boards, the State Water Resources Board can issue and enforce permits containing waste discharge requirements to maintain clean surface water and groundwater. Each basin plan identifies the specific beneficial uses of water in their region for the past, present, and future. These basin plans also all have objectives for which the plan clearly states steps that are being taken or will be taken to meet the objectives. These objectives are created for the purpose of keeping the water clean and safe to use beneficially. The Regional Board has the authority to give out permits for the purpose of waste disposal or waste assimilation.

Waters of the State (WSC) 401 Water Quality Certification

The RWQCB regulates activities pursuant to Section 401(a)(1) of the CWA. Section 401 of the CWA specifies that certification from the State is required for any applicant requesting a federal license or permit including a Section 404 permit. The RWQCB' s delegated authority over Section 401 requires a Water Quality Certification consistent with the USACE of Engineers definition of waters of the US.

The State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State was adopted in April 2020 and put into effect statewide on May 28, 2020 (State Water Resources Control Board [SWRCB] 2020a). The Water Boards define wetlands as follows:

"An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area' s vegetation is dominated by hydrophytes or the area lacks vegetation."

The Water Code defines Waters of the State of California (WSC) broadly to include "any surface water or groundwater, including saline waters, within the boundaries of the state." In the 2020 state wetland definition, the State did not define non-wetland WSC, rather they are relying on regional characterizations of jurisdiction was delegated to the Regional Boards.

The following wetlands are WSC based on the 2020 Procedures:

1. Natural wetlands;
2. Wetlands created by modification of a surface water of the state; and
3. Artificial wetlands that meet any of the following criteria:
    a. Approved by an agency as compensatory mitigation for impacts to other WSC, except where the approving agency explicitly identifies the mitigation as being of limited duration;
    b. Specifically identified in a water quality control plan as a wetland or other water of the state;
    c. Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape; or
    d. Greater than or equal to one acre in size, unless the artificial wetland was constructed, and is currently used and maintained, primarily for one or more of the following purposes (i.e., the following artificial wetlands are not WSC unless they also satisfy the criteria set forth in 2, 3a, or 3b):
        i. Industrial or municipal wastewater treatment or disposal;
        ii. Settling of sediment;

iii. Detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial stormwater permitting program,
iv. Treatment of surface waters;
v. Agricultural crop irrigation or stock watering;
vi. Fire suppression;
vii. Industrial processing or cooling;
viii. Active surface mining – even if the site is managed for interim wetlands functions and values;
ix. Log storage;
x. Treatment, storage, or distribution of recycled water;
xi. Maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits); or
xii. Fields flooded for rice growing.

All artificial wetlands that are less than 1 acre in size and do not satisfy the criteria set forth in 2, 3.a, 3.b, or 3.c are not WSC.

State of California Fish and Game Code Section 1600

Fish and Game Code Section 1602 outlines the Lake and Streambed Alteration Agreement (LSAA) permitting process, and states:

- An entity shall not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake

Fish and Game Code Section 1602 requires any entity (defined as any person, State or local governmental agency, or public utility) to notify the CDFW before beginning any activity that will do one or more of the following:

- substantially divert or obstruct the natural flow of and river, stream, or lake, or
- substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or
- deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

A permit, known as a Lake or Streambed Alteration Agreement, from CDFW is required to conduct any of the activities described above.

Methodology

This jurisdictional delineation is based on information compiled through a field survey and a review of appropriate reference materials and literature regarding the resources of the region. The jurisdictional delineation was conducted by South Environmental principal biologist Matthew South and the sources and literature referenced in this assessment are provided below in Section 4. Bibliography.

Literature Review

The assessment of the jurisdictional features began with a review of literature relating to the topography, soils, biological resources, and hydrology that are known to occur on and in the vicinity of the project site, and include the following sources:

- United States Geologic Service (USGS) Mint Canyon 7.5"quad topographic map,
- US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soils Database (USDA 2020)
- National Hydrography Dataset (USGS 2020a)
- National Wetlands Inventory (USFWS 2020)
- National Watershed Boundary Dataset (USGS 2020b)
- Historic aerial photographs (historicaerials.com),
- Biological Resources Assessment (South Environmental 2020).

Jurisdictional Delineation

A formal delineation of "waters of the U.S." and "waters of the state" was conducted on November 21, 2020 by South Environmental biologist Matthew South on the project site and a 200-foot buffer (survey area). The limits of jurisdictional features were recorded in the field using Arc Collector mobile application and a Trimble R1 GPS Receiver was used to ensure that the accuracy of the measurements was less than 36-inches of error.

Waters of the U.S.

Guidance documents released by the US Army Corps of Engineers (USACE) following the US Supreme Courts' 2006 Rapanos Decision define waters of the US as any of the following:

- Traditional Navigable Waters (TNWs),
- wetlands adjacent to TNWs,
- tributaries of TNWs (relatively permanent, minimum of a 3-month seasonal flow)

- wetlands directly adjacent to tributaries of TNWs.

Wetlands

The biologist used methods described in the USACE 1987 *Wetland Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008) to determine the presence or absence of wetlands. During the site survey the following three wetland indicators were evaluated:

1. Dominance of wetland vegetation,
2. Presence of hydric soils, and
3. Periods of surface flooding or ponding water (visible surface water or saturated soils).

The USACE Arid West 2016 *Regional Wetland Plant List* was used to determine the wetland indicator status of plants that were observed in the survey area, and changes in vegetation, soils, or hydrologic features are used to identify boundaries of wetlands, when present. Completed *Wetland Determination Data Form – Arid West Region* worksheet were completed for the project and are included in Appendix B.

Non-Wetland Waters

Non-wetland waters of the US are waters that lack wetland vegetation or hydric soils and have a clearly defined Ordinary High-Water Mark (OHWM), which indicates periods of surface flow. The OHWM was delineated using the methods in two USACE guidance documents: *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley 2008) and *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2010). A completed Datasheet for Identification of the OHWM is found in Appendix B.

Waters of the State

Los Angeles Regional Water Quality Control Board

South Environmental assumes all waters of the US are also considered waters of the state and are under the jurisdiction of the Los Angeles Regional Water Quality Control Board (RWQCB). The limits of wetlands, or the OHWM for non-wetland waters delineated on the project site will also be considered the limits of waters of the state under the jurisdiction of the RWQCB.

California Department of Fish and Wildlife (CDFW)

Waters of the state that are under the jurisdiction of the California Department of Fish and Wildlife (CDFW) are delineated at the top of the bank of a stream and extend to riparian habitats or vegetation associated with watercourses. Riparian vegetation is that which depends on surface or

groundwater associated with the stream to exist and other vegetation that is either more dense or vigorous than the surrounding communities will also be considered under the jurisdiction of the CDFW.

Results

Topography and Climate

The project site is a steeply sloping group of hills that is at an elevation of 1750-feet at the home site and 1560-feet in the northern tip. There is a hilltop that is at the northwest edge of the homesite and extends northeast through the project site and is steeply sloped on the east and west sides. Climate in the region is hot and dry, with average summer high temperatures in the mid-90s and average winter lows in the mid-30s. Average yearly rainfall is 14-inches (less than half the national average) and the wettest months are January – March, and almost no precipitation between May-August.

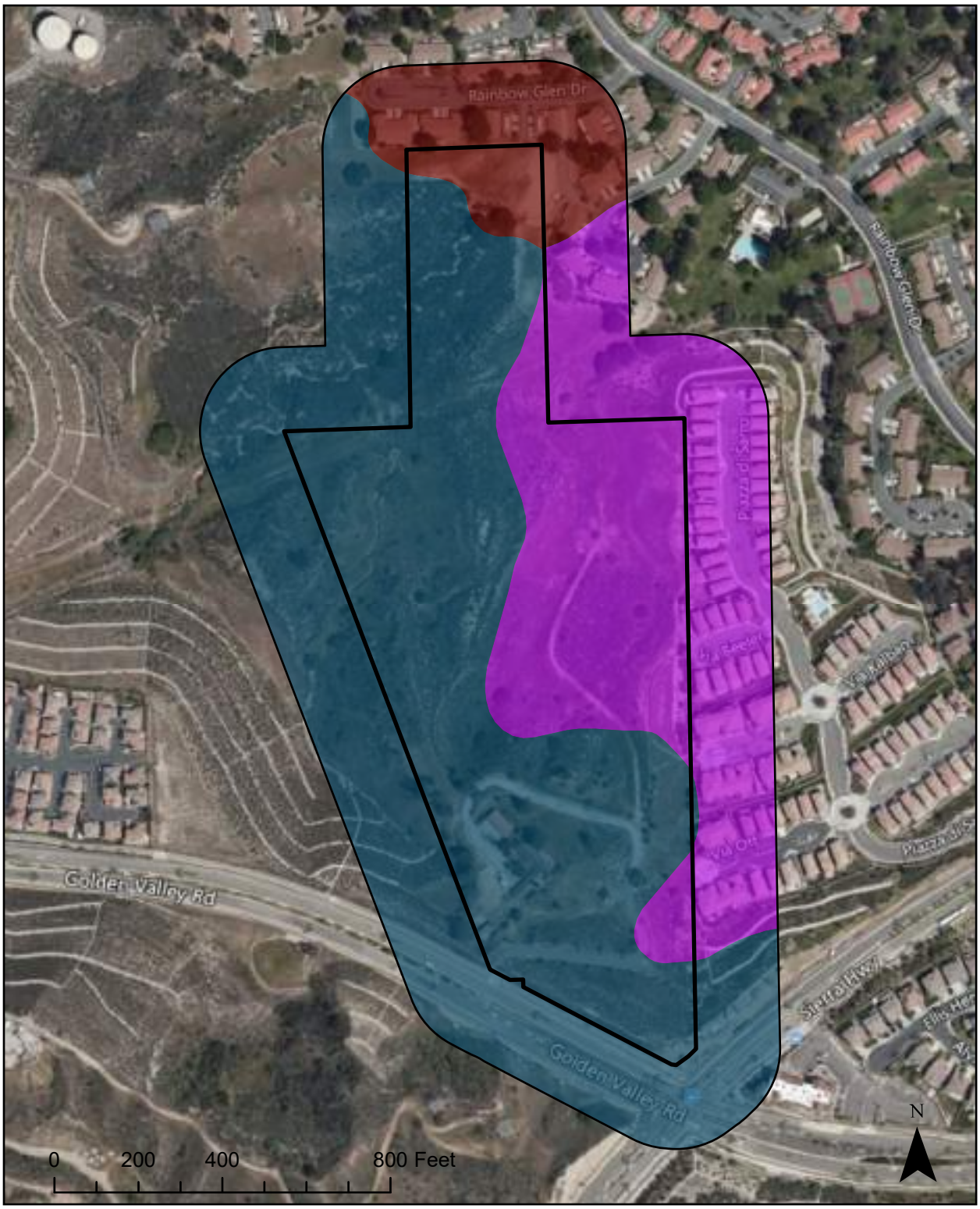
Soils

Three soils occur on the project site as shown in Figure 4:

- **Saugus loam, 30 to 50 percent slopes, eroded** is the most abundant soil type and occurs in the western half of the project site. This is an upland soil found on backslope of hills, and is well drained.
- **Castaic-Balcom silty clay loams, 15 to 30 percent slopes** is on the eastern portions of the project site. This soil type largely includes (99%) upland hills and backslopes and includes 1% of drainageways. This is a well-drained soil.
- **Zmora loam, 2 to 9 percent slopes** is on the northern tip of the project site. This soil type is typically found on terraces and backslopes and is well drained.

Plant Communities

As shown in Figure 5, there are five plant communities or cover types in a 200-foot buffer surrounding the project site, and they are summarized in Table 1 below.



Source: BING Aerial Basemap 2020, USDA NRCS Soils GIS

Santa Clarita TTM 68203

Figure 4. Soils

Survey Area (200-foot Buffer)

Project Boundary

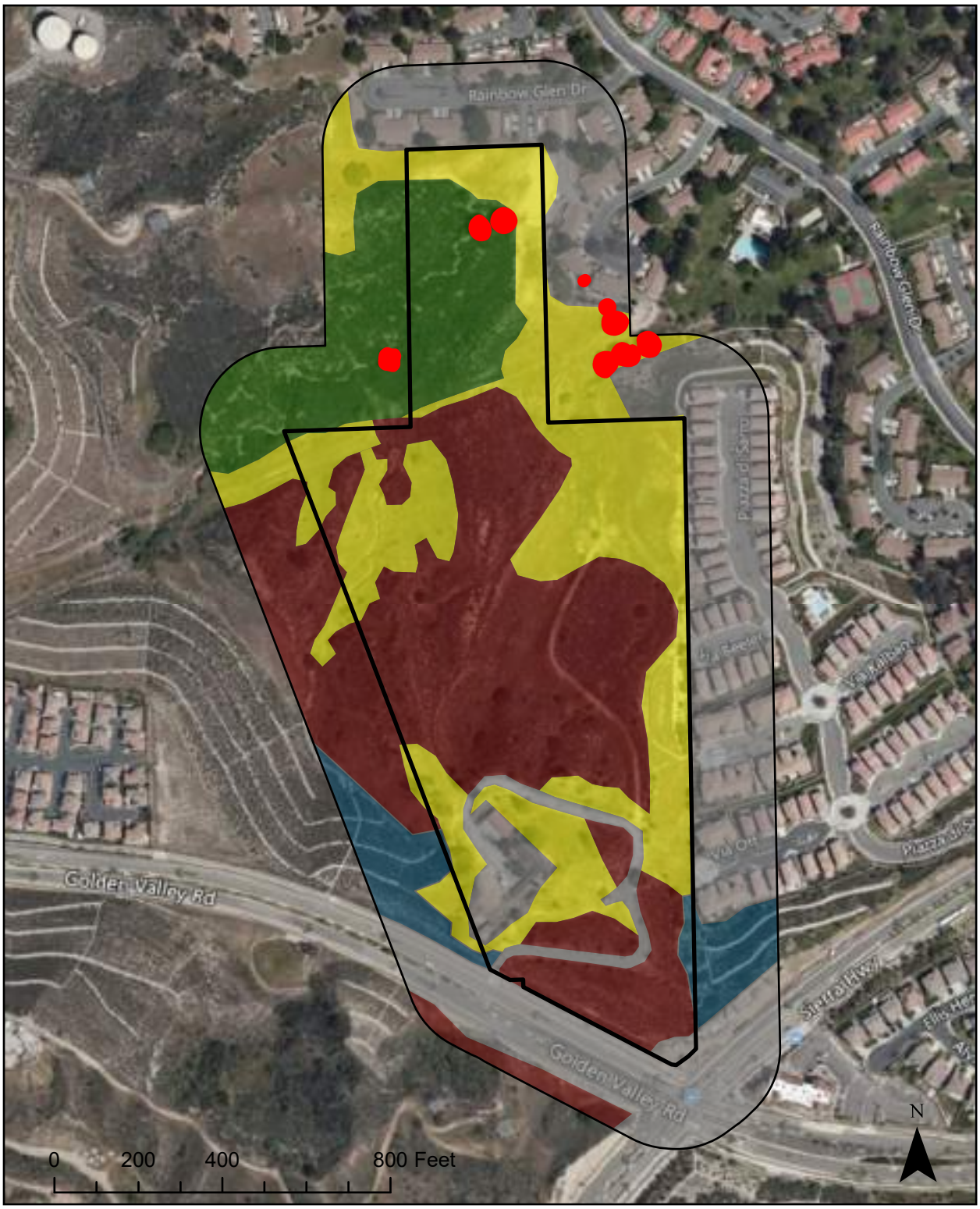
Soils

Castaic-Balcom silty clay loams, 15 to 30 % slopes

Saugus loam, 30 to 50 % slopes, eroded

Zamora loam, 2 to 9 % slopes

SOUTH ENVIRONMENTAL



Source: BING Aerial Basemap 2020, USDA NRCS Soils GIS

Santa Clarita TTM 68203

Figure 5. Plant Communities

- Survey Area (200-foot Buffer)
- Project Boundary
- Protected Oak Tree
- California Sagebrush - (Purple Sage) Scrub
- Chamise Chaparral
- Installed Sage Scrub
- Ruderal
- Developed

SOUTH ENVIRONMENTAL

Table 1. Summary of Plant Communities in Survey Area

Plant Community	Acres	Global Rank (G) /State Rank (S)
California Sagebrush – (Purple Sage) Scrub	16.71	G5/S5
Chamise Chaparral	6.66	G5/S5
Installed Sage Scrub	2.50	G5/S5
Ruderal	13.44	not ranked
Developed	17.21	not ranked
Total	56.52	

California Sagebrush – (Purple Sage) Scrub

California sagebrush – (purple sage) scrub [*Artemisia californica* – (*Salvia leucophylla*) Shrubland Alliance] as described by the Manual of California Vegetation Online occurs on 16.71-acres of the survey area. This community occurs in two Associations described by the Manual:

- ***Artemisia californica – Salvia leucophylla*** **Association** occurs on the central portions of the survey area and on the areas south of Golden Valley Road. This community is dominated by California sagebrush (*Artemisia californica*) and purple sage (*Salvia leucophylla*) is a sub-dominant species. Other prominent shrubs include California buckwheat (*Eriogonum fasciculatum*), black elderberry (Sambucus nigra), toyon (*Heteromeles arbutifolia*), and chaparral yucca (*Hesperoyucca whipplei*).
- ***Artemisia californica – Eriogonum fasciculatum*** **Association** occurs on the southern portions of the survey area between the house and the installed sage scrub. This community is co-dominated by California sagebrush and California buckwheat.

Chamise Chaparral

Chamise chaparral (*Adenostoma fasciculatum* Shrubland Alliance) as described by the Manual occurs in the northern portion of the survey area. Specifically, the *Adenostoma fasciculatum* – (*Ceanothus crassifolius*) Association occurs on the survey area and is dominated by chamise (*Adenostoma fasciculatum*) and hoary leaved ceanothus (*Ceanothus crassifolius*) is sub-dominant. Purple sage, coast live oak (*Quercus agrifolia*), and coast prickly pear (*Opuntia littoralis*) occur occassioinaly.

Installed Sage Scrub

Installed sage scrub occurs on hillsides adjacent to existing developments and are dominated by California buckwheat and have a variety of other landscaped species. These are managed areas that have a series of concrete drainage channels that direct surface water on the slopes away from the houses.

Ruderal

Ruderal areas occur throughout the survey area surrounding the house, on the hillsides adjacent to neighborhoods, and along the gas company easement. These areas are dominated by black mustard (Brassica nigra) and has a variety of other plants associated with disturbed area and landscaped species such as telegraph weed (*Heterotheca grandiflora*), California pepper tree (*Schinus molle*), olive tree (*Olea europaea*), Mexican fan palm (*Washingtonia robusta*), Canary Island date palm (*Phoenix canariensis*), blue gum eucalyptus (*Eucalyptus globulus*), and Aleppo pine (*Pinus halepensis*).

Developed

Developed areas include Golden Valley Road, Sierra Highway, paved driveway, the single-family residence on the project site, and the surrounding homes in the neighborhoods.

Hydrology & Jurisdictional Features

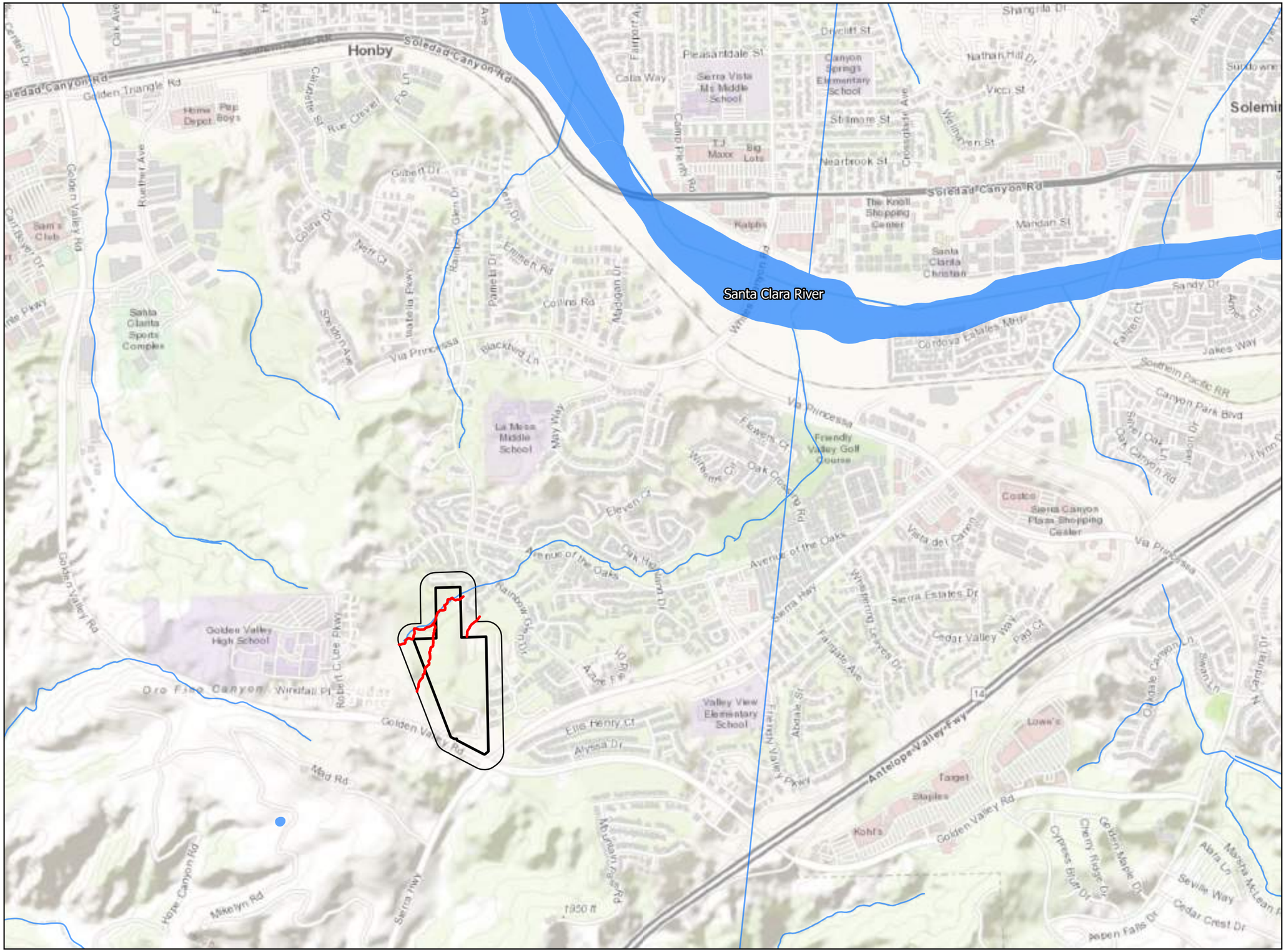
The project site is located within the Santa Clara watershed (HUC8) and within the Sand Canyon – Santa Clara River sub-watershed (HUC12). As shown in Figure 6 and Figure 7, there are three ephemeral drainages in the survey area, two of which cross through the northern portion of the project site and one of which occurs in the 200-foot buffer surrounding the project site in the northeast. These drainages are named Ephemeral Drainages #1, #2, and #3 and Table 2 below summarizes the size of these drainages in the survey area.

Table 2. Summary of Jurisdictional Features in the Survey Area

Feature	Linear Feet	Wetlands (acres)	Non-Wetland Waters of the State RWQCB/CDFW (acres)	Permanent Impacts (square feet/linear feet)	Temporary Impacts (square feet/linear feet)
Ephemeral Drainage #1	1,315	0	0.33	15/10	206/20
Ephemeral Drainage #2	1,015	0	0.23	0	105/10
Ephemeral Drainage #3	350	0	0.13	1,175/67	0
Total	2,680	0	0.69	1190/77	311/30

Figure 6.
Regional Hydrology

- Ephemeral Drainage
- National Wetlands Inventory
- Survey Area (200-foot buffer)
- Project Boundary

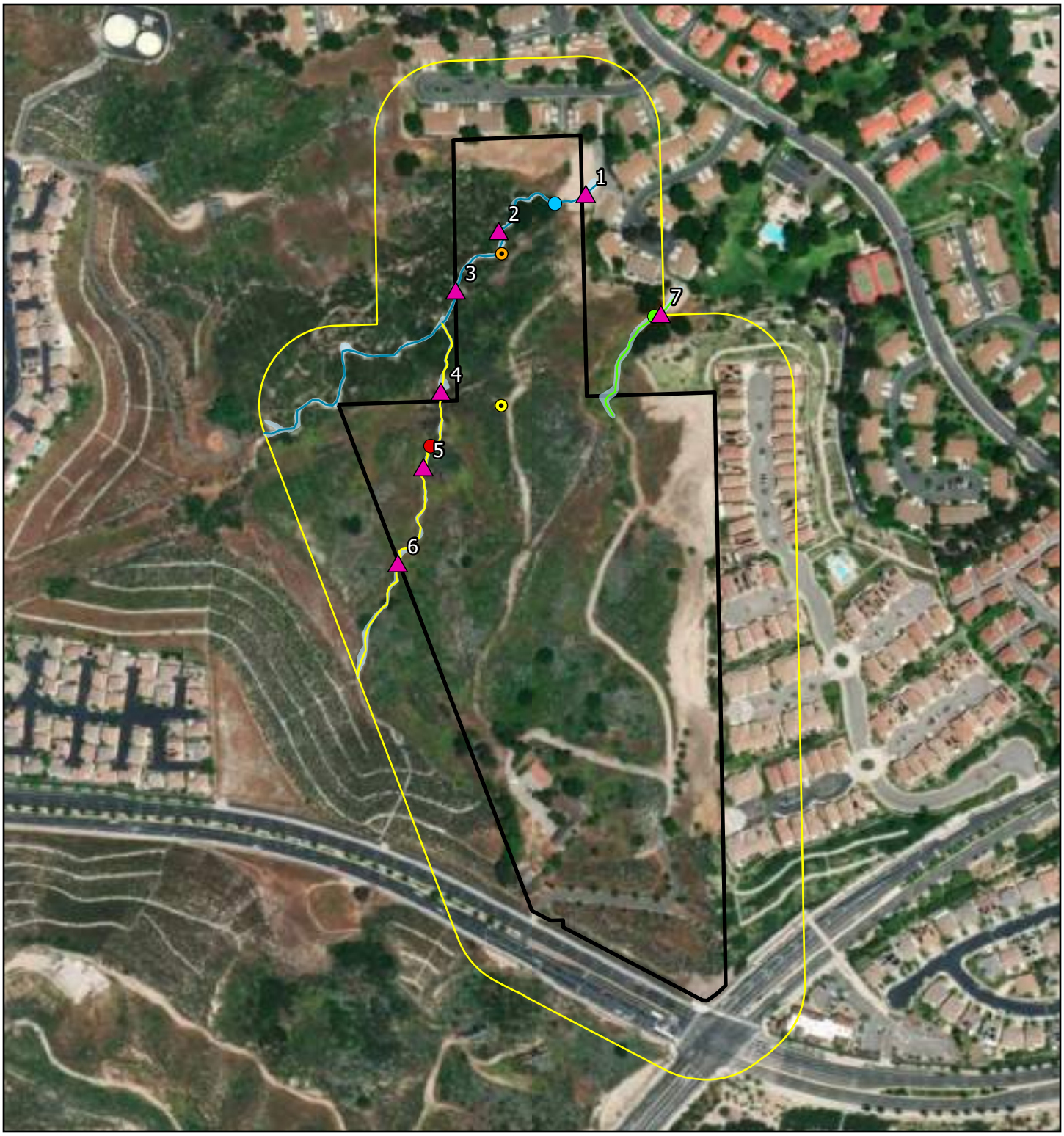


Source: ESRI World Topo 2020,
National Wetlands Inventory, 2020

0 500 1,000 2,000 Feet

N

SOUTH ENVIRONMENTAL



Source: ESRI Aerial Imagery 2025

Santa Clarita VTTM 68203 Project

Figure 7. Jurisdictional Delineation

0 215 430 Feet

N

- Photo Points
- OHWM Form #1
- OHWM Form #2
- OHWM Form #3
- Upland Data Form
- Wetland Data Form
- Project Boundary
- Survey Area - 200-foot Buffer

Jurisdictional Features

- Ephemeral Drainage #1
- Ephemeral Drainage #2
- Ephemeral Drainage #3
- Streambed / OHWM

SOUTH ENVIRONMENTAL

These drainages flow into underground culverts at the northeastern portion of the survey area and outlet into a concrete-lined drainage channel just north of Avenue of the Oak and just east of Green Terrace Drive. The channel flows east along Avenue of the Oaks and then bends northeast through Friendly Valley Golf Course, and finally flows through a culvert under Via Princessa and into the Santa Clara River. This path is shown as a blue line by the National Wetland Inventory data shown in Figure 6. The Santa Clara River outlets to the Pacific Ocean approximately 45-miles to the southwest of the survey area.

Ephemeral Drainage #1

A total of 1,315-feet (0.33-acre) of Ephemeral Drainage #1 is aboveground in the survey area. This drainage originates approximately 300-feet southwest of where it enters the survey area where a series of concrete v-ditches on the developed hillslope outlets. The drainage flows toward the northeast and into a large underground culvert and ultimately into the Santa Clara River. The drainage varies in width from about 2-feet to 25-feet and has a well-defined bed and bank, which is also the limits of the OHWM. The streambed consists of boulder and cobble substrate throughout that is contained in abrupt banks from 6-inches to 2.5-feet tall. The drainage typically lacks a floodplain, except at a few areas where the drainage turns there is a sandy floodplain that is entirely vegetated with upland plants. The drainage has dense chaparral dominated by chamise along most of the aboveground areas except near the culvert where vegetation removal occurs regularly. The drainage is also underneath the canopy of a few large coast live oaks, and other plants present include hoary leaved ceanothus, coastal prickly pear, California buckwheat, and black elderberry. Ephemeral Drainage #1 is waters of the state under the jurisdiction of the RWQCB and the CDFW. This is not waters of the U.S. because it is not relatively permanent as it only flows periodically in response to rain events.

Ephemeral Drainage #2

A total of 1,015-feet (0.23-acre) of Ephemeral Drainage #2 is on the survey area. This drainage originates on the western edge of the survey area where a series of concrete v-ditches on the developed hillslope outlets, and outlets into Ephemeral Drainage #1 in the north of the survey area. Typically, this drainage has an extremely steep and well-defined bank that is from 6-inches to 6-feet tall and typically between 1-foot and 5-feet wide, except at one point where it crosses a gas pipeline easement that was previously filled, the drainage flows over the easement and then enters a large boulder rip-rap area before continuing into a well-defined streambed again. The drainage has no floodplain and is entirely contained in the banks. The streambed consists of a cobble substrate and the surrounding area are vegetated with a dense mat of black mustard (upland species) in some areas, and native upland shrubs dominate in other areas, including California buckwheat, California sagebrush, and purple sage. As it gets closer to the endpoint the vegetation becomes dominated by chamise chaparral that covers the entire streambed.

Ephemeral Drainage #2 is waters of the state under the jurisdiction of the RWQCB and the CDFW. This is not waters of the U.S. because it is not relatively permanent as it only flows periodically in response to rain events.

Ephemeral Drainage #3

A total of 350-feet (0.13-acre) of Ephemeral Drainage #3 is on the survey area. The drainage originates at the edge of the project site where a graded dirt road on the project site drops stopes steeply to create a "U" shaped drainage that is entirely dirt lined and heavily vegetated with mostly black mustard. Purple sage also occurs in the channel, particularly in the area that is passes by several large coast live oaks. The drainage ends at an underground culvert near the northeastern edge of the survey area, and eventually joins Ephemeral Drainage #1 underground and ultimately into the Santa Clara River. This drainage has fewer surrounding slopes to direct water into it and is less well defined as a result. Ephemeral Drainage #2 is waters of the state under the jurisdiction of the RWQCB and the CDFW. This is not waters of the U.S. because it is not relatively permanent as it only flows periodically in response to rain events.

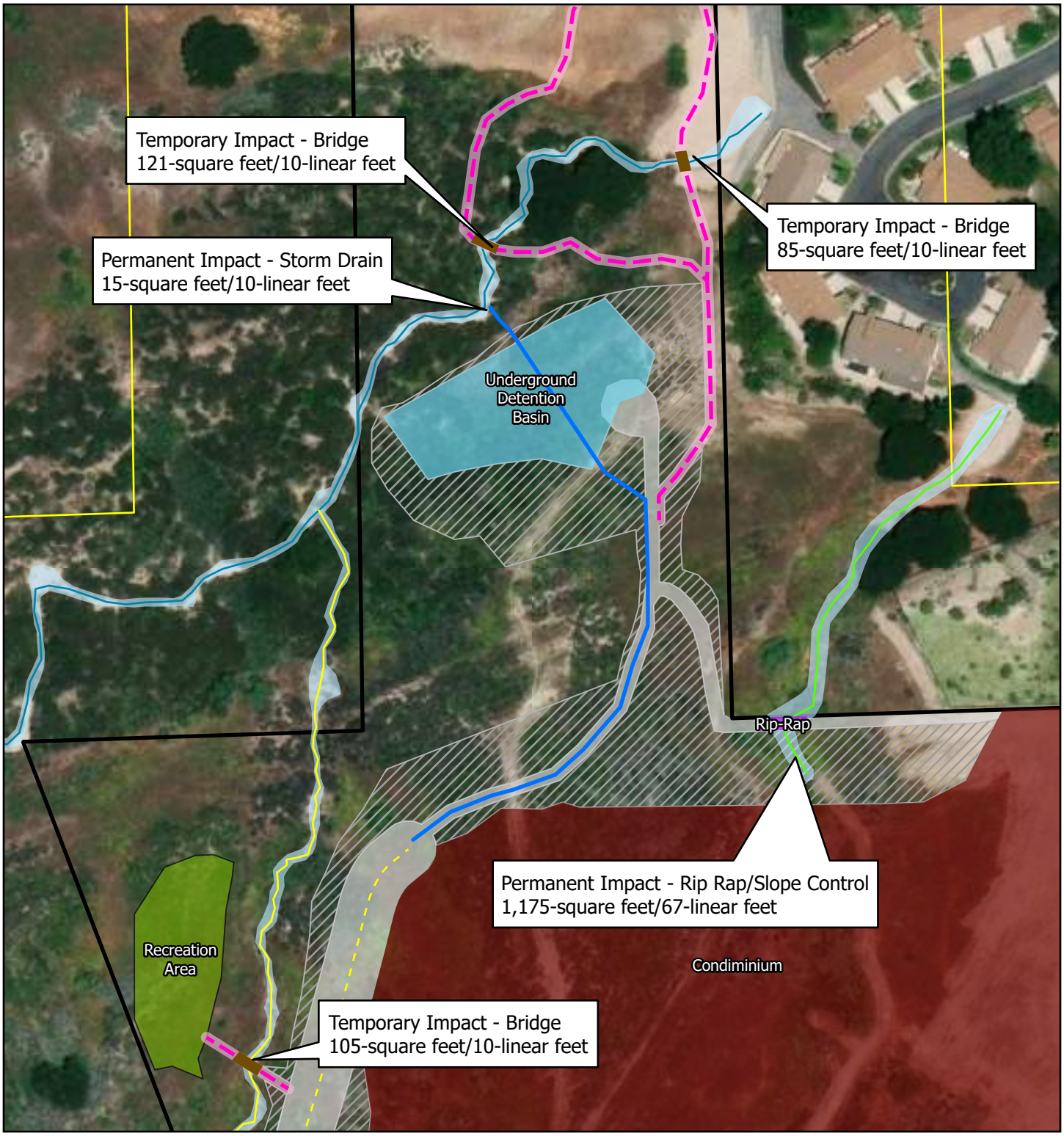
Impacts Analysis

Permanent Impacts: As shown in Figure 8 and summarized in Table 2 above, the proposed development would result in a total permanent impact to 1,190-square feet (77-linear feet) of CDFW and RWQCB features from construction as follows:

- 15-square feet (10-linear feet) of Drainage #1 where the proposed storm drain outlet would be placed within the drainage. This drain may also outlet overflow water into the drainage.
- 1,175-square feet (67-linear feet) of Drainage #3 where the proposed fire access road, rip rap, and slope control associated with the new condominiums would be permanently developed at the south end of the drainage.

Temporary Impacts: As shown in Figure 8 and summarized in Table 2 above, the proposed development would result in a total of 311-square feet (30-linear feet) of temporary impacts to CDFW and RWQCB features from construction as follows:

- 105-square feet (10-linear feet) of pedestrian bridge will be constructed over the top of Drainage #2 between the proposed road and recreation area. The bridge would not fill the stream, and the stream would remain entirely intact beneath the bridge with no obstruction of the flow during construction or operation of the project.



Source: ESRI Aerial Imagery 2025

Santa Clarita VTTM 68203 Project

Figure 8. Impacts to Jurisdictional Features

0 75 150 Feet

N

- Project Boundary
- Survey Area - 200-foot Buffer

Proposed Development

- Riding/Hiking Trail
- Drainage Pipe
- Road Centerline
- Hikinig Trail
- Condiminium
- Underground Detention Basin
- Hotel
- Senior Assisted Living
- Recreation Area
- Rip-Rap
- Bridge
- Road
- Slope Control

Jurisdictional Features

- Ephemeral Drainage #1
- Ephemeral Drainage #2
- Ephemeral Drainage #3
- Streambed / OHWM

SOUTH ENVIRONMENTAL

- 121-square feet (10-linear feet) of pedestrian/horse bridge will be constructed over the top of Drainage #1 immediately north of the proposed underground detention basin.. The bridge would not fill the stream, and the stream would remain entirely intact beneath the bridge with no obstruction of the flow during construction or operation of the project.
- 85-square feet (10-linear feet) of pedestrian/horse bridge will be constructed over the top of Drainage #1 northeast of the proposed underground detention basin. The bridge would not fill the stream, and the stream would remain entirely intact beneath the bridge with no obstruction of the flow during construction or operation of the project.

The impacts from construction of the bridges would be temporary and only occur during construction. Following construction, the drainages would be unaffected by the new development and will function exactly as they do now. The bed and bank would not be altered as the footings for the bridge would be outside of the bank in upland areas that would not alter drainages in any way The discharged water from the underground detention basin will be treated prior to discharge which will reduce the potential for contaminants in the water, and the amount of discharged water would be similar to pre-construction runoff that would naturally runoff into the drainages. Nonetheless, these temporary and permanent impacts would be considered significant according to Porter Cologne Act, Section 401 of the Clean Water Act, and Section 1600 of the Fish and Game Code and permits and mitigations will be required to construct the project to reduce the impacts to a less than significant level.

Recommendations:

- Prior to construction the project shall obtain a Lake and Streambed Alteration Agreement from CDFW and a water quality certification and Waste Discharge Requirements from RWQCB.

Conclusion

Three ephemeral drainages occur in the survey area that are under the jurisdiction of the RWQCB, and the CDFW. Permits should be sought for impacts to these features. Permit conditions should be followed to compensate or mitigate for the impacts, and to avoid impacts to the remaining features during construction and operation of the development. If you have any questions regarding the information in this report, please contact Matthew South by email: msouth@southenvironmental.com or by mobile phone: 303.818-3632.

Sincerely,

Matthew R. South

List of Attachments

1. **Attachment A**. Photograph Exhibit
2. **Attachment B**. Wetland Determination Data Forms – Arid West Region and Arid West Ephemeral and Intermittent Streams OHWM Datasheets

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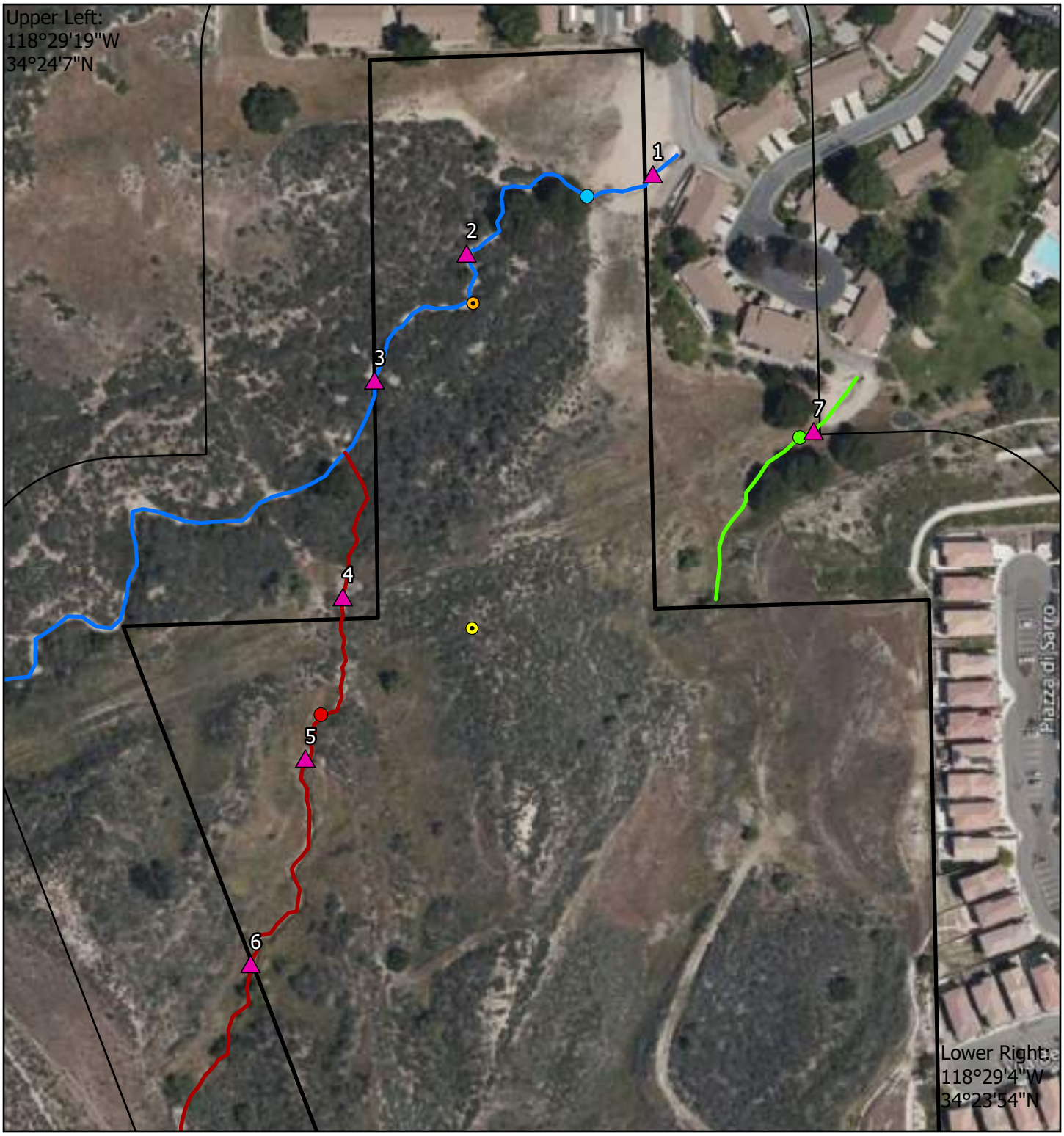
Attachment A

Photograph Exhibit



Source: BING Aerial Basemap 2020

Santa Clarita TTM 68203

Photograph Points

0 70 140 280 Feet

N

- Photo Points
- OHWM Form #1
- OHWM Form #2
- OHWM Form #3
- Upland Data Form
- Wetland Data Form
- Ephemeral Drainage #1 (1,315-ft / 0.33-acre)
- Ephemeral Drainage #2 (1,015-ft / 0.23-acre)
- Ephemeral Drainage #3 (326-ft / 0.12-acre)
- Project Boundary
- Survey Area (200-foot buffer)

SOUTH ENVIRONMENTAL

Photo Point #1 facing NE

Photo Point #1 facing SW (OHWM Data Point Location)

Photo Point #2 facing NE

Photo Point #2 facing S

Photo Point #3 facing N

Photo Point #3 facing S

Photo Point #4 facing N

Photo Point #4 facing S

Photo Point #5 facing S

Photo Point #5 facing E into drainage bottom

Photo Point #6 facing S

Photo Point #6 facing N

Photo Point #7 facing NE

Photo Point #7 facing SW

TENTATIVE TRACT MAP No. 68

LOCATED IN THE CITY OF SANTA CLARITA
STATE OF CALIFORNIA

LEGEND
-APPROXIMATE OVER-EXCAVATION
-APPROXIMATE REMEDIAL REMOVAL DEPTH
Afu -ARTIFICIAL FILL-UNDOCUMENTED
Cf -CERTIFIED FILL
Qal -QUATERNARY ALLUVIUM (REMOVE ALL)
Qls? -LANDSLIDE DEBRIS, QUERIED WHERE UNCERTAIN
Qols -OLDER LANDSLIDE DEBRIS, CIRCLED WHERE BURIED
Tsr -SAUGUS FORMATION, SUNSHINE RANCH MEMBER
-APPROXIMATE GEOLOGIC CONTACT
-APPROXIMATE DESIGN KEYWAY LOCATION
-LOCATION OF RESTRICTED USE AREA
TRACT 30787
TRACT No. 061811-03
TR. BOUNDARY
LOT 1 CONDOMINIUM PURPOSES
LOT 2 SENIOR ASSISTANT LOT
LOT 3 CONDOMINIUM PURPOSES
HOTEL LOT "A"
PRIVATE ST.
"B" ST.
100' SCE EASEMENT
ROBERT C. LEE PARKWAY
GOLDEN VALLEY RD
GOLDEN VALLEY ROAD
RAINBOW
DE SABRO
PIAZZA
VIA BERLER
VIA KALDAN
VIA OTT
SIERRA
HIGH
2:1 SLOPE
APN 2836-013-106
APN 2836-013-126
APN 2836-013-157
APN 2836-013-158
APN 2836-013-159
APN 2836-013-918 WILLIAM S. HART UNION HIGH SCHOOL DISTRICT
APN 2836-013-180 DWP
APN 2836-013-129
APN 2836-013-111
APN 2836-013-181
APN 2836-014-055
APN 2836-014-078
APN 2836-013-904 CITY OF SANTA CLARITA
APN 2836-013-905 TRACT 52294
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APN

Attachment B

Wetland Determination Data Forms – Arid West Region and Arid West Ephemeral and Intermittent Streams OHWM Datasheets

WETLAND DETERMINATION DATA FORM – Arid West Region

Wetland Sample Point

Project/Site: Santa Clarita VTTM City/County: Santa Clarita/Los Angeles Co. Sampling Date: 11/11/20

Applicant/Owner: Velocat State: CA Sampling Point: #1-cactus Photo

Investigator(s): Matthew South Section, Township, Range: S30, T04N, R15W

Landform (hillslope, terrace, etc.): streambed Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): Lat: 34.4009 N Long: -118.4866 W Datum: Dec. Degrees

Soil Map Unit Name: NWI classification: Riverine ephemeral

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.) – Dry season

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X*

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

This area is a stream, w/ boulder/gravel bottom, sandy sides

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. blue elderberry (1)	6	Y	FACU
2.			
3.			
4.			
	6 = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. chamise	50	Y	UPL
2. hoary cassiope	20	Y	UPL
3. Cal. buckwheat	2	N	UPL
4.			
5.			
	72 = Total Cover		
Herb Stratum (Plot size: ____)			
1. Opuntia	1	N	UPL
2. Red leafy	3	N	T
3.			
4.			
5.			
6.			
7.			
8.			
	4 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	6	x 4 =	24
UPL species	73	x 5 =	365
Column Totals:	79 (A)		389 (B)

Prevalence Index = B/A = 4.92

Hydrophytic Vegetation Indicators:

N Dominance Test is >50%

N Prevalence Index is ≤3.0[1]

N Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

N Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

Upland vegetation

Wetland sampling point

Sampling Point: ____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 4/6	100					course sandy loam, boulders	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ No ____

Remarks:

Boulders, sandy, gravelly, very loose alluvial material
no signs of hydric soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- X Water Marks (B1) (Riverine)
- X Sediment Deposits (B2) (Riverine)
- X Drift Deposits (B3) (Riverine)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This is a streambed. Visible bed + bank ~ 10-15 ft wide
walls 1-3 ft on upslope

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: SantaClaritaVTTM City/County: SantaClarita/LosAngeles Sampling Date: 11/21/20
Applicant/Owner: Valley Oak State: _____ Sampling Point: Upland Sample Point
Investigator(s): Matthew Smith Section, Township, Range: S30, T04N, R15W
Landform (hillslope, terrace, etc.): on top of hill/ridge Local relief (concave, convex, none): convex Slope (%): 5
Subregion (LRR): _____ Lat: 34.3999 Long: -118.4866 Datum: Decimal Degrees
Soil Map Unit Name: _____ NWI classification: not mapped
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	Is the Sampled Area within a Wetland? Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:
This is on a peak above the drainages surveyed

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 30ft radius)			
1. California sagebrush	65	Y	UPL
2. purple sage	20	Y	UPL
3. Deerweed	2		UPL
4.			
5.			
	87 = Total Cover		
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust _____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of		Multiply by:	
OBL species	0	x 1 =	—
FACW species	0	x 2 =	—
FAC species	0	x 3 =	—
FACU species	0	x 4 =	—
UPL species	87	x 5 =	
Column Totals:	87 (A)		(B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:
N Dominance Test is >50%
N Prevalence Index is ≤3.0[1]
N Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
N Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:
purple sage scrub upland habitat
dominated by Cal. sagebrush + purple sage

SOIL

Sampling Point: upland sampling point

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5 5/3	100	none				Sandy loam	no of gravel layer no gravel/cobble

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

Non-hydric soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicator

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Santa Clarita UTM 68203
Project Number:
Stream: Ephemeral Drainage #1
Investigator(s): Matthew South

Date: 11/21/2020 **Time:**
Town: Santa Clarita **State:** CA
Photo begin file#: **Photo end file#:**

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details:

Projection: Decimal Degrees **Datum:**
Coordinates: Lat: 34.4013 N Long: -118.4862 W

Potential anthropogenic influences on the channel system:

This receives water from drainages on the slope / neighborhood surfaces.

Brief site description:

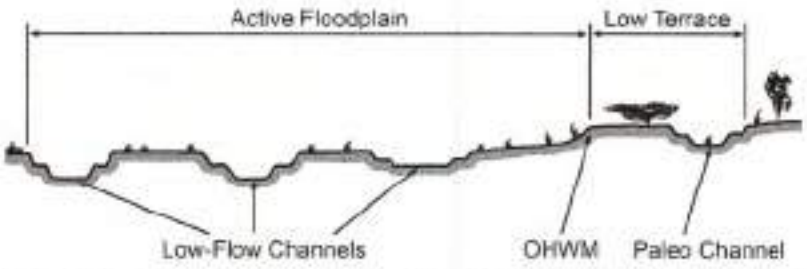
Drainage flows through chamise chaparral and into underground culvert near the OHWM point to NE.

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☒ Geologic maps
- ☒ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



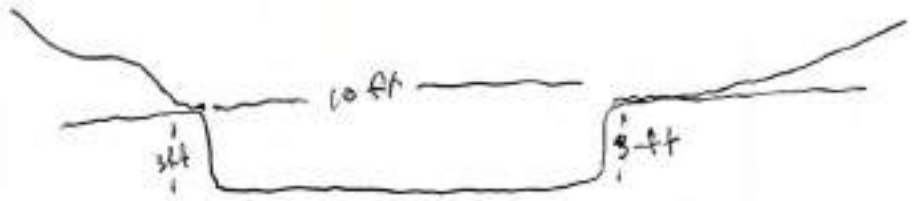
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☒ Digitized on computer
   - ☒ GPS
   - ☐ Other:

Ephemeral

roject ID: **Cross section ID:** Dmingo#1 **Date:** 11/21/2020 **Time:**

Cross section drawing:



OHWM

GPS point: OHWM Form#1 Lat: 34.4013N Long: -118.4862W

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

The channel is well-defined bed + bank where OHWM is contained

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: None

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Santa Clarita VTTM 68203
Project Number:
Stream: Ephemeral Drainage #2
Investigator(s): Matthew South

Date: 11/21/2020 **Time:**
Town: Santa Clarita **State:** CA
Photo begin file#: **Photo end file#:**

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details:

Projection: Decimal Degrees **Datum:**
Coordinates: Lat, 34.3796N Long: -118.4826W

Potential anthropogenic influences on the channel system:

Recieves water from drainage channels on slopes upstream

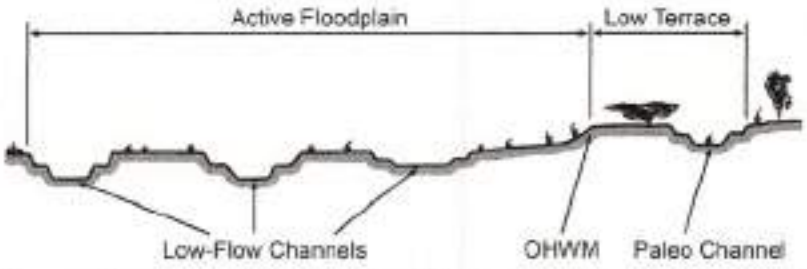
Brief site description:

Drainage flows through sagebrush & bedrock scrub. Well defined channel w/ no flood plain

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [X] Geologic maps
- [X] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

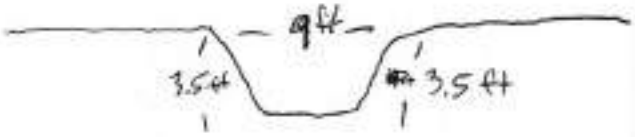


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [X] Mapping on aerial photograph
   - [X] Digitized on computer
   - [X] GPS
   - [ ] Other:

Project ID: Cross section ID: Ephemeral Drainage #2 Date: 11/21/2020 Time:

Cross section drawing:



OHWM

GPS point: OHWM Form #2 Lat: 34.3596N Long: -118.4872W

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

The channel is well defined w/ steep banks heavily vegetated, no floodplain

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Santa Clarita UTM 68203
Project Number:
Stream: Ephemeral Drainage #3
Investigator(s): Matthew South

Date: 11/21/2020 **Time:**
Town: Santa Clarita **State:** CA
Photo begin file#: **Photo end file#:**

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [X] / N [ ] Is the site significantly disturbed?

Location Details: near underground culvert @ edge of neighborhood

Projection: Dec. Degrees **Datum:**

Coordinates: Lat: 34.4005N Long: -118.485°3W

Potential anthropogenic influences on the channel system:

near residential development and in a gas line easement

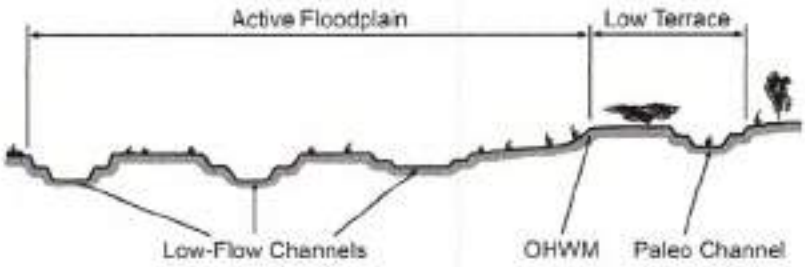
Brief site description:

Area w/ const Live oaks + black mustard + purple sage near residential development

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [X] Geologic maps
- [X] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



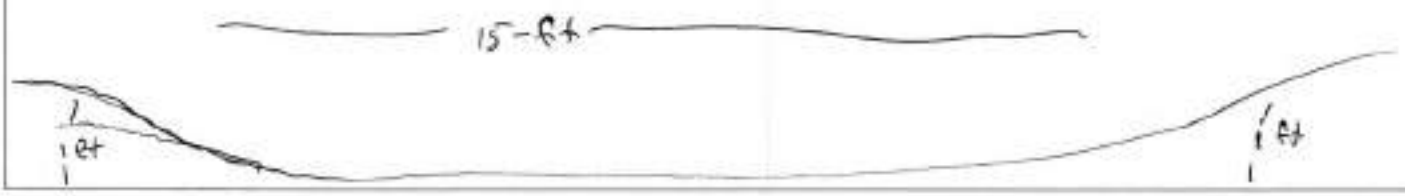
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [X] Mapping on aerial photograph
   - [X] Digitized on computer
   - [X] GPS
   - [ ] Other:

Ephemeral Draining

Project ID: **Cross section ID:** #3 **Date:** **Time:**

Cross section drawing:



OHWM

GPS point: OHWM Form #3 Lat: 34.4005 N Long: -118.4853

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [ ] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments:

Shallow depression that spreads out near culvert underground

Floodplain unit:

- [ ] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

Comments:

APPENDIX B-4
Oak Tree Report

December 30, 2020 (updated August 13, 2025)

Renaud & Sue Veluzat
24715 Oak Creek Road
Newhall, California 91321

RE: Oak Tree Report for Tentative Tract Map (TTM) 68203 in Santa Clarita, California

Dear Mr. & Mrs. Veluzat,

This letter includes results of a focused oak tree survey and an assessment of impacts to oaks protected by the City of Santa Clarita Oak Tree Preservation Ordinance from a proposed mixed-use development on Tentative Tract Map (TTM) 68203 in the City of Santa Clarita, California. The scope of this letter report includes a description of the project, methodology, results of the survey, an assessment of potential impacts to protected oaks, and required and recommended mitigation to reduce or avoid potential impacts.

Project Description

Project Location and Setting

The property proposed for development (property) includes 28.13-acres consisting of 10 parcels located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita (see Figure 1 below).

- Assessor's Parcel Numbers (APNs): 2836-013-106, 2836-013-107, 2836-013-111, 2836-013-128, 2836-013-133, 2836-013-141, 2836-020-058, 2836-020-078, 2836-020-086, 2836-020-087

Source: BING Aerial Basemap 2020

Santa Clarita TTM 68203

Figure 1. Project Location

SOUTH ENVIRONMENTAL

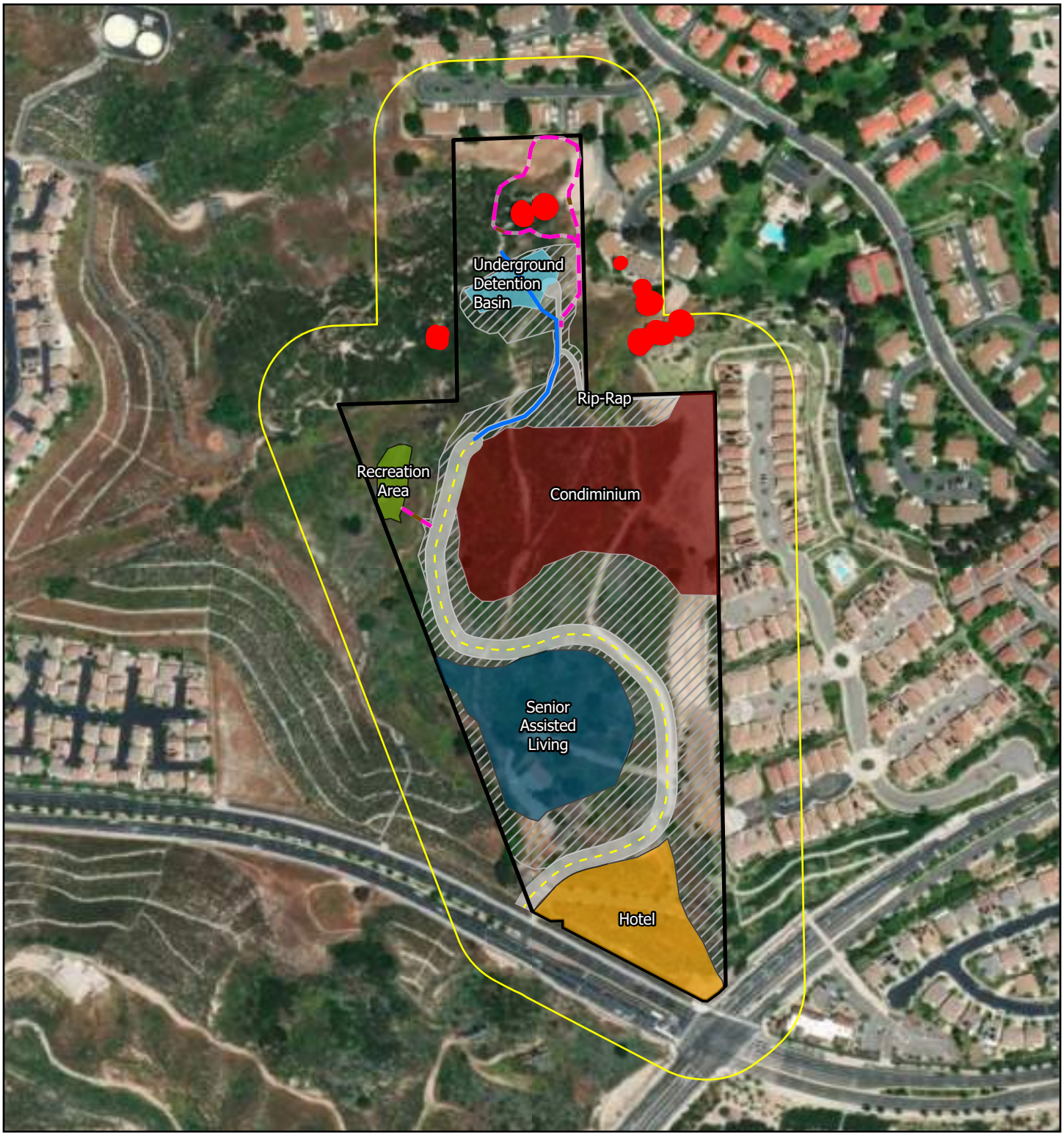
Most of the property is undeveloped except for a single-family home and accessory structures with a street address 20101 Golden Valley Road. A windy paved driveway exists off Golden Valley Road provided access to the home, and a series of dirt roads provide access to the remaining undeveloped hills on the property. Adjacent uses include residential uses to the immediate north and east, vacant land to the south, and residential uses/Golden Valley High School to the west.

The undeveloped areas of the property are largely covered with coastal sage scrub plant communities on the slopes and a chamise chaparral in the very northern parcel that surrounds a drainage which flows into a culvert at the northeastern corner of the property. Disturbed areas are also on the parcel where past grading for utility corridors and near the adjacent housing developments that are dominated by non-native grasses and invasive mustard.

Proposed Development

The proposed development seeks to merge the 10 parcels and entitle a Tentative Tract Map 68203 for a four (4) lot subdivision consisting of the following (shown in Figure 2 below and in the attached Site Plan):

- One (1) 5.04-acre lot for a four (4) story building consisting of 154-unit senior assisted living units; the proposed four (4) story building will be 50-foot maximum height.
- One (1) 5.04-acre lot for a 100-room commercial hotel and retail building.
- One (1) 11.48-acre lot for 73 residential Condominium units consisting two, three, and four-plex buildings.
- One (1) 5.83-acre open space lot for L.I.D. storm water treatment and an eight-foot wide riding and hiking trial.
- Proposed streets and circulations will result in approximately 0.73 acres of development.
- A Proposed Recreation Area and foot bridge access is proposed west of the condominium units.
- The project will require slope control surrounding all developments as shown in the Site Plan.



Source: ESRI Aerial Imagery 2025

Santa Clarita VTTM 68203 Project

Figure 2. Proposed Development

0 215 430 Feet

N

- Project Boundary
- Survey Area - 200-foot Buffer
- Oak Tree Protected Zone

Proposed Development

- Riding/Hiking Trail
- Drainage Pipe
- Road Centerline
- Hikinig Trail
- Condiminium
- Underground Detention Basin
- Hotel
- Senior Assisted Living
- Recreation Area
- Rip-Rap
- Bridge
- Road
- Slope Control

SOUTH ENVIRONMENTAL

Methodology

Focused Oak Tree Surveys

A focused survey for oak trees was conducted within the project parcels on October 10, 2020 and another focused survey for oak trees was conducted within a 200-foot buffer surrounding the parcels on November 4, 2020 by South Environmental certified arborist Matthew South (International Society for Arboriculture [ISA] WE-12564A). The surveys were conducted in accordance with the City of Santa Clarita Oak Tree Preservation Ordinance and Oak Tree Preservation and Protection Guidelines (City of Santa Clarita 1990).

City of Santa Clarita Oak Tree Preservation Ordinance

According to the City of Santa Clarita Oak Tree Preservation Ordinance no person "shall cut, prune, remove, relocate, endanger, damage or encroach into the protected zone of any oak tree" that is 6-inches in circumference when measured at a point 4.5-feet above the tree's natural grade "except in accordance with the conditions of a valid oak tree permit issued by the City". An oak tree report conforming to the City of Santa Clarita Oak Tree Preservation and Protection Guidelines is required for a permit application. Heritage oaks are further protected by the ordinance, which is defined as an oak with a circumference of 108-inches for one stem or 72-inches for each stem of a multi-stem tree.

City of Santa Clarita Oak Tree Preservation and Protection Guidelines

This letter report is written per the City of Santa Clarita Oak Tree Preservation and Protection Guidelines and includes the following information for each protected oak tree:

- Physical Evaluation of each protected oak that includes location of the tree (South Environmental uses a Trimble R1 GPS unit with sub-meter accuracy), circumference of the trunk at 4.5-feet above grade, diameter of canopy at 8 compass points, protected zone of the tree (measured 5-feet from the canopy or 15-feet from trunk at a minimum), mean natural grade at base, height, symmetry rating A-F scale, tree environment, physical structure, and canopy clearance from grade for each compass point.

- Horticultural Evaluation of each protected oak that includes physical evidence of disease (exfoliation, leaf scorch, exudations), identification of pests, and an evaluation of vigor.

- Recommended Mitigation Measures for correcting physical or horticultural problems or for reducing or avoiding impacts from the proposed project to protected oaks.

- Oak Tree Rating System definitions will be used to describe the condition of each protected oak:

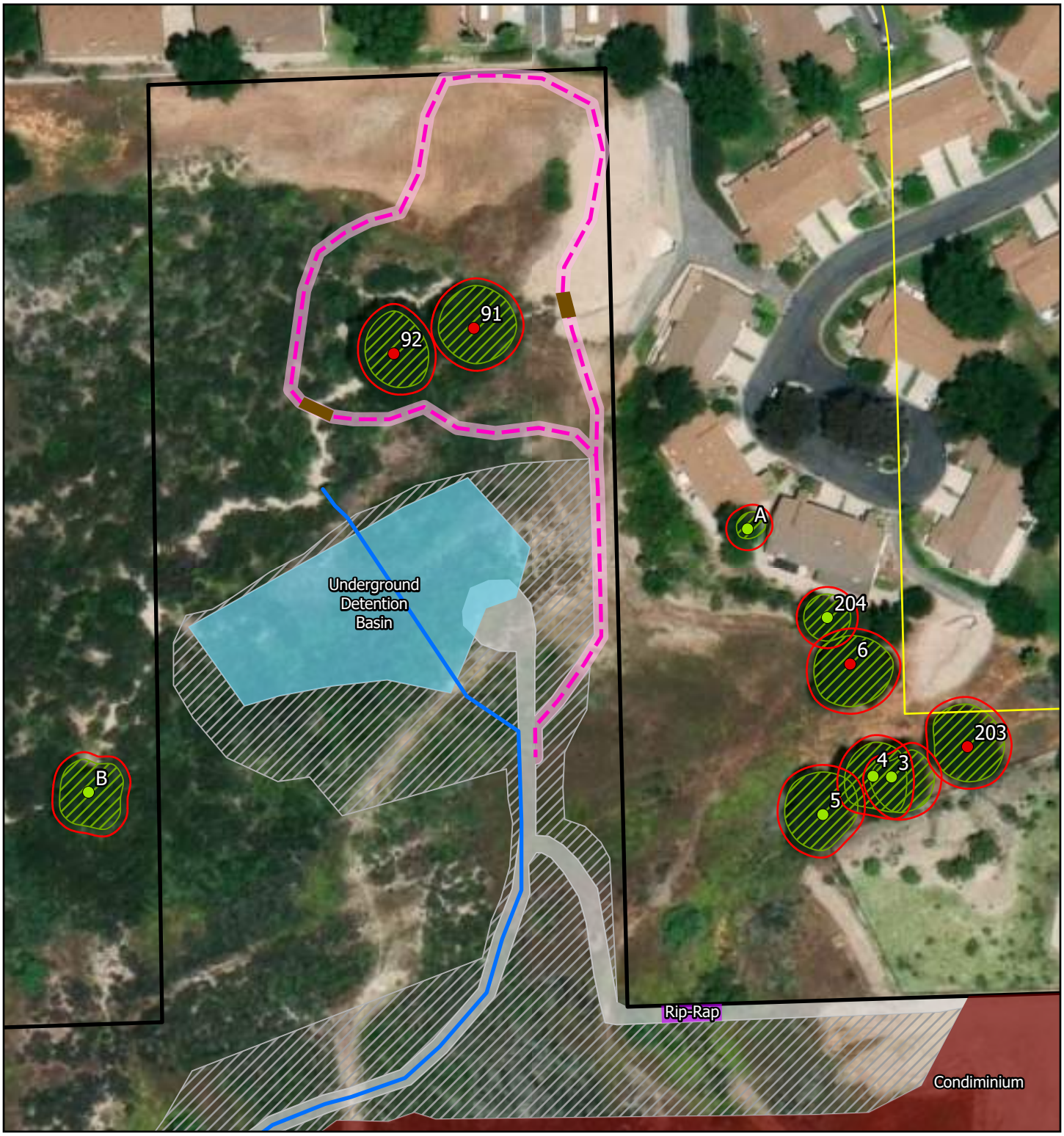
    - **A = Outstanding:** A healthy and vigorous tree characteristic of its species and reasonably free of any visible signs of stress, disease or pest infestation.
    - **B = Above Average:** A healthy and vigorous tree with minor visible signs of stress, disease and/or pest infestation.
    - **C = Average:** Although healthy in overall appearance there is an abnormal amount of stress or disease and/or pest infestation.
    - **D = Below Average/Poor:** This tree is characterized by exhibiting a greater degree of stress, disease and/or pest infestation than normal and appears to be in a state of rapid decline. The degree of decline may vary greatly in signs of dieback, disease and pest infestation and appears to be in an advanced state of decline.
    - **F = Dead:** This tree exhibits no signs of life whatsoever.

Results

As shown in Figure 3 below, there are two (2) heritage oaks on the property and eight (8) off-property protected oaks (including 2 heritage oaks) within the 200-foot survey buffer. Oak #91, #92, and #3-#6 were already tagged and numbered. Tags were applied to Oak #203 and #204 during the survey. Oak A was on private property and Oak B was surrounded by dense chaparral, making them inaccessible during the survey, therefore, the measurements and assessment for these trees were estimated as best as possible from the nearest vantage point. The measurements and data collected for each oak is included in the table in Attachment A and a photograph of each oak is in Attachment B.

Impact Analysis

As shown in Figure 3, the Tree Protected Zones (TPZs) for all the oaks are outside of the proposed construction and no impacts are expected to occur from construction. All the oaks would remain in place following the project. TPZs of oaks #91 and #92 are 15-feet north of the proposed hiking and riding trail, 15-feet west of stormwater overflow outlet, and 75-feet north of the underground detention basin and these trees could be endangered by project equipment if it goes outside of the proposed construction area. All of the proposed project features are proposed to be constructed greater than 15-feet from onsite oaks TPZs, and therefore, no direct impacts are anticipated. Drawn sections of these trees are not included because there are no direct impacts to protected zone above or below ground.



Source: ESRI Aerial Imagery 2025

Santa Clarita VTTM 68203 Project

Figure 3. Oak Tree Survey

0 60 120 Feet

N

Project Boundary

Survey Area - 200-foot Buffer

Oak Tree

Oak Tree

Heritage Oak

Canopy

Oak Tree Protected Zone

Proposed Development

Riding/Hiking Trail

Drainage Pipe

Road Centerline

Hikinig Trail

Condiminium

Underground Detention Basin

Hotel

Senior Assisted Living

Recreation Area

Rip-Rap

Bridge

Road

Slope Control

SOUTH ENVIRONMENTAL

Recommendations

Protective fencing shown in Figure 3 is recommended to avoid impacts to onsite oaks during construction. Similarly, off-property oaks are between 50-200 feet from proposed project and fencing to delineate the edge of construction described in the mitigation below is recommended to ensure construction equipment avoids impacts to off-property oaks by staying within the project limits. Additional mitigation from the City's Ordinance and Guidelines are below.

To avoid impacts to protected oaks on the property the following mitigation is recommended:

- Apply for and receive a valid Oak Tree Permit from the City of Santa Clarita because the project endangers on-site protected heritage oak trees due to proximity of construction activities. All oak trees should be protected during construction and remain following completion.

- No work shall occur within the protected zones of protected oaks.

- The area surrounding the oaks should remain natural and no new plantings should be introduced within the protected zones of protected oaks.

- Protective fencing should be placed around protected heritage oaks on the project site. The fencing should be a highly visible material at least 5-feet high but should avoid damaging the surrounding native shrubs. No footings or chain-link fencing is proposed due to the potential to impact the native chaparral surrounding the oaks. Fencing should be a plastic or other similar fencing that has high visibility and small posts should be used to install the fencing without damaging the shrubs. Fencing should be inspected by the project arborist prior to commencement of work and should remain in place throughout the construction of the project.

- Signs should be installed on the fence in four locations around the trees. The signs must be a minimum of 2-feet by 2-feet square and must contain the following:
    - "Warning: This fence is for the protection of these trees and shall not be removed or relocated without written authorization from the City of Santa Clarita Community Development Department"

- All oak tree protection measures implemented during the project should be certified by an oak tree preservation consultant following completion of the project. Approval and certification of oak tree work by the City of Santa Clarita Community Development Department should also be completed after construction of the project.

To avoid impacts to off-property protected oak the following mitigation is recommended:

- Limits of construction should be delineated clearly using a visible fencing and project equipment should remain inside the approved project limits for the duration of construction. No driving, materials staging, project personnel, or other activities should be located outside of the project limits during construction.

Certification Statement

I, Matthew South, certify that I have inspected the trees described in this report personally and have accurately stated my findings. The analysis, assessments, and conclusions were prepared using accepted arboricultural practices. I performed the work myself and I have no current or future interest in the property or project. If you have any questions regarding the information in this report, please contact Matthew South by email: msouth@southenvironmental.com or by mobile phone: 303.818-3632.

Sincerely,

Matthew R. South
ISA Certified Arborist (WE-12564A)

Bibliography

City of Calabasas. 1990. City of Santa Clarita Oak Tree Preservation and Protection Guidelines

List of Attachments

1. **Attachment A**. Oak Tree Data Summary Table
2. **Attachment B**. Photograph Exhibit
3. **Attachment C**. Site Plan

Attachment A

Oak Tree Data Summary Table

					Canopy (Spread[ft]/Distance to Ground [ft])											
ID#	**Latin Name**	**Heritage**	**CBH**	**Ht (ft)**	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**	**Physical Evaluation**	**Horticultural Evaluation**	**Health**	**Impacts**	**Notes**
91	*Quercus agrifolia*	Y	81,85	30	30/0	30/0	30/0	28/0	25/0	22/0	20/0	25/0	low horizontal branching, some branches on ground, interior branches some broken and colluded, overall structure is well balanced	no visible pests or disease, high vigor	B	Remain	Slight grade change under canopy slopes to N into a channelized dirt drainage. Woodrat middens under canopy. Tag already on tree. Surrounded by dense chaparral except on E where area is cleared of vegetation for fuel modification for nearby houses.
92	*Quercus agrifolia*	Y	75,107	35	28/0	22/0	25/0	28/0	25/0	20/0	20/0	22/0	some broken interior branches on ground. Overall structure is very balanced.	no visible pests or disease, high vigor	A	Remain	Drainage underneath canopy, slight slope into drainage. Vegetation growing underneath such as opuntia cactus. Tag alread on tree. Surrounded by dense chaparral except on E where area is cleared of vegetation for fuel modification for nearby houses.
op3	*Quercus agrifolia*	N	75	40	10/20	25/8	30/2	30/0	25/0	15/20	15/25	15/25	unbalanced crown, lean to SE, suppressed by op4.	High vigor	B	Remain	on a N facing slope where small mammal burrows under canopy, also has a lot of shrub growth under canopy. Area is disturbed habitat near houses that has non-native grasses and limited shrub cover.
op4	*Quercus agrifolia*	N	44,50,53	40	25/15	25/4	30/0	30/0	20/0	25/0	20/15	20/6	minor dieback of interior branches	High vigor. Boring insects on dead interior wood.	B	Remain	on N facing slope, small mammal burrows and woodrat middens under canopy, shrubs under canopy. Mostly non-native grasses in habitat near houses.
op5	*Quercus agrifolia*	N	91	40	25/10	30/1	25/15	20/8	20/2	20/1	25/3	25/2	minor dieback of interior branches	High vigor. Boring insects on dead interior wood.	A	Remain	on slope, small mammal burrows and woodrat middens under canopy. Area has some shrub cover in nearby drainage to the S, but immediate vicinity is graded and covered with non-native grassess and mustad.
op6	*Quercus agrifolia*	Y	113	40	20/3	20/2	25/1	25/4	25/0	25/1	20/2	20/0	very well balanced	High vigor. Boring insects on dead interior wood.	A	Remain	on flat area
op203	*Quercus agrifolia*	Y	~188	30	30/0	30/0	25/0	25/0	25/0	25/0	30/0	30/0	lots of broken branches and dieback, main branch broke from stem and on ground	canopy growth remains good	C	Remain	huge woodrat midden in tree. Near housing and a culvert where a drainage enters. Area has non-native grasses and mustard.
op204	*Quercus agrifolia*	N	25,31,37	25	15/0	15/0	15/0	15/0	15/0	15/0	15/0	15/0	slightly unbalanced	high vigor	A	Remain	near house on flat ground. Area is graded and has no native plants, has some non-neative grasses.
opA	*Quercus agrifolia*	N	--	30	10/10	10/10	10/10	10/10	10/10	10/10	10/10	10/10		high vigor	A	Remain	not tagged and measurements estimated due to being in backyard on private property. In landscaped area
opB	*Quercus agrifolia*	unknown	--	35	20/0	20/0	20/0	20/0	20/0	20/0	20/0	20/0		high vigor	A	Remain	not tagged and measurements estimated due to being surrounded by dense chaparral and innaccessible. Along a drainage and surrounded by native chamise chaparral. At the base of a slope into the drainage.

Attachment B

Photograph Exhibit

Oak #91 (right) and #92 (left)

Oak #91

Oak #92

CAUTION
HIGH PRESSURE
GAS PIPELINE
CALL COLLECT
805-759-2017

Oak #op3

Oak #op4

Oak #op5

Oak #op6 (right) and #op204 (left)

Oak #op203

Oak #op203

Oak #opB

Attachment C

Site Plan

TENTATIVE TRACT MAP No. 68

LOCATED IN THE CITY OF SANTA CLARITA
STATE OF CALIFORNIA

LEGEND
-APPROXIMATE OVER-EXCAVATION
-APPROXIMATE REMEDIAL REMOVAL DEPTH
Afu -ARTIFICIAL FILL-UNDOCUMENTED
Cf -CERTIFIED FILL
Qal -QUATERNARY ALLUVIUM (REMOVE ALL)
Qls? -LANDSLIDE DEBRIS, QUERIED WHERE UNCERTAIN
Qols -OLDER LANDSLIDE DEBRIS, CIRCLED WHERE BURIED
Tsr -SAUGUS FORMATION, SUNSHINE RANCH MEMBER
-APPROXIMATE GEOLOGIC CONTACT
-APPROXIMATE DESIGN KEYWAY LOCATION
-LOCATION OF RESTRICTED USE AREA
TRACT 30787
TRACT No. 061811-03
TR. BOUNDARY
LOT 1 CONDOMINIUM PURPOSES
LOT 2 SENIOR ASSISTANT LOT
LOT 3 CONDOMINIUM PURPOSES
HOTEL LOT "A"
PRIVATE ST.
"B" ST.
100' SCE EASEMENT
ROBERT C. LEE PARKWAY
GOLDEN VALLEY RD
GOLDEN VALLEY ROAD
RAINBOW
DE SABRO
PIAZZA
VIA BERLER
VIA KALDAN
VIA OTT
SIERRA
HIGH
2:1 SLOPE
APN 2836-013-106
APN 2836-013-126
APN 2836-013-157
APN 2836-013-158
APN 2836-013-159
APN 2836-013-918 WILLIAM S. HART UNION HIGH SCHOOL DISTRICT
APN 2836-013-180 DWP
APN 2836-013-129
APN 2836-013-111
APN 2836-013-181
APN 2836-014-055
APN 2836-014-078
APN 2836-013-904 CITY OF SANTA CLARITA
APN 2836-013-905 TRACT 52294
APN 2836-013-906 TRACT 52294
APN 2836-013-907 TRACT 52294
APN 2836-013-908 TRACT 52294
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APN 2836-013-910 TRACT 52294
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APN 2836-013-925 TRACT 52294
APN 2836-013-926 TRACT 52294
APN 2836-013-927 TRACT 52294
APN 2836-013-928 TRACT 52294
APN

APPENDIX B-5
Focused Gnatcatcher Survey

DUDEK
38 NORTH MARENGO AVENUE
PASADENA, CALIFORNIA 91101
T 626.204.9800 F 626.204.9834

August 11, 2023 15283

U.S. Fish and Wildlife Service
Attn: Recovery Permit Coordinator
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

Subject: Focused California Gnatcatcher Survey Results for the Santa Clarita Vesting Tentative Tract Map 68203 Project, Santa Clarita, California

Dear Recovery Permit Coordinator:

This report documents the results of protocol-level presence/absence surveys for the coastal California gnatcatcher (*Polioptila californica californica*; hereafter, gnatcatcher). Focused surveys were conducted throughout all areas of suitable habitat for the Santa Clarita Vesting Tentative Tract Map 68203 Project (Project) located in the city of Santa Clarita in Los Angeles County (Figure 1, Project Location). There are approximately 33 acres of suitable habitat for gnatcatcher in the Project site and surrounding 500-feet study area (Figure 2).

The gnatcatcher is a federally listed threatened species and a California Department of Fish and Wildlife (CDFW) Species of Special Concern (SSC). It is closely associated with coastal sage scrub habitat and typically occurs below 950 feet elevation and on slopes less than 40% (Atwood 1990), but gnatcatchers have been observed at elevations greater than 2,000 feet. The species is threatened primarily by loss, degradation, and fragmentation of coastal sage scrub habitat, and is also impacted by brown-headed cowbird (*Molothrus ater*) nest parasitism (Braden et al. 1997).

1 Location and Existing Conditions

The Project site is in the city of Santa Clarita, northwest of the intersection of Sierra Highway and Golden Valley Road, northwestern portion of Los Angeles County (Figure 1, Project Location). The site encompasses approximately 28 acres and is located on ten parcels (Assessor Parcel Numbers 2836-013-106, 2836-013-107, 2836-013-111, 2836-013-128, 2836-013-141, 2836-013-175, 2836-020-058, 2836-020-078, 2836-020-086, and 2836-020-087). The Project site is located on the U.S. Geologic Survey's (USGS) Newhall 7.5-minute topographic quadrangle (USGS 2018).

The proposed project seeks to merge 10 parcels and entitle TTM 68203 for a four-lot subdivision on an approximately 28-acre site. The subdivisions include the following developments: senior assisted residential units, commercial hotel and retail building, residential condominiums, open space for storm water treatment and riding/hiking trails, and associated access roads and appurtenant features.

The Study Area consists of mostly loamy soils with clay soils characterizing the eastern portion of the site (NRCS USDA 2023). The Study Area includes some terraced slopes in the western portion and moderately steep hillsides

in the central area. The Santa Clara River lies to the north of the Project Site. Elevations in the Study Area range from approximately 1,570 feet above mean sea level at the north side to 1,850 feet above mean sea level in the southern portion of the project (CalTopo 2023). The Project region has a Mediterranean climate with cool, wet winters and hot, dry summers. Rainfall occurs primarily between October and April (LACPW 2022).

2 Vegetation Communities

Vegetation communities and land uses within the Study Area were mapped in the field using the ESRI Collector mobile application. Following completion of the fieldwork, all vegetation polygons were digitized using ESRI ArcGIS software and a geographic information system (GIS) coverage was created. Once in ArcGIS, the acreage of each vegetation community and land cover present on site was determined. Natural vegetation communities were classified using the California Natural Community List (CDFW 2023), which is based on A Manual of California Vegetation, Second Edition (Sawyer et al. 2009) and A Manual of California Vegetation, Online Edition (CNPS 2023), where feasible, with modifications to accommodate the lack of conformity of the observed communities.

The Study Area includes a variety of native and non-native upland vegetation communities and developed areas. Five vegetation communities and land covers were identified within the Study Area, which are shown in Figure 3 and summarized in Table 1. Three of these vegetation communities were identified as potentially suitable gnatcatcher habitat, including California sagebrush-purple sage, chamise chaparral, and installed sage scrub. Suitable habitat within the study area is described in Table 1 and detailed below.

Table 1. Suitable Vegetation Communities in the Study Area[1]

Vegetation Community/Land Cover Type	Alliance	Association	Ranking[2] (Global/State)	Study Area Acreage	Project Site Acreage
Native Vegetation Communities					
Scrub					
California Sagebrush Scrub	*Artemisia californica* Shrubland	*Artemisia californica* (Installed)	G5/S5	9.06	0.19
		Artemisia californica- Salvia leucophylla	G4/S5	24.14	17.80
			Total[3]	*33.21*	*17.99*

Table 1 Notes:

[1] Study Area includes the project site plus a 500-foot buffer.

[2] The ranking of a vegetation community is designated by a number from 1 to 5, preceded by a letter reflecting the appropriate geographic scale of the assessment (G = global and S = State). The numerical component of the rankings are described below. Natural Communities with ranks of S1-S3 are considered Sensitive Natural Communities (CDFW 2022b). Vegetation communities and land covers not identified in A Manual of California Vegetation (Sawyer et al. 2009) are not assigned a rarity rank.

1 = critically imperiled
2 = imperiled
3 = vulnerable to extirpation or extinction
4 = apparently secure
5 = demonstrably widespread, abundant, and secure

[3] Totals may not sum due to rounding.

NA = not applicable

Coastal Scrub

Installed Sagebrush Scrub

The California sagebrush scrub (*Artemisia californica*) alliance includes California sagebrush as the dominant or co-dominant species in the shrub canopy, when comprising at least 60% of the relative cover in the shrub canopy. California sagebrush scrub has an intermittent to continuous shrub canopy that is two-tiered: one tier includes shrubs less than 2 meters (7 feet) in height, and the second tier includes shrubs less than 5 meters (16 feet) in height. The herbaceous layer is variable both seasonally and annually. California sagebrush scrub is usually found on steep slopes that are rarely flooded and on low-gradient deposits along streams (Sawyer et al. 2009).

This California sagebrush alliance was mapped on terraced hills in the western portion of the Study Area (Figure 2). This vegetation community occurs throughout the site, with 0.19 acres within the Project Boundary and 9.06 acres within the Study Area.

California Sagebrush–(Purple Sage) Scrub

California sagebrush–(purple sage) scrub communities (*Artemisia californica–Salvia leucophylla* shrubland alliance) include California sagebrush and/or purple sage (*Salvia leucophylla*) as dominant or co-dominant shrubs in an intermittent to continuous shrub layer less than 2 meters (7 feet) in height or in two tiers with the second tier less than 5 meters (16 feet) in height. Species associated with the California sagebrush scrub alliance include chamise, coyotebrush, bladderpod (*Peritoma arborea*), bush monkeyflower, California brittle bush, brittle bush (*Encelia farinosa*), California jointfir (*Ephedra californica*), narrowleaf goldenbush (*Ericameria linearifolia*), ashy buckwheat (*Eriogonum cinereum*), California buckwheat, chaparral yucca, golden-yarrow (*Eriophyllum confertiflorum*), Menzies' goldenbush, common deerweed, heartleaf keckiella (*Keckiella cordifolia*), southern honeysuckle (*Lonicera subspicata*), bush mallow, laurel sumac, coast prickly pear (*Opuntia littoralis*), hollyleaf redberry (*Rhamnus ilicifolia*), lemonade berry (*Rhus integrifolia*), sugarbush, white sage, black sage, and poison oak (*Toxicodendron diversilobum*) (CNPS 2022). These communities typically occur on steep slopes or rarely flooded terraces along streams in alluvial- or colluvial-derived soils (CNPS 2022). This vegetation community occurs throughout the project and in the northern portion of the Study Area, with 17.80 acres within the Project Boundary and 33.21 acres within the Study Area.

3 Methods

The focused surveys for gnatcatcher were conducted between May 12 and June 27, 2023, by Melissa Blundell (TE-97717A) and Tsutomu (Tommy) Molioo (TE-02412D-0) (Table 2). The surveys were conducted following the currently accepted protocol of the U.S. Fish and Wildlife Service (USFWS) *Coastal California Gnatcatcher (Polioptila californica californica) Presence/Absence Survey Protocol* (USFWS 1997). The surveys included six survey passes at a minimum of 7-day intervals during the breeding season.

In accordance with the protocol, no more than 80 acres of suitable habitat were surveyed by a single permitted biologist during each site visit conducted. Survey routes are shown on Figure 3 and allowed for complete audible and visual coverage of all suitable gnatcatcher habitat on site. Birding binoculars (e.g., 8x42 magnification) were used to aid in detecting and identifying bird species. Recorded vocalizations were used frequently in order to elicit

a response from the species. The tape was played approximately every 50 to 100 feet. If gnatcatchers would have been detected, the playing of the tape would have ceased to avoid harassment.

A digital aerial map overlain with vegetation polygons and the site area was used for the survey. The digital mobile map was also utilized during the surveys to assist in navigating and mapping any gnatcatchers present. Weather conditions, time of day, and season were appropriate for the detection of gnatcatchers and are provided in Table 2.

Table 2. Survey Dates and Conditions

Survey Pass	Date	Biologist's Initials[1]	Time	Survey Conditions[2]
1	5/12/2023	MB	0825-1045	62–78°F; 0% cc; 0–3 mph wind
2	5/19/2023	MB	0855-1120	66–81°F; 0–100% cc; 0–3 mph wind
3	6/2/2023	MB	0610-0825	60°F; 60–90% cc; 0–3 mph wind
4	6/9/2023	TM	1030-1200	64–67°F; 100% cc; 0–2 mph wind
5	6/16/2023	MB	0640-0905	60–70°F; 100% cc; 0–5 mph wind
6	6/27/2023	TM	0630-0815	60–68°F; 100% cc; 0–3 mph wind

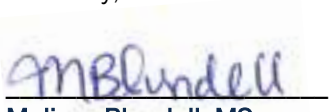
[1]Biologist Initials: MB = Melissa Blundell; TM = Tommy Molioo
[2]Survey Conditions: °F = degrees Fahrenheit; % cc = percent cloud cover; mph = mile per hour

4 Results

No California gnatcatchers were observed during the focused surveys. Five special-status species were observed during the surveys including Costa's hummingbird (*Calypte costae*; USFWS Bird of Conservation Concern [BCC]), wrentit (*Chamaea fasciata*; BCC), Lawrence's goldfinch (*Spinus lawrencei*, BCC), California thrasher (*Toxostoma redivivum*, BCC), and Nuttall's woodpecker (*Dryobates nuttallii*; BCC). Overall, 30 avian species were observed during the surveys. A full list of avian species observed during the survey is provided in Attachment A. Photo documentation of the Survey Area is provided in Attachment B.

Please feel free to contact Melissa Blundell (mblundell@dudek.com, 760-214-1878, cell) or Tommy Molioo (tmolioo@dudek.com, 949-373-8308) with questions or if you require additional information regarding this survey. I certify that the information in this survey report and attached exhibits fully and accurately represent my work.

Sincerely,



Melissa Blundell, MS
Biologist (TE-97717A)

Tommy Molioo
Sr. Biologist (TE-06873C)

Att.: *Figures 1-3*
A – List of Bird Species Observed
B – Photo Log

cc: *Mike Cady (mcady@dudek.com)*

5 References

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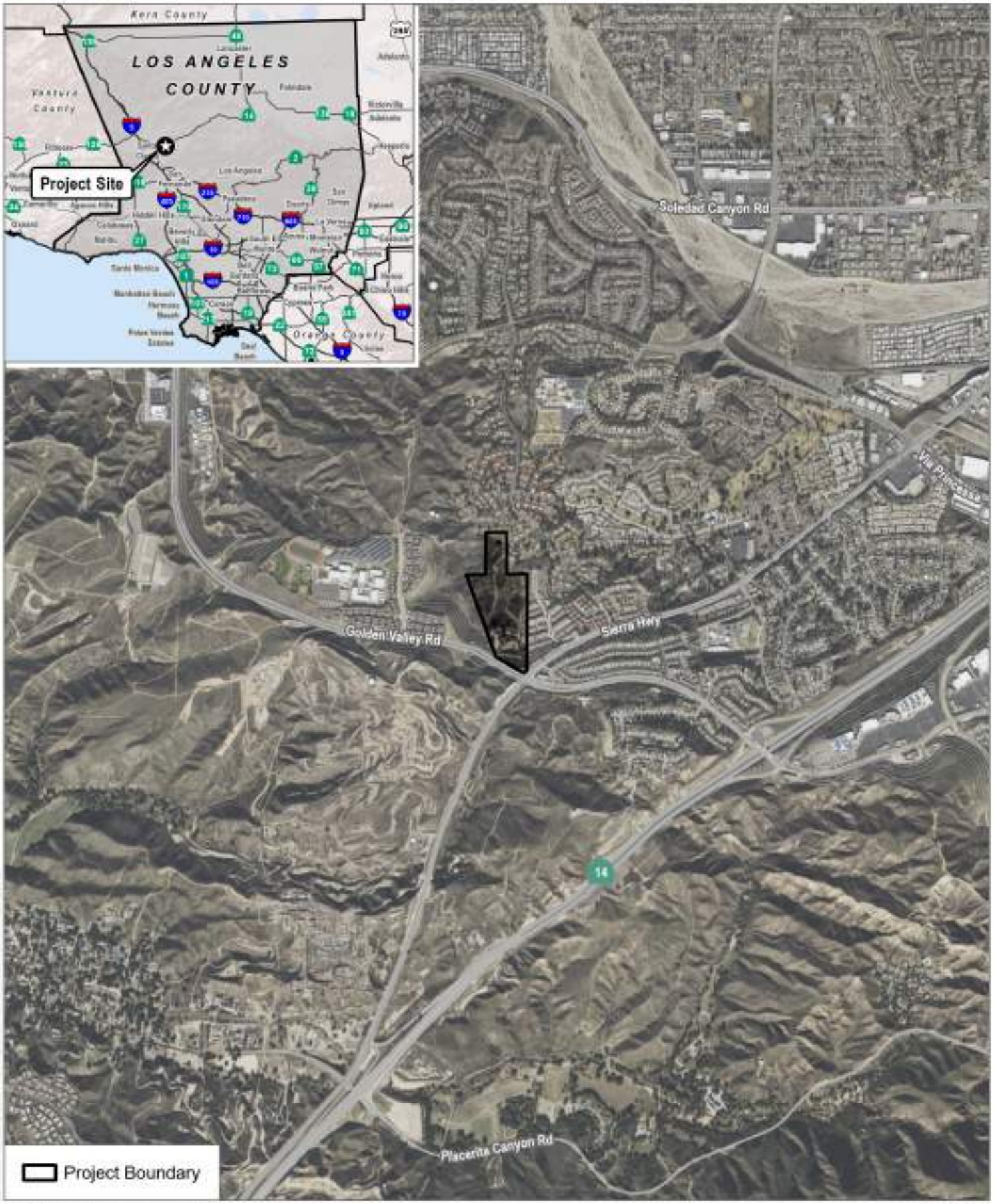


SOURCE: Bing Maps Aerial (accessed 2023)

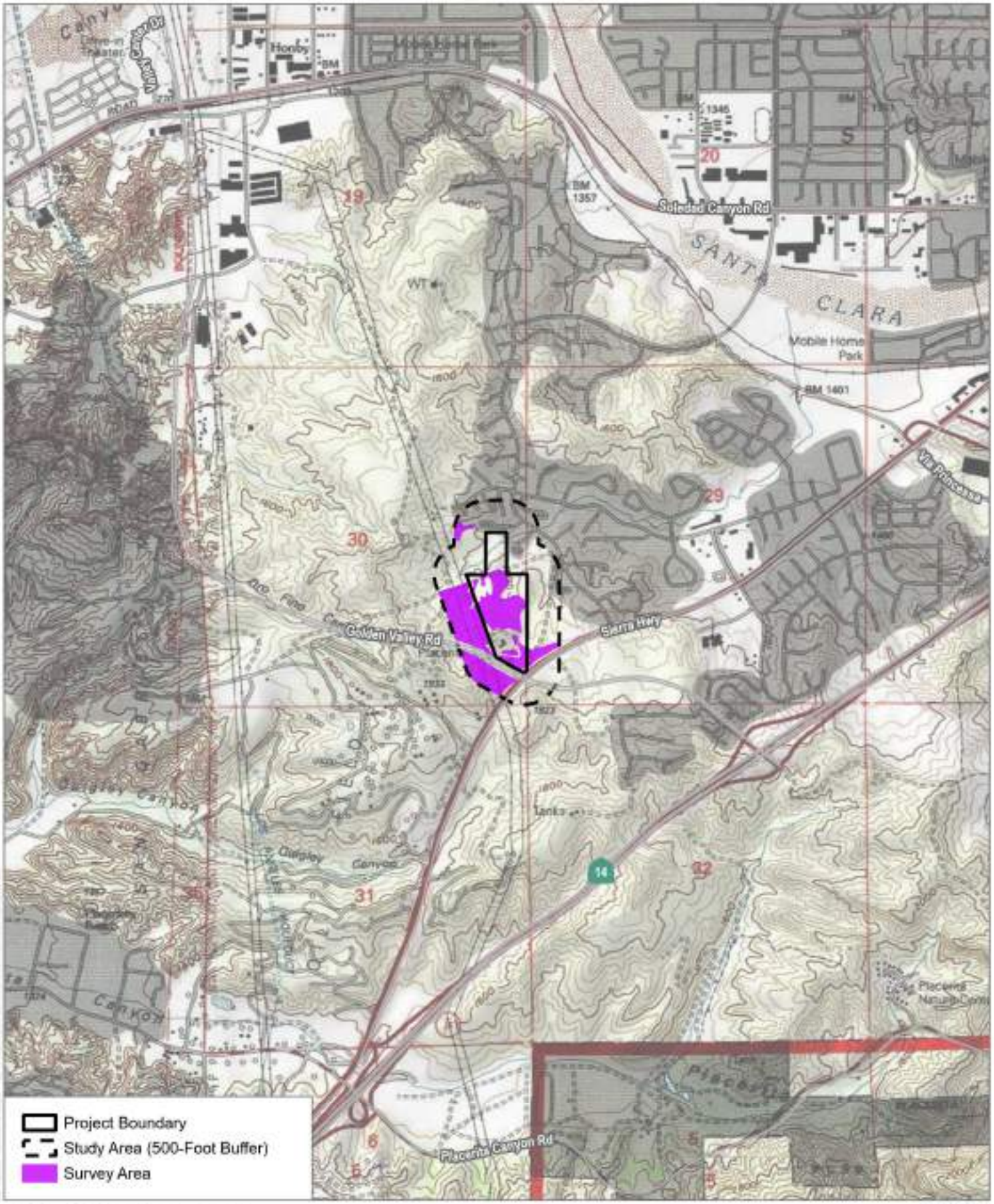
DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location

Santa Clarita VTTM 68203 CAGN Survey Project



SOURCE: USGS 7.5 Minute Mint Canyon Quadrangle

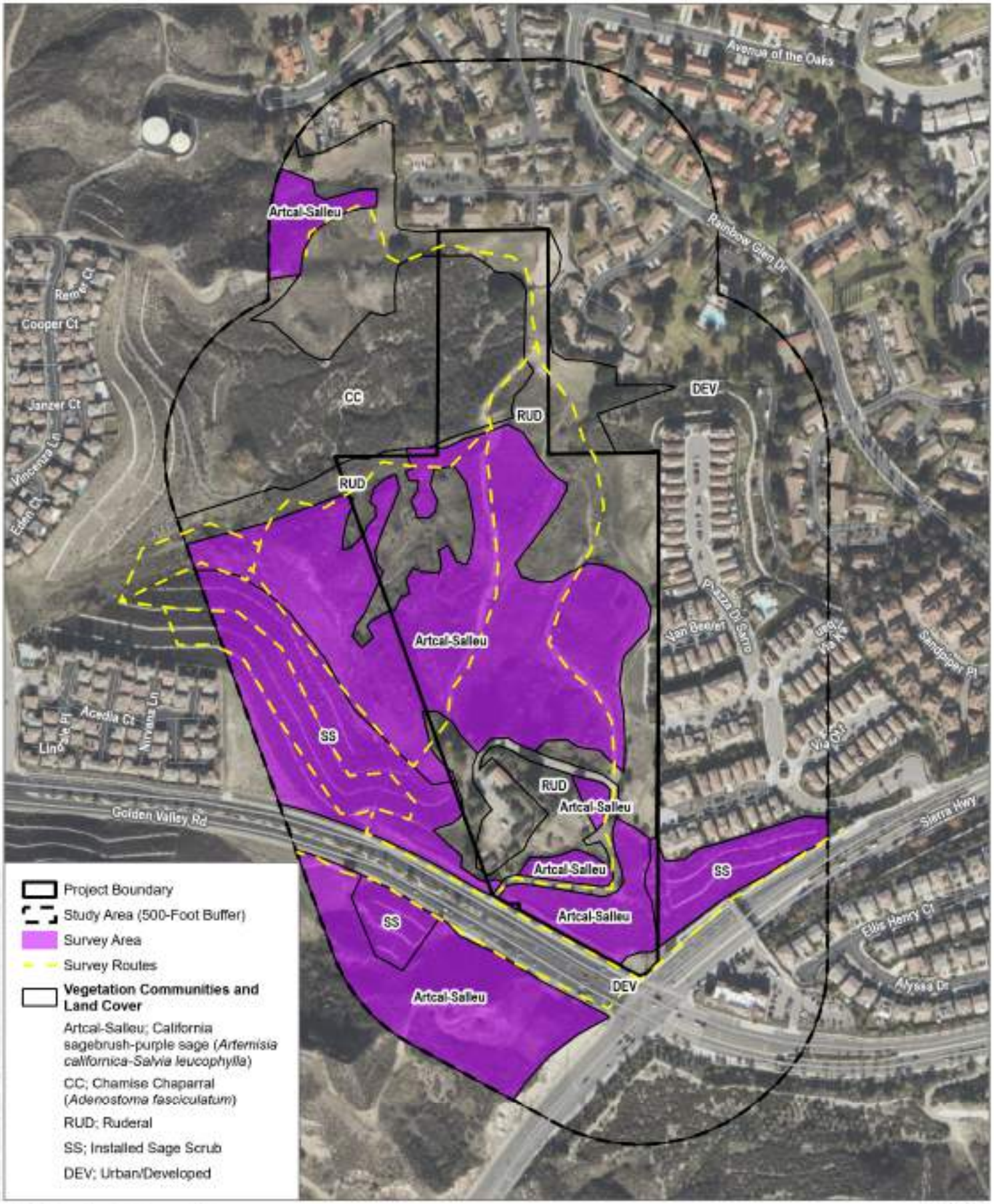
DUDEK

0 1,000 2,000 Feet

FIGURE 2

Coastal California Gnatcatcher (CAGN) Survey Areas

Santa Clarita VTTM 68203 CAGN Survey Project



SOURCE: Bing Maps Aerial (accessed 2023)

DUDEK

0 100 200 Feet

FIGURE 3

Survey Results

Santa Clarita VTTM 68203 CAGN Survey Project

Attachment A

List of Bird Species Observed

Bird Species Observed

AEGITHALIDAE—LONG-TAILED TITS & BUSHTITS

Psaltriparus minimus—bushtit

APODIDAE—SWIFTS

Aeronautes—white-throated swift

Cathartes aura—turkey vulture

COLUMBIDAE—PIGEONS & DOVES

Zenaida macroura—mourning dove

Columba livia—rock pigeon (rock dove)

Streptopelia decaocto—Eurasian collared-dove*

CORVIDAE—CROWS & JAYS

Aphelocoma californica—California scrub-jay

Corvus brachyrhynchos—American crow

Corvus corax—common raven

FRINGILLIDAE—FRINGILLINE & CARDUELINE FINCHES & ALLIES

Haemorhous mexicanus—house finch

Spinus lawrencei—Lawrence's goldfinch

Spinus psaltria—lesser goldfinch

Spinus tristis—American goldfinch

ICTERIDAE—BLACKBIRDS, ORIOLES & ALLIES

Icterus cucullatus—hooded oriole

MIMIDAE—MOCKINGBIRDS & THRASHERS

Mimus polyglottos—northern mockingbird

Toxostoma redivivum—California thrasher

ODONTOPHORIDAE—NEW WORLD QUAIL

Callipepla californica—California quail

PASSERELLIDAE—NEW WORLD SPARROWS

Melospiza melodia—song sparrow

Melozone crissalis—California towhee

Pipilo maculatus—spotted towhee

PASSERIDAE—OLD WORLD SPARROWS

Passer domesticus—house sparrow*

PICIDAE—WOODPECKERS & ALLIES

Dryobates nuttallii—Nuttall's woodpecker

PTILOGONATIDAE—SILKY-FLYCATCHERS

Phainopepla nitens—phainopepla

SYLVIIDAE—SYLVIID WARBLERS

Chamaea fasciata—wrentit

TROCHILIDAE—HUMMINGBIRDS

Calypte anna—Anna's hummingbird

Calypte costae—Costa's hummingbird

Selasphorus sasin—Allen’s hummingbird

TROGLODYTIDAE—WRENS

Thryomanes bewickii—Bewick's wren

TYRANNIDAE—TYRANT FLYCATCHERS

Tyrannus verticalis—western kingbird

Tyrannus vociferans—Cassin’s kingbird

* signifies introduced (non-native) species

Attachment B

Photo Documentation

Photo 1. View of California sagebrush-purple sage scrub (foreground) and installed sage scrub (background) in the central and western portion of the Study Area, respectively. Photo facing southwest. June 16, 2023

Photo 2. View of California sagebrush-purple sage scrub in the northeastern portion of the project boundary. Photo facing west. June 16, 2023

Photo 3. View of California sagebrush-purple sage scrub along the western project boundary. Photo facing west. June 16, 2023

Photo 4. View of installed sagebrush scrub in the western portion of the project boundary. Photo facing southeast. June 16, 2023

APPENDIX B-6
Biological Studies Peer Review

January 12, 2026

City of Santa Clarita
23920 Valencia Blvd., Suite 300
Santa Clarita, CA 91355

Attn: Ms. Erika Iverson, Senior Planner

Subj: Peer Review of Biological Resources Technical Reports for Tentative Tract Map No. 68203 (*Envicom Project #2022-105-01*)

Dear Ms. Iverson:

I reviewed the revised August 2025 biological technical reports from South Environmental including the Biological Resources Assessment, the Jurisdictional Delineation, and the Oak Tree Report for Tentative Tract Map No. 68203. The reports have adequately addressed prior comments, however, there are two items that require attention. The technical reports do not require revision, noting these items in the completed IS/MND is sufficient.

First, according to the August 2023 botanical survey report horehound bush mallow (*Malacothamnus marrubioides*) [also referred to as Santa Clarita bush mallow] occurs at the project site. This plant species was recently placed on the California Native Plant Society (CNPS) CRPR 4 list in September 2025, which is a "watch list" of species with limited distribution. The botanical survey does not require revision to note this.

CRPR 4 plants are not considered rare, but they may be significant locally. CNPS recommends CRPR 4 plants be evaluated for consideration during preparation of environmental documents, which may be particularly appropriate for the type locality of a CRPR 4 plant; populations at the periphery of a species' range; areas where the taxon is especially uncommon; areas where the taxon has sustained heavy losses; or populations exhibiting unusual morphology or occurring on unusual substrates. In this case, horehound bush mallow is relatively secure locally and does not meet the above criteria to be considered locally significant. Therefore, project impacts to horehound bush mallow would be less than significant.

Second, we feel an expansion of the identified mitigation measures is necessary in order to bring them in line with industry standards, remove any ambiguities, and ensure all potential significant impacts are mitigated. We propose the addition of the following mitigation measures to the project. There is no need to revise the biological reports, these can be added to the IS/MND.

BIO-1 Biological Monitoring

Prior to issuance of a grading permit, the Applicant shall retain a qualified biologist as the lead biological monitor subject to approval by the City of Santa Clarita Planning Division. The lead biological monitor shall ensure that impacts to biological resources are avoided

or minimized and shall conduct (or supervise) field surveys for species that may be impacted by grading and construction activities. The lead biological monitor shall ensure that all surveys are conducted by qualified personnel (e.g., avian biologists for bird surveys, herpetologists for reptile surveys, etc.) and that they possess all necessary permits and memoranda of understanding with the appropriate agencies for the handling of potentially occurring special-status species. During grading as well as other ground disturbing and vegetation removal activities the biological monitor shall be present to inspect and enforce all biological mitigation requirements and to relocate any species that may come into harm's way to an appropriate safe location with similar habitat (unless such relocation would require an Incidental Take Permit for take of a listed species, in which case the appropriate trustee agencies (CDFW or USFWS) will be consulted first). The biological monitor shall be onsite daily throughout rough grading and other vegetation removal activities and shall then conduct periodic site visits as necessary throughout the remainder of project construction.
The biological monitor shall be authorized to stop specific grading or construction activities if violations of mitigation measures or any local, state, or federal laws are suspected.

The biological monitor shall ensure that daily monitoring reports (e.g., survey results, protective actions, results of protective actions, adaptive measures, etc.) are prepared, which shall be made available to the City of Santa Clarita Planning Division and CDFW at their request. The biological monitor shall file a final report of monitoring activities with City of Santa Clarita Planning Division and CDFW. The final report of monitoring activities shall be filed within one month of completion of construction.

BIO-2 Protection Measures During Grading and Construction

The Applicant must implement the following measures during grading and construction to avoid and minimize potential impacts to native habitats and associated flora and fauna:

- Prior to initiation of grading and construction activities, the Applicant must demarcate the project limits of disturbance with temporary exclusionary fencing to prevent encroachment of project activities into adjacent native habitats and jurisdictional waterways, and to dissuade wildlife from entering the construction area. The fencing must be marked with highly visible flagging. Temporary signs must be posted or placed at regular intervals along the fencing prohibit access beyond the project limits. The temporary fencing must be routinely inspected and maintained in functional condition for the duration of project grading and construction.
- Tree protective fencing that is at least 6-feet tall chain-link fencing should be placed at the Tree Protection Zone of on-site oak trees near the proposed hiking trail. The fencing should be placed at least 5 feet from the dripline of the oaks and should be approved by a certified arborist approved by the City of Santa Clarita Planning Division prior to start of project activities. The fencing should remain in place throughout project construction and should be monitored by the certified

arborist on at least a monthly basis to ensure its continued effectiveness.

- No construction and maintenance activities may occur during nighttime hours, except in an emergency or if authorized by the City of Santa Clarita Planning Division, or designee.
- If construction lighting is required, then lighting must be pointed away from native habitats and be pointed downward and shielded to the extent practicable.
- The Applicant shall implement standard measures to avoid excessive construction noise at the construction site.
- No pets are allowed on the project site.
- Trash must be disposed of in closed-containers, and all food-related trash must be disposed of in closed animal-proof containers. The Applicant must provide sufficient containers on-site during construction.
- Standard measures to control fugitive dust shall be implemented at the construction site, including sufficient watering of disturbed areas and reduced vehicle speeds below 15 m.p.h.
- All trenches must be filled within the same day or escape ramps for animals shall be constructed if trenches are to be left open overnight.
- All project related equipment and vehicles must be cleaned and decontaminated of weeds and soils before entering the project site to reduce the potential for the spread and introduction of invasive and noxious weeds.
- The project must obtain and implement a Stormwater Pollution Prevention Plan to prevent discharge and runoff of pollutants into streams and riparian habitats as well as the natural habitats adjacent to the construction footprint.

The Applicant shall implement the required measures throughout grading and construction. The biological monitor required by MM BIO-1 must maintain a record of monitoring notes including construction activities and observations related to the requirements of this mitigation measure for submittal to the City of Santa Clarita Planning Division and CDFW, when requested. The biological monitor shall file a final report of monitoring activities with the City of Santa Clarita Planning Division and CDFW. The final monitoring report shall be submitted within one month of completion of construction.

BIO-3 Nesting Birds

- If possible, ground disturbing activities and vegetation removal should be timed to occur between September 1 – January 31, which is outside the bird nesting season.
- If ground disturbing activities or vegetation removal (including tree trimming) are scheduled between February 1 – August 31, which is the bird nesting season, two preconstruction surveys for nesting birds should be conducted. One within 7 days prior to construction activity and the second within 72 hours prior to construction activities. The surveys should be conducted by a qualified biologist with prior experience conducting nesting bird surveys for construction projects. The survey

area should include the area of ground disturbing activities and vegetation removal as well as suitable nesting habitat within a 300-foot buffer, or a buffer size determined by the qualified biologist based on level of proposed disturbance and access. A letter report summarizing the methods and results of the nesting bird surveys must be submitted to the City of Santa Clarita Planning Division, or designee, before commencement of project activities. If no active nests are found, no additional measures are required.

- If active nests are found the biologist will map the location and document the species and nesting stage. A no-work buffer will be established around the active nest as determined by the qualified biologist and based on the species sensitivity to disturbance and the type and duration of the disturbance. No construction activities shall occur within the no-work buffer until the biologist has determined the nest is no longer active.

BIO-4 Crotch's Bumble Bee

Pre-Project Habitat Assessment and Protocol Surveys

Prior to issuance of a grading permit, the Applicant shall retain a qualified biologist to conduct a habitat assessment to determine if the Project site contains suitable habitat for Crotch's bumble bee. If it is determined that the Project site contains suitable habitat, prior to issuance of a grading permit the qualified biologist shall conduct a protocol survey of the Project site for Crotch's bumble bee. The protocol survey shall be conducted during the Colony Active Period (April 1 through August 31) and shall follow CDFW's *Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species* (June 6, 2023), or other survey protocol approved by California Department of Fish and Wildlife (CDFW). The qualified biologist shall prepare and submit a report with the methods and results of the survey to City of Santa Clarita Planning Division and CDFW.

If Crotch's bumble bee(s) are not detected during the pre-project protocol survey, no additional mitigation is required provided the Project commences within one year of completion of the survey. If the Project does not commence within one year of completion of the survey, an additional protocol survey of the Project site shall be conducted and the survey results submitted to the City of Santa Clarita Planning Division and CDFW.

If a Crotch's bumble bee(s) is found during the protocol survey, the Applicant shall notify the City of Santa Clarita Planning Division and initiate consultation with CDFW to determine if an Incidental Take Permit (ITP) for Crotch's bumble bee will be required for the Project. If required, the Applicant shall obtain an ITP from CDFW prior to issuance of a grading permit. The Applicant shall comply will the conditions of the ITP.

If a Crotch's bumble bee(s) is found at the Project site during the protocol surveys, mitigation to avoid and minimize Project impacts as well as to compensate for loss of habitat for the species shall include the following, or as otherwise determined by CDFW:

Project Timing

To the extent feasible, initial ground-disturbing and vegetation removal activities shall be scheduled after Crotch's bumble bee nectar sources have stopped blooming in the fall, as determined by the qualified biologist, and outside of the Queen Flight Season (February 1 through March 30) and the Colony Active Period (April 1 through August 31).

Pre-Construction Surveys

Prior to initial ground-disturbing or vegetation removal activities that would occur during the Queen Flight Season (February 1 through March 30) and the Colony Active Period (April 1 through August 31), including but not limited to grading and fuel modification, a qualified biologist shall conduct two (2) visual surveys for Crotch's bumble bee within the development and fuel modification areas, plus 50 feet. Surveys shall occur no more than 10 days prior to commencement of ground-disturbing and vegetation removal activities. The surveys shall be at least four (4) days apart, with the second survey completed within two (2) days of starting work. Surveys shall be conducted at a minimum effort of one (1) person-hour per three (3) acres of habitat. Survey effort shall focus on blooming nectar and pollen resources and potential nesting substrates (burrows, grasses, brush piles, old bird nests, dead trees, hollow logs). If the biologist detects any nesting Crotch's bumble bees during the pre-construction survey, a 50-foot exclusionary buffer in which no activities would be allowed to occur shall be established around the nesting bee(s). All Project personnel shall be notified of the buffer, and the City of Santa Clarita Planning Division and CDFW shall be notified within 24 hours of detection of nesting Crotch's bumble bee(s). The exclusionary buffer shall be maintained until the Crotch bumble bee(s) are no longer nesting, as determined by the biologist. Within 14 days of completion of the pre-construction surveys, the surveying biologist shall prepare and submit a report documenting the methods and results of the pre-construction surveys to the City of Santa Clarita Planning Division and CDFW.

Biological Monitoring

A qualified biologist shall monitor initial ground disturbance and vegetation removal activities occurring at any time of year to ensure that the Project does not result in take of Crotch's bumble bee. Biological monitoring during the Queen Flight Season (February 1 through March 30) and the Colony Active Period (April 1 through August 31) shall include searches for nests, which shall include observations of ground animal burrows, bunch grasses, thatched annual grasses, brush piles, old bird nests, dead trees, and hollow logs. Biological monitoring conducted during the Overwintering Season for Crotch's bumble bee (November 1 through January 31) shall include searches of potential hibernacula. If the biological monitor detects any nesting or overwintering Crotch's bumble bees during monitoring activities, a 50-foot exclusionary buffer in which no activities would be allowed to occur shall be established around the nesting or overwintering

bee(s). All Project personnel shall be notified of the buffer, and the City of Santa Clarita Planning Division and CDFW shall be notified within 24 hours of detection of the nesting or overwintering Crotch's bumble bee(s). The exclusionary buffer shall be maintained until the Crotch bumble bee(s) are no longer nesting or overwintering, as determined by the biologist. The monitoring biologist shall maintain daily field notes, including the locations of nesting and overwintering bees and collect photographs and other appropriate information. Within one month of completion of all biological monitoring activities, the biological monitor shall prepare and submit a monitoring report documenting the methods and outcome of monitoring activities to the City of Santa Clarita Planning Division and CDFW. The biological monitor's field notes shall be attached to the report.

Compensatory Mitigation for Loss of Habitat

If Crotch's bumble bee is found on the Project site during the pre-project protocol surveys, the qualified biologist shall delineate the extent of suitable habitat for the species and quantify the extent of Project impacts. The Applicant shall mitigate for permanent and temporary impacts to suitable habitat at a 1:1 ratio. Suitable habitats that are temporarily impacted shall be restored to pre-project or better conditions and shall contain locally native nectar sources for Crotch's bumble bee. Suitable habitats that are permanently impacted shall be mitigated by restoration and/or enhancement of onsite habitats suitable for Crotch's bumble bee, as well as permanent preservation of the mitigation area(s) by deed restriction or conservation easement. If onsite restoration or enhancement is not feasible, offsite restoration or enhancement at a location acceptable to the City of Santa Clarita Planning Division and CDFW would be sufficient. Alternatively, the Applicant can mitigate for permanent impacts to suitable habitat via contribution to an in-lieu fee program or mitigation bank approved by the City of Santa Clarita Planning Division and CDFW. In-lieu fees or mitigation bank credits shall be used for restoration and/or enhancement and permanent protection of suitable habitats for Crotch's bumble bee. A Mitigation and Monitoring Plan that compensates for permanent and temporary impacts to suitable habitats for Crotch's bumble bee shall be prepared by a qualified restoration ecologist and shall include the following:

1. Plant Palette: The Applicant shall compile a plant palette(s) of local native species that is appropriate for the habitats being restored or enhanced. The plant palette(s) shall include a diverse assemblage of locally native nectar resources for Crotch's bumble bee that can be expected to be blooming during the Colony Active Period for Crotch's bumble bee. Nectar and pollen-producing plants for Crotch's bumble bee in the plant palette may include, but would not be limited to, the genera *Chaenactis, Lupinus, Phacelia,* and *Salvia* and other suitable flowering plants in the families Fabaceae, Apocynaceae, Asteraceae, Lamiaceae, Hydrophyllaceae, Plantaginaceae, Onograceae, Papaveraceae, Polygonaceae, and Boraginaceae. Seeding may be utilized as a method of plant establishment

given that seed mixes consist of only locally native species. Seeds to be used shall be collected locally from the region.

2. Timing: The Mitigation and Monitoring Plan shall be approved by the City of Santa Clarita Planning Division and CDFW prior to issuance of a grading permit. The Applicant shall begin implementation of restoration and/or enhancement activities during the rainy season (October to March), or prior to the onset of the first rain event. This will ensure proper establishment of the planted species.
3. Performance Standards: The restoration and/or enhancement area shall provide a minimum absolute cover of native plant species by the end of the required monitoring period that is not less than the absolute cover of native species found at high quality reference sites found onsite or in the surrounding area and approved by the City of Santa Clarita Planning Division and CDFW. Species richness, diversity, abundance, and frequency/density within each restoration and enhancement area shall be roughly proportionate to that of the reference sites. Non-native species shall not exceed 5% cover of the restoration and/or enhancement area by the end of the required monitoring period.
4. Monitoring and Maintenance: The Applicant shall monitor and maintain restoration and/or enhancement areas for a period of 5 years or until performance standards have been met. The Applicant shall perform periodic maintenance of the site including weeding, repairing irrigation or other associated components, and replanting or re-seeding dead plants. Monitoring shall involve qualitative and quantitative methods to document site conditions and success. The monitoring period shall begin immediately following initial implementation activities including seeding, weeding, and establishment of appropriate irrigation and other restoration components. Replacement plantings shall be monitored with the same survival and growth requirements for three years after planting.
5. Reporting: The Applicant shall submit annual reports to the City of Santa Clarita Planning Division and CDFW documenting mitigation activities no later than January 31 of each year until performance standards have been met.
6. Adaptive Management: The Applicant will implement adaptive management/contingency measures as needed throughout the duration of the monitoring period to ensure that performance standards are met, at the direction of the restoration ecologist.

If impacts are mitigated by purchasing credits from a mitigation bank or by contribution to an in-lieu fee program, the Applicant must provide written documentation to the City of Santa Clarita Planning Division and CDFW of purchase of mitigation credits or payment of the in-lieu fee prior to issuance of a grading permit.

BIO-5 Roosting Bat Surveys and Avoidance Measures

- Construction activities including demolition, grading, and vegetation removal shall occur outside the bat maternity season, which occurs between April 1 through August 31, as feasible. If the bat maternity season cannot be avoided, a bat habitat assessment survey shall be conducted by a qualified biologist no more than 14 days prior to the start of construction activities. The habitat assessment survey shall document the locations of potential bat roosting habitat as well as evidence of bat species that may occur in the proposed Project limits through direct observation (e.g., roosting bats) and/or sign (e.g., bat guano).
- No more than 5 days prior to the start of construction activities, emergence bat surveys shall be conducted during the bat maternity season in areas of suitable bat habitat identified during the habitat assessment survey (e.g., near vacant structures or suitable roosting trees) to document any bat species emerging from these features. Generally, the emergence survey(s) will be conducted approximately one hour prior to sunset and last a minimum of two hours after sunset; however, the timing will be determined by the qualified biologist. Passive acoustic monitoring equipment will be utilized during the emergence surveys to identify bats to the species level. In the event multiple features were identified in the habitat assessment in which bats may occur, at the discretion of the qualified biologist, either multiple emergence surveys may be necessary or additional acoustic equipment may need to be set up to capture the acoustics of bats as they emerge at dusk.
- Prior to the start of Project activities, the qualified biologist shall prepare and submit a letter report documenting the methods and results of the habitat assessment and emergence surveys to the City of Santa Clarita Planning Division and CDFW.
- If no bats are detected during the habitat assessment or emergence surveys, then construction activities may proceed. If roosting bats are detected during the habitat assessment or emergence surveys, the roost sites and roosting bats shall be avoided during the maternity season. The qualified biologist shall determine an appropriate buffer around the roost site where construction shall be avoided. The buffer typically ranges in size, between 100 to 300 feet around the roost site, depending on potential for project impacts and surrounding terrain. For example, if a project will result in high noise decibels and the roost site is exposed without surrounding trees or hills, the buffer may be increased to reduce disturbances to the roosting bats during breeding activities. CDFW shall be consulted regarding the buffer distances around roosts containing special-status bat species. Features such as trees or structures determined to be active roosts shall be left in place throughout the maternity season.
- If an active roost site cannot be avoided by the Project, including within or outside of the maternity season, a bat mitigation and management plan shall be developed by a qualified biologist for roost relocation. Roost relocation shall involve eviction by non-invasive means and only in exceptional circumstances should involve the direct capture and transfer of bats to appropriate natural or artificial bat roosting

habitat in the surrounding area. Mitigation and management plans shall require consultation with and approval from the City of Santa Clarita Planning Division and CDFW.

- If confirmed occupied special-status bat roosting habitat is destroyed, artificial bat roosts of comparable size and quality shall be constructed and maintained at a suitable undisturbed area, preferably on the subject property. The design and location of the artificial bat roosts shall be determined by the qualified bat biologist in consultation with CDFW.
- No more than one month following completion of all bat survey, monitoring, and mitigation activities, the qualified biologist shall prepare and submit a summary report of the methods and results of these activities to the City of Santa Clarita Planning Division and CDFW.

BIO-6 Pre-Construction Surveys and Salvage of Special-Status Lizards and Mammals

Prior to issuance of a grading permit, a salvage plan that includes the details of the methods to be used to capture and relocate special-status wildlife species occurring within the Project area, including coastal whiptail, coast horned lizard, and San Diego desert woodrat, shall be prepared by a qualified biologist and submitted to the City of Santa Clarita Planning Division and CDFW for review and approval.

Pre-construction surveys for potentially occurring special-status wildlife species including but not limited to coastal whiptail, coast horned lizard, and San Diego desert woodrat shall be conducted by a qualified biologist within 48 hours prior to initiation of Project activities that would result in ground disturbance or removal of vegetation. If a special-status wildlife species is found, avoidance is the preferred option (e.g., waiting for the animal(s) to leave the impact area). If avoidance is not feasible, the species shall be captured (if possible) and released into a predetermined area containing appropriate habitat and at a location where they would not be harmed by Project activities. The salvage program shall continue throughout initial ground disturbance and vegetation removal activities and will conclude when all suitable habitat within the grading limits has been removed. If a federal or State listed species is found, Project activities shall be delayed until USFWS and/or CDFW, as applicable, have been consulted regarding the presence of the listed species. Within 14 days following completion of the pre-construction surveys and monitoring activities, a letter report summarizing the methods and results of the surveys and salvage efforts shall be submitted to the City of Santa Clarita Planning Division, CDFW, and USFWS, as applicable.

BIO-7 Resource Agency Permitting for Impacts to Jurisdictional Features

Prior to issuance of a grading permit, to ensure compliance with resource agency permitting requirements related to impacts to jurisdictional waters and riparian habitat, the Applicant shall submit applications and obtain permits, if required, from USACE, RWQCB, and CDFW for any excavation, fill, or other land and vegetation disturbing activities within the

streams at the site. If required, a CWA Section 404 permit shall be obtained from the USACE, a Streambed Alteration Agreement shall be entered into with the CDFW under Section 1602 of the California Fish and Game Code, and a CWA Section 401 Water Quality Certification or Wastewater Discharge Permit shall be obtained from the RWQCB. The Applicant shall comply with the permit conditions. Mitigation for unavoidable impacts to jurisdictional waters and habitat shall be provided through implementation of the Habitat Mitigation and Monitoring Program required by mitigation measure BIO-8, or as otherwise required by USACE, RWQCB, and/or CDFW, as applicable. The Applicant shall provide written proof or documentation to the City of Santa Clarita Planning Division that the required permits from USACE, RWQCB, and/or CDFW have been obtained or written verification from USACE, RWQCB, and CDFW stating the permit is not required.

BIO-8 Habitat Mitigation and Monitoring Program

To mitigate for permanent significant impacts to jurisdictional waters and riparian habitat, the project must prepare a Habitat Mitigation and Monitoring Program. The Program must be developed by a qualified restoration ecologist approved by the City of Santa Clarita Planning Division, RWQCB, CDFW, and USACE, as applicable, in compliance with the Porter-Cologne Water Quality Control Act, CWA Sections 401 and 404, and Fish and Game Code 1602 and supporting regulations. The Habitat Mitigation and Monitoring Program must be submitted and approved prior to issuance of a grading permit. The Habitat Mitigation and Monitoring Program must mitigate for permanent impacts to jurisdictional waters and habitats at a 2:1 ratio by the restoration or enhancement of degraded in-kind jurisdictional habitats. The project must also mitigate for temporary significant impacts to jurisdictional waters and habitat at a 1:1 ratio, which shall consist restoration of the habitats that are temporarily disturbed by the project to in-kind habitat. The Program may also mitigate impacts by purchase of mitigation bank credits or by contribution to an in-lieu fee program approved by the City of Santa Clarita Planning Division, RWQCB, CDFW, and USACE, as applicable.

To the extent possible, mitigation must be accomplished on-site. If the mitigation will be performed off-site, to the extent feasible the mitigation sites should be implemented within the Santa Clara River watershed. Off-site mitigation must also be compensated for at a minimum 2:1 replacement ratio, or as recommended by RWQCB, CDFW, and USACE, as applicable. If impacts are mitigated by purchasing credits from a mitigation bank or by contribution to an in-lieu fee program, the Permittee must provide evidence of purchase of mitigation credits or payment of the in-lieu fee prior to issuance of a grading permit. To the extent feasible, in-lieu fees must be used for the creation and/or restoration of in-kind jurisdictional habitat within the Santa Clara River watershed.

The Habitat Mitigation and Monitoring Program (at a minimum) shall include:

- Description of the project/impact and mitigation sites;
- Specific objectives;
- Success criteria;

- Plant palette;
- Implementation plan;
- Maintenance activities;
- Monitoring plan; and
- Contingency measures.

The mitigation project must be implemented over a five-year period. To the extent feasible, the mitigation project must be initiated prior to development of the project. Success criteria are (at a minimum) evaluated based on appropriate survival rates and percent cover of planted native species, as well as eradication and control of invasive species within the restoration or enhancement areas. The target species and native plant palette, as well as the specific methods for evaluating whether the project was successful at meeting the above-mentioned success criteria shall be determined by the qualified restoration ecologist and included in the mitigation program.

Annual reports discussing the implementation, monitoring, and management of the mitigation project must be submitted to the City of Santa Clarita Planning Division, RWQCB, CDFW, and USACE, as applicable. The annual monitoring reports and the final monitoring report shall be submitted by the month / day the mitigation project was first initiated. Five years after project start, a final report must be submitted to the City of Santa Clarita Planning Division, RWQCB, CDFW, and USACE, as applicable, which (at a minimum) discusses the implementation, monitoring and management of the mitigation project over the five-year period and indicate whether the mitigation project has been successful based on established success criteria. The mitigation project must be extended if success criteria have not been met at the end of the five-year period to the satisfaction of the City of Santa Clarita Planning Division, RWQCB, CDFW, and USACE, as applicable.

Please contact me if you have any questions.

Sincerely,

Jim Anderson
Principal Biologist

APPENDIX C
Cultural Resources Technical Report

Cultural Resources Technical Report

Santa Clarita TTM 68203 Project,
City of Santa Clarita, Los Angeles County, California

December 2021

Prepared For:
Renaud & Sue Veluzat
24715 Oak Creek Road
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Executive Summary

South Environmental was retained to complete a cultural resources technical report for the Tentative Tract Map (TTM) 68203 Project (proposed project) located in the City of Santa Clarita, Los Angeles County, California. This study includes the results of a California Historical Resources Information Center (CHRIS) records search of the project site and a one-mile radius; a California Native American Heritage Commission (NAHC) Sacred Lands File search and informational letters to local tribes; an intensive pedestrian survey of the project site by a qualified archaeologist and architectural historian; building development and archival research; and recordation and evaluation of the existing single-family residence (built 1966) for historical significance and integrity in consideration of California Register of Historical Resources (CRHR) and City of Santa Clarita designation criteria. This study was completed in compliance with the California Environmental Quality Act (CEQA), including Public Resources Code (PRC) Section 5024.1, Title 14 California Code of Regulations (CCR) Section 15064.5 of the CEQA Guidelines, and PRC Sections 21083.2 and 21084.1.

No archaeological resources were identified within the project site as a result of the CHRIS records search, NAHC Sacred Lands File search, Native American outreach letters, or pedestrian survey by a qualified archaeologist. Further, significant portions of the project site have been disturbed by construction of the existing residence, the construction of Golden Valley Road, recent grading in the northeastern portion of the site, road cuts, and ephemeral drainages that have moved soils overtime. Therefore, the project site is unlikely to contain intact buried archaeological deposits. Still, it is always possible to encounter resources during ground disturbance. Standard unanticipated discovery measures for archaeological resources and human remains have been provided in Section 6.1.2.

The existing residence located at 25800 Sierra Highway/20101 Golden Valley Road was evaluated by a qualified architectural historian for historical significance in consideration of CRHR and City designation criteria and integrity requirements. As a result of the property significance evaluation, the subject property is recommended not eligible under all CRHR and City designation criteria due to a lack of significant historical associations and compromised integrity. Therefore, the residence and its related built environment is not considered an historical resource under CEQA Guidelines Section 15064.5, and no additional study or management recommendations are necessary.

1 Introduction

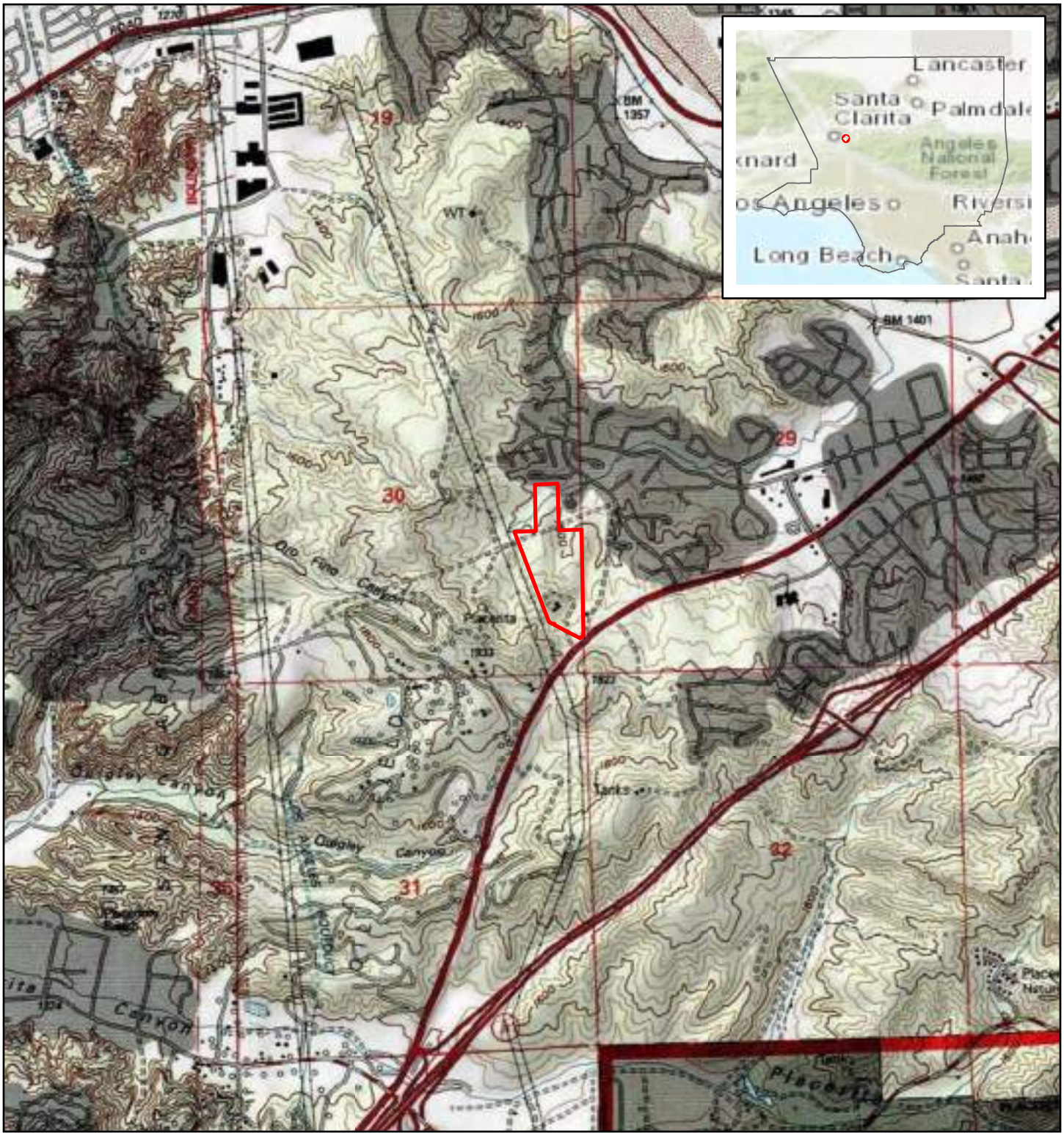
South Environmental was retained to complete a cultural resources technical report for the Tentative Tract Map (TTM) 68203 Project (proposed project) located in the City of Santa Clarita, Los Angeles County, California. This study includes the results of a California Historical Resources Information Center (CHRIS) records search of the project site and a one-mile radius; a California Native American Heritage Commission (NAHC) Sacred Lands File search and informational letters to local tribes; an intensive pedestrian survey of the project site by a qualified archaeologist and architectural historian; building development and archival research; and recordation and evaluation of the existing single-family residence (built 1966) for historical significance and integrity in consideration of California Register of Historical Resources (CRHR) and City of Santa Clarita designation criteria. This study was completed in compliance with the California Environmental Quality Act (CEQA), including Public Resources Code (PRC) Section 5024.1, Title 14 California Code of Regulations (CCR) Section 15064.5 of the CEQA Guidelines, and PRC Sections 21083.2 and 21084.1.

1.1 Project Location Description

1.1.1 Project Location

The property proposed for development (project site) includes 28.13-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita (Figures 1 and 2). The project site is on the United States Geological Survey (USGS) Mint Canyon 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North (T04N) and Range 15 West (R15W). The associated APNs are: 2836-013-106, 2836-013-107, 2836-013-111, 2836-013-128, 2836-013-133, 2836-013-141, 2836-020-058, 2836-020-078, 2836-020-086, 2836-020-087.

Most of the project site is undeveloped except for a single-family home and accessory structures with a street address of 20101 Golden Valley Road and an Assessor's address of 25800 Sierra Highway. A windy paved driveway exists off Golden Valley Road provide access to the home, and a series of dirt roads provide access to the remaining undeveloped hills on the property. Adjacent uses include residential uses to the immediate north and east, vacant land to the south, and residential uses/Golden Valley High School to the west.



Source: ESRI USA Topo Maps and World Topo Map 2021

Santa Clarita VTTM 68203 Project

Figure 1. Project Location

Project Site

0 1,000 2,000 Feet

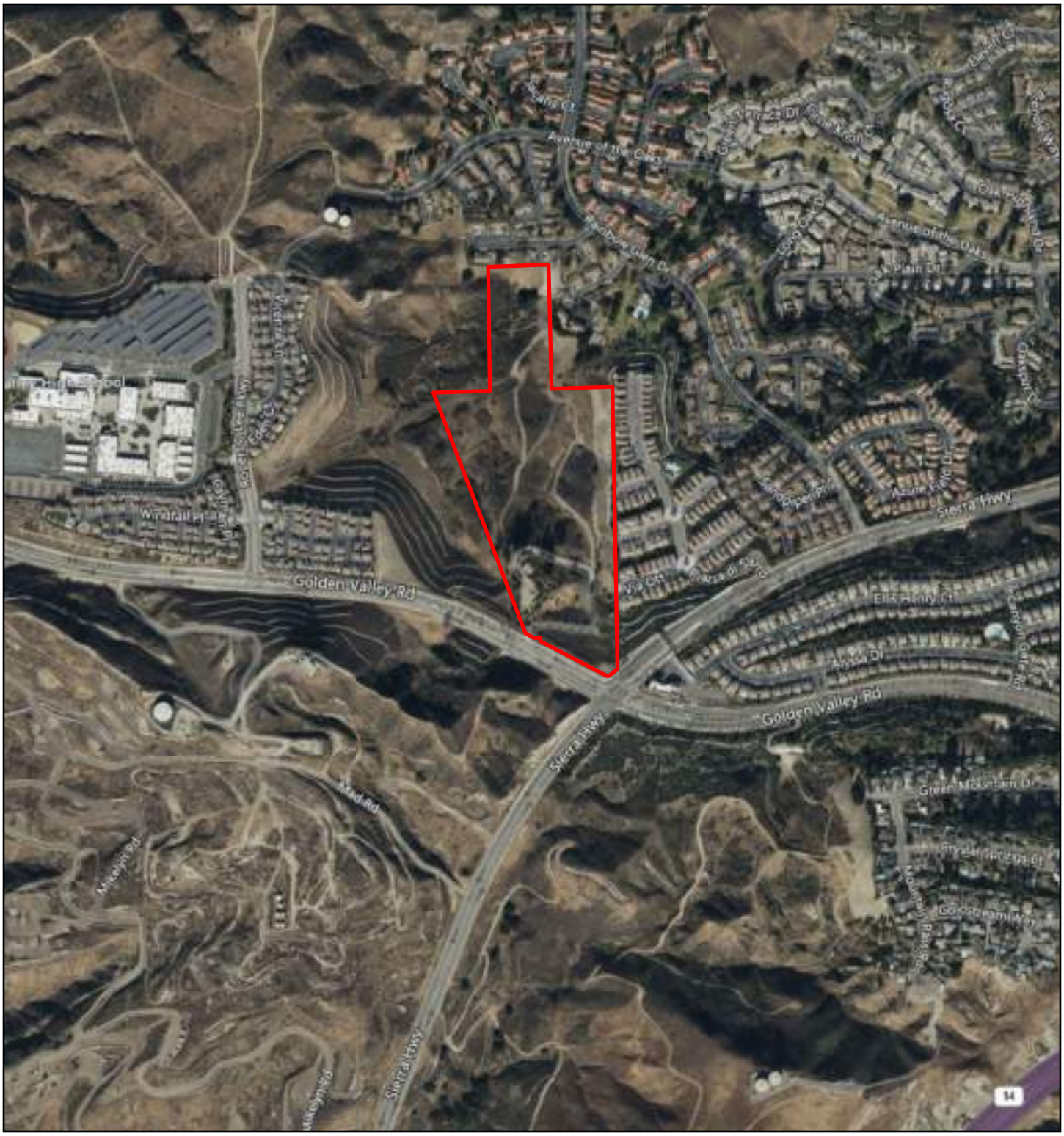
Scale: 1:24,000

N

Project Site is within the City of Santa Clarita, California, in Los Angeles County on the USGS Mint Canyon 7.5-minute quadrangle map in Section 30 of Township 04 North (T04N) and Range 15 West (R15W)

Center Coordinate (Decimal Degrees):
Latitude: 34.3985N Longitude: -188.4861W

SOUTH ENVIRONMENTAL



Source: BING Aerial Basemap accessed Sept 2021

Santa Clarita VTTM 68203 Project

Figure 2. Project Site Detail

0 450 900 Feet

N

Project Site

SOUTH ENVIRONMENTAL

1.1.2 Project Description

The proposed development seeks to merge the 10 parcels and entitle TTM 68203 for a four (4) lot subdivision consisting of the following:

- One (1) 5.04-acre lot for a four (4) story building consisting of 154-unit senior assisted living units; the proposed four (4) story building will be 50-foot maximum height.
- One (1) 5.04-acre lot for a 100-room commercial hotel and retail building.
- One (1) 11.48-acre lot for 73 residential Condominium units consisting two, three, and four-plex buildings.
- One (1) 5.83-acre open space lot for L.I.D. storm water treatment with two discharge pipes, and an eight-foot wide riding and hiking trial.
- Proposed streets and circulations will result in approximately 0.73 acres of development.

1.1.3 Project Study Area

The archaeological study area is the entirety of the project site and includes all areas where ground disturbance is expected to occur as a result of demolition and new construction. The built environment study area includes the developed portion of the project site that contains the single-family residence built in 1966 and its related garage/storage structures.

1.2 Regulatory Setting

1.2.1 State

California Register of Historical Resources

In California, the term "historical resource" includes but is not limited to "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (California PRC Section 5020.1(j)). In 1992, the California legislature established the CRHR "to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (California PRC Section 5024.1(a)). The criteria for listing resources on the CRHR were expressly developed to be in accordance with previously established criteria developed for listing in the National Register of Historic Places (NRHP), enumerated below. According to California PRC Section 5024.1(c)(1–4), a resource is considered historically significant if it (i) retains "substantial integrity," and (ii) meets at least one of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California' s history and cultural heritage.

(2) Is associated with the lives of persons important in our past.

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

(4) Has yielded, or may be likely to yield, information important in prehistory or history.

In order to understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than 50 years old may be considered for listing in the CRHR if it can be demonstrated that sufficient time has passed to understand its historical importance (see 14 CCR 4852(d)(2)).

The CRHR protects cultural resources by requiring evaluations of the significance of prehistoric and historic resources. The criteria for the CRHR are nearly identical to those for the NRHP, and properties listed or formally designated as eligible for listing in the NRHP are automatically listed in the CRHR, as are the state landmarks and points of interest. The CRHR also includes properties designated under local ordinances or identified through local historical resource surveys.

California Environmental Quality Act

As described further below, the following CEQA statutes and CEQA Guidelines are of relevance to the analysis of archaeological, historic, and tribal cultural resources:

- California PRC Section 21083.2(g) defines "unique archaeological resource."
- California PRC Section 21084.1 and CEQA Guidelines Section 15064.5(a) define "historical resources." In addition, CEQA Guidelines Section 15064.5(b) defines the phrase "substantial adverse change in the significance of an historical resource." It also defines the circumstances when a project would materially impair the significance of an historical resource.
- California PRC Section 21074(a) defines "tribal cultural resources."
- California PRC Section 5097.98 and CEQA Guidelines Section 15064.5(e) set forth standards and steps to be employed following the accidental discovery of human remains in any location other than a dedicated ceremony.
- California PRC Sections 21083.2(b)-(c) and CEQA Guidelines Section 15126.4 provide information regarding the mitigation framework for archaeological and historic resources, including examples of preservation-in-place mitigation measures; preservation-in-place is the preferred manner of mitigating impacts to significant archaeological sites because it maintains the relationship between artifacts and the archaeological context and may also help avoid conflict with religious or cultural values of groups associated with the archaeological site(s).

More specifically, under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an historical resource" (California PRC Section 21084.1; CEQA Guidelines Section 15064.5(b).) If a site is either listed or eligible for listing in the CRHR, or if it is included in a local register of historic resources or identified as significant in a historical resources survey (meeting the requirements of California PRC Section 5024.1(q)), it

is a "historical resource" and is presumed to be historically or culturally significant for purposes of CEQA (California PRC Section 21084.1; CEQA Guidelines Section 15064.5(a)). The lead agency is not precluded from determining that a resource is a historical resource even if it does not fall within this presumption (California PRC Section 21084.1; CEQA Guidelines Section 15064.5(a)).

A "substantial adverse change in the significance of an historical resource" reflecting a significant effect under CEQA means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines Section 15064.5(b)(1); California PRC Section 5020.1(q)). In turn, CEQA Guidelines section 15064.5(b)(2) states the significance of an historical resource is materially impaired when a project:

1. Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources; or
2. Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the PRC or its identification in an historical resources survey meeting the requirements of section 5024.1(g) of the PRC, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
3. Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

Pursuant to these sections, the CEQA inquiry begins with evaluating whether a project site contains any "historical resources," then evaluates whether that project will cause a substantial adverse change in the significance of a historical resource such that the resource's historical significance is materially impaired.

If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (California PRC Section 21083.2[a], [b], and [c]).

California PRC Section 21083.2(g) defines a unique archaeological resource as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Impacts to non-unique archaeological resources are generally not considered a significant environmental impact (California PRC section 21083.2(a); CEQA Guidelines Section 15064.5(c)(4)). However, if a non-unique archaeological resource qualifies as tribal cultural resource (California PRC Section 21074(c), 21083.2(h)), further consideration of significant impacts is required. CEQA Guidelines Section 15064.5 assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. As described below, these procedures are detailed in California PRC Section 5097.98.

California State Assembly Bill 52 (AB 52)

AB 52 amended PRC Section 5097.94 and added PRC Sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3. Section 4 of AB 52 adds Sections 21074(a) and (b) to the PRC, which address tribal cultural resources and cultural landscapes. Section 21074(a) defines tribal cultural resources as one of the following:

(1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

(A) Included or determined to be eligible for inclusion in the California Register of Historical Resources.

(B) Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

(2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

Section 1(a)(9) of AB 52 establishes that "a substantial adverse change to a tribal cultural resource has a significant effect on the environment." Effects on tribal cultural resources should be considered under CEQA. Section 6 of AB 52 adds Section 21080.3.2 to the PRC, which states that parties may propose mitigation measures "capable of avoiding or substantially lessening potential

significant impacts to a tribal cultural resource or alternatives that would avoid significant impacts to a tribal cultural resource."

California Health and Safety Code Section 7050.5

California law protects Native American burials, skeletal remains, and associated grave goods, regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains. California Health and Safety Code Section 7050.5 requires that if human remains are discovered in any place other than a dedicated cemetery, no further disturbance or excavation of the site or nearby area reasonably suspected to contain human remains can occur until the county coroner has examined the remains (Health and Safety Code Section 7050.5(b)). PRC Section 5097.98 also outlines the process to be followed in the event that remains are discovered. If the coroner determines or has reason to believe the remains are those of a Native American, the coroner must contact the NAHC within 24 hours (Health and Safety Code Section 7050.5(c)). The NAHC will notify the "most likely descendant." With the permission of the landowner, the most likely descendant may inspect the site of discovery. The inspection must be completed within 48 hours of notification of the most likely descendant by the NAHC. The most likely descendant may recommend means of treating or disposing of, with appropriate dignity, the human remains and items associated with Native Americans.

1.2.2 Local

City of Santa Clarita Municipal Code Chapter 17.64 (Historic Preservation)

17.64.030 Commission Resolution Findings for Designating a Historic Resource.

A building, structure, or object may be designated by the Commission as a historic resource if it possesses sufficient character-defining features and integrity, and meets at least one (1) of the following criteria:

A. Is associated with events that have made a significant contribution to the historical, archaeological, cultural, social, economic, aesthetic, engineering, or architectural development of the City, State or nation; or

B. Is associated with persons significant in the history of the City, State or nation; or

C. Embodies distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials or craftsmanship; or

D. Has a unique location, singular physical characteristic(s), or is a landscape, view or vista representing an established and familiar visual feature of a neighborhood, community, or the City; or

E. Has yielded, or has the potential to yield, information important to the history or prehistory of the City, State, or nation. (Ord. 13-8 § 4 (Exh. A), 6/11/13)

City of Santa Clarita General Plan

Conservation and Open Space Element

This combined Element establishes a policy framework for the designation and long-term preservation of open space within the planning area and addresses the wide range of community benefits derived from open space. In addition to providing land for park and recreational facilities, open spaces provide the benefits of wildlife habitat preservation, scenic views, water recharge and watershed protection, enhancement of air quality, protection of cultural and historical resources, moderation of microclimates, and enhanced property values. In addition, preservation of scenic and accessible open spaces around the urbanized portions of the Valley, and between neighborhoods and districts, contributes to community character and the distinctive sense of place enjoyed by Santa Clarita Valley residents.

2 Background Research

2.1 CHRIS Records Search

On November 5, 2021, staff at the South Central Coastal Information Center (SCCIC) completed a CHRIS records search of the project site and a one-mile search radius. This search included their collections of mapped prehistoric and historic archaeological resources and historic built-environment resources, State of California Department of Parks and Recreation Site Records (DPR forms), technical reports, archival resources, and ethnographic references. Additional consulted sources include historical maps of the study area, the NRHP, the CRHR, the lists of California State Historical Landmarks, California Points of Historical Interest, and the Archaeological Determinations of Eligibility. The results of the records search are presented in Confidential Appendix A.

2.1.1 Previously Conducted Cultural Resource Studies

The SCCIC records search results indicate that three (3) previously conducted cultural resources studies intersect the project site. An additional 29 studies were identified outside the project site within the one-mile records search radius. A list of all previously conducted studies identified within the records search radius is provided in Table 1, and summaries of the three studies that intersect the project site are provided following the table.

Table 1. Previous Cultural Resources Investigations Within 1-Mile of the Project Site

SCCIC Report Number	Author	Year	Report Title	Proximity to Project Site
LA-00274	Rice, Glen E.	1977	An Archaeological Survey of Tract 324558, Santa Clarita Valley Los Angeles	Outside
LA-01032	Van Horn, David M.	1981	Archaeological Survey Report: a 285+ Acre Parcel Located Near Saugus and Newhall in an Unincorporated Portion of Los Angeles County, California	Outside
LA-01117	Anonymous	1979	Preliminary Draft Environmental Impact Report for Zone Case No 6406, Soledad Canyon Area, California	Outside
LA-01322	Wessel, Richard L.	1979	Assessment of the Impact Upon Cultural Resources by the Proposed Zone Change 6406 for Tract Number 35984, 102.4 Acres Centered at the Section Corner of Sections 19, 20, 29 and 30 Series USGS Topographic Map in Friendly Valley of Los Angeles	Outside

Table 1. Previous Cultural Resources Investigations Within 1-Mile of the Project Site

SCCIC Report Number	Author	Year	Report Title	Proximity to Project Site
LA-01466	Taylor, Thomas T.	1985	Tosco Cogeneration Project Transmission Line: Archaeological Survey and Native American Contacts	**Within**
LA-01515	Bissell, Ronald M.	1986	Cultural Resources Assessment of the Mitchell Properties, Santa Clarita Valley Area, Los Angeles County, California	Outside
LA-02193	Romani, John F.	1990	Archaeological Assessment for the Proposed Santa Fe Specific Plan Southeast and Adjacent to the City of Santa Clarita Los Angeles County, California	Outside
LA-02503	Romani, John F., Roberta S. Greenwood, Portia Lee, and Gwen Romani	1992	Historic Property Survey Report & Archaeological Survey Report & Historic Architectural Survey Report for the Route 126 Location Study (easterly Extension) From I-5 to SR-14, Santa Clarita Valley, Los Angeles County, California 07-la-126-5.8/12.7. Final	Outside
LA-02979	Whitley, David S.	1993	Phase I Archaeological Survey and Cultural Resources Assessment for the Porta Bella Specific Plan Study Area, Santa Clarita, Los Angeles County, California	Outside
LA-03690	Wlodarski, Robert J.	1997	Cultural Resources Evaluation City of Santa Clarita Circulation Element EIR	**Within**
LA-03895	Pence, Robert L.	1977	Archaeological Assessment of the Proposed Oxnard Lng Pipeline Route From La Vista, Ventura County, to Quiqley, Los Angeles County	Outside
LA-04008	Unknown	1996	Cultural Resources Investigation Pacific Pipeline Emidio Route	Outside
LA-04058	Wlodarski, Robert J.	1998	Cultural Resources Evaluation: Golden Valley Ranch EIR City of Santa Clarita, Los Angeles County, California	Outside
LA-04104	Macko, Michael E.	1993	Cultural Resource Evaluation of the LADWP Power Plant 1--olive Line 1 Transmission Line Maintenance Project Los Angeles County, California	Outside
LA-04200	Maxon, Patrick O.	1998	Cultural Resources Reconnaissance of Tentative Tract 48892, a 62.2 Acre Parcel in Santa Clarita, Los Angeles County, California	Outside
LA-04250	Wlodarski, Robert J.	1998	A Phase I Archaeological Study: City of Santa Clarita Golden Valley Road/ High School EIR, Los Angeles County, California	Outside
LA-06917	Bricker, Lauren W. and Janet L. Tearnen	1998	Historic Property Clearance Report for the Magic Mountain Parkway Via Princessa Improvement Project in the City of Santa Clarita, Los Angeles County, California	Outside

Table 1. Previous Cultural Resources Investigations Within 1-Mile of the Project Site

SCCIC Report Number	Author	Year	Report Title	Proximity to Project Site
LA-07486	McKenna, Jeanette A.	2005	A Phase I Cultural Resources Investigation of the Soledad Circle Estates Project Area (Tract Map 62343), Located in the Santa Clarita Area of Los Angeles County, California	Outside
LA-07500	Kirkish, Alex	2002	Highway Project for Drainage Improvement Project on the Southbound SR-14 Off-ramp at KP 45.7 (pm 28.4)	Outside
LA-08782	Bonner, Wayne H.	2006	Cultural Resources Records Search and Site Visit Results for Cingular Wireless Candidate NI-0206-01 (berry Petroleum), 22116 Soledad Canyon Road, Santa Clarita, Los Angeles County, California	Outside
LA-08792	Bonner, Wayne H. and Sarah A. Williams	2006	Cultural Resources Records Search Results and Site Visit for T-Mobile USA Candidate Sv01459b (Spectrasite Collocation) 25521 Mountain Pass Road, Santa Clarita, Los Angeles County, California	Outside
LA-08958	Tsunoda, Koji and Moreno, A.	2007	Archaeological Survey Report for Southern California Edison Company Saugus-north Oaks FO Cable Project Los Angeles County, California (wo#8456-0639, Jo#6155)	**Within**
LA-09038	Wlodarski, Robert J.	2006	A Phase I Archaeological Study for the Proposed Sports Complex Expansion Project a 38-acre Site Located in the City of Santa Clarita, County of Los Angeles, California	Outside
LA-09102	Bonner, Wayne H.	2007	Cultural Resources Records Search and Site Visit Results for T-Mobile USA Candidate SV01459B (Cingular Collocation), 25529 1/2 Mountain Pass Road, Santa Clarita, Los Angeles County, California	Outside
LA-09103	Bonner, Wayne H.	2007	Cultural Resources Records Search and Site Visit Results for T-Mobile Candidate SV01563A-R (Caltrans Monopalm), Golden Valley Road and Highway 14, Santa Clarita, Los Angeles County, California	Outside
LA-10560	Hunt, Kevin and Richard D. Schultz	2005	Final Confidential: Cultural Resources Study for the Upper Santa Clara River Watershed Arundo and Tamarisk Removal Program Long-term Implementation Plan, Program Environmental Impact Report/Environmental Assessment, Los Angeles County, California	Outside
LA-10578	Fortier, Jana	2009	TEA21 Rural Roadside Inventory: Native American Consultation and Ethnographic Study Caltrans District 7, County of Los Angeles	Outside

Table 1. Previous Cultural Resources Investigations Within 1-Mile of the Project Site

SCCIC Report Number	Author	Year	Report Title	Proximity to Project Site
LA-10642	Tang, Bai "Tom"	2010	Preliminary Historical/Archaeological Resources Study, Antelope Valley line Positive Train Control (PTC) Project Southern California Regional Rail Authority, Lancaster to Glendale, Los Angeles County, California	Outside
LA-10952	Bonner, Wayne	2011	Cultural Resources Records Search and Site Visit Results for AT&T Mobility, LLC Candidate LAC009-01, USID #11629 (Soledad Overlay-C009), 25529-1/2 Mountain Pass Road, Newhall, Los Angeles County, California	Outside
LA-11228	Unknown	2004	Environmental Analysis - Onshore Component of BHP Billiton LNG International Inc. Cabrillo Port Project	Outside
LA-12815	Letter, Rachael J.	2016	Cultural Resources Report Sierra Canyon Technical Campus Project, City of Santa Clarita Los Angeles County, California	Outside
LA-13110	Anonymous	2010	Class III Inventory I Phase I Archaeological Survey of the Via Princessa Road Extension, City of Santa Clarita, Los Angeles County, California	Outside

LA-01466

Tosco Cogeneration Project Transmission Line: Archaeological Survey and Native American Contacts (Taylor 1985). This archaeological survey report barely intersects the southern tip of the current project site and included a transmission line alignment survey between a plant site in Placerita Canyon to the Southern California Edison (SCE) North Oaks Substation. No archaeological resources were identified as a result of the archaeological survey and no further management recommendations were considered.

LA-03690

Cultural Resources Evaluation City of Santa Clarita Circulation Element EIR (Wlodarski 1997). The SCCIC did not have this report digitized and it could not be provided with the records search results. However, the SCCIC explained that this report consisted of a literature review only and did not include a survey or additional study and would therefore be unlikely to contain any useful information.

LA-08958

Archaeological Survey Report for Southern California Edison Company Saugus-north Oaks FO Cable Project Los Angeles County, California (wo#8456-0639, Jo#6155) (Moreno and Tsunoda 2007). This archaeological survey report barely intersects the southern tip of the current project site and included a survey of approximately 374 acres of private land in support of an SCE fiber optic cable project. No new cultural resources were identified as a result of the pedestrian survey, however three previously recorded resources (P-19-002898, CA-LAN-2105H, and CA-LAN-2132H) were updated as part of the study. Avoidance was recommended for these three resources and no further mitigation was required.

2.1.2 Previously Recorded Cultural Resources

The SCCIC records search results indicate that no previously recorded cultural resources exist within the project site. Three (3) previously recorded cultural resources were identified within the one-mile records search radius (Table 2).

Table 2. Previously Recorded Cultural Resources Within 1-Mile of the Project Site

Primary Number	Trinomial	Resource Description	Resource Eligibility	Recorded by and Year	Proximity to Project Site
P-19-002105	CA-LAN-002105H	Los Angeles Aqueduct	Eligible for NRHP and CRHR	1992 (A. Cole, D. McDowell, and D. Shelton); 1992 (J. Costello, J. Marvin, and J. Tordoff); 2007 (A. Moreno, K. Tsunoda); 2009 (K. Anderson); 2011 (N. Lawson, M. Kaye); 2017 (A. Stevenson)	Outside
P-19-002132	CA-LAN-002132H	LA Aqueduct Transmission Line / Olive-Power Plant 1-Transmission Line	Eligible for NRHP and CRHR	1992 (A. Cole, D. McDowell, and D. Shelton); 1993 (M. Macko); 2004 (Whitley, DS); 2007 (K. Tsunoda); 2010 (J.M. Simon)	Outside
P-19-003582	CA-LAN-003582H	Southern Pacific/Santa Fe Railroad	6Z (not eligible)	2005 (J.A. McKenna)	Outside

2.2 Native American Coordination

On October 6, 2021, the California NAHC responded to South Environmental's request for a Sacred Lands File Search of the project site. The results of the search were negative, but because the NAHC does not maintain an exhaustive list of Native American cultural resources, it was recommended that other sources be contacted for information regarding cultural resources within the project site. The NAHC provided a list of 17 contacts who may have knowledge of cultural resources in the project site and should be contacted for additional information. On October 7, 2021, South Environmental sent informational outreach letters to all 17 of these contacts (Table 3).

One response was received to the outreach letters. On October 7, 2021, Jairo Avila, Tribal Historic and Cultural Preservation Officer for the Fernandeño Tataviam Band of Mission Indians stated that "This project is of interest to the FTBMI and the tribe wishes to provide confidential information during the consultation process with the Lead Agency." No other responses have been received to date. All Native American outreach completed by South Environmental is documented in Appendix B. This outreach was conducted for informational purposes only and does not constitute government-to-government consultation as specified by AB 52.

Table 3. Summary of Native American Outreach

Native American Tribal Contact	Method of Notification/Date	Response Received
Gabrielino-Tongva Tribe Charles Alvarez 23454 Vanowen Street West Hills, CA, 91307 roadkingcharles@aol.com	Emailed on October 7, 2021	No response received to date
Fernandeno Tataviam Band of Mission Indians Jairo Avila, Tribal Historic and Cultural Preservation Officer 1019 Second Street, Suite 1 San Fernando, CA, 91340 jairo.avila@tataviam-nsn.us	Emailed on October 7, 2021	Email response received on October 7, 2021: "This project is of interest to the FTBMI and the tribe wishes to provide confidential information during the consultation process with the Lead Agency."

Table 3. Summary of Native American Outreach

Native American Tribal Contact	Method of Notification/Date	Response Received
Barbareno/Ventureno Band of Mission Indians Annette Ayala 188 S. Santa Rosa Street Ventura, CA, 93001 annetteayala78@yahoo.com	Emailed on October 7, 2021	No response received to date
Northern Chumash Tribal Council Fred Collins, Spokesperson P.O. Box 6533 Los Osos, CA, 93412 fcollins@northernchumash.org	Emailed on October 7, 2021	No response received to date
Gabrielino Tongva Indians of California Tribal Council Christina Conley, Tribal Consultant and Administrator P.O. Box 941078 Simi Valley, CA, 93094 christina.marsden@alumni.usc.edu	Emailed on October 7, 2021	No response received to date
Gabrielino Tongva Indians of California Tribal Council Robert Dorame, Chairperson P.O. Box 490 Bellflower, CA 90707 gtongva@gmail.com	Emailed on October 7, 2021	No response received to date
Gabrielino /Tongva Nation Sandonne Goad, Chairperson 106 1/2 Judge John Aiso St., #231 Los Angeles, CA, 90012 sgoad@gabrielino-tongva.com	Emailed on October 7, 2021	No response received to date
Barbareno/Ventureno Band of Mission Indians Brenda Guzman 58 N. Ann Street, #8 Ventura, CA, 93001 brendamguzman@gmail.com	Emailed on October 7, 2021	No response received to date
Santa Ynez Band of Chumash Indians Kenneth Kahn, Chairperson P.O. Box 517 Santa Ynez, CA, 93460 kkahn@santaynezchumash.org	Emailed on October 7, 2021	No response received to date
Gabrieleno/Tongva San Gabriel Band of Mission Indians Anthony Morales, Chairperson P.O. Box 693 San Gabriel, CA 91778 GTTribalcouncil@aol.com	Emailed on October 7, 2021	No response received to date

Table 3. Summary of Native American Outreach

Native American Tribal Contact	Method of Notification/Date	Response Received
Chumash Council of Bakersfield Julio Quair, Chairperson 729 Texas Street Bakersfield, CA, 93307 chumashtribe@sbcglobal.net	U.S. Mail on October 7, 2021	No response received to date
Gabrieleno Band of Mission Indians - Kizh Nation Andrew Salas, Chairperson P.O. Box 393 Covina, CA, 91723 admin@gabrielenoindians.org	Emailed on October 7, 2021	No response received to date
Coastal Band of the Chumash Nation Mariza Sullivan, Chairperson P. O. Box 4464 Santa Barbara, CA, 93140 cbcntribalchair@gmail.com	Emailed on October 7, 2021	No response received to date
Barbareno/Ventureno Band of Mission Indians Attn: Patrick Tumamait 992 El Camino Corto Ojai, CA 93023	U.S. Mail on October 7, 2021	No response received to date
Barbareno/Ventureno Band of Mission Indians Julie Tumamait-Stenslie, Chairperson 365 North Poli Ave Ojai, CA 93023	Emailed on October 7, 2021	No response received to date
San Luis Obispo County Chumash Council Mark Vigil, Chief 1030 Ritchie Road Grover Beach, CA 93433	U.S. Mail on October 7, 2021	No response received to date
San Fernando Band of Mission Indians Donna Yocum, Chairperson P.O. Box 221838 Newhall, CA, 91322 ddyocum@comcast.net	Emailed on October 7, 2021	No response received to date

2.3 Background Research

Additional background research was completed on the project site in an effort to establish a thorough and accurate historic context, and to confirm the building development history of the property.

2.3.1 Los Angeles County Office of the Assessor

According to Los Angeles County Assessor records, the single-family residence, storage building, and garage occupy two parcels, both associated with the address 25800 Sierra Highway (the residence's original address prior to construction of Golden Valley Road) The single-family residence and storage building are located on APN 2836-013-141. The residence is described by the Assessor as a 2 bedroom/3 bathroom 3,182-square foot home constructed in 1966. Adjacent to the east, APN 2836-013-111 is also associated with this address. The garage is adjacent to the north on APN 2836-013-133. Undeveloped parcels were not included in this search.

2.3.2 City of Santa Clarita Building Permits

South Environmental reviewed all available building permits online via the City of Santa Clarita's ePermit system. The search included all APNs (2836-013-141, 2836-013-111, and 2836-013-133) and all addresses (25800 Sierra Highway and 20101 Golden Valley Road) associated with the single-family residence. Undeveloped parcels were not included in this search. Only APN 2836-013-141 yielded information concerning previous alterations to the property, as described below:

- 1996: Construct new 6-car garage (Record 29604853).
- 2001: Add 55-foot-long, 4-foot-high slumpstone retaining wall with three square pilasters with precast stone veneer and 10 foot high slumpstone wall (Record 30013747).

2.3.3 Los Angeles County Public Works

The City of Santa Clarita was not incorporated until 1987. Therefore, South Environmental searched for additional building permits via the Los Angeles County Public Work's online Building Permit Viewer Application and Land Records Viewer. No additional building permits were identified under any of the current/former addresses or APNs associated with the single-family residence.

2.3.4 Historical Newspaper Search

South Environmental reviewed historical newspapers via newspapers.com and the California Digital Newspaper Collection covering the Los Angeles area in an effort to understand the development of the project site and surrounding area.

2.3.5 Sanborn Fire Insurance Maps

No Sanborn Maps were identified for the project site among the Los Angeles County Sanborn Fire Insurance Company maps available on the Los Angeles Public Library website.

2.3.6 Historical Topographic Map and Aerial Photograph Review

Historic topographic maps and aerial photographs of the project site were available from Nationwide Environmental Title Research (NETR 2021) LLC. These included topographic maps for the years 1900, 1905, 1910, 1914, 1924, 1925, 1928, 1929, 1930, 1935, 1944, 1945, 1955, 1961, 1964, 1975, 1988, 1994, 1999, 2012, 2015, 2018; aerial imagery for the years 1947, 1952, 1959, 1969, 1974, 1977, 1994, 2000, 2002, 2003, 2005, 2009, 2010, 2012, 2014, 2016, and 2018, and from the University of California, Santa Barbara (UCSB), FrameFinder Maps for the years 1928, 1930, 1968, 1976, and 1986 (UCSB 2021).

3 Cultural Context

3.1 Environmental Setting

The project site is a steeply sloping group of hills at an elevation of 1,750-feet above mean sea level (at the residence) and 1,560-feet at the northern tip. There is a hilltop at the northwest edge of the residence that extends northeast through the project site and is steeply sloped on the east and west sides. Ephemeral drainages travel through the northern portion of the project site and flow into nearby underground culverts.

The geology in the project site is dominated by Saugus Formation terrestrial fluviatile, weakly indurated, which is comprised in Pliocene and Pleistocene age geologic units (USGS 2020a, USGS 2020b). The primary rock type in this geologic unit is QTp light gray to light reddish-brown pebble-cobble conglomerate, sandstone, and siltstone; conglomerate composed of granitic, gneissic, metavolcanic, quartzitic gabbroic, anorthositic and volcanic detritus; deposited by westward flowing streams; probably mostly of Pleistocene age. A minor amount of alluvial gravel, sand and clay of valley areas (Qa) and landslide debris (Qls) also occurs in the project site.

Soils within the project site include:

- Saugus loam, 30 to 50 percent slopes, eroded is the most abundant soil type and occurs in the western half of the project site. This is an upland soil found on backslope of hills, and is well drained.
- Castaic-Balcom silty clay loams, 15 to 30 percent slopes is on the eastern portions of the project site. This soil type largely includes (99%) upland hills and backslopes and includes 1% of drainageways. This is a well-drained soil.
- Zmora loam, 2 to 9 percent slopes is on the northern tip of the project site. This soil type is typically found on terraces and backslopes and is well drained.

Climate in the region is hot and dry, with average summer high temperatures in the mid-90s and average winter lows in the mid-30s. Average yearly rainfall is 14-inches (less than half the national average) and the wettest months are January – March, and almost no precipitation between May-August.

3.2 Prehistoric Context

While many chronological sequences have been developed to describe cultural changes in Southern California, the following builds on Wallace (1955, 1978), who developed a prehistoric chronology for the Southern California coastal region that is still widely used today. Four periods

are presented in this sequence: Early Man, Milling Stone, Intermediate, and Late Prehistoric. The summary of prehistoric chronological sequences for Southern California coastal and near-coastal areas presented below is a combination of Wallace (1955) and Warren (1968) as well as more recent studies.

3.2.1 Early Man Horizon (ca. 10,000 – 6,000 B.C.)

Numerous pre-8,000 B.C. sites have been identified along the mainland coast and Channel Islands of Southern California (Moratto 1984; Erlandson 1991; Rick et al. 2001; Johnson et al. 2002; Jones and Klar 2007). The Arlington Springs site on Santa Rosa Island produced human femurs dated to approximately 13,000 years ago (Johnson et al. 2002). The most widely accepted dates for archaeological sites on the southern California coast are from two of the northern Channel Islands, located off the coast of Santa Barbara. On San Miguel Island, Daisy Cave clearly establishes the presence of people in this area about 10,000 years ago (Erlandson 1991:105).

Early Man Horizon sites are generally associated with a greater emphasis on hunting than later horizons. Recent data indicate that the Early Man economy was a diverse mixture of hunting and gathering, including a significant focus on aquatic resources in coastal areas and on inland Pleistocene lakeshores (Moratto 1984).

3.2.2 Milling Stone Horizon (6,000 – 3,000 B.C.)

Set during the Altithermal, which began around 6,000 B.C., the Milling Stone Horizon is characterized by changing subsistence strategies in response to drier climate. This included a greater emphasis on plant foods and small game. Extensive seed processing is evident in the dominance of stone grinding implements in contemporary archaeological assemblages; namely, milling stones (metates) and handstones (manos). The mortar and pestle, associated with acorns or other foods processed through pounding, were first used during the Milling Stone Horizon and increased dramatically in later periods (Wallace 1955, 1978; Warren 1968). Other food resources including small and large terrestrial mammals, sea mammals, birds, shellfish and other littoral and estuarine species, near-shore fishes, yucca, agave, and seeds and other plant products (Kowta 1969). Depending on the environmental setting (coastal or inland), food procurement strategies are found to be highly variable (Byrd and Raab 2007:220).

3.2.3 Intermediate Horizon (3,000 B.C. – A.D. 500)

The Intermediate Horizon is characterized by a shift toward a hunting and maritime subsistence strategy, as well as greater use of plant foods. During the Intermediate Horizon, a noticeable trend occurred towards a greater adaptation to local resources including a broad variety of fish, land mammals, and sea mammals along the coast. This diversity was reflected in tool kits for hunting,

fishing, and processing food and materials, with flake scrapers, drills, various projectile points, and shell fishhooks being manufactured. Mortars and pestles became more common during this period, gradually replacing manos and metates as the dominant milling tool. This change in milling stone technology indicates a transition from the processing and consumption of hard seed resources to the increased reliance on acorns (Glassow et al. 1988; True 1993).

3.2.4 Late Prehistoric Horizon (A.D. 500 – Historic Contact)

The Late Prehistoric Horizon is characterized by an increased diversity of plant food resources and land and sea mammal hunting. Material culture became more complex as demonstrated through more diverse classes of artifacts. During this period, the northern Channel Islands populations further developed craft specializations, including shell bead manufacture, that sustained trade with mainland settlements and with further trading partners to the east, creating a regional economy. Steatite quarried on Santa Catalina Island was used to make stone bowls, pipes, comals, sucking tubes, pendants, beads, and effigies. The lack of pottery in coastal and near-coastal sites implies that ceramic technology was not widely used, or that ceramics were obtained by trade with neighboring groups to the south and east. The lack of widespread pottery manufacture may also be due to the utility of tightly woven and watertight basketry that functioned in much the same way as ceramic vessels.

In areas of inland settlement, by the end of the Intermediate Period, mobility and long-distance migration towards the coast from seasonal camps was replaced by the development of permanent settlements. The period between A.D. 500 and historic contact is divided into three regional patterns: Chumash (Santa Barbara and Ventura counties), Takic/Numic (Los Angeles, Orange, and western Riverside counties), and Yuman (San Diego County). Modern Gabrielino/Tongva, Juaneño, and Luiseño people in this region are considered to be the descendants of the Uto-Aztecan, Takic-speaking populations that settled along the California coast during this period (Warren 1968).

3.3 Ethnographic Context

The following ethnographic context was originally presented in Murray and Hale 2015:

The proposed project site falls within the ethnographic boundary of the Tataviam (Johnson and Earle 1990; King and Blackburn 1978; Kroeber 1925). Tataviam territories included the upper reaches of the Santa Clara River drainage east of Piru Creek, but also encompassed the Sawmill Mountains to the north and the southwestern portion of the Antelope Valley (King and Blackburn 1978). Tataviam territory is bounded by various branches of Chumash to the north and west (including the Ventureño to the west, and Castac and Emigdiano to the northwest), Kitanemuk to the northeast, Serrano to the east, and Gabrielino to the south (King and Blackburn 1978).

Note that there is almost no ethnographic data (i.e., data acquired by means of observation or taken from persons who practiced native lifeways) in existence concerning the Tataviam and their native lifeways. Most of what is known today about the Tataviam comes in the form of ethnohistory (i.e., historical accounts developed through examination of historical records and oral histories) as presented in the works of anthropologists Alfred L. Kroeber (1925) and John P. Harrington (1935). Their data is largely based on interviews conducted in the early 1900s with a Native American consultant named Juan José Fustero, a man who spoke Kitanemuk and claimed that his grandparents were born near the town of Newhall and spoke a language that is no longer extant (Bright 1975). Most of the subsequent works published on the Tatatviam (Bright 1975; Hudson 1982; King and Blackburn 1978), including discussions of their cultural and geographic affiliations, were based on the Kroeber and Harrington interviews with Fustero and several other Kitanemuk consultants. Other studies have analyzed Spanish mission baptismal, marriage, and burial registers in an attempt to better understand the distribution of historic village settlements and kinship ties between settlements (Johnson 1978, 1997; NEA and King 2004).

Early ethnologies referred to the Tataviam as Ataplili'ish (Kroeber 1915), but Kroeber found this name to be too general since it had already been used to describe other indigenous groups (namely the Gabrielino). Kroeber (1925) changed the term to Alliklik, which was noted to be a Ventureño Chumash name for the group (although it is believed to be a derogatory term for the sound of the language), but offered almost no information concerning their native lifeways, saying, "In fact, there is nothing known about them except that they held the river up from a point between Sespe and Piru, most of Piru Creek, Castac Creek, and probably Pastoria Creek across the mountains in the San Joaquin Valley drainage and adjacent to the Yokuts" (Kroeber 1925:613–614).

The Tataviam are linguistically classified as an Uto-Aztecan Serran sub-branch of Takic speaking groups consisting of Kitanemuk, Serrano (including Vanyume), and Tataviam (Golla 2011; Sutton 1980). William Bright has suggested that Tataviam was actually a separate language with Takic affinities, or perhaps a "remnant, influenced by Takic, of a language family otherwise unknown in southern California" (Bright 1975:230). However, the current and most widely accepted view is that Tataviam is in fact a Takic language (King and Blackburn 1978; Johnson and Earle 1990; Sutton 1980).

King and Blackburn (1978:536) noted several Tataviam settlements based on information provided by Harrington and other sources, including mission registers. Among these is the putative village of *tsawayung* (also referred to as *Chaguayabit, Chaguayanga, takuyama'm*), which some believe was located near Castaic Junction at the site of Rancho San Francisco. However, there is a lack of consensus as to its exact location. Harrington's own notes reflect this confusion: "Jose Juan Olivas thinks it is over by San Francisquito [Rancho San Francisco] but does not know and never did

know just where" (NEA and King 2004:119). Based on diary entries from the Portolá Expedition (Perkins 1957), some have hypothesized that Estancia San Francisco de Xavier (often incorrectly referred to as an asistencia) was placed at the location of the village of *tsawayang*, but this is based on descriptive diary entries and has never been confirmed by archaeological or other historic evidence. In fact, no physical evidence of the village has ever been found. Other mapped Tataviam villages include *tikatsing* located on upper Castaic Creek, and *pi'ing* located where Castaic Creek meets Elizabeth Lake Canyon. The village of *Tochonaga* was recorded on an 1843 land grant map. This site appears to be located to the southeast of Newhall, but its precise location has also never been confirmed: "Tochononga was located in the mountains northwest of San Fernando···over by Los Alamos somewhere here in the Tejon Ranch" (NEA and King 2004:117). Other villages and seasonal campsites identified by Harrington include *akure'eng*, which was located at the original Newhall townsite; *apatsitsing,* located on upper Castaic Creek; and *naqava'atang*, located east of Townsend Peak. Piru Creek also contained several village and rancheria sites, located on the northern edge of Tataviam territory (Johnson and Earle 1990).

Pedro Fage's account of the 1769 Portola expedition indicates that the first Chumash settlement encountered upon leaving Tataviam territory was located west of the mouth of Piru Creek. The village of *kamulus* (Camulos), located east of Piru Canyon, bears a Chumash name (Johnson and Earle 1990), leading to speculation that this village consisted of a mixed Chumash-Tataviam population. There has been much discussion regarding Chumash ties to areas generally accepted as Tataviam territory (Beeler and Klar 1977).

More recent studies have examined additional Tataviam investigations conducted by Harrington with neighboring groups (Johnson and Earle 1990). These studies support the original Kroeber and Harrington findings that the Tataviam were a distinct group.

> The correspondence between (1) ancestral villages traced using genealogical evidence and (2) independently elicited information regarding Tataviam territoriality builds confidence in the reliability of the ethnographic record compiled by Kroeber and Harrington. The distinctiveness of the Tataviam as an ethnic entity, separate from the Kitanemuk and Fernandeño, is supported by research (Johnson and Earle 1990:209).

The preponderance of evidence indicates that the Tataviam inhabited the Santa Clarita Valley at the time of Spanish Contact in the 1700s and for some time thereafter, and that there is no demonstrable link indicating direct and prolonged occupation by neighboring Chumash, Kitanemuk, Gabrielino, Serrano, or other ethnohistorically known native groups. The archaeological record contains artifacts that are commonly found in both coastal and desert regions, which is not surprising since Santa Clarita Valley is in the midst of natural corridors connecting the Ventura Coast, southern San Joaquin Valley, and Mojave Desert. The commonality

of coastal artifacts in the desert and desert artifacts at the coast testifies to extensive movement of these items. Artifact translocation primarily occurred through trade and exchange. The widespread manifestation of earlier Milling Stone assemblages throughout all parts of Southern California indicates that human populations were strongly established during the early Holocene, likely resulting in the development of ethnic borders and some degree of territoriality. The ethnographic and ethnohistoric record in California indicates that such sociocultural conditions are more conducive to trade and exchange than to open travel through multiethnic territories by unaffiliated individuals or groups.

Considering the ethnohistorically mapped aboriginal villages, any efforts to rectify mapped locations with archaeological deposits would be wrought with tenuous assumptions. Ethnohistoric village location maps for the Santa Clarita Valley were developed through interviews with persons far removed from any aboriginal occupation of those settlements and are estimates only. Discovering an archaeological deposit near a mapped village location does not itself prove that the ethnohistoric village has been located.

With respect to the putative Tataviam village of *tsawayung*, it was mapped using ethnohistorical data only; no archaeological evidence exists that could confirm its location. Even if archaeological deposits dating to the last few hundred years are identified in the general area, those deposits must be studied to first address basic anthropological questions of settlement, subsistence, and general socioeconomic adaptations, followed by a test of expectations regarding what the ethnohistoric settlement may have looked like. The devastating effect of introduced disease, along with Missionization of California Indians, would have certainly modified the nature of aboriginal occupation of any village, creating an archaeological signature distinct from the traditional Late Prehistoric record. Moreover, the ethnohistoric period archaeological record from neighboring regions can only be used as a proxy for the kinds of archaeological patterns that may appear in the Santa Clarita Valley. Socioeconomic adaptations in Chumash and Kitanemuk territories were regionally specific and can be expected to have responded differently to the effects of introduced disease, Missionization, and integration into Mexican and American economies—all of which preceded development of the ethnographic and ethnohistoric records of Southern California aboriginal groups during the early 1900s.

3.4 Historic Context

Post-Contact history for the state of California is generally divided into three periods: the Spanish Period (1769–1822), Mexican Period (1822–1848), and American Period (1848–present).

3.4.1 Spanish Period (1769–1822)

In search of the legendary Northwest Passage, Spanish explorer Juan Rodríquez Cabríllo stopped in 1542 at present-day San Diego Bay. Cabríllo explored the shorelines of present-day Catalina Island as well as San Pedro and Santa Monica Bays. Much of the present California and Oregon coastline was mapped and recorded in the next half-century by Spanish naval officer Sebastián Vizcaíno. Spain laid claim to California based on the surveys conducted by Cabríllo and Vizcaíno (Bancroft 1885:96–99; Gumprecht 1999:35).

The 1769 overland expedition by Captain Gaspar de Portolá marks the start of California's Historic period. With a band of 64 soldiers, missionaries, Baja (lower) California Native Americans, and Mexican civilians, Portolá established the Presidio of San Diego, a fortified military outpost, as the first Spanish settlement in Alta California. In July of 1769, while Portolá was exploring southern California, Franciscan Fr. Junípero Serra founded Mission San Diego de Alcalá at Presidio Hill, the first of the 21 missions that would be established in Alta California by the Spanish and the Franciscan Order between 1769 and 1823.

The Portolá expedition first reached the present-day boundaries of Los Angeles in August 1769, thereby becoming the first Europeans to visit the area. Father Juan Crespí, a member of the expedition, named "the campsite by the river Nuestra Señora la Reina de los Angeles de la Porciúncula" or "Our Lady the Queen of the Angeles of the Porciúncula." Two years later, Friar Junípero Serra returned to the valley to establish a Catholic mission, the Mission San Gabriel Arcángel, on September 8, 1771 (Kyle 2002:151).

A major emphasis during the Spanish Period in California was the construction of missions and associated presidios to integrate the Native American population into Christianity and communal enterprise. Incentives were also provided to bring settlers to pueblos or towns, but just three pueblos were established during the Spanish Period, only two of which were successful and remain as California cities (San José and Los Angeles).

3.4.2 Mexican Period (1822–1848)

After more than a decade of intermittent rebellion and warfare, New Spain (Mexico and the California territory) won independence from Spain in 1821. In 1822, the Mexican legislative body in California ended isolationist policies designed to protect the Spanish monopoly on trade, and decreed California ports open to foreign merchants (Dallas 1955:14).

Extensive land grants were established in the interior during the Mexican Period, in part to increase the population inland from the more settled coastal areas where the Spanish had first concentrated their colonization efforts. The secularization of the missions following Mexico's

independence from Spain resulted in the subdivision of former mission lands and establishment of many additional ranchos. During the supremacy of the ranchos (1834–1848), landowners largely focused on the cattle industry and devoted large tracts to grazing. Cattle hides became a primary southern California export, providing a commodity to trade for goods from the east and other areas in the United States and Mexico. The number of nonnative inhabitants increased during this period because of the influx of explorers, trappers, and ranchers associated with the land grants. The rising California population contributed to the introduction and rise of diseases foreign to the Native American population, who had no associated immunities.

War in 1846 between Mexico and the United States precipitated the Battle of Chino, a clash between resident Californios and Americans in the San Bernardino area.

3.4.3 American Period (1848–Present)

The Mexican–American War ended with the Treaty of Guadalupe Hidalgo in 1848, ushering California into its American Period. California officially became a state with the Compromise of 1850, which also designated Utah and New Mexico (with present-day Arizona) as U.S. Territories.

The Gold Rush began in 1848, and with the influx of people seeking gold, cattle were no longer desired mainly for their hides but also as a source of meat and other goods. During the 1850s cattle boom, rancho vaqueros drove large herds from southern to northern California to feed that region's burgeoning mining and commercial boom. The cattle boom ended for southern California as neighbor states and territories drove herds to northern California at reduced prices. Operation of the huge ranchos became increasingly difficult, and droughts severely reduced their productivity (Cleland 2005:102–103).

Historical Overview of Santa Clarita

In 1795, Fr. Fermin Lasuen ordered a new report on possible mission sites, and the Francisco Reyes Rancho was ultimately chosen as the new mission site, with Mission San Fernando Rey de España being formally founded in 1797 (Perkins 1957). Shortly thereafter, many of the local Tataviam people were removed from their homeland, relocated to the mission, and their native lifeways taken away.

Despite the fact that the new mission was to be built elsewhere, Mission San Fernando acquired the headwaters of the Santa Clara River east from Piru and named the land Rancho San Francisco. When Mission padres learned that Francisco Avila had claimed a large portion of this land as his own, they protested to Governor José Arrillaga at Monterey, insisting the land belonged to the church and not Avila. After acknowledging the church's title to the land, Avila's land grant was

rescinded and the padres quickly made plans to build in the area in order to more clearly establish their presence (Perkins 1957).

Using Native American labor in 1804, the church built what many have termed as an "asistencia" at the location that Fr. Crespi has first noted in his diary entry (Perkins 1957). However, it is important to note that mission records suggest that this was actually an outpost known as Estancia San Francisco de Xavier, and that it was likely never elevated to the status of asistencia or sub-mission.

By 1813, Rancho San Francisco had increased its production and herds of cattle had grown larger. It became necessary to construct a fence to keep mission cattle separate from neighboring cattle. The fence was erected at Piru Creek across the river, establishing a formal boundary between San Francsico and Triunfo ranches. An irrigation canal was dug, and a small dam was built at the eastern boundary of the rancho to provide the western side of the rancho with much needed water (Perkins 1957).

Following secularization of the missions in 1833, the Mexican government confiscated all mission land holdings and commissioned Lieutenant Antonio Del Valle to take over Mission San Fernando by inventory from the incumbent Padre, Fr. Ybarra in 1834. After meeting his wife Doña Jacoba Felix and having two children, Del Valle decided to settle his family on a piece of land. In 1838, he resigned his army commission and petitioned the Mexican government for Rancho San Francisco (despite the fact that the land was supposed to revert back to Native Americans). On January 22, 1839, the request was granted, and Del Valle became the owner of 48,829 acres of Rancho San Francisco. Just 2 years later, Antonio Del Valle died, leaving behind thousands of heads of livestock, over 75 square miles of land, and no legal will. Legal battles ensued between his widow Jacoba Felix Del Valle and his oldest son Ygnacio Del Valle, with a judge eventually dividing up the land amongst the parties and their children (Reynolds 1998).

Ygnacio would go on to build his own corral on the western edge of the property (in present-day Ventura County in Piru) surrounding the former village of kamulus (Rasmussen 2001). The Camulos Rancho was formerly established by Ygnacio in 1853.

Rancho San Francisco was owned and operated by Ygnacio Del Valle until 1865, by which time it was deep in debt as a result of 2 years of drought, which killed most of the cattle. Del Valle eventually lost the rancho to his financiers who then sold it to oil speculators. This resulted in the first major discovery of oil on the Rancho, and just seven weeks later, the first oil well was installed on the south side of the Santa Clara River near the Del Valle residence. The region eventually be surrounded by oil fields including the Hasley Canyon and Castaic Junction Oil Fields to the north and the historic Pico Oil Field to the south.

The land changed hands a few more times until Henry Mayo Newhall acquired it in 1875. Shortly thereafter in 1876, a new town-site known as "Newhall" was founded and a Southern Pacific Railroad right-of-way was granted across the rancho (Perkins 1957). In 1875, work had already begun on the San Fernando Railroad Tunnel, which was constructed by over 1,000 Chinese and 500 white laborers, and overseen Frank Frates. The completion of the tunnel in 1876 resulted in the completion of the Southern Pacific Railroad at Lang Station. A Golden Spike ceremony was held the day the final pieces of track were laid (Pollack 2010). That same year the Newhall station was built, although adverse conditions from sand storms would result in the building (and the rest of the town-site) being moved 3 miles to the south. In 1882, Henry Mayo Newhall was killed in a riding accident on his ranch (Perkins 2010).

In 1928, the Santa Clarita Valley experienced a disaster of monumental proportions when the concrete walls of the St. Francis Dam in San Francisquito Canyon broke. Noted to be one of the worst American civil engineering disasters of the twentieth century and second greatest loss of life in California after the San Francisco earthquake, the torrent of water that swept through the valley resulted in the death of hundreds of people and thousands of animals. Newhall Land and Farming Company released a report on the St. Francis Dam Flood just weeks after the disaster occurred and noted that a total of 1,720 acres of farmland were destroyed as a result.

The Newhall area originally founded by Mayo Newhall was eventually split up into separate communities, including Newhall, Valencia, Saugus, and Canyon Country. The contemporary City of Santa Clarita would not officially incorporate all these areas until 1987. Today the City is home to over 200,000 residents, ranking it the third-largest city in the County.

The Sierra Highway through Santa Clarita

From 1910 to 1938, the main road into the Santa Clarita Valley was via the Newhall tunnel under the present-day Sierra Highway next to the old Beale's Cut Stagecoach Pass (Boston 2009). Originally known as U.S. Route 6 or the Grand Army of the Republic Highway in honor of Civil War veterans, the highway currently runs between Provincetown Massachusetts and Bishop, California. The highway arrived out west in 1937 when U.S. 6 was extended from Denver, Colorado to Long Beach (Buttelman 2019). The Sierra Highway is a small portion of Route 6, beginning where it intersects with San Fernando Road and The Old Road, near the present-day Golden State and Antelope Valley Freeways, and continuing into Palmdale. By 1938, the Newhall tunnel was abandoned to make way for the Sierra Highway through the Santa Clarita Valley. The Sierra Highway between Canyon Country to Newhall was constructed with three lanes and included a bridge over Placerita Canyon Road.

Between its initial construction in the late 1930s and prior to the construction of the first leg of the Antelope Valley Freeway in 1963, the Sierra Highway served as the primary route between Los

Angeles and the Mojave Desert. Over the next several decades, the Sierra Highway developed an eclectic assortment of businesses to support the motorists who braved the windy thoroughfare, including the now famed eateries of the Backwoods Inn, The Halfway House Café, and Le Chene, which have appeared in countless movies. Other properties along the route come with intriguing backstories, like the now abandoned Tony Alamo Christian Church property, which was once the home of a religious cult; or Callahan's Old West and Sierra Inn, which originally served as a replica frontier town started by Robert Callahan and later became movie ranch (Padilla 1989, Buttelman 2019).

In 1968, Sierra Highway was widened to a four-lane divided highway from Soledad Canyon Road to Interstate (I)-5, which included the portion adjacent to the subject property. Over the next several decades, the setting of the Sierra Highway in Santa Clarita was largely overtaken by new residential housing developments and left unrecognizable. However, the northern portion of the highway in unincorporated Los Angeles County and in Agua Dulce contain some of the more storied historic locations and have largely maintained their rural settings.

3.5 Project Site Context

3.5.1 Development History

Historic aerial photographs of the subject property and its setting from 1928 and 1930 shows that land south of the Santa Clara River was entirely undeveloped but for the Southern Pacific Railroad, the Los Angeles Aqueduct, and smaller roads through Placerita Canyon and Sand Canyon. North of the river, agricultural development had taken hold around the aqueduct as evidenced by fields with sparse buildings and structures. By the 1947 aerial photograph, the Sierra Highway through the Santa Clarita Valley was constructed adjacent to the subject property, winding its way north through the rural landscape. There is still almost no development south of the Santa Clara River at this time. In the 1952 aerial photograph, the most noticeable change to the setting is the presence of a large oil field directly south of the subject property. This oil field persists to the present-day, occupying most of the land south of Golden Valley Road. Despite this new industrial development, the area south the Santa Clara River remains largely undeveloped throughout the 1950s.

By the 1968 aerial photograph, the residence at the subject property has been constructed and is visible in its L-shape plan. At this time, the residence was accessed via a long driveway off Sierra Highway, as Golden Valley Road would not be constructed for another 34 years. The 1968 aerial also reveals that the first major residential subdivision has been constructed directly east of the subject property, with large sections containing newly constructed homes and others appearing to be in the process of grading/new construction. By the 1969 aerial photograph, the Antelope Valley Freeway can be seen under construction just south of the subject property. By 1974, the

Antelope Valley Freeway has been constructed, running northeast along the southern edge of the newly developed residential subdivisions. Throughout the 1970s, residential development continued to expand to the northeast. The 1976 and 1977 aerial photographs also show the presence of more formal landscaping around the residence on the subject property, with manicured lawns and mature trees visible. By the 1986 aerial photograph, suburban sprawl has continued, and the subject property appears far less isolated than it ever has before. More homes continued to be added northeast of the subject property well into the 1990s. In 1996, a rectangular-plan garage is constructed northwest of the residence.

The 2000 aerial photograph shows the beginning of the construction of Golden Valley Road south of the subject property. This photograph reveals that the subject property underwent significant changes at this time, with its entire southern and eastern boundary cut and graded, obliterating the original driveway on the eastern side of the property and the natural hillside to the west, which was completely graded and terraced, resulting in the biggest change to the property's setting to date. By the 2002 aerial, Golden Valley Road was completed between Soledad Canyon Road to the north and Sierra Highway to the south, and the subject property's driveway was reoriented to its present-day configuration. Golden Valley High School was under construction at this time, as was the large residential development located southeast of the subject property that sits between present-day Sierra Highway to the north and Golden Valley Road to the south. By 2005, Golden Valley High was constructed, Golden Valley Road was continued east of Sierra Highway to the Antelope Valley Freeway, and the new large residential development southeast of the subject property had started to be developed with homes. Also in 2005, the properties adjacent to the east and west of the subject property were graded and prepped for new housing developments. By 2009, the subject property's setting looks almost exactly as it does today, but for the development of the remaining homes in the adjacent lot to the east, which were completed by 2016.

3.5.2 Previous Owners/Occupants

The following presents a summary of known owners/occupants living at the subject property's original address of 25800 Sierra Highway since its construction in 1966, based on publicly available records.

- 1966: William Edward Rider and Clara H. Rider
- 1966-c. 1982: Clara H. Rider
- 1982: Trustee's Sale by Major Assurance Corp
- 1990: Shantel S. Hudson
- 1993-present: Veluzat Paul R. and Carol S. TRS Veluzat Trust

The Rider Family (1966-c. 1982)

The original owners who commissioned the residence at 25800 Sierra Highway in 1966 were William Edward (W.E.) Rider, born in Kansas City, Missouri in 1900, and his wife Clara H. Rider, born in Vernon, Texas in 1908. W.E. got his start working as milker in a Missouri dairy "and drove his way upward through sheer ability, energy, and determination" (The Signal 1959a). It is unclear where and when William and Clara were married. The couple had one child together, Robert W. Rider, who was born in 1933.

In 1942, the family was living at 6045 Carpenter Avenue in North Hollywood, with W.E. employed at McKessens Robins Co., one of the largest U.S. distributors of wholesale pharmaceutical drugs, beverages and chemicals. By 1948, the Riders were living at another North Hollywood home at 12309 Emelita Street. By the 1950s, the Riders moved yet again to a North Hollywood residence at 7002 Sunnyslope Avenue.

In the 1950s W.E. would go on to start his own pharmaceuticals company, Riders Limited (Ltd), with a production plant located at 7234 Varna Avenue in North Hollywood (LAT 1955). In 1959, Riders Ltd. suffered a major loss when their plant was destroyed in a two-alarm chemical fire, resulting in an estimated $200,000 in damages (Citizen-News 1959). That same year, W.E. moved his business to the Golden Triangle Industrial Park at 21020 Soledad Canyon Road in what was then known as the Saugus-Newhall area (The Signal 1959b, Valley Times Today 1961). Riders Ltd. was one of two large additions made to the 600-acre industrial park. At the ground-breaking ceremony, W.E. explained that this plant would replace the North Hollywood plant and would contain 80,000 square feet of space (The Signal 1959b). Starting out with 48 employees, he expected the number to double once machines and personnel from the old North Hollywood plant could be moved (The Signal 1959a). At the time, the Rider family was still living at their home on Sunnyslope Avenue in North Hollywood (The Van Nuys News and Valley Green Sheet 1960)."

The Riders relocated to the Santa Clarita Valley around 1964 (The Signal 1973). It is unknown when exactly the Riders commissioned the house on Sierra Highway or who designed/constructed the home. Assessor's records indicate that the house was constructed in 1966. Shortly after moving into the house, W.E. passed in December 1966.

In the years following her husband's death, Clara would go on to become a prominent figure in the Santa Clarita Valley's political and social circles, with her first name appearing as "Claire" in dozens of local newspaper articles over the next decade (Figure 3). Her involvement in the Republican Party included throwing her support behind then candidate for the U.S. House of Representatives, Barry Goldwater, Jr. In March 1969, Rider hosted a massive party at her Sierra Highway home for Goldwater, Jr. in what was called "the biggest political (and possibly even social) bash ever seen in Valencia Valley." Fancy cars and limousines "poured through the gates of the

Rider mansion, the imposing lonely white house just off Highway 14 north of "confusion hill"" (The Signal 1969). It was reported that "...a great many of the people who turned up Wednesday night had come just so they could see the inside of the Clara Rider home, an intriguing landmark for thousands of persons who travel Highway 14" (The Signal 1969).

Goldwater, Jr. was elected to the U.S. House of Representatives in 1969 and would go on to serve six consecutive terms until 1983. During his time in office, Rider served as a committeewoman for Goldwater, Jr's Finance Committee (The Signal 1973) and hosted numerous parties for Goldwater, Jr. at her home on Sierra Highway including a reception for approximately 40 guests including Goldwater, Jr. and his staff in 1970 (The Signal 1970a); an evening called "62 for 72" hosted by the 62nd Assembly District Republican Coordinating Council in 1972 (The Signal 1972a); "Dinner with Barry" in 1974 which was sponsored by the Republican Women's Club (The Signal 1974); and "An Evening with Barry" in 1976 with the public invited to attend (The Signal 1976). A 1972 gossip column reported that Goldwater, Jr. and his girlfriend Susie Gherman were "planning to buy that palatial pad on Highway 14 from that vivacious redhead, Claire Rider, and set up housekeeping" (The Signal 1972b), but such a real estate transaction would never occur.

In 1970, Rider simultaneously threw her support to another political cause – the campaign of Haig Kehiayan for Newhall Municipal Court Judge, throwing a 300-guest party at her house. "Mrs. Rider graciously greeted her guests in a stunning green-knit hostess gown, accented by semi-precious jewels at the neck" (The Signal 1970b). In 1972, Rider supported Congressman John H. Rousselot (served in the U.S. House of Representatives from 1970-1983) by throwing a gala at "her spectacular hilltop home overlooking Friendly Valley and most of Canyon Country" to introduce him to the voters of the Santa Clarita Valley (Valley News 1972).

In 1971, a tongue-in-cheek newspaper article announced that "the vivacious and gracious redhead Claire Rider" was planning to sell the Riders Ltd. for a "price that's plenty good medicine, and enough that it should provide a rose-colored view out of every one of the giant windows of Mrs. Rider's palatial hilltop home overlooking Friendly Valley" (The Signal 1971). At this time, Rider still owned the Olive Avenue Medical Pharmacy in Burbank (The Signal 1973).

Parallel to her busy political life, Rider was one of the early members of the governing board of Henry Mayo Newhall Memorial Hospital (The Signal 1988). In 1972, Rider donated $15,000 for a new nursing room to be named in honor of her late husband William E. Rider (The Signal 1972c). In 1973, Rider became a candidate herself when she successfully ran for and was elected as "Honorary Mayor" of the Santa Clarita Valley with support from the Newhall-Saugus-Elks Lodge and the Local Rotary Club (The Signal 1973 and 1988).

Rider moved to Kailua, Hawaii in the mid-1980s. After the death of her son Robert in 1986, her health declined, and she moved to New Mexico to live with her sisters in a retirement home where

she died in 1988. In addition to noting her many personal accomplishments, her obituary states that Rider "lived in the Santa Clarita Valley for 25 years. She and her husband built one of the early dramatic homes here, off Sierra highway overlooking all of Canyon Country" (The Signal 1988). The Rider family is entombed at the Eternal Valley Memorial Park Mausoleum in Newhall.

Claire Rider hostesses reception for Barry Goldwater Jr. and staff. Some forty guests enjoyed an evening of cocktails and hors d' oeuvres.

Chuck White and Hostess Claire Rider cheered Haig Kehaiyan (see January Jones' column).

Congressman Barry Goldwater, Jr. presented a gift certificate recently to Mrs. Prudy Thatcher, which she won at a recent fund-raising cocktail party held at the home of Claire Rider (left). Chet Fortin, chairman of the event, looks on. Over 100 people attended the party held just before the re-election of the congressman.

A farewell hug for Barry from hostess Claire Rider. (See January Jones)

Figure 3. Political Events at the Rider House

Clockwise from top left: Rider and Goldwater in 1970, Rider and Haig in 1970; Rider and Goldwater on front porch in 1972; Rider and Goldwater in 1976 (The Signal)

3.5.3 Architectural Style

Ranch (c. 1935–1975)

The Ranch house is a style of architecture that was popular starting in the 1930s and fell out of popularity by the 1980s. In the 1930s and early 1940s, the Ranch house was part of the Small House Movement that was brought into fashion by the Federal Housing Administration. Like the Minimal Traditional house, the Ranch house could be constructed quickly and use modern materials that could be mass-produced. The style provided an easy option for large-scale housing tracts during the 1930s and 1940s to meet the needs of relocated war-effort workers and those of soldiers returning home and starting families. Following the war years, a new era of prosperity brought about a departure from the Small House Movement. In the 1950s, post-war prosperity combined with increased lot sizes made the larger "rambling" Ranch house possible. The rambling form maximizes the façade's width, often further broadened by attached garages.

The ability of the Ranch house to exist in different sizes and arrangements made it one of the most popular house choices throughout the United States across multiple social classes into the 1970s. Key characteristics of the Ranch style of architecture are the following (Gottfried and Jennings 2009; Hess 2004; McAlester 2013):

- One story in height
- Gabled or hipped roofs constructed with a low pitch and moderate overhang
- Offset entry points causing asymmetry in the façade
- Focus on horizontal and rambling forms
- Focus on informality
- Entry points are typically placed under the roof overhang on the façade
- Use of large picture-style windows on the façade
- Variations on the eave overhang, typically boxed eaves or exposed rafter tails, or the less-common boxed rafters
- Large chimneys
- Variety of exterior cladding, including brick and stone
- Attached garage, typically incorporated into the façade
- Front and rear yards
- Large rectangular blocks are the basis for the plan design, and could be simply rectangular or a combination of rectangular blocks to create L, U, and T shapes in plan

4 Survey

4.1 Methods and Results

Principal archaeologist and architectural historian Samantha Murray, MA, RPA, conducted a pedestrian survey of the project site on November 29, 2021. Fieldwork included taking field notes, digital photography, and examination of close-scale field maps and aerial photographs. Photographs were taken with an Olympus OM-D digital camera.

4.1.1 Archaeological Survey

During the archaeological survey, Ms. Murray examined the ground surface for the presence of prehistoric artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools), historical artifacts (e.g., metal, glass, ceramics), sediment discolorations that might indicate the presence of a cultural midden, depressions, and other features that might indicate the former presence of structures or buildings (e.g., post holes, foundations).

All accessible, undeveloped portions of the project site were subject to an intensive-level pedestrian survey which consisted of walking parallel transects spaced no more than 10 meters apart. These areas were limited to the access roads (Photograph 1), a large unpaved/disturbed area directly in front of the existing residence (Photograph 2), unpaved areas directly to the rear (northwest) of the residence (Photograph 3), areas in the northeastern portion of the project site that were cleared and graded (Photograph 4), and a cleared strip along the eastern boundary of the project site (Photograph 5). Steep slopes with dense vegetation in the central and western portions of the project site were largely inaccessible, making examination of the ground surface impossible in most of these areas (Photographs 6-8). Where gaps in the vegetation allowed, Ms. Murray spot-checked the ground surface.

Ground surface visibility throughout the proposed project site was low (approximately 0%–15%) due to the presence of dense vegetation comprised of California sagebrush, chamise chaparral, and ruderal areas. Mature trees observed during the survey included oak trees, California pepper tree (*Schinus molle*), olive tree (*Olea europaea*), Mexican fan palm (*Washingtonia robusta*), Canary Island date palm (*Phoenix canariensis*), blue gum eucalyptus (*Eucalyptus globulus*), and Aleppo pine (*Pinus halepensis*). Soils in the proposed project site were variable and ranged from a medium grayish brown clayey loam to reddish-yellow brown loamy sand. There were gravel inclusions throughout the soils present in the site. Paved areas were limited to the driveway and parking area directly in front of the residence. No archaeological resources were identified within the proposed project site as a result of the pedestrian survey.

Photograph 1. Example of an access road with visibility surrounded by dense vegetation, view to north

Photograph 2. Unpaved area directly in front of residence, view to southeast

Photograph 3. Unpaved area with some visibility to the rear of the residence, view to northeast

Photograph 4. Graded area in northeastern portion of project site, view to west

Photograph 5. Overview of areas with visibility along the eastern border of the project site, view to west

Photograph 6. Overview of project site showing vegetation coverage, view to north

Photograph 7. Overview of steep slopes and dense vegetation in central portion of project site, view to northwest

Photograph 8. Overview of project site, view to south

4.1.2 Built Environment Survey

The built environment survey entailed walking the exterior of accessible portions of the vacant single-family residence, storage building, and garage. Each building/structure was documented with notes and photographs, specifically noting any character-defining features, spatial relationships, observed alterations, and landscaping features. The Significance Evaluation (Section 5) provides a detailed physical description and photographs of residence as well as a significance evaluation in consideration of CRHR and City designation criteria and integrity requirements.

5 Significance Evaluation

5.1 25800 Sierra Highway

5.1.1 Property Description

The subject property is a Ranch-style single-family residence constructed in 1966 (architect/builder unknown) (Photograph 9). The residence is accessed via a driveway off Golden Valley Road behind a brick and stone wall (built in 2000) with a wrought iron gate. Behind the gate is a paved road that winds its way below and around the eastern side of the residence, until curving to the northwest where it meets with a flat paved area at the top of the hill that contains the main residence (1966), the detached garage (1996), and a wooden storage building (c. 1976-1994).

The residence is L-shape in plan with a cross-gabled roof clad in wood shingles. The main exterior materials are stucco with brick and wood panel details. The main entrance (Photograph 10) is located on the west elevation and is accessed via a concrete walk. The entrance is recessed beneath a front-gabled roof supported by decorative wooden posts and beams, creating a partial-width porch; and is surrounded by painted brick veneer, vertical wood panel detailing above the doors, and original light fixtures. The entrance consists of diagonal wood panel doors with boarded-up lites. The northernmost portion of the west elevation features an integrated brick planter that continues until it becomes flush with the veneer wall cladding (Photograph 11). All windows on the west elevation are aluminum-framed horizontal sliders and all have been boarded-up. The windows are surrounded by board-and-batten siding, with one of the windows containing a decorative wood surround (Photograph 12). A low brick planter follows the outline of the southern half of the west elevation. The north and south elevations represent the gabled ends of each L-shape wing and exhibit no details, but for one louvred door on the north elevation. The southernmost portion of the east elevation features a shed roof extension supported by wooden posts, creating a partial width rear porch. Most of the fenestration is boarded-up and not visible but for one small aluminum-framed horizontal slider (Photograph 13). The northernmost portion of the east elevation was only visible from the bottom of the hill and features a brick eave-wall chimney and a prominent partial-width porch with an integrated shed roof supported by wooden posts and decorative beams, and a low brick retaining wall. This porch represents the primary viewpoint of the house, with a continuous wall of floor-to-ceiling glass windows/doors, all of which were boarded-up (Photograph 14).

Other buildings on the property include the 6-car garage adjacent to the residence's north elevation, which features a tiled, side-gabled roof with stucco exterior walls and metal roll-up

doors (Photograph 15); and a wooden storage building adjacent to the residence's south elevation, which features flat angled roof and two industrial door openings (Photograph 16).

Although there is no formal landscaping on the property, the triangular-shaped pad at the top of the hill that contains the buildings is surrounded by a variety of mature trees including olive, palm, pine, and California pepper trees.

Photograph 9. Overview of main (west) elevation, view to southeast

Photograph 10. Main entrance on west elevation, view to east

Photograph 11. Integrated brick planter on west elevation, view to southeast

Photograph 12. Southern half of west elevation showing decorative window surround, view to south

Photograph 13. Southern half of east elevation showing partial-width porch, view to northeast

Photograph 14. Northern half of east elevation showing partial-width porch and chimney, view to south

Photograph 15. Overview of garage west elevation, facing east

Photograph 16. Overview of wooden storage building north elevation, facing southwest

5.1.2 Application of CRHR and City Designation Criteria

The following provides an evaluation of the subject property in consideration of CRHR and City of Santa Clarita designation criteria. Given the similarities in the criteria of these two programs, the criteria are addressed together to avoid duplicative text. A DPR form set for the property is provided in Appendix C.

CRHR Criterion 1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

City Criterion A. Is associated with events that have made a significant contribution to the historical, archaeological, cultural, social, economic, aesthetic, engineering, or architectural development of the City, State or nation.

The subject property was constructed in 1966 just prior to the development boom that started in the eastern portion of what is now the City of Santa Clarita, south of Canyon Country, in the late 1960s and is not associated with a larger pattern of planned residential development in the Santa Clarita Valley. At the time of its construction, the subject property appears to have been one of the first residences in the area. However, due to extensive alteration of the surrounding setting over the last several decades, the residence struggles to convey its early association as a lone residence atop a hill surrounded by a rural landscape.

The subject property hosted numerous Republican political events/parties during the 1960s and 1970s that were organized by the residence's owner, local socialite Clara Rider. Many of these parties featured prominent political candidates including Barry Goldwater, Jr. who was elected to the U.S. House of Representatives in 1969 and would go on to serve six-consecutive terms until 1983. Just prior to his election, Rider hosted for Goldwater, Jr. what was called "the biggest political (and possibly even social) bash ever seen in Valencia Valley" (The Signal 1969). Although the subject property hosted large parties that were attended by prominent political and social figures, these events cannot be said to have made a significant contribution to the cultural or social development of the City, State, or nation. The parties were singular political gatherings that did not go on to influence the development of local politics or the community. For these reasons, the subject property is recommended not eligible under CRHR Criterion 1 and City Criterion A.

CRHR Criterion 2. Is associated with the lives of persons important in our past.

City Criterion B. Is associated with persons significant in the history of the City, State or nation.

The subject property's original owner was Clara Rider, who lived at the residence between 1966 and c. 1982 and became a prominent figure in Santa Clarita Valley social and political circles in the late 1960s through 1970s, hosting numerous high-profile political fundraising events at her home and even serving as Honorary Mayor of the Santa Clarita Valley in 1973. However, Rider's contributions to local fundraising and larger political campaigns cannot be said to have made a significant impact on the City's history, and although she was a well-known socialite with a local party house, she does not appear to rise to the level of significance required under this criterion. Therefore, the subject property is recommended not eligible under CRHR Criterion 2 and City Criterion B.

CRHR Criterion 3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

City Criterion C. Embodies distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials or craftsmanship.

The subject property embodies the distinctive characteristics of the Ranch style of architecture, which became one of the most popular and prolific styles of residential architecture between the 1930s and 1970s. Constructed in 1966, the subject property is an example of the larger "rambling" Ranch-style house that became possible in the postwar years as lot sizes increased and people moved away from crowded cities. The rambling Ranch maximizes the façade's width, as seen in the subject property with its cross-gabled L-shape plan that creates a long, dominant west elevation. The subject property features several character-defining features of the style including

its one-story, rambling, L-shape plan; cross-gabled roof with moderate eave overhang; focus on horizontal forms; front entry sheltered beneath a gabled porch; its mixture of exterior cladding including stucco, brick, and wood; its use of integrated brick planters; and the prominent rear balcony with a window wall looking out over the property and beyond. Although most of residence's original materials appear to be intact, many of these materials, including the roof shingles and rear porches, were found to be in poor condition. Alterations since the residence was built include removal of original landscaping, construction of an incompatible Spanish-style garage in 1996, as well as significant changes to the property's main path of circulation with the construction of Golden Valley Road, which shifted the driveway entrance from Sierra Highway to its current location. A brick and stone wall was also added along the southern boundary of the property in 2001. Although the original plans for the house could not be located and the original architect and builder are unknown, there is no indication that the property is the work of an important creative individual. In Clara Rider's (the original owner's) obituary, it states that "she and her husband built one of the early dramatic homes here" but it is assumed that someone was commissioned to design and construct the home. Despite the subject property's relatively high integrity of original materials, design, and workmanship, it is not considered an important or valuable example of the Ranch style of architecture, which produced countless examples of the rambling ranch during the mid-century and beyond. Given the prolific nature of the style, the property's overall condition, and alterations to its setting, the subject property does not rise to the level of significance required under this criterion. Therefore, the subject property is recommended not eligible under CRHR Criterion 3 and City Criterion C.

City Criterion D. Has a unique location, singular physical characteristic(s), or is a landscape, view or vista representing an established and familiar visual feature of a neighborhood, community, or the City.

At the time of the subject property's construction, it stood as a single house on a hill amidst a largely undeveloped rural landscape, referred to as "the imposing lonely white house just off Highway 14" and "an intriguing landmark for thousands of persons who travel Highway 14" (The Signal 1969). The house was also known for its rear view off the back porch "overlooking Friendly Valley and most of Canyon Country" (Valley News 1972). Other newspaper articles described the subject property as a "palatial hilltop home" with "giant windows" (The Signal 1971). It appears that the subject property did, at one time, function as somewhat of a local landmark along Sierra Highway. However, extensive development all around the subject property, the construction of Golden Valley Road, and the reorientation of the approach to the residence have completely altered the original setting of the residence, such that it can longer convey itself as an established or familiar visual feature of the neighborhood. Therefore, the subject property is recommended not eligible under City Criterion D.

CRHR Criterion 4. Has yielded, or may be likely to yield, information important in prehistory or history.

City Criterion E. Has yielded, or has the potential to yield, information important to the history or prehistory of the City, State, or nation.

The property is not significant as a source, or likely source, of important historical information nor does it appear likely to yield important information about historic construction methods, materials or technologies. Therefore, the property is not eligible under CRHR Criterion 4 or City Criterion E.

5.1.3 Integrity Discussion

Integrity is the authenticity of a historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Historical resources eligible for listing in the CRHR must meet one of the designation criteria and retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association. It must also be judged with reference to the particular criteria under which a resource is proposed for eligibility (OHP 2011).

Location: The subject property retains integrity of location. The residence is located in the place it was originally constructed.

Design: The subject property retains integrity of design. All major Ranch-style design elements are still present. The essential elements of form, space, structure and style have all been retained and the property can be identified as a Ranch-style home from the 1960s.

Setting: The subject property lacks integrity of setting. Since the subject property's construction in 1966, numerous residential developments have been constructed on nearly all sides of the property, with surrounding homes visible from all angles. At the time of its construction, the subject property was a lone residence in a largely undeveloped and rural landscape. Further, the driveway orientation was changed with the construction of Golden Valley Road in the early 2000s, which also greatly changed the subject property's setting.

Materials: The subject property retains integrity of materials. Although there are condition issues present throughout the property, the residence retains the vast majority of its original materials including its wood shingle roof, brick and wood panel-clad stucco walls, doors, and windows.

Workmanship: The subject property retains integrity of workmanship. The physical evidence of the craftsmanship required to create the Ranch-style residence has been retained.

Feeling: The subject property lacks integrity of feeling. Although the residence itself maintains integrity of design, materials, and workmanship, alterations to the immediate setting prevent the property from conveying its historic feeling as a relatively rural and isolated property with uninterrupted views to Canyon County.

Association: The subject property lacks integrity of association. The property has no important associations with events, people, or important patterns of development in the City.

5.1.4 Significance Evaluation Findings

As a result of the property significance evaluation, the subject property at 25800 Sierra Highway/20101 Golden Valley Road is recommended not eligible under all CRHR and City designation criteria due to a lack of significant historical associations and compromised integrity.

6 Findings and Conclusions

6.1 Archaeological Resources

6.1.1 Findings

No archaeological resources were identified within the project site as a result of the CHRIS records search, NAHC Sacred Lands File search, or pedestrian survey by a qualified archaeologist. Further, significant portions of the project site have been disturbed by construction of the existing residence, the construction of Golden Valley Road, recent grading in the northeastern portion of the site, road cuts, and ephemeral drainages that have moved soils overtime. Therefore, the project site is unlikely to contain intact buried archaeological deposits. Still, it is always possible to encounter resources during ground disturbance. Standard unanticipated discovery measures for archaeological resources and human remains have been provided below.

6.1.2 Recommendations

Unanticipated Discovery of Cultural Resources

Should archaeological resources (sites, features, or artifacts) be exposed during construction activities for the proposed project, all construction work occurring within 100 feet of the find shall immediately stop until a qualified archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, can evaluate the significance of the find and determine whether or not additional study is warranted. Depending upon the significance of the find, the archaeologist may simply record the find and allow work to continue. If the discovery proves significant under CEQA, additional work such as preparation of an archaeological treatment plan, testing, or data recovery may be warranted.

Unanticipated Discovery of Human Remains

In accordance with Section 7050.5 of the California Health and Safety Code, if human remains are found, the County Coroner shall be notified within 24 hours of the discovery. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within two working days of notification of the discovery, the appropriate treatment and disposition of the human remains. If the remains are determined to be Native American, the Coroner shall notify the NAHC in Sacramento within 24 hours. In accordance with California PRC, Section 5097.98, the NAHC must immediately notify those persons it believes to be the Most Likely Descendant (MLD) from the deceased Native American. The MLD shall complete their inspection within 48 hours of being granted access to the

site. The MLD would then determine, in consultation with the property owner, the disposition of the human remains.

6.2 Historic Built Environment Resources

6.2.1 Findings

The existing residence located at 25800 Sierra Highway/20101 Golden Valley Road was evaluated by a qualified architectural historian for historical significance in consideration of CRHR and City designation criteria and integrity requirements. As a result of the property significance evaluation, the subject property is recommended not eligible under all CRHR and City designation criteria due to a lack of significant historical associations and compromised integrity. Therefore, the residence and its related built environment is not considered an historical resource under CEQA Guidelines Section 15064.5, and no additional study or management recommendations are necessary.

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Appendix A: CONFIDENTIAL Records Search Results

Not for public distribution

Appendix B:
Native American Coordination

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Laura Miranda
Luiseño

VICE CHAIRPERSON
Reginald Pagaling
Chumash

SECRETARY
Merri Lopez-Keifer
Luiseño

PARLIAMENTARIAN
Russell Attebery
Karuk

COMMISSIONER
William Mungary
Paiute/White Mountain Apache

COMMISSIONER
Julie Tumamait-Stenslie
Chumash

COMMISSIONER
[**Vacant**]

COMMISSIONER
[**Vacant**]

COMMISSIONER
[**Vacant**]

EXECUTIVE SECRETARY
Christina Snider
Pomo

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

October 6, 2021

Sam Murray
South Environmental

Via Email to: smurray@southenvironmental.com

Re: Santa Clarita VTTM 68203 Project, Los Angeles County

Dear Ms. Murray:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

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

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Los Angeles County
10/6/2021

Barbareno/ Ventureno Band of Mission Indians
Patrick Tumamait,
992 El Camino Corto — Chumash
Ojai, CA, 93023
Phone: (805) 216 - 1253

Barbareno/ Ventureno Band of Mission Indians
Annette Ayala,
188 S. Santa Rosa Street — Chumash
Ventura, CA, 93001
Phone: (805) 515 - 9844
annetteayala78@yahoo.com

Barbareno/Ventureno Band of Mission Indians
Julie Tumamait-Stenslie, Chairperson
365 North Poli Ave — Chumash
Ojai, CA, 93023
Phone: (805) 646 - 6214
jtumamait@hotmail.com

Barbareno/ Ventureno Band of Mission Indians
Brenda Guzman,
58 N. Ann Street, #8 — Chumash
Ventura, CA, 93001
Phone: (209) 601 - 4676
brendamguzman@gmail.com

Chumash Council of Bakersfield
Julio Quair, Chairperson
729 Texas Street — Chumash
Bakersfield, CA, 93307
Phone: (661) 322 - 0121
chumashtribe@sbcglobal.net

Coastal Band of the Chumash Nation
Mariza Sullivan, Chairperson
P. O. Box 4464 — Chumash
Santa Barbara, CA, 93140
Phone: (805) 665 - 0486
cbcntribalchair@gmail.com

Fernandeno Tataviam Band of Mission Indians
Jairo Avila, Tribal Historic and Cultural Preservation Officer
1019 Second Street, Suite 1 — Tataviam
San Fernando, CA, 91340
Phone: (818) 837 - 0794
Fax: (818) 837-0796
jairo.avila@tataviam-nsn.us

Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chairperson
P.O. Box 393 — Gabrieleno
Covina, CA, 91723
Phone: (626) 926 - 4131
admin@gabrielenoindians.org

Gabrieleno/Tongva San Gabriel Band of Mission Indians
Anthony Morales, Chairperson
P.O. Box 693 — Gabrieleno
San Gabriel, CA, 91778
Phone: (626) 483 - 3564
Fax: (626) 286-1262
GTTribalcouncil@aol.com

Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231 — Gabrielino
Los Angeles, CA, 90012
Phone: (951) 807 - 0479
sgoad@gabrielino-tongva.com

Gabrielino Tongva Indians of California Tribal Council
Christina Conley, Tribal Consultant and Administrator
P.O. Box 941078 — Gabrielino
Simi Valley, CA, 93094
Phone: (626) 407 - 8761
christina.marsden@alumni.usc.edu

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Santa Clarita VTTM 68203, Los Angeles County.

Native American Heritage Commission
Native American Contact List
Los Angeles County
10/6/2021

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Chairperson
P.O. Box 490 — Gabrielino
Bellflower, CA, 90707
Phone: (562) 761 - 6417
Fax: (562) 761-6417
gtongva@gmail.com

Gabrielino-Tongva Tribe
Charles Alvarez,
23454 Vanowen Street — Gabrielino
West Hills, CA, 91307
Phone: (310) 403 - 6048
roadkingcharles@aol.com

Northern Chumash Tribal Council
Fred Collins, Spokesperson
P.O. Box 6533 — Chumash
Los Osos, CA, 93412
Phone: (805) 801 - 0347
fcollins@northernchumash.org

San Fernando Band of Mission Indians
Donna Yocum, Chairperson
P.O. Box 221838 — Kitanemuk
Newhall, CA, 91322 — Vanyume
Phone: (503) 539 - 0933 — Tataviam
Fax: (503) 574-3308
ddyocum@comcast.net

San Luis Obispo County Chumash Council
Mark Vigil, Chief
1030 Ritchie Road — Chumash
Grover Beach, CA, 93433
Phone: (805) 481 - 2461
Fax: (805) 474-4729

Santa Ynez Band of Chumash Indians
Kenneth Kahn, Chairperson
P.O. Box 517 — Chumash
Santa Ynez, CA, 93460
Phone: (805) 688 - 7997
Fax: (805) 686-9578
kkahn@santaynezchumash.org

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Santa Clarita VTTM 68203, Los Angeles County.

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Gabrielino-Tongva Tribe
Charles Alvarez
23454 Vanowen Street
West Hills, CA, 91307
roadkingcharles@aol.com

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Mr. Alvarez:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

The Native American Heritage Commission (NAHC) conducted a Sacred Lands File search with negative results, and a California Historical Resources Information System records search is currently underway. The NAHC recommended that we contact you regarding your knowledge of the presence of cultural resources that may be impacted by the proposed project. If you have any knowledge of cultural resources that may exist within or near the project site, please contact me directly either by phone at (818) 458-1162, by email at smurray@southenvironmental.com, or by mail at the address above.

Please note that the request herein is for informational purposes only and does not constitute Assembly Bill (AB) 52 notification or initiation of consultation.

Thank you for assistance with this information request.

Respectfully Submitted,

Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Fernandeno Tataviam Band of Mission Indians
Jairo Avila, Tribal Historic and Cultural Preservation Officer
1019 Second Street, Suite 1
San Fernando, CA, 91340
jairo.avila@tataviam-nsn.us

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Mr. Avila:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Please note that the request herein is for informational purposes only and does not constitute Assembly Bill (AB) 52 notification or initiation of consultation.

Thank you for assistance with this information request.

Respectfully Submitted,

Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Barbareno/Ventureno Band of Mission Indians
Annette Ayala
188 S. Santa Rosa Street
Ventura, CA, 93001
Email: annetteayala78@yahoo.com

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Ms. Ayala:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle a Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Respectfully Submitted,

Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Northern Chumash Tribal Council
Fred Collins, Spokesperson
P.O. Box 6533
Los Osos, CA, 93412
fcollins@northernchumash.org

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Mr. Collins:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Respectfully Submitted,

Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Gabrielino Tongva Indians of California Tribal Council
Christina Conley, Tribal Consultant and Administrator
P.O. Box 941078
Simi Valley, CA, 93094
christina.marsden@alumni.usc.edu

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Ms. Conley:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Chairperson
P.O. Box 490
Bellflower, CA 90707
gtongva@gmail.com

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Chairperson Dorame:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Respectfully Submitted,

Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231
Los Angeles, CA, 90012
sgoad@gabrielino-tongva.com

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Chairperson Goad:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Thank you for assistance with this information request.

Respectfully Submitted,

Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Barbareno/Ventureno Band of Mission Indians
Brenda Guzman
58 N. Ann Street, #8
Ventura, CA, 93001
brendamguzman@gmail.com

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Ms. Guzman:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

The Native American Heritage Commission (NAHC) conducted a Sacred Lands File search with negative results, and a California Historical Resources Information System records search is currently underway. The NAHC recommended that we contact you regarding your knowledge of the presence of cultural resources that may be impacted by the proposed project. If you have any knowledge of cultural resources that may exist within or near the project site, please contact me directly either by phone at (818) 458-1162, by email at smurray@southenvironmental.com, or by mail at the address above.

Please note that the request herein is for informational purposes only and does not constitute Assembly Bill (AB) 52 notification or initiation of consultation.

Thank you for assistance with this information request.

Respectfully Submitted,

Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Santa Ynez Band of Chumash Indians
Kenneth Kahn, Chairperson
P.O. Box 517
Santa Ynez, CA, 93460
kkahn@santaynezchumash.org

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Chairperson Kahn:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Cultural Resources Director

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SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Gabrieleno/Tongva San Gabriel Band of Mission Indians
Anthony Morales, Chairperson
P.O. Box 693
San Gabriel, CA 91778
GTTribalcouncil@aol.com

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Chairperson Morales:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Respectfully Submitted,

Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Chumash Council of Bakersfield
Julio Quair, Chairperson
729 Texas Street
Bakersfield, CA, 93307
chumashtribe@sbcglobal.net

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Chairperson Quair:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chairperson
P.O. Box 393
Covina, CA, 91723
admin@gabrielenoindians.org

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Chairperson Salas:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Coastal Band of the Chumash Nation
Mariza Sullivan, Chairperson
P. O. Box 4464
Santa Barbara, CA, 93140
cbcntribalchair@gmail.com

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Chairperson Sullivan:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Respectfully Submitted,

Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Barbareno/Ventureno Band of Mission Indians
Attn: Patrick Tumamait
992 El Camino Corto
Ojai, CA 93023

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Mr. Tumamait:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle a Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Thank you for assistance with this information request.

Respectfully Submitted,

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Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

Barbareno/Ventureno Band of Mission Indians
Julie Tumamait-Stenslie, Chairperson
365 North Poli Ave
Ojai, CA 93023
Email: jtumamait@hotmail.com

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Chairperson Tumamait-Stenslie:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

San Luis Obispo County Chumash Council
Mark Vigil, Chief
1030 Ritchie Road
Grover Beach, CA 93433

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Chief Vigil:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle a Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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Samantha Murray, MA, RPA
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location

SOUTH ENVIRONMENTAL
1443 E. Washington Blvd., #288 Pasadena, California 91104 / www.southenvironmental.com

October 7, 2021

San Fernando Band of Mission Indians
Donna Yocum, Chairperson
P.O. Box 221838
Newhall, CA, 91322
ddyocum@comcast.net

RE: VTTM 68203 Project in Santa Clarita, Los Angeles County, California

Dear Chairperson Yocum:

South Environmental was retained by Land Design Consultants, Inc. to conduct a cultural resources inventory in support of the proposed VTTM 68203 Project (proposed project). The property proposed for development (project site) includes approximately 28-acres consisting of 10 Assessor's Parcel Numbers (APNs) located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The project site is located on the United States Geological Survey (USGS) *Mint Canyon* 7.5-minute Quadrangle Map in the southeast corner of Section 30 of Township 04 North and Range 15 West (see attached map). The proposed project seeks to merge the 10 parcels and entitle Tentative Tract Map 68203 for a four lot subdivision, which will include demolition of all existing buildings and construction of new senior assisted living units, hotel and retail spaces, residential condominium units, storm water treatment, and trails.

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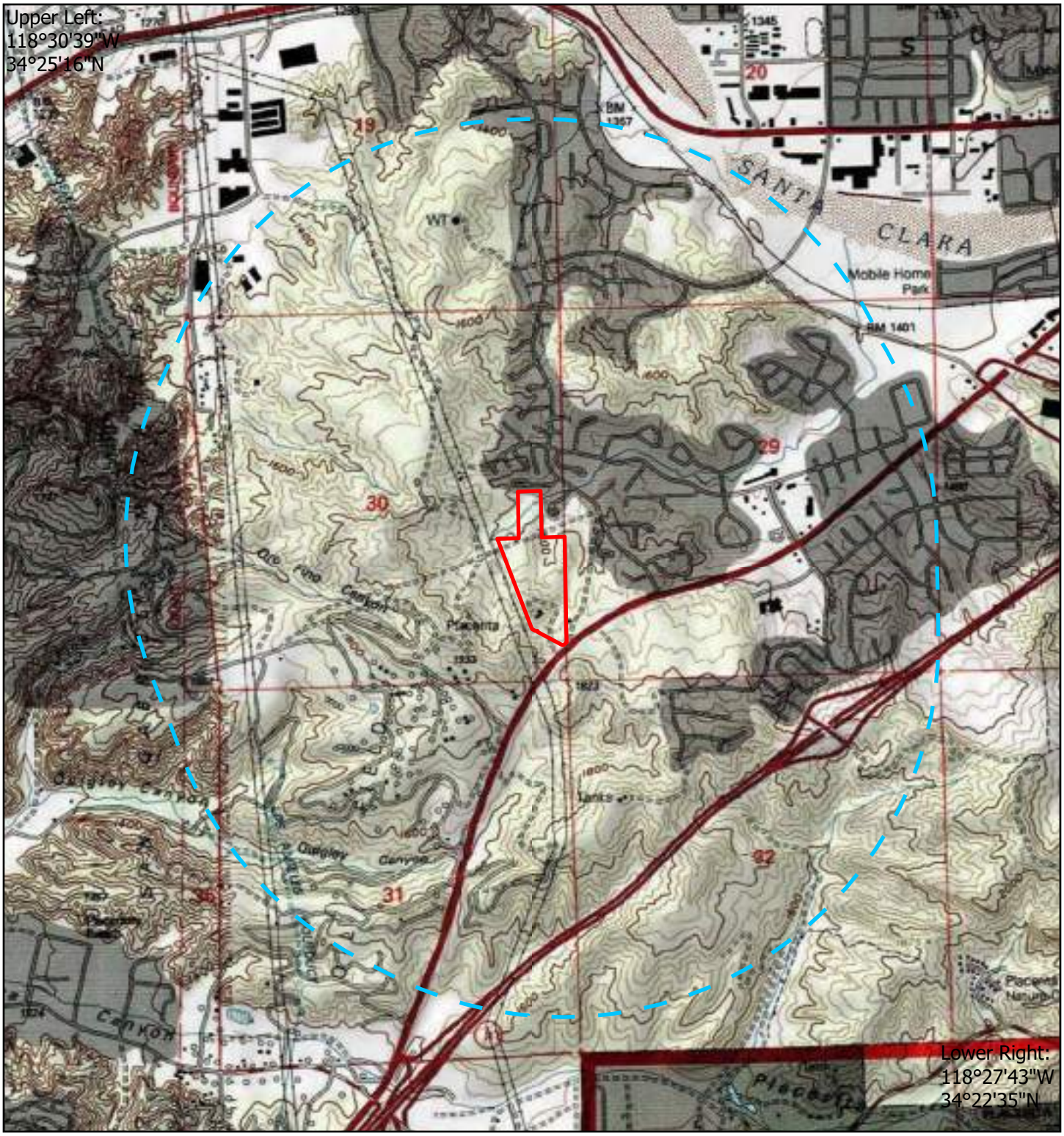
Cultural Resources Director

Enclosure: Records Search Request Map showing proposed project location



Source: BING Aerial Basemap 2020

Santa Clarita TTM 68203

Records Search Map

0 1,000 2,000 4,000 Feet

N

1-Mile Buffer

Project Boundary

SOUTH ENVIRONMENTAL

Samantha Murray

From: Jairo Avila <jairo.avila@tataviam-nsn.us>
Sent: Thursday, October 7, 2021 2:14 PM
To: Samantha Murray
Subject: Re: VTTM 68203 Project located in the City of Santa Clarita

Hello Samantha,

On behalf of the Cultural Resource Management (CRM) Division of the Fernandeño Tataviam Band of Mission Indians (FTBMI), thank you for the formal notification and opportunity to provide comments for the VTTM 68203 Project in Santa Clarita. This project is of interest to the FTBMI and the tribe wishes to provide confidential information during the consultation process with the Lead Agency. Should you have any questions, I am available next Tuesday and Thursday to go over the project and address some initial concerns. You can reach me at (818) 837-0794.

Thank you,

Jairo F. Avila, M.A., RPA.
Tribal Historic and Cultural Preservation Officer
Cultural Resources Management Division
Tribal Historic and Cultural Preservation Department

Fernandeño Tataviam Band of Mission Indians
1019 Second Street, Suite 1
San Fernando, California 91340
Office: (818) 837-0794
Website: http://www.tataviam-nsn.us

From: Samantha Murray <smurray@southenvironmental.com>
Sent: Thursday, October 7, 2021 12:48 PM
To: Jairo Avila <jairo.avila@tataviam-nsn.us>
Subject: VTTM 68203 Project located in the City of Santa Clarita

[CAUTION] EXTERNAL Email. Exercise caution.

Dear Mr. Avila:
Attached, please find an informational outreach letter for the VTTM 68203 Project located in the City of Santa Clarita in Los Angeles County.
Please feel free to contact me with any information/questions you may have.

Respectfully,

Sam Murray, MA (she/her)
Cultural Resources Director

SOUTH ENVIRONMENTAL

Mobile: 818.458.1162

Appendix C:
DPR Forms: 25800 Sierra Highway

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings
Review Code Reviewer Date

Page 1 **of** 17 ***Resource Name or #:** (Assigned by recorder) 25800 Sierra Highway
P1. Other Identifier: The Rider House

*P2. **Location:** ☐ **Not for Publication** ■ **Unrestricted**

***a. County** Los Angeles **and** (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Mint Canyon **Date** 2021 **T** 04 N ; **R** 15 W ; _ ☐ **of** _ ☐ **of Sec** 30; SB **B.M.**

c. Address 20101 Golden Valley Road/25800 Sierra Hwy City Santa Clarita Zip 91321

d. UTM: (Give more than one for large and/or linear resources) Zone __, _____ mE/ _____ mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, decimal degrees, etc., as appropriate)

APNs 2836-013-141, 2836-013-111, and 2836-013-133. The subject property is located northeast of the intersection of Sierra Highway and Golden Valley Road and is accessed via Golden Valley Road.

***P3a. Description:**

The subject property is a Ranch-style single-family residence constructed in 1966 (architect/builder unknown) (Photograph 1). The residence is accessed via a driveway off Golden Valley Road behind a brick and stone wall (built in 2000) with a wrought iron gate. Behind the gate is a paved road that winds its way below and around the eastern side of the residence, until curving to the northwest where it meets with a flat paved area at the top of the hill that contains the main residence (1966), the detached garage (1996), and a wooden storage building (c. 1976-1994) (see Continuation Sheet).

***P3b. Resource Attributes:** (List attributes and codes) HP2. Single family property

***P4.Resources Present:** ■ Building ■ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (view, date, accession #) Photograph 1. Overview of main (west) elevation, view to southeast

***P6. Date Constructed/Age and Source:** ■ Historic ☐ Prehistoric ☐ Both
1966 (County Assessor)

***P7. Owner and Address:**
Veluzat Paul R. and Carol S. TRS Veluzat Trust
PO BOX 220597
Newhall, CA 91322

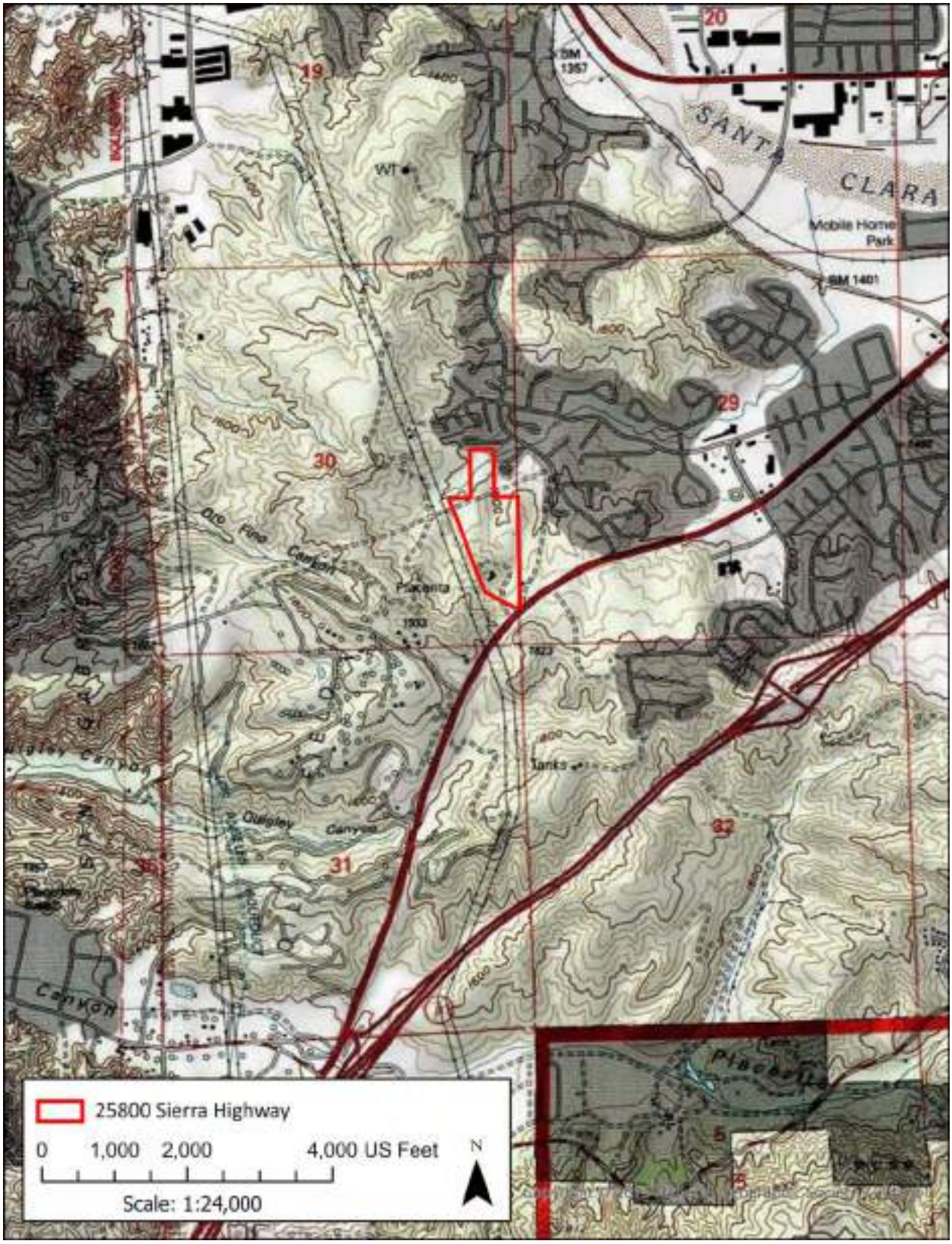
***P8. Recorded by:** Samantha Murray South Environmental
Pasadena, CA 91104

***P9. Date Recorded:**
11/29/2021

***P10. Survey Type:** Pedestrian

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
Cultural Resources Technical Report: Santa Clarita TTM 68203 Project, City of Santa Clarita, Los Angeles County, California (South Environmental 2021)

***Attachments:** ☐NONE ■Location Map ■Continuation Sheet ■Building, Structure, and Object Record
☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ☐Photograph Record ☐ Other (List): _____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Mobile Home Park
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25800 Sierra Highway
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Scale: 1:24,000
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BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) 25800 Sierra Highway ***NRHP Status Code** 6Z
Page 3 **of** 17

B1. Historic Name: The Rider House
B2. Common Name: n/a
B3. Original Use: Single-family residence B4. Present Use: Single-family residence/vacant
*** B5. Architectural Style:** Ranch
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed in 1966 (County Assessor); wooden storage building constructed c. 1976-1994 (NETR 2021); detached garage constructed in 1996 (building permit).

***B7. Moved?** ■**No** □**Yes** □**Unknown** **Date:** _____ **Original Location:** _____
***B8. Related Features:** n/a
B9a. Architect: unknown b. Builder: unknown
***B10. Significance: Theme** n/a **Area** n/a
Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a

Development History

Historic aerial photographs of the subject property and its setting from 1928 and 1930 shows that land south of the Santa Clara River was entirely undeveloped but for the Southern Pacific Railroad, the Los Angeles Aqueduct, and smaller roads through Placerita Canyon and Sand Canyon. North of the river, agricultural development had taken hold around the aqueduct as evidenced by fields with sparse buildings and structures. By the 1947 aerial photograph, the Sierra Highway through the Santa Clarita Valley was constructed adjacent to the subject property, winding its way north through the rural landscape. There is still almost no development south of the Santa Clara River at this time. In the 1952 aerial photograph, the most noticeable change to the setting is the presence of a large oil field directly south of the subject property. This oil field persists to the present-day, occupying most of the land south of Golden Valley Road. Despite this new industrial development, the area south the Santa Clara River remains largely undeveloped throughout the 1950s. (see Continuation Sheet).

B11. Additional Resource Attributes: (List attributes and codes) _____
***B12. References:** See Continuation Sheet

B13. Remarks:

***B14. Evaluator:** Samantha Murray, South Environmental
***Date of Evaluation:** 11/8/2021

(This space reserved for official comments.)

(Sketch Map with north arrow required.)

***P3a. Description (Continued):** The residence is L-shape in plan with a cross-gabled roof clad in wood shingles. The main exterior materials are stucco with brick and wood panel details. The main entrance (Photograph 2) is located on the west elevation and is accessed via a concrete walk. The entrance is recessed beneath a front-gabled roof supported by decorative wooden posts and beams, creating a partial-width porch; and is surrounded by painted brick veneer, vertical wood panel detailing above the doors, and original light fixtures. The entrance consists of diagonal wood panel doors with boarded-up lites. The northernmost portion of the west elevation features an integrated brick planter that continues until it becomes flush with the veneer wall cladding (Photograph 3). All windows on the west elevation are aluminum-framed horizontal sliders and all have been boarded-up. The windows are surrounded by board-and-batten siding, with one of the windows containing a decorative wood surround (Photograph 4). A low brick planter follows the outline of the southern half of the west elevation. The north and south elevations represent the gabled ends of each L-shape wing and exhibit no details, but for one louvred door on the north elevation. The southernmost portion of the east elevation features a shed roof extension supported by wooden posts, creating a partial width rear porch. Most of the fenestration is boarded-up and not visible but for one small aluminum-framed horizontal slider (Photograph 5). The northernmost portion of the east elevation was only visible from the bottom of the hill and features a brick eave-wall chimney and a prominent partial-width porch with an integrated shed roof supported by wooden posts and decorative beams, and a low brick retaining wall. This porch represents the primary viewpoint of the house, with a continuous wall of floor-to-ceiling glass windows/doors, all of which were boarded-up (Photograph 6).

Other buildings on the property include the 6-car garage adjacent to the residence's north elevation, which features a tiled, side-gabled roof with stucco exterior walls and metal roll-up doors (Photograph 7); and a wooden storage building adjacent to the residence's south elevation, which features flat angled roof and two industrial door openings (Photograph 8).

Although there is no formal landscaping on the property, the triangular-shaped pad at the top of the hill that contains the buildings is surrounded by a variety of mature trees including olive, palm, pine, and California pepper trees.

Photograph 2. Main entrance on west elevation, view to east

Photograph 3. Integrated brick planter on west elevation, view to southeast

Photograph 4. Southern half of west elevation showing decorative window surround, view to south

Photograph 5. Southern half of east elevation showing partial-width porch, view to northeast

Photograph 6. Northern half of east elevation showing partial-width porch and chimney, view to south

Photograph 7. Overview of garage west elevation, facing east

Photograph 8. Overview of wooden storage building north elevation, facing southwest

***B10. Significance (Continued):** By the 1968 aerial photograph, the residence at the subject property has been constructed and is visible in its L-shape plan. At this time, the residence was accessed via a long driveway off Sierra Highway, as Golden Valley Road would not be constructed for another 34 years. The 1968 aerial also reveals that the first major residential subdivision has been constructed directly east of the subject property, with large sections containing newly constructed homes and others appearing to be in the process of grading/new construction. By the 1969 aerial photograph, the Antelope Valley Freeway can be seen under construction just south of the subject property. By 1974, the Antelope Valley Freeway has been constructed, running northeast along the southern edge of the newly developed residential subdivisions. Throughout the 1970s, residential development continued to expand to the northeast. The 1976 and 1977 aerial photographs also show the presence of more formal landscaping around the residence on the subject property, with manicured lawns and mature trees visible. By the 1986 aerial photograph, suburban sprawl has continued, and the subject property appears far less isolated than it ever has before. More homes continued to be added northeast of the subject property well into the 1990s. In 1996, a rectangular-plan garage is constructed northwest of the residence.

The 2000 aerial photograph shows the beginning of the construction of Golden Valley Road south of the subject property. This photograph reveals that the subject property underwent significant changes at this time, with its entire southern and eastern boundary cut and graded, obliterating the original driveway on the eastern side of the property and the natural hillside to the west, which was completely graded and terraced, resulting in the biggest change to the property's setting to date. By the 2002 aerial, Golden Valley Road was completed between Soledad Canyon Road to the north and Sierra Highway to the south, and the subject property's driveway was reoriented to its present-day configuration. Golden Valley High School was under construction at this time, as was the large residential development located southeast of the subject property that sits between present-day Sierra Highway to the north and Golden Valley Road to the south. By

2005, Golden Valley High was constructed, Golden Valley Road was continued east of Sierra Highway to the Antelope Valley Freeway, and the new large residential development southeast of the subject property had started to be developed with homes. Also in 2005, the properties adjacent to the east and west of the subject property were graded and prepped for new housing developments. By 2009, the subject property's setting looks almost exactly as it does today, but for the development of the remaining homes in the adjacent lot to the east, which were completed by 2016.

Previous Owners/Occupants

The following presents a summary of known owners/occupants living at the subject property's original address of 25800 Sierra Highway since its construction in 1966, based on publicly available records.

- 1966: William Edward Rider and Clara H. Rider
- 1966-c. 1982: Clara H. Rider
- 1982: Trustee's Sale by Major Assurance Corp
- 1990: Shantel S. Hudson
- 1993-present: Veluzat Paul R. and Carol S. TRS Veluzat Trust

The Rider Family (1966-c. 1982)

The original owners who commissioned the residence at 25800 Sierra Highway in 1966 were William Edward (W.E.) Rider, born in Kansas City, Missouri in 1900, and his wife Clara H. Rider, born in Vernon, Texas in 1908. W.E. got his start working as milker in a Missouri dairy "and drove his way upward through sheer ability, energy, and determination" (The Signal 1959a). It is unclear where and when William and Clara were married. The couple had one child together, Robert W. Rider, who was born in 1933.

In 1942, the family was living at 6045 Carpenter Avenue in North Hollywood, with W.E. employed at McKessens Robins Co., one of the largest U.S. distributors of wholesale pharmaceutical drugs, beverages and chemicals. By 1948, the Riders were living at another North Hollywood home at 12309 Emelita Street. By the 1950s, the Riders moved yet again to a North Hollywood residence at 7002 Sunnyslope Avenue.

In the 1950s W.E. would go on to start his own pharmaceuticals company, Riders Limited (Ltd), with a production plant located at 7234 Varna Avenue in North Hollywood (LAT 1955). In 1959, Riders Ltd. suffered a major loss when their plant was destroyed in a two-alarm chemical fire, resulting in an estimated $200,000 in damages (Citizen-News 1959). That same year, W.E. moved his business to the Golden Triangle Industrial Park at 21020 Soledad Canyon Road in what was then known as the Saugus-Newhall area (The Signal 1959b, Valley Times Today 1961). Riders Ltd. was one of two large additions made to the 600-acre industrial park. At the ground-breaking ceremony, W.E. explained that this plant would replace the North Hollywood plant and would contain 80,000 square feet of space (The Signal 1959b). Starting out with 48 employees, he expected the number to double once machines and personnel from the old North Hollywood plant could be moved (The Signal 1959a). At the time, the Rider family was still living at their home on Sunnyslope Avenue in North Hollywood (The Van Nuys News and Valley Green Sheet 1960)."

The Riders relocated to the Santa Clarita Valley around 1964 (The Signal 1973). It is unknown when exactly the Riders commissioned the house on Sierra Highway or who designed/constructed the home. Assessor's records indicate that the house was constructed in 1966. Shortly after moving into the house, W.E. passed in December 1966.

In the years following her husband's death, Clara would go on to become a prominent

figure in the Santa Clarita Valley's political and social circles, with her first name appearing as "Claire" in dozens of local newspaper articles over the next decade (Figure 1). Her involvement in the Republican Party included throwing her support behind then candidate for the U.S. House of Representatives, Barry Goldwater, Jr. In March 1969, Rider hosted a massive party at her Sierra Highway home for Goldwater, Jr. in what was called "the biggest political (and possibly even social) bash ever seen in Valencia Valley." Fancy cars and limousines "poured through the gates of the Rider mansion, the imposing lonely white house just off Highway 14 north of "confusion hill"" (The Signal 1969). It was reported that "...a great many of the people who turned up Wednesday night had come just so they could see the inside of the Clara Rider home, an intriguing landmark for thousands of persons who travel Highway 14" (The Signal 1969).

Goldwater, Jr. was elected to the U.S. House of Representatives in 1969 and would go on to serve six consecutive terms until 1983. During his time in office, Rider served as a committeewoman for Goldwater, Jr's Finance Committee (The Signal 1973) and hosted numerous parties for Goldwater, Jr. at her home on Sierra Highway including a reception for approximately 40 guests including Goldwater, Jr. and his staff in 1970 (The Signal 1970a); an evening called "62 for 72" hosted by the 62nd Assembly District Republican Coordinating Council in 1972 (The Signal 1972a); "Dinner with Barry" in 1974 which was sponsored by the Republican Women's Club (The Signal 1974); and "An Evening with Barry" in 1976 with the public invited to attend (The Signal 1976). A 1972 gossip column reported that Goldwater, Jr. and his girlfriend Susie Gherman were "planning to buy that palatial pad on Highway 14 from that vivacious redhead, Claire Rider, and set up housekeeping" (The Signal 1972b), but such a real estate transaction would never occur.

In 1970, Rider simultaneously threw her support to another political cause – the campaign of Haig Kehiayan for Newhall Municipal Court Judge, throwing a 300-guest party at her house. "Mrs. Rider graciously greeted her guests in a stunning green-knit hostess gown, accented by semi-precious jewels at the neck" (The Signal 1970b). In 1972, Rider supported Congressman John H. Rousselot (served in the U.S. House of Representatives from 1970-1983) by throwing a gala at "her spectacular hilltop home overlooking Friendly Valley and most of Canyon Country" to introduce him to the voters of the Santa Clarita Valley (Valley News 1972).

In 1971, a tongue-in-cheek newspaper article announced that "the vivacious and gracious redhead Claire Rider" was planning to sell the Riders Ltd. for a "price that's plenty good medicine, and enough that it should provide a rose-colored view out of every one of the giant windows of Mrs. Rider's palatial hilltop home overlooking Friendly Valley" (The Signal 1971). At this time, Rider still owned the Olive Avenue Medical Pharmacy in Burbank (The Signal 1973).

Parallel to her busy political life, Rider was one of the early members of the governing board of Henry Mayo Newhall Memorial Hospital (The Signal 1988). In 1972, Rider donated $15,000 for a new nursing room to be named in honor of her late husband William E. Rider (The Signal 1972c). In 1973, Rider became a candidate herself when she successfully ran for and was elected as "Honorary Mayor" of the Santa Clarita Valley with support from the Newhall-Saugus-Elks Lodge and the Local Rotary Club (The Signal 1973 and 1988).

Rider moved to Kailua, Hawaii in the mid-1980s. After the death of her son Robert in 1986, her health declined, and she moved to New Mexico to live with her sisters in a retirement home where she died in 1988. In addition to noting her many personal accomplishments, her obituary states that Rider "lived in the Santa Clarita Valley for 25 years. She and her husband built one of the early dramatic homes here, off Sierra

highway overlooking all of Canyon Country" (The Signal 1988). The Rider family is entombed at the Eternal Valley Memorial Park Mausoleum in Newhall.

Figure 1. Political Events at the Rider House

Clockwise from top left: Rider and Goldwater in 1970, Rider and Haig in 1970; Rider and Goldwater on front porch in 1972; Rider and Goldwater in 1976 (The Signal)

Architectural Style

Ranch (c. 1935–1975)

The Ranch house is a style of architecture that was popular starting in the 1930s and fell out of popularity by the 1980s. In the 1930s and early 1940s, the Ranch house was part of the Small House Movement that was brought into fashion by the Federal Housing Administration. Like the Minimal Traditional house, the Ranch house could be constructed quickly and use modern materials that could be mass-produced. The style provided an easy option for large-scale housing tracts during the 1930s and 1940s to meet the needs of relocated war-effort workers and those of soldiers returning home and starting families. Following the war years, a new era of prosperity brought about a departure from the Small House Movement. In the 1950s, post-war prosperity combined with increased lot sizes made the larger "rambling" Ranch house possible. The rambling form maximizes the façade's width, often further broadened by attached garages.

The ability of the Ranch house to exist in different sizes and arrangements made it one of the most popular house choices throughout the United States across multiple social classes into the 1970s. Key characteristics of the Ranch style of architecture are the following (Gottfried and Jennings 2009; Hess 2004; McAlester 2013):

- One story in height
- Gabled or hipped roofs constructed with a low pitch and moderate overhang
- Offset entry points causing asymmetry in the façade
- Focus on horizontal and rambling forms
- Focus on informality
- Entry points are typically placed under the roof overhang on the façade
- Use of large picture-style windows on the façade
- Variations on the eave overhang, typically boxed eaves or exposed rafter tails, or the less-common boxed rafters
- Large chimneys
- Variety of exterior cladding, including brick and stone
- Attached garage, typically incorporated into the façade
- Front and rear yards
- Large rectangular blocks are the basis for the plan design, and could be simply rectangular or a combination of rectangular blocks to create L, U, and T shapes in plan

Significance Evaluation

The following provides an evaluation of the subject property in consideration of CRHR and City of Santa Clarita designation criteria. Given the similarities in the criteria of these two programs, the criteria are addressed together to avoid duplicative text.

CRHR Criterion 1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

City Criterion A. Is associated with events that have made a significant contribution to the historical, archaeological, cultural, social, economic, aesthetic, engineering, or architectural development of the City, State or nation.

The subject property was constructed in 1966 just prior to the development boom that started in the eastern portion of what is now the City of Santa Clarita, south of Canyon Country, in the late 1960s and is not associated with a larger pattern of planned residential development in the Santa Clarita Valley. At the time of its construction, the

subject property appears to have been one of the first residences in the area. However, due to extensive alteration of the surrounding setting over the last several decades, the residence struggles to convey its early association as a lone residence atop a hill surrounded by a rural landscape.

The subject property hosted numerous Republican political events/parties during the 1960s and 1970s that were organized by the residence's owner, local socialite Clara Rider. Many of these parties featured prominent political candidates including Barry Goldwater, Jr. who was elected to the U.S. House of Representatives in 1969 and would go on to serve six-consecutive terms until 1983. Just prior to his election, Rider hosted for Goldwater, Jr. what was called "the biggest political (and possibly even social) bash ever seen in Valencia Valley" (The Signal 1969). Although the subject property hosted large parties that were attended by prominent political and social figures, these events cannot be said to have made a significant contribution to the cultural or social development of the City, State, or nation. The parties were singular political gatherings that did not go on to influence the development of local politics or the community. For these reasons, the subject property is recommended not eligible under CRHR Criterion 1 and City Criterion A.

CRHR Criterion 2. Is associated with the lives of persons important in our past.

City Criterion B. Is associated with persons significant in the history of the City, State or nation.

The subject property's original owner was Clara Rider, who lived at the residence between 1966 and c. 1982 and became a prominent figure in Santa Clarita Valley social and political circles in the late 1960s through 1970s, hosting numerous high-profile political fundraising events at her home and even serving as Honorary Mayor of the Santa Clarita Valley in 1973. However, Rider's contributions to local fundraising and larger political campaigns cannot be said to have made a significant impact on the City's history, and although she was a well-known socialite with a local party house, she does not appear to rise to the level of significance required under this criterion. Therefore, the subject property is recommended not eligible under CRHR Criterion 2 and City Criterion B.

CRHR Criterion 3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

City Criterion C. Embodies distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials or craftsmanship.

The subject property embodies the distinctive characteristics of the Ranch style of architecture, which became one of the most popular and prolific styles of residential architecture between the 1930s and 1970s. Constructed in 1966, the subject property is an example of the larger "rambling" Ranch-style house that became possible in the postwar years as lot sizes increased and people moved away from crowded cities. The rambling Ranch maximizes the façade's width, as seen in the subject property with its cross-gabled L-shape plan that creates a long, dominant west elevation. The subject property features several character-defining features of the style including its one-story, rambling, L-shape plan; cross-gabled roof with moderate eave overhang; focus on horizontal forms; front entry sheltered beneath a gabled porch; its mixture of exterior cladding including stucco, brick, and wood; its use of integrated brick planters; and the prominent rear balcony with a window wall looking out over the property and beyond. Although most of

residence's original materials appear to be intact, many of these materials, including the roof shingles and rear porches, were found to be in poor condition. Alterations since the residence was built include removal of original landscaping, construction of an incompatible Spanish-style garage in 1996, as well as significant changes to the property's main path of circulation with the construction of Golden Valley Road, which shifted the driveway entrance from Sierra Highway to its current location. A brick and stone wall was also added along the southern boundary of the property in 2001. Although the original plans for the house could not be located and the original architect and builder are unknown, there is no indication that the property is the work of an important creative individual. In Clara Rider's (the original owner's) obituary, it states that "she and her husband built one of the early dramatic homes here" but it is assumed that someone was commissioned to design and construct the home. Despite the subject property's relatively high integrity of original materials, design, and workmanship, it is not considered an important or valuable example of the Ranch style of architecture, which produced countless examples of the rambling ranch during the mid-century and beyond. Given the prolific nature of the style, the property's overall condition, and alterations to its setting, the subject property does not rise to the level of significance required under this criterion. Therefore, the subject property is recommended not eligible under CRHR Criterion 3 and City Criterion C.

City Criterion D. Has a unique location, singular physical characteristic(s), or is a landscape, view or vista representing an established and familiar visual feature of a neighborhood, community, or the City.

At the time of the subject property's construction, it stood as a single house on a hill amidst a largely undeveloped rural landscape, referred to as "the imposing lonely white house just off Highway 14" and "an intriguing landmark for thousands of persons who travel Highway 14" (The Signal 1969). The house was also known for its rear view off the back porch "overlooking Friendly Valley and most of Canyon Country" (Valley News 1972). Other newspaper articles described the subject property as a "palatial hilltop home" with "giant windows" (The Signal 1971). It appears that the subject property did, at one time, function as somewhat of a local landmark along Sierra Highway. However, extensive development all around the subject property, the construction of Golden Valley Road, and the reorientation of the approach to the residence have completely altered the original setting of the residence, such that it can longer convey itself as an established or familiar visual feature of the neighborhood. Therefore, the subject property is recommended not eligible under City Criterion D.

CRHR Criterion 4. Has yielded, or may be likely to yield, information important in prehistory or history.

City Criterion E. Has yielded, or has the potential to yield, information important to the history or prehistory of the City, State, or nation.

The property is not significant as a source, or likely source, of important historical information nor does it appear likely to yield important information about historic construction methods, materials or technologies. Therefore, the property is not eligible under CRHR Criterion 4 or City Criterion E.

Integrity Discussion

Integrity is the authenticity of a historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Historical resources eligible for listing in the CRHR must meet one of the designation

criteria and retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association. It must also be judged with reference to the particular criteria under which a resource is proposed for eligibility (OHP 2011).

Location: The subject property retains integrity of location. The residence is located in the place it was originally constructed.

Design: The subject property retains integrity of design. All major Ranch-style design elements are still present. The essential elements of form, space, structure and style have all been retained and the property can be identified as a Ranch-style home from the 1960s.

Setting: The subject property lacks integrity of setting. Since the subject property's construction in 1966, numerous residential developments have been constructed on nearly all sides of the property, with surrounding homes visible from all angles. At the time of its construction, the subject property was a lone residence in a largely undeveloped and rural landscape. Further, the driveway orientation was changed with the construction of Golden Valley Road in the early 2000s, which also greatly changed the subject property's setting.

Materials: The subject property retains integrity of materials. Although there are condition issues present throughout the property, the residence retains the vast majority of its original materials including its wood shingle roof, brick and wood panel-clad stucco walls, doors, and windows.

Workmanship: The subject property retains integrity of workmanship. The physical evidence of the craftsmanship required to create the Ranch-style residence has been retained.
Feeling: The subject property lacks integrity of feeling. Although the residence itself maintains integrity of design, materials, and workmanship, alterations to the immediate setting prevent the property from conveying its historic feeling as a relatively rural and isolated property with uninterrupted views to Canyon County.

Association: The subject property lacks integrity of association. The property has no important associations with events, people, or important patterns of development in the City.

Significance Evaluation Findings
As a result of the property significance evaluation, the subject property at 25800 Sierra Highway/20101 Golden Valley Road is recommended not eligible under all CRHR and City designation criteria due to a lack of significant historical associations and compromised integrity.

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Appendix D:
Preparer's Qualifications

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Samantha Murray, MA

CULTURAL RESOURCES DIRECTOR

Samantha Murray is the cultural resources director at South Environmental and a principal archaeologist and architectural historian with over 15 years' experience in all elements of cultural resources management, including project management, archaeological and architectural history studies, and historical significance evaluations in consideration of the National Register of Historic Places (NRHP), California Register of Historical Resources (CRHR), and local-level designation criteria. Ms. Murray has conducted thousands of historical resource evaluations and developed detailed historic context statements for a multitude of property types and architectural styles. She has also provided expertise on numerous projects requiring conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

Ms. Murray meets the Secretary of the Interior's Professional Qualification Standards for both Architectural History and Archaeology. She is experienced managing multidisciplinary projects in the lines of private development, transportation, transmission and generation, federal land management, land development, and state and local government. She is an expert in preparation of cultural resources compliance documentation for projects that fall under the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and Sections 106 and 110 of the National Historic Preservation Act (NHPA). Ms. Murray has also served as an expert witness in legal proceedings concerning historical resources under CEQA and local ordinance protection.

EXPERTISE

- CEQA, NEPA, and Section 106 of the NHPA compliance documentation in consideration of impacts to historical, archaeological, and tribal cultural resources, and historic properties
- Historic resource significance evaluations in consideration of NRHP, CRHR, and local designation criteria.
- Project design review for conformance with the Secretary of the Interior's Standards.
- Preparation of archival documentation for HABS/HAER/HALS.
- Assistance with complex mitigation including salvage and interpretive displays.
- Peer review.

EDUCATION

M.A., Anthropology, California State University, Los Angeles, 2013

B.A., Anthropology, California State University, Northridge, 2003

PROFESSIONAL AFFILIATIONS

California Preservation Foundation

Society of Architectural Historians

National Trust for Historic Preservation

PROFESSIONAL CERTIFICATIONS

Registered Professional Archaeologist (2013)

SELECT PROJECT EXPERIENCE

Phase I and II Historical Resource Assessment Report for 4607 W. Melbourne Avenue, City of Los Angeles, California (2021). South Environmental was retained to complete a Historical Resource Assessment (HRA) for a property located at 4607 W. Melbourne Avenue in the City of Los Angeles, California. The HRA included the results of a pedestrian survey of the project site by a qualified architectural historian; building development and archival research; recordation and evaluation of one single-family residence for historical significance and integrity; meeting with Office of Historic Resources staff to discuss findings and recommendations; and review of proposed design plans for conformance with the Secretary of the Interior's Standards for Rehabilitation. The property was found eligible for designation in the NRHP, CRHR, and as a City HCM under Criteria C/3/3 as an individual property for its embodiment of the Craftsman-style of architecture and serving as an example of the airplane bungalow sub-type. The proposed project was found to be in conformance with the Standards for Rehabilitation such that the residence would continue to retain all its major character-defining features and would remain unchanged when viewed from the public right-of-way.

Hope Gardens Sequoia Building Project, Los Angeles County, California (2021). South Environmental was retained by Union Rescue Mission to complete a cultural resources technical report for the Hope Gardens Sequoia Building Project located at 12249 Lopez Canyon Drive in unincorporated Los Angeles County, California, which proposes demolition of the existing building on the site and construction of a new facility. Ms. Murray authored the cultural resources technical report, serving as principal archaeologist and architectural historian. This study included an intensive pedestrian survey of the project site by a qualified archaeologist and architectural historian; building development and archival research; and recordation and evaluation of the Hope Gardens property for historical significance and integrity in consideration of CRHR and Los Angeles County designation criteria. As a result of the property significance evaluation, eight buildings on the property were found eligible as contributing resources to the newly identified Forester Haven Historic District under CRHR and County Criterion 3. South Environmental is currently assisting Union Rescue Mission with implementation of project-specific mitigation.

Sand Canyon Resort Project, City of Santa Clarita, Los Angeles County, California (2019). While working for her previous firm, Ms. Murray served as principal architectural historian, co-author, and QA/QC of final cultural resources work products. Dudek was retained by the City of Santa Clarita to complete a cultural resources technical report in support of the EIR for a project that proposes to replace existing open space that was formerly the Mountain Course of the Robinson Ranch Golf Course, with a new resort and spa development. The report included a records search, Native American coordination, and a pedestrian survey.

Stickleback Movie Ranch Property Evaluation, Los Angeles County, California (2018). While working for her previous firm, Ms. Murray served as principal architectural historian, co-author, QA/QC of final work products. Dudek was retained by the Metropolitan Water District of Southern California to complete a historical resource significance evaluation of the Stickleback Movie Ranch property, located in unincorporated Los Angeles County near Santa Clarita, California. The study included a CHRIS records search of the Stickleback Movie Ranch property and a 0.25-mile radius; a pedestrian survey of the subject property for cultural resources; building development and archival research; recordation and evaluation of cultural resources identified within and around the Stickleback Movie Ranch portion of the study area; and an assessment of potential impacts to historical resources in conformance with CEQA and all applicable local municipal code and planning documents. The former Stickleback Movie Ranch and all associated buildings and structures were found not eligible under all NRHP, CRHR, and Los Angeles County designation criteria.

APPENDIX D
Fuel Consumption Worksheets

Golden Valley On-Road Construction Fuel Use

Construction Phase	Worker Trips/day	Worker Miles/trip	Days	Worker Miles
Demolition	15	18.5	22	6,105
Grading	20.0	18.5	110	40,700
Construction	181.0	18.5	259	867,262
Paving	15.0	18.5	21	5,828
Painting	36.3	18.5	43	28,877
Total Worker Miles				**948,771**
	EMFAC 2025	Gasoline	Avg. miles/gal	24.98
Worker Fuel Use			Total gallons	**37,975**

Construction Phase	Vendor Trips/day	Vendor Miles/trip	Days	Vendor Miles
Demolition	0	10.2	60	-
Grading	0	10.2	60	-
Construction	31.8	10.2	365	118,391
Paving	0	10.2	2	-
Painting	0	10.2	26	-
Total Vendor Miles				**118,391**
	EMFAC 2025	Diesel	Avg. miles/gal	8.64
Vendor Fuel Use			Total gallons	**13,710**

Construction Phase	Haul Trips/day	Haul Miles/trip		Haul Miles
Demolition	4.59	20.0	60	5,508
Grading	0.0	20.0	60	-
Total Hauling Miles				**5,508**
	EMFAC 2025	Diesel HHDT Only (T7 tractor construction)	Avg. miles/gal	6.12
Hauling Fuel Use			Total gallons	**900**

Golden Valley Off-Road Construction Fuel Use

Construction Phase	Equipment	Qty	Hrs/day	HP	Load Factor	#Days	HP hr
Demolition	Rubber Tired Dozer	2	8	367	0.4	22	51,674
	Excavators	3	8	36	0.38	22	7,223
	Concrete/Industrial	1	8	33	0.73	22	4,240
Grading	Graders	1	8	148	0.41	110	53,398
	Excavators	2	8	36	0.38	110	24,077
	Tractors/Loaders/E	2	8	84	0.37	110	54,701
	Scrapers	2	8	423	0.48	110	357,350
	Rubber Tired Dozer	1	8	367	0.4	110	129,184
Construction	Forklifts	3	8	82	0.2	259	101,942
	Generator Sets	1	8	14	0.74	259	21,466
	Cranes	1	7	367	0.29	259	192,958
	Welders	1	8	46	0.45	259	42,890
	Tractors/Loaders/E	3	7	84	0.37	259	169,044
Paving	Pavers	2	8	81	0.42	21	11,431
	Paving Equipment	2	8	89	0.36	21	10,765
	Rollers	2	8	36	0.38	21	4,596
Coating	Air Compressor	1	6	37	0.48	43	4,582
						Total HP	**1,241,522**
	HP = horsepower						
	gallons of diesel fuel per HP----hour= 0.05					**Gallons**	**62,076**

Golden Valley Operational Fuel Use

Light-duty (up to 8,500 lb GVWR)	% VMT	Heavy-duty (> 8,500 lb GVWR)	% VMT
LDA	49.32835102	LHD1	2.69669443
LDT1	4.23294678	LHD2	0.69253580
LDT2	24.02349710	MH	0.27810240
MDV	14.34000432	MHD	1.10110268
MCY	2.20090058	HHD	0.89450693
		OBUS	0.08452810
		SBUS	0.06490860
		UBUS	0.06192110
% of VMT	94.1%		5.9%

Vehicle Class	% VMT	Annual VMT	EMFAC 2027 M	Gal/year	Fuel
All		4,488,405			
light duty	94.1%	4,224,743	25.99	162,554	gasoline
heavy-duty	5.9%	263,662	8.87	29,733	diesel

APPENDIX E-1
Geotechnical Report

LGC Valley, Inc.

Geotechnical Consulting

GEOTECHNICAL REPORT FOR MULTI-USE DEVELOPMENT, TENTATIVE TRACT MAP 68203 CITY OF SANTA CLARITA, CALIFORNIA

Dated: November 19, 2020

Project No. 203003-01

Prepared For:

RENAUD AND SUE VELUZAT
C/O *MR. STEVE HUNTER, LAND DESIGN CONSULTANTS, INC.*
800 Royal Oaks Drive, Suite 104
Monrovia, California 91016

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LGC Valley, Inc.

Geotechnical Consulting

November 19, 2020 Project No. 203003-01

Mr. Renaud & Mrs. Sue Veluzat
c/o Mr. Steve Hunter, Land Design Consultants, Inc.
800 Royal Oaks Drive, Suite 104
Monrovia, Ca 91016

Subject: ***Geotechnical Report for a Multi-Use Development, Tentative Tract Map 68203, City of Santa Clarita, California***

In accordance with your request, LGC Valley, Inc. (LGC) is providing this geotechnical investigation report for the proposed multi-use development, Tentative Tract Map 68203, City of Santa Clarita, California. The purpose of our investigation was to evaluate the existing onsite geotechnical conditions, review geotechnical and geologic data and maps pertinent to the site, and prepare a geotechnical report, with respect to the proposed residential development, indicating our findings, conclusions, opinions, and recommendations for site development.

LGC has reviewed the prior geotechnical reports prepared by R.T. Frankian and Associates (RTF&A) with respect to the subject site and accepts responsibility as geotechnical consultant-of-record and concurs with the findings, conclusions and recommendations provided therein, except as modified herein.

LGC has reviewed the laboratory test data, procedures and results performed by EGLAB, Inc. (EGL) with respect to the subject site and concurs with and accepts responsibility as geotechnical engineer of record for their work (laboratory testing).

If you have any questions regarding our report, please contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LGC VALLEY, INC.

Adam Rich, PE 85642
Project Engineer

Matt C. Hawley, CEG 2122
Principal Geologist

NLK/MCH/ACR

Distribution: (4) Addressee

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1.0 INTRODUCTION

1.1 Purpose and Scope of Services

The main purpose of this geotechnical investigation was to identify and evaluate the existing geologic and geotechnical conditions at the site and provide preliminary geotechnical design criteria for the proposed development. Recommendations for grading construction, preliminary foundation design, retaining walls and other relevant aspects that may likely be used to support the proposed development are included herein to address the identified site geotechnical constraints. This report includes the results of site exploration, laboratory testing and engineering evaluation, and provides our conclusions, opinions, and recommendations with respect to site development.

These items plus other geotechnical conditions are discussed and addressed within this document.

Our scope of services for preparation of this document included:

- Review of geotechnical reports, geologic maps and other documents relevant to the site (Appendix A).
- Perform a site visit to evaluate the existing condition and mark the geotechnical excavation locations.
- Performed a subsurface investigation including down hole logging of one large diameter boring (B-LGC-LB, Appendix B).
- The excavation and logging of ten test pits using a backhoe (LGC-TP-1 through LGC-TP-10). (Appendix B).
- Performed a subsurface investigation using an 8-inch diameter hollow-stem auger drill rig to excavate three borings in the area of the proposed detention basin (Appendix B).
- Laboratory testing of representative soil samples obtained during our subsurface investigation (Appendix C).
- Review of on-site laboratory testing by others (Appendix D).
- Perform percolation testing and analysis (Appendix E).
- Perform geotechnical slope stability analyses (Appendix F) and evaluation of the overall data.
- Preparation of this report presenting our findings, conclusions, opinions, and recommendations with respect to the evaluated geologic and geotechnical conditions at the site.

1.2 Site and Project Description

The subject property is a roughly 28-acre arrowhead-shaped parcel located adjacent to and northwest of the intersection of Golden Valley Road and Sierra Highway. The site is hilly and generally defined by a low ridge spur that ascends from north to south roughly through the middle of the site that divides two north-draining canyons. The ridge spur ascends to a main ridgeline south of Golden Valley Road that generally follows the trend of the San Gabriel fault which is also located just south of the site. The two canyons meet further down slope and off site after crossing over a Southern California Gas easement that trends roughly east to west across the upper portion of the site and off site. At the approximate crest of the ridge spur on site, a tree-lined single-family compound is located near the southern site boundary that has access from a long driveway to Golden Valley Road to the south.

High fill slopes generally mark the southern and western boundaries of the property on either side of the ridge spur that leads up to Golden Valley Road and the single-family residential home site. North of the Gas line easement, the site begins to rise again. As such, the site is very hilly with many elevation changes over relatively short distances.

Based on our review of the proposed plans, the majority of the site is planned for three basic developments from south to north: a 100-unit, four-story hotel, a 154-unit senior-assisted living facility, and a 73-unit condominium complex in the north. Beyond the main development, in the northern portion of the site, an infiltration basin for storm water run-off is planned.

A sinuous road that descends to the north with access from Golden Valley Road is planned to provide access to the various improvements. Numerous private streets are also planned within each of the three main development concepts. Main line utilities, and other basic and fundamental necessities will also be provided to support the planned development.

Site construction is anticipated to consist of cut and fill grading up to approximately 60 feet in height and thickness, respectively. Fill and cut slopes are designed at 3:1 to 2:1 (Horizontal to Vertical) ratios.

1.3 Document Review

LGC reviewed the documents indicated within Appendix A and used this information to assist with our interpretations, conclusions and recommendations of the site. Fill placed as a part of construction for Golden Valley Road was reported by R.T. Frankian and Associates (RTF&A, 2003). Based on our review of that report, LGC concludes that those fills are suitable as support for the intended development where the influence of those fills impacts the subject site. As indicated in their report, RTF&A indicates that all unsuitable soils were removed prior to fill placement and engineered fill was placed in the same manner and quality as that used for residential developments.

LGC has reviewed the referenced RTF&A report and concurs with the conclusions and recommendations performed and accepts as engineer-of-record, those fills that influence the subject site.

1.4 Subsurface Investigation and Laboratory Testing

Our subsurface investigation began on September 15, 2020 and finished on October 7, 2020. One large-diameter boring (B-LGC-LB) was extended to a maximum depth of 80 feet on September 15, 2020 to determine geologic structure and provide data for slope stability. Ten backhoe test pits were excavated on September 18, 2020 (LGC-TP-1 through LGC-TP-10) and were extended to a maximum depth of 13.5 feet to determine approximate remedial removal depths; due to safety concerns most test pits were not entered beyond approximately five feet from the ground surface. On October 6, 2020 three hollow stem borings (B-LGC-1 through B-LGC-3) were extended to depths ranging from approximately 20 to 31.5 feet. On October 7, 2020 these borings were observed for indications of groundwater seepage, and one preliminary percolation test was performed; no seepage was observed. The approximate locations of the test pits and borings are shown on the Geotechnical Map (Plate 1). The test pits and borings were sampled and logged under the supervision of a geologist from LGC.

During the subsurface investigation, representative bulk and relatively undisturbed samples were collected for laboratory testing. Laboratory testing was performed by EGLAB, Inc. (EGL). Laboratory testing was performed on representative soil samples and included moisture and density tests, maximum density and optimum moisture content, expansion and corrosion testing. A summary of the test procedures and printouts of the laboratory test results are presented in Appendix C. The moisture and density test results are presented on the test pit and boring logs included in Appendix B.

Approximate
Site Location

LGC

Figure 1:
Site Location Map
Veluzat Property,
City of Santa Clarita, California

Project Name	Golden Valley
Project No.	203003-01
Eng. / Geol.	ACR/MCH/NLK
Scale	not to scale
Date	November 2020

2.0 GEOTECHNICAL CONDITIONS

2.1 Regional and Local Geology

The subject site is located within the Santa Clarita Basin of the Transverse Ranges geomorphic province of California. The site and surrounding area is hilly terrain with narrow ridgelines and canyons as a result from local and regional faulting and erosion processes. The San Gabriel Fault is located within 1 mile from the site to the south. Bedrock is composed of sandstone, conglomerate, siltstone and claystone of the Saugus Formation which is shallowly to moderately dipping to the northwest and west. Canyons have relatively thin accumulations of alluvium (commonly less than 20 feet in thickness). The surrounding area is prone to landslide activity due to high and steep ridgelines that contain locally out-of-slope dipping clay beds.

2.2 Site-Specific Geology

The site is underlain by certified fill, alluvium, the Saugus Formation, and locally undocumented fill soils. Overall, the site is blanketed by a thin veneer of topsoil with thicknesses ranging from 1 to 5 feet, however these soils are not shown on the geologic map. Heavy brush precluded visual reconnaissance mapping in many areas, though geologic units have been interpreted and applied across the site.

2.2.1 Artificial Fill – Undocumented (Afu)

Based on the results of our subsurface investigation, the site is underlain by approximately one to eight feet of undocumented fill located on the downhill side of access roads. Based on our observations and review, all undocumented fill is considered unsuitable for support of structures.

2.2.2 Certified Fill (Cf)

The entire southern portion of the site runs adjacent to Golden Valley Road where high ascending slopes of certified fill mark the southern boundary of the site (RTF&A, 2003). Based on our review, the surface of the certified fill is dry and remedial removals will be required prior to additional fill placement.

2.2.3 Quaternary Landslide-Surficial (Qls?)

Based on review of aerial photographs (Google Earth, 2020) two possible surficial features on the subject site appear to have topography consistent with a landslide. Based on their shape and locations these features appear to be relatively thin in nature, assumed approximately 10 feet in thickness, and are anticipated to be made up of broken weathered blocks of bedrock combined with topsoil. All landslide debris is considered unsuitable for support of structures and if found during construction will be removed during the site grading construction.

2.2.4 Quaternary Alluvium (Qal)

Alluvial soils were encountered in the bottoms of local drainages that ranged from approximately one to thirteen feet in depth. As encountered, these soils generally consist of pale-yellow brown to olive-green and gray, interbedded sandy silts, silty sands, and sandy to silty clays that are damp, stiff, porous and locally contain roots. Based on our observations, alluvium is not considered suitable for support of structures and is recommended for removal during site grading construction.

2.2.5 Quaternary Saugus Formation, Sunshine ranch member (Tsr)

Bedrock at the site consists of Saugus Formation, Sunshine Ranch member (Saul and Wooton, 1983), and is composed of relatively thick beds of clayey to sandy siltstone, silty to clayey sandstone and gravel to cobble conglomerate. Overall, bedrock is dense, massive to poorly bedded, locally cross bedded and locally cemented. Changes in lithology occurred gradationally except for areas of channelized deposits. The upper approximate fifteen feet along the main ridge spur was observed as weathered and should be overexcavated if not removed by planned cut. A few reddish-brown to brown claystone beds were identified within B-LGC-LB and single reddish-brown to purple claystone was identified with non-planar and steeply dipping internal shears attributed to tectonic uplift of the nearby San Gabriel fault. The observed shears were not through-going or of significant length and are not interpreted as long, planar surfaces that should be reviewed from a global slope stability perspective. At depth, the Sunshine Ranch member transitions to unoxidized gray and blue-gray colors.

2.3 Geologic Structure

The bedrock within the site is generally massive to poorly bedded sandstone, siltstone and claystone. Locally, infilled channelized deposits were observed with steeply dipping margins. Bedding is shallowly dipping to the north-west, ranging from six to fourteen degrees, with slight variations along strike and dip angle (see boring logs, Appendix B). Variations in strike and dip are to be expected due to the massive, gradational and undulatory conditions. A northwest tending anticline was mapped north of the site (Saul and Wooton, 1983) but does not appear to be relevant to the site from a structural or slope stability perspective.

2.4 Landslides

The site is in a region that is prone to landslides due to high slopes and steep ridgelines with relatively shallow dipping clays. The "Friendly Valley Landslide Complex" is east of the site (Dibble, 2006) and (Saul and Wooton, 1983) show two additional landslides in the immediate area of the subject site. Both landslides have been removed in the grading of the Golden Valley Road between March 2000 and May 2001 (RTF&A, 2003).

Based on the topographic map and aerial photos, we believe there are potentially two surficial slides on site immediately north of the existing residence descending into the eastern most canyon with interpreted thicknesses of approximately 10 feet. Due to heavy brush on the site, other surficial slides may be present but unidentified. Any identified landslide will be removed during the course of grading

in its entirety as landslide debris is considered compressible and not suitable for the support of structures or fill.

2.5 Groundwater

Historic high groundwater is not considered to be a concern for the site based on the published historic high groundwater map (CGS, 1998). No data is available through the California Department of Water Resources, and no known waters wells are on site.

Groundwater was not encountered during our site investigations to the maximum explored depth of 80 feet on the southern hills of the site and 31.5 feet in the northern lower alluvium portion of the site; as such none is anticipated during site grading.

2.6 Oil Wells

The site is located less than 1 mile north of the active Placerita oil field (California Department of Conservation, 2020). Upon review, there appears to be a single abandoned dry Mobile Oil Corp well (API:0403713340, Well #4) located within or near the northern site boundary. LGC is not an environmental consultant, and we recommend the site be reviewed by a qualified environmental consultant to assess the relevance of this feature relative to the proposed development.

2.7 Surface Water

Based on our review of local maps, surface water will drain to the canyon bottoms and flow north from the site. Surface water runoff relative to project design is the purview of the project civil engineer and should be directed away from the planned structure.

2.8 Seismicity, Faulting and Related Effects

2.8.1 Seismicity

The main seismic parameters to be considered when discussing the potential for earthquake-induced damage onsite are the distances to the causative faults, earthquake magnitudes, and expected ground accelerations. We have performed site-specific analysis based on these seismic parameters for the site and the onsite geologic conditions. The results of our analysis are discussed in terms of the potential seismic events that could be produced by the maximum probable earthquakes. A maximum probable earthquake is the maximum earthquake likely to occur given the known tectonic framework.

2.8.2 Seismic Design Criteria

The site seismic characteristics were evaluated per the guidelines set forth in Chapter 16, Section 1613 of the 2019 California Building Code (CBC). Representative site coordinates for the project sites of latitude 34.3978° N and longitude -118.4862° W were utilized in our analyses. The maximum considered earthquake (MCE) spectral response accelerations (SMS and SM1) and adjusted design spectral response acceleration parameters (SDS and SD1) for Site Class D are provided in the following table.

Table 1

Seismic Design Parameters

Selected Parameters from 2019 CBC, Section 1613 - Earthquake Loads	Seismic Design Values
Site Class (per Chapter 20 of ASCE 7)	C
Risk-Targeted Spectral Acceleration for Short Periods (S_S)	2.377
Risk-Targeted Spectral Accelerations for 1-Second Periods (S_1)	0.849
Site Coefficient F_a [per Table 1613.3.3(1)]	1.2
Site Coefficient F_v [per Table 1613.3.3(2)]	1.4
Site Modified Spectral Acceleration for Short Periods (S_{MS}) for Site Class D [Note: $S_{MS} = F_aS_S$]	2.852
Site Modified Spectral Acceleration for 1-Second Periods (S_{M1}) for Site Class D [Note: $S_{M1} = F_vS_1$]	1.188
Design Spectral Acceleration for Short Periods (S_{DS}) for Site Class D [Note: $S_{DS} = (^2/_3)S_{MS}$]	1.901
Design Spectral Acceleration for 1-Second Periods (S_{D1}) for Site Class D [Note: $S_{D1} = (^2/_3)S_{M1}$]	0.792
Seismic Design Category (per Section 1613.2.5)	E

Section 1803.5.12 of the 2019 CBC (per Section 11.8.3 of ASCE 7) states that the maximum considered earthquake ground motions, Peak Ground Acceleration (PGA) should be used for the geotechnical evaluations. The PGA_M for the site is equal to 1.206g (USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2).

A deaggregation of the PGA based on a 2,475-year average return period indicates that an earthquake magnitude of 7.5 at a distance of approximately 6.9 km (4.2 mi) from the site would contribute the most to this ground motion (USGS, 2020).

2.8.3 Faulting

The subject site is not located within an Alquist-Priolo Earthquake Fault Zone (Hart and Bryant, 1997); therefore, there are no known active or potentially active faults onsite. However, the active San Gabriel Fault is located less than 1-mile from the site to the south.

The possibility of damage due to ground rupture from earthquake fault rupture is considered low since active faults are not known to cross the site but the site is in close proximity to an active fault. The site is also in proximity to other active faults (Simi-Santa Rosa, Santa Susana, Sierra Madre/San Fernando and San Andreas) which are capable of producing significant ground shaking.

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the southern California region include shallow ground rupture, soil liquefaction, and seismically induced-settlements, seiches and tsunamis.

The secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and causative fault and the onsite geology. The major active fault that could produce these secondary effects is the San Gabriel Fault located to the south of the site. Other active faults that may result in shaking to the site include the Simi-Santa Rosa, Northridge, Santa Susana and San Andreas Fault, among others. A discussion of liquefaction and these secondary effects is provided in the following sections.

2.8.4 Shallow Ground Rupture

Shallow ground rupture due to active faulting is not likely to occur on site due to the lack of active or potentially active fault traces across the site. Therefore, this phenomenon is not considered a significant hazard, although it is a possibility at any site.

2.8.5 Liquefaction

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions exist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Liquefaction is typified by a buildup of pore-water pressure in the affected soil layer to a point where a total loss of shear strength occurs, causing the soil to behave as a liquid. Studies indicate that saturated, loose to dense, near surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential.

According to the City of Santa Clarita Geologic hazards map the site is partially within a mapped liquefaction hazard zone (City of Sana Clarita, 2020). Due to the presence of shallow bedrock at the site, the planned complete removal of loose surficial materials beneath compacted fills and the lack of shallow groundwater, the liquefaction hazard potential is considered very low to nil.

2.8.6 Seismically Induced Settlement

During a strong seismic event, seismically induced settlement can occur within loose to moderately dense, dry or saturated granular soil. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement.

Provided that the recommendations in this report are followed and removals of unsuitable materials are performed, the site is not anticipated to be susceptible to seismically induced settlement.

2.8.7 Seiches and Tsunamis

A seiche is a standing wave in an enclosed or partially enclosed body of water propagated by earthquake waves. Tsunamis are large ocean waves or series of waves generated by displacement of a large volume of water. The site is not in close proximity to body of water or near the ocean; therefore, the hazard associated with seiches and tsunamis is considered nil.

2.9 Slope Stability

After a review of the latest grading plan and based on our investigation, seven cross-sections (A-A', B-B', D-D' E-E', H-H', O-O', P-P', and Q-Q') were considered representative and critical with regards to slope stability analysis. Each of these cross-sections are discussed below.

Slope stability analysis was conducted using the computer program Slope-W from Geo- Slope International. The Modified Bishop's Method was used to analyze rotational failure modes and the Janbu Method was considered for translational failure modes. A coefficient of horizontal acceleration Kh of 0.15 (FS of 1.1) was considered for pseudostatic analyses. The design shear strength values utilized for the analyses were based on the values provided in the RTF&A report summarizing the grading of the adjacent Golden Valley Road and High School site (RTF&A, 2003) and are summarized in Appendix F.

Cross-section A-A' was used to analyze the proposed approximately 80-foot-high design fill slope descending to the east. Based on our geologic interpretations of the site, the proposed slope is to be constructed over an existing fill slope and the material underlying the fill consist of bedrock dipping approximately 0-7 degrees into slope. The results of the slope stability analyses on cross-section A-A' indicate adequate factors of safety greater than 1.5 and 1.1 (as applicable), for rotational and translational modes of failure, under static and pseudostatic conditions, respectively, and the analyses are included in Appendix F. However, a stability fill keyway is shown at the toe of the slope to indicate how the design fill slope should be established into competent soils in this area.

Cross-section B-B' was used to analyze the proposed cut condition with Saugus Formation, Sunshine Ranch member, dipping approximately 6 to14 degrees out-of-slope. The results of the slope stability analyses on cross-section B-B' indicate adequate factors of safety greater than 1.5 and 1.1 (as applicable), for rotational and translational modes of failure, under static and pseudostatic conditions, respectively, and the analyses are included in Appendix F.

Cross-section D-D' was used to analyze the proposed fill slope overlying Saugus Formation, Sunshine Ranch member, dipping approximately 0 to 2 degrees out-of-slope. The results of the slope stability analyses on cross-section D-D' indicate adequate factors of safety greater than 1.5 and 1.1 (as applicable), for rotational and translational modes of failure, under static and pseudostatic conditions, respectively, and the analyses are included in Appendix F.

Cross-section E-E' was used to analyze the proposed cut slope above the planned basin into Saugus Formation, Sunshine Ranch member, dipping approximately 0-10 degrees out-of-slope. The results of the slope stability analyses on cross-section E-E' under rapid drawdown conditions indicate adequate factors of safety greater than 1.5 and 1.1 (as applicable), for rotational and translational modes of failure, under static and pseudostatic conditions, respectively, and the analyses are included in Appendix F. Although analysis show the slope meets standard criteria, we conclude there is a possibility for surficial instability for the west-facing slope and have thus recommended a stabilization keyway for this area. Additionally, design cut slopes show two different soil types (alluvium and bedrock). It is our conclusion that a uniform soil is prudent for this basin to r educe potential differential weathering over time.

Cross-section H-H' was used to analyze the proposed cut slope into Saugus Formation, Sunshine Ranch member, dipping approximately 4 to 11 degrees out-of-slope. The results of the slope stability analyses on cross-section H-H' indicate adequate factors of safety greater than 1.5 and 1.1 (as applicable), for rotational and translational modes of failure, under static and pseudostatic conditions, respectively, and the analyses are included in Appendix F. As that for cross-section A-A', a stability fill is shown at the toe of the slope to indicate where and how design fill should be established for the project.

Cross-section O-O' was used to analyze the proposed cut condition with Saugus Formation, Sunshine Ranch member, dipping approximately 6 to 14 degrees out of slope. The results of the slope stability analyses on cross-section O-O' indicate adequate factors of safety greater than 1.5 and 1.1 (as applicable), for rotational and translational modes of failure, under static and pseudostatic conditions, respectively, and the analyses are included in Appendix F. Cross-section O-O' also indicates a stability fill at the toe of the slope to indicate establishment of design fill into competent soils.

Cross-section P-P' was used to analyze the proposed fill over cut slope condition with Saugus Formation, Sunshine Ranch member, dipping approximately 6 to 14 degrees out of slope. Based on analysis, this slope area will require a stabilization fill key at least 20 feet wide with a 2:1 backcut. The results of the slope stability analyses on cross-section P-P', considering the stabilization fill, indicate adequate factors of safety greater than 1.5 and 1.1 (as applicable), for rotational and translational modes of failure, under static and pseudostatic conditions, respectively, and the analyses are included in Appendix F. Cross-section P-P' shows a keyway for the reasons described in the previous analyzed cross-sections.

Cross-section Q-Q' was used to analyze the proposed approximately 25-foot-high fill slope overlying Saugus Formation, Sunshine Ranch member, dipping approximately 4 to 14 degrees out of slope. The results of the slope stability analyses on cross-section Q-Q' indicate adequate factors of safety greater than 1.5 and 1.1 (as applicable), for rotational and translational modes of failure, under static

and pseudostatic conditions, respectively, and the analyses are included in Appendix F. Q-Q' also requires a keyway to establish design fill soils.

Additional cross sections G-G', C-C' and F-F' show stability fills at the designed toe of slope to indicate where design fill is established for the project. These cross-sections were not analyzed but are considered similar to those evaluated above, while the keyway brings consistency to the geotechnical design.

2.10 Laboratory Testing

Laboratory testing of the onsite soils was performed on representative samples obtained from the borings and included moisture and density tests, maximum density and optimum moisture content, sieve analysis, Atterberg Limits, expansion, and corrosion testing. Laboratory testing was performed by EGLAB, Inc. (EGL). LGC has reviewed the laboratory test data, procedures and results performed by EGL with respect to the subject site and concurs with and accepts responsibility as geotechnical engineer of record for their work (laboratory testing). A discussion of the tests performed, and printout of the laboratory test results are presented in Appendix C.

These results should be confirmed at the completion of site grading.

Expansion potential testing indicated an expansion index of 98, "High" (2010 California Building Code, CBC). Sulfate testing indicated soluble sulfate content was 0.027 percent Exposure Class S0 (negligible) ACI 318R-14 Table 19.3.1.1).

A corrosion suite (pH, resistivity, and chloride content) was performed on a representative sample of the onsite soils. The result for the resistivity test indicated a minimum resistivity value of 390 ohm-centimeters, pH value of 8.07, and chloride content of 700 parts-per-million (ppm). Caltrans defines a corrosive area where any of the following conditions exist: the soil contains more than 500 ppm of chlorides, more than 2,000 ppm (0.2 percent) of sulfates, or a pH of 5.5 or less. Test results are provided in Appendix C.

2.11 Percolation Testing

As a part of the geotechnical investigation of the subject site, LGC excavated three 8-inch diameter hollow-stem borings, (B-LGC-1 through B-LGC-3) to perform percolation testing. Two borings (B-LGC-1 and B-LGC-2) were monitored over a 24-hour period to determine seasonal groundwater, and one boring (B-LGC-3) was tested for percolation. The approximate locations of the borings is shown on the Geotechnical Map (Plate 1) at the location where the water infiltration system is planned.

Upon completion of drilling, a 4-inch diameter slotted PVC well casing was installed in the boring to prevent caving during percolation testing. The pipe was installed at a depth of 17 to 20 below the existing surface; solid PVC was extended to the surface. The annular space between the well casing and the boring was backfilled with pea gravel to 17 feet and capped with bentonite to isolate the depth for the percolation test. The boring was pre-saturated on October 6, 2020.

On October 7, 2020, the percolation test was performed to evaluate the percolation rate for the subsurface soil layers for use in onsite disposal of stormwater runoff. The test method employed was the falling head percolation test procedure.

Percolation testing was performed at the location and on soil layers anticipated to conform with the designed proposed storm water treatment system. The depth interval where percolation testing was performed was approximately 17 to 20 feet below the existing grade.

The percolation test was conducted by filling the hole with clear water to the same level (16.25 feet) below existing ground surface. The drop in water level was measured at 30-minute intervals from a fixed initial reference point located at the surface. Testing was performed for approximately five hours and was completed when three successive readings that did not vary by more than ten percent. Percolation test data recorded in the field are presented in Appendix E.

Percolation test results are provided in inches per hour. The measured percolation test rate is ***1.68*** **inches per hour** for the soils layers (bedrock) between 17 and 20 feet below the ground surface. Using Los Angeles County Low Impact Development guidelines for storm water infiltration a total reduction factor of 18 was determined based on test type, soil variability and unknown long-term silting and maintenance; the adjusted design infiltration rate is **0.0933 inches per hour.** This rate is below the minimum design requirement of 0.3 inches per hour.

3.0 CONCLUSIONS

Based on the results of our geotechnical evaluation and review, it is our opinion that the proposed site development is feasible from a geotechnical standpoint, provided the following recommendations included in this report are incorporated into the project plans and specifications, and followed during site grading and construction.

Our geotechnical conclusions are as follows:

- The site is not located within an Alquist-Priolo Earthquake Fault Zone (Hart, 1997), though the San Gabriel fault is less than 1 mile from the site to the south.
- The site is partially located within an area deemed to have a potential for liquefaction (City of Santa Clarita Website). Total removal of alluvium during grading will reduce the potential for liquefaction to very low to nil.
- Groundwater was not encountered in our geotechnical borings to the maximum explored depth of 31.5 feet below the existing grade on the lower northern portion of the site, or 80 feet below the ground surface on the southern higher portion. As such groundwater is not anticipated to be a concern for the project.
- Based on the subsurface exploration and our review, the site is underlain by a thin veneer of topsoil, undocumented artificial fill and shallow alluvium over the Saugus Formation, Sunshine Ranch Member. The undocumented fill and alluvial soils are considered potentially compressible/collapsible and should be remove prior to fill placement or where support of structures is required.
- In general, site review indicates bedrock is composed chiefly of sandstone and siltstone with conglomerate and/or claystone with undulating and/or gradational lithologic changes between soil types.
- Bedrock is interpreted as dipping shallowly (7 to 14 degrees) to the northwest and west.
- Due to bedrock orientation, stability fills are recommended for the slopes dipping to the west and northwest.
- Additional stability fills are recommended for slope continuity, to establish design fill and to create a more uniform product across the site.
- Two possible landslides are indicated on the geotechnical map and should be removed in their entirety if they exist.
- The magnitude weighted peak horizontal ground acceleration due to a maximum probable earthquake is estimated to be 1.206g.
- A single oil well was identified within the subject site during our review. This well should be reviewed by a qualified consultant to determine relevance to the site.
- Laboratory test results of the onsite soils indicate a high expansion potential.
- Laboratory test results of the onsite soils indicate negligible soluble sulfates. Soil resistivity is 390 ohm-centimeters and is considered very corrosive to metals.
- The onsite soils below recommended remedial grading/excavation depths have a low potential for static settlement (i.e., slightly compressible).
- From a geotechnical perspective, the existing onsite soils are suitable for use as fill, provided they are relatively free from rocks (larger than 6 inches in maximum dimension), construction debris, and organic material.

4.0 RECOMMENDATIONS

4.1 Site Earthwork

We anticipate that earthwork at the site will consist of demolition of existing structures and site preparation and grading followed by construction of slab-on-grade type foundations for the proposed residential and commercial structures, installation of utilities, subsequently followed by paving/pouring of driveways.

We recommend that earthwork onsite be performed in accordance with the recommendations herein, the City of Santa Clarita and the County of Los Angeles guidelines and the General Earthwork and Grading Specifications for Rough Grading included in Appendix G. In case of conflict, the recommendations in the following sections shall supersede those included as part of Appendix G.

4.1.1 Site Preparation

Prior to grading of areas to receive structural fill or engineered structures, all ground surfaces should be cleared of obstructions, any existing debris and stripped of vegetation. Heavy vegetation and debris should be removed and properly disposed of offsite. All debris from any demolition activities at the site should also be removed and disposed off-site. Holes or depressions resulting from the removal of buried obstructions should be replaced with compacted fill.

Following remedial removals, areas to receive fill should be scarified to a minimum depth of 12 inches, brought to a near-optimum moisture condition, and recompacted to at least 90 percent relative compaction (based on ASTM Test Method D1557). Fills that have a depth of 40 feet or greater require at least 93 percent relative compaction.

4.1.2 Removal and Recompaction

As discussed in Section 2.2, the proposed site is locally underlain by unsuitable soils, which may settle under the addition of water, surcharge of fill and/or foundation loads. Therefore, compressible materials, within areas planned to support engineered fill, roads or the proposed building structures, should be excavated to competent material and replaced with compacted fill soils. We anticipate removals on the site to be on the order of approximately 7 to 13 feet below existing grade mostly within mapped alluvial areas; however, localized, deeper removals should be anticipated where deemed necessary by the geotechnical consultant based on observations during grading. Prior to placing fill, removal bottoms should be scarified to a minimum depth of 6 inches, brought to at least optimum-moisture content, and recompacted. The fill prism beneath the building footings should extend downward at a 1:1 (horizontal to vertical) slope from the outside edge of the footing bottoms. The removals should extend a minimum of 5 feet beyond the building perimeters. In general, the intent of the remedial removals is to remove all undocumented fills, alluvium, any landslide debris and any other unsuitable soils.

Due to the potential of variable material types in bedrock at design cuts, all cut lots should be over-excavated and provided with a minimum of five feet of compacted fill. Transition lots may need additional over-excavation if the transition slope is steeper than a 2:1 horizontal to

vertical (h:v) inclination to a minimum depth of 20 feet below finish surface to reduce the potential of differential settlement.

Keyway have been recommended for west and northwest facing slopes along with design slopes to establish base fills. For constructability, we recommend extending the keyways as shown on the geotechnical map (Plate 1). Keyways should be a minimum of two feet deep into competent soil at the tow and twenty feet wide with a minimum of 20 feet of fill maintained at the top of slope. Keyways should have a 1-foot tilt towards the heel.

From a geotechnical perspective, material that is removed may be placed as fill provided the material is relatively free from rocks (greater than 6 inches in maximum dimension), organic material and construction debris, is moisture-conditioned or dried (as needed) to obtain above-optimum moisture content, and then recompacted prior to additional fill placement or construction.

4.1.3 Shrinkage/Bulking

The preliminary estimated shrinkage factors of 5 to 10 percent for the undocumented fill and alluvium may be used for consideration of earthwork calculations. The Saugus Formation bedrock shrink/bulk will be variable with depth. The upper 20 feet is expected to shrink approximately 3 percent and removals below approximately 20 feet is expected to bulk approximately 3 percent. These are preliminary rough estimates which will vary with depth of removal, stripping losses, field conditions at the time of grading, etc. In addition, handling losses are not included in the estimates.

4.1.4 Temporary Excavation Stability

All excavations for the proposed development should be performed in accordance with current OSHA (Occupational Safety and Health Agency) regulations and those of other regulatory agencies, as appropriate.

Temporary excavations maybe cut vertically up to five feet. Excavations over five feet should be slot-cut, shored, or cut no steeper than 1H: 1V (horizontal, H: vertical, V) slope gradient. Surface water should be diverted away from the exposed cut, and not be allowed to pond on top of the excavations. Temporary cuts should not be left open for an extended period of time. Planned temporary conditions should be reviewed by the geotechnical consultant of record in order to reduce the potential for sidewall failure. The geotechnical consultant may provide recommendations for controlling the length of sidewall exposed.

4.1.5 Fill Placement and Compaction

From a geotechnical perspective, the onsite soils are suitable for use as compacted fill provided they are screened of rocks greater than 6-inches in maximum dimension, organic material, and construction debris. Areas prepared to receive structural fill and/or other surface improvements should be scarified to a minimum depth of 6-inches, brought to at least optimum-moisture

content, and recompacted to at least 90 percent relative compaction (based on ASTM Test Method D1557). 93 percent relative compaction is required where fill depths are greater than 40 feet to surface. The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts generally not exceeding 8-inches in loose thickness. Placement and compaction of fill should be performed in accordance with local grading ordinances under the observation and testing of the geotechnical consultant.

4.1.6 Trench Backfill and Compaction

The onsite soils may generally be suitable as trench backfill provided, they are screened of rocks and other material over 6-inches in diameter and organic matter. Trench backfill should be compacted in uniform lifts (generally not exceeding 8-inches in compacted thickness) by mechanical means to at least 90 percent relative compaction (per ASTM Test Method D1557).

If trenches are shallow and the use of conventional equipment may result in damage to the utilities; clean sand, having sand equivalent (SE) of 30 or greater, should be used to bed and shade the utilities. Sand backfill should be densified. The densification may be accomplished by jetting or flooding and then tamping to ensure adequate compaction. A representative from LGC should observe, probe, and test the backfill to verify compliance with the project specifications.

4.2 Foundations

4.2.1 General

Preliminary recommendations for foundation design and foundation construction are presented herein. When the structural loads for the proposed structures are known they should be provided to our office to verify the recommendations presented herein.

The following foundation recommendations are provided for residential structures. Foundations recommended for the proposed structures are: (1) Post-tension Foundations; or (2) Mat foundations. For preliminary design purposes a high expansion potential should be considered for design. The as-graded soil conditions should be verified.

Foundation recommendations for the planned hotel will be provided once information regarding structural loads and configuration of the hotel are available.

The information and recommendations presented in this section are not meant to supersede design by the project structural engineer or civil engineer specializing in the structural design nor impede those recommendations by a corrosion consultant. Should conflict arise, modifications to the foundation design provided herein can be provided.

4.2.2 Bearing Capacity

Shallow foundations may be designed for a maximum allowable bearing capacity of 1,500 lb/ft^2 (gross), for continuous footings a minimum of 15 inches wide and 18 inches deep and spread footings 24-inches wide and 18-inches deep, into certified compacted fill. A factor of

safety greater than 3 was used in evaluating the above bearing capacity value. This value maybe increased by 300 psf for each additional foot in depth and 300 psf for each additional foot of width to a maximum value of 2,500 psf.

Lateral forces on footings may be resisted by passive earth resistance and friction at the bottom of the footing. Foundations may be designed for a coefficient of friction of 0.35, and a passive earth pressure of 250 $lb/ft^2/ft$. The passive earth pressure incorporates a factor of safety of greater than 1.5.

All footing excavations should be cut square and level as much as possible, and should be free of sloughed materials including sand, rocks and gravel, and trash debris. Subgrade soils should be pre-moistened for the assumed high expansion potential (to be confirmed at the end of grading).

4.2.3 Post-Tension Foundations

Based on the site geotechnical conditions after rough grading, the site is considered suitable for the support of the anticipated residential structures using a post-tensioned slab-on-grade foundation system for high expansion potential (91-130 Expansion Index). The following section summarizes our recommendations for the foundation system.

TABLE 2
Preliminary Geotechnical Parameters for Post-Tensioned Foundation Slab Design, (PTI, 2006)

Parameter	Value
Expansion Index	High Expansion[2]
Clay Mineral Type	Montmorillonite (assumed)
Thornthwaite Moisture Index	-20
Depth to Constant Soil Suction (depth to constant moisture content over time, but within C.B.C. limits)	7 feet
Constant Soil Suction	PF 3.6
Moisture Velocity	0.7 inches/month
Center Lift Edge moisture variation distance, e_m Center lift, y_m	 9.0 feet 0.66 inches
Edge Lift Edge moisture variation distance, e_m Edge lift, y_m	 5.0 feet 1.6 inches
Modulus of Subgrade Reaction, k (assuming presoaking as indicated below)	85 pci
Perimeter foundation embedment below finish grade (for a conventional PT foundation)	24 inches
Perimeter foundation reinforcement	2 No. 5 Bars (or equivalent as necessary)[3]
Minimum slab thickness	5 inches[3]
Under slab moisture retarder and sand layer	15-mil thick polyolefin (or equivalent) in conformance with an ASTM E 1745 Class A material underlain by 1 inch of sand[4]

1. Presaturate slab subgrade to a minimum 1.3 times optimum moisture to a depth of 24 inches below the ground surface.
2. Data obtained from finish grade laboratory testing performed at the completion of grading.
3. Recommendations for foundation reinforcement are ultimately the purview of the foundation engineer/structural engineering based upon the geotechnical criteria presented in this report, and structural engineering considerations.
4. The underslab moisture retarder (i.e. an equivalent capillary break method) should consist of a 15-mil thick polyolefin (or equivalent) in conformance with ASTM E 1745 Class A material underlain by a minimum 1-inch of sand, as needed. The sand layer requirements above the vapor barrier are the purview of the foundation engineer/structural engineer, and should be provided in accordance with ACI Publication 302 "Guide for Concrete Floor and Slab Construction".

4.2.4 Mat Foundation

Mat foundation can be used for support of the proposed building structures. An allowable soil bearing pressure of 1,500 psf may be used for the design of the mat slab. The allowable bearing value is for total dead loads and frequently applied live loads and may be increased by one-third for short durations of loading which will include the effect of wind or seismic forces. A coefficient of vertical subgrade reaction, k, of 100 pounds per cubic inch (pci) may be used to evaluate the pressure distribution beneath the mat foundation. The magnitude of total and differential settlements of the mat foundation will be a function of the structural design and stiffness of the mat.

Resistance to lateral loads can be provided by friction acting at the base of foundations and by passive earth pressure. A coefficient of friction of 0.35 may be used.

4.2.5 Foundation Settlement

Based on our current understanding of the project, the results of our site investigation and the recommended remedial grading with shallow foundations embedded into compacted fills, we estimate the post-construction settlement of the site to be less than 1-inch with a differential settlement of approximately of 0.5-inch in 30 feet for residential structures.

Potential settlements for the planned hotel will be evaluated once more information regarding structural loads configuration of the hotel are available.

4.3 Lateral Earth Pressures for Retaining Walls (If Any)

The following lateral earth pressures may be used for the design of any future site retaining walls (If Any). Due to the potentially expansive nature of onsite soils, we recommend site retaining walls be backfilled with select soils. Select soils should consist of clean, granular soils (less than 15 percent passing the No. 200 sieve) of very low expansion potential (expansion index 20 or less based on ASTM D4829). The recommended lateral pressures for approved select soils for level or sloping backfill are presented in the table below.

TABLE 3
Lateral Earth Pressures for Retaining Walls

Conditions	Equivalent Fluid Weight (pcf)		
	Level Backfill	**2:1 Backfill Sloping Upwards**	**Seismic Earth Pressure (pcf) ***
	Approved Select Material	**Approved Select Material**	
Active	40	64	19
At Rest	60	87	31

* This dynamic pressure should be added to the pressures given in Table 2 and considered as a triangular distribution with the resultant acting at 1/3H in relation to the base of the retaining wall footing (where H is the retained height). The aforementioned incremental seismic load was determined in general

accordance with LA County Administrative Manual S004.0 for determining earth pressures as a result of seismic events.

For design purposes, the recommended equivalent fluid pressure for each case for walls founded above the static ground water and backfilled with approved select soils is provided in Table 3. The equivalent fluid pressure values assume free-draining conditions. If conditions other than those assumed above are anticipated, the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical engineer. Surcharge loading effects from the adjacent structures should be evaluated by the geotechnical and structural engineers. Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. The outlet pipe should be sloped to drain to a suitable outlet. Typical wall drainage design is illustrated on Figure 3. It should be noted that the recommended subdrain does not provide protection against seepage through the face of the wall and/or efflorescence. Efflorescence is generally a white crystalline powder (discoloration) that results when water, which contains soluble salts, migrates over a period of time through the face of a retaining wall and evaporates. If such seepage or efflorescence is undesirable, retaining walls should be waterproofed to reduce this potential.

Lateral earth pressures are provided as equivalent fluid unit weights, in psf/ft of depth or pcf. These values do not contain an appreciable factor of safety. A soil unit weight of 120 pcf may be assumed for calculating the actual weight of soil. For sliding resistance, a friction coefficient of 0.35 may be used at the concrete and soil interface. Wall footings should be designed in accordance with structural considerations. Refer to Sections 4.2.2 for passive resistance and allowable soil bearing, respectively.

4.4 Preliminary Pavement Recommendations

Based on an assumed R-value of 15, we recommend the following preliminary minimum street sections for Traffic Indices of 5 and 6 (Table 4). These recommendations should be confirmed with R-value testing of representative near-surface soils at the completion of grading. Final street sections should be confirmed by the project civil engineer based upon the projected Traffic Index. In addition, additional sections can be provided based on other traffic indices.

TABLE 4
Preliminary Pavement Design Sections

Assumed Traffic Index	5	6
R-Value Subgrade	15	15
AC Thickness	3.0 inches	3.5 inches
Base Thickness	8.0 inches	10.0 inches

Portland Cement Concrete Pavement (PCCP) may be designed using a minimum of 6-inches of Portland cement concrete over 4-inches of compacted aggregate base. The modulus of rupture of the concrete should be a minimum of 500 pounds per square inch (psi) at 28 days. Contraction joints should be placed at maximum 15-foot spacing. Where the outer edge of a concrete pavement connects to an asphalt pavement, the concrete slab should be thickened by 50 percent at a taper not to exceed a slope of 1 in 10. This section is only applicable for passenger car driveway areas and should be thickened if heavy truck loading is anticipated. In addition, additional sections can be provided based on other desired anticipated traffic loadings.

Aggregate base should conform to the requirements of the latest edition of the Standard Specifications for Public Works Construction ("Greenbook"). Aggregate base should be compacted to a minimum of

95 percent relative compaction over subgrade compacted to a minimum of 90 percent relative compaction per ASTM- D1557.

4.5 Corrosivity to Concrete and Metal

The National Association of Corrosion Engineers (NACE) defines corrosion as "a deterioration of a substance or its properties because of a reaction with its environment." From a geotechnical viewpoint, the "environment" is the prevailing foundation soils and the "substances" are the reinforced concrete foundations or various buried metallic elements such as rebar, piles, pipes, etc., which are in direct contact with or within close vicinity of the foundation soil.

In general, soil environments that are detrimental to concrete have high concentrations of soluble sulfates and/or pH values of less than 5.5. ACI 318R-14 Table 19.3.1.1, provides specific guidelines for the concrete mix design when the soluble sulfate content of the soils exceeds 0.1 percent by weight or 1,000 ppm. The minimum amount of chloride ions in the soil environment that are corrosive to steel, either in the form of reinforcement protected by concrete cover, or plain steel substructures such as steel pipes or piles, is 500 ppm per California Test 532.

Based on site soil testing, the onsite soils are classified as having a S0 exposure class (negligible) sulfate condition in accordance with ACI 318R-14 Table 19.3.1.1. As a preliminary recommendation due to results of sulfate content testing, concrete in contact with onsite soils should be designed in accordance with ACI 318R-14 Table 19.3.1.1 for the negligible category. It is also our opinion that onsite soils should be considered very corrosive to buried metals. The client and/or other members of the design team should consider this potential as they determine necessary. LGC is not a corrosion consultant and does not provide recommendations related to corrosion.

4.6 Nonstructural Concrete Flatwork

Concrete flatwork (such as walkways, bicycle trails, etc.) have a high potential for cracking due to changes in soil volume related to soil-moisture fluctuations because these slabs are typically much thinner than foundation slabs and are not reinforced with the same dynamic as foundation elements. To reduce the potential for excessive cracking and lifting, concrete should be designed in accordance with the minimum guidelines outlined in Table 5. These guidelines will reduce the potential for irregular cracking and promote cracking along construction joints but will not eliminate all cracking or lifting. Thickening the concrete and/or adding additional reinforcement will further reduce cosmetic distress.

TABLE 5
Nonstructural Concrete Flatwork

	Homeowner Sidewalks	Private Drives	Patios/Entryways	City Sidewalk Curb and Gutters
Minimum Thickness (in.)	4 (nominal)	5 (full)	5 (full)	City/Agency Standard
Presaturation	Wet down	Presoak to 12 inches	Presoak to 12 inches	City/Agency Standard
Reinforcement	—	No. 3 at 24 inches on centers	No. 3 at 24 inches on centers	City/Agency Standard
Thickened Edge	—	8" x 8"	—	City/Agency Standard
Crack Control	Saw cut or deep tool joint to a minimum of 1/3 the concrete thickness	Saw cut or deep tool joint to a minimum of 1/3 the concrete thickness	Saw cut or deep tool joint to a minimum of 1/3 the concrete thickness	City/Agency Standard
Maximum Joint Spacing	5 feet	10 feet or quarter cut whichever is closer	6 feet	City/Agency Standard
Aggregate Base	—	2	2	City/Agency Standard

4.7 Control of Surface Water and Drainage

Positive drainage of surface water away from structures is very important. No water should be allowed to pond adjacent to buildings. Positive drainage may be accomplished by providing drainage away from buildings at a gradient of at least 5 percent for a distance of at least 10 feet, and further maintained by a swale or drainage path at a gradient of at least 2 percent. Where necessary, drainage paths may be shortened by use of area drains and collector pipes.

Planters with open bottoms adjacent to buildings should be avoided. Planters should not be designed adjacent to buildings unless provisions for drainage, such as catch basins, liners, and/or area drains, are made. Overwatering must be avoided.

4.8 Construction Observation and Testing

The recommendations provided in this report are based on limited subsurface observations and geotechnical analysis. The interpolated subsurface conditions should be checked in the field during construction by a representative of LGC.

Construction observation and testing should also be performed by the geotechnical consultant during future grading, excavations, backfill of utility trenches, foundation or retaining wall construction or when an unusual soil condition is encountered at the site. Grading plans, foundation plans, and final project drawings should be reviewed by this office prior to construction.

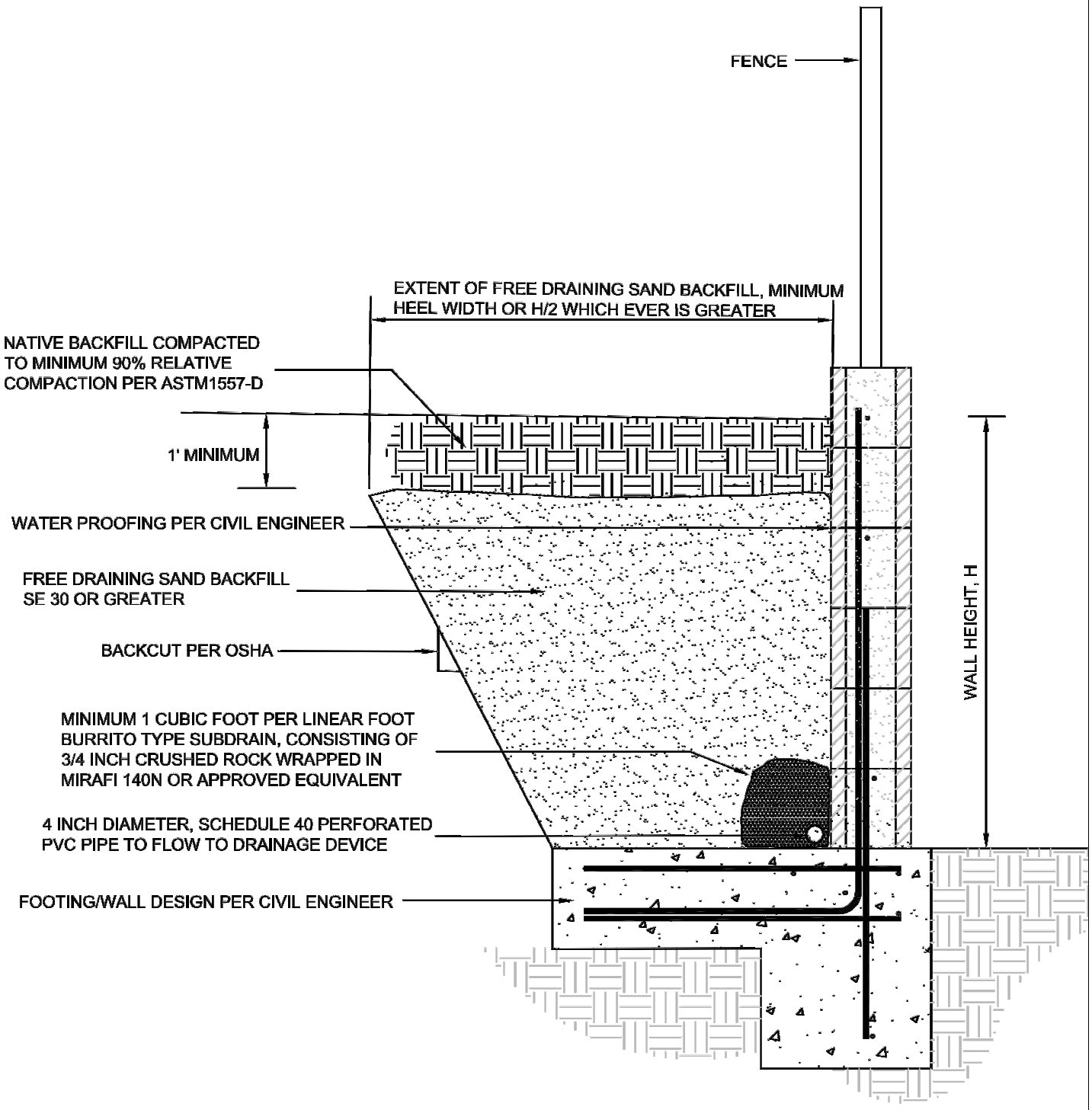
5.0 LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report. The samples taken and submitted for laboratory testing, the observations made, and the in-situ field testing performed are believed representative of the entire project; however, soil and geologic conditions revealed by excavation may be different than our preliminary findings. If this occurs, the changed conditions must be evaluated by the project soils engineer and geologist and design(s) adjusted as required or alternate design(s) recommended.

This report is issued with the understanding that it is he responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and/or project engineer and incorporated into the plans, and the necessary steps are taken to see that the contractor and/or subcontractor properly implements the recommendations in the field. The contractor and/or subcontractor should notify the owner if they consider any of the recommendations presented herein to be unsafe.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control.



LGC	**Figure 2: Retaining Wall Detail Sand Backfill** **Veluzat Property, City of Santa Clarita, California**		
		Project Name	Golden Valley
		Project No.	203003-01
		Eng. / Geol.	ACR/MCH/NLK
		Scale	not to scale
		Date	November 2020

APPENDIX A

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APPENDIX B

EXPLORATION LOGS

Test Pit Logs TP-1 through TP-10

And

Boring Logs B-LGC-LB and B-LGC-1 through B-LGC-3

Geotechnical Boring Log LB-1

Date:	9/15/2020		**Page:** 1 of 3
Project Name:	Veluzat/LDC-Golden Valley		**Project Number:** 203003-01
Drilling Company:	Tri-Valley		**Type of Rig:** Bucket Auger
Drive Weight:			**Drop:** 12" **Hole Dia:** 24"
Elevation of Top of Hole:	1716+/-		**Hole Location:**

Elevation (ft)	Depth (ft)	Attitudes	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION
								Logged By: NLK/MCH Sampled By: NLK
1716	0							**Top Soil:** 0'-Medium brown to dark brown, sandy SILT, dry, soft to medium stiff; roots, some gravel, porous. **Saugus Formation/Sunshine Ranch Member (Tsr):**
			Bulk 1 (1-5')					1'- Pale yellow-brown SILTSTONE, dry, hard; granitic cobbles, roots present, weathered.
1711	5		R1	1 4	101.2	10.9		5.5'- Same as above, caliche, root hairs.
								7.5'- Medium brown SILTSTONE, dry, hard; gradational contact into CLAYSTONE with gravel and caliche, paleosol.
1706	10		R2	3 5	110.6	5.8		9.0'- Pale yellow SILTSTONE, dry to damp, hard; grading into very fine to coarse SANDSTONE.
		Channel: N60E/34SE and N55E/36NW	Bulk 2 (10-15')					11'- Orange-brown gravel SANDSTONE conglomerate, dry to damp, very dense; minor carbonate development.
		Channel: N10E/40NW and E/34S						13'- Dark gray clayey SILTSTONE, damp, hard; caliche, roots, channel attitudes:N55E/36NW N60E/34SE.
1701	15		R3	3 4	107.7	14.7		14'- Pale gray medium to very coarse SANDSTONE, dry to damp, dense; roots, cross-cutting channel: N10E/40NW and E/34S.
								15.5'- Dark brown-gray clayey SILTSTONE with caliche.
		Channel: N47E/64NW and S55W/36SW						17.5'- Pale yellow-orange medium to very coarse gravel SANDSTONE conglomerate, roots, cemented; gradational contact, channel attitudes: N47E/64NW and S55W/36SW.
1696	20		R4	4 6	108.6	11.3		18.7'- Pale yellow SILSTONE grading into dark brown-gray CLAYSTONE, damp, hard; pencil sized roots observed.
								19.5'-Light brown sandy SILTSTONE with pebbles.
		B:N14E/7NW	B-1					20'- Very Dense/Hard; no roots observed.
								21'- Caliche.
		B:N20E/8SE						22'- Dark brown to reddish-brown CLAYSTONE; caliche, paleosol, gradational contact, B:N14E/7NW.
1691	25		R5	10 13 for 1"	119.9	3.8		24'- Light gray, very coarse SANDSTONE; B: N20E/8SE.
			Bulk 3 (22-27')					26'- Light gray cemented gravel.
								27'- Pale yellow-orange silty very fine sand grading into gravel/cobble conglomerate; cemented.
1686	30							

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Geotechnical Boring Log LB-1

Date:	9/15/2020		**Page: 2 of 3**
Project Name:	Veluzat/LDC-Golden Valley		**Project Number: 203003-01**
Drilling Company:	Tri-Valley		**Type of Rig: Bucket Auger**
Drive Weight:			**Drop: 12"** **Hole Dia: 24"**
Elevation of Top of Hole:	1716		**Hole Location:**

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: NLK/MCH Sampled By: NLK
1686	30			R6	23 27 for 3"	115.2	3.1		30'- interbedded yellow-brown and orange fine to coarse SANDSTONES.
				Bulk 4 (28-32')					
1681	35		B:N40E/8NW	R7	11 21	123.8	12.3		34.5'- Medium to dark brown clayey SILTSTONE; gradational contact, B: N40E/8NW.
			B:N12W/7SW	B-2					36.5'- Reddish-brown to red-purple CLAYSTONE, internally sheared, very steeply diping non plannar shears, B: N12W/7SW.
									39.5'- Medium brown SILTSTONE.
1676	40			R8	13 40	128.9	9.1		40.5'- Caliche.
				Bulk 5 (35-40')					42'- Yellow-brown very fine SANDSTONE.
									43.5'- Caliche.
1671	45			R9	7 14	110.8	19.3		44'- Medium brown-gray SILTSTONE.
			B:N30E/6NW						46'- Reddish-brown CLAYSTONE; caliche, paleosol, gradational contact, B: N30E/6NW.
									47'- Brown-gray SILTSTONE.
									48.5'- Caliche.
1666	50			R10	23 20	136.3	2.8		50'- Pale yellow very fine SANDSTONE; cemented.
									52'-Dark brown-gray SILTSTONE.
			B:N30E/14NW						53'- B:N30E/14NW
1661	55			R11	18 21 for 1"	112	13.2		56'- Yellow-gray silty fine SANDSTONE; gradational contact.
									58'- Dark brown-gray clayey SILTSTONE, caliche.
1656	60								

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Geotechnical Boring Log LB-1

Date:	9/15/2020		**Page:** 3 of 3
Project Name:	Veluzat/LDC-Golden Valley		**Project Number:** 203003-01
Drilling Company:	Tri-Valley		**Type of Rig:** Bucket Auger
Drive Weight:			**Drop:** 12" **Hole Dia:** 24"
Elevation of Top of Hole:	1716		**Hole Location:**

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: NLK/MCH Sampled By: NLK
1656	60			R12	15 23	123.0	11.9		60'- Interbedded yellow-gray and orange-brown fine to coarse SANDSTONE. 62'- Brown-gray SILTSTONE, caliche. 63.5'- Brown-gray silty CLAYSTONE transitioning to reddish gray color.
1651	65		B:N35E/14NW	R13	8 25	106.2	21		66'- Reddish brown silty CLAYSTONE; caliche at base, paleosol, transition to unoxidized, B: N35E/14NW. 67'- Blue-gray clayey SILTSTONE grading into dark brown-gray silty CLAYSTONE (4-6" thick).
1646	70			R14	13 34	127.9	7.9		68'- Blue-gray SILTSTONE;damp, hard; unoxidized, darkening with depth, massive. 70'- Same as above with gravel.
1641	75			R15	16 32	124.2	11.5		75'- Same as above, flecks of white.
1636	80			R16	22 32	115.8	16.7		80'- Same as above, Dark blue-gray.
1631	85								Total Depth 80.0' No groundwater encountered Backfilled 9/15/2020
1626	90								

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Geotechnical Boring Log B-LGC-1

Date: 10/6/2020	**Page: 1 of 1**
Project Name: Veluza/LDC Golden Valley	**Project Number:** 203003-01
Drilling Company: Choice Drilling	**Type of Rig:** Hollow Stem
Drive Weight: 140lbs	**Drop:** 30" **Hole Dia:** 8"
Elevation of Top of Hole: 1583+/-	**Hole Location:**

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: NLK Sampled By: NLK	Type of Test
1583	0							Topsoil: 0'-Medium to dark brown sandy SILT with gravel, dry, soft; rooted	
								Saugus Formation-Sunshine Ranch Member(Tsr): 2'- Pale yellow medium brown sandy SILTSTONE, dry, soft to medium stiff	
1578	5		SPT1	5 7 11				5'- Pale yellow brown silty fine to medium coarse SANDSTONE, dry, medium dense; some gravel 6'- Same as above with less gravel	
1573	10		SPT2	50/6				10'- Same as above, poor recovery, broken cobble in sampler, broken cobbles in cuttings, difficult to drill	
1568	15		SPT3	11 8 7				15'- Light to medium brown medium to very coarse SANDSTONE with some gravel, damp, medium dense 19'- Damp to moist	
1563	20		SPT4	8 6 6				20'- Same as above with caliche	
1558	25		SPT5	9 12 14				25'- Same as above, abundant caliche	
	30							Total Depth 26.5' No groundwater encounter, rechecked after 24hrs Backfilled 10/7/2020	

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Geotechnical Boring Log B-LGC-2

Date:	10/6/2020	**Page:**	1 of 2
Project Name:	Veluza/LDC Golden Valley	**Project Number:**	203003-01
Drilling Company:	Choice Drilling	**Type of Rig:**	Hollow Stem
Drive Weight:	140lbs	**Drop:** 30"	**Hole Dia:** 8"
Elevation of Top of Hole:	1585+/-	**Hole Location:**	

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: NLK Sampled By: NLK	Type of Test
1585	0							<u>Saugus Formation-Sunshine Ranch Member(Tsr):</u> 0'- Pale yellow to light brown silty SANDSTONE	
1580	5		R1	18 50/6"				5'- Pale yellow to medium brown sandy SILTSTONE, dry to damp, hard; roots present, some pores observed 7'- Same as above, broken cobbles in cuttings, difficult to drill	
1575	10		R2	18 28 36				10'- Light brown to olive gray SILSTONE, dry to damp, hard; abundant caliche, stains from decomposed roots, no pores observed	
1570	15		R3	18 24 42				15'- Same as above, no roots observed, some rust coloration	
1565	20		R4	80/6"				20'- Olive green to gray clayey SILSTONE, damp to moist, hard; calich/ carbonate nodules, no pores observed	
1560	25		R5	38 50/5"				25'- Same as above 27'- Dark brown to olive green CLAYSTONE, damp to moist, hard; abundant caliche	
1555	30								

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Geotechnical Boring Log B-LGC-2

Date:	10/6/2020	**Page:**	1 of 2
Project Name:	Veluza/LDC Golden Valley	**Project Number:**	203003-01
Drilling Company:	Choice Drilling	**Type of Rig:**	Hollow Stem
Drive Weight:	140lbs	**Drop:** 30"	**Hole Dia:** 8"
Elevation of Top of Hole:	1585+/-	**Hole Location:**	

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: NLK Sampled By: NLK	Type of Test
1585	0							<u>Saugus Formation-Sunshine Ranch Member(Tsr):</u> 0'- Pale yellow to light brown silty SANDSTONE	
1580	5		R1	18 50/6"				5'- Pale yellow to medium brown sandy SILTSTONE, dry to damp, hard; roots present, some pores observed 7'- Same as above, broken cobbles in cuttings, difficult to drill	
1575	10		R2	18 28 36				10'- Light brown to olive gray SILSTONE, dry to damp, hard; abundant caliche, stains from decomposed roots, no pores observed	
1570	15		R3	18 24 42				15'- Same as above, no roots observed, some rust coloration	
1565	20		R4	80/6"				20'- Olive green to gray clayey SILSTONE, damp to moist, hard; calich/ carbonate nodules, no pores observed	
1560	25		R5	38 50/5"				25'- Same as above 27'- Dark brown to olive green CLAYSTONE, damp to moist, hard; abundant caliche	
1555	30								

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Geotechnical Boring Log B-LGC-3

Date: 10/6/2020	**Page: 1 of 1**
Project Name: Veluza/LDC Golden Valley	**Project Number:** 203003-01
Drilling Company: Choice Drilling	**Type of Rig:** Hollow Stem
Drive Weight: 140lbs	**Drop:** 30" **Hole Dia:** 8"
Elevation of Top of Hole: 1587+/-	**Hole Location:**

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: NLK Sampled By: NLK	Type of Test
1587	0							Saugus Formation-Sunshine Ranch Member(Tsr): 0'- Reddish to medium brown, sandy SILSTONE, dry ,soft to medium stiff; some gravel, roots present	
1582	5		R1	28 38 43				5'- Medium brown gravelly sandy SILTSTONE, dry to damp,hard; porous in top half of sampler, minor caliche	
								8'- same as above, color change to pale yellow to light brown; no pores observed	
1577	10		R2	32 22 44				10'- Pale yellow to light brown silty veryfine to medium SANDSTONE, dry to damp, dense	
1572	15		R3	38 50/6"				15'- Pale yellow to very light gray mottled with rusty orange medium to very coarse SANDSTONE, dry to damp, very dense; cemented	
1567	20		R4	50/6"				20'- Olive green to gray sandy SILSTONE or silty fine SANDSTONE, damp, hard/very dense, rusty orange stains, slightly cemented	
	25							Total Depth 20' No groundwater observed Percolation well set. 3" perforated PVC with gravel and bentonite cap at 17' and solid pvc to surface with native soil backfilled annulus to surface.	
	30								

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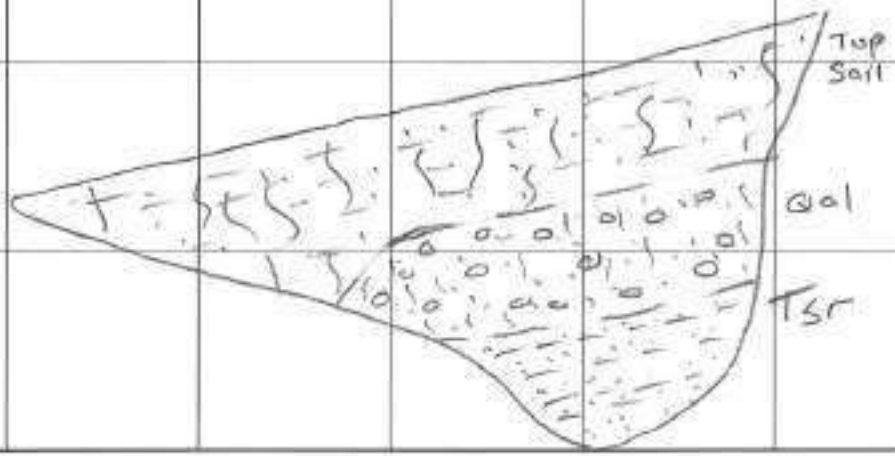
LOG OF TRENCH: LGC-TP-1

Project Name:	Veluzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES			
Project Number:	203003-01	Elevation:	1583'+/-				
Equipment:	Backhoe	Location/Grid:					

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
massive	Topsoil: 0-3.0': Dark brown to gray brown sandy SILT, dry, soft to medium stiff; heavily rooted, very porous Quaternary Alluvium (Qal): 3.0-7.0': Medium to dark brown cobble-rich gravelly SAND, dry, medium dense to dense; abundant root hairs, very porous, weathered Tertiary Saugus formation-Sunshine Ranch member (Tsr): 7.0-11.0': Pale brown interbedded sandy SILTSTONE and silty fine to medium SANDSTONE, approximately 4-6" beds, damp, hard/very dense; staining from decomposed roots, minor caliche 9': no pores observed	Topsoil Qal Tsr					

GRAPHICAL REPRESENTATION: East side of test pit	SCALE: 1"=5'	SURFACE SLOPE: 13N	TREND: N24W



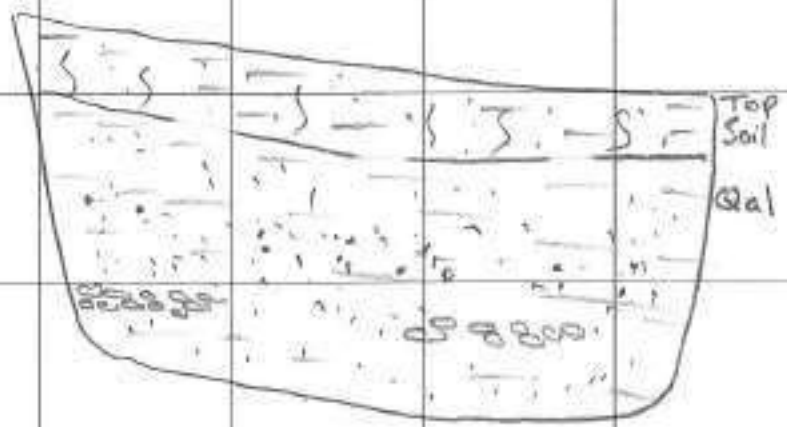
Total Depth = 11 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-2

Project Name:	Veluzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES			
Project Number:	203003-01	Elevation:	1580'+/-				
Equipment:	Backhoe	Location/Grid:					

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	Topsoil: 0-2': Dark brown to gray medium to coarse sandy SILT, dry, soft; very porous, animal burrows, heavily rooted		Topsoil				
massive	Quaternary Alluvium (Qal): 2.0-T.D.: Pale yellow to medium brown interbedded silty SAND and sandy GRAVEL beds, dry to damp, firmness increases with depth, porous to bottom of trench 7': discontinuous cobble bed		Qal				

GRAPHICAL REPRESENTATION: West side of test pit | SCALE: 1"=5' | SURFACE SLOPE: 5N | TREND: N70W



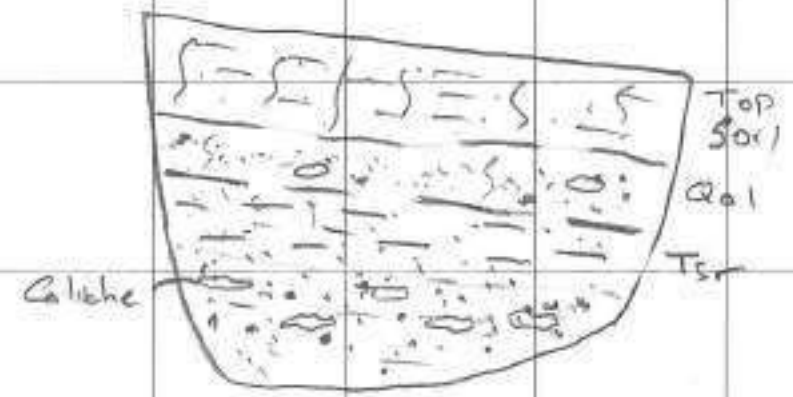
Total Depth = 9 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-3

Project Name:	Veluzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES			
Project Number:	203003-01	Elevation:	1585'+/-				
Equipment:	Backhoe	Location/Grid:					

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
massive	Topsoil: 0-2.5': Dark brown to gray brown sandy SILT, dry, soft to medium stiff; heavily rooted, very porous Quaternary Alluvium (Qal): 2.5': Light brown silty SAND with gravel, dry medium stiff; porous, rooted, some cobbles present Tertiary Saugus formation-Sunshine Ranch member (Tsr): 4.0': Light brown sandy SILT, dry to damp, medium stiff to stiff; some root hairs, porous, weathered 4.5': Density change noted by operator, less porous 6.0'-T.D.: Light brown to gray silty gravelly SANDSTONE, dry to damp, medium dense to dense; root hairs present, caliche, weathered, slightly porous 8.5': No pores observed	Topsoil Qal Tsr					

GRAPHICAL REPRESENTATION: West side of test pit | SCALE: 1"=5' | SURFACE SLOPE: 8N | TREND: N30W



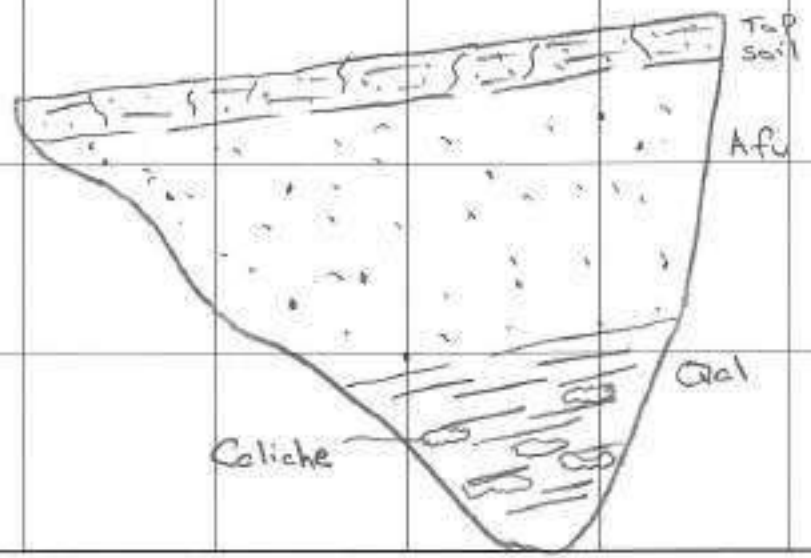
Total Depth = 9 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-4

Project Name:	Veluzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES			
Project Number:	203003-01	Elevation:	1585' +/-				
Equipment:	Backhoe	Location/Grid:					

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	Topsoil: 0-1': Medium to dark brown, sandy SILT, dry very soft to soft; pebble rich, rooted, porous		Topsoil				
	Artificial fil- undocumented (Afu): 1-8': Medium brown silty SAND with gravel; dry to damp, medium dense; abundant gypsum		Afu				
	Quaternary Alluvium (Qal): 8.0-13.5': Mottled medium gray and dark brown silty sandy CLAY, moist; gypsum 9'- T.D.: Abundant caliche		Qal				
	Recommend total removal of all Afu and Qal						

GRAPHICAL REPRESENTATION: East side of test pit	SCALE: 1"=5'	SURFACE SLOPE: 7N	TREND: N31E



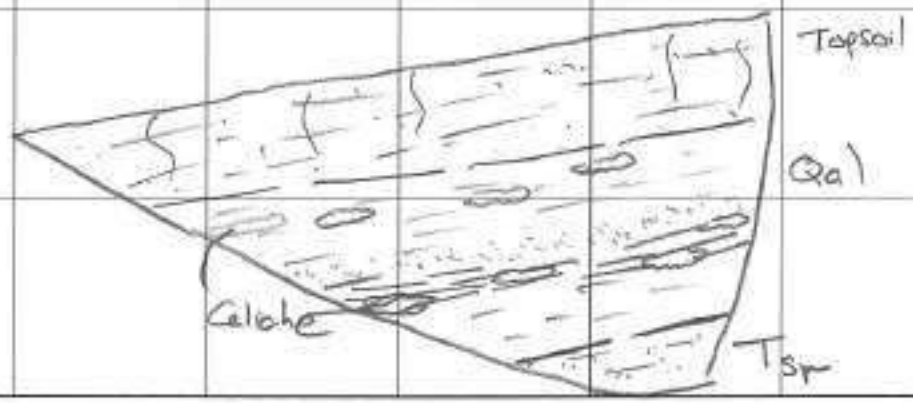
Total Depth = 13.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-5

Project Name:	Veluzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES			
Project Number:	203003-01	Elevation:	1590'+/-				
Equipment:	Backhoe	Location/Grid:					

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	Topsoil: 0-2.5': Medium to dark brown, sandy silty CLAY, dry to damp, soft, blocky soils, heavily rooted, +6" cobbles present Quaternary Alluvium (Qal): 2.5': Pale yellow to light gray SILT with caliche, damp to moist, soft to medium stiff; iron oxidation, root hairs, porous 4.5': Light orange to brown, very fine SAND, moist, medium dense; decomposed roots 5.0': Pale yellow to white-gray sandy silty CLAY with caliche, moist, soft; decomposed roots 5.5': Brown gray sandy SILT with caliche, moist medium stiff to stiff; pores present Tertiary Saugus formation-Sunshine Ranch member (Tsr): 8.5-T.D.: Mottled Orange and brown, silty medium to coarse SANDSTONE, moist, dense; no roots observed in cutting, very few pores, contractor noted density change; Minimum removal depth recommended 9'		Topsoil Qal Tsr				

GRAPHICAL REPRESENTATION:	SCALE: 1"=5'	SURFACE SLOPE: 9 N	TREND: N5E



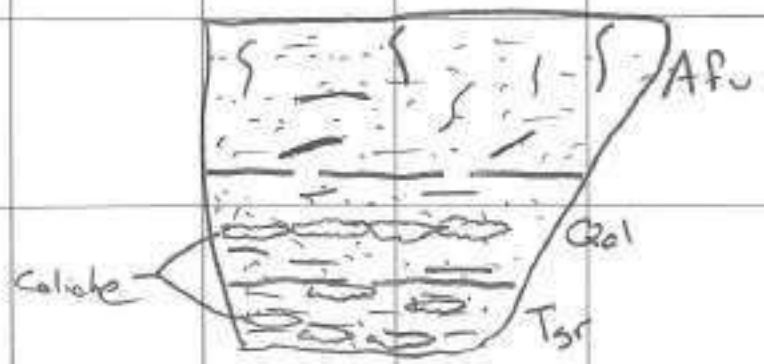
Total Depth = 9.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-6

Project Name:	Veluzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES			
Project Number:	203003-01	Elevation:	1595'+/-				
Equipment:	Backhoe	Location/Grid:					

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
		Artificial fil- undocumented (Afu): 0-4': Dark brown silty SAND, dry to damp, loose to medium dense; buried roots and brush	Afu				
		Quaternary Alluvium (Qal): 4-6.5': Mottled pale yellow and light brown with gray gravel rich silty SAND with clay nodules, damp to moist, medium dense; cobble rich, abundant root hairs, porous 5.5': Caliche rich layer	Qal				
massive		Tertiary Saugus formation-Sunshine Ranch member (Tsr): 6.5-T.D.: Medium gray to olive gray sandy SILTSTONE, damp to moist, hard, caliche rich, 7': No pores observed Minimum recommended removal depth 7'	Tsr				

GRAPHICAL REPRESENTATION: West side of test pit	SCALE: 1"=5'	SURFACE SLOPE: Flat	TREND: N16W

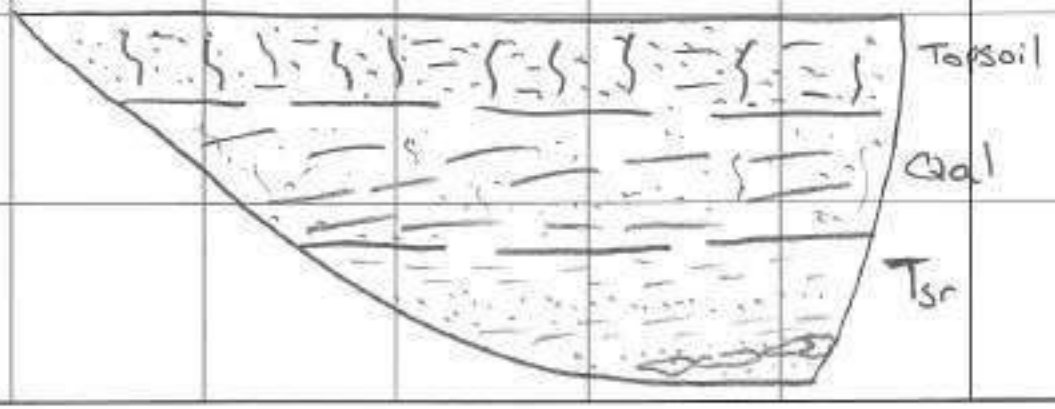


Total Depth = 8.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-7

Project Name:	Veluzat/LDC		Logged by:	NLK		ENGINEERING PROPERTIES			
Project Number:	203003-01		Elevation:	1605'+/-					
Equipment:	Backhoe		Location/Grid:						
GEOLOGIC ATTITUDES	DATE:	9/18/20	DESCRIPTION:	Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	Topsoil: 0-2.5': Dark brown to dark gray clayey silty SAND, dry, loose to medium dense; heavily rooted, blocky Quaternary Alluvium (Qal): 2.5': Dark brown to gray sandy CLAY, moist to wet, soft to medium stiff; calcium carbonate stringers, abundant root hairs, few pores observed, weathered Tertiary Saugus formation-Sunshine Ranch member (Tsr): 6.0'-9.5': Light brown to pale gray interbedded sandy SILTSTONE and medium to coarse SANDSTONE, damp to moist, hard/dense; no pores observed 8.0' -T.D.: Caliche rich lens Minimum removal depth recommended 7'				Topsoil Qal Tsr				

GRAPHICAL REPRESENTATION: East side of test pit | SCALE: 1"=5' | SURFACE SLOPE: Flat | TREND: N40E



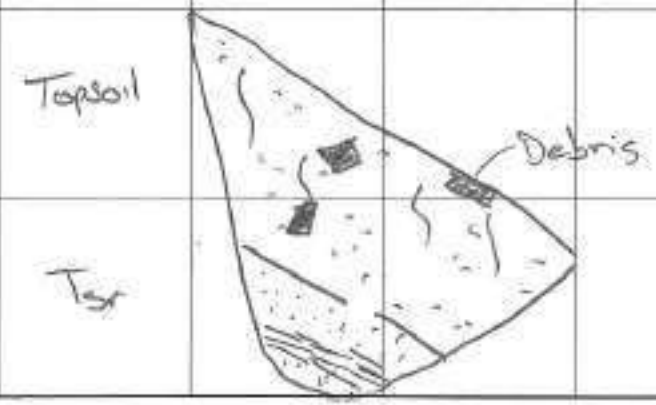
Total Depth = 9.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-8

Project Name:	Veluzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES			
Project Number:	203003-01	Elevation:	1695'+/-				
Equipment:	Backhoe	Location/Grid:					

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	Topsoil: 0-6.0': Brown to dark brown silty SAND, dry, medium dense to dense; heavily rooted, porous, abundant construction debris at surface and near surface		Topsoil				
massive	Tertiary Saugus formation-Sunshine Ranch member (Tsr): 6-10' 6.0-10.0': Orange brown silty SANDSTONE, dry, dense to very dense; heavily weathered, few pores 8.0'- T.D.: Dark brown CLAYSTONE lens approximately 10inches thick, heavily weathered, stains from decomposed roots		Tsr				

GRAPHICAL REPRESENTATION: East side of test pit	SCALE: 1"=5'	SURFACE SLOPE: 7N	TREND: N31E



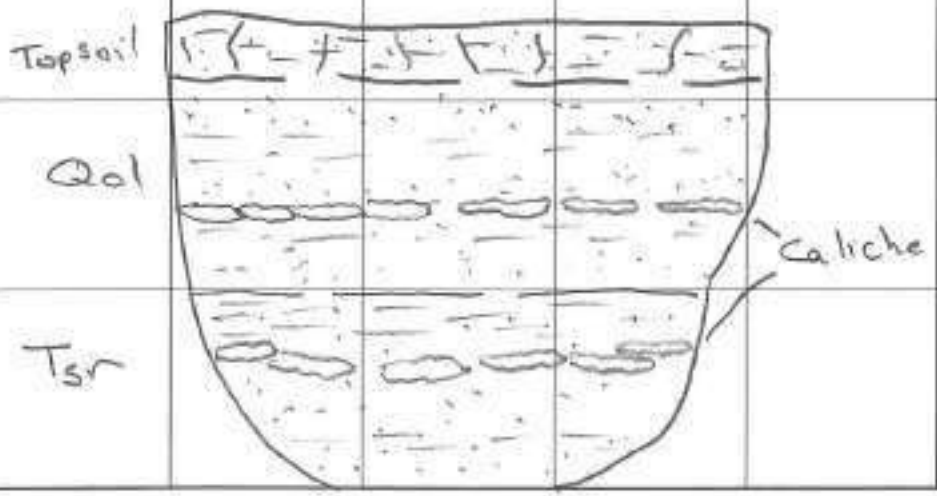
Total Depth = 10 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-9

Project Name:	Veluzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES			
Project Number:	203003-01	Elevation:	1615' +/-				
Equipment:	Backhoe	Location/Grid:					

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
massive	Topsoil: 0-1.5': Medium to dark brown sandy SILT, dry, soft to medium stiff; heavily rooted, very porous Quaternary Alluvium (Qal): 1.5-7.0': Light brown interbedded sandy SILT and silty SANDS, dry to damp, medium stiff/medium dense; carbonate stringers, porous 5.0': Caliche rich cobble lens Tertiary Saugus formation-Sunshine Ranch member (Tsr): 7.0-12.0': Light brown to olive gray interbedded sandy SILTSTONE and silty SANDSTONE, dry to damp, hard/very dense 8.0': Abundant caliche 10.0': Minor pores still present 11.5': No pores observed, some carbonate stringers present Minimum recommended removal depth 12'		Topsoil Qal Tsr				

GRAPHICAL REPRESENTATION: West side of test pit | SCALE: 1"=5' | SURFACE SLOPE: Flat | TREND: N14W



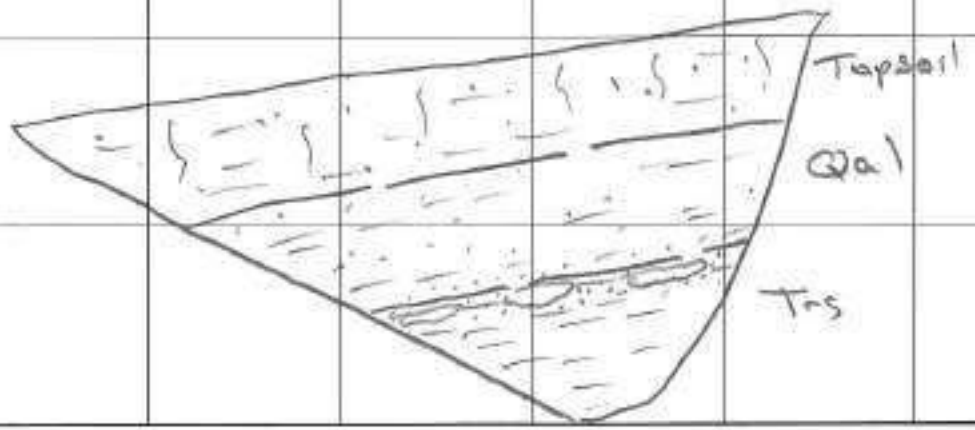
Total Depth = 12 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-10

Project Name:	Veluzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES			
Project Number:	203003-01	Elevation:	1605'+/-				
Equipment:	Backhoe	Location/Grid:					

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
massive	Topsoil: 0-2.0': Dark brown gravelly sandy SILT, dry, soft to medium stiff; heavily rooted, very porous, blocky soil Quaternary Alluvium (Qal): 2.0-6.0': Medium brown to olive-gray interbedded silty SAND and sandy SILT, damp, stiff/dense; root hairs, slightly porous Tertiary Saugus formation-Sunshine Ranch member (Tsr): 6.0-7.0': Medium brown to olive gray sandy SILTSTONE, damp, hard; caliche 7.0-10.0': Medium brown to olive gray SILTSTONE, damp, hard, weathered, abundant caliche at upper contact Minimum recommended removal depth 7-8'	Topsoil Qal Tsr				

GRAPHICAL REPRESENTATION: East side of test pit | SCALE: 1"=5' | SURFACE SLOPE: 9N | TREND: N20W



Total Depth = 11 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

APPENDIX C

Laboratory Testing Results by EGLAB, Inc.

Laboratory testing was performed by EGLAB, Inc. The laboratory testing program was directed towards providing quantitative data relating to the relevant engineering properties of the soils. Samples considered representative of site conditions were tested in general accordance with ASTM procedure and/or California Test Methods (CTM), where applicable. The following summary is a brief outline of the test type and the results are presented on the following pages.

LGC has reviewed the laboratory test data, procedures and results performed by EGL with respect to the subject site and concurs with and accepts responsibility as geotechnical engineer of record for their work (laboratory testing).

Moisture and Density Determination Tests: Moisture content (ASTM D2216) and dry density determinations (ASTM D2937) were performed on relatively undisturbed samples obtained from the test borings and/or trenches. The results of these tests are presented in the boring logs. Where applicable, only moisture content was determined from undisturbed or disturbed samples.

Grain Size Distribution: Representative samples were dried, weighed, and soaked in water until individual soil particles were separated (per ASTM D421) and then washed on a No. 200 sieve. The portion retained on the No. 200 sieve was dried and then sieved on a U.S. Standard brass sieve set in accordance with ASTM D422 (CTM 202).

Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined in accordance with ASTM Test Method D4318 for engineering classification of fine-grained material.

Soil Classification: Soils were classified according the Unified Soil Classification System (USCS) in accordance with ASTM Test Methods D2487 and D2488. This system uses relies on the Atterberg Limits and grain size distribution of a soil. The soil classifications (or group symbol) are shown on the laboratory test data, and boring logs.

Expansion Index: The expansion potential of selected samples were evaluated by the Expansion Index Test, U.B.C. Standard No. 18-2 and/or ASTM D4829. Specimens are molded under a given compactive energy to approximately the optimum moisture content and approximately 50 percent saturation or approximately 90 percent relative compaction. The prepared 1-inch-thick by 4-inch-diameter specimens are loaded to an equivalent 144 psf surcharge and are inundated with tap water until volumetric equilibrium is reached.

Maximum Density Tests: The maximum dry density and optimum moisture content of typical materials were determined in accordance with ASTM D1557.

Consolidation: Consolidation tests were performed on selected, relatively undisturbed ring samples (Modified ASTM Test Method D2435). Samples (2.42 inches in diameter and 1 inch in height) were placed in a consolidometer and increasing loads were applied. The samples were allowed to consolidate under "double drainage" and total deformation for each loading step was recorded. The percent consolidation for each load step was recorded as the ratio of the amount of vertical compression to the original sample height.

Corrosion Testing: Chloride content was tested in accordance with Caltrans Test Method (CTM) 422. The soluble sulfate contents of selected samples were determined by standard geotechnical methods (CTM 417). The soluble sulfate content is used to determine the appropriate cement type and maximum water-cement ratios. The test results are presented in the table below: Minimum resistivity and pH tests were performed in general accordance with CTM 643 and standard geochemical methods. The electrical resistivity of a soil is a measure of its resistance to the flow of electrical current. As a result, as soil's resistivity decreases corrosivity increases.

SUMMARY OF TEST RESULTS

PROJECT NAME: Veluzat / LDC

EGLAB JOB No.: 20-059-011

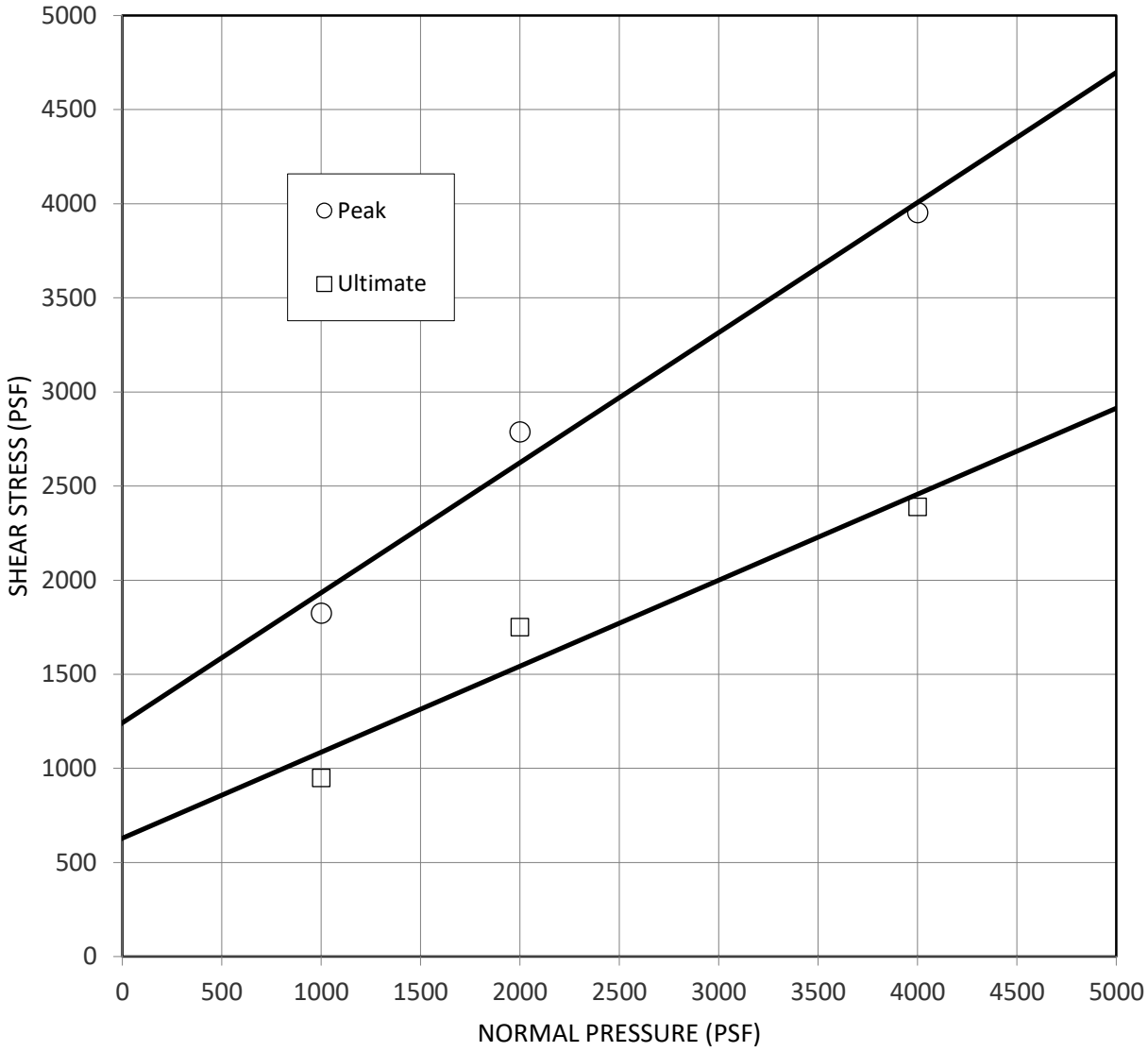
PROJECT No.: 203003-01

CLIENT: LGC Valley, Inc.

DATE: 10/8/2020

SUMMARIZED BY: JT

Boring No.	Sample No.	Depth (ft)	pH CalTrans 643	Chloride Content CalTrans 422 (ppm)	Sulfate Content CalTrans 417 (% by weight)	Minimum Resistivity CalTrans 643 (ohm-cm)	Expansion Index ASTM D 4829
LB-1	Bulk-3	22.0-27.0	8.07	700	0.027	390	98



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
LB-1	R-9	45.0	Ring	Bedrock	○	1242	35
					□	629	25

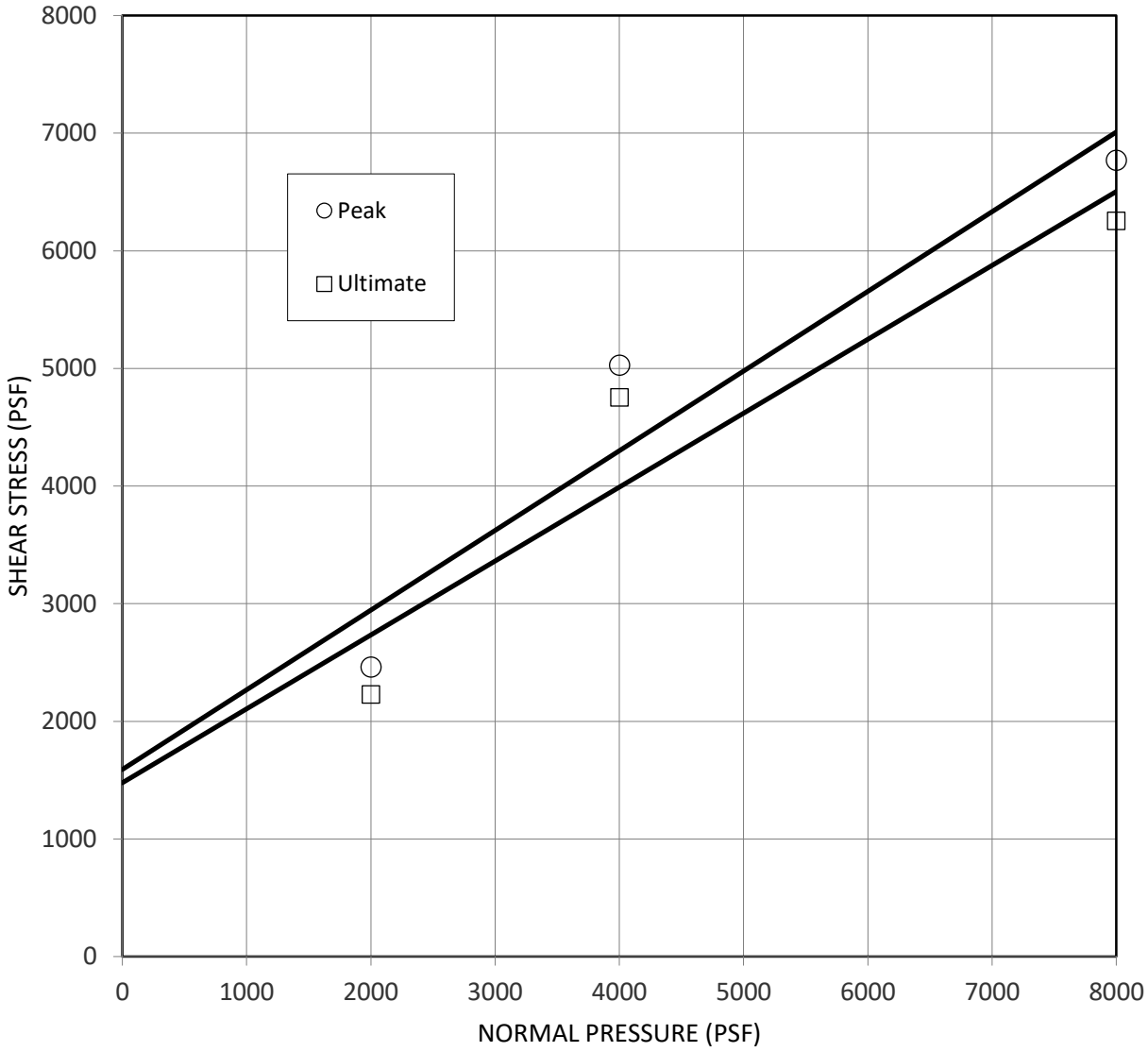
Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
1000	19.3	27.0
2000	19.3	23.7
4000	19.3	23.2

EGLAB, INC.

Project Name:
Veluzat / LDC
Client: LGC Valley, Inc.
Project No.: 203003-01
EGLAB Project No.: 20-059-011

DIRECT SHEAR

10/20 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
LB-1	R-10	50.0	Ring	Bedrock	○	1590	34
					□	1478	32

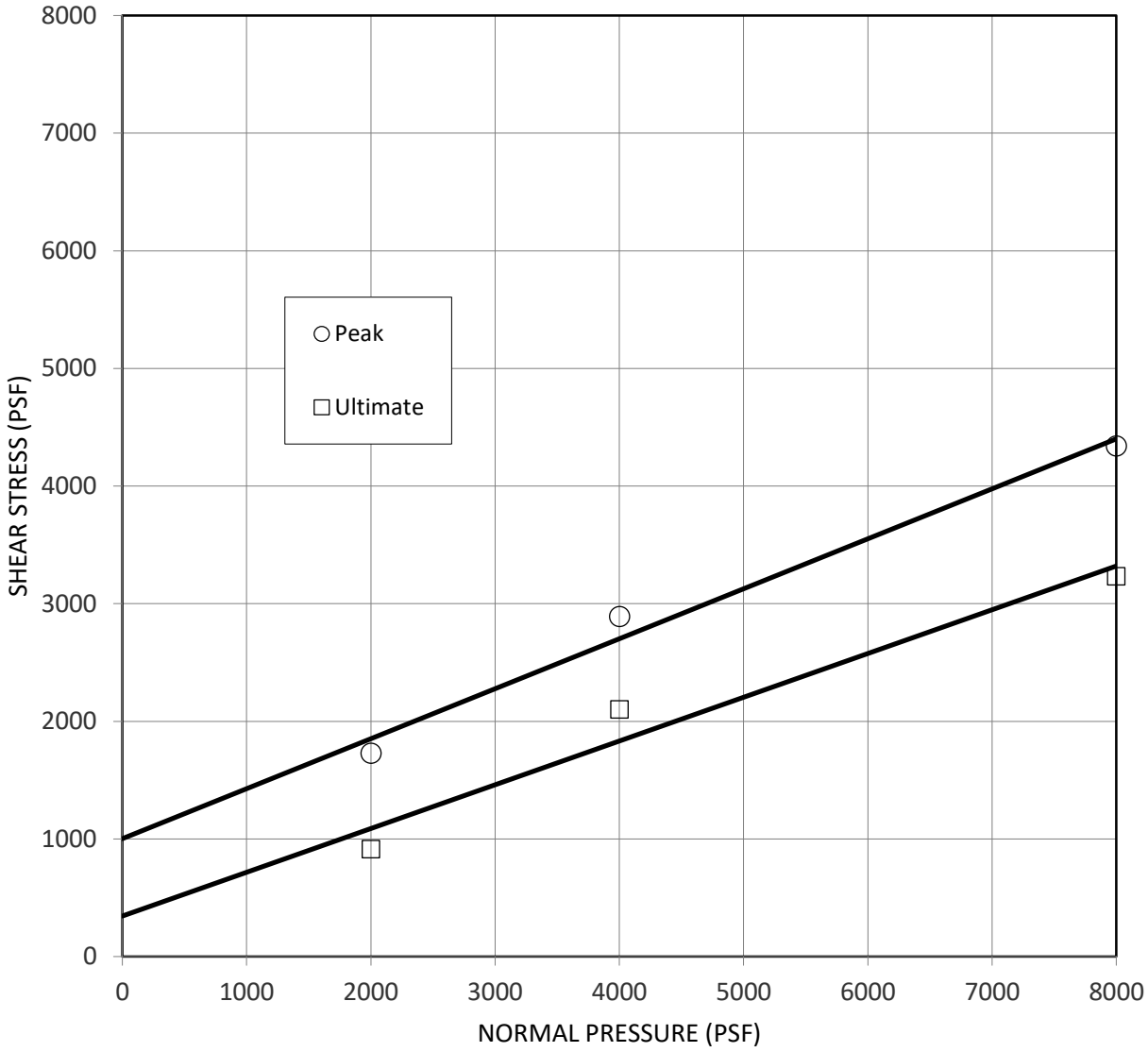
Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
2000	2.8	14.5
4000	2.8	12.0
8000	2.8	11.3

EGLAB, INC.

Project Name:
Veluzat / LDC
Client: LGC Valley, Inc.
Project No.: 203003-01
EGLAB Project No.: 20-059-011

DIRECT SHEAR

10/20 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
LB-1	R-13	65.0	Ring	Bedrock	○	1004	23
					□	346	20

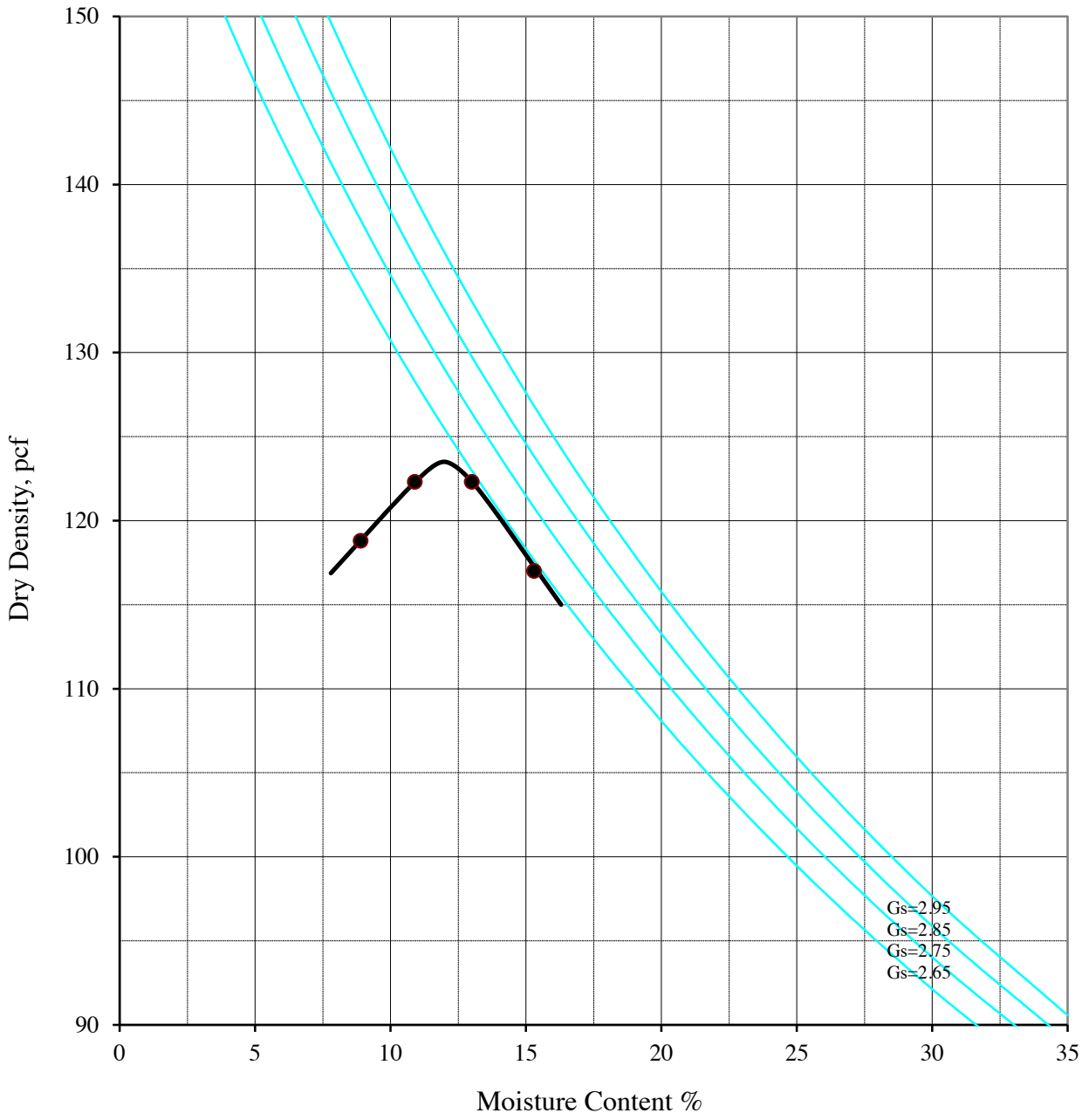
Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
2000	21.0	30.9
4000	21.0	31.4
8000	21.0	27.8

EGLAB, INC.

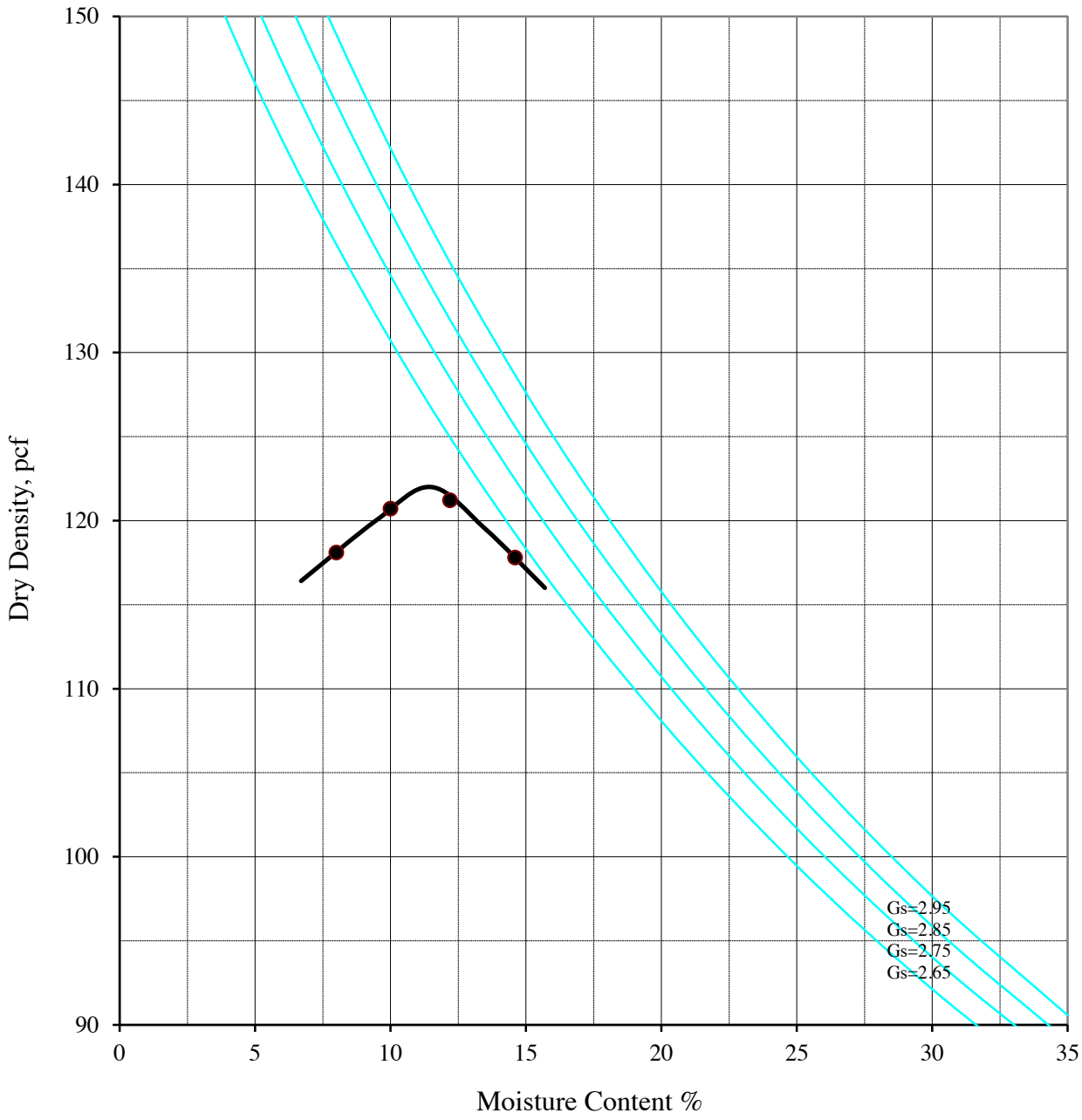
Project Name:
Veluzat / LDC
Client: LGC Valley, Inc.
Project No.: 203003-01
EGLAB Project No.: 20-059-011

DIRECT SHEAR

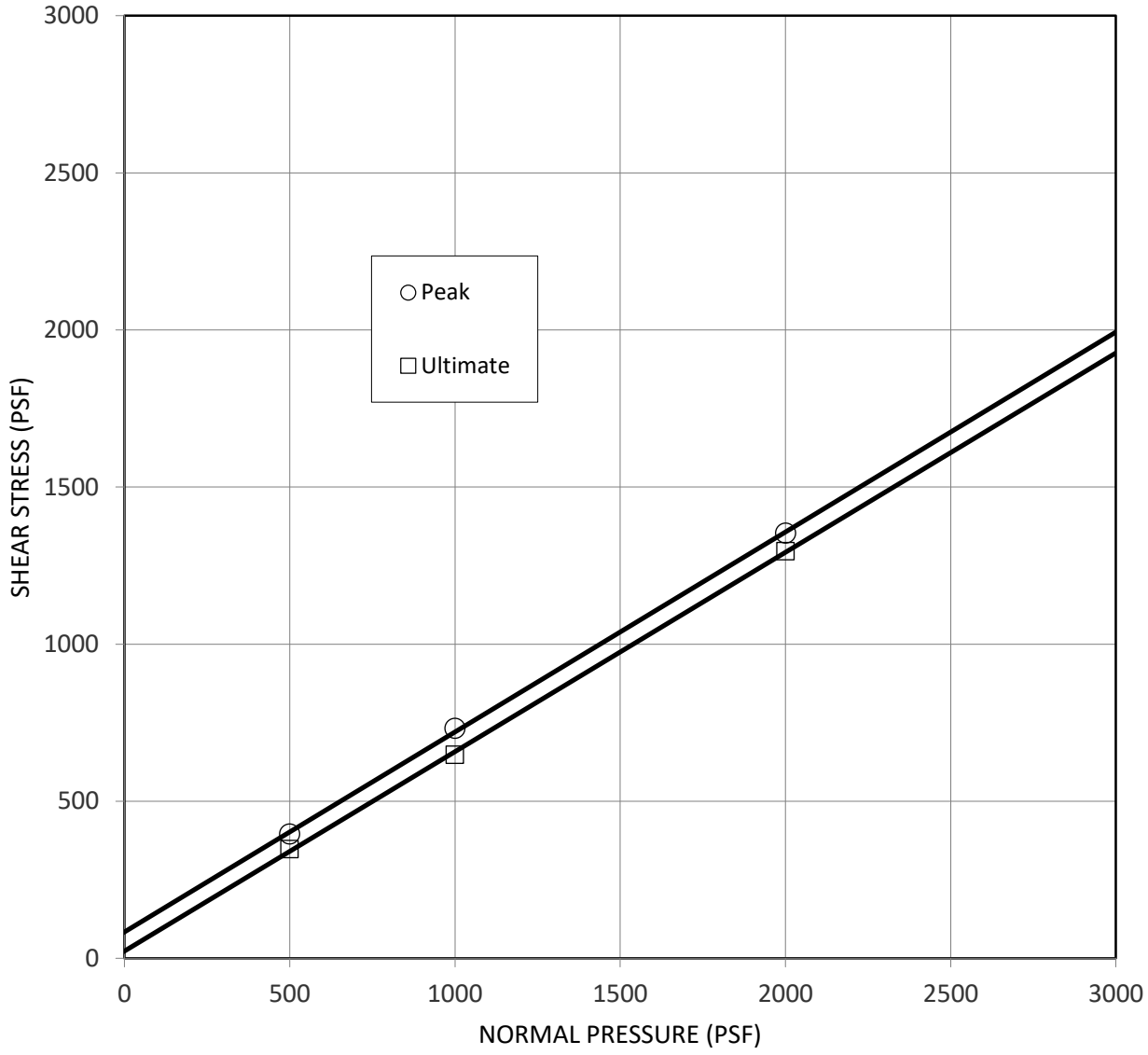
10/20 (ASTM D3080) Figure



Maximum Dry Density = 123.5 pcf Optimum Moisture Content = 12.0 %	Boring No: LB-1 Sample: Bulk-2 Depth : 35.0-40.0 feet Description : Clayey sand (SC), olive brown, trace of gravel
EGLAB, INC.	Project Name: Veluzat / LDC Client Name: LGC Valley, Inc.
Modified Proctor **(ASTM D1557)**	Job No.: 203003-01 EGLAB Project No.: 20-059-011 Date : Oct-20 Figure



Maximum Dry Density = 122.0 pcf Optimum Moisture Content = 11.5 %	Boring No: LB-1 Sample: Bulk-5 Depth : 35.0-40.0 feet Description : Sandy clay (CL), brown, few gravel
EGLAB, INC.	Project Name: Veluzat / LDC Client Name: LGC Valley, Inc.
Modified Proctor **(ASTM D1557)**	Job No.: 203003-01 EGLAB Project No.: 20-059-011 Date : Oct-20 Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
LB-1	Bulk-2	10.0-15.0	Bulk	SC	○	85	32
					□	24	32

Note: Sample was remolded to **90 %** maximum relative density and optimum moisture

Maximum Dry Density: **123.5 pcf** Optimum Moisture: **12.0 %**

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
500	12.0	21.3
1000	12.0	20.6
2000	12.0	19.8

EGLAB, INC.

Project Address:
Veluzat / LDC

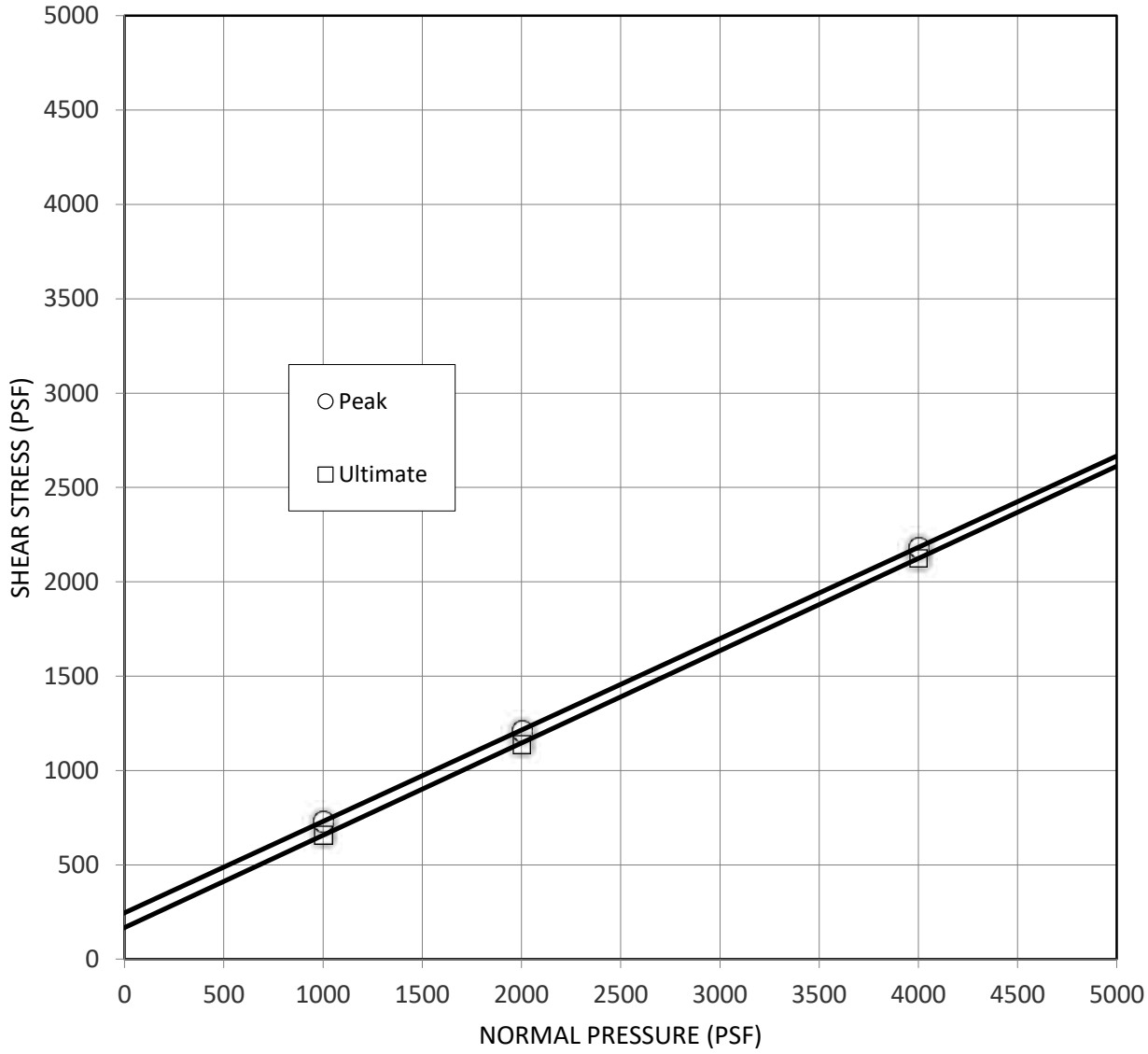
Client: LGC Valley, Inc.

Project No.: 203003-01

EGLAB Project No.: 20-059-011

DIRECT SHEAR

10/20 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
LB-1	Bulk-5	35.0-40.0	Bulk	CL	○	246	26
					□	167	26

Note: Sample was remolded to **90 %** maximum relative density and optimum moisture

Maximum Dry Density: **122.0 pcf** Optimum Moisture: **11.5 %**

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
1000	11.5	24.0
2000	11.5	22.3
4000	11.5	21.6

EGLAB, INC.

Project Address:
Veluzat / LDC

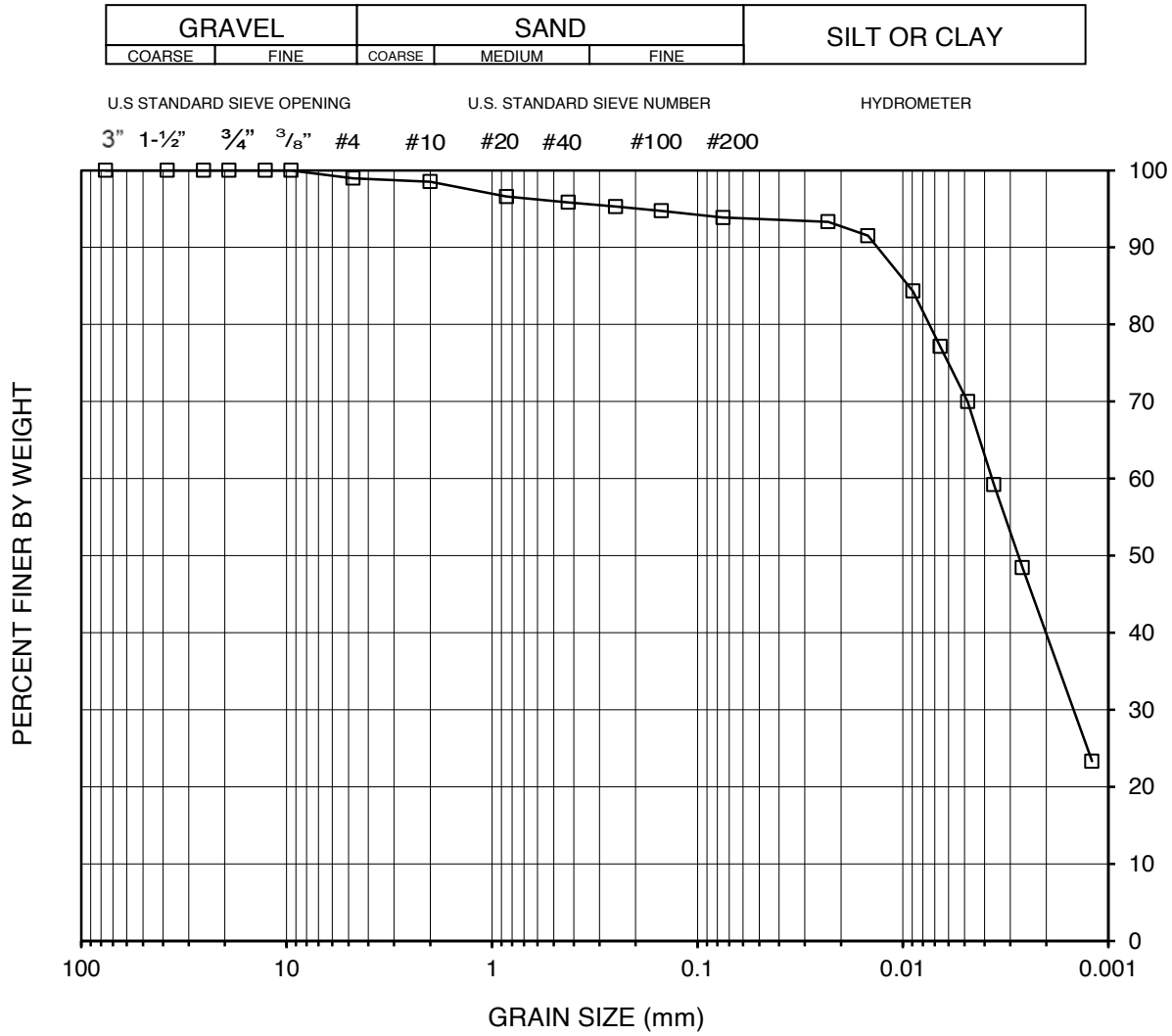
Client: LGC Valley, Inc.

Project No.: 203003-01

EGLAB Project No.: 20-059-011

DIRECT SHEAR

10/20 (ASTM D3080) Figure



SYMBOL	BORING No.	SAMPLE ID.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	LB-1	B-2	36.5	Bag	CH	61	35

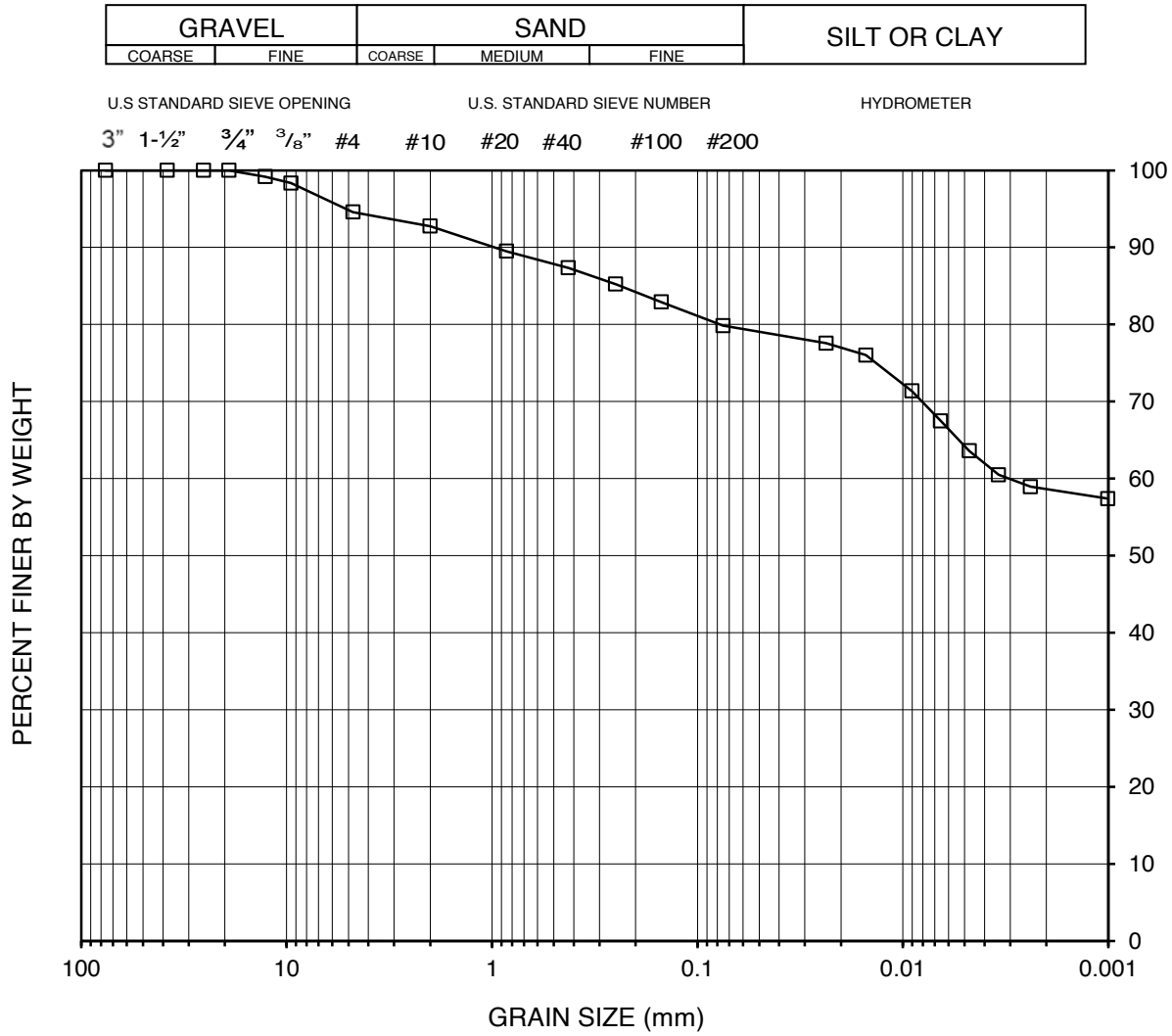
Clay	70.7%
Sand	6.1%
Silt	23.2%

EGLAB, INC.

Project Name: Veluzat / LDC
Client: LGC Valley, Inc.
Job No.: 203003-01
EGLAB Project No.: 20-059-011

GRAINSIZE DISTRIBUTION CURVE

10/15/20 (ASTM D422) FIGURE



SYMBOL	BORING No.	SAMPLE ID.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	LB-1	B-1	22.0	Bag	CH	60	40

Clay	64.2%
Sand	20.1%
Silt	15.7%

EGLAB, INC.

Project Name: Veluzat / LDC
Client: LGC Valley, Inc.
Job No.: 203003-01
EGLAB Project No.: 20-059-011

GRAINSIZE DISTRIBUTION CURVE

10/15/20 (ASTM D422) FIGURE

SUMMARY OF LABORATORY TEST RESULTS

PROJECT NAME: Veluzat / LDC

EGLAB JOB NO.: 20-059-011

PROJECT NO.: 203003-01

CLIENT: LGC Valley, Inc.

DATE: 10/9/2020

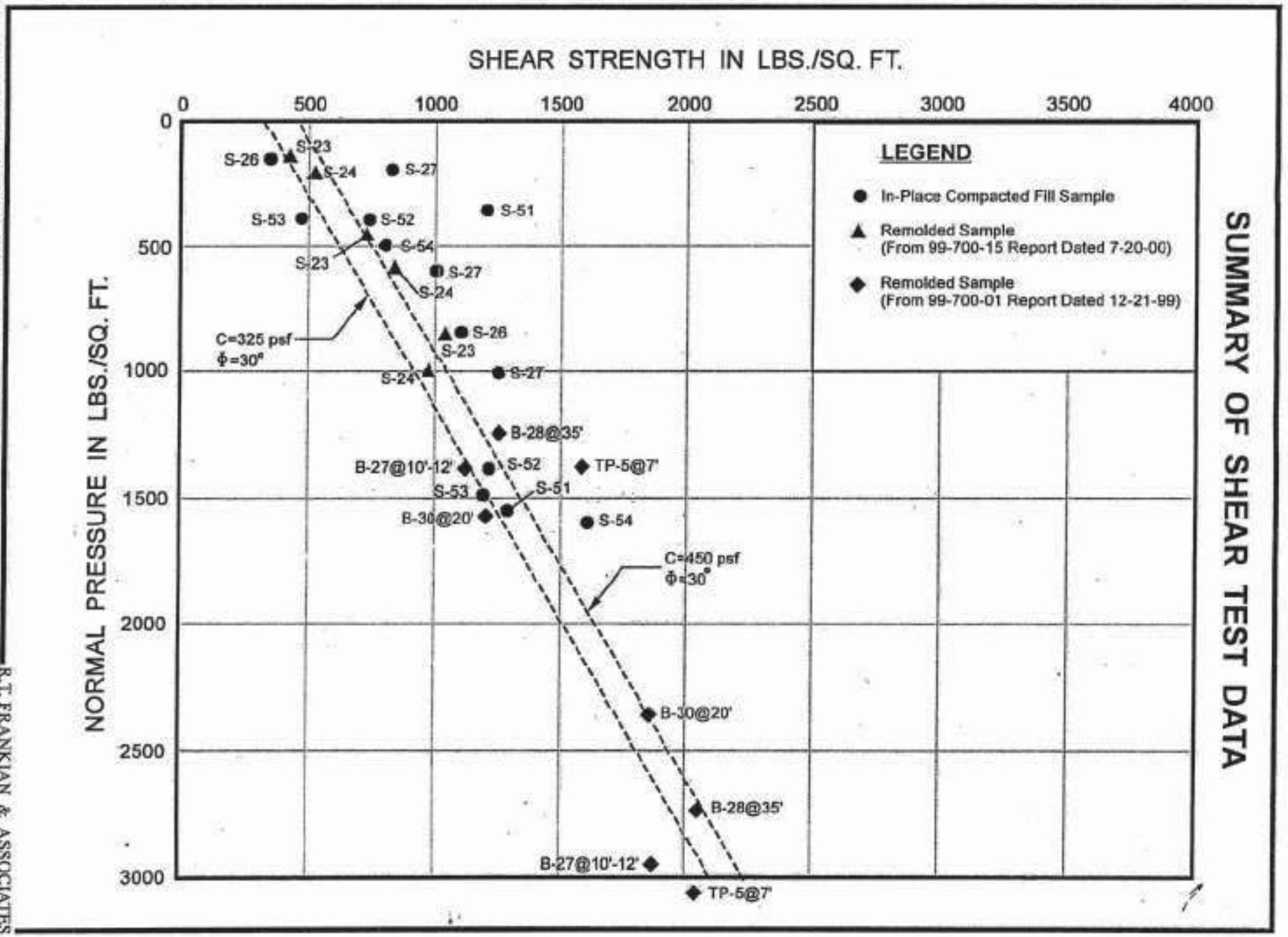
SUMMARIZED BY: JT

BORING NO.	SAMPLE NO.	DEPTH (in.)	MOISTURE CONTENT ASTM D2216 (%)	DRY DENSITY ASTM D2937 (PCF)	ATTERBERG LIMITS ASTM D4318 *(LL,PL,PI)
LB-1	R-1	5.0	10.9	101.2	
LB-1	R-2	10.0	5.8	110.6	
LB-1	R-3	15.0	14.7	107.7	
LB-1	R-4	20.0	11.3	108.6	
LB-1	B-1	22.0			60,20,40
LB-1	R-5	25.0	3.8	119.9	
LB-1	R-6	30.0	3.1	115.2	
LB-1	R-7	35.0	12.3	123.8	
LB-1	B-2	36.5			61,26,35
LB-1	R-8	40.0	9.1	128.9	
LB-1	R-9	45.0	19.3	110.8	
LB-1	R-10	50.0	2.8	136.3	
LB-1	R-11	55.0	13.2	112.0	
LB-1	R-12	60.0	11.9	123.0	
LB-1	R-13	65.0	21.0	106.2	
LB-1	R-14	70.0	7.9	127.9	
LB-1	R-15	75.0	11.5	124.2	
LB-1	R-16	80.0	16.7	115.8	

*LL,PL,PI = LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX

APPENDIX D

Laboratory Testing by Others



SUMMARY OF SHEAR TEST DATA

99-700-20 REPORT DATED 01-06-03

R.T. FRANKIAN & ASSOCIATES

FIGURE 6

20 feet. The sample was previously included in our grading plan review (RTF&A, 1999b) but was not indicated as being from within the Pacoima Formation. The shear strength parameters are summarized in the following table.

MATERIAL	COHESION (psf)	ANGLE OF SHEARING RESISTANCE (degrees)
Landslide failure plane and clay bedding plane material (Multiple Shear)	200	10
Clay bedding plane material	250	18
Landslide failure plane and clay bedding plane material (Peak for Seismic Analysis)	375	19
Saugus Formation cross bedding	600	32
Alluvium	350	28
Compacted fill	450	30
Pacoima Formation cross bedding	300	30
Compacted fill (upper 5 feet on slopes)	325	30

CORROSIVITY

Samples of onsite soils were obtained during our previous field investigation and were tested by M. J. Schiff. A copy or their findings and test results, as well as their recommendations was previously presented in our grading plan review (RTF&A, 1999b). A copy of their report is also included in Appendix C of this report. It is recommended that additional samples be obtained for corrosion testing as part of future site-specific development.

GRADING RESULTS

Field density tests were accepted only where the tests indicated that at least the required compaction of the soil had been obtained. Any areas in which tests were not

APPENDIX E

Percolation Testing

Excavation Percolation Testing Field Log

Date 10/7/2020

Project Location Veluzat Property- Golden Valley
Earth Description Clayey Silts and Clayey Sands
Tested by NLK
Liquid Description Clean Clear Water
Measurement Method Sounder

Boring/Test Number B-LGC-3
Diameter of Boring 8" **Diameter of Casing** 3"
Depth of Boring 20'
Depth to Invert of BMP 17'
Depth to Water Table Unknown
Depth to Initial Water Depth (d_1) 16.25'

Time Interval Standard
Start Time for Pre-Soak 2:00PM 10/6/2020
Start Time for Standard 8:05 AM

Water Remaining In Boring (Y/N) Yes
Standard Time Interval Between Readings 30 minute

Reading Number	Time Start/End (hh:mm)	Elapsed Time Δtime (mins)	Water Drop During Standard Time Interval Δd (inches)	Percolation Rate for Reading (in/hr)	Soil Description/Notes/Comments
1	8:05am 8:35am	30	.6	1.20	
2	8:35am 9:05am	30	.84	1.68	
3	9:09am 9:39am	30	.96	1.92	
4	9:40am 10:10am	30	.96	1.92	
5	10:12am 10:42am	30	.60	1.20	
6	10:45am 11:15am	30	.72	1.44	
7	11:17am 11:47am	30	.84	1.68	
8	11:50am 12:20pm	30	.84	1.68	
9	12:23pm 12:53pm	30	.84	1.68	
10	12:55pm 1:25pm	30	.84	1.68	Stabilized Percolation rate

APPENDIX F

Slope Stability Analyses

1.0 Approach

- Slope stability analyses were conducted using the computer program Slope W. The Modified Bishop's Method was used to analyze rotational failure modes and the Janbu Method was used to evaluate translational failure modes. A coefficient of horizontal acceleration, Kh of 0.15 (FS of 1.1) was used to evaluate the pseudostatic stability analyses.

2.0 Design Shear Strength

The shear strength parameters used in the slope stability analysis are presented in Table F-1.

TABLE F-1
Design Shear Strength Parameters for Slope Stability Analyses

Material	**Cohesion (lb/ft^2)**		**Angle of Internal Friction (Degrees)**		**Saturated Bulk Density (lb/ft^3)**
	Ultimate	**Peak**	**Ultimate**	**Peak**	
Engineered Fill (Af)	325	-	30	-	120
Alluvium (Qal)	350	-	28	-	120
Bedrock/Saugus Formation (Tsr) Along Bedding	250	375	18	19	125
Bedrock/Saugus Formation (Tsr) Cross Bedding	600	-	32	-	125

TABLE F-2
Summary of Slope Stability Analyses

Cross-Section	Condition	Factor of Safety	Remarks
A-A'	Global Stability, Rotational, Static	1.99	Modified Bishop Method
A-A'	Global Stability, Rotational, Pseudostatic	1.42	Modified Bishop Method
A-A'	Global Stability, Translational, Static	1.66	Simplified Janbu Method
A-A'	Global Stability, Translational, Pseudostatic	1.18	Simplified Janbu Method
B-B'	Global Stability, Rotational, Static	2.34	Modified Bishop Method
B-B'	Global Stability, Rotational, Pseudostatic	1.70	Modified Bishop Method
B-B'	Global Stability, Translational, Static	1.75	Simplified Janbu Method
B-B'	Global Stability, Translational, Pseudostatic	1.32	Simplified Janbu Method
D-D'	Upper Slope, Rotational, Static	2.43	Modified Bishop Method
D-D'	Upper Slope, Rotational, Pseudostatic	1.65	Modified Bishop Method
D-D'	Lower Slope, Rotational, Static	1.89	Modified Bishop Method
D-D'	Lower Slope, Rotational, Pseudostatic	1.39	Modified Bishop Method
D-D'	Upper Slope, Translational, Static	2.28	Simplified Janbu Method
D-D'	Upper Slope, Translational, Pseudostatic	1.56	Simplified Janbu Method
D-D'	Lower Slope, Translational, Static	1.91	Simplified Janbu Method
D-D'	Lower Slope, Translational, Pseudostatic	1.39	Simplified Janbu Method
E-E'	Rapid Drawdown, Rotational, Static	1.97	Modified Bishop Method
E-E'	Rapid Drawdown, Rotational, Pseudostatic	1.40	Modified Bishop Method
E-E'	Rapid Drawdown, Translational, Static	1.50	Simplified Janbu Method
E-E'	Rapid Drawdown, Translational, Pseudostatic	1.12	Simplified Janbu Method
H-H'	Global Stability, Rotational, Static	2.18	Modified Bishop Method
H-H'	Global Stability, Rotational, Pseudostatic	1.58	Modified Bishop Method
H-H'	Global Stability, Translational, Static	1.62	Simplified Janbu Method
H-H'	Global Stability, Translational, Pseudostatic	1.22	Simplified Janbu Method
O-O'	Global Stability, Rotational, Static	2.49	Modified Bishop Method
O-O'	Global Stability, Rotational, Pseudostatic	1.80	Modified Bishop Method
O-O'	Global Stability, Translational, Static	1.78	Simplified Janbu Method
O-O'	Global Stability, Translational, Pseudostatic	1.36	Simplified Janbu Method
P-P'	Global Stability, Rotational, Static	2.01	Modified Bishop Method
P-P'	Global Stability, Rotational, Pseudostatic	1.48	Modified Bishop Method
P-P'	Global Stability, Translational, Static	1.51	Simplified Janbu Method
P-P'	Global Stability, Translational, Pseudostatic	1.16	Simplified Janbu Method
Q-Q'	Global Stability, Rotational, Static	2.61	Modified Bishop Method
Q-Q'	Global Stability, Rotational, Pseudostatic	1.91	Modified Bishop Method
Q-Q'	Global Stability, Translational, Static	1.99	Simplified Janbu Method
Q-Q'	Global Stability, Translational, Pseudostatic	1.43	Simplified Janbu Method
Q-Q'	Lower Slope, Translational, Static	1.97	Simplified Janbu Method
Q-Q'	Lower Slope, Translational, Pseudostatic	1.42	Simplified Janbu Method

Section A-A Tr 68203 SSA.gsz 11/06/2020 10:49:39 AM

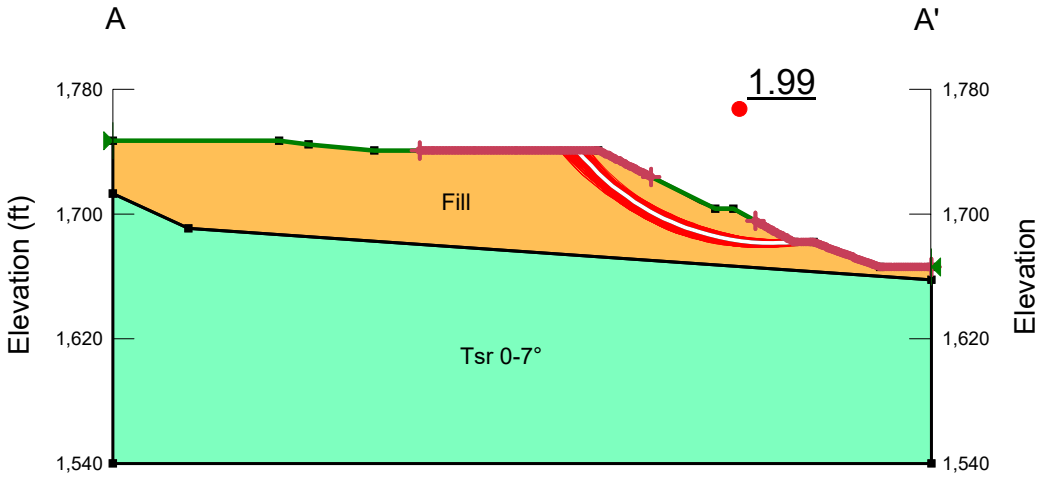
Section A-A Tr 68203 SSA.gsz

1 -Rotational Static Global

Horz Seismic Coef.: 0

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 0-7°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-7°
C-Anisotropic Strength Fn.: Tsr 250 bedding 0-7°



LGC

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Static Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 711
Date: 11/06/2020
Time: 10:49:39 AM
Tool Version: 10.1.0.18696
File Name: Section A-A Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/06/2020
Last Solved Time: 10:49:48 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Static Global

Kind: SLOPE/W
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 0-7°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-7°
C-Anisotropic Strength Fn.: Tsr 250 bedding 0-7°
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (196.90652, 1,740.8652) ft
Left-Zone Right Coordinate: (345.29809, 1,723.8283) ft
Left-Zone Increment: 80
Right Type: Range
Right-Zone Left Coordinate: (412.30905, 1,695.3607) ft
Right-Zone Right Coordinate: (525.146, 1,665.7748) ft
Right-Zone Increment: 80
Radius Increments: 14

Slip Surface Limits

Left Coordinate: (0.03953, 1,746.9781) ft
Right Coordinate: (525.146, 1,665.7748) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 18° bedding 0-7°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (0, 1)
- Data Point: (0.1, 0.5625)
- Data Point: (7, 0.5625)

Data Point: (7.01, 1)

Tsr 250 bedding 0-7°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (0, 1)
Data Point: (0.1, 0.4167)
Data Point: (7, 0.4167)
Data Point: (7.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	492.09114 ft	1,665.7748 ft
Point 2	525.146 ft	1,665.7748 ft
Point 3	525.146 ft	1,539.7155 ft
Point 4	0.03953 ft	1,539.7155 ft
Point 5	0.03953 ft	1,713.0176 ft
Point 6	0.03953 ft	1,746.9781 ft
Point 7	106.82845 ft	1,746.9781 ft
Point 8	125.69538 ft	1,744.5631 ft
Point 9	167.9573 ft	1,740.8652 ft
Point 10	311.4969 ft	1,740.8652 ft
Point 11	386.36087 ft	1,703.1313 ft
Point 12	398.05837 ft	1,703.1313 ft
Point 13	437.22611 ft	1,681.774 ft
Point 14	449.75375 ft	1,681.774 ft
Point 15	48.62654 ft	1,690.7021 ft
Point 16	525.146 ft	1,657.6545 ft

Regions

	Material	Points	Area
Region 1	Tsr 0-7°	4,3,16,15,5	71,952 ft²
Region 2	Fill	5,15,16,2,1,14,13,12,11,10,9,8,7,6	24,683 ft²

Slip Results

Slip Surfaces Analysed: 95719 of 98415 converged

Current Slip Surface

Slip Surface: 64,686
Factor of Safety: 1.99
Volume: 2,262.0971 ft³
Weight: 271,451.66 lbf
Resisting Moment: 32,746,065 lbf·ft
Activating Moment: 16,485,889 lbf·ft
Slip Rank: 1 of 98,415 slip surfaces
Exit: (437.16885, 1,681.8052) ft
Entry: (297.89962, 1,740.8652) ft
Radius: 163.07606 ft
Center: (423.93924, 1,844.3438) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	300.16583 ft	1,738.222 ft	0 psf	94.520767 psf	54.57159 psf	325 psf	0 psf	Fill
Slice 2	304.69826 ft	1,733.1487 ft	0 psf	572.44413 psf	330.50078 psf	325 psf	0 psf	Fill
Slice 3	309.23069 ft	1,728.475 ft	0 psf	1,029.1558 psf	594.18336 psf	325 psf	0 psf	Fill
Slice 4	313.8364 ft	1,724.0894 ft	0 psf	1,360.2796 psf	785.35781 psf	325 psf	0 psf	Fill
Slice 5	318.5154 ft	1,719.9645 ft	0 psf	1,560.8673 psf	901.16718 psf	325 psf	0 psf	Fill
Slice 6	323.1944 ft	1,716.1431 ft	0 psf	1,734.8272 psf	1,001.6029 psf	325 psf	0 psf	Fill
Slice 7	327.87339 ft	1,712.5987 ft	0 psf	1,883.4763 psf	1,087.4256 psf	325 psf	0 psf	Fill
Slice 8	332.55239 ft	1,709.3095 ft	0 psf	2,007.9488 psf	1,159.2898 psf	325 psf	0 psf	Fill
Slice 9	337.23139 ft	1,706.2571 ft	0 psf	2,109.2211 psf	1,217.7594 psf	325 psf	0 psf	Fill
Slice 10	341.91039 ft	1,703.4263 ft	0 psf	2,188.1332 psf	1,263.3193 psf	325 psf	0 psf	Fill
Slice 11	346.58939 ft	1,700.8037 ft	0 psf	2,245.4064 psf	1,296.386 psf	325 psf	0 psf	Fill
Slice 12	351.26838 ft	1,698.3783 ft	0 psf	2,281.657 psf	1,317.3153 psf	325 psf	0 psf	Fill
Slice 13	355.94738 ft	1,696.1402 ft	0 psf	2,297.4087 psf	1,326.4095 psf	325 psf	0 psf	Fill
Slice 14	360.62638 ft	1,694.0812 ft	0 psf	2,293.1013 psf	1,323.9226 psf	325 psf	0 psf	Fill
Slice 15	365.30538 ft	1,692.1939 ft	0 psf	2,269.0989 psf	1,310.0649 psf	325 psf	0 psf	Fill
Slice 16	369.98438 ft	1,690.472 ft	0 psf	2,225.6962 psf	1,285.0063 psf	325 psf	0 psf	Fill
Slice 17	374.66337 ft	1,688.91 ft	0 psf	2,163.1229 psf	1,248.8796 psf	325 psf	0 psf	Fill

Slice 18	379.34237 ft	1,687.5031 ft	0 psf	2,081.5477 psf	1,201.7822 psf	325 psf	0 psf	Fill
Slice 19	384.02137 ft	1,686.2471 ft	0 psf	1,981.0815 psf	1,143.7779 psf	325 psf	0 psf	Fill
Slice 20	388.31045 ft	1,685.2199 ft	0 psf	1,983.7862 psf	1,145.3395 psf	325 psf	0 psf	Fill
Slice 21	392.20962 ft	1,684.3966 ft	0 psf	2,095.0496 psf	1,209.5774 psf	325 psf	0 psf	Fill
Slice 22	396.10879 ft	1,683.6722 ft	0 psf	2,196.3104 psf	1,268.0404 psf	325 psf	0 psf	Fill
Slice 23	400.50277 ft	1,682.9795 ft	0 psf	2,144.1057 psf	1,237.9 psf	325 psf	0 psf	Fill
Slice 24	405.39158 ft	1,682.3446 ft	0 psf	1,931.6342 psf	1,115.2295 psf	325 psf	0 psf	Fill
Slice 25	410.28039 ft	1,681.8592 ft	0 psf	1,697.7364 psf	980.18857 psf	325 psf	0 psf	Fill
Slice 26	415.1692 ft	1,681.5221 ft	0 psf	1,442.1249 psf	832.61118 psf	325 psf	0 psf	Fill
Slice 27	420.05801 ft	1,681.3322 ft	0 psf	1,164.4347 psf	672.28669 psf	325 psf	0 psf	Fill
Slice 28	424.94682 ft	1,681.2891 ft	0 psf	864.21822 psf	498.95662 psf	325 psf	0 psf	Fill
Slice 29	429.83563 ft	1,681.3927 ft	0 psf	540.9381 psf	312.31076 psf	325 psf	0 psf	Fill
Slice 30	434.72444 ft	1,681.6432 ft	0 psf	193.95881 psf	111.98217 psf	325 psf	0 psf	Fill

Section A-A Tr 68203 SSA.gsz 11/06/2020 10:49:39 AM

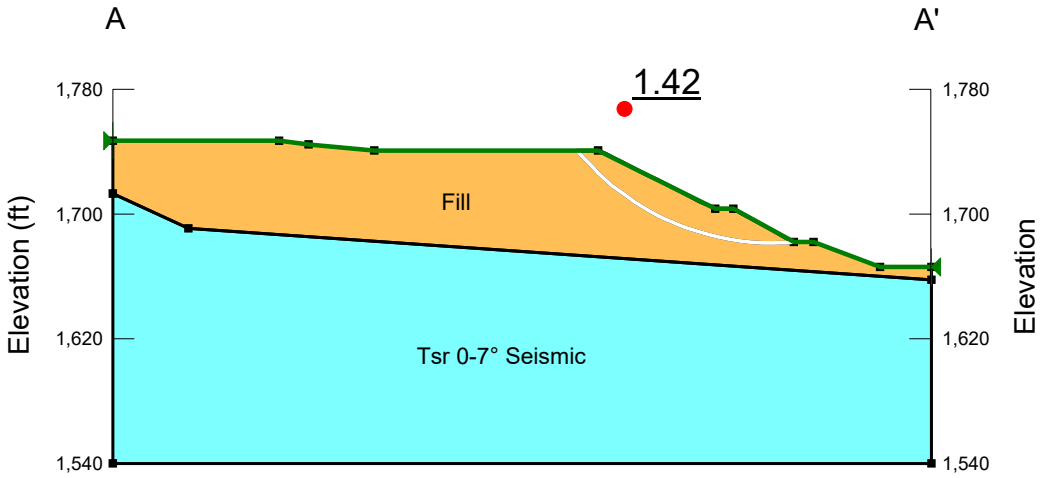
Section A-A Tr 68203 SSA.gsz

1 -Rotational Pseudostatic Global

Horz Seismic Coef.: 0.15

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 0-7° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-7° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-7° (Seismic)



LGC

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GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Pseudostatic Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 711
Date: 11/06/2020
Time: 10:49:39 AM
Tool Version: 10.1.0.18696
File Name: Section A-A Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/06/2020
Last Solved Time: 10:49:54 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Pseudostatic Global

Kind: SLOPE/W
Parent: 1 -Rotational Static Global
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 0-7° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-7° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-7° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.03953, 1,746.9781) ft
Right Coordinate: (525.146, 1,665.7748) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 375 bedding 0-7° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (0, 1)
- Data Point: (0.1, 0.625)
- Data Point: (7, 0.625)
- Data Point: (7.1, 1)

Tsr 19° bedding 0-7° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (0, 1)
- Data Point: (0.1, 0.5938)
- Data Point: (7, 0.5938)

Data Point: (7.1, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	492.09114 ft	1,665.7748 ft
Point 2	525.146 ft	1,665.7748 ft
Point 3	525.146 ft	1,539.7155 ft
Point 4	0.03953 ft	1,539.7155 ft
Point 5	0.03953 ft	1,713.0176 ft
Point 6	0.03953 ft	1,746.9781 ft
Point 7	106.82845 ft	1,746.9781 ft
Point 8	125.69538 ft	1,744.5631 ft
Point 9	167.9573 ft	1,740.8652 ft
Point 10	311.4969 ft	1,740.8652 ft
Point 11	386.36087 ft	1,703.1313 ft
Point 12	398.05837 ft	1,703.1313 ft
Point 13	437.22611 ft	1,681.774 ft
Point 14	449.75375 ft	1,681.774 ft
Point 15	48.62654 ft	1,690.7021 ft
Point 16	525.146 ft	1,657.6545 ft

Regions

	Material	Points	Area
Region 1	Tsr 0-7° Seismic	4,3,16,15,5	71,952 ft²
Region 2	Fill	5,15,16,2,1,14,13,12,11,10,9,8,7,6	24,683 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.42
Volume: 2,262.0971 ft³
Weight: 271,451.66 lbf
Resisting Moment: 31,406,159 lbf·ft
Activating Moment: 22,091,900 lbf·ft
Slip Rank: 1 of 1 slip surfaces
Exit: (437.16885, 1,681.8052) ft
Entry: (297.89962, 1,740.8652) ft

Radius: 163.07606 ft
Center: (423.93924, 1,844.3438) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	300.16583 ft	1,738.222 ft	0 psf	34.590157 psf	19.970636 psf	325 psf	0 psf	Fill
Slice 2	304.69826 ft	1,733.1487 ft	0 psf	474.75893 psf	274.10219 psf	325 psf	0 psf	Fill
Slice 3	309.23069 ft	1,728.475 ft	0 psf	899.68355 psf	519.43254 psf	325 psf	0 psf	Fill
Slice 4	313.8364 ft	1,724.0894 ft	0 psf	1,212.4513 psf	700.00909 psf	325 psf	0 psf	Fill
Slice 5	318.5154 ft	1,719.9645 ft	0 psf	1,406.6415 psf	812.12486 psf	325 psf	0 psf	Fill
Slice 6	323.1944 ft	1,716.1431 ft	0 psf	1,577.1891 psf	910.59057 psf	325 psf	0 psf	Fill
Slice 7	327.87339 ft	1,712.5987 ft	0 psf	1,724.9793 psf	995.91727 psf	325 psf	0 psf	Fill
Slice 8	332.55239 ft	1,709.3095 ft	0 psf	1,850.7816 psf	1,068.5492 psf	325 psf	0 psf	Fill
Slice 9	337.23139 ft	1,706.2571 ft	0 psf	1,955.2599 psf	1,128.8698 psf	325 psf	0 psf	Fill
Slice 10	341.91039 ft	1,703.4263 ft	0 psf	2,038.9826 psf	1,177.2071 psf	325 psf	0 psf	Fill
Slice 11	346.58939 ft	1,700.8037 ft	0 psf	2,102.4307 psf	1,213.8389 psf	325 psf	0 psf	Fill
Slice 12	351.26838 ft	1,698.3783 ft	0 psf	2,146.0058 psf	1,238.997 psf	325 psf	0 psf	Fill
Slice 13	355.94738 ft	1,696.1402 ft	0 psf	2,170.0361 psf	1,252.8709 psf	325 psf	0 psf	Fill
Slice 14	360.62638 ft	1,694.0812 ft	0 psf	2,174.7816 psf	1,255.6107 psf	325 psf	0 psf	Fill
Slice 15	365.30538 ft	1,692.1939 ft	0 psf	2,160.4381 psf	1,247.3295 psf	325 psf	0 psf	Fill
Slice 16	369.98438 ft	1,690.472 ft	0 psf	2,127.1407 psf	1,228.1052 psf	325 psf	0 psf	Fill
Slice 17	374.66337 ft	1,688.91 ft	0 psf	2,074.9656 psf	1,197.982 psf	325 psf	0 psf	Fill
Slice 18	379.34237 ft	1,687.5031 ft	0 psf	2,003.932 psf	1,156.9707 psf	325 psf	0 psf	Fill
Slice 19	384.02137 ft	1,686.2471 ft	0 psf	1,914.0024 psf	1,105.0498 psf	325 psf	0 psf	Fill
Slice 20	388.31045 ft	1,685.2199 ft	0 psf	1,923.6051 psf	1,110.5939 psf	325 psf	0 psf	Fill
Slice 21	392.20962 ft	1,684.3966 ft	0 psf	2,038.8678 psf	1,177.1409 psf	325 psf	0 psf	Fill
Slice 22	396.10879 ft	1,683.6722 ft	0 psf	2,144.9004 psf	1,238.3588 psf	325 psf	0 psf	Fill

Slice 23	400.50277 ft	1,682.9795 ft	0 psf	2,101.361 psf	1,213.2213 psf	325 psf	0 psf	Fill
Slice 24	405.39158 ft	1,682.3446 ft	0 psf	1,900.2133 psf	1,097.0887 psf	325 psf	0 psf	Fill
Slice 25	410.28039 ft	1,681.8592 ft	0 psf	1,676.5802 psf	967.97404 psf	325 psf	0 psf	Fill
Slice 26	415.1692 ft	1,681.5221 ft	0 psf	1,429.9578 psf	825.5865 psf	325 psf	0 psf	Fill
Slice 27	420.05801 ft	1,681.3322 ft	0 psf	1,159.7453 psf	669.57927 psf	325 psf	0 psf	Fill
Slice 28	424.94682 ft	1,681.2891 ft	0 psf	865.23602 psf	499.54425 psf	325 psf	0 psf	Fill
Slice 29	429.83563 ft	1,681.3927 ft	0 psf	545.6049 psf	315.00514 psf	325 psf	0 psf	Fill
Slice 30	434.72444 ft	1,681.6432 ft	0 psf	199.89429 psf	115.40902 psf	325 psf	0 psf	Fill

Section A-A Tr 68203 SSA.gsz 11/06/2020 10:49:39 AM

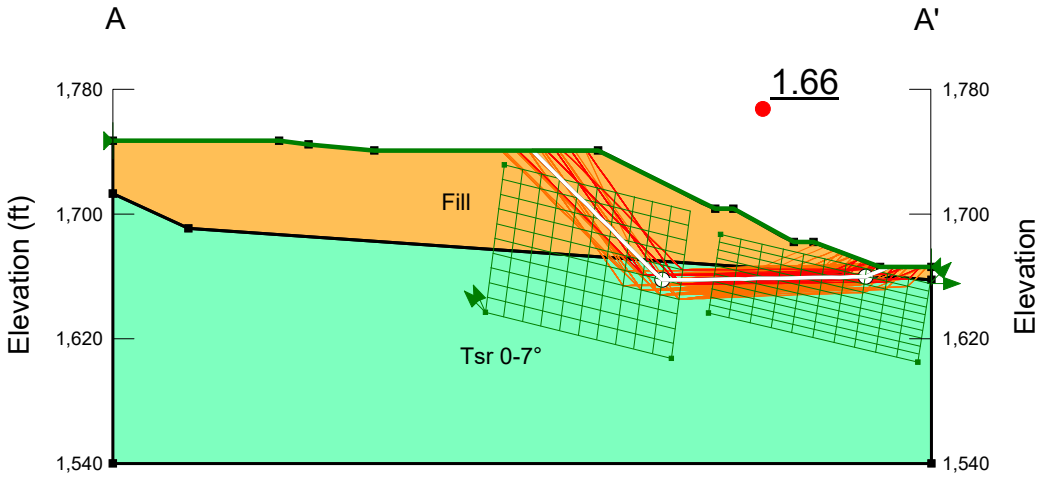
Section A-A Tr 68203 SSA.gsz

2 -Translational Static Global

Horz Seismic Coef.: 0

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 0-7°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-7°
C-Anisotropic Strength Fn.: Tsr 250 bedding 0-7°



LGC

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2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Static Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 711
Date: 11/06/2020
Time: 10:49:39 AM
Tool Version: 10.1.0.18696
File Name: Section A-A Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/06/2020
Last Solved Time: 10:49:54 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Static Global

Kind: SLOPE/W
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 1
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 0-7°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-7°
C-Anisotropic Strength Fn.: Tsr 250 bedding 0-7°
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.03953, 1,746.9781) ft
Right Coordinate: (525.146, 1,665.7748) ft

Slip Surface Block

Left Grid
- Upper Left: (251.11545, 1,731.4155) ft
- Lower Left: (239.2051, 1,636.8957) ft
- Lower Right: (358.45037, 1,607.3191) ft
- X Increments: 10
- Y Increments: 10
- Starting Angle: 115 °
- Ending Angle: 135 °
- Angle Increments: 2

Right Grid
- Upper Left: (389.98245, 1,686.5856) ft
- Lower Left: (382.41085, 1,636.2885) ft
- Lower Right: (516.53643, 1,604.9204) ft
- X Increments: 10
- Y Increments: 10
- Angle Increments: 2

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 18° bedding 0-7°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (0, 1)
Data Point: (0.1, 0.5625)
Data Point: (7, 0.5625)
Data Point: (7.01, 1)

Tsr 250 bedding 0-7°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (0, 1)
Data Point: (0.1, 0.4167)
Data Point: (7, 0.4167)
Data Point: (7.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	492.09114 ft	1,665.7748 ft
Point 2	525.146 ft	1,665.7748 ft
Point 3	525.146 ft	1,539.7155 ft
Point 4	0.03953 ft	1,539.7155 ft
Point 5	0.03953 ft	1,713.0176 ft
Point 6	0.03953 ft	1,746.9781 ft
Point 7	106.82845 ft	1,746.9781 ft
Point 8	125.69538 ft	1,744.5631 ft
Point 9	167.9573 ft	1,740.8652 ft
Point 10	311.4969 ft	1,740.8652 ft
Point 11	386.36087 ft	1,703.1313 ft
Point 12	398.05837 ft	1,703.1313 ft
Point 13	437.22611 ft	1,681.774 ft
Point 14	449.75375 ft	1,681.774 ft
Point 15	48.62654 ft	1,690.7021 ft
Point 16	525.146 ft	1,657.6545 ft

Regions

	Material	Points	Area

Region 1	Tsr 0-7°	4,3,16,15,5	71,952 ft²
Region 2	Fill	5,15,16,2,1,14,13,12,11,10,9,8,7,6	24,683 ft²

Slip Results

Slip Surfaces Analysed: 63919 of 131769 converged

Current Slip Surface

Slip Surface: 70,742
Factor of Safety: 1.66
Volume: 7,611.9872 ft³
Weight: 918,102.56 lbf
Resisting Force: 403,382.59 lbf
Activating Force: 243,486.06 lbf
Slip Rank: 1 of 131,769 slip surfaces
Exit: (498.02478, 1,665.7748) ft
Entry: (269.15248, 1,740.8652) ft
Radius: 123.91388 ft
Center: (402.06586, 1,759.6378) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	272.68118 ft	1,737.3365 ft	0 psf	168.20959 psf	97.115854 psf	325 psf	0 psf	Fill
Slice 2	279.73858 ft	1,730.2791 ft	0 psf	795.95381 psf	459.54415 psf	325 psf	0 psf	Fill
Slice 3	286.79599 ft	1,723.2217 ft	0 psf	1,423.698 psf	821.97244 psf	325 psf	0 psf	Fill
Slice 4	293.85339 ft	1,716.1643 ft	0 psf	2,051.4423 psf	1,184.4007 psf	325 psf	0 psf	Fill
Slice 5	300.91079 ft	1,709.1069 ft	0 psf	2,679.1865 psf	1,546.829 psf	325 psf	0 psf	Fill
Slice 6	307.9682 ft	1,702.0495 ft	0 psf	3,306.9307 psf	1,909.2573 psf	325 psf	0 psf	Fill
Slice 7	314.99571 ft	1,695.022 ft	0 psf	3,775.1543 psf	2,179.5864 psf	325 psf	0 psf	Fill
Slice 8	321.99333 ft	1,688.0244 ft	0 psf	4,083.8574 psf	2,357.8161 psf	325 psf	0 psf	Fill
Slice 9	328.99095 ft	1,681.0267 ft	0 psf	4,392.5604 psf	2,536.0459 psf	325 psf	0 psf	Fill
Slice 10	335.98856 ft	1,674.0291 ft	0 psf	4,701.2634 psf	2,714.2757 psf	325 psf	0 psf	Fill
Slice 11	342.73578 ft	1,667.2819 ft	0 psf	4,784.9628 psf	2,989.9766 psf	600 psf	0 psf	Tsr 0-7°
Slice 12	349.23261 ft	1,660.7851 ft	0 psf	5,087.5374 psf	3,179.0462 psf	600 psf	0 psf	Tsr 0-7°
Slice 13	356.716 ft	1,657.6035 ft	0 psf	7,340.1791 psf	2,384.9688 psf	250.02 psf	0 psf	Tsr 0-7°

Slice 14	365.18596 ft	1,657.7372 ft	0 psf	6,806.5824 psf	2,211.5927 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 15	373.65593 ft	1,657.8708 ft	0 psf	6,272.9857 psf	2,038.2166 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 16	382.12589 ft	1,658.0045 ft	0 psf	5,739.389 psf	1,864.8405 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 17	389.28524 ft	1,658.1175 ft	0 psf	5,465.7866 psf	1,775.9417 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 18	395.134 ft	1,658.2098 ft	0 psf	5,452.1787 psf	1,771.5202 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 19	401.97514 ft	1,658.3177 ft	0 psf	5,179.177 psf	1,682.8166 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 20	409.80869 ft	1,658.4414 ft	0 psf	4,646.7817 psf	1,509.8309 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 21	417.64224 ft	1,658.565 ft	0 psf	4,114.3864 psf	1,336.8452 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 22	425.47579 ft	1,658.6886 ft	0 psf	3,581.9911 psf	1,163.8595 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 23	433.30934 ft	1,658.8122 ft	0 psf	3,049.5958 psf	990.87374 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 24	440.35802 ft	1,658.9235 ft	0 psf	2,776.1113 psf	902.01324 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 25	446.62184 ft	1,659.0223 ft	0 psf	2,761.5376 psf	897.27795 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 26	453.92368 ft	1,659.1376 ft	0 psf	2,554.8638 psf	830.12556 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 27	462.26354 ft	1,659.2692 ft	0 psf	2,156.0899 psf	700.55608 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 28	470.6034 ft	1,659.4008 ft	0 psf	1,757.3161 psf	570.9866 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 29	478.94327 ft	1,659.5324 ft	0 psf	1,358.5422 psf	441.41712 psf	250.02 psf	0 psf	Tsr 0-7°
Slice 30	484.11755 ft	1,660.0142 ft	0 psf	1,429.2326 psf	893.08363 psf	600 psf	0 psf	Tsr 0-7°
Slice 31	488.60652 ft	1,661.8736 ft	0 psf	827.16768 psf	477.56548 psf	325 psf	0 psf	Fill
Slice 32	495.05796 ft	1,664.5459 ft	0 psf	267.55468 psf	154.47277 psf	325 psf	0 psf	Fill

Section A-A Tr 68203 SSA.gsz 11/06/2020 10:49:39 AM

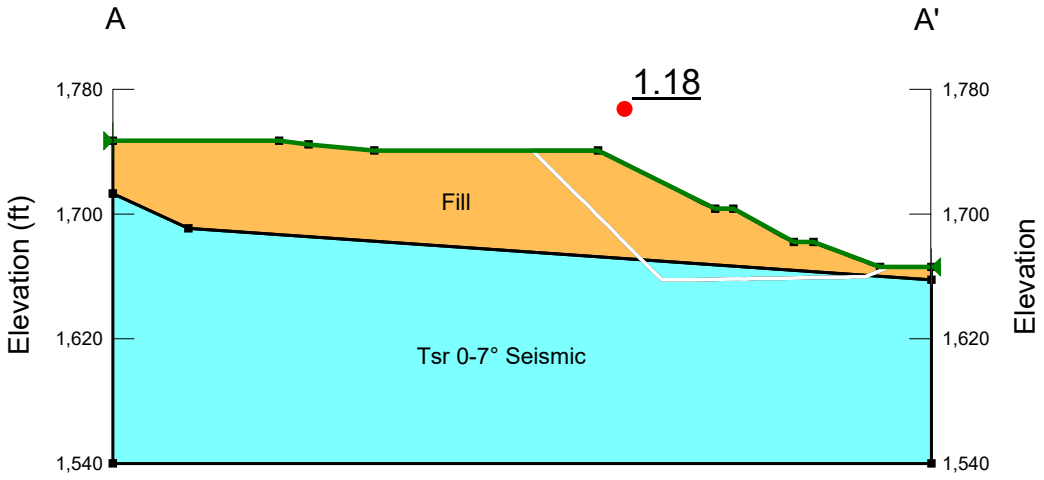
Section A-A Tr 68203 SSA.gsz

2 -Translational Pseudostatic Global

Horz Seismic Coef.: 0.15

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 0-7° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-7° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-7° (Seismic)



LGC

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Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Pseudostatic Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 711
Date: 11/06/2020
Time: 10:49:39 AM
Tool Version: 10.1.0.18696
File Name: Section A-A Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/06/2020
Last Solved Time: 10:49:56 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Pseudostatic Global

Kind: SLOPE/W
Parent: 2 -Translational Static Global
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 0-7° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-7° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-7° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.03953, 1,746.9781) ft
Right Coordinate: (525.146, 1,665.7748) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 375 bedding 0-7° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (0, 1)
- Data Point: (0.1, 0.625)
- Data Point: (7, 0.625)
- Data Point: (7.1, 1)

Tsr 19° bedding 0-7° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (0, 1)
- Data Point: (0.1, 0.5938)
- Data Point: (7, 0.5938)

Data Point: (7.1, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	492.09114 ft	1,665.7748 ft
Point 2	525.146 ft	1,665.7748 ft
Point 3	525.146 ft	1,539.7155 ft
Point 4	0.03953 ft	1,539.7155 ft
Point 5	0.03953 ft	1,713.0176 ft
Point 6	0.03953 ft	1,746.9781 ft
Point 7	106.82845 ft	1,746.9781 ft
Point 8	125.69538 ft	1,744.5631 ft
Point 9	167.9573 ft	1,740.8652 ft
Point 10	311.4969 ft	1,740.8652 ft
Point 11	386.36087 ft	1,703.1313 ft
Point 12	398.05837 ft	1,703.1313 ft
Point 13	437.22611 ft	1,681.774 ft
Point 14	449.75375 ft	1,681.774 ft
Point 15	48.62654 ft	1,690.7021 ft
Point 16	525.146 ft	1,657.6545 ft

Regions

	Material	Points	Area
Region 1	Tsr 0-7° Seismic	4,3,16,15,5	71,952 ft²
Region 2	Fill	5,15,16,2,1,14,13,12,11,10,9,8,7,6	24,683 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.18
Volume: 7,611.9872 ft³
Weight: 918,102.56 lbf
Resisting Force: 414,408.93 lbf
Activating Force: 351,469.68 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (498.02478, 1,665.7748) ft
Entry: (269.15248, 1,740.8652) ft

Radius: 123.91388 ft
Center: (402.06586, 1,759.6378) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	272.68118 ft	1,737.3365 ft	0 psf	100.09013 psf	57.787065 psf	325 psf	0 psf	Fill
Slice 2	279.73858 ft	1,730.2791 ft	0 psf	669.34704 psf	386.4477 psf	325 psf	0 psf	Fill
Slice 3	286.79599 ft	1,723.2217 ft	0 psf	1,238.604 psf	715.10833 psf	325 psf	0 psf	Fill
Slice 4	293.85339 ft	1,716.1643 ft	0 psf	1,807.8609 psf	1,043.769 psf	325 psf	0 psf	Fill
Slice 5	300.91079 ft	1,709.1069 ft	0 psf	2,377.1178 psf	1,372.4296 psf	325 psf	0 psf	Fill
Slice 6	307.9682 ft	1,702.0495 ft	0 psf	2,946.3747 psf	1,701.0902 psf	325 psf	0 psf	Fill
Slice 7	314.99571 ft	1,695.022 ft	0 psf	3,370.9736 psf	1,946.2325 psf	325 psf	0 psf	Fill
Slice 8	321.99333 ft	1,688.0244 ft	0 psf	3,650.9146 psf	2,107.8565 psf	325 psf	0 psf	Fill
Slice 9	328.99095 ft	1,681.0267 ft	0 psf	3,930.8556 psf	2,269.4806 psf	325 psf	0 psf	Fill
Slice 10	335.98856 ft	1,674.0291 ft	0 psf	4,210.7966 psf	2,431.1046 psf	325 psf	0 psf	Fill
Slice 11	342.73578 ft	1,667.2819 ft	0 psf	4,220.8468 psf	2,637.4778 psf	600 psf	0 psf	Tsr 0-7° Seismic
Slice 12	349.23261 ft	1,660.7851 ft	0 psf	4,493.7117 psf	2,807.9827 psf	600 psf	0 psf	Tsr 0-7° Seismic
Slice 13	356.716 ft	1,657.6035 ft	0 psf	7,353.7934 psf	2,532.3438 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 14	365.18596 ft	1,657.7372 ft	0 psf	6,819.3978 psf	2,348.32 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 15	373.65593 ft	1,657.8708 ft	0 psf	6,285.0023 psf	2,164.2962 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 16	382.12589 ft	1,658.0045 ft	0 psf	5,750.6068 psf	1,980.2723 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 17	389.28524 ft	1,658.1175 ft	0 psf	5,476.5948 psf	1,885.9139 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 18	395.134 ft	1,658.2098 ft	0 psf	5,462.9664 psf	1,881.2208 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 19	401.97514 ft	1,658.3177 ft	0 psf	5,189.5561 psf	1,787.0696 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 20	409.80869 ft	1,658.4414 ft	0 psf	4,656.3638 psf	1,603.4601 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 21	417.64224 ft	1,658.565 ft	0 psf	4,123.1714 psf	1,419.8506 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 22	425.47579 ft	1,658.6886 ft	0 psf	3,589.9791 psf	1,236.2411 psf	375 psf	0 psf	Tsr 0-7° Seismic

Slice 23	433.30934 ft	1,658.8122 ft	0 psf	3,056.7867 psf	1,052.6316 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 24	440.35802 ft	1,658.9235 ft	0 psf	2,782.8928 psf	958.31376 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 25	446.62184 ft	1,659.0223 ft	0 psf	2,768.2973 psf	953.28766 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 26	453.92368 ft	1,659.1376 ft	0 psf	2,561.3141 psf	882.01117 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 27	462.26354 ft	1,659.2692 ft	0 psf	2,161.9432 psf	744.48428 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 28	470.6034 ft	1,659.4008 ft	0 psf	1,762.5724 psf	606.95739 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 29	478.94327 ft	1,659.5324 ft	0 psf	1,363.2015 psf	469.43051 psf	375 psf	0 psf	Tsr 0-7° Seismic
Slice 30	484.11755 ft	1,660.0142 ft	0 psf	1,619.2599 psf	1,011.8259 psf	600 psf	0 psf	Tsr 0-7° Seismic
Slice 31	488.60652 ft	1,661.8736 ft	0 psf	927.18329 psf	535.30952 psf	325 psf	0 psf	Fill
Slice 32	495.05796 ft	1,664.5459 ft	0 psf	327.30652 psf	188.97051 psf	325 psf	0 psf	Fill

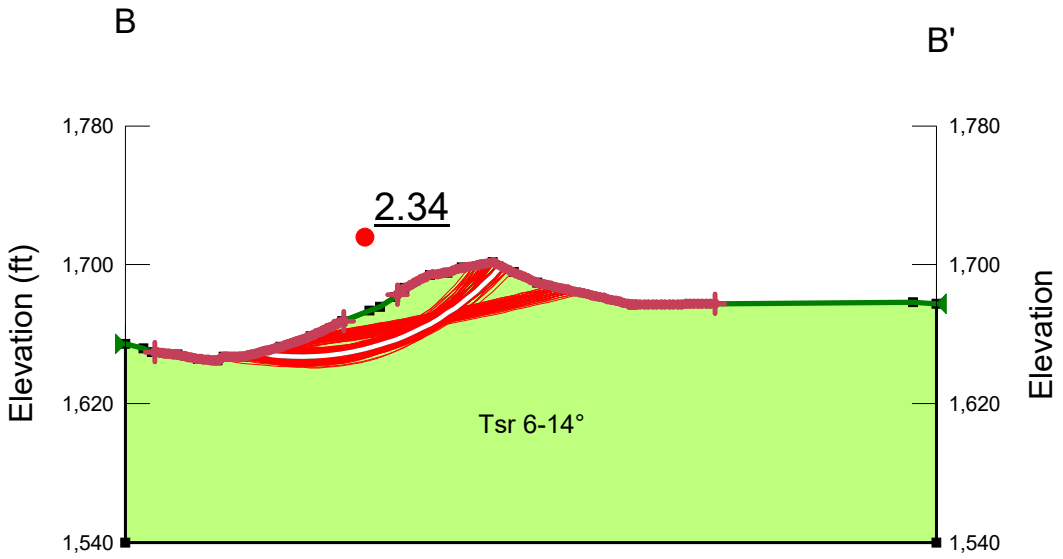
Section B-B Tr 68203 SSA.gsz 11/18/2020 09:56:32 AM

Section B-B Tr 68203 SSA.gsz

1 -Rotational Static Global

Horz Seismic Coef.: 0

Name: Tsr 6-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°



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2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Static Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 731
Date: 11/18/2020
Time: 09:56:32 AM
Tool Version: 10.1.0.18696
File Name: Section B-B Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 09:56:45 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Static Global

Kind: SLOPE/W
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 6-14°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (16.82697, 1,649.5566) ft
Left-Zone Right Coordinate: (125.5032, 1,667.6198) ft
Left-Zone Increment: 80
Right Type: Range
Right-Zone Left Coordinate: (156.72276, 1,682.649) ft
Right-Zone Right Coordinate: (339.37952, 1,677.4192) ft
Right-Zone Increment: 80
Radius Increments: 14

Slip Surface Limits

Left Coordinate: (-0.07723, 1,654.2154) ft
Right Coordinate: (466.94718, 1,677.4443) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.4167)
- Data Point: (14, 0.4167)
- Data Point: (14.01, 1)

Tsr 18° bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (5.99, 1)
Data Point: (6, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	466.94718 ft	1,677.4443 ft
Point 2	466.94718 ft	1,539.7912 ft
Point 3	-0.07723 ft	1,539.7912 ft
Point 4	-0.07723 ft	1,654.2154 ft
Point 5	10.29203 ft	1,651.7249 ft
Point 6	14.97103 ft	1,649.7628 ft
Point 7	29.91364 ft	1,648.1025 ft
Point 8	41.6866 ft	1,645.6875 ft
Point 9	53.00437 ft	1,644.6211 ft
Point 10	56.52355 ft	1,647.0158 ft
Point 11	67.84371 ft	1,647.0158 ft
Point 12	89.03505 ft	1,652.4494 ft
Point 13	106.60393 ft	1,658.6982 ft
Point 14	124.62562 ft	1,667.2713 ft
Point 15	140.39837 ft	1,673.5351 ft
Point 16	146.58673 ft	1,675.9501 ft
Point 17	155.26551 ft	1,681.2328 ft
Point 18	160.62372 ft	1,686.4401 ft
Point 19	175.11352 ft	1,694.1378 ft
Point 20	185.48049 ft	1,695.2823 ft
Point 21	193.60311 ft	1,698.213 ft
Point 22	206.28169 ft	1,700.1752 ft
Point 23	211.32062 ft	1,701.5785 ft
Point 24	223.51852 ft	1,695.5566 ft
Point 25	237.1027 ft	1,689.5795 ft
Point 26	291.80171 ft	1,676.9915 ft
Point 27	453.44475 ft	1,678.4447 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14°	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27	62,735 ft²

Slip Results

Slip Surfaces Analysed: 93728 of 98415 converged

Current Slip Surface

Slip Surface: 52,656
Factor of Safety: 2.34
Volume: 2,370.0898 ft³
Weight: 296,261.22 lbf
Resisting Moment: 37,039,129 lbf·ft
Activating Moment: 15,802,176 lbf·ft
Slip Rank: 1 of 98,415 slip surfaces
Exit: (76.470495, 1,649.2278) ft
Entry: (216.28131, 1,699.1295) ft
Radius: 151.47096 ft
Center: (101.99081, 1,798.5334) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	78.564587 ft	1,648.8999 ft	0 psf	154.58946 psf	96.598214 psf	600 psf	0 psf	Tsr 6-14°
Slice 2	82.752772 ft	1,648.3039 ft	0 psf	361.93529 psf	226.16227 psf	600 psf	0 psf	Tsr 6-14°
Slice 3	86.940957 ft	1,647.8266 ft	0 psf	550.92771 psf	344.25784 psf	600 psf	0 psf	Tsr 6-14°
Slice 4	91.23116 ft	1,647.4611 ft	0 psf	753.69219 psf	470.95915 psf	600 psf	0 psf	Tsr 6-14°
Slice 5	95.62338 ft	1,647.2123 ft	0 psf	969.17998 psf	605.61087 psf	600 psf	0 psf	Tsr 6-14°
Slice 6	100.0156 ft	1,647.0912 ft	0 psf	1,165.3449 psf	728.18829 psf	600 psf	0 psf	Tsr 6-14°
Slice 7	104.40782 ft	1,647.0976 ft	0 psf	1,342.6431 psf	838.97654 psf	600 psf	0 psf	Tsr 6-14°
Slice 8	108.85664 ft	1,647.2349 ft	0 psf	1,536.6834 psf	960.22635 psf	600 psf	0 psf	Tsr 6-14°
Slice 9	113.36206 ft	1,647.5067 ft	0 psf	1,746.508 psf	1,091.3393 psf	600 psf	0 psf	Tsr 6-14°
Slice 10	117.86749 ft	1,647.9138 ft	0 psf	1,977.7107 psf	642.59717 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 11	122.37291 ft	1,648.4572 ft	0 psf	2,162.6471 psf	702.68664 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 12	127.25441 ft	1,649.2079 ft	0 psf	2,316.1101 psf	752.5498 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 13	132.512 ft	1,650.1935 ft	0 psf	2,434.8844 psf	791.1419 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 14	137.76958 ft	1,651.3736 ft	0 psf	2,528.6278 psf	821.60097 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 15	143.49255 ft	1,652.8944 ft	0 psf	2,470.5938 psf	1,543.7983 psf	600 psf	0 psf	Tsr 6-14°

Slice 16	148.75643 ft	1,654.4805 ft	0 psf	2,545.6035 psf	1,590.6696 psf	600 psf	0 psf	Tsr 6-14°
Slice 17	153.09581 ft	1,655.9626 ft	0 psf	2,649.0543 psf	1,655.3129 psf	600 psf	0 psf	Tsr 6-14°
Slice 18	157.94461 ft	1,657.8056 ft	0 psf	2,850.2736 psf	1,781.0486 psf	600 psf	0 psf	Tsr 6-14°
Slice 19	163.03869 ft	1,659.9345 ft	0 psf	3,007.9732 psf	1,879.5903 psf	600 psf	0 psf	Tsr 6-14°
Slice 20	167.86862 ft	1,662.1649 ft	0 psf	3,005.2182 psf	1,877.8688 psf	600 psf	0 psf	Tsr 6-14°
Slice 21	172.69855 ft	1,664.6065 ft	0 psf	2,977.2816 psf	1,860.412 psf	600 psf	0 psf	Tsr 6-14°
Slice 22	177.70526 ft	1,667.3777 ft	0 psf	2,802.2022 psf	1,751.0103 psf	600 psf	0 psf	Tsr 6-14°
Slice 23	182.88875 ft	1,670.5116 ft	0 psf	2,481.2721 psf	1,550.4709 psf	600 psf	0 psf	Tsr 6-14°
Slice 24	187.51114 ft	1,673.5387 ft	0 psf	2,228.3923 psf	1,392.4541 psf	600 psf	0 psf	Tsr 6-14°
Slice 25	191.57245 ft	1,676.4177 ft	0 psf	2,045.4791 psf	1,278.1572 psf	600 psf	0 psf	Tsr 6-14°
Slice 26	195.71621 ft	1,679.5722 ft	0 psf	1,793.1297 psf	1,120.4718 psf	600 psf	0 psf	Tsr 6-14°
Slice 27	199.9424 ft	1,683.029 ft	0 psf	1,471.3477 psf	919.40009 psf	600 psf	0 psf	Tsr 6-14°
Slice 28	204.16859 ft	1,686.7525 ft	0 psf	1,128.3874 psf	705.0947 psf	600 psf	0 psf	Tsr 6-14°
Slice 29	208.80115 ft	1,691.1911 ft	0 psf	755.85873 psf	472.31295 psf	600 psf	0 psf	Tsr 6-14°
Slice 30	213.80097 ft	1,696.4138 ft	0 psf	164.49751 psf	102.78945 psf	600 psf	0 psf	Tsr 6-14°

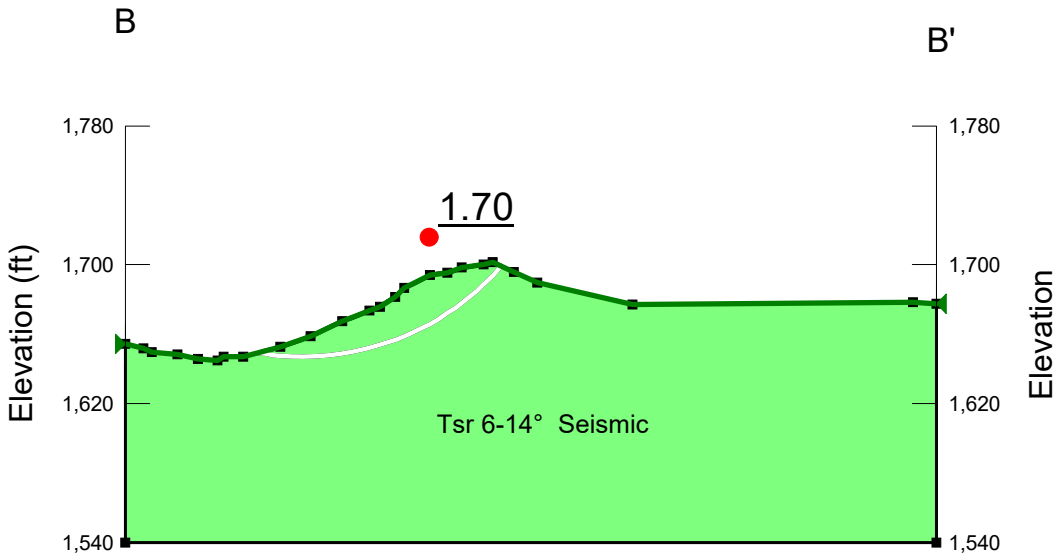
Section B-B Tr 68203 SSA.gsz 11/18/2020 09:56:32 AM

Section B-B Tr 68203 SSA.gsz

1 -Rotational Pseudostatic Global

Horz Seismic Coef.: 0.15

Name: Tsr 6-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)



LGC

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2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Pseudostatic Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 731
Date: 11/18/2020
Time: 09:56:32 AM
Tool Version: 10.1.0.18696
File Name: Section B-B Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 09:56:59 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Pseudostatic Global

Kind: SLOPE/W
Parent: 1 -Rotational Static Global
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 6-14° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (-0.07723, 1,654.2154) ft
Right Coordinate: (466.94718, 1,677.4443) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 19° bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.5938)
- Data Point: (14, 0.5938)
- Data Point: (14.01, 1)

Tsr 375 bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.625)
- Data Point: (14, 0.625)
- Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	466.94718 ft	1,677.4443 ft
Point 2	466.94718 ft	1,539.7912 ft
Point 3	-0.07723 ft	1,539.7912 ft
Point 4	-0.07723 ft	1,654.2154 ft
Point 5	10.29203 ft	1,651.7249 ft
Point 6	14.97103 ft	1,649.7628 ft
Point 7	29.91364 ft	1,648.1025 ft
Point 8	41.6866 ft	1,645.6875 ft
Point 9	53.00437 ft	1,644.6211 ft
Point 10	56.52355 ft	1,647.0158 ft
Point 11	67.84371 ft	1,647.0158 ft
Point 12	89.03505 ft	1,652.4494 ft
Point 13	106.60393 ft	1,658.6982 ft
Point 14	124.62562 ft	1,667.2713 ft
Point 15	140.39837 ft	1,673.5351 ft
Point 16	146.58673 ft	1,675.9501 ft
Point 17	155.26551 ft	1,681.2328 ft
Point 18	160.62372 ft	1,686.4401 ft
Point 19	175.11352 ft	1,694.1378 ft
Point 20	185.48049 ft	1,695.2823 ft
Point 21	193.60311 ft	1,698.213 ft
Point 22	206.28169 ft	1,700.1752 ft
Point 23	211.32062 ft	1,701.5785 ft
Point 24	223.51852 ft	1,695.5566 ft
Point 25	237.1027 ft	1,689.5795 ft
Point 26	291.80171 ft	1,676.9915 ft
Point 27	453.44475 ft	1,678.4447 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14° Seismic	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27	62,735 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.70
Volume: 2,370.0898 ft³
Weight: 296,261.22 lbf

Resisting Moment: 36,398,152 lbf·ft
Activating Moment: 21,460,015 lbf·ft
Slip Rank: 1 of 1 slip surfaces
Exit: (76.470495, 1,649.2278) ft
Entry: (216.28131, 1,699.1295) ft
Radius: 151.47096 ft
Center: (101.99081, 1,798.5334) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	78.564587 ft	1,648.8999 ft	0 psf	173.40548 psf	108.35577 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 2	82.752772 ft	1,648.3039 ft	0 psf	379.98775 psf	237.4427 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 3	86.940957 ft	1,647.8266 ft	0 psf	566.84438 psf	354.20368 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 4	91.23116 ft	1,647.4611 ft	0 psf	766.42788 psf	478.91729 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 5	95.62338 ft	1,647.2123 ft	0 psf	977.5582 psf	610.84616 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 6	100.0156 ft	1,647.0912 ft	0 psf	1,168.1751 psf	729.9568 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 7	104.40782 ft	1,647.0976 ft	0 psf	1,338.9307 psf	836.65673 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 8	108.85664 ft	1,647.2349 ft	0 psf	1,525.3605 psf	953.15104 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 9	113.36206 ft	1,647.5067 ft	0 psf	1,726.3606 psf	1,078.7498 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 10	117.86749 ft	1,647.9138 ft	0 psf	1,952.8002 psf	672.46404 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 11	122.37291 ft	1,648.4572 ft	0 psf	2,129.1732 psf	733.19965 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 12	127.25441 ft	1,649.2079 ft	0 psf	2,273.07 psf	782.75178 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 13	132.512 ft	1,650.1935 ft	0 psf	2,381.4065 psf	820.0584 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 14	137.76958 ft	1,651.3736 ft	0 psf	2,464.4954 psf	848.6708 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 15	143.49255 ft	1,652.8944 ft	0 psf	2,380.6921 psf	1,487.6216 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 16	148.75643 ft	1,654.4805 ft	0 psf	2,442.3096 psf	1,526.1244 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 17	153.09581 ft	1,655.9626 ft	0 psf	2,532.9275 psf	1,582.7488 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 18	157.94461 ft	1,657.8056 ft	0 psf	2,715.9914 psf	1,697.1398 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 19	163.03869 ft	1,659.9345 ft	0 psf	2,855.1617 psf	1,784.103 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 20	167.86862 ft	1,662.1649 ft	0 psf	2,839.9664 psf	1,774.6079 psf	600 psf	0 psf	Tsr 6-14° Seismic

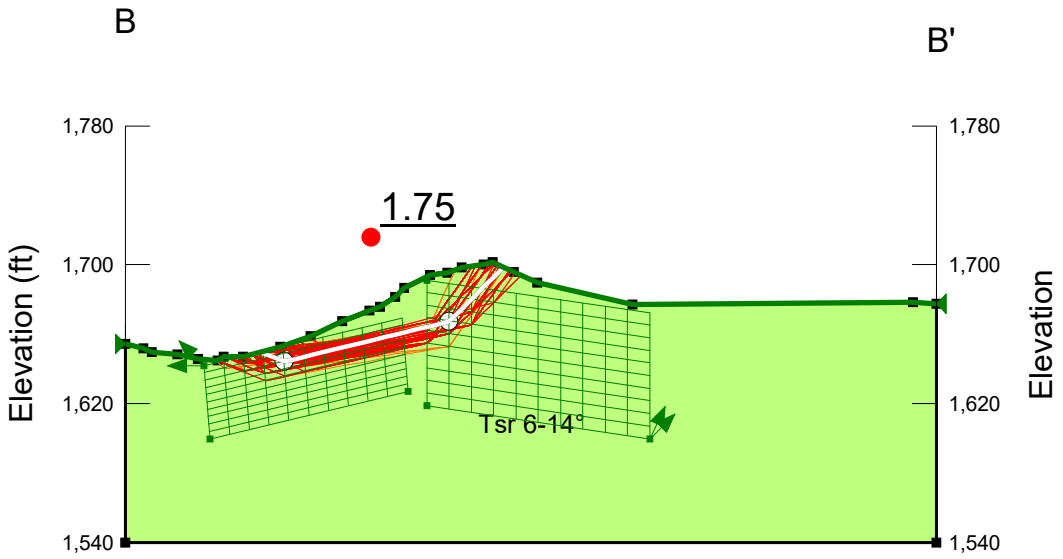
Slice 21	172.69855 ft	1,664.6065 ft	0 psf	2,800.4321 psf	1,749.9042 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 22	177.70526 ft	1,667.3777 ft	0 psf	2,620.1937 psf	1,637.2787 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 23	182.88875 ft	1,670.5116 ft	0 psf	2,302.0086 psf	1,438.4546 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 24	187.51114 ft	1,673.5387 ft	0 psf	2,051.3227 psf	1,281.8087 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 25	191.57245 ft	1,676.4177 ft	0 psf	1,869.0796 psf	1,167.9306 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 26	195.71621 ft	1,679.5722 ft	0 psf	1,622.2702 psf	1,013.7069 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 27	199.9424 ft	1,683.029 ft	0 psf	1,311.6739 psf	819.62482 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 28	204.16859 ft	1,686.7525 ft	0 psf	983.24063 psf	614.39694 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 29	208.80115 ft	1,691.1911 ft	0 psf	628.86992 psf	392.96154 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 30	213.80097 ft	1,696.4138 ft	0 psf	75.316417 psf	47.062921 psf	600 psf	0 psf	Tsr 6-14° Seismic

Section B-B Tr 68203 SSA.gsz

2 -Translational Static Global

Horz Seismic Coef.: 0

Name: Tsr 6-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°



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Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Static Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 731
Date: 11/18/2020
Time: 09:56:32 AM
Tool Version: 10.1.0.18696
File Name: Section B-B Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 09:56:59 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Static Global

Kind: SLOPE/W
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 1
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 6-14°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (-0.07723, 1,654.2154) ft
Right Coordinate: (466.94718, 1,677.4443) ft

Slip Surface Block

Left Grid
- Upper Left: (45.09472, 1,641.6545) ft
- Lower Left: (48.68095, 1,599.4892) ft
- Lower Right: (162.57079, 1,626.8749) ft
- X Increments: 10
- Y Increments: 10
- Starting Angle: 135 °
- Ending Angle: 180 °
- Angle Increments: 2

Right Grid
- Upper Left: (173.43814, 1,690.9923) ft
- Lower Left: (173.65549, 1,618.5071) ft
- Lower Right: (301.9989, 1,599.5979) ft
- X Increments: 10
- Y Increments: 10
- Angle Increments: 2

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.4167)
- Data Point: (14, 0.4167)

Data Point: (14.01, 1)

Tsr 18° bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (5.99, 1)
Data Point: (6, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	466.94718 ft	1,677.4443 ft
Point 2	466.94718 ft	1,539.7912 ft
Point 3	-0.07723 ft	1,539.7912 ft
Point 4	-0.07723 ft	1,654.2154 ft
Point 5	10.29203 ft	1,651.7249 ft
Point 6	14.97103 ft	1,649.7628 ft
Point 7	29.91364 ft	1,648.1025 ft
Point 8	41.6866 ft	1,645.6875 ft
Point 9	53.00437 ft	1,644.6211 ft
Point 10	56.52355 ft	1,647.0158 ft
Point 11	67.84371 ft	1,647.0158 ft
Point 12	89.03505 ft	1,652.4494 ft
Point 13	106.60393 ft	1,658.6982 ft
Point 14	124.62562 ft	1,667.2713 ft
Point 15	140.39837 ft	1,673.5351 ft
Point 16	146.58673 ft	1,675.9501 ft
Point 17	155.26551 ft	1,681.2328 ft
Point 18	160.62372 ft	1,686.4401 ft
Point 19	175.11352 ft	1,694.1378 ft
Point 20	185.48049 ft	1,695.2823 ft
Point 21	193.60311 ft	1,698.213 ft
Point 22	206.28169 ft	1,700.1752 ft
Point 23	211.32062 ft	1,701.5785 ft
Point 24	223.51852 ft	1,695.5566 ft
Point 25	237.1027 ft	1,689.5795 ft

Point 26	291.80171 ft	1,676.9915 ft
Point 27	453.44475 ft	1,678.4447 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14°	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27	62,735 ft²

Slip Results

Slip Surfaces Analysed: 75830 of 131769 converged

Current Slip Surface

Slip Surface: 100,786
Factor of Safety: 1.75
Volume: 2,330.9847 ft³
Weight: 291,373.09 lbf
Resisting Force: 148,994.9 lbf
Activating Force: 85,012.01 lbf
Slip Rank: 1 of 131,769 slip surfaces
Exit: (78.138597, 1,649.6555) ft
Entry: (217.5065, 1,698.5246) ft
Radius: 73.733077 ft
Center: (134.97062, 1,710.7419) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	80.862711 ft	1,648.5271 ft	0 psf	433.12425 psf	270.64607 psf	600 psf	0 psf	Tsr 6-14°
Slice 2	86.310937 ft	1,646.2704 ft	0 psf	968.51936 psf	605.19807 psf	600 psf	0 psf	Tsr 6-14°
Slice 3	90.201476 ft	1,644.6589 ft	0 psf	1,367.8083 psf	854.70147 psf	600 psf	0 psf	Tsr 6-14°
Slice 4	93.90724 ft	1,644.7955 ft	0 psf	1,089.6331 psf	354.04326 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 5	98.985916 ft	1,646.0351 ft	0 psf	1,157.4252 psf	376.07025 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 6	104.06459 ft	1,647.2747 ft	0 psf	1,225.2173 psf	398.09723 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 7	108.85664 ft	1,648.4443 ft	0 psf	1,321.5277 psf	429.39036 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 8	113.36206 ft	1,649.544 ft	0 psf	1,446.3563 psf	469.94964 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 9	117.86749 ft	1,650.6437 ft	0 psf	1,571.1849 psf	510.50892 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 10	122.37291 ft	1,651.7434 ft	0 psf	1,696.0135 psf	551.0682 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 11	127.25441 ft	1,652.9349 ft	0 psf	1,806.5526 psf	586.98453 psf	250.02 psf	0 psf	Tsr 6-14°

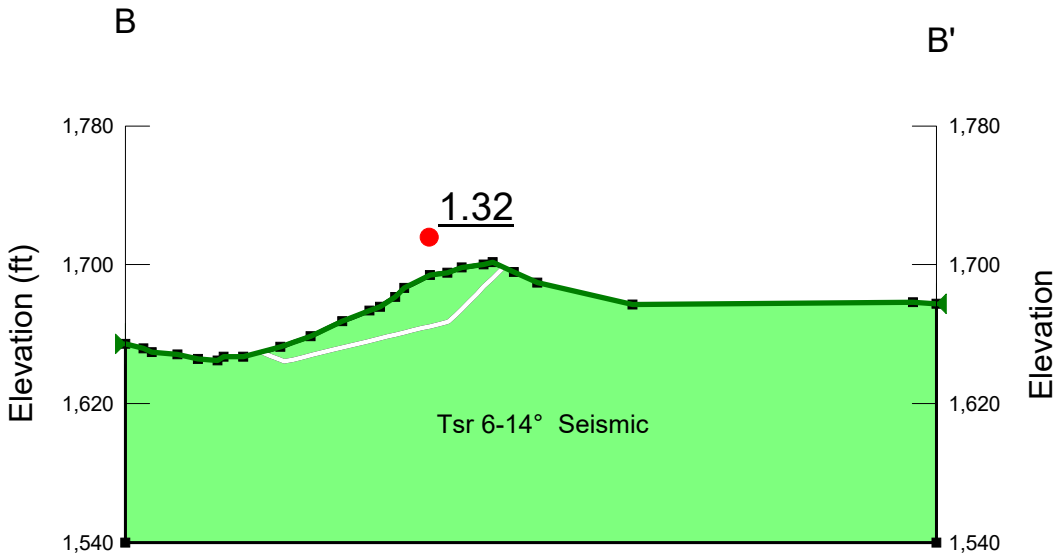
Slice 12	132.512 ft	1,654.2181 ft	0 psf	1,902.8021 psf	618.25789 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 13	137.76958 ft	1,655.5014 ft	0 psf	1,999.0517 psf	649.53126 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 14	143.49255 ft	1,656.8982 ft	0 psf	2,101.275 psf	682.74562 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 15	148.75643 ft	1,658.183 ft	0 psf	2,249.9998 psf	731.06924 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 16	153.09581 ft	1,659.2422 ft	0 psf	2,439.2524 psf	792.56114 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 17	157.94461 ft	1,660.4257 ft	0 psf	2,767.0941 psf	899.08339 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 18	163.03869 ft	1,661.669 ft	0 psf	3,083.2627 psf	1,001.8128 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 19	167.86862 ft	1,662.8479 ft	0 psf	3,249.169 psf	1,055.719 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 20	172.69855 ft	1,664.0268 ft	0 psf	3,415.0752 psf	1,109.6252 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 21	177.70526 ft	1,665.2488 ft	0 psf	3,456.5865 psf	1,123.113 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 22	182.88875 ft	1,666.514 ft	0 psf	3,373.7027 psf	1,096.1825 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 23	185.90909 ft	1,667.2512 ft	0 psf	3,338.2451 psf	1,084.6616 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 24	188.15404 ft	1,669.1722 ft	0 psf	2,246.5737 psf	1,403.8151 psf	600 psf	0 psf	Tsr 6-14°
Slice 25	191.78675 ft	1,672.8049 ft	0 psf	2,032.3355 psf	1,269.9442 psf	600 psf	0 psf	Tsr 6-14°
Slice 26	195.71621 ft	1,676.7343 ft	0 psf	1,760.4264 psf	1,100.0365 psf	600 psf	0 psf	Tsr 6-14°
Slice 27	199.9424 ft	1,680.9605 ft	0 psf	1,430.8464 psf	894.09206 psf	600 psf	0 psf	Tsr 6-14°
Slice 28	204.16859 ft	1,685.1867 ft	0 psf	1,101.2664 psf	688.14759 psf	600 psf	0 psf	Tsr 6-14°
Slice 29	208.80115 ft	1,689.8193 ft	0 psf	768.75678 psf	480.37255 psf	600 psf	0 psf	Tsr 6-14°
Slice 30	214.41356 ft	1,695.4317 ft	0 psf	174.78752 psf	109.21937 psf	600 psf	0 psf	Tsr 6-14°

Section B-B Tr 68203 SSA.gsz

2 -Translational Pseudostatic Global

Horz Seismic Coef.: 0.15

Name: Tsr 6-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)



LGC

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Pseudostatic Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 731
Date: 11/18/2020
Time: 09:56:32 AM
Tool Version: 10.1.0.18696
File Name: Section B-B Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 09:57:00 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Pseudostatic Global

Kind: SLOPE/W
Parent: 2 -Translational Static Global
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 6-14° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (-0.07723, 1,654.2154) ft
Right Coordinate: (466.94718, 1,677.4443) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 19° bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.5938)
- Data Point: (14, 0.5938)
- Data Point: (14.01, 1)

Tsr 375 bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.625)
- Data Point: (14, 0.625)
- Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	466.94718 ft	1,677.4443 ft
Point 2	466.94718 ft	1,539.7912 ft
Point 3	-0.07723 ft	1,539.7912 ft
Point 4	-0.07723 ft	1,654.2154 ft
Point 5	10.29203 ft	1,651.7249 ft
Point 6	14.97103 ft	1,649.7628 ft
Point 7	29.91364 ft	1,648.1025 ft
Point 8	41.6866 ft	1,645.6875 ft
Point 9	53.00437 ft	1,644.6211 ft
Point 10	56.52355 ft	1,647.0158 ft
Point 11	67.84371 ft	1,647.0158 ft
Point 12	89.03505 ft	1,652.4494 ft
Point 13	106.60393 ft	1,658.6982 ft
Point 14	124.62562 ft	1,667.2713 ft
Point 15	140.39837 ft	1,673.5351 ft
Point 16	146.58673 ft	1,675.9501 ft
Point 17	155.26551 ft	1,681.2328 ft
Point 18	160.62372 ft	1,686.4401 ft
Point 19	175.11352 ft	1,694.1378 ft
Point 20	185.48049 ft	1,695.2823 ft
Point 21	193.60311 ft	1,698.213 ft
Point 22	206.28169 ft	1,700.1752 ft
Point 23	211.32062 ft	1,701.5785 ft
Point 24	223.51852 ft	1,695.5566 ft
Point 25	237.1027 ft	1,689.5795 ft
Point 26	291.80171 ft	1,676.9915 ft
Point 27	453.44475 ft	1,678.4447 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14° Seismic	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27	62,735 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.32
Volume: 2,330.9847 ft³
Weight: 291,373.09 lbf

Resisting Force: 160,114.45 lbf
Activating Force: 121,089.8 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (78.138597, 1,649.6555) ft
Entry: (217.5065, 1,698.5246) ft
Radius: 73.733077 ft
Center: (134.97062, 1,710.7419) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	80.862711 ft	1,648.5271 ft	0 psf	516.49349 psf	322.74095 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 2	86.310937 ft	1,646.2704 ft	0 psf	1,083.9238 psf	677.31079 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 3	90.201476 ft	1,644.6589 ft	0 psf	1,507.1041 psf	941.74316 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 4	93.90724 ft	1,644.7955 ft	0 psf	1,038.5426 psf	357.63134 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 5	98.985916 ft	1,646.0351 ft	0 psf	1,105.1659 psf	380.57367 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 6	104.06459 ft	1,647.2747 ft	0 psf	1,171.7892 psf	403.516 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 7	108.85664 ft	1,648.4443 ft	0 psf	1,266.4392 psf	436.10953 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 8	113.36206 ft	1,649.544 ft	0 psf	1,389.1156 psf	478.35427 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 9	117.86749 ft	1,650.6437 ft	0 psf	1,511.7921 psf	520.599 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 10	122.37291 ft	1,651.7434 ft	0 psf	1,634.4686 psf	562.84374 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 11	127.25441 ft	1,652.9349 ft	0 psf	1,743.102 psf	600.25258 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 12	132.512 ft	1,654.2181 ft	0 psf	1,837.6921 psf	632.82553 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 13	137.76958 ft	1,655.5014 ft	0 psf	1,932.2822 psf	665.39848 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 14	143.49255 ft	1,656.8982 ft	0 psf	2,032.7431 psf	699.99307 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 15	148.75643 ft	1,658.183 ft	0 psf	2,178.9038 psf	750.3248 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 16	153.09581 ft	1,659.2422 ft	0 psf	2,364.8936 psf	814.37202 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 17	157.94461 ft	1,660.4257 ft	0 psf	2,687.0831 psf	925.32085 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 18	163.03869 ft	1,661.669 ft	0 psf	2,997.8008 psf	1,032.3192 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 19	167.86862 ft	1,662.8479 ft	0 psf	3,160.8467 psf	1,088.4655 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 20	172.69855 ft	1,664.0268 ft	0 psf	3,323.8926 psf	1,144.6118 psf	375 psf	0 psf	Tsr 6-14° Seismic

Slice 21	177.70526 ft	1,665.2488 ft	0 psf	3,364.6881 psf	1,158.6601 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 22	182.88875 ft	1,666.514 ft	0 psf	3,283.2334 psf	1,130.6105 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 23	185.90909 ft	1,667.2512 ft	0 psf	3,248.387 psf	1,118.6108 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 24	188.15404 ft	1,669.1722 ft	0 psf	1,993.123 psf	1,245.4415 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 25	191.78675 ft	1,672.8049 ft	0 psf	1,795.8174 psf	1,122.1512 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 26	195.71621 ft	1,676.7343 ft	0 psf	1,545.3989 psf	965.67241 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 27	199.9424 ft	1,680.9605 ft	0 psf	1,241.8676 psf	776.00498 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 28	204.16859 ft	1,685.1867 ft	0 psf	938.33622 psf	586.33754 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 29	208.80115 ft	1,689.8193 ft	0 psf	632.10687 psf	394.98421 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 30	214.41356 ft	1,695.4317 ft	0 psf	85.082576 psf	53.165494 psf	600 psf	0 psf	Tsr 6-14° Seismic

Section D-D Tr 68203 SSA.gsz 11/20/2020 11:57:04 AM

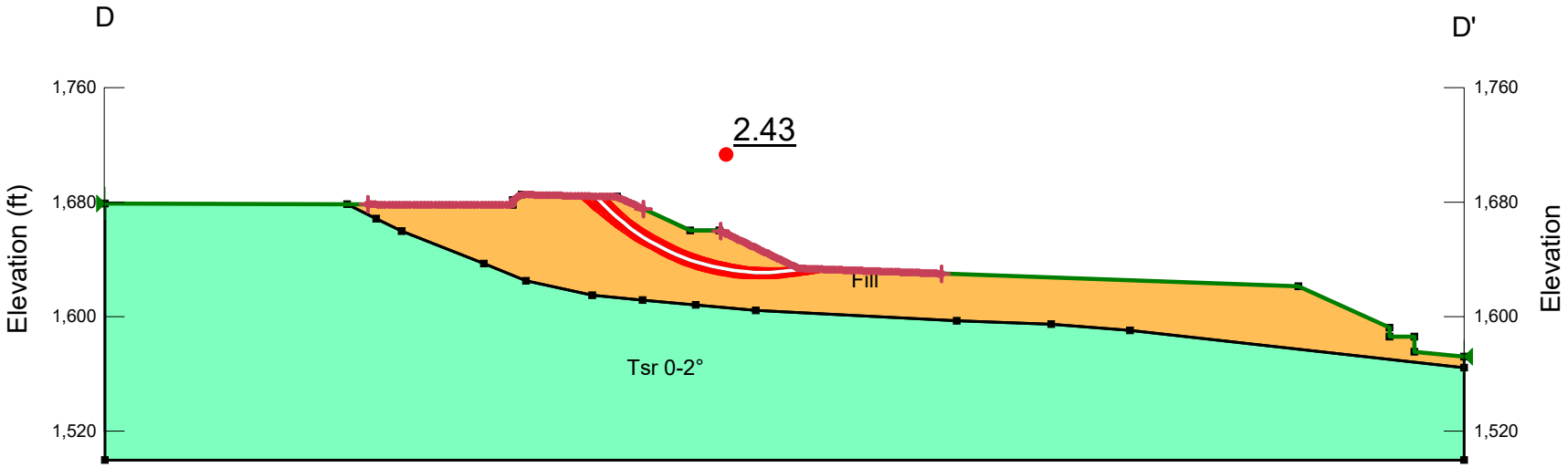
Section D-D Tr 68203 SSA.gsz

1 -Rotational Static (Upper Slope)

Horz Seismic Coef.: 0

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 0-2°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-2)°
C-Anisotropic Strength Fn.: Tsr 175 bedding 0-(-2)°



LGC	**LGC Valley, Inc** *GEOTECHNICAL CONSULTING* 2420 Grand Avenue, Vista, CA 92081 Phone 760-599-7000, Fax 760-599-7007	**Tentative Tract 68203** **Santa Clarita, CA**

Project No:	**203003-01**
Engineer:	**ACR**
Date:	**Nov 2020**

1 -Rotational Static (Upper Slope)

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 749
Date: 11/20/2020
Time: 11:57:04 AM
Tool Version: 10.1.0.18696
File Name: Section D-D Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 12:02:42 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Static (Upper Slope)

Kind: SLOPE/W
Method: Bishop
Settings
PWP Conditions from: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Distribution
F of S Calculation Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 0-2°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-2)°
C-Anisotropic Strength Fn.: Tsr 175 bedding 0-(-2)°
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (183.98347, 1,678.3283) ft
Left-Zone Right Coordinate: (376.46578, 1,675.2766) ft
Left-Zone Increment: 80
Right Type: Range
Right-Zone Left Coordinate: (430.69421, 1,659.7776) ft
Right-Zone Right Coordinate: (584.91196, 1,629.9889) ft
Right-Zone Increment: 80
Radius Increments: 14

Slip Surface Limits

Left Coordinate: (0.37029, 1,678.8933) ft
Right Coordinate: (949.95944, 1,572.1035) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 18° bedding 0-(-2)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.5625
Data Points: Inclination (°), Modifier Factor
Data Point: (-2.01, 1)
Data Point: (-2, 0.5625)
Data Point: (0, 0.5625)

Data Point: (0.01, 1)

Tsr 175 bedding 0-(-2)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.4167
Data Points: Inclination (°), Modifier Factor
Data Point: (-2.01, 1)
Data Point: (-2, 0.4167)
Data Point: (0, 0.4167)
Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	949.95944 ft	1,572.1035 ft
Point 2	949.95944 ft	1,499.6182 ft
Point 3	0.37029 ft	1,499.6182 ft
Point 4	0.37029 ft	1,678.8933 ft
Point 5	285.28293 ft	1,678.0167 ft
Point 6	285.28293 ft	1,681.429 ft
Point 7	291.83265 ft	1,685.2326 ft
Point 8	358.2382 ft	1,683.6478 ft
Point 9	409.17891 ft	1,660.2528 ft
Point 10	429.70613 ft	1,660.2528 ft
Point 11	485.09943 ft	1,633.6127 ft
Point 12	834.11347 ft	1,620.9414 ft
Point 13	898.0135 ft	1,592.382 ft
Point 14	898.0135 ft	1,585.7311 ft
Point 15	915.4882 ft	1,585.7311 ft
Point 16	915.4882 ft	1,575.5593 ft
Point 17	949.95944 ft	1,564.1824 ft
Point 18	716.78532 ft	1,590.2187 ft
Point 19	661.84483 ft	1,594.5204 ft
Point 20	595.5087 ft	1,596.9354 ft
Point 21	455.16894 ft	1,604.0535 ft
Point 22	413.43831 ft	1,608.2918 ft
Point 23	376.05462 ft	1,611.552 ft
Point 24	340.8444 ft	1,615.0295 ft
Point 25	294.54949 ft	1,625.1362 ft

Point 26	265.09897 ft	1,637.0902 ft
Point 27	207.61068 ft	1,659.9117 ft
Point 28	189.8969 ft	1,668.2795 ft
Point 29	169.46656 ft	1,678.373 ft

Regions

	Material	Points	Area
Region 1	Tsr 0-2°	4,3,2,17,18,19,20,21,22,23,24,25,26,27,28,29	1.1103e+05 ft²
Region 2	Fill	1,16,15,14,13,12,11,10,9,8,7,6,5,29,28,27,26,25,24,23,22,21,20,19,18,17	29,091 ft²

Slip Results

Slip Surfaces Analysed: 96067 of 98415 converged

Current Slip Surface

Slip Surface: 80,676
Factor of Safety: 2.43
Volume: 2,435.3164 ft³
Weight: 292,237.96 lbf
Resisting Moment: 33,907,911 lbf·ft
Activating Moment: 13,971,405 lbf·ft
Slip Rank: 1 of 98,415 slip surfaces
Exit: (488.82633, 1,633.4774) ft
Entry: (343.51583, 1,683.9992) ft
Radius: 155.78721 ft
Center: (460.66003, 1,786.6972) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	345.96956 ft	1,681.3284 ft	0 psf	133.28374 psf	76.951403 psf	325 psf	0 psf	Fill
Slice 2	350.87701 ft	1,676.2193 ft	0 psf	630.51946 psf	364.03058 psf	325 psf	0 psf	Fill
Slice 3	355.78447 ft	1,671.5462 ft	0 psf	1,099.2602 psf	634.65816 psf	325 psf	0 psf	Fill
Slice 4	360.55369 ft	1,667.3689 ft	0 psf	1,428.5985 psf	824.80174 psf	325 psf	0 psf	Fill
Slice 5	365.18466 ft	1,663.6301 ft	0 psf	1,617.1489 psf	933.66135 psf	325 psf	0 psf	Fill
Slice 6	369.81563 ft	1,660.1712 ft	0 psf	1,779.2798 psf	1,027.2676 psf	325 psf	0 psf	Fill
Slice 7	374.44661 ft	1,656.9699 ft	0 psf	1,916.313 psf	1,106.3838 psf	325 psf	0 psf	Fill
Slice 8	379.07758 ft	1,654.0075 ft	0 psf	2,029.3807 psf	1,171.6635 psf	325 psf	0 psf	Fill

Slice 9	383.70855 ft	1,651.2681 ft	0 psf	2,119.4539 psf	1,223.6673 psf	325 psf	0 psf	Fill
Slice 10	388.33953 ft	1,648.7387 ft	0 psf	2,187.3646 psf	1,262.8755 psf	325 psf	0 psf	Fill
Slice 11	392.9705 ft	1,646.4076 ft	0 psf	2,233.8244 psf	1,289.6991 psf	325 psf	0 psf	Fill
Slice 12	397.60148 ft	1,644.2653 ft	0 psf	2,259.4393 psf	1,304.4879 psf	325 psf	0 psf	Fill
Slice 13	402.23245 ft	1,642.3032 ft	0 psf	2,264.7214 psf	1,307.5375 psf	325 psf	0 psf	Fill
Slice 14	406.86342 ft	1,640.5141 ft	0 psf	2,250.0987 psf	1,299.0951 psf	325 psf	0 psf	Fill
Slice 15	411.74481 ft	1,638.8133 ft	0 psf	2,344.1056 psf	1,353.37 psf	325 psf	0 psf	Fill
Slice 16	416.87662 ft	1,637.213 ft	0 psf	2,548.1069 psf	1,471.1502 psf	325 psf	0 psf	Fill
Slice 17	422.00842 ft	1,635.8042 ft	0 psf	2,733.0783 psf	1,577.9435 psf	325 psf	0 psf	Fill
Slice 18	427.14023 ft	1,634.5816 ft	0 psf	2,899.1512 psf	1,673.8257 psf	325 psf	0 psf	Fill
Slice 19	432.22401 ft	1,633.5486 ft	0 psf	2,906.0381 psf	1,677.8019 psf	325 psf	0 psf	Fill
Slice 20	437.25976 ft	1,632.6985 ft	0 psf	2,750.8557 psf	1,588.2073 psf	325 psf	0 psf	Fill
Slice 21	442.29552 ft	1,632.017 ft	0 psf	2,573.2146 psf	1,485.6461 psf	325 psf	0 psf	Fill
Slice 22	447.33127 ft	1,631.5018 ft	0 psf	2,372.996 psf	1,370.0499 psf	325 psf	0 psf	Fill
Slice 23	452.36703 ft	1,631.1513 ft	0 psf	2,149.9978 psf	1,241.3018 psf	325 psf	0 psf	Fill
Slice 24	457.40278 ft	1,630.9644 ft	0 psf	1,903.931 psf	1,099.2351 psf	325 psf	0 psf	Fill
Slice 25	462.43853 ft	1,630.9405 ft	0 psf	1,634.4154 psf	943.63016 psf	325 psf	0 psf	Fill
Slice 26	467.47429 ft	1,631.0795 ft	0 psf	1,340.9728 psf	774.21101 psf	325 psf	0 psf	Fill
Slice 27	472.51004 ft	1,631.3819 ft	0 psf	1,023.0187 psf	590.6401 psf	325 psf	0 psf	Fill
Slice 28	477.5458 ft	1,631.8485 ft	0 psf	679.85097 psf	392.51214 psf	325 psf	0 psf	Fill
Slice 29	482.58155 ft	1,632.481 ft	0 psf	310.63648 psf	179.34606 psf	325 psf	0 psf	Fill
Slice 30	486.96288 ft	1,633.1582 ft	0 psf	72.300658 psf	41.742805 psf	325 psf	0 psf	Fill

Section D-D Tr 68203 SSA.gsz 11/20/2020 11:57:04 AM

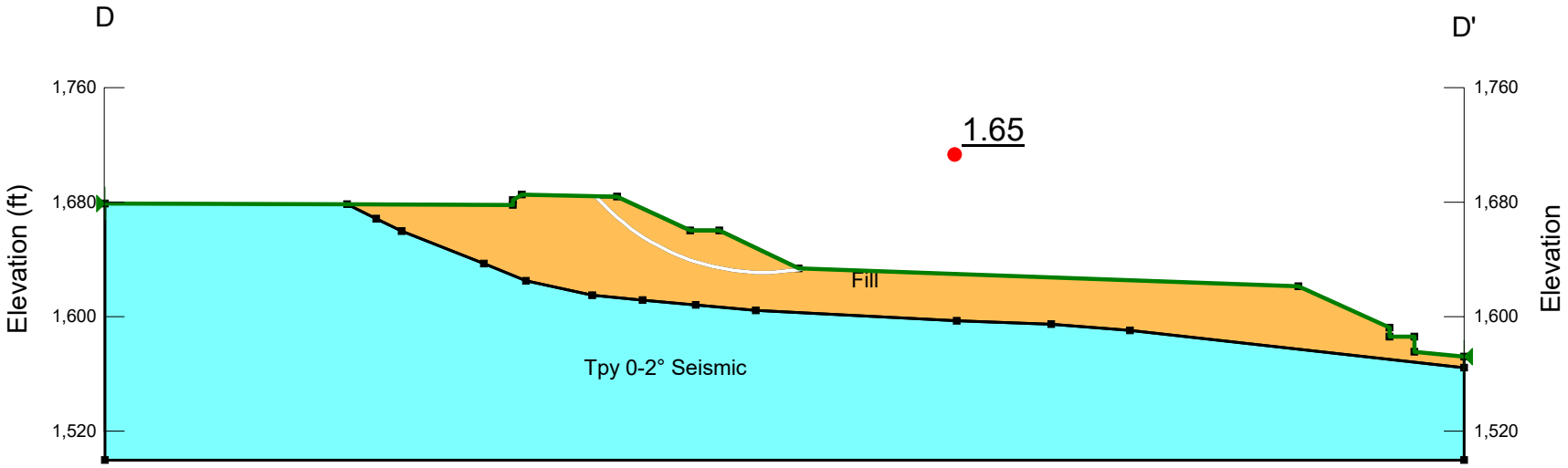
Section D-D Tr 68203 SSA.gsz

1 -Rotational Pseudostatic (Upper Slope)

Horz Seismic Coef.: 0.15

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tpy 0-2° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-2)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-2)° (Seismic)



LGC	**LGC Valley, Inc** *GEOTECHNICAL CONSULTING* 2420 Grand Avenue, Vista, CA 92081 Phone 760-599-7000, Fax 760-599-7007	**Tentative Tract 68203** **Santa Clarita, CA**	Project No: **203003-01** Engineer: **ACR** Date: **Nov 2020**

1 -Rotational Pseudostatic (Upper Slope)

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 749
Date: 11/20/2020
Time: 11:57:04 AM
Tool Version: 10.1.0.18696
File Name: Section D-D Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 12:03:38 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Pseudostatic (Upper Slope)

Kind: SLOPE/W
Parent: 1 -Rotational Static (Upper Slope)
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tpy 0-2° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-2)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-2)° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.37029, 1,678.8933) ft
Right Coordinate: (949.95944, 1,572.1035) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 375 bedding 0-(-2)° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 0.625
Data Points: Inclination (°), Modifier Factor
- Data Point: (-2.01, 1)
- Data Point: (-2, 0.625)
- Data Point: (0, 0.625)
- Data Point: (0.01, 1)

Tsr 19° bedding 0-(-2)° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 0.5936
Data Points: Inclination (°), Modifier Factor
- Data Point: (-2.01, 1)
- Data Point: (-2, 0.5936)
- Data Point: (0, 0.5936)

Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	949.95944 ft	1,572.1035 ft
Point 2	949.95944 ft	1,499.6182 ft
Point 3	0.37029 ft	1,499.6182 ft
Point 4	0.37029 ft	1,678.8933 ft
Point 5	285.28293 ft	1,678.0167 ft
Point 6	285.28293 ft	1,681.429 ft
Point 7	291.83265 ft	1,685.2326 ft
Point 8	358.2382 ft	1,683.6478 ft
Point 9	409.17891 ft	1,660.2528 ft
Point 10	429.70613 ft	1,660.2528 ft
Point 11	485.09943 ft	1,633.6127 ft
Point 12	834.11347 ft	1,620.9414 ft
Point 13	898.0135 ft	1,592.382 ft
Point 14	898.0135 ft	1,585.7311 ft
Point 15	915.4882 ft	1,585.7311 ft
Point 16	915.4882 ft	1,575.5593 ft
Point 17	949.95944 ft	1,564.1824 ft
Point 18	716.78532 ft	1,590.2187 ft
Point 19	661.84483 ft	1,594.5204 ft
Point 20	595.5087 ft	1,596.9354 ft
Point 21	455.16894 ft	1,604.0535 ft
Point 22	413.43831 ft	1,608.2918 ft
Point 23	376.05462 ft	1,611.552 ft
Point 24	340.8444 ft	1,615.0295 ft
Point 25	294.54949 ft	1,625.1362 ft
Point 26	265.09897 ft	1,637.0902 ft
Point 27	207.61068 ft	1,659.9117 ft
Point 28	189.8969 ft	1,668.2795 ft
Point 29	169.46656 ft	1,678.373 ft

Regions

	Material	Points	Area
Region 1	Tpy 0-2° Seismic	4,3,2,17,18,19,20,21,22,23,24,25,26,27,28,29	1.1103e+05 ft²
Region 2	Fill	1,16,15,14,13,12,11,10,9,8,7,6,5,29,28,27,26,25,24,23,22,21,20,19,18,17	29,091 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.65
Volume: 2,435.3164 ft³
Weight: 292,237.96 lbf
Resisting Moment: 32,773,177 lbf·ft
Activating Moment: 19,846,663 lbf·ft
Slip Rank: 1 of 1 slip surfaces
Exit: (488.82633, 1,633.4774) ft
Entry: (343.51583, 1,683.9992) ft
Radius: 155.78721 ft
Center: (460.66003, 1,786.6972) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	345.96956 ft	1,681.3284 ft	0 psf	72.032924 psf	41.588228 psf	325 psf	0 psf	Fill
Slice 2	350.87701 ft	1,676.2193 ft	0 psf	532.30761 psf	307.32794 psf	325 psf	0 psf	Fill
Slice 3	355.78447 ft	1,671.5462 ft	0 psf	971.13571 psf	560.68546 psf	325 psf	0 psf	Fill
Slice 4	360.55369 ft	1,667.3689 ft	0 psf	1,284.4535 psf	741.57959 psf	325 psf	0 psf	Fill
Slice 5	365.18466 ft	1,663.6301 ft	0 psf	1,468.6969 psf	847.95256 psf	325 psf	0 psf	Fill
Slice 6	369.81563 ft	1,660.1712 ft	0 psf	1,629.2889 psf	940.6704 psf	325 psf	0 psf	Fill
Slice 7	374.44661 ft	1,656.9699 ft	0 psf	1,767.1328 psf	1,020.2546 psf	325 psf	0 psf	Fill
Slice 8	379.07758 ft	1,654.0075 ft	0 psf	1,883.0071 psf	1,087.1547 psf	325 psf	0 psf	Fill
Slice 9	383.70855 ft	1,651.2681 ft	0 psf	1,977.579 psf	1,141.7557 psf	325 psf	0 psf	Fill
Slice 10	388.33953 ft	1,648.7387 ft	0 psf	2,051.4156 psf	1,184.3854 psf	325 psf	0 psf	Fill
Slice 11	392.9705 ft	1,646.4076 ft	0 psf	2,104.9943 psf	1,215.319 psf	325 psf	0 psf	Fill
Slice 12	397.60148 ft	1,644.2653 ft	0 psf	2,138.7102 psf	1,234.7849 psf	325 psf	0 psf	Fill
Slice 13	402.23245 ft	1,642.3032 ft	0 psf	2,152.8833 psf	1,242.9678 psf	325 psf	0 psf	Fill
Slice 14	406.86342 ft	1,640.5141 ft	0 psf	2,147.7637 psf	1,240.012 psf	325 psf	0 psf	Fill
Slice 15	411.74481 ft	1,638.8133 ft	0 psf	2,247.9442 psf	1,297.8512 psf	325 psf	0 psf	Fill

Slice 16	416.87662 ft	1,637.213 ft	0 psf	2,455.8862 psf	1,417.9065 psf	325 psf	0 psf	Fill
Slice 17	422.00842 ft	1,635.8042 ft	0 psf	2,646.6248 psf	1,528.0295 psf	325 psf	0 psf	Fill
Slice 18	427.14023 ft	1,634.5816 ft	0 psf	2,820.1244 psf	1,628.1996 psf	325 psf	0 psf	Fill
Slice 19	432.22401 ft	1,633.5486 ft	0 psf	2,838.5575 psf	1,638.8419 psf	325 psf	0 psf	Fill
Slice 20	437.25976 ft	1,632.6985 ft	0 psf	2,697.5121 psf	1,557.4093 psf	325 psf	0 psf	Fill
Slice 21	442.29552 ft	1,632.017 ft	0 psf	2,533.3297 psf	1,462.6186 psf	325 psf	0 psf	Fill
Slice 22	447.33127 ft	1,631.5018 ft	0 psf	2,345.6853 psf	1,354.282 psf	325 psf	0 psf	Fill
Slice 23	452.36703 ft	1,631.1513 ft	0 psf	2,134.1564 psf	1,232.1558 psf	325 psf	0 psf	Fill
Slice 24	457.40278 ft	1,630.9644 ft	0 psf	1,898.2166 psf	1,095.9359 psf	325 psf	0 psf	Fill
Slice 25	462.43853 ft	1,630.9405 ft	0 psf	1,637.2257 psf	945.25271 psf	325 psf	0 psf	Fill
Slice 26	467.47429 ft	1,631.0795 ft	0 psf	1,350.4181 psf	779.66425 psf	325 psf	0 psf	Fill
Slice 27	472.51004 ft	1,631.3819 ft	0 psf	1,036.8875 psf	598.6473 psf	325 psf	0 psf	Fill
Slice 28	477.5458 ft	1,631.8485 ft	0 psf	695.56869 psf	401.58677 psf	325 psf	0 psf	Fill
Slice 29	482.58155 ft	1,632.481 ft	0 psf	325.2135 psf	187.7621 psf	325 psf	0 psf	Fill
Slice 30	486.96288 ft	1,633.1582 ft	0 psf	85.213616 psf	49.198104 psf	325 psf	0 psf	Fill

Section D-D Tr 68203 SSA.gsz 11/20/2020 11:57:04 AM

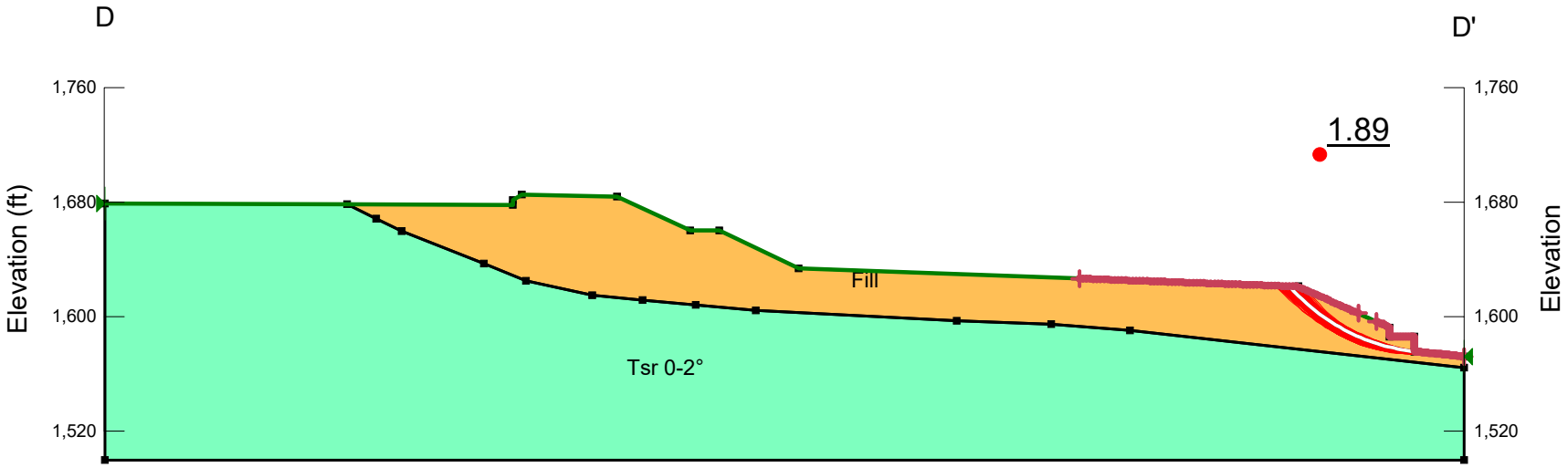
Section D-D Tr 68203 SSA.gsz

2 -Rotational Static (Lower Slope)

Horz Seismic Coef.: 0

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 0-2°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-2)°
C-Anisotropic Strength Fn.: Tsr 175 bedding 0-(-2)°



LGC

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Rotational Static (Lower Slope)

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 749
Date: 11/20/2020
Time: 11:57:04 AM
Tool Version: 10.1.0.18696
File Name: Section D-D Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 12:03:30 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Rotational Static (Lower Slope)

Kind: SLOPE/W
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 0-2°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-2)°
C-Anisotropic Strength Fn.: Tsr 175 bedding 0-(-2)°
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (681.15141, 1,626.4948) ft
Left-Zone Right Coordinate: (876.18231, 1,602.1392) ft
Left-Zone Increment: 80
Right Type: Range
Right-Zone Left Coordinate: (889.002, 1,596.4096) ft
Right-Zone Right Coordinate: (949.95944, 1,572.1035) ft
Right-Zone Increment: 80
Radius Increments: 14

Slip Surface Limits

Left Coordinate: (0.37029, 1,678.8933) ft
Right Coordinate: (949.95944, 1,572.1035) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 18° bedding 0-(-2)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 0.5625
Data Points: Inclination (°), Modifier Factor
- Data Point: (-2.01, 1)
- Data Point: (-2, 0.5625)
- Data Point: (0, 0.5625)

Data Point: (0.01, 1)

Tsr 175 bedding 0-(-2)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.4167
Data Points: Inclination (°), Modifier Factor
Data Point: (-2.01, 1)
Data Point: (-2, 0.4167)
Data Point: (0, 0.4167)
Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	949.95944 ft	1,572.1035 ft
Point 2	949.95944 ft	1,499.6182 ft
Point 3	0.37029 ft	1,499.6182 ft
Point 4	0.37029 ft	1,678.8933 ft
Point 5	285.28293 ft	1,678.0167 ft
Point 6	285.28293 ft	1,681.429 ft
Point 7	291.83265 ft	1,685.2326 ft
Point 8	358.2382 ft	1,683.6478 ft
Point 9	409.17891 ft	1,660.2528 ft
Point 10	429.70613 ft	1,660.2528 ft
Point 11	485.09943 ft	1,633.6127 ft
Point 12	834.11347 ft	1,620.9414 ft
Point 13	898.0135 ft	1,592.382 ft
Point 14	898.0135 ft	1,585.7311 ft
Point 15	915.4882 ft	1,585.7311 ft
Point 16	915.4882 ft	1,575.5593 ft
Point 17	949.95944 ft	1,564.1824 ft
Point 18	716.78532 ft	1,590.2187 ft
Point 19	661.84483 ft	1,594.5204 ft
Point 20	595.5087 ft	1,596.9354 ft
Point 21	455.16894 ft	1,604.0535 ft
Point 22	413.43831 ft	1,608.2918 ft
Point 23	376.05462 ft	1,611.552 ft
Point 24	340.8444 ft	1,615.0295 ft
Point 25	294.54949 ft	1,625.1362 ft

Point 26	265.09897 ft	1,637.0902 ft
Point 27	207.61068 ft	1,659.9117 ft
Point 28	189.8969 ft	1,668.2795 ft
Point 29	169.46656 ft	1,678.373 ft

Regions

	Material	Points	Area
Region 1	Tsr 0-2°	4,3,2,17,18,19,20,21,22,23,24,25,26,27,28,29	1.1103e+05 ft²
Region 2	Fill	1,16,15,14,13,12,11,10,9,8,7,6,5,29,28,27,26,25,24,23,22,21,20,19,18,17	29,091 ft²

Slip Results

Slip Surfaces Analysed: 98415 of 98415 converged

Current Slip Surface

Slip Surface: 72,365
Factor of Safety: 1.89
Volume: 1,058.2736 ft³
Weight: 126,992.84 lbf
Resisting Moment: 13,757,558 lbf·ft
Activating Moment: 7,275,930 lbf·ft
Slip Rank: 1 of 98,415 slip surfaces
Exit: (915.4882, 1,575.5612) ft
Entry: (827.9221, 1,621.1662) ft
Radius: 137.18557 ft
Center: (930.8285, 1,711.8864) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	829.46994 ft	1,619.4686 ft	0 psf	6.5711059 psf	3.7938297 psf	325 psf	0 psf	Fill
Slice 2	832.56563 ft	1,616.1818 ft	0 psf	305.95237 psf	176.64168 psf	325 psf	0 psf	Fill
Slice 3	835.56574 ft	1,613.1908 ft	0 psf	530.46896 psf	306.26639 psf	325 psf	0 psf	Fill
Slice 4	838.47029 ft	1,610.4665 ft	0 psf	678.65434 psf	391.82127 psf	325 psf	0 psf	Fill
Slice 5	841.37484 ft	1,607.8948 ft	0 psf	814.86478 psf	470.4624 psf	325 psf	0 psf	Fill
Slice 6	844.27938 ft	1,605.4645 ft	0 psf	939.53236 psf	542.43926 psf	325 psf	0 psf	Fill
Slice 7	847.18393 ft	1,603.1661 ft	0 psf	1,053.0487 psf	607.97797 psf	325 psf	0 psf	Fill
Slice 8	850.08848 ft	1,600.9914 ft	0 psf	1,155.7681 psf	667.28303 psf	325 psf	0 psf	Fill

Slice 9	852.99302 ft	1,598.9333 ft	0 psf	1,248.0103 psf	720.53908 psf	325 psf	0 psf	Fill
Slice 10	855.89757 ft	1,596.9854 ft	0 psf	1,330.0635 psf	767.91252 psf	325 psf	0 psf	Fill
Slice 11	858.80212 ft	1,595.1424 ft	0 psf	1,402.187 psf	809.55304 psf	325 psf	0 psf	Fill
Slice 12	861.70666 ft	1,593.3991 ft	0 psf	1,464.6136 psf	845.59505 psf	325 psf	0 psf	Fill
Slice 13	864.61121 ft	1,591.7515 ft	0 psf	1,517.5516 psf	876.15885 psf	325 psf	0 psf	Fill
Slice 14	867.51576 ft	1,590.1954 ft	0 psf	1,561.1871 psf	901.35179 psf	325 psf	0 psf	Fill
Slice 15	870.42031 ft	1,588.7275 ft	0 psf	1,595.685 psf	921.26917 psf	325 psf	0 psf	Fill
Slice 16	873.32485 ft	1,587.3446 ft	0 psf	1,621.1911 psf	935.99512 psf	325 psf	0 psf	Fill
Slice 17	876.2294 ft	1,586.044 ft	0 psf	1,637.833 psf	945.60332 psf	325 psf	0 psf	Fill
Slice 18	879.13395 ft	1,584.823 ft	0 psf	1,645.7213 psf	950.15761 psf	325 psf	0 psf	Fill
Slice 19	882.03849 ft	1,583.6795 ft	0 psf	1,644.9504 psf	949.71255 psf	325 psf	0 psf	Fill
Slice 20	884.94304 ft	1,582.6114 ft	0 psf	1,635.5996 psf	944.31388 psf	325 psf	0 psf	Fill
Slice 21	887.84759 ft	1,581.6167 ft	0 psf	1,617.7335 psf	933.99885 psf	325 psf	0 psf	Fill
Slice 22	890.75213 ft	1,580.6939 ft	0 psf	1,591.4024 psf	918.7966 psf	325 psf	0 psf	Fill
Slice 23	893.65668 ft	1,579.8415 ft	0 psf	1,556.6432 psf	898.72835 psf	325 psf	0 psf	Fill
Slice 24	896.56123 ft	1,579.058 ft	0 psf	1,513.4791 psf	873.80759 psf	325 psf	0 psf	Fill
Slice 25	899.46973 ft	1,578.3414 ft	0 psf	789.92897 psf	456.0657 psf	325 psf	0 psf	Fill
Slice 26	902.38217 ft	1,577.6907 ft	0 psf	872.11407 psf	503.5153 psf	325 psf	0 psf	Fill
Slice 27	905.29462 ft	1,577.1062 ft	0 psf	947.74886 psf	547.18306 psf	325 psf	0 psf	Fill
Slice 28	908.20708 ft	1,576.5868 ft	0 psf	1,016.7996 psf	587.04952 psf	325 psf	0 psf	Fill
Slice 29	911.11953 ft	1,576.1319 ft	0 psf	1,079.2247 psf	623.09065 psf	325 psf	0 psf	Fill
Slice 30	914.03197 ft	1,575.7409 ft	0 psf	1,134.9742 psf	655.27765 psf	325 psf	0 psf	Fill

Section D-D Tr 68203 SSA.gsz 11/20/2020 11:57:04 AM

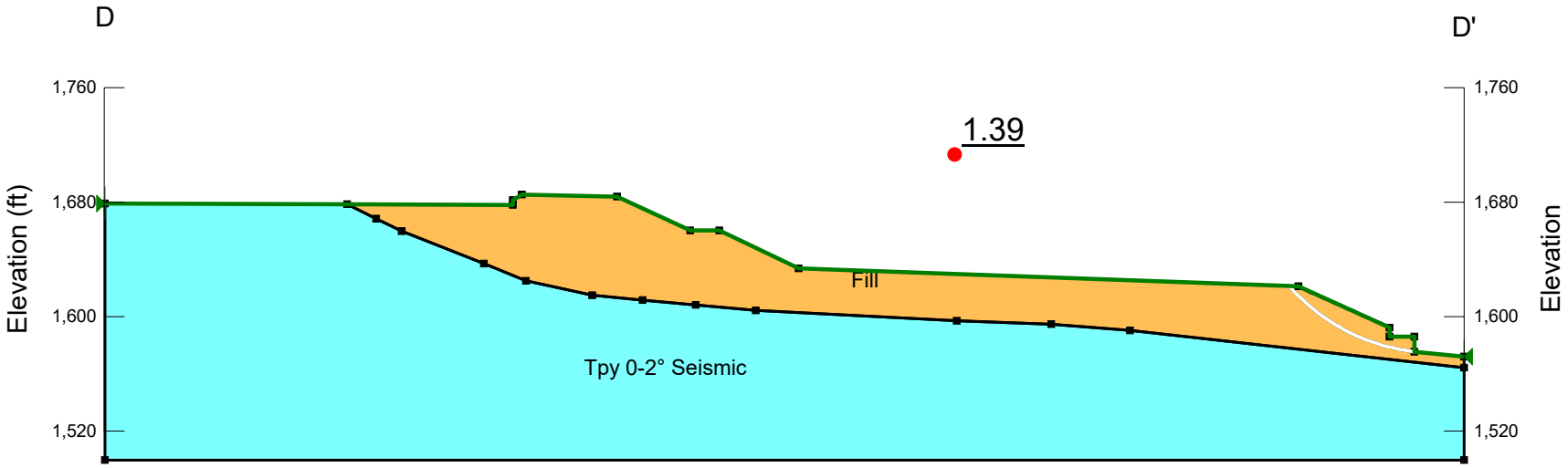
Section D-D Tr 68203 SSA.gsz

2 -Rotational Pseudostatic (Lower Slope)

Horz Seismic Coef.: 0.15

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tpy 0-2° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-2)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-2)° (Seismic)



LGC	**LGC Valley, Inc** *GEOTECHNICAL CONSULTING* 2420 Grand Avenue, Vista, CA 92081 Phone 760-599-7000, Fax 760-599-7007	**Tentative Tract 68203** **Santa Clarita, CA**	Project No: **203003-01** Engineer: **ACR** Date: **Nov 2020**

2 -Rotational Pseudostatic (Lower Slope)

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 749
Date: 11/20/2020
Time: 11:57:04 AM
Tool Version: 10.1.0.18696
File Name: Section D-D Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 12:03:40 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Rotational Pseudostatic (Lower Slope)

Kind: SLOPE/W
Parent: 2 -Rotational Static (Lower Slope)
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tpy 0-2° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-2)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-2)° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.37029, 1,678.8933) ft
Right Coordinate: (949.95944, 1,572.1035) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 375 bedding 0-(-2)° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 0.625
Data Points: Inclination (°), Modifier Factor
- Data Point: (-2.01, 1)
- Data Point: (-2, 0.625)
- Data Point: (0, 0.625)
- Data Point: (0.01, 1)

Tsr 19° bedding 0-(-2)° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 0.5936
Data Points: Inclination (°), Modifier Factor
- Data Point: (-2.01, 1)
- Data Point: (-2, 0.5936)
- Data Point: (0, 0.5936)

Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	949.95944 ft	1,572.1035 ft
Point 2	949.95944 ft	1,499.6182 ft
Point 3	0.37029 ft	1,499.6182 ft
Point 4	0.37029 ft	1,678.8933 ft
Point 5	285.28293 ft	1,678.0167 ft
Point 6	285.28293 ft	1,681.429 ft
Point 7	291.83265 ft	1,685.2326 ft
Point 8	358.2382 ft	1,683.6478 ft
Point 9	409.17891 ft	1,660.2528 ft
Point 10	429.70613 ft	1,660.2528 ft
Point 11	485.09943 ft	1,633.6127 ft
Point 12	834.11347 ft	1,620.9414 ft
Point 13	898.0135 ft	1,592.382 ft
Point 14	898.0135 ft	1,585.7311 ft
Point 15	915.4882 ft	1,585.7311 ft
Point 16	915.4882 ft	1,575.5593 ft
Point 17	949.95944 ft	1,564.1824 ft
Point 18	716.78532 ft	1,590.2187 ft
Point 19	661.84483 ft	1,594.5204 ft
Point 20	595.5087 ft	1,596.9354 ft
Point 21	455.16894 ft	1,604.0535 ft
Point 22	413.43831 ft	1,608.2918 ft
Point 23	376.05462 ft	1,611.552 ft
Point 24	340.8444 ft	1,615.0295 ft
Point 25	294.54949 ft	1,625.1362 ft
Point 26	265.09897 ft	1,637.0902 ft
Point 27	207.61068 ft	1,659.9117 ft
Point 28	189.8969 ft	1,668.2795 ft
Point 29	169.46656 ft	1,678.373 ft

Regions

	Material	Points	Area
Region 1	Tpy 0-2° Seismic	4,3,2,17,18,19,20,21,22,23,24,25,26,27,28,29	1.1103e+05 ft²
Region 2	Fill	1,16,15,14,13,12,11,10,9,8,7,6,5,29,28,27,26,25,24,23,22,21,20,19,18,17	29,091 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.39
Volume: 1,058.2736 ft³
Weight: 126,992.84 lbf
Resisting Moment: 13,144,098 lbf·ft
Activating Moment: 9,478,234.7 lbf·ft
Slip Rank: 1 of 1 slip surfaces
Exit: (915.4882, 1,575.5612) ft
Entry: (827.9221, 1,621.1662) ft
Radius: 137.18557 ft
Center: (930.8285, 1,711.8864) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	829.46994 ft	1,619.4686 ft	0 psf	-40.816166 psf	-23.565224 psf	325 psf	0 psf	Fill
Slice 2	832.56563 ft	1,616.1818 ft	0 psf	236.88918 psf	136.76803 psf	325 psf	0 psf	Fill
Slice 3	835.56574 ft	1,613.1908 ft	0 psf	447.27677 psf	258.23537 psf	325 psf	0 psf	Fill
Slice 4	838.47029 ft	1,610.4665 ft	0 psf	588.06226 psf	339.5179 psf	325 psf	0 psf	Fill
Slice 5	841.37484 ft	1,607.8948 ft	0 psf	718.4377 psf	414.7902 psf	325 psf	0 psf	Fill
Slice 6	844.27938 ft	1,605.4645 ft	0 psf	838.66926 psf	484.20592 psf	325 psf	0 psf	Fill
Slice 7	847.18393 ft	1,603.1661 ft	0 psf	949.00393 psf	547.90767 psf	325 psf	0 psf	Fill
Slice 8	850.08848 ft	1,600.9914 ft	0 psf	1,049.6686 psf	606.02645 psf	325 psf	0 psf	Fill
Slice 9	852.99302 ft	1,598.9333 ft	0 psf	1,140.8701 psf	658.68167 psf	325 psf	0 psf	Fill
Slice 10	855.89757 ft	1,596.9854 ft	0 psf	1,222.7957 psf	705.98141 psf	325 psf	0 psf	Fill
Slice 11	858.80212 ft	1,595.1424 ft	0 psf	1,295.6135 psf	748.02283 psf	325 psf	0 psf	Fill
Slice 12	861.70666 ft	1,593.3991 ft	0 psf	1,359.4738 psf	784.89257 psf	325 psf	0 psf	Fill
Slice 13	864.61121 ft	1,591.7515 ft	0 psf	1,414.5092 psf	816.66727 psf	325 psf	0 psf	Fill
Slice 14	867.51576 ft	1,590.1954 ft	0 psf	1,460.8359 psf	843.41403 psf	325 psf	0 psf	Fill
Slice 15	870.42031 ft	1,588.7275 ft	0 psf	1,498.5544 psf	865.19076 psf	325 psf	0 psf	Fill

Slice 16	873.32485 ft	1,587.3446 ft	0 psf	1,527.7496 psf	882.04662 psf	325 psf	0 psf	Fill
Slice 17	876.2294 ft	1,586.044 ft	0 psf	1,548.4921 psf	894.02233 psf	325 psf	0 psf	Fill
Slice 18	879.13395 ft	1,584.823 ft	0 psf	1,560.8384 psf	901.15045 psf	325 psf	0 psf	Fill
Slice 19	882.03849 ft	1,583.6795 ft	0 psf	1,564.831 psf	903.45558 psf	325 psf	0 psf	Fill
Slice 20	884.94304 ft	1,582.6114 ft	0 psf	1,560.4991 psf	900.9546 psf	325 psf	0 psf	Fill
Slice 21	887.84759 ft	1,581.6167 ft	0 psf	1,547.8589 psf	893.65674 psf	325 psf	0 psf	Fill
Slice 22	890.75213 ft	1,580.6939 ft	0 psf	1,526.9131 psf	881.5637 psf	325 psf	0 psf	Fill
Slice 23	893.65668 ft	1,579.8415 ft	0 psf	1,497.6517 psf	864.66963 psf	325 psf	0 psf	Fill
Slice 24	896.56123 ft	1,579.058 ft	0 psf	1,460.0516 psf	842.96116 psf	325 psf	0 psf	Fill
Slice 25	899.46973 ft	1,578.3414 ft	0 psf	757.96681 psf	437.61234 psf	325 psf	0 psf	Fill
Slice 26	902.38217 ft	1,577.6907 ft	0 psf	841.24134 psf	485.69091 psf	325 psf	0 psf	Fill
Slice 27	905.29462 ft	1,577.1062 ft	0 psf	918.45103 psf	530.26795 psf	325 psf	0 psf	Fill
Slice 28	908.20708 ft	1,576.5868 ft	0 psf	989.52768 psf	571.30407 psf	325 psf	0 psf	Fill
Slice 29	911.11953 ft	1,576.1319 ft	0 psf	1,054.3955 psf	608.75553 psf	325 psf	0 psf	Fill
Slice 30	914.03197 ft	1,575.7409 ft	0 psf	1,112.9706 psf	642.5739 psf	325 psf	0 psf	Fill

Section D-D Tr 68203 SSA.gsz 11/20/2020 11:57:04 AM

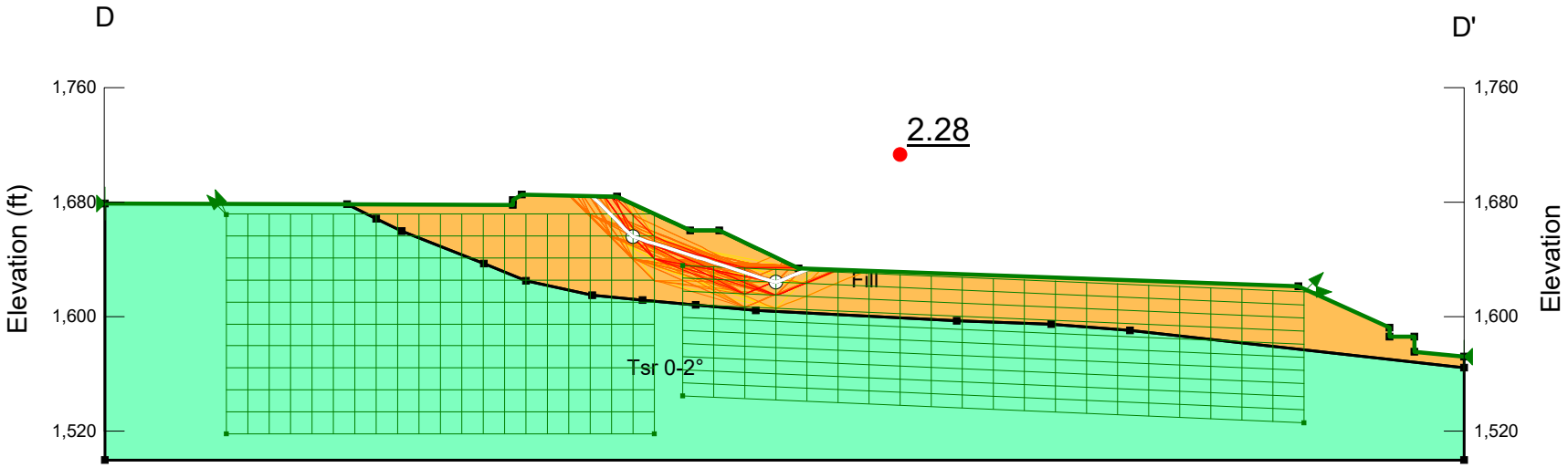
Section D-D Tr 68203 SSA.gsz

3 -Translational Static Global

Horz Seismic Coef.: 0

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 0-2°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-2)°
C-Anisotropic Strength Fn.: Tsr 175 bedding 0-(-2)°



LGC	**LGC Valley, Inc** *GEOTECHNICAL CONSULTING* 2420 Grand Avenue, Vista, CA 92081 Phone 760-599-7000, Fax 760-599-7007	**Tentative Tract 68203** **Santa Clarita, CA**

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

3 -Translational Static Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 749
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Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 12:03:26 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

3 -Translational Static Global

Kind: SLOPE/W
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 1
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 0-2°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-2)°
C-Anisotropic Strength Fn.: Tsr 175 bedding 0-(-2)°
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.37029, 1,678.8933) ft
Right Coordinate: (949.95944, 1,572.1035) ft

Slip Surface Block

Left Grid
- Upper Left: (85.40355, 1,671.2074) ft
- Lower Left: (85.40355, 1,517.8823) ft
- Lower Right: (384.18209, 1,517.8823) ft
- X Increments: 20
- Y Increments: 10
- Starting Angle: 115 °
- Ending Angle: 135 °
- Angle Increments: 2

Right Grid
- Upper Left: (404.05006, 1,635.8371) ft
- Lower Left: (404.05006, 1,544.437) ft
- Lower Right: (838.06529, 1,525.7784) ft
- X Increments: 20
- Y Increments: 10
- Angle Increments: 2

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 18° bedding 0-(-2)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.5625
Data Points: Inclination (°), Modifier Factor
Data Point: (-2.01, 1)
Data Point: (-2, 0.5625)
Data Point: (0, 0.5625)
Data Point: (0.01, 1)

Tsr 175 bedding 0-(-2)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.4167
Data Points: Inclination (°), Modifier Factor
Data Point: (-2.01, 1)
Data Point: (-2, 0.4167)
Data Point: (0, 0.4167)
Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	949.95944 ft	1,572.1035 ft
Point 2	949.95944 ft	1,499.6182 ft
Point 3	0.37029 ft	1,499.6182 ft
Point 4	0.37029 ft	1,678.8933 ft
Point 5	285.28293 ft	1,678.0167 ft
Point 6	285.28293 ft	1,681.429 ft
Point 7	291.83265 ft	1,685.2326 ft
Point 8	358.2382 ft	1,683.6478 ft
Point 9	409.17891 ft	1,660.2528 ft
Point 10	429.70613 ft	1,660.2528 ft
Point 11	485.09943 ft	1,633.6127 ft
Point 12	834.11347 ft	1,620.9414 ft
Point 13	898.0135 ft	1,592.382 ft
Point 14	898.0135 ft	1,585.7311 ft
Point 15	915.4882 ft	1,585.7311 ft
Point 16	915.4882 ft	1,575.5593 ft
Point 17	949.95944 ft	1,564.1824 ft
Point 18	716.78532 ft	1,590.2187 ft
Point 19	661.84483 ft	1,594.5204 ft

Point 20	595.5087 ft	1,596.9354 ft
Point 21	455.16894 ft	1,604.0535 ft
Point 22	413.43831 ft	1,608.2918 ft
Point 23	376.05462 ft	1,611.552 ft
Point 24	340.8444 ft	1,615.0295 ft
Point 25	294.54949 ft	1,625.1362 ft
Point 26	265.09897 ft	1,637.0902 ft
Point 27	207.61068 ft	1,659.9117 ft
Point 28	189.8969 ft	1,668.2795 ft
Point 29	169.46656 ft	1,678.373 ft

Regions

	Material	Points	Area
Region 1	Tsr 0-2°	4,3,2,17,18,19,20,21,22,23,24,25,26,27,28,29	1.1103e+05 ft²
Region 2	Fill	1,16,15,14,13,12,11,10,9,8,7,6,5,29,28,27,26,25,24,23,22,21,20,19,18,17	29,091 ft²

Slip Results

Slip Surfaces Analysed: 378474 of 480249 converged

Current Slip Surface

Slip Surface: 434,396
Factor of Safety: 2.28
Volume: 2,562.2574 ft³
Weight: 307,470.89 lbf
Resisting Force: 209,007.87 lbf
Activating Force: 91,779.633 lbf
Slip Rank: 1 of 480,249 slip surfaces
Exit: (492.00013, 1,633.3622) ft
Entry: (341.06029, 1,684.0578) ft
Radius: 78.573473 ft
Center: (429.30042, 1,696.7317) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	343.92328 ft	1,681.1948 ft	0 psf	154.05477 psf	88.943564 psf	325 psf	0 psf	Fill
Slice 2	349.64925 ft	1,675.4688 ft	0 psf	689.39775 psf	398.02398 psf	325 psf	0 psf	Fill
Slice 3	355.37522 ft	1,669.7428 ft	0 psf	1,224.7407 psf	707.10439 psf	325 psf	0 psf	Fill
Slice 4	360.98944 ft	1,664.1286 ft	0 psf	1,634.9044 psf	943.9125 psf	325 psf	0 psf	Fill
Slice 5	366.49192 ft	1,658.6261 ft	0 psf	1,919.8888 psf	1,108.4483 psf	325 psf	0 psf	Fill

Slice 6	371.73915 ft	1,655.076 ft	0 psf	2,441.4066 psf	1,409.5468 psf	325 psf	0 psf	Fill
Slice 7	376.73112 ft	1,653.4783 ft	0 psf	2,364.2627 psf	1,365.0077 psf	325 psf	0 psf	Fill
Slice 8	381.72308 ft	1,651.8806 ft	0 psf	2,287.1187 psf	1,320.4686 psf	325 psf	0 psf	Fill
Slice 9	386.71505 ft	1,650.2829 ft	0 psf	2,209.9748 psf	1,275.9295 psf	325 psf	0 psf	Fill
Slice 10	391.70702 ft	1,648.6852 ft	0 psf	2,132.8309 psf	1,231.3905 psf	325 psf	0 psf	Fill
Slice 11	396.69899 ft	1,647.0875 ft	0 psf	2,055.6869 psf	1,186.8514 psf	325 psf	0 psf	Fill
Slice 12	401.69096 ft	1,645.4898 ft	0 psf	1,978.543 psf	1,142.3123 psf	325 psf	0 psf	Fill
Slice 13	406.68293 ft	1,643.892 ft	0 psf	1,901.399 psf	1,097.7732 psf	325 psf	0 psf	Fill
Slice 14	411.74481 ft	1,642.272 ft	0 psf	1,953.9964 psf	1,128.1403 psf	325 psf	0 psf	Fill
Slice 15	416.87662 ft	1,640.6295 ft	0 psf	2,136.3351 psf	1,233.4136 psf	325 psf	0 psf	Fill
Slice 16	422.00842 ft	1,638.987 ft	0 psf	2,318.6738 psf	1,338.6869 psf	325 psf	0 psf	Fill
Slice 17	427.14023 ft	1,637.3446 ft	0 psf	2,501.0125 psf	1,443.9602 psf	325 psf	0 psf	Fill
Slice 18	432.17152 ft	1,635.7343 ft	0 psf	2,548.1525 psf	1,471.1765 psf	325 psf	0 psf	Fill
Slice 19	437.1023 ft	1,634.1561 ft	0 psf	2,460.0939 psf	1,420.3359 psf	325 psf	0 psf	Fill
Slice 20	442.03307 ft	1,632.578 ft	0 psf	2,372.0353 psf	1,369.4952 psf	325 psf	0 psf	Fill
Slice 21	446.96385 ft	1,630.9999 ft	0 psf	2,283.9767 psf	1,318.6545 psf	325 psf	0 psf	Fill
Slice 22	451.89463 ft	1,629.4217 ft	0 psf	2,195.918 psf	1,267.8139 psf	325 psf	0 psf	Fill
Slice 23	456.8254 ft	1,627.8436 ft	0 psf	2,107.8594 psf	1,216.9732 psf	325 psf	0 psf	Fill
Slice 24	461.75618 ft	1,626.2655 ft	0 psf	2,019.8008 psf	1,166.1325 psf	325 psf	0 psf	Fill
Slice 25	466.68696 ft	1,624.6874 ft	0 psf	1,931.7422 psf	1,115.2919 psf	325 psf	0 psf	Fill
Slice 26	471.81019 ft	1,624.9992 ft	0 psf	2,077.08 psf	1,199.2027 psf	325 psf	0 psf	Fill
Slice 27	477.12589 ft	1,627.201 ft	0 psf	1,439.2791 psf	830.96815 psf	325 psf	0 psf	Fill
Slice 28	482.44158 ft	1,629.4029 ft	0 psf	801.47812 psf	462.73361 psf	325 psf	0 psf	Fill
Slice 29	488.54978 ft	1,631.933 ft	0 psf	274.21924 psf	158.32055 psf	325 psf	0 psf	Fill

Section D-D Tr 68203 SSA.gsz 11/20/2020 11:57:04 AM

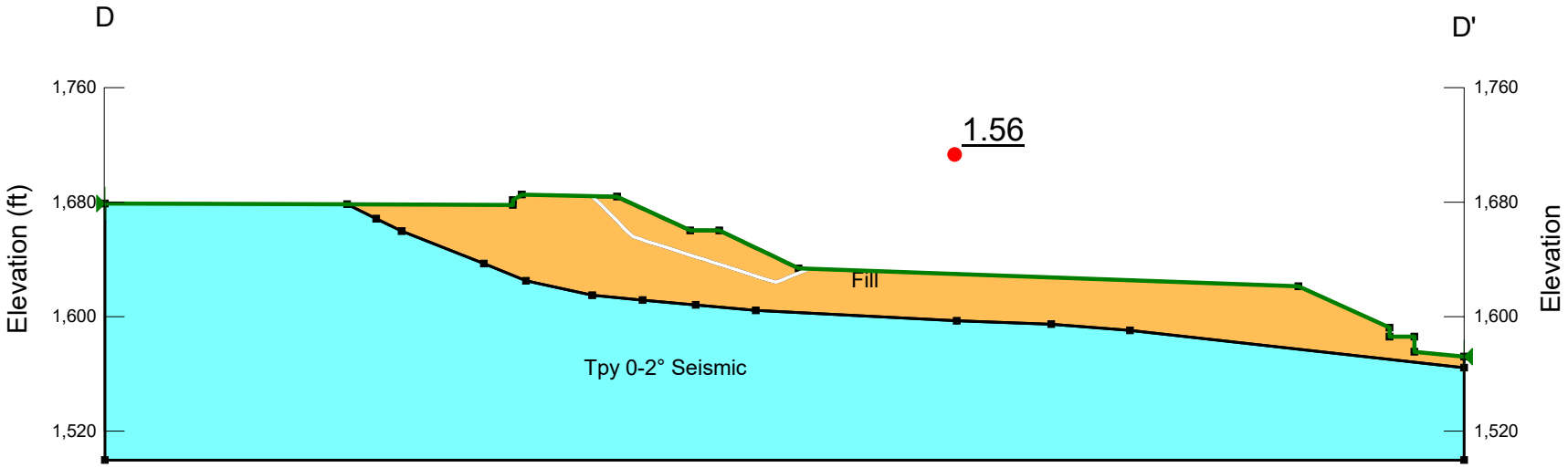
Section D-D Tr 68203 SSA.gsz

3 -Translational Pseudostatic Global

Horz Seismic Coef.: 0.15

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tpy 0-2° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-2)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-2)° (Seismic)



LGC

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

3 -Translational Pseudostatic Global

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Project Settings

Unit System: U.S. Customary Units

Analysis Settings

3 -Translational Pseudostatic Global

Kind: SLOPE/W
Parent: 3 -Translational Static Global
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tpy 0-2° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-2)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-2)° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.37029, 1,678.8933) ft
Right Coordinate: (949.95944, 1,572.1035) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 375 bedding 0-(-2)° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 0.625
Data Points: Inclination (°), Modifier Factor
- Data Point: (-2.01, 1)
- Data Point: (-2, 0.625)
- Data Point: (0, 0.625)
- Data Point: (0.01, 1)

Tsr 19° bedding 0-(-2)° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 0.5936
Data Points: Inclination (°), Modifier Factor
- Data Point: (-2.01, 1)
- Data Point: (-2, 0.5936)
- Data Point: (0, 0.5936)

Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	949.95944 ft	1,572.1035 ft
Point 2	949.95944 ft	1,499.6182 ft
Point 3	0.37029 ft	1,499.6182 ft
Point 4	0.37029 ft	1,678.8933 ft
Point 5	285.28293 ft	1,678.0167 ft
Point 6	285.28293 ft	1,681.429 ft
Point 7	291.83265 ft	1,685.2326 ft
Point 8	358.2382 ft	1,683.6478 ft
Point 9	409.17891 ft	1,660.2528 ft
Point 10	429.70613 ft	1,660.2528 ft
Point 11	485.09943 ft	1,633.6127 ft
Point 12	834.11347 ft	1,620.9414 ft
Point 13	898.0135 ft	1,592.382 ft
Point 14	898.0135 ft	1,585.7311 ft
Point 15	915.4882 ft	1,585.7311 ft
Point 16	915.4882 ft	1,575.5593 ft
Point 17	949.95944 ft	1,564.1824 ft
Point 18	716.78532 ft	1,590.2187 ft
Point 19	661.84483 ft	1,594.5204 ft
Point 20	595.5087 ft	1,596.9354 ft
Point 21	455.16894 ft	1,604.0535 ft
Point 22	413.43831 ft	1,608.2918 ft
Point 23	376.05462 ft	1,611.552 ft
Point 24	340.8444 ft	1,615.0295 ft
Point 25	294.54949 ft	1,625.1362 ft
Point 26	265.09897 ft	1,637.0902 ft
Point 27	207.61068 ft	1,659.9117 ft
Point 28	189.8969 ft	1,668.2795 ft
Point 29	169.46656 ft	1,678.373 ft

Regions

	Material	Points	Area
Region 1	Tpy 0-2° Seismic	4,3,2,17,18,19,20,21,22,23,24,25,26,27,28,29	1.1103e+05 ft²
Region 2	Fill	1,16,15,14,13,12,11,10,9,8,7,6,5,29,28,27,26,25,24,23,22,21,20,19,18,17	29,091 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.56
Volume: 2,562.2574 ft³
Weight: 307,470.89 lbf
Resisting Force: 202,562.65 lbf
Activating Force: 129,994.49 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (492.00013, 1,633.3622) ft
Entry: (341.06029, 1,684.0578) ft
Radius: 78.573473 ft
Center: (429.30042, 1,696.7317) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	343.92328 ft	1,681.1948 ft	0 psf	92.77406 psf	53.563129 psf	325 psf	0 psf	Fill
Slice 2	349.64925 ft	1,675.4688 ft	0 psf	582.3604 psf	336.22593 psf	325 psf	0 psf	Fill
Slice 3	355.37522 ft	1,669.7428 ft	0 psf	1,071.9467 psf	618.88874 psf	325 psf	0 psf	Fill
Slice 4	360.98944 ft	1,664.1286 ft	0 psf	1,447.0531 psf	835.45647 psf	325 psf	0 psf	Fill
Slice 5	366.49192 ft	1,658.6261 ft	0 psf	1,707.6793 psf	985.92913 psf	325 psf	0 psf	Fill
Slice 6	371.73915 ft	1,655.076 ft	0 psf	2,340.7356 psf	1,351.4243 psf	325 psf	0 psf	Fill
Slice 7	376.73112 ft	1,653.4783 ft	0 psf	2,266.1766 psf	1,308.3777 psf	325 psf	0 psf	Fill
Slice 8	381.72308 ft	1,651.8806 ft	0 psf	2,191.6177 psf	1,265.3311 psf	325 psf	0 psf	Fill
Slice 9	386.71505 ft	1,650.2829 ft	0 psf	2,117.0587 psf	1,222.2844 psf	325 psf	0 psf	Fill
Slice 10	391.70702 ft	1,648.6852 ft	0 psf	2,042.4998 psf	1,179.2378 psf	325 psf	0 psf	Fill
Slice 11	396.69899 ft	1,647.0875 ft	0 psf	1,967.9408 psf	1,136.1912 psf	325 psf	0 psf	Fill
Slice 12	401.69096 ft	1,645.4898 ft	0 psf	1,893.3819 psf	1,093.1445 psf	325 psf	0 psf	Fill
Slice 13	406.68293 ft	1,643.892 ft	0 psf	1,818.8229 psf	1,050.0979 psf	325 psf	0 psf	Fill
Slice 14	411.74481 ft	1,642.272 ft	0 psf	1,869.6578 psf	1,079.4475 psf	325 psf	0 psf	Fill
Slice 15	416.87662 ft	1,640.6295 ft	0 psf	2,045.8866 psf	1,181.1932 psf	325 psf	0 psf	Fill

Slice 16	422.00842 ft	1,638.987 ft	0 psf	2,222.1153 psf	1,282.9389 psf	325 psf	0 psf	Fill
Slice 17	427.14023 ft	1,637.3446 ft	0 psf	2,398.3441 psf	1,384.6846 psf	325 psf	0 psf	Fill
Slice 18	432.17152 ft	1,635.7343 ft	0 psf	2,443.9045 psf	1,410.9889 psf	325 psf	0 psf	Fill
Slice 19	437.1023 ft	1,634.1561 ft	0 psf	2,358.7966 psf	1,361.8519 psf	325 psf	0 psf	Fill
Slice 20	442.03307 ft	1,632.578 ft	0 psf	2,273.6888 psf	1,312.7148 psf	325 psf	0 psf	Fill
Slice 21	446.96385 ft	1,630.9999 ft	0 psf	2,188.5809 psf	1,263.5778 psf	325 psf	0 psf	Fill
Slice 22	451.89463 ft	1,629.4217 ft	0 psf	2,103.473 psf	1,214.4407 psf	325 psf	0 psf	Fill
Slice 23	456.8254 ft	1,627.8436 ft	0 psf	2,018.3651 psf	1,165.3036 psf	325 psf	0 psf	Fill
Slice 24	461.75618 ft	1,626.2655 ft	0 psf	1,933.2572 psf	1,116.1666 psf	325 psf	0 psf	Fill
Slice 25	466.68696 ft	1,624.6874 ft	0 psf	1,848.1493 psf	1,067.0295 psf	325 psf	0 psf	Fill
Slice 26	471.81019 ft	1,624.9992 ft	0 psf	2,228.2978 psf	1,286.5084 psf	325 psf	0 psf	Fill
Slice 27	477.12589 ft	1,627.201 ft	0 psf	1,553.9639 psf	897.1815 psf	325 psf	0 psf	Fill
Slice 28	482.44158 ft	1,629.4029 ft	0 psf	879.63004 psf	507.85464 psf	325 psf	0 psf	Fill
Slice 29	488.54978 ft	1,631.933 ft	0 psf	322.17001 psf	186.00494 psf	325 psf	0 psf	Fill

Section D-D Tr 68203 SSA.gsz 11/20/2020 11:57:04 AM

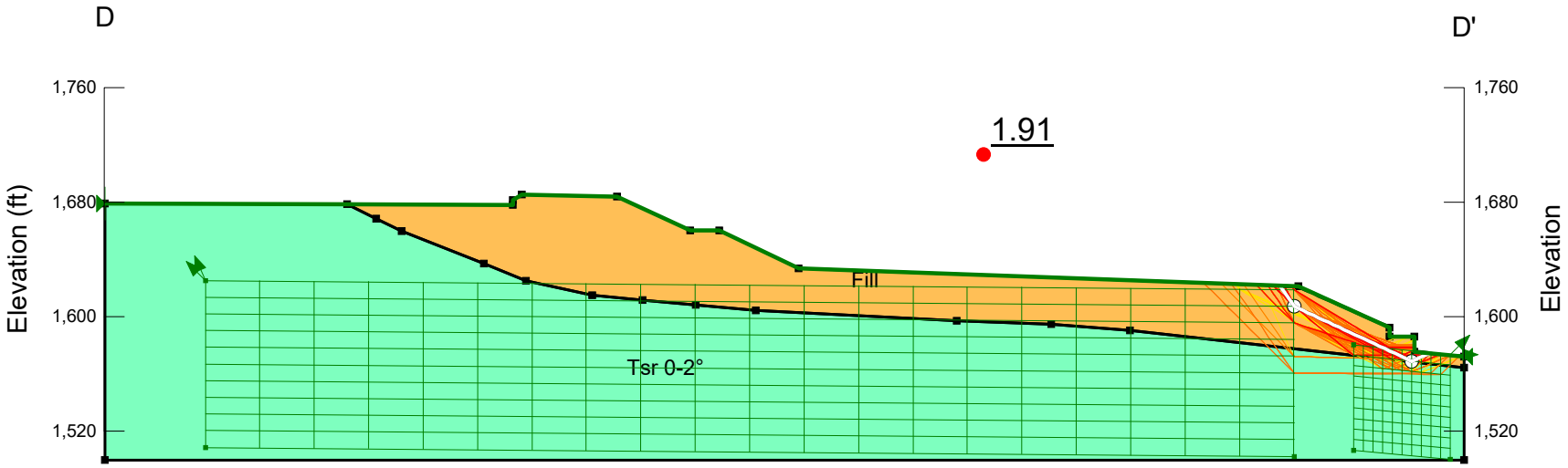
Section D-D Tr 68203 SSA.gsz

4 -Translational Static Lower Slope

Horz Seismic Coef.: 0

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 0-2°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-2)°
C-Anisotropic Strength Fn.: Tsr 175 bedding 0-(-2)°



LGC

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

4 -Translational Static Lower Slope

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 749
Date: 11/20/2020
Time: 11:57:04 AM
Tool Version: 10.1.0.18696
File Name: Section D-D Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 12:03:44 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

4 -Translational Static Lower Slope

Kind: SLOPE/W
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 1
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 0-2°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-2)°
C-Anisotropic Strength Fn.: Tsr 175 bedding 0-(-2)°
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.37029, 1,678.8933) ft
Right Coordinate: (949.95944, 1,572.1035) ft

Slip Surface Block

Left Grid
- Upper Left: (70.68041, 1,624.9665) ft
- Lower Left: (70.68041, 1,508.4178) ft
- Lower Right: (831.24553, 1,502.1983) ft
- X Increments: 20
- Y Increments: 10
- Starting Angle: 115 °
- Ending Angle: 135 °
- Angle Increments: 2

Right Grid
- Upper Left: (872.88936, 1,580.0777) ft
- Lower Left: (872.88936, 1,506.5249) ft
- Lower Right: (940.49298, 1,500.035) ft
- X Increments: 10
- Y Increments: 10
- Angle Increments: 2

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 18° bedding 0-(-2)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.5625
Data Points: Inclination (°), Modifier Factor
Data Point: (-2.01, 1)
Data Point: (-2, 0.5625)
Data Point: (0, 0.5625)
Data Point: (0.01, 1)

Tsr 175 bedding 0-(-2)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.4167
Data Points: Inclination (°), Modifier Factor
Data Point: (-2.01, 1)
Data Point: (-2, 0.4167)
Data Point: (0, 0.4167)
Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	949.95944 ft	1,572.1035 ft
Point 2	949.95944 ft	1,499.6182 ft
Point 3	0.37029 ft	1,499.6182 ft
Point 4	0.37029 ft	1,678.8933 ft
Point 5	285.28293 ft	1,678.0167 ft
Point 6	285.28293 ft	1,681.429 ft
Point 7	291.83265 ft	1,685.2326 ft
Point 8	358.2382 ft	1,683.6478 ft
Point 9	409.17891 ft	1,660.2528 ft
Point 10	429.70613 ft	1,660.2528 ft
Point 11	485.09943 ft	1,633.6127 ft
Point 12	834.11347 ft	1,620.9414 ft
Point 13	898.0135 ft	1,592.382 ft
Point 14	898.0135 ft	1,585.7311 ft
Point 15	915.4882 ft	1,585.7311 ft
Point 16	915.4882 ft	1,575.5593 ft
Point 17	949.95944 ft	1,564.1824 ft
Point 18	716.78532 ft	1,590.2187 ft
Point 19	661.84483 ft	1,594.5204 ft

Point 20	595.5087 ft	1,596.9354 ft
Point 21	455.16894 ft	1,604.0535 ft
Point 22	413.43831 ft	1,608.2918 ft
Point 23	376.05462 ft	1,611.552 ft
Point 24	340.8444 ft	1,615.0295 ft
Point 25	294.54949 ft	1,625.1362 ft
Point 26	265.09897 ft	1,637.0902 ft
Point 27	207.61068 ft	1,659.9117 ft
Point 28	189.8969 ft	1,668.2795 ft
Point 29	169.46656 ft	1,678.373 ft

Regions

	Material	Points	Area
Region 1	Tsr 0-2°	4,3,2,17,18,19,20,21,22,23,24,25,26,27,28,29	1.1103e+05 ft²
Region 2	Fill	1,16,15,14,13,12,11,10,9,8,7,6,5,29,28,27,26,25,24,23,22,21,20,19,18,17	29,091 ft²

Slip Results

Slip Surfaces Analysed: 82026 of 251559 converged

Current Slip Surface

Slip Surface: 228,281
Factor of Safety: 1.91
Volume: 1,392.5352 ft³
Weight: 167,104.22 lbf
Resisting Force: 115,710.9 lbf
Activating Force: 60,543.515 lbf
Slip Rank: 1 of 251,559 slip surfaces
Exit: (926.93155, 1,574.4121) ft
Entry: (821.2204, 1,621.4095) ft
Radius: 62.550307 ft
Center: (889.74667, 1,633.1588) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	822.89126 ft	1,619.0233 ft	0 psf	25.889743 psf	14.94745 psf	325 psf	0 psf	Fill
Slice 2	826.23297 ft	1,614.2508 ft	0 psf	416.19842 psf	240.29227 psf	325 psf	0 psf	Fill
Slice 3	829.57468 ft	1,609.4784 ft	0 psf	806.50711 psf	465.63709 psf	325 psf	0 psf	Fill
Slice 4	832.6795 ft	1,606.4247 ft	0 psf	1,464.1769 psf	845.34291 psf	325 psf	0 psf	Fill
Slice 5	835.88847 ft	1,604.931 ft	0 psf	1,532.4075 psf	884.73588 psf	325 psf	0 psf	Fill

Slice 6	839.43847 ft	1,603.2786 ft	0 psf	1,539.328 psf	888.73141 psf	325 psf	0 psf	Fill
Slice 7	842.98847 ft	1,601.6263 ft	0 psf	1,546.2484 psf	892.72693 psf	325 psf	0 psf	Fill
Slice 8	846.53848 ft	1,599.9739 ft	0 psf	1,553.1688 psf	896.72245 psf	325 psf	0 psf	Fill
Slice 9	850.08848 ft	1,598.3215 ft	0 psf	1,560.0893 psf	900.71797 psf	325 psf	0 psf	Fill
Slice 10	853.63848 ft	1,596.6691 ft	0 psf	1,567.0097 psf	904.7135 psf	325 psf	0 psf	Fill
Slice 11	857.18848 ft	1,595.0167 ft	0 psf	1,573.9302 psf	908.70902 psf	325 psf	0 psf	Fill
Slice 12	860.73848 ft	1,593.3643 ft	0 psf	1,580.8506 psf	912.70454 psf	325 psf	0 psf	Fill
Slice 13	864.28848 ft	1,591.7119 ft	0 psf	1,587.7711 psf	916.70007 psf	325 psf	0 psf	Fill
Slice 14	867.83849 ft	1,590.0596 ft	0 psf	1,594.6915 psf	920.69559 psf	325 psf	0 psf	Fill
Slice 15	871.38849 ft	1,588.4072 ft	0 psf	1,601.612 psf	924.69111 psf	325 psf	0 psf	Fill
Slice 16	874.93849 ft	1,586.7548 ft	0 psf	1,608.5324 psf	928.68663 psf	325 psf	0 psf	Fill
Slice 17	878.48849 ft	1,585.1024 ft	0 psf	1,615.4529 psf	932.68216 psf	325 psf	0 psf	Fill
Slice 18	882.03849 ft	1,583.45 ft	0 psf	1,622.3733 psf	936.67768 psf	325 psf	0 psf	Fill
Slice 19	885.58849 ft	1,581.7976 ft	0 psf	1,629.2938 psf	940.6732 psf	325 psf	0 psf	Fill
Slice 20	889.1385 ft	1,580.1452 ft	0 psf	1,636.2142 psf	944.66872 psf	325 psf	0 psf	Fill
Slice 21	892.6885 ft	1,578.4929 ft	0 psf	1,643.1347 psf	948.66425 psf	325 psf	0 psf	Fill
Slice 22	896.2385 ft	1,576.8405 ft	0 psf	1,650.0551 psf	952.65977 psf	325 psf	0 psf	Fill
Slice 23	899.94325 ft	1,575.1161 ft	0 psf	1,048.0451 psf	605.08913 psf	325 psf	0 psf	Fill
Slice 24	903.80276 ft	1,573.3196 ft	0 psf	1,237.1217 psf	714.25254 psf	325 psf	0 psf	Fill
Slice 25	907.66227 ft	1,571.5232 ft	0 psf	1,426.1983 psf	823.41595 psf	325 psf	0 psf	Fill
Slice 26	911.52178 ft	1,569.7267 ft	0 psf	1,615.2748 psf	932.57936 psf	325 psf	0 psf	Fill
Slice 27	914.46987 ft	1,569.2503 ft	0 psf	2,339.6837 psf	1,350.817 psf	325 psf	0 psf	Fill
Slice 28	917.39542 ft	1,570.4621 ft	0 psf	752.80549 psf	434.63245 psf	325 psf	0 psf	Fill
Slice 29	921.20987 ft	1,572.0421 ft	0 psf	483.765 psf	279.30185 psf	325 psf	0 psf	Fill
Slice 30	925.02432 ft	1,573.6221 ft	0 psf	214.7245 psf	123.97125 psf	325 psf	0 psf	Fill

Section D-D Tr 68203 SSA.gsz 11/20/2020 11:57:04 AM

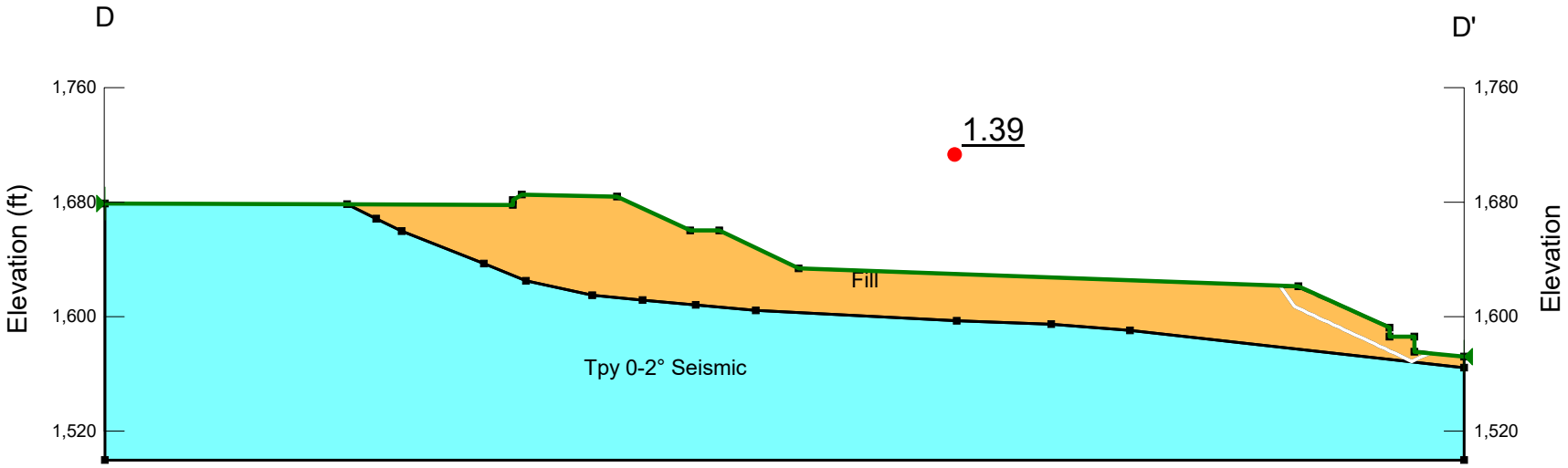
Section D-D Tr 68203 SSA.gsz

4 -Translational Pseudostatic Lower Slope

Horz Seismic Coef.: 0.15

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tpy 0-2° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-2)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-2)° (Seismic)



LGC	**LGC Valley, Inc** *GEOTECHNICAL CONSULTING* 2420 Grand Avenue, Vista, CA 92081 Phone 760-599-7000, Fax 760-599-7007	**Tentative Tract 68203** **Santa Clarita, CA**

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

4 -Translational Pseudostatic Lower Slope

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 749
Date: 11/20/2020
Time: 11:57:04 AM
Tool Version: 10.1.0.18696
File Name: Section D-D Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 12:03:44 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

4 -Translational Pseudostatic Lower Slope

Kind: SLOPE/W
Parent: 4 -Translational Static Lower Slope
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tpy 0-2° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-2)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-2)° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.37029, 1,678.8933) ft
Right Coordinate: (949.95944, 1,572.1035) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 375 bedding 0-(-2)° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 0.625
Data Points: Inclination (°), Modifier Factor
- Data Point: (-2.01, 1)
- Data Point: (-2, 0.625)
- Data Point: (0, 0.625)
- Data Point: (0.01, 1)

Tsr 19° bedding 0-(-2)° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 0.5936
Data Points: Inclination (°), Modifier Factor
- Data Point: (-2.01, 1)
- Data Point: (-2, 0.5936)
- Data Point: (0, 0.5936)

Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	949.95944 ft	1,572.1035 ft
Point 2	949.95944 ft	1,499.6182 ft
Point 3	0.37029 ft	1,499.6182 ft
Point 4	0.37029 ft	1,678.8933 ft
Point 5	285.28293 ft	1,678.0167 ft
Point 6	285.28293 ft	1,681.429 ft
Point 7	291.83265 ft	1,685.2326 ft
Point 8	358.2382 ft	1,683.6478 ft
Point 9	409.17891 ft	1,660.2528 ft
Point 10	429.70613 ft	1,660.2528 ft
Point 11	485.09943 ft	1,633.6127 ft
Point 12	834.11347 ft	1,620.9414 ft
Point 13	898.0135 ft	1,592.382 ft
Point 14	898.0135 ft	1,585.7311 ft
Point 15	915.4882 ft	1,585.7311 ft
Point 16	915.4882 ft	1,575.5593 ft
Point 17	949.95944 ft	1,564.1824 ft
Point 18	716.78532 ft	1,590.2187 ft
Point 19	661.84483 ft	1,594.5204 ft
Point 20	595.5087 ft	1,596.9354 ft
Point 21	455.16894 ft	1,604.0535 ft
Point 22	413.43831 ft	1,608.2918 ft
Point 23	376.05462 ft	1,611.552 ft
Point 24	340.8444 ft	1,615.0295 ft
Point 25	294.54949 ft	1,625.1362 ft
Point 26	265.09897 ft	1,637.0902 ft
Point 27	207.61068 ft	1,659.9117 ft
Point 28	189.8969 ft	1,668.2795 ft
Point 29	169.46656 ft	1,678.373 ft

Regions

	Material	Points	Area
Region 1	Tpy 0-2° Seismic	4,3,2,17,18,19,20,21,22,23,24,25,26,27,28,29	1.1103e+05 ft²
Region 2	Fill	1,16,15,14,13,12,11,10,9,8,7,6,5,29,28,27,26,25,24,23,22,21,20,19,18,17	29,091 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.39
Volume: 1,392.5352 ft³
Weight: 167,104.22 lbf
Resisting Force: 111,281.15 lbf
Activating Force: 80,172.405 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (926.93155, 1,574.4121) ft
Entry: (821.2204, 1,621.4095) ft
Radius: 62.550307 ft
Center: (889.74667, 1,633.1588) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	822.89126 ft	1,619.0233 ft	0 psf	-34.361388 psf	-19.838557 psf	325 psf	0 psf	Fill
Slice 2	826.23297 ft	1,614.2508 ft	0 psf	316.00794 psf	182.44727 psf	325 psf	0 psf	Fill
Slice 3	829.57468 ft	1,609.4784 ft	0 psf	666.37727 psf	384.7331 psf	325 psf	0 psf	Fill
Slice 4	832.6795 ft	1,606.4247 ft	0 psf	1,373.9258 psf	793.23645 psf	325 psf	0 psf	Fill
Slice 5	835.88847 ft	1,604.931 ft	0 psf	1,439.1187 psf	830.87556 psf	325 psf	0 psf	Fill
Slice 6	839.43847 ft	1,603.2786 ft	0 psf	1,445.731 psf	834.6932 psf	325 psf	0 psf	Fill
Slice 7	842.98847 ft	1,601.6263 ft	0 psf	1,452.3434 psf	838.51083 psf	325 psf	0 psf	Fill
Slice 8	846.53848 ft	1,599.9739 ft	0 psf	1,458.9557 psf	842.32846 psf	325 psf	0 psf	Fill
Slice 9	850.08848 ft	1,598.3215 ft	0 psf	1,465.568 psf	846.14609 psf	325 psf	0 psf	Fill
Slice 10	853.63848 ft	1,596.6691 ft	0 psf	1,472.1804 psf	849.96373 psf	325 psf	0 psf	Fill
Slice 11	857.18848 ft	1,595.0167 ft	0 psf	1,478.7927 psf	853.78136 psf	325 psf	0 psf	Fill
Slice 12	860.73848 ft	1,593.3643 ft	0 psf	1,485.405 psf	857.59899 psf	325 psf	0 psf	Fill
Slice 13	864.28848 ft	1,591.7119 ft	0 psf	1,492.0174 psf	861.41662 psf	325 psf	0 psf	Fill
Slice 14	867.83849 ft	1,590.0596 ft	0 psf	1,498.6297 psf	865.23426 psf	325 psf	0 psf	Fill
Slice 15	871.38849 ft	1,588.4072 ft	0 psf	1,505.242 psf	869.05189 psf	325 psf	0 psf	Fill

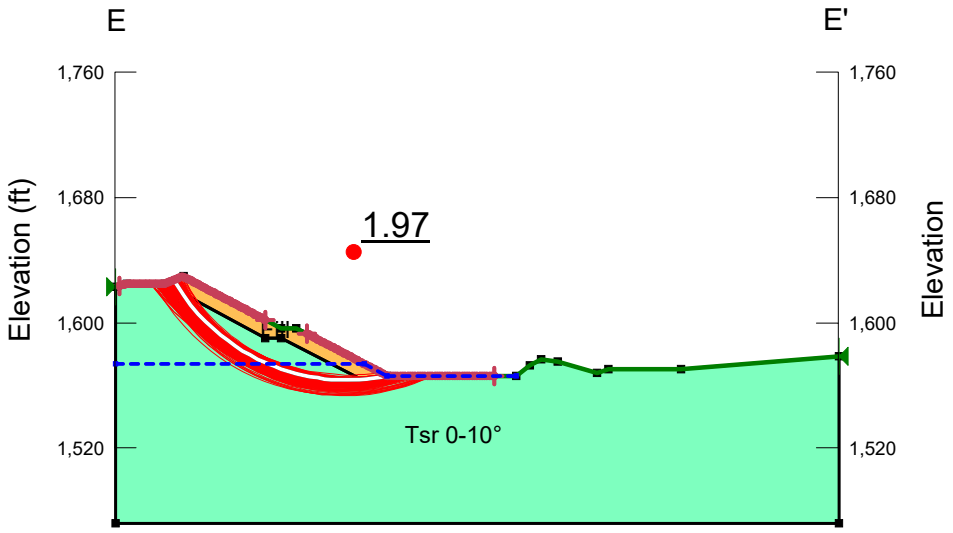
Slice 16	874.93849 ft	1,586.7548 ft	0 psf	1,511.8544 psf	872.86952 psf	325 psf	0 psf	Fill
Slice 17	878.48849 ft	1,585.1024 ft	0 psf	1,518.4667 psf	876.68715 psf	325 psf	0 psf	Fill
Slice 18	882.03849 ft	1,583.45 ft	0 psf	1,525.079 psf	880.50479 psf	325 psf	0 psf	Fill
Slice 19	885.58849 ft	1,581.7976 ft	0 psf	1,531.6914 psf	884.32242 psf	325 psf	0 psf	Fill
Slice 20	889.1385 ft	1,580.1452 ft	0 psf	1,538.3037 psf	888.14005 psf	325 psf	0 psf	Fill
Slice 21	892.6885 ft	1,578.4929 ft	0 psf	1,544.916 psf	891.95768 psf	325 psf	0 psf	Fill
Slice 22	896.2385 ft	1,576.8405 ft	0 psf	1,551.5284 psf	895.77532 psf	325 psf	0 psf	Fill
Slice 23	899.94325 ft	1,575.1161 ft	0 psf	976.32127 psf	563.67935 psf	325 psf	0 psf	Fill
Slice 24	903.80276 ft	1,573.3196 ft	0 psf	1,156.9797 psf	667.98254 psf	325 psf	0 psf	Fill
Slice 25	907.66227 ft	1,571.5232 ft	0 psf	1,337.6381 psf	772.28574 psf	325 psf	0 psf	Fill
Slice 26	911.52178 ft	1,569.7267 ft	0 psf	1,518.2966 psf	876.58893 psf	325 psf	0 psf	Fill
Slice 27	914.46987 ft	1,569.2503 ft	0 psf	2,505.4166 psf	1,446.503 psf	325 psf	0 psf	Fill
Slice 28	917.39542 ft	1,570.4621 ft	0 psf	827.93069 psf	478.006 psf	325 psf	0 psf	Fill
Slice 29	921.20987 ft	1,572.0421 ft	0 psf	543.5285 psf	313.80632 psf	325 psf	0 psf	Fill
Slice 30	925.02432 ft	1,573.6221 ft	0 psf	259.1263 psf	149.60664 psf	325 psf	0 psf	Fill

Section E-E Tr 68203 SSA.gsz 11/20/2020 12:55:56 PM

Section E-E Tr 68203 SSA.gsz

1 -Rotational Static (rapid drawdown)

Horz Seismic Coef.: 0



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Piezometric Line: 1

Name: Tsr 0-10°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-10)°
C-Anisotropic Strength Fn.: Tsr 250 bedding 0-(-10)°
Piezometric Line: 1

LGC

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GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Static (rapid drawdown)

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 784
Date: 11/20/2020
Time: 12:55:56 PM
Tool Version: 10.1.0.18696
File Name: Section E-E Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 12:56:08 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Static (rapid drawdown)

Kind: SLOPE/W
Method: Bishop
Settings
- PWP Conditions from: Piezometric Line
  - Apply Phreatic Correction: Yes
  - Use Staged Rapid Drawdown: No
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °
Pore Water Pressure
- Piezometric Line: 1

Tsr 0-10°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-10)°
C-Anisotropic Strength Fn.: Tsr 250 bedding 0-(-10)°
Phi-B: 0 °
Pore Water Pressure
- Piezometric Line: 1

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (3.05385, 1,623.5735) ft
Left-Zone Right Coordinate: (96.43492, 1,601.8057) ft
Left-Zone Increment: 80
Right Type: Range
Right-Zone Left Coordinate: (122.7625, 1,593.1089) ft
Right-Zone Right Coordinate: (242.58181, 1,566.1445) ft
Right-Zone Increment: 80
Radius Increments: 14

Slip Surface Limits

Left Coordinate: (0.54417, 1,622.8208) ft
Right Coordinate: (462.32328, 1,578.642) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X	Y
Coordinate 1	0.54417 ft	1,573.7913 ft
Coordinate 2	159.42081 ft	1,573.8059 ft
Coordinate 3	174.02151 ft	1,566.1445 ft
Coordinate 4	256.47753 ft	1,566.1445 ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 18° bedding 0-(-10)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.5625
Data Points: Inclination (°), Modifier Factor
Data Point: (-10.01, 1)
Data Point: (-10, 0.5625)
Data Point: (0, 0.5625)
Data Point: (0.01, 1)

Tsr 250 bedding 0-(-10)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.4167
Data Points: Inclination (°), Modifier Factor
Data Point: (-10.01, 1)
Data Point: (-10, 0.4167)
Data Point: (0, 0.4167)
Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	462.32328 ft	1,578.642 ft
Point 2	462.32328 ft	1,471.7797 ft
Point 3	0.54417 ft	1,471.7797 ft
Point 4	0.54417 ft	1,622.8208 ft
Point 5	7.84159 ft	1,625.0094 ft
Point 6	32.06673 ft	1,625.0094 ft
Point 7	43.91516 ft	1,629.5374 ft
Point 8	106.23033 ft	1,596.6335 ft
Point 9	116.0623 ft	1,596.6335 ft

Point 10	174.02151 ft	1,566.1445 ft
Point 11	256.47753 ft	1,566.1445 ft
Point 12	265.35254 ft	1,572.9366 ft
Point 13	272.23519 ft	1,576.8308 ft
Point 14	282.88089 ft	1,575.2968 ft
Point 15	307.90124 ft	1,567.8803 ft
Point 16	315.29707 ft	1,570.4462 ft
Point 17	361.70972 ft	1,570.4462 ft
Point 18	174.02151 ft	1,564.1291 ft
Point 19	159.01227 ft	1,563.127 ft
Point 20	106.29459 ft	1,590.1384 ft
Point 21	96.10412 ft	1,590.1384 ft

Regions

	Material	Points	Area
Region 1	Tsr 0-10°	1,17,16,15,14,13,12,11,10,18,19,20,21,6,5,4,3,2	50,235 ft²
Region 2	Fill	10,9,8,7,6,21,20,19,18	1,420.1 ft²

Slip Results

Slip Surfaces Analysed: 91565 of 98415 converged

Current Slip Surface

Slip Surface: 34,583
Factor of Safety: 1.97
Volume: 2,777.7157 ft³
Weight: 340,352.87 lbf
Resisting Moment: 31,549,574 lbf·ft
Activating Moment: 16,047,634 lbf·ft
Slip Rank: 1 of 98,415 slip surfaces
Exit: (174.5994, 1,566.1445) ft
Entry: (37.887396, 1,627.2338) ft
Radius: 127.59756 ft
Center: (148.39595, 1,691.0225) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	40.467798 ft	1,623.1317 ft	-3,078.6109 psf	237.44931 psf	137.09143 psf	325 psf	0 psf	Fill
Slice 2	43.48168 ft	1,618.4033 ft	-2,783.5413 psf	601.86503 psf	376.08701 psf	600 psf	0 psf	Tsr 0-10°
Slice 3	46.287385 ft	1,614.6072 ft	-2,546.6487 psf	875.87822 psf	547.30945 psf	600 psf	0 psf	Tsr 0-10°
Slice 4	51.031836 ft	1,608.6339 ft	-2,173.8901 psf	1,256.314 psf	785.0321 psf	600 psf	0 psf	Tsr 0-10°
Slice 5	55.776287 ft	1,603.3251 ft	-1,842.5942 psf	1,584.687 psf	990.22235 psf	600 psf	0 psf	Tsr 0-10°

Slice 6	60.520738 ft	1,598.5651 ft	-1,545.541 psf	1,866.5047 psf	1,166.3216 psf	600 psf	0 psf	Tsr 0-10°
Slice 7	65.265189 ft	1,594.2722 ft	-1,277.6341 psf	2,106.08 psf	1,316.0249 psf	600 psf	0 psf	Tsr 0-10°
Slice 8	70.00964 ft	1,590.3861 ft	-1,035.1188 psf	2,306.8359 psf	1,441.471 psf	600 psf	0 psf	Tsr 0-10°
Slice 9	74.754091 ft	1,586.8612 ft	-815.13775 psf	2,471.5195 psf	1,544.3768 psf	600 psf	0 psf	Tsr 0-10°
Slice 10	79.498542 ft	1,583.6617 ft	-615.46143 psf	2,602.3536 psf	1,626.131 psf	600 psf	0 psf	Tsr 0-10°
Slice 11	84.242993 ft	1,580.7592 ft	-434.31549 psf	2,701.1452 psf	1,687.8629 psf	600 psf	0 psf	Tsr 0-10°
Slice 12	88.987444 ft	1,578.1306 ft	-270.26587 psf	2,769.3647 psf	1,730.4911 psf	600 psf	0 psf	Tsr 0-10°
Slice 13	93.731895 ft	1,575.7572 ft	-122.13954 psf	2,808.2043 psf	1,754.7608 psf	600 psf	0 psf	Tsr 0-10°
Slice 14	97.05043 ft	1,574.2162 ft	-25.962416 psf	2,823.4381 psf	1,764.2799 psf	600 psf	0 psf	Tsr 0-10°
Slice 15	100.05514 ft	1,572.9575 ft	52.602207 psf	2,832.2772 psf	1,736.9337 psf	600 psf	0 psf	Tsr 0-10°
Slice 16	104.17193 ft	1,571.354 ft	152.68326 psf	2,831.0887 psf	1,673.6535 psf	600 psf	0 psf	Tsr 0-10°
Slice 17	108.70439 ft	1,569.7833 ft	250.71796 psf	2,938.4718 psf	1,679.495 psf	600 psf	0 psf	Tsr 0-10°
Slice 18	113.62037 ft	1,568.2815 ft	344.45981 psf	3,153.7694 psf	1,755.4514 psf	600 psf	0 psf	Tsr 0-10°
Slice 19	118.2735 ft	1,567.0524 ft	421.18474 psf	3,206.0624 psf	1,740.1847 psf	600 psf	0 psf	Tsr 0-10°
Slice 20	122.69589 ft	1,566.0603 ft	483.11342 psf	3,095.2137 psf	1,632.2214 psf	600 psf	0 psf	Tsr 0-10°
Slice 21	127.11828 ft	1,565.2315 ft	534.85507 psf	3,049.8192 psf	817.16137 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 22	131.54067 ft	1,564.5628 ft	576.61024 psf	2,867.2945 psf	744.28845 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 23	135.96306 ft	1,564.0515 ft	608.53695 psf	2,662.3957 psf	667.33915 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 24	140.62239 ft	1,563.6856 ft	631.40021 psf	2,421.9192 psf	581.77488 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 25	145.51867 ft	1,563.4809 ft	644.20037 psf	2,143.2296 psf	487.06413 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 26	150.41494 ft	1,563.4644 ft	645.25679 psf	1,842.9556 psf	748.40526 psf	600 psf	0 psf	Tsr 0-10°
Slice 27	155.31122 ft	1,563.6361 ft	634.57403 psf	1,520.8529 psf	553.80849 psf	600 psf	0 psf	Tsr 0-10°
Slice 28	158.59008 ft	1,563.8355 ft	622.14513 psf	1,279.8763 psf	379.74125 psf	325 psf	0 psf	Fill
Slice 29	161.85426 ft	1,564.1603 ft	409.46553 psf	1,043.4001 psf	366.00229 psf	325 psf	0 psf	Fill
Slice 30	166.72116 ft	1,564.7717 ft	254.59974 psf	667.09749 psf	238.15568 psf	325 psf	0 psf	Fill

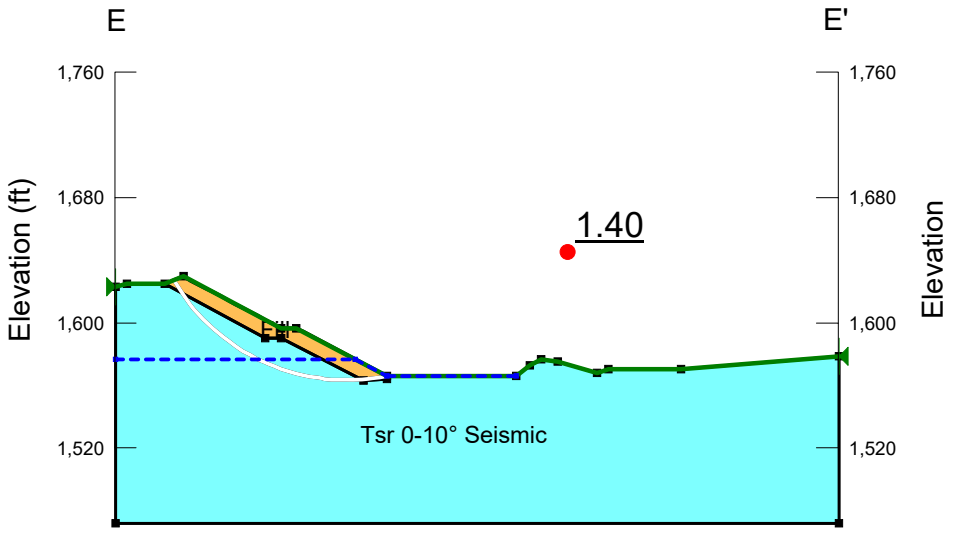
Slice 31	171.58806 ft	1,565.5748 ft	90.353051 psf	261.79681 psf	98.983099 psf	325 psf	0 psf	Fill
Slice 32	174.31045 ft	1,566.0846 ft	3.7397847 psf	75.426677 psf	44.794942 psf	600 psf	0 psf	Tsr 0-10°

Section E-E Tr 68203 SSA.gsz 11/20/2020 12:55:56 PM

Section E-E Tr 68203 SSA.gsz

1 -Rotational Pseudostatic (rapid drawdown)

Horz Seismic Coef.: 0.15



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Piezometric Line: 1

Name: Tsr 0-10° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-10)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-10)° (Seismic)
Piezometric Line: 1

LGC

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GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Pseudostatic (rapid drawdown)

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 784
Date: 11/20/2020
Time: 12:55:56 PM
Tool Version: 10.1.0.18696
File Name: Section E-E Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 12:56:16 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Pseudostatic (rapid drawdown)

Kind: SLOPE/W
Parent: 1 -Rotational Static (rapid drawdown)
Method: Bishop
Settings
PWP Conditions from: Piezometric Line
Apply Phreatic Correction: Yes
Use Staged Rapid Drawdown: No
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Critical Slip Surfaces from Other
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Distribution
F of S Calculation Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Tsr 0-10° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-10)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-10)° (Seismic)
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Limits

Left Coordinate: (0.54417, 1,622.8208) ft
Right Coordinate: (462.32328, 1,578.642) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X	Y
Coordinate 1	0.54417 ft	1,576.8608 ft
Coordinate 2	153.7163 ft	1,576.8249 ft
Coordinate 3	174.02151 ft	1,566.1445 ft
Coordinate 4	256.47753 ft	1,566.1445 ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 375 bedding 0-(-10)° (Seismic)

Model: Spline Data Point Function

Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.625
Data Points: Inclination (°), Modifier Factor
Data Point: (-10.01, 1)
Data Point: (-10, 0.625)
Data Point: (0, 0.625)
Data Point: (0.01, 1)

Tsr 19° bedding 0-(-10)° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.5936
Data Points: Inclination (°), Modifier Factor
Data Point: (-10.01, 1)
Data Point: (-10, 0.5936)
Data Point: (0, 0.5936)
Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	462.32328 ft	1,578.642 ft
Point 2	462.32328 ft	1,471.7797 ft
Point 3	0.54417 ft	1,471.7797 ft
Point 4	0.54417 ft	1,622.8208 ft
Point 5	7.84159 ft	1,625.0094 ft
Point 6	32.06673 ft	1,625.0094 ft
Point 7	43.91516 ft	1,629.5374 ft
Point 8	106.23033 ft	1,596.6335 ft
Point 9	116.0623 ft	1,596.6335 ft
Point 10	174.02151 ft	1,566.1445 ft
Point 11	256.47753 ft	1,566.1445 ft
Point 12	265.35254 ft	1,572.9366 ft
Point 13	272.23519 ft	1,576.8308 ft
Point 14	282.88089 ft	1,575.2968 ft
Point 15	307.90124 ft	1,567.8803 ft
Point 16	315.29707 ft	1,570.4462 ft
Point 17	361.70972 ft	1,570.4462 ft
Point 18	174.02151 ft	1,564.1291 ft

Point 19	159.01227 ft	1,563.127 ft
Point 20	106.29459 ft	1,590.1384 ft
Point 21	96.10412 ft	1,590.1384 ft

Regions

	Material	Points	Area
Region 1	Tsr 0-10° Seismic	1,17,16,15,14,13,12,11,10,18,19,20,21,6,5,4,3,2	50,235 ft²
Region 2	Fill	10,9,8,7,6,21,20,19,18	1,420.1 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.40
Volume: 2,777.7157 ft³
Weight: 340,352.87 lbf
Resisting Moment: 29,754,298 lbf·ft
Activating Moment: 21,227,937 lbf·ft
Slip Rank: 1 of 1 slip surfaces
Exit: (174.5994, 1,566.1445) ft
Entry: (37.887396, 1,627.2338) ft
Radius: 127.59756 ft
Center: (148.39595, 1,691.0225) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	40.467798 ft	1,623.1317 ft	-2,887.8868 psf	146.83168 psf	84.77331 psf	325 psf	0 psf	Fill
Slice 2	43.48168 ft	1,618.4033 ft	-2,592.8786 psf	426.7755 psf	266.67893 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 3	46.287385 ft	1,614.6072 ft	-2,356.0431 psf	679.76753 psf	424.7659 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 4	51.031836 ft	1,608.6339 ft	-1,983.3811 psf	1,037.5063 psf	648.30591 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 5	55.776287 ft	1,603.3251 ft	-1,652.1819 psf	1,351.6348 psf	844.59516 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 6	60.520738 ft	1,598.5651 ft	-1,355.2253 psf	1,625.8512 psf	1,015.9446 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 7	65.265189 ft	1,594.2722 ft	-1,087.415 psf	1,863.1544 psf	1,164.2281 psf	600 psf	0 psf	Tsr 0-10° Seismic

Slice 8	70.00964 ft	1,590.3861 ft	-844.99622 psf	2,065.9752 psf	1,290.9646 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 9	74.754091 ft	1,586.8612 ft	-625.11179 psf	2,236.2861 psf	1,397.3867 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 10	79.498542 ft	1,583.6617 ft	-425.53208 psf	2,375.6876 psf	1,484.4944 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 11	84.242993 ft	1,580.7592 ft	-244.48274 psf	2,485.4728 psf	1,553.0958 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 12	88.987444 ft	1,578.1306 ft	-80.529717 psf	2,566.6775 psf	1,603.8381 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 13	91.404742 ft	1,576.8609 ft	-1.3331949 psf	2,633.1937 psf	1,645.402 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 14	93.776968 ft	1,575.7359 ft	68.833209 psf	2,631.8551 psf	1,601.5538 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 15	97.05043 ft	1,574.2162 ft	163.60957 psf	2,672.8974 psf	1,567.9771 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 16	100.05514 ft	1,572.9575 ft	242.11301 psf	2,696.3895 psf	1,533.6022 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 17	104.17193 ft	1,571.354 ft	342.11024 psf	2,710.6546 psf	1,480.0308 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 18	108.70439 ft	1,569.7833 ft	440.05266 psf	2,829.6818 psf	1,493.206 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 19	113.62037 ft	1,568.2815 ft	533.69442 psf	3,054.0719 psf	1,574.9066 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 20	118.2735 ft	1,567.0524 ft	610.32462 psf	3,119.8499 psf	1,568.1254 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 21	122.69589 ft	1,566.0603 ft	672.16325 psf	3,025.2739 psf	1,470.3868 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 22	127.11828 ft	1,565.2315 ft	723.81486 psf	3,001.9204 psf	784.20117 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 23	130.79899 ft	1,564.6616 ft	759.32227 psf	2,866.561 psf	725.38302 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 24	133.01019 ft	1,564.3669 ft	777.68052 psf	2,762.164 psf	683.1265 psf	375 psf	0 psf	Tsr 0-10° Seismic

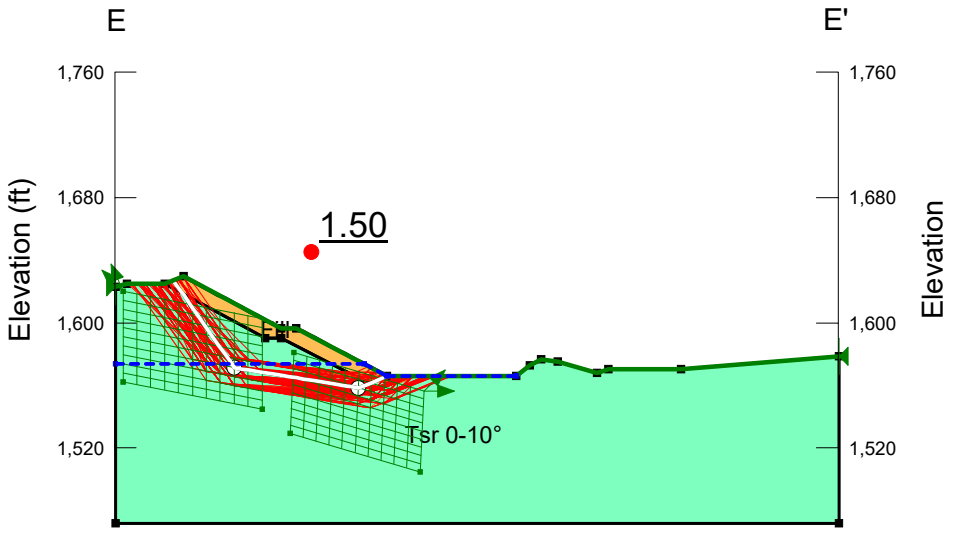
Slice 25	135.96306 ft	1,564.0515 ft	797.31666 psf	2,637.7192 psf	633.52894 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 26	140.62239 ft	1,563.6856 ft	820.08507 psf	2,407.6639 psf	546.49845 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 27	145.51867 ft	1,563.4809 ft	832.78554 psf	2,138.435 psf	449.44882 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 28	150.41494 ft	1,563.4644 ft	833.74227 psf	1,846.0029 psf	632.53063 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 29	153.28969 ft	1,563.5263 ft	829.83718 psf	1,679.2431 psf	530.76772 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 30	155.73783 ft	1,563.6592 ft	591.52976 psf	1,503.3267 psf	569.75394 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 31	158.59008 ft	1,563.8355 ft	509.58273 psf	1,295.624 psf	453.82116 psf	325 psf	0 psf	Fill
Slice 32	161.85426 ft	1,564.1603 ft	409.79148 psf	1,059.0183 psf	374.83126 psf	325 psf	0 psf	Fill
Slice 33	166.72116 ft	1,564.7717 ft	254.78603 psf	684.81537 psf	248.27756 psf	325 psf	0 psf	Fill
Slice 34	171.58806 ft	1,565.5748 ft	90.409434 psf	279.09398 psf	108.93707 psf	325 psf	0 psf	Fill
Slice 35	174.31045 ft	1,566.0846 ft	3.7397847 psf	105.47756 psf	63.572817 psf	600 psf	0 psf	Tsr 0-10° Seismic

Section E-E Tr 68203 SSA.gsz 11/20/2020 01:02:38 PM

Section E-E Tr 68203 SSA.gsz

2 -Tanslational Static (rapid drawdown)

Horz Seismic Coef.: 0



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Piezometric Line: 1

Name: Tsr 0-10°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-10)°
C-Anisotropic Strength Fn.: Tsr 250 bedding 0-(-10)°
Piezometric Line: 1

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2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Tanslational Static (rapid drawdown)

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 787
Date: 11/20/2020
Time: 01:02:38 PM
Tool Version: 10.1.0.18696
File Name: Section E-E Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 01:02:51 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Tanslational Static (rapid drawdown)

Kind: SLOPE/W
Method: Janbu
Settings
- PWP Conditions from: Piezometric Line
  - Apply Phreatic Correction: Yes
  - Use Staged Rapid Drawdown: No
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 1
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °
Pore Water Pressure
- Piezometric Line: 1

Tsr 0-10°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 0-(-10)°
C-Anisotropic Strength Fn.: Tsr 250 bedding 0-(-10)°
Phi-B: 0 °
Pore Water Pressure
- Piezometric Line: 1

Slip Surface Limits

Left Coordinate: (0.54417, 1,622.8208) ft
Right Coordinate: (462.32328, 1,578.642) ft

Slip Surface Block

Left Grid
- Upper Left: (5.47795, 1,619.9198) ft
- Lower Left: (5.47795, 1,561.9968) ft
- Lower Right: (94.26421, 1,544.8264) ft
- X Increments: 10
- Y Increments: 10
- Starting Angle: 115 °
- Ending Angle: 135 °
- Angle Increments: 2

Right Grid
- Upper Left: (114.737, 1,580.985) ft
- Lower Left: (112.12884, 1,529.3651) ft
- Lower Right: (195.1554, 1,504.8049) ft
- X Increments: 10
- Y Increments: 10
- Angle Increments: 2

Piezometric Lines

Piezometric Line 1

Coordinates

	X	Y
Coordinate 1	0.62172 ft	1,573.7495 ft
Coordinate 2	159.46478 ft	1,573.7992 ft
Coordinate 3	174.02137 ft	1,566.1141 ft
Coordinate 4	256.47705 ft	1,566.1317 ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 18° bedding 0-(-10)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.5625
Data Points: Inclination (°), Modifier Factor
Data Point: (-10.01, 1)
Data Point: (-10, 0.5625)
Data Point: (0, 0.5625)
Data Point: (0.01, 1)

Tsr 250 bedding 0-(-10)°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.4167
Data Points: Inclination (°), Modifier Factor
Data Point: (-10.01, 1)
Data Point: (-10, 0.4167)
Data Point: (0, 0.4167)
Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	462.32328 ft	1,578.642 ft

Point 2	462.32328 ft	1,471.7797 ft
Point 3	0.54417 ft	1,471.7797 ft
Point 4	0.54417 ft	1,622.8208 ft
Point 5	7.84159 ft	1,625.0094 ft
Point 6	32.06673 ft	1,625.0094 ft
Point 7	43.91516 ft	1,629.5374 ft
Point 8	106.23033 ft	1,596.6335 ft
Point 9	116.0623 ft	1,596.6335 ft
Point 10	174.02151 ft	1,566.1445 ft
Point 11	256.47753 ft	1,566.1445 ft
Point 12	265.35254 ft	1,572.9366 ft
Point 13	272.23519 ft	1,576.8308 ft
Point 14	282.88089 ft	1,575.2968 ft
Point 15	307.90124 ft	1,567.8803 ft
Point 16	315.29707 ft	1,570.4462 ft
Point 17	361.70972 ft	1,570.4462 ft
Point 18	174.02151 ft	1,564.1291 ft
Point 19	159.01227 ft	1,563.127 ft
Point 20	106.29459 ft	1,590.1384 ft
Point 21	96.10412 ft	1,590.1384 ft

Regions

	Material	Points	Area
Region 1	Tsr 0-10°	1,17,16,15,14,13,12,11,10,18,19,20,21,6,5,4,3,2	50,235 ft²
Region 2	Fill	10,9,8,7,6,21,20,19,18	1,420.1 ft²

Slip Results

Slip Surfaces Analysed: 64772 of 131769 converged

Current Slip Surface

Slip Surface: 57,272
Factor of Safety: 1.50
Volume: 3,385.5467 ft³
Weight: 416,258.31 lbf
Resisting Force: 172,097.72 lbf
Activating Force: 114,847.02 lbf
Slip Rank: 1 of 131,769 slip surfaces
Exit: (174.47159, 1,566.1445) ft
Entry: (37.528508, 1,627.0967) ft
Radius: 86.226628 ft
Center: (126.34701, 1,642.3347) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material

Slice 1	40.392587 ft	1,623.0063 ft	-3,072.8504 psf	202.19788 psf	116.739 psf	325 psf	0 psf	Fill
Slice 2	43.585913 ft	1,618.4458 ft	-2,788.2103 psf	468.53663 psf	292.77418 psf	600 psf	0 psf	Tsr 0-10°
Slice 3	46.125958 ft	1,614.8182 ft	-2,561.8009 psf	670.24677 psf	418.81667 psf	600 psf	0 psf	Tsr 0-10°
Slice 4	50.547555 ft	1,608.5035 ft	-2,167.6777 psf	982.10524 psf	613.68746 psf	600 psf	0 psf	Tsr 0-10°
Slice 5	54.969152 ft	1,602.1889 ft	-1,773.5545 psf	1,293.9637 psf	808.55826 psf	600 psf	0 psf	Tsr 0-10°
Slice 6	59.390748 ft	1,595.8742 ft	-1,379.4313 psf	1,605.8222 psf	1,003.4291 psf	600 psf	0 psf	Tsr 0-10°
Slice 7	63.812345 ft	1,589.5595 ft	-985.30806 psf	1,917.6806 psf	1,198.2999 psf	600 psf	0 psf	Tsr 0-10°
Slice 8	68.233942 ft	1,583.2448 ft	-591.18483 psf	2,229.5391 psf	1,393.1707 psf	600 psf	0 psf	Tsr 0-10°
Slice 9	72.655538 ft	1,576.9301 ft	-197.06161 psf	2,541.3976 psf	1,588.0415 psf	600 psf	0 psf	Tsr 0-10°
Slice 10	75.686647 ft	1,572.6012 ft	73.119175 psf	2,782.4344 psf	1,692.9681 psf	600 psf	0 psf	Tsr 0-10°
Slice 11	78.956603 ft	1,571.0262 ft	171.46369 psf	4,752.6316 psf	1,488.5117 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 12	83.855894 ft	1,570.2192 ft	221.91438 psf	4,539.1346 psf	1,402.7499 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 13	88.755184 ft	1,569.4123 ft	272.36507 psf	4,325.6377 psf	1,316.9881 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 14	93.654475 ft	1,568.6053 ft	322.81575 psf	4,112.1408 psf	1,231.2263 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 15	98.635672 ft	1,567.7848 ft	374.10989 psf	3,901.7301 psf	1,146.1933 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 16	103.69878 ft	1,566.9509 ft	426.24746 psf	3,694.4058 psf	1,061.889 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 17	108.70439 ft	1,566.1264 ft	477.79298 psf	3,634.7652 psf	1,025.7625 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 18	113.62037 ft	1,565.3167 ft	528.41558 psf	3,722.1584 psf	1,037.71 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 19	118.27572 ft	1,564.5499 ft	576.35426 psf	3,669.9274 psf	1,005.1628 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 20	122.70256 ft	1,563.8207 ft	621.93989 psf	3,478.7223 psf	928.22486 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 21	127.12941 ft	1,563.0916 ft	667.52551 psf	3,287.5171 psf	851.28687 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 22	131.55625 ft	1,562.3624 ft	713.11114 psf	3,096.312 psf	774.34889 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 23	135.98309 ft	1,561.6332 ft	758.69676 psf	2,905.1068 psf	697.4109 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 24	140.38803 ft	1,560.9077 ft	804.05683 psf	2,714.8477 psf	620.8536 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 25	144.77106 ft	1,560.1858 ft	849.19135 psf	2,525.5347 psf	544.67698 psf	250.02 psf	0 psf	Tsr 0-10°

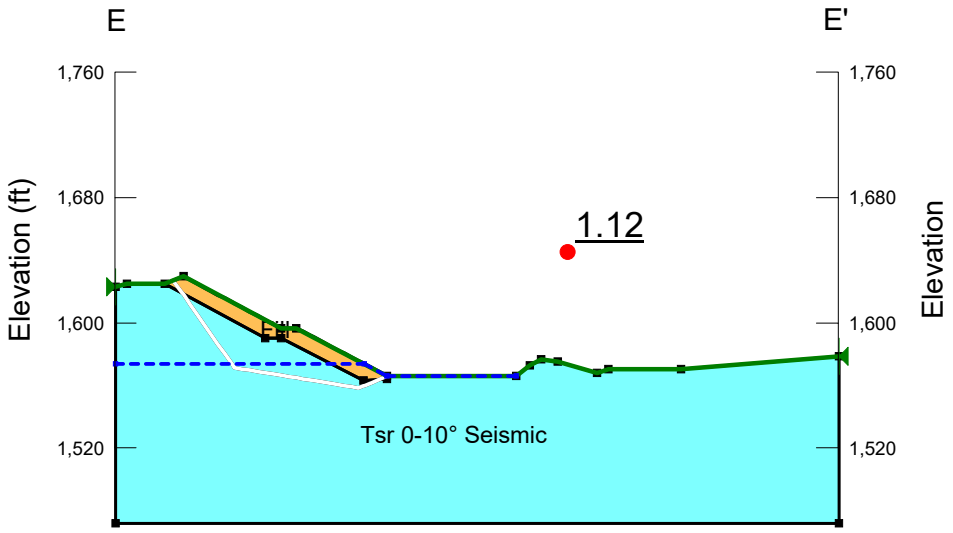
Slice 26	149.1541 ft	1,559.4638 ft	894.32586 psf	2,336.2217 psf	468.50037 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 27	153.53713 ft	1,558.7419 ft	939.46038 psf	2,146.9087 psf	392.32376 psf	250.02 psf	0 psf	Tsr 0-10°
Slice 28	157.37046 ft	1,559.061 ft	919.62392 psf	2,334.9906 psf	884.41924 psf	600 psf	0 psf	Tsr 0-10°
Slice 29	159.23853 ft	1,559.8348 ft	871.37664 psf	2,080.7152 psf	755.67863 psf	600 psf	0 psf	Tsr 0-10°
Slice 30	161.78796 ft	1,560.8908 ft	570.06021 psf	1,790.554 psf	762.64915 psf	600 psf	0 psf	Tsr 0-10°
Slice 31	166.43432 ft	1,562.8154 ft	356.43923 psf	1,191.8824 psf	522.04284 psf	600 psf	0 psf	Tsr 0-10°
Slice 32	171.38943 ft	1,564.8678 ft	128.62276 psf	462.05466 psf	192.507 psf	325 psf	0 psf	Fill
Slice 33	174.02144 ft	1,565.958 ft	9.737986 psf	131.36236 psf	70.219863 psf	325 psf	0 psf	Fill
Slice 34	174.20995 ft	1,566.0361 ft	4.8680888 psf	215.24919 psf	131.46071 psf	600 psf	0 psf	Tsr 0-10°
Slice 35	174.43499 ft	1,566.1293 ft	-0.94548169 psf	202.18518 psf	126.33932 psf	600 psf	0 psf	Tsr 0-10°

Section E-E Tr 68203 SSA.gsz 11/20/2020 01:02:38 PM

Section E-E Tr 68203 SSA.gsz

2 -Tanslational Pseudostatic (rapid drawdown)

Horz Seismic Coef.: 0.15



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Piezometric Line: 1

Name: Tsr 0-10° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-10)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-10)° (Seismic)
Piezometric Line: 1

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GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
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Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Tanslational Pseudostatic (rapid drawdown)

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 787
Date: 11/20/2020
Time: 01:02:38 PM
Tool Version: 10.1.0.18696
File Name: Section E-E Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 01:02:51 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Tanslational Pseudostatic (rapid drawdown)

Kind: SLOPE/W
Parent: 2 -Tanslational Static (rapid drawdown)
Method: Janbu
Settings
PWP Conditions from: Piezometric Line
Apply Phreatic Correction: Yes
Use Staged Rapid Drawdown: No
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Critical Slip Surfaces from Other
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Distribution
F of S Calculation Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Tsr 0-10° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 0-(-10)° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 0-(-10)° (Seismic)
Phi-B: 0 °
Pore Water Pressure
Piezometric Line: 1

Slip Surface Limits

Left Coordinate: (0.54417, 1,622.8208) ft
Right Coordinate: (462.32328, 1,578.642) ft

Piezometric Lines

Piezometric Line 1

Coordinates

	X	Y
Coordinate 1	0.60691 ft	1,573.8172 ft
Coordinate 2	159.59938 ft	1,573.7121 ft
Coordinate 3	174.00809 ft	1,566.1417 ft
Coordinate 4	256.45589 ft	1,566.1106 ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 375 bedding 0-(-10)° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.625
Data Points: Inclination (°), Modifier Factor
Data Point: (-10.01, 1)
Data Point: (-10, 0.625)
Data Point: (0, 0.625)
Data Point: (0.01, 1)

Tsr 19° bedding 0-(-10)° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0.5936
Data Points: Inclination (°), Modifier Factor
Data Point: (-10.01, 1)
Data Point: (-10, 0.5936)
Data Point: (0, 0.5936)
Data Point: (0.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	462.32328 ft	1,578.642 ft
Point 2	462.32328 ft	1,471.7797 ft
Point 3	0.54417 ft	1,471.7797 ft
Point 4	0.54417 ft	1,622.8208 ft
Point 5	7.84159 ft	1,625.0094 ft
Point 6	32.06673 ft	1,625.0094 ft
Point 7	43.91516 ft	1,629.5374 ft
Point 8	106.23033 ft	1,596.6335 ft
Point 9	116.0623 ft	1,596.6335 ft
Point 10	174.02151 ft	1,566.1445 ft
Point 11	256.47753 ft	1,566.1445 ft
Point 12	265.35254 ft	1,572.9366 ft
Point 13	272.23519 ft	1,576.8308 ft
Point 14	282.88089 ft	1,575.2968 ft
Point 15	307.90124 ft	1,567.8803 ft
Point 16	315.29707 ft	1,570.4462 ft

Point 17	361.70972 ft	1,570.4462 ft
Point 18	174.02151 ft	1,564.1291 ft
Point 19	159.01227 ft	1,563.127 ft
Point 20	106.29459 ft	1,590.1384 ft
Point 21	96.10412 ft	1,590.1384 ft

Regions

	Material	Points	Area
Region 1	Tsr 0-10° Seismic	1,17,16,15,14,13,12,11,10,18,19,20,21,6,5,4,3,2	50,235 ft²
Region 2	Fill	10,9,8,7,6,21,20,19,18	1,420.1 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.12
Volume: 3,385.5467 ft³
Weight: 416,257.58 lbf
Resisting Force: 179,777.01 lbf
Activating Force: 160,596.85 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (174.47159, 1,566.1445) ft
Entry: (37.528508, 1,627.0967) ft
Radius: 86.226628 ft
Center: (126.34701, 1,642.3347) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	40.392587 ft	1,623.0063 ft	-3,071.0425 psf	118.7156 psf	68.540484 psf	325 psf	0 psf	Fill
Slice 2	43.585913 ft	1,618.4458 ft	-2,786.5966 psf	305.51542 psf	190.90723 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 3	46.125958 ft	1,614.8182 ft	-2,560.3416 psf	484.21012 psf	302.56806 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 4	50.547555 ft	1,608.5035 ft	-2,166.4873 psf	760.48504 psf	475.20379 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 5	54.969152 ft	1,602.1889 ft	-1,772.6329 psf	1,036.76 psf	647.83952 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 6	59.390748 ft	1,595.8742 ft	-1,378.7785 psf	1,313.0349 psf	820.47525 psf	600 psf	0 psf	Tsr 0-10° Seismic

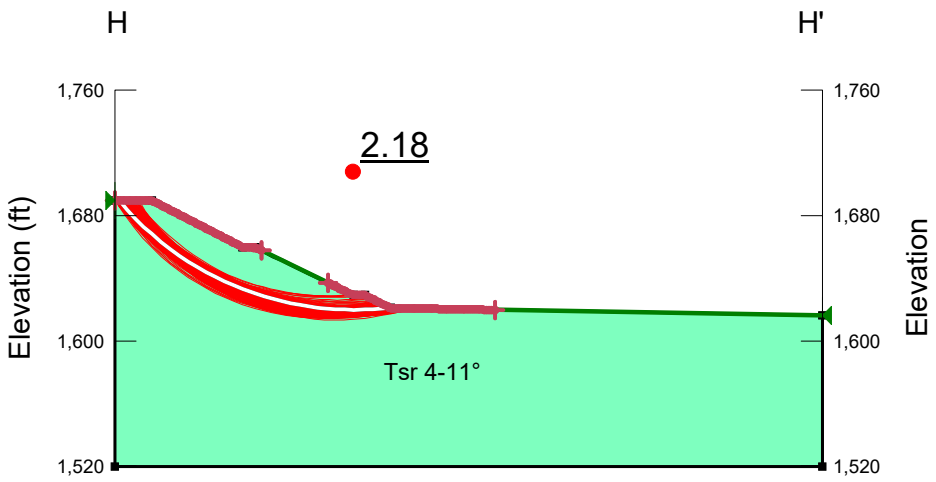
Slice 7	63.812345 ft	1,589.5595 ft	-984.92413 psf	1,589.3098 psf	993.11098 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 8	68.233942 ft	1,583.2448 ft	-591.06976 psf	1,865.5847 psf	1,165.7467 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 9	72.655538 ft	1,576.9301 ft	-197.21538 psf	2,141.8596 psf	1,338.3824 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 10	74.867954 ft	1,573.7704 ft	-0.14409656 psf	2,280.0982 psf	1,424.7635 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 11	75.688265 ft	1,572.5989 ft	72.925201 psf	2,363.7517 psf	1,431.4673 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 12	78.956603 ft	1,571.0262 ft	170.92687 psf	4,659.9343 psf	1,545.2686 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 13	83.855894 ft	1,570.2192 ft	221.07979 psf	4,450.2318 psf	1,455.8175 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 14	88.755184 ft	1,569.4123 ft	271.23272 psf	4,240.5292 psf	1,366.3664 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 15	93.654475 ft	1,568.6053 ft	321.38564 psf	4,030.8266 psf	1,276.9153 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 16	98.635672 ft	1,567.7848 ft	372.37703 psf	3,824.1776 psf	1,188.2268 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 17	103.69878 ft	1,566.9509 ft	424.20689 psf	3,620.5823 psf	1,100.3008 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 18	108.70439 ft	1,566.1264 ft	475.44819 psf	3,562.5315 psf	1,062.6788 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 19	113.62037 ft	1,565.3167 ft	525.77201 psf	3,649.3797 psf	1,075.2517 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 20	118.27572 ft	1,564.5499 ft	573.42776 psf	3,598.5804 psf	1,041.3601 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 21	122.70256 ft	1,563.8207 ft	618.74434 psf	3,410.7791 psf	961.11303 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 22	127.12941 ft	1,563.0916 ft	664.06091 psf	3,222.9778 psf	880.86595 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 23	131.55625 ft	1,562.3624 ft	709.37749 psf	3,035.1765 psf	800.61887 psf	375 psf	0 psf	Tsr 0-10° Seismic

Slice 24	135.98309 ft	1,561.6332 ft	754.69407 psf	2,847.3752 psf	720.37179 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 25	140.38803 ft	1,560.9077 ft	799.78642 psf	2,660.3452 psf	640.4674 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 26	144.77106 ft	1,560.1858 ft	844.65455 psf	2,474.5602 psf	561.06881 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 27	149.1541 ft	1,559.4638 ft	889.52268 psf	2,288.6174 psf	481.61584 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 28	153.53713 ft	1,558.7419 ft	934.39081 psf	2,102.6746 psf	402.16288 psf	375 psf	0 psf	Tsr 0-10° Seismic
Slice 29	157.37046 ft	1,559.061 ft	914.3214 psf	2,520.7531 psf	1,003.8099 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 30	159.23853 ft	1,559.8348 ft	865.96061 psf	2,250.5401 psf	865.18128 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 31	159.53208 ft	1,559.9564 ft	858.36101 psf	2,209.0504 psf	844.00439 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 32	161.85526 ft	1,560.9186 ft	567.65187 psf	1,950.298 psf	863.97318 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 33	166.43432 ft	1,562.8154 ft	357.25252 psf	1,330.8413 psf	608.3658 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 34	171.38279 ft	1,564.8651 ft	129.87906 psf	525.42859 psf	228.37063 psf	325 psf	0 psf	Fill
Slice 35	174.01473 ft	1,565.9553 ft	11.6335 psf	179.74114 psf	97.056993 psf	325 psf	0 psf	Fill
Slice 36	174.02144 ft	1,565.958 ft	11.45991 psf	178.82497 psf	96.628262 psf	325 psf	0 psf	Fill
Slice 37	174.20995 ft	1,566.0361 ft	6.583065 psf	305.47901 psf	186.77091 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 38	174.4314 ft	1,566.1279 ft	0.85401568 psf	292.28132 psf	182.10399 psf	600 psf	0 psf	Tsr 0-10° Seismic
Slice 39	174.468 ft	1,566.143 ft	-0.09281485 psf	290.07214 psf	181.25719 psf	600 psf	0 psf	Tsr 0-10° Seismic

Section H-H Tr 68203 SSA.gsz

1 -Rotational Static

Horz Seismic Coef.: 0



Name: Tsr 4-11°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding -4-11°
C-Anisotropic Strength Fn.: Tsr 175 bedding -4-11°

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Static

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 758
Date: 11/20/2020
Time: 11:50:04 AM
Tool Version: 10.1.0.18696
File Name: Section H-H Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 11:50:12 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Static

Kind: SLOPE/W
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 4-11°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding -4-11°
C-Anisotropic Strength Fn.: Tsr 175 bedding -4-11°
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (0.37029, 1,689.5795) ft
Left-Zone Right Coordinate: (93.88003, 1,657.6415) ft
Left-Zone Increment: 80
Right Type: Range
Right-Zone Left Coordinate: (136.31725, 1,637.0046) ft
Right-Zone Right Coordinate: (243.20985, 1,619.7487) ft
Right-Zone Increment: 80
Radius Increments: 14

Slip Surface Limits

Left Coordinate: (0.37029, 1,689.5795) ft
Right Coordinate: (452.12608, 1,616.3336) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 18° bedding -4-11°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (-11.01, 1)
- Data Point: (-11, 0.5625)
- Data Point: (-4, 0.5625)
- Data Point: (-3.99, 1)

Tsr 175 bedding -4-11°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (-11.01, 1)
Data Point: (-11, 0.4167)
Data Point: (-4, 0.4167)
Data Point: (-3.99, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	452.12608 ft	1,616.3336 ft
Point 2	452.12608 ft	1,519.8315 ft
Point 3	0.37029 ft	1,519.8315 ft
Point 4	0.37029 ft	1,689.5795 ft
Point 5	23.91622 ft	1,689.5795 ft
Point 6	81.96599 ft	1,659.6038 ft
Point 7	89.84482 ft	1,659.6038 ft
Point 8	152.60377 ft	1,629.0846 ft
Point 9	159.75811 ft	1,629.0846 ft
Point 10	176.24026 ft	1,620.8435 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-11°	1,2,3,4,5,6,7,8,9,10	51,656 ft²

Slip Results

Slip Surfaces Analysed: 89836 of 98415 converged

Current Slip Surface

Slip Surface: 2,901
Factor of Safety: 2.18
Volume: 3,440.9036 ft³
Weight: 430,112.94 lbf
Resisting Moment: 66,674,031 lbf·ft
Activating Moment: 30,542,883 lbf·ft
Slip Rank: 1 of 98,415 slip surfaces
Exit: (175.51826, 1,621.2045) ft
Entry: (2.9013943, 1,689.5795) ft
Radius: 195.62915 ft
Center: (152.62584, 1,815.4896) ft

Slip Slices

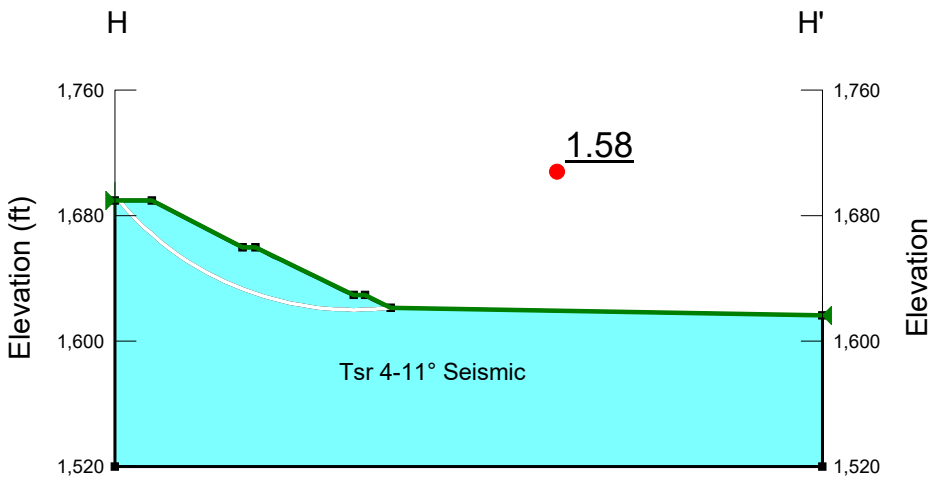
	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	5.5282475 ft	1,686.582 ft	0 psf	46.269705 psf	28.912521 psf	600 psf	0 psf	Tsr 4-11°
Slice 2	10.781954 ft	1,680.8177 ft	0 psf	619.4531 psf	387.07726 psf	600 psf	0 psf	Tsr 4-11°
Slice 3	16.03566 ft	1,675.4881 ft	0 psf	1,167.7464 psf	729.68895 psf	600 psf	0 psf	Tsr 4-11°
Slice 4	21.289367 ft	1,670.545 ft	0 psf	1,692.0743 psf	1,057.3254 psf	600 psf	0 psf	Tsr 4-11°
Slice 5	26.818708 ft	1,665.7266 ft	0 psf	2,067.0653 psf	1,291.6457 psf	600 psf	0 psf	Tsr 4-11°
Slice 6	32.623686 ft	1,661.0333 ft	0 psf	2,285.1945 psf	1,427.948 psf	600 psf	0 psf	Tsr 4-11°
Slice 7	38.428663 ft	1,656.691 ft	0 psf	2,469.1086 psf	1,542.8703 psf	600 psf	0 psf	Tsr 4-11°
Slice 8	44.23364 ft	1,652.6715 ft	0 psf	2,620.4214 psf	1,637.421 psf	600 psf	0 psf	Tsr 4-11°
Slice 9	50.038617 ft	1,648.9513 ft	0 psf	2,740.5116 psf	1,712.4617 psf	600 psf	0 psf	Tsr 4-11°
Slice 10	55.843594 ft	1,645.5108 ft	0 psf	2,830.5569 psf	1,768.7283 psf	600 psf	0 psf	Tsr 4-11°
Slice 11	61.648571 ft	1,642.3332 ft	0 psf	2,891.5614 psf	1,806.8481 psf	600 psf	0 psf	Tsr 4-11°
Slice 12	67.453548 ft	1,639.4043 ft	0 psf	2,924.3772 psf	1,827.3537 psf	600 psf	0 psf	Tsr 4-11°
Slice 13	73.258525 ft	1,636.7118 ft	0 psf	2,929.7225 psf	1,830.6938 psf	600 psf	0 psf	Tsr 4-11°
Slice 14	79.063502 ft	1,634.2452 ft	0 psf	2,908.1955 psf	1,817.2422 psf	600 psf	0 psf	Tsr 4-11°
Slice 15	85.905405 ft	1,631.6375 ft	0 psf	3,076.8393 psf	1,922.6226 psf	600 psf	0 psf	Tsr 4-11°
Slice 16	92.6975 ft	1,629.2898 ft	0 psf	3,230.1843 psf	2,018.4432 psf	600 psf	0 psf	Tsr 4-11°
Slice 17	98.402859 ft	1,627.5486 ft	0 psf	3,147.7691 psf	1,966.9444 psf	600 psf	0 psf	Tsr 4-11°
Slice 18	104.10822 ft	1,625.9952 ft	0 psf	3,041.0947 psf	1,900.2869 psf	600 psf	0 psf	Tsr 4-11°
Slice 19	109.81358 ft	1,624.6249 ft	0 psf	2,910.2667 psf	1,818.5364 psf	600 psf	0 psf	Tsr 4-11°
Slice 20	115.51894 ft	1,623.4339 ft	0 psf	2,856.4306 psf	928.11056 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 21	121.22429 ft	1,622.4188 ft	0 psf	2,657.7964 psf	863.57039 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 22	126.92965 ft	1,621.5768 ft	0 psf	2,435.9606 psf	791.49156 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 23	132.63501 ft	1,620.9057 ft	0 psf	2,190.9735 psf	711.89046 psf	250.02 psf	0 psf	Tsr 4-11°

Slice 24	138.34037 ft	1,620.4037 ft	0 psf	1,922.82 psf	624.76209 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 25	144.04573 ft	1,620.0696 ft	0 psf	1,614.7637 psf	1,009.0163 psf	600 psf	0 psf	Tsr 4-11°
Slice 26	149.75109 ft	1,619.9024 ft	0 psf	1,311.6327 psf	819.59907 psf	600 psf	0 psf	Tsr 4-11°
Slice 27	156.18094 ft	1,619.9255 ft	0 psf	1,155.8895 psf	722.2799 psf	600 psf	0 psf	Tsr 4-11°
Slice 28	162.3848 ft	1,620.1217 ft	0 psf	983.96172 psf	614.84752 psf	600 psf	0 psf	Tsr 4-11°
Slice 29	167.63818 ft	1,620.4551 ft	0 psf	620.98321 psf	388.03337 psf	600 psf	0 psf	Tsr 4-11°
Slice 30	172.89157 ft	1,620.9309 ft	0 psf	233.93783 psf	146.18058 psf	600 psf	0 psf	Tsr 4-11°

Section H-H Tr 68203 SSA.gsz

1 -Rotational Pseudostatic

Horz Seismic Coef.: 0.15



Name: Tsr 4-11° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding -4-11° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding -4-11° (Seismic)

LGC

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2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Pseudostatic

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 758
Date: 11/20/2020
Time: 11:50:04 AM
Tool Version: 10.1.0.18696
File Name: Section H-H Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 11:50:18 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Pseudostatic

Kind: SLOPE/W
Parent: 1 -Rotational Static
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 4-11° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding -4-11° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding -4-11° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.37029, 1,689.5795) ft
Right Coordinate: (452.12608, 1,616.3336) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 375 bedding -4-11° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (-11.01, 1)
- Data Point: (-11, 0.625)
- Data Point: (-4, 0.625)
- Data Point: (-3.99, 1)

Tsr 19° bedding -4-11° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (-11.01, 1)
- Data Point: (-11, 0.5936)
- Data Point: (-4, 0.5936)
- Data Point: (-3.99, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	452.12608 ft	1,616.3336 ft
Point 2	452.12608 ft	1,519.8315 ft
Point 3	0.37029 ft	1,519.8315 ft
Point 4	0.37029 ft	1,689.5795 ft
Point 5	23.91622 ft	1,689.5795 ft
Point 6	81.96599 ft	1,659.6038 ft
Point 7	89.84482 ft	1,659.6038 ft
Point 8	152.60377 ft	1,629.0846 ft
Point 9	159.75811 ft	1,629.0846 ft
Point 10	176.24026 ft	1,620.8435 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-11° Seismic	1,2,3,4,5,6,7,8,9,10	51,656 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.58
Volume: 3,440.9036 ft³
Weight: 430,112.94 lbf
Resisting Moment: 65,015,019 lbf·ft
Activating Moment: 41,210,883 lbf·ft
Slip Rank: 1 of 1 slip surfaces
Exit: (175.51826, 1,621.2045) ft
Entry: (2.9013943, 1,689.5795) ft
Radius: 195.62915 ft
Center: (152.62584, 1,815.4896) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	5.5282475 ft	1,686.582 ft	0 psf	-40.39767 psf	-25.243266 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 2	10.781954 ft	1,680.8177 ft	0 psf	490.82177 psf	306.69948 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 3	16.03566 ft	1,675.4881 ft	0 psf	1,003.6822 psf	627.17027 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 4	21.289367 ft	1,670.545 ft	0 psf	1,498.3115 psf	936.24893 psf	600 psf	0 psf	Tsr 4-11° Seismic

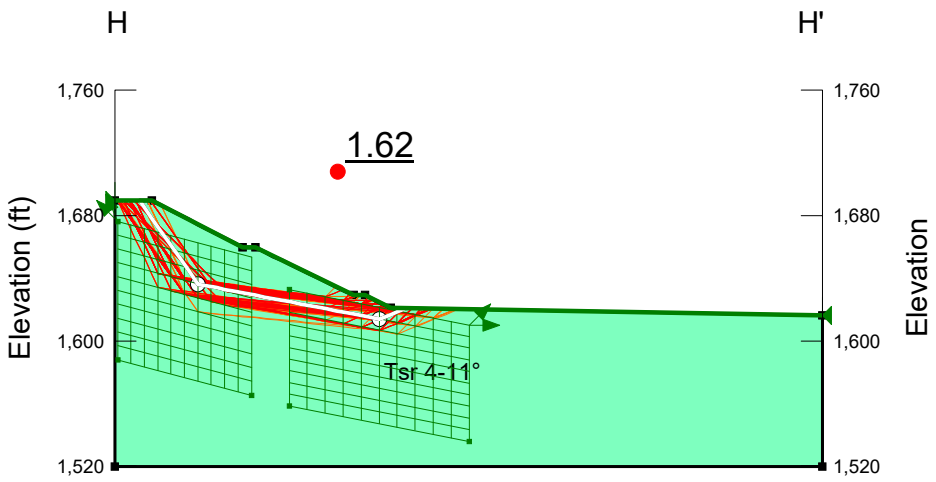
Slice 5	26.818708 ft	1,665.7266 ft	0 psf	1,858.0126 psf	1,161.0151 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 6	32.623686 ft	1,661.0333 ft	0 psf	2,073.9581 psf	1,295.9529 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 7	38.428663 ft	1,656.691 ft	0 psf	2,258.8304 psf	1,411.4739 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 8	44.23364 ft	1,652.6715 ft	0 psf	2,413.7722 psf	1,508.2922 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 9	50.038617 ft	1,648.9513 ft	0 psf	2,539.7602 psf	1,587.0183 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 10	55.843594 ft	1,645.5108 ft	0 psf	2,637.6234 psf	1,648.1701 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 11	61.648571 ft	1,642.3332 ft	0 psf	2,708.0585 psf	1,692.1827 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 12	67.453548 ft	1,639.4043 ft	0 psf	2,751.6424 psf	1,719.417 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 13	73.258525 ft	1,636.7118 ft	0 psf	2,768.8433 psf	1,730.1653 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 14	79.063502 ft	1,634.2452 ft	0 psf	2,760.0288 psf	1,724.6574 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 15	85.905405 ft	1,631.6375 ft	0 psf	2,936.5293 psf	1,834.9471 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 16	92.6975 ft	1,629.2898 ft	0 psf	3,099.1598 psf	1,936.57 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 17	98.402859 ft	1,627.5486 ft	0 psf	3,031.2642 psf	1,894.1441 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 18	104.10822 ft	1,625.9952 ft	0 psf	2,939.2135 psf	1,836.6244 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 19	109.81358 ft	1,624.6249 ft	0 psf	2,822.9346 psf	1,763.9653 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 20	115.51894 ft	1,623.4339 ft	0 psf	2,797.0088 psf	962.82527 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 21	121.22429 ft	1,622.4188 ft	0 psf	2,609.6118 psf	898.31687 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 22	126.92965 ft	1,621.5768 ft	0 psf	2,398.4277 psf	825.62014 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 23	132.63501 ft	1,620.9057 ft	0 psf	2,163.3931 psf	744.71325 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 24	138.34037 ft	1,620.4037 ft	0 psf	1,904.3741 psf	655.55015 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 25	144.04573 ft	1,620.0696 ft	0 psf	1,602.5935 psf	1,001.4115 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 26	149.75109 ft	1,619.9024 ft	0 psf	1,307.9969 psf	817.32719 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 27	156.18094 ft	1,619.9255 ft	0 psf	1,160.1328 psf	724.93144 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 28	162.3848 ft	1,620.1217 ft	0 psf	994.81165 psf	621.62731 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 29	167.63818 ft	1,620.4551 ft	0 psf	634.73071 psf	396.62377 psf	600 psf	0 psf	Tsr 4-11° Seismic

Slice 30	172.89157 ft	1,620.9309 ft	0 psf	248.14522 psf	155.05834 psf	600 psf	0 psf	Tsr 4-11° Seismic

Section H-H Tr 68203 SSA.gsz

2 -Translational Static

Horz Seismic Coef.: 0



Name: Tsr 4-11°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding -4-11°
C-Anisotropic Strength Fn.: Tsr 175 bedding -4-11°

LGC

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Static

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 758
Date: 11/20/2020
Time: 11:50:04 AM
Tool Version: 10.1.0.18696
File Name: Section H-H Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 11:50:18 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Static

Kind: SLOPE/W
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 1
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 4-11°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding -4-11°
C-Anisotropic Strength Fn.: Tsr 175 bedding -4-11°
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.37029, 1,689.5795) ft
Right Coordinate: (452.12608, 1,616.3336) ft

Slip Surface Block

Left Grid
- Upper Left: (2.3125, 1,676.1875) ft
- Lower Left: (2.3125, 1,587.7394) ft
- Lower Right: (87.38039, 1,565.2049) ft
- X Increments: 10
- Y Increments: 10
- Starting Angle: 115 °
- Ending Angle: 135 °
- Angle Increments: 2

Right Grid
- Upper Left: (111.79281, 1,632.6207) ft
- Lower Left: (111.79281, 1,558.2567) ft
- Lower Right: (226.71896, 1,535.7222) ft
- X Increments: 10
- Y Increments: 10
- Angle Increments: 2

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 18° bedding -4-11°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (-11.01, 1)
- Data Point: (-11, 0.5625)
- Data Point: (-4, 0.5625)

Data Point: (-3.99, 1)

Tsr 175 bedding -4-11°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (-11.01, 1)
Data Point: (-11, 0.4167)
Data Point: (-4, 0.4167)
Data Point: (-3.99, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	452.12608 ft	1,616.3336 ft
Point 2	452.12608 ft	1,519.8315 ft
Point 3	0.37029 ft	1,519.8315 ft
Point 4	0.37029 ft	1,689.5795 ft
Point 5	23.91622 ft	1,689.5795 ft
Point 6	81.96599 ft	1,659.6038 ft
Point 7	89.84482 ft	1,659.6038 ft
Point 8	152.60377 ft	1,629.0846 ft
Point 9	159.75811 ft	1,629.0846 ft
Point 10	176.24026 ft	1,620.8435 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-11°	1,2,3,4,5,6,7,8,9,10	51,656 ft²

Slip Results

Slip Surfaces Analysed: 37356 of 131769 converged

Current Slip Surface

Slip Surface: 91,064
Factor of Safety: 1.62
Volume: 3,576.4832 ft³
Weight: 447,060.4 lbf
Resisting Force: 206,283.57 lbf

Activating Force: 127,690.32 lbf
Slip Rank: 1 of 131,769 slip surfaces
Exit: (185.60811, 1,620.6904) ft
Entry: (15.929151, 1,689.5795) ft
Radius: 98.962274 ft
Center: (121.74521, 1,706.8018) ft

Slip Slices

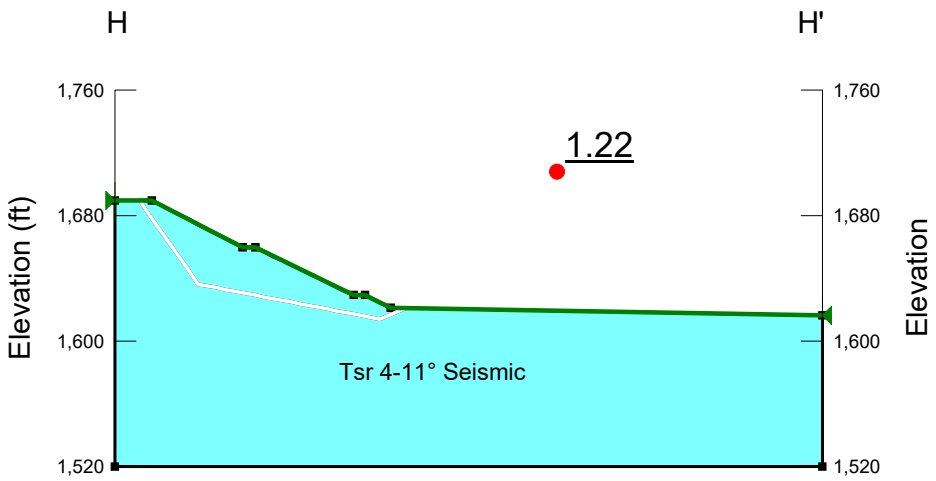
	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	19.922685 ft	1,683.8761 ft	0 psf	116.20208 psf	72.611119 psf	600 psf	0 psf	Tsr 4-11°
Slice 2	26.859921 ft	1,673.9687 ft	0 psf	790.70139 psf	494.08506 psf	600 psf	0 psf	Tsr 4-11°
Slice 3	32.747324 ft	1,665.5607 ft	0 psf	1,222.3855 psf	763.83121 psf	600 psf	0 psf	Tsr 4-11°
Slice 4	38.634727 ft	1,657.1526 ft	0 psf	1,654.0695 psf	1,033.5774 psf	600 psf	0 psf	Tsr 4-11°
Slice 5	44.52213 ft	1,648.7445 ft	0 psf	2,085.7536 psf	1,303.3235 psf	600 psf	0 psf	Tsr 4-11°
Slice 6	50.409533 ft	1,640.3364 ft	0 psf	2,517.4377 psf	1,573.0697 psf	600 psf	0 psf	Tsr 4-11°
Slice 7	56.21451 ft	1,635.5839 ft	0 psf	4,462.2718 psf	1,449.88 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 8	61.937061 ft	1,634.4871 ft	0 psf	4,238.6539 psf	1,377.2221 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 9	67.659612 ft	1,633.3902 ft	0 psf	4,015.0359 psf	1,304.5642 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 10	73.382163 ft	1,632.2934 ft	0 psf	3,791.418 psf	1,231.9064 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 11	79.104714 ft	1,631.1965 ft	0 psf	3,567.8 psf	1,159.2485 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 12	85.905405 ft	1,629.893 ft	0 psf	3,546.8601 psf	1,152.4447 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 13	92.6975 ft	1,628.5912 ft	0 psf	3,536.5851 psf	1,149.1061 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 14	98.402859 ft	1,627.4976 ft	0 psf	3,334.2968 psf	1,083.3787 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 15	104.10822 ft	1,626.404 ft	0 psf	3,132.0085 psf	1,017.6513 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 16	109.81358 ft	1,625.3105 ft	0 psf	2,929.7203 psf	951.92382 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 17	115.51894 ft	1,624.2169 ft	0 psf	2,727.432 psf	886.19638 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 18	121.22429 ft	1,623.1234 ft	0 psf	2,525.1437 psf	820.46893 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 19	126.92965 ft	1,622.0298 ft	0 psf	2,322.8555 psf	754.74149 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 20	132.63501 ft	1,620.9363 ft	0 psf	2,120.5672 psf	689.01405 psf	250.02 psf	0 psf	Tsr 4-11°

Slice 21	138.34037 ft	1,619.8427 ft	0 psf	1,918.2789 psf	623.28661 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 22	144.04573 ft	1,618.7491 ft	0 psf	1,715.9907 psf	557.55917 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 23	149.75109 ft	1,617.6556 ft	0 psf	1,513.7024 psf	491.83172 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 24	156.18094 ft	1,616.4232 ft	0 psf	1,495.0716 psf	485.7782 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 25	162.13255 ft	1,615.2824 ft	0 psf	1,489.4796 psf	483.96127 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 26	166.88144 ft	1,614.3722 ft	0 psf	1,313.2691 psf	426.70699 psf	250.02 psf	0 psf	Tsr 4-11°
Slice 27	172.74807 ft	1,615.3636 ft	0 psf	1,260.2734 psf	787.50621 psf	600 psf	0 psf	Tsr 4-11°
Slice 28	178.58222 ft	1,617.7801 ft	0 psf	634.54477 psf	396.50758 psf	600 psf	0 psf	Tsr 4-11°
Slice 29	183.26615 ft	1,619.7203 ft	0 psf	334.1579 psf	208.80503 psf	600 psf	0 psf	Tsr 4-11°

Section H-H Tr 68203 SSA.gsz

2 -Translational Pseudostatic

Horz Seismic Coef.: 0.15



Name: Tsr 4-11° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding -4-11° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding -4-11° (Seismic)

LGC

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2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Pseudostatic

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 758
Date: 11/20/2020
Time: 11:50:04 AM
Tool Version: 10.1.0.18696
File Name: Section H-H Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/20/2020
Last Solved Time: 11:50:18 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Pseudostatic

Kind: SLOPE/W
Parent: 2 -Translational Static
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 4-11° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding -4-11° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding -4-11° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.37029, 1,689.5795) ft
Right Coordinate: (452.12608, 1,616.3336) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 375 bedding -4-11° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (-11.01, 1)
- Data Point: (-11, 0.625)
- Data Point: (-4, 0.625)
- Data Point: (-3.99, 1)

Tsr 19° bedding -4-11° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (-11.01, 1)
- Data Point: (-11, 0.5936)
- Data Point: (-4, 0.5936)
- Data Point: (-3.99, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	452.12608 ft	1,616.3336 ft
Point 2	452.12608 ft	1,519.8315 ft
Point 3	0.37029 ft	1,519.8315 ft
Point 4	0.37029 ft	1,689.5795 ft
Point 5	23.91622 ft	1,689.5795 ft
Point 6	81.96599 ft	1,659.6038 ft
Point 7	89.84482 ft	1,659.6038 ft
Point 8	152.60377 ft	1,629.0846 ft
Point 9	159.75811 ft	1,629.0846 ft
Point 10	176.24026 ft	1,620.8435 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-11° Seismic	1,2,3,4,5,6,7,8,9,10	51,656 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.22
Volume: 3,576.4832 ft³
Weight: 447,060.4 lbf
Resisting Force: 220,204.47 lbf
Activating Force: 180,358.22 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (185.60811, 1,620.6904) ft
Entry: (15.929151, 1,689.5795) ft
Radius: 98.962274 ft
Center: (121.74521, 1,706.8018) ft

Slip Slices

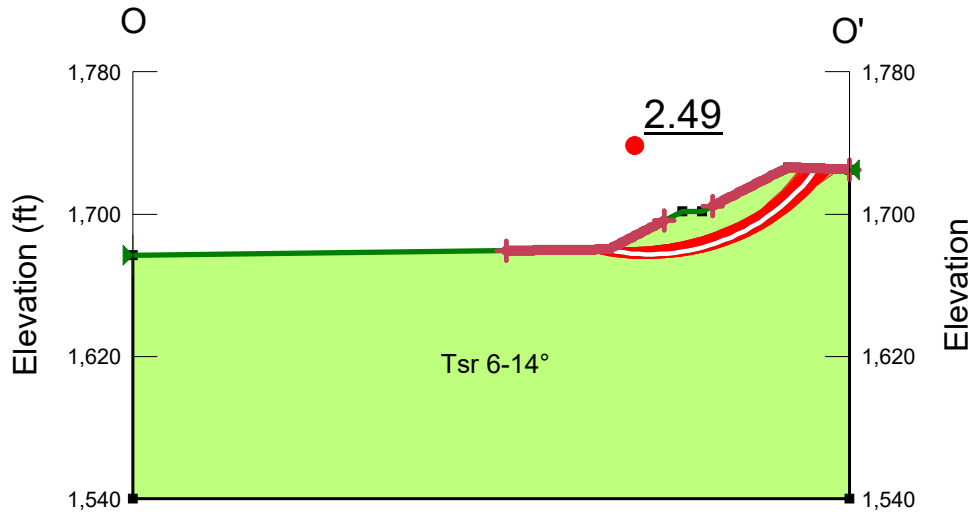
	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	19.922685 ft	1,683.8761 ft	0 psf	9.2361202 psf	5.7713684 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 2	26.859921 ft	1,673.9687 ft	0 psf	616.70804 psf	385.36195 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 3	32.747324 ft	1,665.5607 ft	0 psf	1,005.4941 psf	628.30247 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 4	38.634727 ft	1,657.1526 ft	0 psf	1,394.2802 psf	871.24299 psf	600 psf	0 psf	Tsr 4-11° Seismic

Slice 5	44.52213 ft	1,648.7445 ft	0 psf	1,783.0663 psf	1,114.1835 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 6	50.409533 ft	1,640.3364 ft	0 psf	2,171.8524 psf	1,357.124 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 7	56.21451 ft	1,635.5839 ft	0 psf	4,371.5988 psf	1,504.8525 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 8	61.937061 ft	1,634.4871 ft	0 psf	4,151.16 psf	1,428.97 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 9	67.659612 ft	1,633.3902 ft	0 psf	3,930.7212 psf	1,353.0875 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 10	73.382163 ft	1,632.2934 ft	0 psf	3,710.2824 psf	1,277.205 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 11	79.104714 ft	1,631.1965 ft	0 psf	3,489.8436 psf	1,201.3225 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 12	85.905405 ft	1,629.893 ft	0 psf	3,469.2014 psf	1,194.2168 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 13	92.6975 ft	1,628.5912 ft	0 psf	3,459.0725 psf	1,190.73 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 14	98.402859 ft	1,627.4976 ft	0 psf	3,259.6601 psf	1,122.0855 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 15	104.10822 ft	1,626.404 ft	0 psf	3,060.2478 psf	1,053.4411 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 16	109.81358 ft	1,625.3105 ft	0 psf	2,860.8354 psf	984.79656 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 17	115.51894 ft	1,624.2169 ft	0 psf	2,661.4231 psf	916.15208 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 18	121.22429 ft	1,623.1234 ft	0 psf	2,462.0108 psf	847.50759 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 19	126.92965 ft	1,622.0298 ft	0 psf	2,262.5984 psf	778.8631 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 20	132.63501 ft	1,620.9363 ft	0 psf	2,063.1861 psf	710.21861 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 21	138.34037 ft	1,619.8427 ft	0 psf	1,863.7738 psf	641.57412 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 22	144.04573 ft	1,618.7491 ft	0 psf	1,664.3614 psf	572.92963 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 23	149.75109 ft	1,617.6556 ft	0 psf	1,464.9491 psf	504.28515 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 24	156.18094 ft	1,616.4232 ft	0 psf	1,446.5831 psf	497.96296 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 25	162.13255 ft	1,615.2824 ft	0 psf	1,441.0707 psf	496.06539 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 26	166.88144 ft	1,614.3722 ft	0 psf	1,267.3653 psf	436.27011 psf	375 psf	0 psf	Tsr 4-11° Seismic
Slice 27	172.74807 ft	1,615.3636 ft	0 psf	1,400.18 psf	874.92959 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 28	178.58222 ft	1,617.7801 ft	0 psf	735.02579 psf	459.29509 psf	600 psf	0 psf	Tsr 4-11° Seismic
Slice 29	183.26615 ft	1,619.7203 ft	0 psf	415.71228 psf	259.76586 psf	600 psf	0 psf	Tsr 4-11° Seismic

Section O-O Tr 68203 SSA.gsz

1 -Rotational Static Global

Horz Seismic Coef.: 0



Name: Tsr 6-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°

LGC

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Static Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 737
Date: 11/18/2020
Time: 08:40:53 AM
Tool Version: 10.1.0.18696
File Name: Section O-O Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 08:41:02 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Static Global

Kind: SLOPE/W
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 6-14°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (210.15326, 1,679.5189) ft
Left-Zone Right Coordinate: (298.87927, 1,696.3166) ft
Left-Zone Increment: 80
Right Type: Range
Right-Zone Left Coordinate: (325.90696, 1,704.564) ft
Right-Zone Right Coordinate: (402.89965, 1,725.1701) ft
Right-Zone Increment: 80
Radius Increments: 14

Slip Surface Limits

Left Coordinate: (0.04477, 1,676.9386) ft
Right Coordinate: (402.89965, 1,725.1701) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.4167)
- Data Point: (14, 0.4167)
- Data Point: (14.01, 1)

Tsr 18° bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (5.99, 1)
Data Point: (6, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	402.89965 ft	1,725.1701 ft
Point 2	402.89965 ft	1,539.9723 ft
Point 3	0.04477 ft	1,539.9723 ft
Point 4	0.04477 ft	1,676.9386 ft
Point 5	267.64242 ft	1,680.2249 ft
Point 6	308.95575 ft	1,701.5075 ft
Point 7	319.91004 ft	1,701.5075 ft
Point 8	368.42189 ft	1,726.2329 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14°	1,2,3,4,5,6,7,8	59,935 ft²

Slip Results

Slip Surfaces Analysed: 90697 of 98415 converged

Current Slip Surface

Slip Surface: 59,257
Factor of Safety: 2.49
Volume: 1,976.7547 ft³
Weight: 247,094.34 lbf
Resisting Moment: 24,127,123 lbf·ft
Activating Moment: 9,673,027.3 lbf·ft
Slip Rank: 1 of 98,415 slip surfaces
Exit: (265.72801, 1,680.2014) ft
Entry: (384.41058, 1,725.74) ft
Radius: 115.6265 ft
Center: (290.46727, 1,793.1503) ft

Slip Slices

	X	Y	PWP	Base	Frictional	Cohesive	Suction	Base

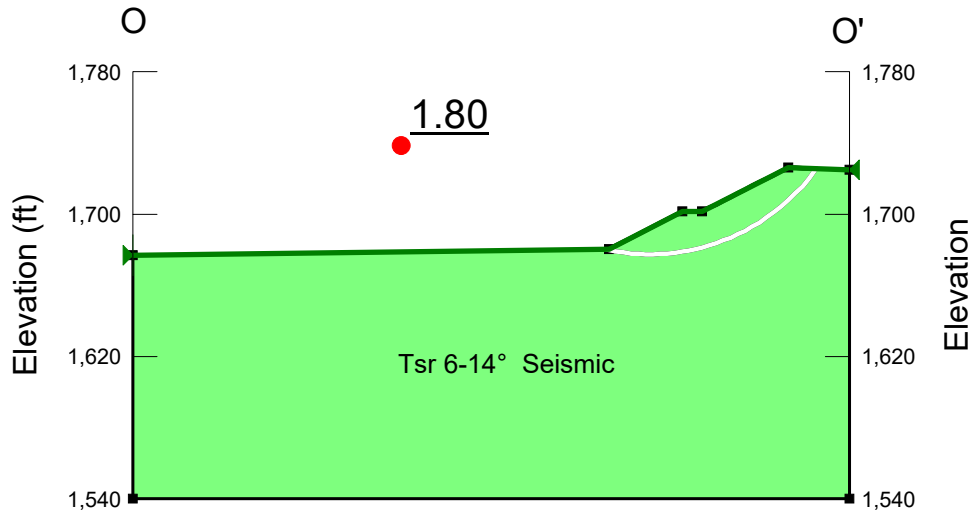
				Normal Stress	Strength	Strength	Strength	Material
Slice 1	266.68521 ft	1,680.0002 ft	0 psf	81.429359 psf	50.882711 psf	600 psf	0 psf	Tsr 6-14°
Slice 2	269.70809 ft	1,679.422 ft	0 psf	290.54096 psf	181.55014 psf	600 psf	0 psf	Tsr 6-14°
Slice 3	273.83942 ft	1,678.7447 ft	0 psf	642.39021 psf	401.40995 psf	600 psf	0 psf	Tsr 6-14°
Slice 4	277.97075 ft	1,678.2199 ft	0 psf	968.20683 psf	605.00277 psf	600 psf	0 psf	Tsr 6-14°
Slice 5	282.10209 ft	1,677.8454 ft	0 psf	1,269.0425 psf	792.98577 psf	600 psf	0 psf	Tsr 6-14°
Slice 6	286.23342 ft	1,677.6198 ft	0 psf	1,545.7722 psf	965.90569 psf	600 psf	0 psf	Tsr 6-14°
Slice 7	290.36475 ft	1,677.5423 ft	0 psf	1,799.1168 psf	1,124.2129 psf	600 psf	0 psf	Tsr 6-14°
Slice 8	294.49608 ft	1,677.6125 ft	0 psf	2,029.6602 psf	1,268.2725 psf	600 psf	0 psf	Tsr 6-14°
Slice 9	298.62742 ft	1,677.8307 ft	0 psf	2,237.8636 psf	1,398.3723 psf	600 psf	0 psf	Tsr 6-14°
Slice 10	302.75875 ft	1,678.1977 ft	0 psf	2,469.5841 psf	802.41652 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 11	306.89008 ft	1,678.7151 ft	0 psf	2,652.1144 psf	861.7242 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 12	310.78147 ft	1,679.3374 ft	0 psf	2,690.8617 psf	874.31396 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 13	314.43289 ft	1,680.0501 ft	0 psf	2,589.5157 psf	841.38465 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 14	318.08432 ft	1,680.8861 ft	0 psf	2,473.8096 psf	803.78946 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 15	321.93137 ft	1,681.9069 ft	0 psf	2,344.8149 psf	1,465.203 psf	600 psf	0 psf	Tsr 6-14°
Slice 16	325.97402 ft	1,683.131 ft	0 psf	2,411.0073 psf	1,506.5646 psf	600 psf	0 psf	Tsr 6-14°
Slice 17	330.01668 ft	1,684.5192 ft	0 psf	2,456.0369 psf	1,534.7022 psf	600 psf	0 psf	Tsr 6-14°
Slice 18	334.05933 ft	1,686.0781 ft	0 psf	2,479.5183 psf	1,549.375 psf	600 psf	0 psf	Tsr 6-14°
Slice 19	338.10198 ft	1,687.8151 ft	0 psf	2,480.952 psf	1,550.2709 psf	600 psf	0 psf	Tsr 6-14°
Slice 20	342.14464 ft	1,689.7393 ft	0 psf	2,459.7117 psf	1,536.9985 psf	600 psf	0 psf	Tsr 6-14°
Slice 21	346.18729 ft	1,691.8614 ft	0 psf	2,415.0268 psf	1,509.0763 psf	600 psf	0 psf	Tsr 6-14°
Slice 22	350.22995 ft	1,694.1941 ft	0 psf	2,345.9599 psf	1,465.9184 psf	600 psf	0 psf	Tsr 6-14°
Slice 23	354.2726 ft	1,696.7527 ft	0 psf	2,251.377 psf	1,406.8165 psf	600 psf	0 psf	Tsr 6-14°
Slice 24	358.31525 ft	1,699.5559 ft	0 psf	2,129.9089 psf	1,330.9148 psf	600 psf	0 psf	Tsr 6-14°

Slice 25	362.35791 ft	1,702.6265 ft	0 psf	1,979.8993 psf	1,237.1784 psf	600 psf	0 psf	Tsr 6-14°
Slice 26	366.40056 ft	1,705.9928 ft	0 psf	1,799.3351 psf	1,124.3494 psf	600 psf	0 psf	Tsr 6-14°
Slice 27	370.42048 ft	1,709.6679 ft	0 psf	1,478.2471 psf	923.71128 psf	600 psf	0 psf	Tsr 6-14°
Slice 28	374.41765 ft	1,713.6936 ft	0 psf	1,020.4045 psf	637.61951 psf	600 psf	0 psf	Tsr 6-14°
Slice 29	378.41482 ft	1,718.1488 ft	0 psf	533.50034 psf	333.36801 psf	600 psf	0 psf	Tsr 6-14°
Slice 30	382.41199 ft	1,723.1162 ft	0 psf	15.111556 psf	9.4427482 psf	600 psf	0 psf	Tsr 6-14°

Section O-O Tr 68203 SSA.gsz

1 -Rotational Pseudostatic Global

Horz Seismic Coef.: 0.15



Name: Tsr 6-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)

LGC

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GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Pseudostatic Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 737
Date: 11/18/2020
Time: 08:40:53 AM
Tool Version: 10.1.0.18696
File Name: Section O-O Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 08:41:08 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Pseudostatic Global

Kind: SLOPE/W
Parent: 1 -Rotational Static Global
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 6-14° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.04477, 1,676.9386) ft
Right Coordinate: (402.89965, 1,725.1701) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 19° bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.5938)
- Data Point: (14, 0.5938)
- Data Point: (14.01, 1)

Tsr 375 bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.625)
- Data Point: (14, 0.625)
- Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	402.89965 ft	1,725.1701 ft
Point 2	402.89965 ft	1,539.9723 ft
Point 3	0.04477 ft	1,539.9723 ft
Point 4	0.04477 ft	1,676.9386 ft
Point 5	267.64242 ft	1,680.2249 ft
Point 6	308.95575 ft	1,701.5075 ft
Point 7	319.91004 ft	1,701.5075 ft
Point 8	368.42189 ft	1,726.2329 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14° Seismic	1,2,3,4,5,6,7,8	59,935 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.80
Volume: 1,976.7547 ft³
Weight: 247,094.34 lbf
Resisting Moment: 23,710,681 lbf·ft
Activating Moment: 13,190,287 lbf·ft
Slip Rank: 1 of 1 slip surfaces
Exit: (265.72801, 1,680.2014) ft
Entry: (384.41058, 1,725.74) ft
Radius: 115.6265 ft
Center: (290.46727, 1,793.1503) ft

Slip Slices

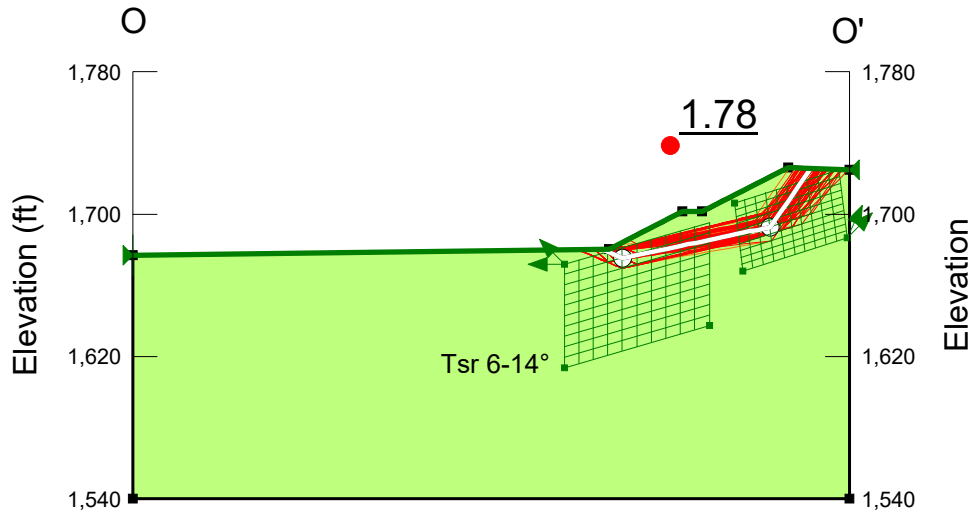
	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	266.68521 ft	1,680.0002 ft	0 psf	104.31803 psf	65.185141 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 2	269.70809 ft	1,679.422 ft	0 psf	314.16459 psf	196.31182 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 3	273.83942 ft	1,678.7447 ft	0 psf	666.16414 psf	416.26555 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 4	277.97075 ft	1,678.2199 ft	0 psf	989.32547 psf	618.19916 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 5	282.10209 ft	1,677.8454 ft	0 psf	1,285.1217 psf	803.03316 psf	600 psf	0 psf	Tsr 6-14° Seismic

Slice 6	286.23342 ft	1,677.6198 ft	0 psf	1,554.7874 psf	971.53901 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 7	290.36475 ft	1,677.5423 ft	0 psf	1,799.354 psf	1,124.3612 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 8	294.49608 ft	1,677.6125 ft	0 psf	2,019.677 psf	1,262.0342 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 9	298.62742 ft	1,677.8307 ft	0 psf	2,216.4576 psf	1,384.9964 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 10	302.75875 ft	1,678.1977 ft	0 psf	2,442.4068 psf	841.06439 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 11	306.89008 ft	1,678.7151 ft	0 psf	2,614.3265 psf	900.26647 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 12	310.78147 ft	1,679.3374 ft	0 psf	2,643.7593 psf	910.40192 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 13	314.43289 ft	1,680.0501 ft	0 psf	2,535.2032 psf	873.01967 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 14	318.08432 ft	1,680.8861 ft	0 psf	2,412.8126 psf	830.87337 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 15	321.93137 ft	1,681.9069 ft	0 psf	2,262.3213 psf	1,413.6552 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 16	325.97402 ft	1,683.131 ft	0 psf	2,316.1896 psf	1,447.3159 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 17	330.01668 ft	1,684.5192 ft	0 psf	2,349.0267 psf	1,467.8348 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 18	334.05933 ft	1,686.0781 ft	0 psf	2,360.6085 psf	1,475.0719 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 19	338.10198 ft	1,687.8151 ft	0 psf	2,350.6053 psf	1,468.8212 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 20	342.14464 ft	1,689.7393 ft	0 psf	2,318.5731 psf	1,448.8053 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 21	346.18729 ft	1,691.8614 ft	0 psf	2,263.9414 psf	1,414.6676 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 22	350.22995 ft	1,694.1941 ft	0 psf	2,185.9972 psf	1,365.9626 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 23	354.2726 ft	1,696.7527 ft	0 psf	2,083.8635 psf	1,302.1424 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 24	358.31525 ft	1,699.5559 ft	0 psf	1,956.472 psf	1,222.5394 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 25	362.35791 ft	1,702.6265 ft	0 psf	1,802.5262 psf	1,126.3434 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 26	366.40056 ft	1,705.9928 ft	0 psf	1,620.454 psf	1,012.5721 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 27	370.42048 ft	1,709.6679 ft	0 psf	1,308.4021 psf	817.58035 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 28	374.41765 ft	1,713.6936 ft	0 psf	872.035 psf	544.90794 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 29	378.41482 ft	1,718.1488 ft	0 psf	412.87124 psf	257.99058 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 30	382.41199 ft	1,723.1162 ft	0 psf	-70.123632 psf	-43.818108 psf	600 psf	0 psf	Tsr 6-14° Seismic

Section O-O Tr 68203 SSA.gsz

2 -Translational Static Global

Horz Seismic Coef.: 0



Name: Tsr 6-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°

LGC

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Static Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 737
Date: 11/18/2020
Time: 08:40:53 AM
Tool Version: 10.1.0.18696
File Name: Section O-O Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 08:41:10 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Static Global

Kind: SLOPE/W
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 1
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 6-14°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.04477, 1,676.9386) ft
Right Coordinate: (402.89965, 1,725.1701) ft

Slip Surface Block

Left Grid
- Upper Left: (242.63534, 1,671.6806) ft
- Lower Left: (242.63534, 1,613.6541) ft
- Lower Right: (324.51084, 1,637.3154) ft
- X Increments: 10
- Y Increments: 10
- Starting Angle: 135 °
- Ending Angle: 180 °
- Angle Increments: 2

Right Grid
- Upper Left: (338.21935, 1,706.4213) ft
- Lower Left: (343.10183, 1,667.9248) ft
- Lower Right: (401.69163, 1,686.5158) ft
- X Increments: 10
- Y Increments: 10
- Angle Increments: 2

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.4167)
- Data Point: (14, 0.4167)

Data Point: (14.01, 1)

Tsr 18° bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (5.99, 1)
Data Point: (6, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	402.89965 ft	1,725.1701 ft
Point 2	402.89965 ft	1,539.9723 ft
Point 3	0.04477 ft	1,539.9723 ft
Point 4	0.04477 ft	1,676.9386 ft
Point 5	267.64242 ft	1,680.2249 ft
Point 6	308.95575 ft	1,701.5075 ft
Point 7	319.91004 ft	1,701.5075 ft
Point 8	368.42189 ft	1,726.2329 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14°	1,2,3,4,5,6,7,8	59,935 ft²

Slip Results

Slip Surfaces Analysed: 62973 of 131769 converged

Current Slip Surface

Slip Surface: 112,706
Factor of Safety: 1.78
Volume: 1,938.2968 ft³
Weight: 242,287.1 lbf
Resisting Force: 120,206.87 lbf
Activating Force: 67,342.83 lbf
Slip Rank: 1 of 131,769 slip surfaces

Exit: (263.71476, 1,680.1767) ft
Entry: (381.40209, 1,725.8328) ft
Radius: 66.571183 ft
Center: (309.27441, 1,737.2468) ft

Slip Slices

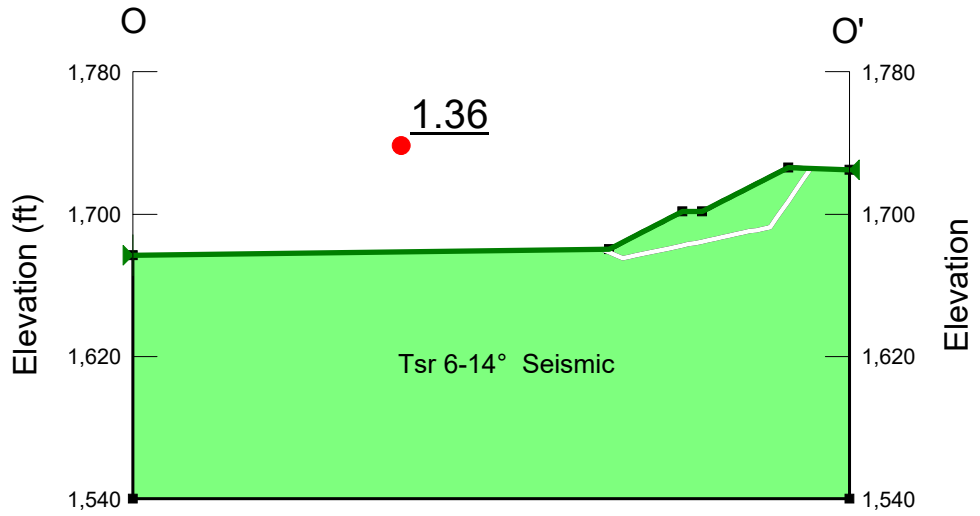
	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	265.67859 ft	1,679.3632 ft	0 psf	286.07255 psf	178.75797 psf	600 psf	0 psf	Tsr 6-14°
Slice 2	269.5782 ft	1,677.7479 ft	0 psf	671.78315 psf	419.7767 psf	600 psf	0 psf	Tsr 6-14°
Slice 3	273.44976 ft	1,676.1443 ft	0 psf	1,198.1496 psf	748.68693 psf	600 psf	0 psf	Tsr 6-14°
Slice 4	277.25055 ft	1,675.7343 ft	0 psf	1,107.9589 psf	359.99767 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 5	280.98057 ft	1,676.518 ft	0 psf	1,244.9282 psf	404.5017 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 6	284.7106 ft	1,677.3017 ft	0 psf	1,381.8976 psf	449.00574 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 7	288.44062 ft	1,678.0854 ft	0 psf	1,518.8669 psf	493.50978 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 8	292.17064 ft	1,678.8692 ft	0 psf	1,655.8363 psf	538.01381 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 9	295.90067 ft	1,679.6529 ft	0 psf	1,792.8056 psf	582.51785 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 10	299.63069 ft	1,680.4366 ft	0 psf	1,929.7749 psf	627.02189 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 11	303.36072 ft	1,681.2203 ft	0 psf	2,066.7443 psf	671.52593 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 12	307.09074 ft	1,682.004 ft	0 psf	2,203.7136 psf	716.02996 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 13	310.78147 ft	1,682.7794 ft	0 psf	2,226.0212 psf	723.27812 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 14	314.43289 ft	1,683.5466 ft	0 psf	2,133.6669 psf	693.27039 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 15	318.08432 ft	1,684.3138 ft	0 psf	2,041.3126 psf	663.26267 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 16	321.82641 ft	1,685.1001 ft	0 psf	2,064.2435 psf	670.71339 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 17	325.65916 ft	1,685.9054 ft	0 psf	2,202.4597 psf	715.62254 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 18	329.49191 ft	1,686.7107 ft	0 psf	2,340.6759 psf	760.5317 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 19	333.32466 ft	1,687.516 ft	0 psf	2,478.8921 psf	805.44086 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 20	337.15741 ft	1,688.3212 ft	0 psf	2,617.1083 psf	850.35002 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 21	340.99016 ft	1,689.1265 ft	0 psf	2,755.3244 psf	895.25918 psf	250.02 psf	0 psf	Tsr 6-14°

Slice 22	344.82291 ft	1,689.9318 ft	0 psf	2,893.5406 psf	940.16834 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 23	348.65566 ft	1,690.7371 ft	0 psf	3,031.7568 psf	985.0775 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 24	352.48841 ft	1,691.5424 ft	0 psf	3,169.973 psf	1,029.9867 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 25	356.32116 ft	1,692.3477 ft	0 psf	3,308.1892 psf	1,074.8958 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 26	359.93492 ft	1,695.1745 ft	0 psf	1,904.2564 psf	1,189.9115 psf	600 psf	0 psf	Tsr 6-14°
Slice 27	363.32971 ft	1,700.0227 ft	0 psf	1,644.7311 psf	1,027.7421 psf	600 psf	0 psf	Tsr 6-14°
Slice 28	366.7245 ft	1,704.871 ft	0 psf	1,385.2058 psf	865.57268 psf	600 psf	0 psf	Tsr 6-14°
Slice 29	370.58526 ft	1,710.3847 ft	0 psf	992.73131 psf	620.32737 psf	600 psf	0 psf	Tsr 6-14°
Slice 30	374.91199 ft	1,716.5639 ft	0 psf	467.30753 psf	292.00615 psf	600 psf	0 psf	Tsr 6-14°
Slice 31	379.23873 ft	1,722.7432 ft	0 psf	-58.116251 psf	-36.315064 psf	600 psf	0 psf	Tsr 6-14°

Section O-O Tr 68203 SSA.gsz

2 -Translational Pseudostatic Global

Horz Seismic Coef.: 0.15



Name: Tsr 6-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)

LGC

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Pseudostatic Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 737
Date: 11/18/2020
Time: 08:40:53 AM
Tool Version: 10.1.0.18696
File Name: Section O-O Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 08:41:10 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Pseudostatic Global

Kind: SLOPE/W
Parent: 2 -Translational Static Global
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Tsr 6-14° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.04477, 1,676.9386) ft
Right Coordinate: (402.89965, 1,725.1701) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 19° bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.5938)
- Data Point: (14, 0.5938)
- Data Point: (14.01, 1)

Tsr 375 bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.625)
- Data Point: (14, 0.625)
- Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	402.89965 ft	1,725.1701 ft
Point 2	402.89965 ft	1,539.9723 ft
Point 3	0.04477 ft	1,539.9723 ft
Point 4	0.04477 ft	1,676.9386 ft
Point 5	267.64242 ft	1,680.2249 ft
Point 6	308.95575 ft	1,701.5075 ft
Point 7	319.91004 ft	1,701.5075 ft
Point 8	368.42189 ft	1,726.2329 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14° Seismic	1,2,3,4,5,6,7,8	59,935 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.36
Volume: 1,938.2968 ft³
Weight: 242,287.1 lbf
Resisting Force: 130,455.19 lbf
Activating Force: 96,126.932 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (263.71476, 1,680.1767) ft
Entry: (381.40209, 1,725.8328) ft
Radius: 66.571183 ft
Center: (309.27441, 1,737.2468) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	265.67859 ft	1,679.3632 ft	0 psf	356.1577 psf	222.55203 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 2	269.5782 ft	1,677.7479 ft	0 psf	763.55904 psf	477.12464 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 3	273.44976 ft	1,676.1443 ft	0 psf	1,319.5261 psf	824.5314 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 4	277.25055 ft	1,675.7343 ft	0 psf	1,065.0044 psf	366.74368 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 5	280.98057 ft	1,676.518 ft	0 psf	1,200.0216 psf	413.23804 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 6	284.7106 ft	1,677.3017 ft	0 psf	1,335.0387 psf	459.73241 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 7	288.44062 ft	1,678.0854 ft	0 psf	1,470.0559 psf	506.22677 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 8	292.17064 ft	1,678.8692 ft	0 psf	1,605.0731 psf	552.72113 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 9	295.90067 ft	1,679.6529 ft	0 psf	1,740.0903 psf	599.21549 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 10	299.63069 ft	1,680.4366 ft	0 psf	1,875.1075 psf	645.70985 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 11	303.36072 ft	1,681.2203 ft	0 psf	2,010.1247 psf	692.20422 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 12	307.09074 ft	1,682.004 ft	0 psf	2,145.1418 psf	738.69858 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 13	310.78147 ft	1,682.7794 ft	0 psf	2,167.1314 psf	746.27089 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 14	314.43289 ft	1,683.5466 ft	0 psf	2,076.0934 psf	714.92115 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 15	318.08432 ft	1,684.3138 ft	0 psf	1,985.0554 psf	683.57141 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 16	321.82641 ft	1,685.1001 ft	0 psf	2,007.6596 psf	691.35534 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 17	325.65916 ft	1,685.9054 ft	0 psf	2,143.9058 psf	738.27294 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 18	329.49191 ft	1,686.7107 ft	0 psf	2,280.1521 psf	785.19054 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 19	333.32466 ft	1,687.516 ft	0 psf	2,416.3983 psf	832.10814 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 20	337.15741 ft	1,688.3212 ft	0 psf	2,552.6446 psf	879.02575 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 21	340.99016 ft	1,689.1265 ft	0 psf	2,688.8908 psf	925.94335 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 22	344.82291 ft	1,689.9318 ft	0 psf	2,825.1371 psf	972.86095 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 23	348.65566 ft	1,690.7371 ft	0 psf	2,961.3833 psf	1,019.7786 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 24	352.48841 ft	1,691.5424 ft	0 psf	3,097.6296 psf	1,066.6962 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 25	356.32116 ft	1,692.3477 ft	0 psf	3,233.8758 psf	1,113.6138 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 26	359.93492 ft	1,695.1745 ft	0 psf	1,633.3714 psf	1,020.6437 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 27	363.32971 ft	1,700.0227 ft	0 psf	1,398.3888 psf	873.81031 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 28	366.7245 ft	1,704.871 ft	0 psf	1,163.4062 psf	726.97689 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 29	370.58526 ft	1,710.3847 ft	0 psf	808.04709 psf	504.92386 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 30	374.91199 ft	1,716.5639 ft	0 psf	332.31141 psf	207.65122 psf	600 psf	0 psf	Tsr 6-14° Seismic

Slice 31	379.23873 ft	1,722.7432 ft	0 psf	-143.42427 psf	-89.621431 psf	600 psf	0 psf	Tsr 6-14° Seismic

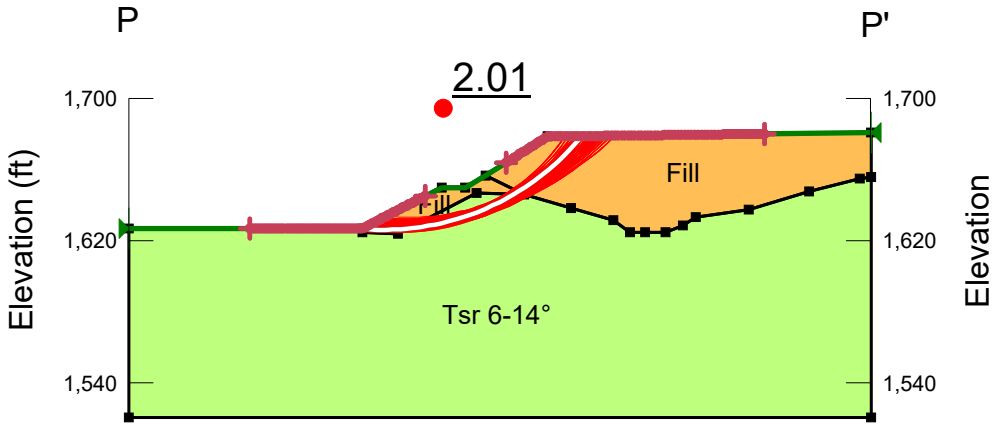
Section P-P Tr 68203 SSA.gsz 11/18/2020 09:10:05 AM

Section P-P Tr 68203 SSA.gsz

1 -Rotational Static Global

Horz Seismic Coef.: 0

20 Foot wide stabilization fill key
with 2:1 backcut.



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 6-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Static Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 735
Date: 11/18/2020
Time: 09:10:05 AM
Tool Version: 10.1.0.18696
File Name: Section P-P Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 09:10:56 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Static Global

Kind: SLOPE/W
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 6-14°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (68.13589, 1,626.6395) ft
Left-Zone Right Coordinate: (166.58416, 1,645.0277) ft
Left-Zone Increment: 80
Right Type: Range
Right-Zone Left Coordinate: (212.04347, 1,663.6749) ft
Right-Zone Right Coordinate: (357.60516, 1,680.0134) ft
Right-Zone Increment: 80
Radius Increments: 14

Slip Surface Limits

Left Coordinate: (0.09861, 1,626.6395) ft
Right Coordinate: (417.17849, 1,680.78) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.4167)
- Data Point: (14, 0.4167)

Data Point: (14.01, 1)

Tsr 18° bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (5.99, 1)
Data Point: (6, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	417.17849 ft	1,680.78 ft
Point 2	417.17849 ft	1,655.8002 ft
Point 3	417.17849 ft	1,520.5922 ft
Point 4	0.09861 ft	1,520.5922 ft
Point 5	0.09861 ft	1,626.6395 ft
Point 6	131.23131 ft	1,626.6395 ft
Point 7	175.83273 ft	1,649.8382 ft
Point 8	189.34145 ft	1,649.8382 ft
Point 9	200.60124 ft	1,656.4341 ft
Point 10	235.37676 ft	1,678.4405 ft
Point 11	410.91688 ft	1,655.0299 ft
Point 12	382.61427 ft	1,647.4233 ft
Point 13	348.72927 ft	1,637.537 ft
Point 14	318.99499 ft	1,633.0844 ft
Point 15	311.75009 ft	1,628.7073 ft
Point 16	301.93929 ft	1,624.8584 ft
Point 17	290.39272 ft	1,624.8584 ft
Point 18	282.01581 ft	1,624.8584 ft
Point 19	272.28047 ft	1,631.4996 ft
Point 20	248.65908 ft	1,638.1407 ft
Point 21	222.54725 ft	1,646.0649 ft
Point 22	131.23131 ft	1,624.6404 ft
Point 23	151.25286 ft	1,623.646 ft
Point 24	195.50367 ft	1,646.9018 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14°	5,4,3,2,11,12,13,14,15,16,17,18,19,20,21,24,23,22,6	47,378 ft²
Region 2	Fill	2,1,10,9,21,20,19,18,17,16,15,14,13,12,11	8,229.4 ft²
Region 3	Fill	6,22,23,24,21,9,8,7	800.42 ft²

Slip Results

Slip Surfaces Analysed: 92661 of 98415 converged

Current Slip Surface

Slip Surface: 59,916
Factor of Safety: 2.01
Volume: 1,823.5389 ft³
Weight: 220,668.25 lbf
Resisting Moment: 24,012,325 lbf·ft
Activating Moment: 11,958,582 lbf·ft
Slip Rank: 1 of 98,415 slip surfaces
Exit: (131.1894, 1,626.6395) ft
Entry: (254.59092, 1,678.6878) ft
Radius: 144.10765 ft
Center: (143.29995, 1,770.2374) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	131.21036 ft	1,626.6377 ft	0 psf	26.029991 psf	16.265344 psf	600 psf	0 psf	Tsr 6-14°
Slice 2	133.40124 ft	1,626.4866 ft	0 psf	168.25256 psf	97.14066 psf	325 psf	0 psf	Fill
Slice 3	137.74109 ft	1,626.2534 ft	0 psf	464.03948 psf	267.91332 psf	325 psf	0 psf	Fill
Slice 4	142.08094 ft	1,626.1512 ft	0 psf	738.94811 psf	426.63189 psf	325 psf	0 psf	Fill
Slice 5	146.4208 ft	1,626.1799 ft	0 psf	993.53889 psf	573.61995 psf	325 psf	0 psf	Fill
Slice 6	150.76065 ft	1,626.3394 ft	0 psf	1,228.2856 psf	709.151 psf	325 psf	0 psf	Fill
Slice 7	155.10051 ft	1,626.6302 ft	0 psf	1,443.5828 psf	833.4529 psf	325 psf	0 psf	Fill
Slice 8	159.12666 ft	1,627.0136 ft	0 psf	1,656.7397 psf	538.30735 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 9	162.83912 ft	1,627.4728 ft	0 psf	1,826.7187 psf	593.53688 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 10	166.55158 ft	1,628.0303 ft	0 psf	1,983.1819 psf	644.37485 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 11	170.26404 ft	1,628.6874 ft	0 psf	2,126.1093 psf	690.81478 psf	250.02 psf	0 psf	Tsr 6-14°

Slice 12	173.9765 ft	1,629.4455 ft	0 psf	2,255.4502 psf	732.84019 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 13	178.08418 ft	1,630.41 ft	0 psf	2,246.7866 psf	730.02523 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 14	182.58709 ft	1,631.6082 ft	0 psf	1,971.8412 psf	1,232.1432 psf	600 psf	0 psf	Tsr 6-14°
Slice 15	187.09 ft	1,632.9644 ft	0 psf	1,798.8457 psf	1,124.0435 psf	600 psf	0 psf	Tsr 6-14°
Slice 16	192.42256 ft	1,634.8002 ft	0 psf	1,766.1863 psf	1,103.6357 psf	600 psf	0 psf	Tsr 6-14°
Slice 17	198.05246 ft	1,636.9648 ft	0 psf	1,847.8428 psf	1,154.6604 psf	600 psf	0 psf	Tsr 6-14°
Slice 18	202.61807 ft	1,638.923 ft	0 psf	1,892.6917 psf	1,182.685 psf	600 psf	0 psf	Tsr 6-14°
Slice 19	206.65174 ft	1,640.8213 ft	0 psf	1,922.9603 psf	1,201.5989 psf	600 psf	0 psf	Tsr 6-14°
Slice 20	210.68541 ft	1,642.8757 ft	0 psf	1,934.4909 psf	1,208.8041 psf	600 psf	0 psf	Tsr 6-14°
Slice 21	214.71908 ft	1,645.0937 ft	0 psf	1,926.8315 psf	1,204.0179 psf	600 psf	0 psf	Tsr 6-14°
Slice 22	217.9262 ft	1,646.9653 ft	0 psf	2,005.3331 psf	1,157.7796 psf	325 psf	0 psf	Fill
Slice 23	221.14902 ft	1,648.9909 ft	0 psf	1,983.8823 psf	1,145.395 psf	325 psf	0 psf	Fill
Slice 24	225.21409 ft	1,651.7005 ft	0 psf	1,940.2591 psf	1,120.2091 psf	325 psf	0 psf	Fill
Slice 25	229.27916 ft	1,654.6166 ft	0 psf	1,875.1309 psf	1,082.6073 psf	325 psf	0 psf	Fill
Slice 26	233.34423 ft	1,657.7551 ft	0 psf	1,787.5085 psf	1,032.0185 psf	325 psf	0 psf	Fill
Slice 27	237.29818 ft	1,661.0361 ft	0 psf	1,565.3458 psf	903.75281 psf	325 psf	0 psf	Fill
Slice 28	241.14101 ft	1,664.4674 ft	0 psf	1,213.6773 psf	700.71693 psf	325 psf	0 psf	Fill
Slice 29	244.98384 ft	1,668.1588 ft	0 psf	845.6587 psf	488.24128 psf	325 psf	0 psf	Fill
Slice 30	248.82667 ft	1,672.1397 ft	0 psf	460.63669 psf	265.94871 psf	325 psf	0 psf	Fill
Slice 31	252.66951 ft	1,676.4472 ft	0 psf	57.962347 psf	33.464577 psf	325 psf	0 psf	Fill

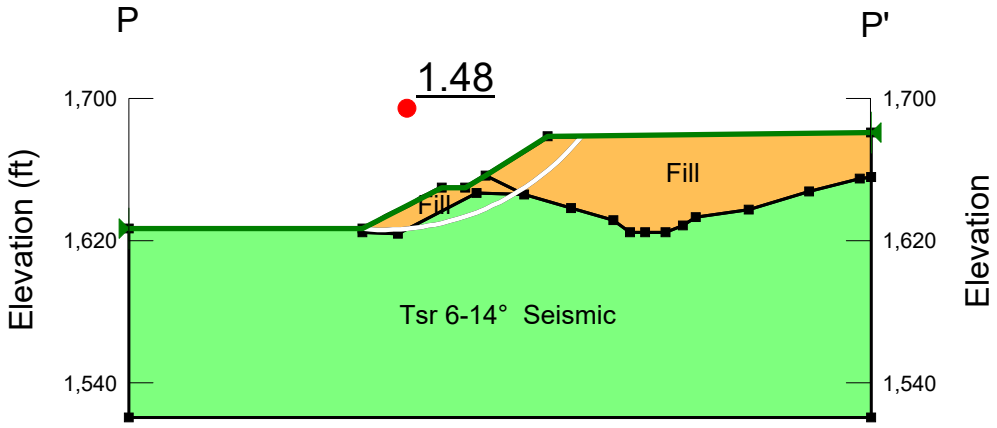
Section P-P Tr 68203 SSA.gsz 11/18/2020 09:10:05 AM

Section P-P Tr 68203 SSA.gsz

1 -Rotational Pseudostatic Global

Horz Seismic Coef.: 0.15

20 Foot wide stabilization fill key
with 2:1 backcut.



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 6-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)

LGC

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Pseudostatic Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 735
Date: 11/18/2020
Time: 09:10:05 AM
Tool Version: 10.1.0.18696
File Name: Section P-P Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 09:11:03 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Pseudostatic Global

Kind: SLOPE/W
Parent: 1 -Rotational Static Global
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 6-14° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.09861, 1,626.6395) ft
Right Coordinate: (417.17849, 1,680.78) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 19° bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.5938)
- Data Point: (14, 0.5938)
- Data Point: (14.01, 1)

Tsr 375 bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.625)
- Data Point: (14, 0.625)

Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	417.17849 ft	1,680.78 ft
Point 2	417.17849 ft	1,655.8002 ft
Point 3	417.17849 ft	1,520.5922 ft
Point 4	0.09861 ft	1,520.5922 ft
Point 5	0.09861 ft	1,626.6395 ft
Point 6	131.23131 ft	1,626.6395 ft
Point 7	175.83273 ft	1,649.8382 ft
Point 8	189.34145 ft	1,649.8382 ft
Point 9	200.60124 ft	1,656.4341 ft
Point 10	235.37676 ft	1,678.4405 ft
Point 11	410.91688 ft	1,655.0299 ft
Point 12	382.61427 ft	1,647.4233 ft
Point 13	348.72927 ft	1,637.537 ft
Point 14	318.99499 ft	1,633.0844 ft
Point 15	311.75009 ft	1,628.7073 ft
Point 16	301.93929 ft	1,624.8584 ft
Point 17	290.39272 ft	1,624.8584 ft
Point 18	282.01581 ft	1,624.8584 ft
Point 19	272.28047 ft	1,631.4996 ft
Point 20	248.65908 ft	1,638.1407 ft
Point 21	222.54725 ft	1,646.0649 ft
Point 22	131.23131 ft	1,624.6404 ft
Point 23	151.25286 ft	1,623.646 ft
Point 24	195.50367 ft	1,646.9018 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14° Seismic	5,4,3,2,11,12,13,14,15,16,17,18,19,20,21,24,23,22,6	47,378 ft²
Region 2	Fill	2,1,10,9,21,20,19,18,17,16,15,14,13,12,11	8,229.4 ft²
Region 3	Fill	6,22,23,24,21,9,8,7	800.42 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.48
Volume: 1,823.5389 ft³
Weight: 220,668.25 lbf
Resisting Moment: 23,617,294 lbf·ft
Activating Moment: 15,967,363 lbf·ft
Slip Rank: 1 of 1 slip surfaces
Exit: (131.1894, 1,626.6395) ft
Entry: (254.59092, 1,678.6878) ft
Radius: 144.10765 ft
Center: (143.29995, 1,770.2374) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	131.21036 ft	1,626.6377 ft	0 psf	35.578928 psf	22.232182 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 2	133.40124 ft	1,626.4866 ft	0 psf	173.55488 psf	100.20196 psf	325 psf	0 psf	Fill
Slice 3	137.74109 ft	1,626.2534 ft	0 psf	468.16495 psf	270.29516 psf	325 psf	0 psf	Fill
Slice 4	142.08094 ft	1,626.1512 ft	0 psf	740.08064 psf	427.28575 psf	325 psf	0 psf	Fill
Slice 5	146.4208 ft	1,626.1799 ft	0 psf	990.11208 psf	571.64148 psf	325 psf	0 psf	Fill
Slice 6	150.76065 ft	1,626.3394 ft	0 psf	1,218.9563 psf	703.76472 psf	325 psf	0 psf	Fill
Slice 7	155.10051 ft	1,626.6302 ft	0 psf	1,427.2092 psf	823.99961 psf	325 psf	0 psf	Fill
Slice 8	159.12666 ft	1,627.0136 ft	0 psf	1,630.2331 psf	561.38518 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 9	162.83912 ft	1,627.4728 ft	0 psf	1,792.4879 psf	617.25906 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 10	166.55158 ft	1,628.0303 ft	0 psf	1,940.7865 psf	668.32702 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 11	170.26404 ft	1,628.6874 ft	0 psf	2,075.1675 psf	714.60229 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 12	173.9765 ft	1,629.4455 ft	0 psf	2,195.6367 psf	756.08694 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 13	178.08418 ft	1,630.41 ft	0 psf	2,179.1037 psf	750.39365 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 14	182.58709 ft	1,631.6082 ft	0 psf	1,889.5132 psf	1,180.6989 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 15	187.09 ft	1,632.9644 ft	0 psf	1,712.7968 psf	1,070.2742 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 16	192.42256 ft	1,634.8002 ft	0 psf	1,671.0539 psf	1,044.1903 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 17	198.05246 ft	1,636.9648 ft	0 psf	1,738.7781 psf	1,086.5092 psf	600 psf	0 psf	Tsr 6-14° Seismic

Slice 18	202.61807 ft	1,638.923 ft	0 psf	1,772.6203 psf	1,107.6561 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 19	206.65174 ft	1,640.8213 ft	0 psf	1,793.1998 psf	1,120.5156 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 20	210.68541 ft	1,642.8757 ft	0 psf	1,795.6024 psf	1,122.0169 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 21	214.71908 ft	1,645.0937 ft	0 psf	1,779.5299 psf	1,111.9737 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 22	217.9262 ft	1,646.9653 ft	0 psf	1,876.406 psf	1,083.3435 psf	325 psf	0 psf	Fill
Slice 23	221.14902 ft	1,648.9909 ft	0 psf	1,849.8335 psf	1,068.0019 psf	325 psf	0 psf	Fill
Slice 24	225.21409 ft	1,651.7005 ft	0 psf	1,800.5896 psf	1,039.5709 psf	325 psf	0 psf	Fill
Slice 25	229.27916 ft	1,654.6166 ft	0 psf	1,731.0692 psf	999.43329 psf	325 psf	0 psf	Fill
Slice 26	233.34423 ft	1,657.7551 ft	0 psf	1,640.5259 psf	947.15805 psf	325 psf	0 psf	Fill
Slice 27	237.29818 ft	1,661.0361 ft	0 psf	1,424.754 psf	822.58209 psf	325 psf	0 psf	Fill
Slice 28	241.14101 ft	1,664.4674 ft	0 psf	1,089.877 psf	629.24076 psf	325 psf	0 psf	Fill
Slice 29	244.98384 ft	1,668.1588 ft	0 psf	742.0689 psf	428.43368 psf	325 psf	0 psf	Fill
Slice 30	248.82667 ft	1,672.1397 ft	0 psf	381.12403 psf	220.04206 psf	325 psf	0 psf	Fill
Slice 31	252.66951 ft	1,676.4472 ft	0 psf	6.9445115 psf	4.0094156 psf	325 psf	0 psf	Fill

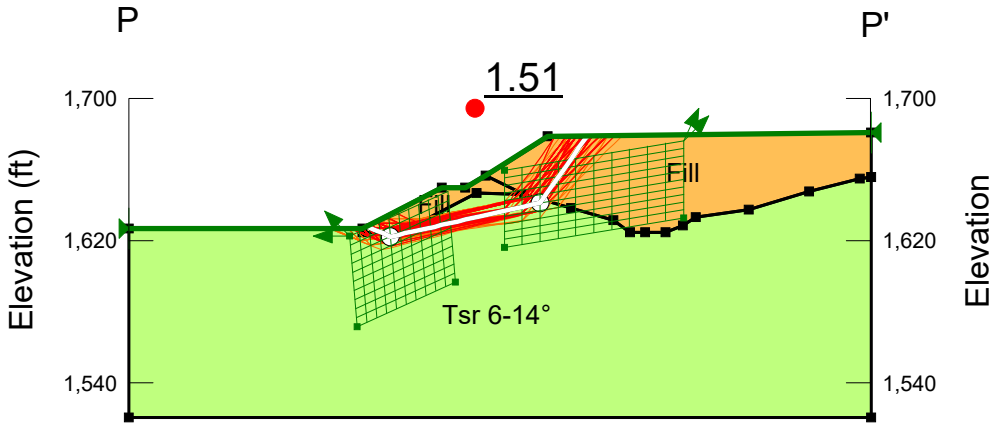
Section P-P Tr 68203 SSA.gsz 11/18/2020 09:10:05 AM

Section P-P Tr 68203 SSA.gsz

2 -Translational Static Global

Horz Seismic Coef.: 0

20 Foot wide stabilization fill key
with 2:1 backcut.



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 6-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Static Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 735
Date: 11/18/2020
Time: 09:10:05 AM
Tool Version: 10.1.0.18696
File Name: Section P-P Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 09:11:04 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Static Global

Kind: SLOPE/W
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 1
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 6-14°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 6-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 6-14°
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.09861, 1,626.6395) ft
Right Coordinate: (417.17849, 1,680.78) ft

Slip Surface Block

Left Grid
- Upper Left: (124.37459, 1,622.4802) ft
- Lower Left: (128.31814, 1,571.5897) ft
- Lower Right: (183.52776, 1,596.5654) ft
- X Increments: 10
- Y Increments: 10
- Starting Angle: 135 °
- Ending Angle: 180 °
- Angle Increments: 2

Right Grid
- Upper Left: (211.13257, 1,659.4744) ft
- Lower Left: (211.13257, 1,616.2832) ft
- Lower Right: (311.78684, 1,632.8085) ft
- X Increments: 10
- Y Increments: 10
- Angle Increments: 2

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (5.99, 1)
Data Point: (6, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18° bedding 6-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (5.99, 1)
Data Point: (6, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	417.17849 ft	1,680.78 ft
Point 2	417.17849 ft	1,655.8002 ft
Point 3	417.17849 ft	1,520.5922 ft
Point 4	0.09861 ft	1,520.5922 ft
Point 5	0.09861 ft	1,626.6395 ft
Point 6	131.23131 ft	1,626.6395 ft
Point 7	175.83273 ft	1,649.8382 ft
Point 8	189.34145 ft	1,649.8382 ft
Point 9	200.60124 ft	1,656.4341 ft
Point 10	235.37676 ft	1,678.4405 ft
Point 11	410.91688 ft	1,655.0299 ft
Point 12	382.61427 ft	1,647.4233 ft
Point 13	348.72927 ft	1,637.537 ft
Point 14	318.99499 ft	1,633.0844 ft
Point 15	311.75009 ft	1,628.7073 ft
Point 16	301.93929 ft	1,624.8584 ft
Point 17	290.39272 ft	1,624.8584 ft
Point 18	282.01581 ft	1,624.8584 ft
Point 19	272.28047 ft	1,631.4996 ft

Point 20	248.65908 ft	1,638.1407 ft
Point 21	222.54725 ft	1,646.0649 ft
Point 22	131.23131 ft	1,624.6404 ft
Point 23	151.25286 ft	1,623.646 ft
Point 24	195.50367 ft	1,646.9018 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14°	5,4,3,2,11,12,13,14,15,16,17,18,19,20,21,24,23,22,6	47,378 ft²
Region 2	Fill	2,1,10,9,21,20,19,18,17,16,15,14,13,12,11	8,229.4 ft²
Region 3	Fill	6,22,23,24,21,9,8,7	800.42 ft²

Slip Results

Slip Surfaces Analysed: 94900 of 131769 converged

Current Slip Surface

Slip Surface: 100,724
Factor of Safety: 1.51
Volume: 2,414.7978 ft³
Weight: 292,982.26 lbf
Resisting Force: 131,249.97 lbf
Activating Force: 87,191.463 lbf
Slip Rank: 1 of 131,769 slip surfaces
Exit: (133.67886, 1,627.9126) ft
Entry: (257.5506, 1,678.7258) ft
Radius: 72.508835 ft
Center: (179.98168, 1,691.4292) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	136.0062 ft	1,626.9485 ft	0 psf	416.96575 psf	240.73529 psf	325 psf	0 psf	Fill
Slice 2	140.6609 ft	1,625.0205 ft	0 psf	1,037.6918 psf	599.11163 psf	325 psf	0 psf	Fill
Slice 3	145.1177 ft	1,623.1744 ft	0 psf	1,754.1879 psf	1,096.1382 psf	600 psf	0 psf	Tsr 6-14°
Slice 4	149.25 ft	1,622.7427 ft	0 psf	1,487.4952 psf	483.3165 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 5	153.30118 ft	1,623.6537 ft	0 psf	1,624.6989 psf	527.89666 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 6	157.39783 ft	1,624.5748 ft	0 psf	1,768.9971 psf	574.782 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 7	161.49447 ft	1,625.496 ft	0 psf	1,913.2953 psf	621.66733 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 8	165.59112 ft	1,626.4171 ft	0 psf	2,057.5936 psf	668.55267 psf	250.02 psf	0 psf	Tsr 6-14°

Slice 9	169.68776 ft	1,627.3383 ft	0 psf	2,201.8918 psf	715.43801 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 10	173.78441 ft	1,628.2594 ft	0 psf	2,346.19 psf	762.32335 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 11	178.08418 ft	1,629.2262 ft	0 psf	2,363.635 psf	767.99156 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 12	182.58709 ft	1,630.2387 ft	0 psf	2,254.2267 psf	732.44265 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 13	187.09 ft	1,631.2512 ft	0 psf	2,144.8184 psf	696.89375 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 14	192.42256 ft	1,632.4503 ft	0 psf	2,221.7919 psf	721.90396 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 15	198.05246 ft	1,633.7162 ft	0 psf	2,455.6343 psf	797.88396 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 16	202.79584 ft	1,634.7828 ft	0 psf	2,657.5753 psf	863.49856 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 17	207.18504 ft	1,635.7697 ft	0 psf	2,857.1279 psf	928.33711 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 18	211.57424 ft	1,636.7566 ft	0 psf	3,056.6804 psf	993.17566 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 19	215.96345 ft	1,637.7436 ft	0 psf	3,256.2329 psf	1,058.0142 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 20	220.35265 ft	1,638.7305 ft	0 psf	3,455.7855 psf	1,122.8528 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 21	224.72629 ft	1,639.714 ft	0 psf	3,651.7992 psf	1,186.5415 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 22	229.08438 ft	1,640.6939 ft	0 psf	3,844.2741 psf	1,249.0804 psf	250.02 psf	0 psf	Tsr 6-14°
Slice 23	231.90904 ft	1,642.1059 ft	0 psf	2,215.522 psf	1,384.4118 psf	600 psf	0 psf	Tsr 6-14°
Slice 24	233.96571 ft	1,645.0431 ft	0 psf	2,318.6304 psf	1,338.6619 psf	325 psf	0 psf	Fill
Slice 25	237.59414 ft	1,650.2251 ft	0 psf	1,988.5692 psf	1,148.101 psf	325 psf	0 psf	Fill
Slice 26	242.02891 ft	1,656.5586 ft	0 psf	1,502.3306 psf	867.37095 psf	325 psf	0 psf	Fill
Slice 27	246.46368 ft	1,662.8921 ft	0 psf	1,016.0919 psf	586.64093 psf	325 psf	0 psf	Fill
Slice 28	250.89845 ft	1,669.2256 ft	0 psf	529.85325 psf	305.91092 psf	325 psf	0 psf	Fill
Slice 29	255.33322 ft	1,675.5591 ft	0 psf	43.614602 psf	25.180902 psf	325 psf	0 psf	Fill

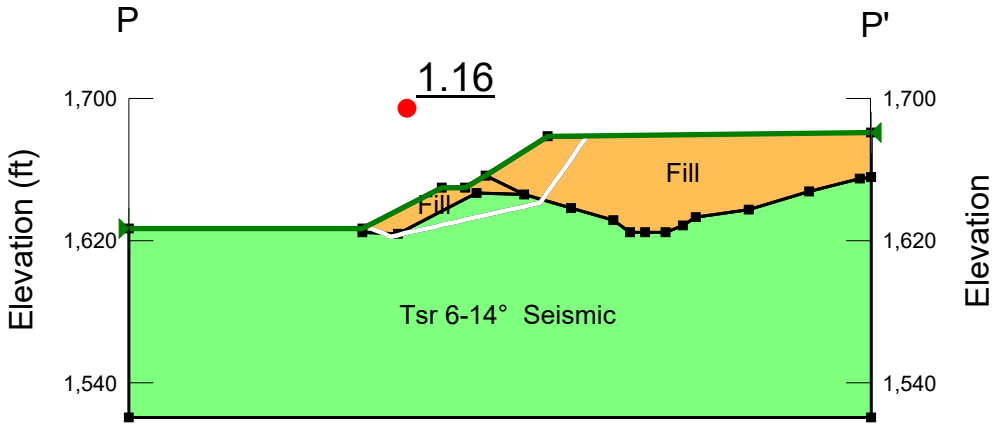
Section P-P Tr 68203 SSA.gsz 11/18/2020 09:10:05 AM

Section P-P Tr 68203 SSA.gsz

2 -Translational Pseudostatic Global

Horz Seismic Coef.: 0.15

20 Foot wide stabilization fill key
with 2:1 backcut.



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Tsr 6-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)

LGC Valley, Inc
GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Pseudostatic Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 735
Date: 11/18/2020
Time: 09:10:05 AM
Tool Version: 10.1.0.18696
File Name: Section P-P Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 09:11:04 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Pseudostatic Global

Kind: SLOPE/W
Parent: 2 -Translational Static Global
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 6-14° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 6-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 6-14° (Seismic)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.09861, 1,626.6395) ft
Right Coordinate: (417.17849, 1,680.78) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 19° bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.5938)
- Data Point: (14, 0.5938)
- Data Point: (14.01, 1)

Tsr 375 bedding 6-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (5.99, 1)
- Data Point: (6, 0.625)
- Data Point: (14, 0.625)

Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	417.17849 ft	1,680.78 ft
Point 2	417.17849 ft	1,655.8002 ft
Point 3	417.17849 ft	1,520.5922 ft
Point 4	0.09861 ft	1,520.5922 ft
Point 5	0.09861 ft	1,626.6395 ft
Point 6	131.23131 ft	1,626.6395 ft
Point 7	175.83273 ft	1,649.8382 ft
Point 8	189.34145 ft	1,649.8382 ft
Point 9	200.60124 ft	1,656.4341 ft
Point 10	235.37676 ft	1,678.4405 ft
Point 11	410.91688 ft	1,655.0299 ft
Point 12	382.61427 ft	1,647.4233 ft
Point 13	348.72927 ft	1,637.537 ft
Point 14	318.99499 ft	1,633.0844 ft
Point 15	311.75009 ft	1,628.7073 ft
Point 16	301.93929 ft	1,624.8584 ft
Point 17	290.39272 ft	1,624.8584 ft
Point 18	282.01581 ft	1,624.8584 ft
Point 19	272.28047 ft	1,631.4996 ft
Point 20	248.65908 ft	1,638.1407 ft
Point 21	222.54725 ft	1,646.0649 ft
Point 22	131.23131 ft	1,624.6404 ft
Point 23	151.25286 ft	1,623.646 ft
Point 24	195.50367 ft	1,646.9018 ft

Regions

	Material	Points	Area
Region 1	Tsr 6-14° Seismic	5,4,3,2,11,12,13,14,15,16,17,18,19,20,21,24,23,22,6	47,378 ft²
Region 2	Fill	2,1,10,9,21,20,19,18,17,16,15,14,13,12,11	8,229.4 ft²
Region 3	Fill	6,22,23,24,21,9,8,7	800.42 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.16
Volume: 2,414.7978 ft³
Weight: 292,982.26 lbf
Resisting Force: 141,968.07 lbf
Activating Force: 122,772.29 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (133.67886, 1,627.9126) ft
Entry: (257.5506, 1,678.7258) ft
Radius: 72.508835 ft
Center: (179.98168, 1,691.4292) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	136.0062 ft	1,626.9485 ft	0 psf	474.24362 psf	273.80468 psf	325 psf	0 psf	Fill
Slice 2	140.6609 ft	1,625.0205 ft	0 psf	1,131.2535 psf	653.12949 psf	325 psf	0 psf	Fill
Slice 3	145.1177 ft	1,623.1744 ft	0 psf	1,929.6523 psf	1,205.7806 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 4	149.25 ft	1,622.7427 ft	0 psf	1,429.5779 psf	492.28781 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 5	153.30118 ft	1,623.6537 ft	0 psf	1,564.4732 psf	538.7402 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 6	157.39783 ft	1,624.5748 ft	0 psf	1,706.3438 psf	587.59459 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 7	161.49447 ft	1,625.496 ft	0 psf	1,848.2144 psf	636.44898 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 8	165.59112 ft	1,626.4171 ft	0 psf	1,990.085 psf	685.30337 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 9	169.68776 ft	1,627.3383 ft	0 psf	2,131.9555 psf	734.15776 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 10	173.78441 ft	1,628.2594 ft	0 psf	2,273.8261 psf	783.01215 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 11	178.08418 ft	1,629.2262 ft	0 psf	2,290.9776 psf	788.91841 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 12	182.58709 ft	1,630.2387 ft	0 psf	2,183.41 psf	751.87655 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 13	187.09 ft	1,631.2512 ft	0 psf	2,075.8424 psf	714.83469 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 14	192.42256 ft	1,632.4503 ft	0 psf	2,151.5209 psf	740.89526 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 15	198.05246 ft	1,633.7162 ft	0 psf	2,381.4292 psf	820.0662 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 16	202.79584 ft	1,634.7828 ft	0 psf	2,579.9727 psf	888.43644 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 17	207.18504 ft	1,635.7697 ft	0 psf	2,776.168 psf	955.99803 psf	375 psf	0 psf	Tsr 6-14° Seismic

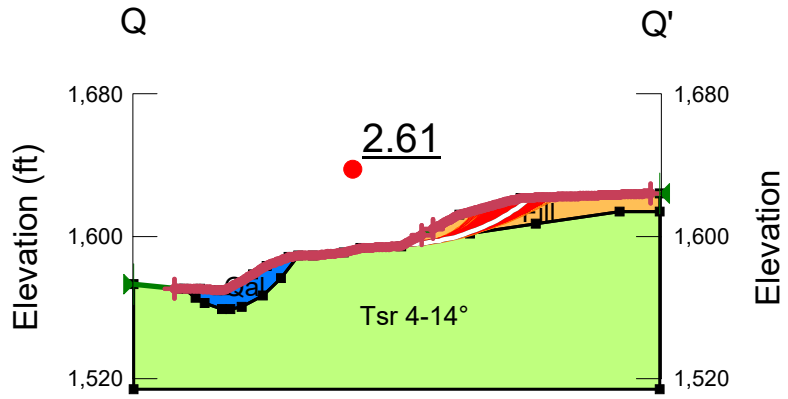
Slice 18	211.57424 ft	1,636.7566 ft	0 psf	2,972.3633 psf	1,023.5596 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 19	215.96345 ft	1,637.7436 ft	0 psf	3,168.5586 psf	1,091.1212 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 20	220.35265 ft	1,638.7305 ft	0 psf	3,364.7539 psf	1,158.6828 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 21	224.72629 ft	1,639.714 ft	0 psf	3,557.4699 psf	1,225.0463 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 22	229.08438 ft	1,640.6939 ft	0 psf	3,746.7067 psf	1,290.2116 psf	375 psf	0 psf	Tsr 6-14° Seismic
Slice 23	231.90904 ft	1,642.1059 ft	0 psf	1,904.1919 psf	1,189.8711 psf	600 psf	0 psf	Tsr 6-14° Seismic
Slice 24	233.96571 ft	1,645.0431 ft	0 psf	2,048.7093 psf	1,182.8228 psf	325 psf	0 psf	Fill
Slice 25	237.59414 ft	1,650.2251 ft	0 psf	1,749.5657 psf	1,010.1122 psf	325 psf	0 psf	Fill
Slice 26	242.02891 ft	1,656.5586 ft	0 psf	1,308.8741 psf	755.67882 psf	325 psf	0 psf	Fill
Slice 27	246.46368 ft	1,662.8921 ft	0 psf	868.18256 psf	501.24543 psf	325 psf	0 psf	Fill
Slice 28	250.89845 ft	1,669.2256 ft	0 psf	427.491 psf	246.81204 psf	325 psf	0 psf	Fill
Slice 29	255.33322 ft	1,675.5591 ft	0 psf	-13.20056 psf	-7.6213467 psf	325 psf	0 psf	Fill

1 -Rotational Static Global

Section Q-Q Tr 68203 SSA.gsz 11/18/2020 08:08:10 AM

Section Q-Q Tr 68203 SSA.gsz

Horz Seismic Coef.: 0



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Static Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 740
Date: 11/18/2020
Time: 08:08:10 AM
Tool Version: 10.1.0.18696
File Name: Section Q-Q Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 08:08:20 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Static Global

Kind: SLOPE/W
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 4-14°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (23.42781, 1,570.6736) ft
Left-Zone Right Coordinate: (162.59502, 1,600.7546) ft
Left-Zone Increment: 80
Right Type: Range
Right-Zone Left Coordinate: (168.86152, 1,604.1593) ft
Right-Zone Right Coordinate: (291.02215, 1,624.0068) ft
Right-Zone Increment: 80
Radius Increments: 14

Slip Surface Limits

Left Coordinate: (0.40013, 1,573.163) ft
Right Coordinate: (296.39961, 1,624.1943) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	296.39961 ft	1,624.1943 ft
Point 2	296.39961 ft	1,513.9813 ft
Point 3	0.40013 ft	1,513.9813 ft
Point 4	0.40013 ft	1,573.163 ft
Point 5	25.53088 ft	1,570.4462 ft
Point 6	29.07786 ft	1,570.4462 ft
Point 7	37.90759 ft	1,570.4462 ft
Point 8	47.78792 ft	1,569.5319 ft
Point 9	51.63118 ft	1,569.5319 ft
Point 10	67.5664 ft	1,578.5213 ft
Point 11	75.18864 ft	1,583.4267 ft
Point 12	87.48988 ft	1,588.1811 ft
Point 13	93.29565 ft	1,589.0976 ft
Point 14	101.225 ft	1,589.0976 ft
Point 15	118.88445 ft	1,590.8225 ft
Point 16	128.16697 ft	1,593.3129 ft
Point 17	150.86599 ft	1,594.382 ft
Point 18	183.48481 ft	1,612.1044 ft
Point 19	218.04902 ft	1,621.4624 ft

Point 20	296.39961 ft	1,613.9428 ft
Point 21	273.74118 ft	1,613.9428 ft
Point 22	226.57688 ft	1,607.205 ft
Point 23	189.73656 ft	1,601.4453 ft
Point 24	83.26368 ft	1,576.6346 ft
Point 25	73.37741 ft	1,566.8992 ft
Point 26	61.22711 ft	1,560.4845 ft
Point 27	55.01151 ft	1,559.1114 ft
Point 28	50.20882 ft	1,559.1114 ft
Point 29	40.39802 ft	1,562.5221 ft
Point 30	35.19075 ft	1,565.3899 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-14°	16,15,14,13,24,25,26,27,28,29,30,6,5,4,3,2,20,21,22,23,17	22,957 ft²
Region 2	Fill	20,1,19,18,17,23,22,21	1,581.6 ft²
Region 3	Qal	13,12,11,10,9,8,7,6,30,29,28,27,26,25,24	632.57 ft²

Slip Results

Slip Surfaces Analysed: 93133 of 98415 converged

Current Slip Surface

Slip Surface: 90,469
Factor of Safety: 2.61
Volume: 531.04775 ft³
Weight: 63,787.392 lbf
Resisting Moment: 6,377,621 lbf·ft
Activating Moment: 2,445,348.7 lbf·ft
Slip Rank: 1 of 98,415 slip surfaces
Exit: (152.9708, 1,595.5256) ft
Entry: (223.62386, 1,621.6568) ft
Radius: 114.54553 ft
Center: (150.77255, 1,710.05) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	154.34487 ft	1,595.5685 ft	0 psf	80.003094 psf	46.189808 psf	325 psf	0 psf	Fill
Slice 2	157.093 ft	1,595.6873 ft	0 psf	239.54511 psf	138.30143 psf	325 psf	0 psf	Fill
Slice 3	159.60423 ft	1,595.8512 ft	0 psf	382.91594 psf	124.41693 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 4	161.87857 ft	1,596.0499 ft	0 psf	504.07287 psf	163.7832 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 5	164.15291 ft	1,596.2944 ft	0 psf	618.96839 psf	201.11502 psf	250.02 psf	0 psf	Tsr 4-14°

Slice 6	166.42725 ft	1,596.5851 ft	0 psf	727.60288 psf	236.41251 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 7	168.7016 ft	1,596.9222 ft	0 psf	829.96855 psf	269.67313 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 8	170.97594 ft	1,597.3062 ft	0 psf	926.04938 psf	300.89168 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 9	173.25028 ft	1,597.7376 ft	0 psf	1,015.821 psf	330.06024 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 10	175.52462 ft	1,598.2169 ft	0 psf	1,099.2504 psf	357.16811 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 11	177.79896 ft	1,598.7447 ft	0 psf	1,176.296 psf	382.20175 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 12	180.0733 ft	1,599.3217 ft	0 psf	1,177.8714 psf	736.01576 psf	600 psf	0 psf	Tsr 4-14°
Slice 13	182.34764 ft	1,599.9487 ft	0 psf	1,234.5995 psf	771.46338 psf	600 psf	0 psf	Tsr 4-14°
Slice 14	183.63099 ft	1,600.3186 ft	0 psf	1,259.948 psf	787.30291 psf	600 psf	0 psf	Tsr 4-14°
Slice 15	184.91956 ft	1,600.7192 ft	0 psf	1,285.1448 psf	741.97868 psf	325 psf	0 psf	Fill
Slice 16	187.20435 ft	1,601.4593 ft	0 psf	1,262.7563 psf	729.05267 psf	325 psf	0 psf	Fill
Slice 17	189.48914 ft	1,602.2528 ft	0 psf	1,234.4493 psf	712.70961 psf	325 psf	0 psf	Fill
Slice 18	191.77393 ft	1,603.1011 ft	0 psf	1,200.1679 psf	692.91727 psf	325 psf	0 psf	Fill
Slice 19	194.05872 ft	1,604.0054 ft	0 psf	1,159.8477 psf	669.63839 psf	325 psf	0 psf	Fill
Slice 20	196.34351 ft	1,604.9671 ft	0 psf	1,113.415 psf	642.83045 psf	325 psf	0 psf	Fill
Slice 21	198.6283 ft	1,605.9879 ft	0 psf	1,060.7865 psf	612.44535 psf	325 psf	0 psf	Fill
Slice 22	200.91309 ft	1,607.0695 ft	0 psf	1,001.8686 psf	578.42913 psf	325 psf	0 psf	Fill
Slice 23	203.19788 ft	1,608.2138 ft	0 psf	936.55723 psf	540.72157 psf	325 psf	0 psf	Fill
Slice 24	205.48267 ft	1,609.423 ft	0 psf	864.73638 psf	499.25578 psf	325 psf	0 psf	Fill
Slice 25	207.76746 ft	1,610.6995 ft	0 psf	786.27788 psf	453.95774 psf	325 psf	0 psf	Fill
Slice 26	210.05225 ft	1,612.0459 ft	0 psf	701.04018 psf	404.74574 psf	325 psf	0 psf	Fill
Slice 27	212.33704 ft	1,613.4651 ft	0 psf	608.86742 psf	351.52977 psf	325 psf	0 psf	Fill
Slice 28	214.62183 ft	1,614.9603 ft	0 psf	509.58823 psf	294.2109 psf	325 psf	0 psf	Fill
Slice 29	216.90662 ft	1,616.5353 ft	0 psf	403.01447 psf	232.68051 psf	325 psf	0 psf	Fill
Slice 30	219.44273 ft	1,618.3873 ft	0 psf	241.5185 psf	139.44077 psf	325 psf	0 psf	Fill

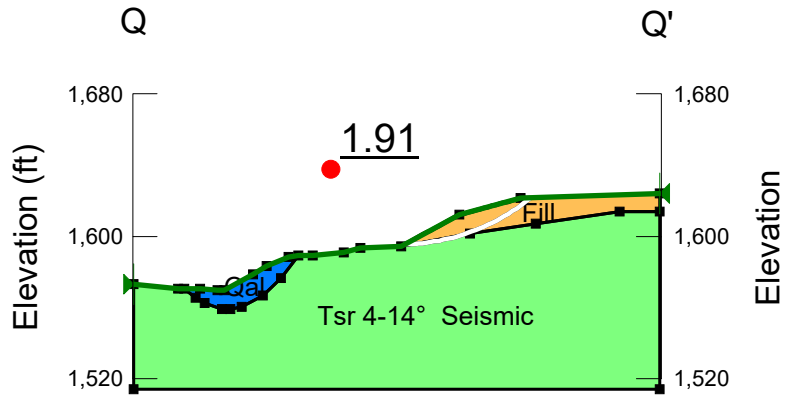
Slice 31	222.23015 ft	1,620.5441 ft	0 psf	24.02492 psf	13.870794 psf	325 psf	0 psf	Fill

1 -Rotational Pseudostatic Global

Section Q-Q Tr 68203 SSA.gsz 11/18/2020 08:08:10 AM

Section Q-Q Tr 68203 SSA.gsz

Horz Seismic Coef.: 0.15



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 4-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 4-14° (Seismic)

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GEOTECHNICAL CONSULTING
2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

1 -Rotational Pseudostatic Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 740
Date: 11/18/2020
Time: 08:08:10 AM
Tool Version: 10.1.0.18696
File Name: Section Q-Q Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 08:08:36 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Pseudostatic Global

Kind: SLOPE/W
Parent: 1 -Rotational Static Global
Method: Bishop
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 4-14° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 4-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 4-14° (Seismic)
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.40013, 1,573.163) ft
Right Coordinate: (296.39961, 1,624.1943) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 19° bedding 4-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (3.99, 1)
- Data Point: (4, 0.5938)
- Data Point: (14, 0.5938)
- Data Point: (14.01, 1)

Tsr 375 bedding 4-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.625)
Data Point: (14, 0.625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	296.39961 ft	1,624.1943 ft
Point 2	296.39961 ft	1,513.9813 ft
Point 3	0.40013 ft	1,513.9813 ft
Point 4	0.40013 ft	1,573.163 ft
Point 5	25.53088 ft	1,570.4462 ft
Point 6	29.07786 ft	1,570.4462 ft
Point 7	37.90759 ft	1,570.4462 ft
Point 8	47.78792 ft	1,569.5319 ft
Point 9	51.63118 ft	1,569.5319 ft
Point 10	67.5664 ft	1,578.5213 ft
Point 11	75.18864 ft	1,583.4267 ft
Point 12	87.48988 ft	1,588.1811 ft
Point 13	93.29565 ft	1,589.0976 ft
Point 14	101.225 ft	1,589.0976 ft
Point 15	118.88445 ft	1,590.8225 ft
Point 16	128.16697 ft	1,593.3129 ft
Point 17	150.86599 ft	1,594.382 ft
Point 18	183.48481 ft	1,612.1044 ft
Point 19	218.04902 ft	1,621.4624 ft
Point 20	296.39961 ft	1,613.9428 ft
Point 21	273.74118 ft	1,613.9428 ft
Point 22	226.57688 ft	1,607.205 ft
Point 23	189.73656 ft	1,601.4453 ft
Point 24	83.26368 ft	1,576.6346 ft
Point 25	73.37741 ft	1,566.8992 ft
Point 26	61.22711 ft	1,560.4845 ft
Point 27	55.01151 ft	1,559.1114 ft
Point 28	50.20882 ft	1,559.1114 ft
Point 29	40.39802 ft	1,562.5221 ft

Point 30	35.19075 ft	1,565.3899 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-14° Seismic	16,15,14,13,24,25,26,27,28,29,30,6,5,4,3,2,20,21,22,23,17	22,957 ft²
Region 2	Fill	20,1,19,18,17,23,22,21	1,581.6 ft²
Region 3	Qal	13,12,11,10,9,8,7,6,30,29,28,27,26,25,24	632.57 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.91
Volume: 531.04775 ft³
Weight: 63,787.392 lbf
Resisting Moment: 6,530,932.9 lbf·ft
Activating Moment: 3,422,073.2 lbf·ft
Slip Rank: 1 of 1 slip surfaces
Exit: (152.9708, 1,595.5256) ft
Entry: (223.62386, 1,621.6568) ft
Radius: 114.54553 ft
Center: (150.77255, 1,710.05) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	154.34487 ft	1,595.5685 ft	0 psf	78.393472 psf	45.260492 psf	325 psf	0 psf	Fill
Slice 2	157.093 ft	1,595.6873 ft	0 psf	236.01228 psf	136.26175 psf	325 psf	0 psf	Fill
Slice 3	159.60423 ft	1,595.8512 ft	0 psf	373.62262 psf	128.66026 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 4	161.87857 ft	1,596.0499 ft	0 psf	491.76088 psf	169.34221 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 5	164.15291 ft	1,596.2944 ft	0 psf	603.41837 psf	207.79246 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 6	166.42725 ft	1,596.5851 ft	0 psf	708.61301 psf	244.01716 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 7	168.7016 ft	1,596.9222 ft	0 psf	807.35402 psf	278.0195 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 8	170.97594 ft	1,597.3062 ft	0 psf	899.64191 psf	309.79965 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 9	173.25028 ft	1,597.7376 ft	0 psf	985.46852 psf	339.3548 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 10	175.52462 ft	1,598.2169 ft	0 psf	1,064.8169 psf	366.67912 psf	375 psf	0 psf	Tsr 4-14° Seismic

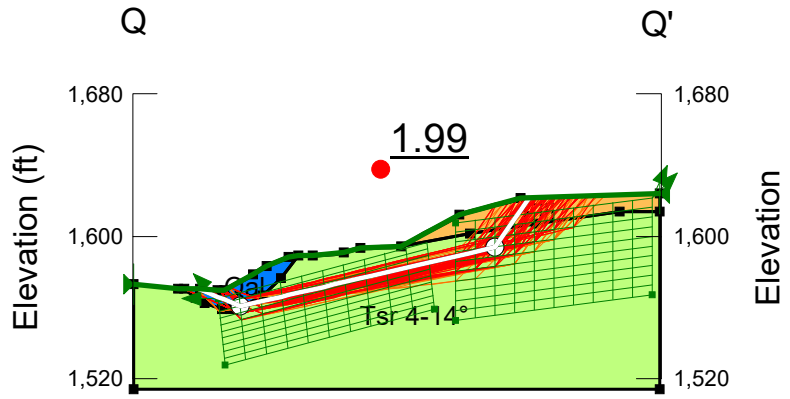
Slice 11	177.79896 ft	1,598.7447 ft	0 psf	1,137.6611 psf	391.76368 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 12	180.0733 ft	1,599.3217 ft	0 psf	1,132.2289 psf	707.49515 psf	600 psf	0 psf	Tsr 4-14° Seismic
Slice 13	182.34764 ft	1,599.9487 ft	0 psf	1,184.1582 psf	739.94414 psf	600 psf	0 psf	Tsr 4-14° Seismic
Slice 14	183.63099 ft	1,600.3186 ft	0 psf	1,206.8723 psf	754.13751 psf	600 psf	0 psf	Tsr 4-14° Seismic
Slice 15	184.91956 ft	1,600.7192 ft	0 psf	1,242.4295 psf	717.31702 psf	325 psf	0 psf	Fill
Slice 16	187.20435 ft	1,601.4593 ft	0 psf	1,217.7164 psf	703.04888 psf	325 psf	0 psf	Fill
Slice 17	189.48914 ft	1,602.2528 ft	0 psf	1,187.2862 psf	685.48002 psf	325 psf	0 psf	Fill
Slice 18	191.77393 ft	1,603.1011 ft	0 psf	1,151.1095 psf	664.59338 psf	325 psf	0 psf	Fill
Slice 19	194.05872 ft	1,604.0054 ft	0 psf	1,109.1492 psf	640.36757 psf	325 psf	0 psf	Fill
Slice 20	196.34351 ft	1,604.9671 ft	0 psf	1,061.3605 psf	612.77674 psf	325 psf	0 psf	Fill
Slice 21	198.6283 ft	1,605.9879 ft	0 psf	1,007.6907 psf	581.7905 psf	325 psf	0 psf	Fill
Slice 22	200.91309 ft	1,607.0695 ft	0 psf	948.07906 psf	547.3737 psf	325 psf	0 psf	Fill
Slice 23	203.19788 ft	1,608.2138 ft	0 psf	882.45613 psf	509.48629 psf	325 psf	0 psf	Fill
Slice 24	205.48267 ft	1,609.423 ft	0 psf	810.74371 psf	468.0831 psf	325 psf	0 psf	Fill
Slice 25	207.76746 ft	1,610.6995 ft	0 psf	732.85434 psf	423.11365 psf	325 psf	0 psf	Fill
Slice 26	210.05225 ft	1,612.0459 ft	0 psf	648.69092 psf	374.52188 psf	325 psf	0 psf	Fill
Slice 27	212.33704 ft	1,613.4651 ft	0 psf	558.14631 psf	322.24592 psf	325 psf	0 psf	Fill
Slice 28	214.62183 ft	1,614.9603 ft	0 psf	461.10284 psf	266.21785 psf	325 psf	0 psf	Fill
Slice 29	216.90662 ft	1,616.5353 ft	0 psf	357.43196 psf	206.36344 psf	325 psf	0 psf	Fill
Slice 30	219.44273 ft	1,618.3873 ft	0 psf	201.72064 psf	116.46347 psf	325 psf	0 psf	Fill
Slice 31	222.23015 ft	1,620.5441 ft	0 psf	-6.5490283 psf	-3.7810832 psf	325 psf	0 psf	Fill

2 -Translational Static Global

Section Q-Q Tr 68203 SSA.gsz 11/18/2020 08:08:10 AM

Section Q-Q Tr 68203 SSA.gsz

Horz Seismic Coef.: 0



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

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Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Static Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 740
Date: 11/18/2020
Time: 08:08:10 AM
Tool Version: 10.1.0.18696
File Name: Section Q-Q Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 08:08:28 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Static Global

Kind: SLOPE/W
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 1
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 4-14°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.40013, 1,573.163) ft
Right Coordinate: (296.39961, 1,624.1943) ft

Slip Surface Block

Left Grid
- Upper Left: (48.11324, 1,565.1266) ft
- Lower Left: (52.15589, 1,527.5691) ft
- Lower Right: (169.52328, 1,558.867) ft
- X Increments: 10
- Y Increments: 10
- Starting Angle: 135 °
- Ending Angle: 180 °
- Angle Increments: 2

Right Grid
- Upper Left: (181.39043, 1,607.3789) ft
- Lower Left: (181.39043, 1,552.8683) ft
- Lower Right: (291.9766, 1,567.2132) ft
- X Increments: 10
- Y Increments: 10
- Angle Increments: 2

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	296.39961 ft	1,624.1943 ft
Point 2	296.39961 ft	1,513.9813 ft
Point 3	0.40013 ft	1,513.9813 ft
Point 4	0.40013 ft	1,573.163 ft
Point 5	25.53088 ft	1,570.4462 ft
Point 6	29.07786 ft	1,570.4462 ft
Point 7	37.90759 ft	1,570.4462 ft
Point 8	47.78792 ft	1,569.5319 ft
Point 9	51.63118 ft	1,569.5319 ft
Point 10	67.5664 ft	1,578.5213 ft
Point 11	75.18864 ft	1,583.4267 ft
Point 12	87.48988 ft	1,588.1811 ft
Point 13	93.29565 ft	1,589.0976 ft
Point 14	101.225 ft	1,589.0976 ft

Point 15	118.88445 ft	1,590.8225 ft
Point 16	128.16697 ft	1,593.3129 ft
Point 17	150.86599 ft	1,594.382 ft
Point 18	183.48481 ft	1,612.1044 ft
Point 19	218.04902 ft	1,621.4624 ft
Point 20	296.39961 ft	1,613.9428 ft
Point 21	273.74118 ft	1,613.9428 ft
Point 22	226.57688 ft	1,607.205 ft
Point 23	189.73656 ft	1,601.4453 ft
Point 24	83.26368 ft	1,576.6346 ft
Point 25	73.37741 ft	1,566.8992 ft
Point 26	61.22711 ft	1,560.4845 ft
Point 27	55.01151 ft	1,559.1114 ft
Point 28	50.20882 ft	1,559.1114 ft
Point 29	40.39802 ft	1,562.5221 ft
Point 30	35.19075 ft	1,565.3899 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-14°	16,15,14,13,24,25,26,27,28,29,30,6,5,4,3,2,20,21,22,23,17	22,957 ft²
Region 2	Fill	20,1,19,18,17,23,22,21	1,581.6 ft²
Region 3	Qal	13,12,11,10,9,8,7,6,30,29,28,27,26,25,24	632.57 ft²

Slip Results

Slip Surfaces Analysed: 74592 of 131769 converged

Current Slip Surface

Slip Surface: 97,523
Factor of Safety: 1.99
Volume: 2,975.9579 ft³
Weight: 366,311.32 lbf
Resisting Force: 172,252 lbf
Activating Force: 86,448.421 lbf
Slip Rank: 1 of 131,769 slip surfaces
Exit: (37.237475, 1,570.4462) ft
Entry: (222.92994, 1,621.6326) ft
Radius: 88.990637 ft
Center: (119.50151, 1,634.4292) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	37.572532 ft	1,570.3074 ft	0 psf	100.1318 psf	53.24102 psf	350 psf	0 psf	Qal
Slice 2	40.377673 ft	1,569.1455 ft	0 psf	225.98729 psf	120.15957 psf	350 psf	0 psf	Qal

Slice 3	45.317838 ft	1,567.0992 ft	0 psf	440.26995 psf	234.09568 psf	350 psf	0 psf	Qal
Slice 4	49.70955 ft	1,565.2801 ft	0 psf	654.74119 psf	348.13206 psf	350 psf	0 psf	Qal
Slice 5	56.144844 ft	1,562.6145 ft	0 psf	1,357.5187 psf	721.80551 psf	350 psf	0 psf	Qal
Slice 6	61.605806 ft	1,560.9647 ft	0 psf	1,566.1175 psf	832.71943 psf	350 psf	0 psf	Qal
Slice 7	65.059752 ft	1,561.7662 ft	0 psf	1,749.6946 psf	568.51024 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 8	70.471905 ft	1,563.0222 ft	0 psf	1,991.9305 psf	647.21746 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 9	74.283025 ft	1,563.9066 ft	0 psf	2,180.7171 psf	708.55794 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 10	79.22616 ft	1,565.0537 ft	0 psf	2,313.8473 psf	751.81455 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 11	85.37678 ft	1,566.4811 ft	0 psf	2,448.6223 psf	795.60563 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 12	90.392765 ft	1,567.6451 ft	0 psf	2,485.869 psf	807.7078 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 13	97.260325 ft	1,569.2388 ft	0 psf	2,364.2612 psf	768.19503 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 14	104.16824 ft	1,570.8418 ft	0 psf	2,205.7858 psf	716.70327 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 15	110.05473 ft	1,572.2079 ft	0 psf	2,110.4943 psf	685.74116 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 16	115.94121 ft	1,573.5739 ft	0 psf	2,015.2027 psf	654.77906 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 17	123.52571 ft	1,575.334 ft	0 psf	1,987.8114 psf	645.87907 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 18	131.00435 ft	1,577.0695 ft	0 psf	1,944.847 psf	631.91911 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 19	136.6791 ft	1,578.3864 ft	0 psf	1,818.4095 psf	590.83706 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 20	142.35386 ft	1,579.7032 ft	0 psf	1,691.972 psf	549.75501 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 21	148.02861 ft	1,581.0201 ft	0 psf	1,565.5344 psf	508.67297 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 22	154.12787 ft	1,582.4355 ft	0 psf	1,618.9337 psf	526.02345 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 23	160.65164 ft	1,583.9495 ft	0 psf	1,852.1698 psf	601.80645 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 24	167.1754 ft	1,585.4634 ft	0 psf	2,085.4059 psf	677.58946 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 25	173.69916 ft	1,586.9773 ft	0 psf	2,318.642 psf	753.37247 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 26	180.22293 ft	1,588.4912 ft	0 psf	2,551.8782 psf	829.15548 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 27	186.61068 ft	1,589.9736 ft	0 psf	2,681.7203 psf	871.34376 psf	250.02 psf	0 psf	Tsr 4-14°

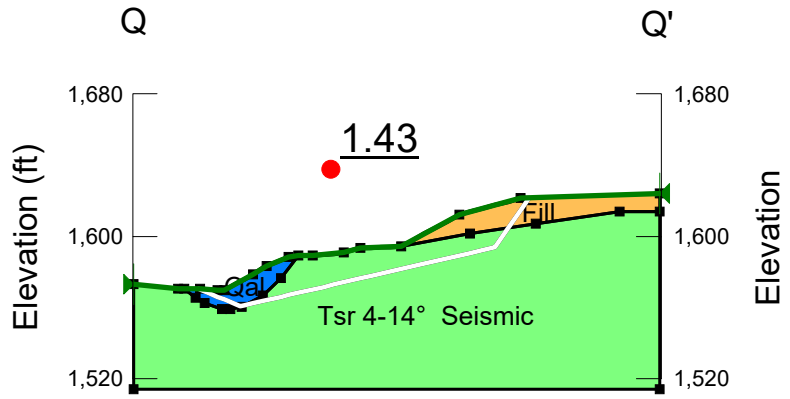
Slice 28	193.17934 ft	1,591.4979 ft	0 psf	2,709.0884 psf	880.23617 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 29	200.06489 ft	1,593.0958 ft	0 psf	2,737.3762 psf	889.42744 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 30	207.32256 ft	1,599.3429 ft	0 psf	1,315.2374 psf	821.85153 psf	600 psf	0 psf	Tsr 4-14°
Slice 31	214.59324 ft	1,609.7265 ft	0 psf	753.53169 psf	435.05172 psf	325 psf	0 psf	Fill
Slice 32	220.48948 ft	1,618.1472 ft	0 psf	124.67792 psf	71.982832 psf	325 psf	0 psf	Fill

2 -Translational Pseudostatic Global

Section Q-Q Tr 68203 SSA.gsz 11/18/2020 08:08:10 AM

Section Q-Q Tr 68203 SSA.gsz

Horz Seismic Coef.: 0.15



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 4-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 4-14° (Seismic)

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

2 -Translational Pseudostatic Global

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 740
Date: 11/18/2020
Time: 08:08:10 AM
Tool Version: 10.1.0.18696
File Name: Section Q-Q Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 08:08:36 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Pseudostatic Global

Kind: SLOPE/W
Parent: 2 -Translational Static Global
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 4-14° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 4-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 4-14° (Seismic)
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.40013, 1,573.163) ft
Right Coordinate: (296.39961, 1,624.1943) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 19° bedding 4-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (3.99, 1)
- Data Point: (4, 0.5938)
- Data Point: (14, 0.5938)
- Data Point: (14.01, 1)

Tsr 375 bedding 4-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.625)
Data Point: (14, 0.625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	296.39961 ft	1,624.1943 ft
Point 2	296.39961 ft	1,513.9813 ft
Point 3	0.40013 ft	1,513.9813 ft
Point 4	0.40013 ft	1,573.163 ft
Point 5	25.53088 ft	1,570.4462 ft
Point 6	29.07786 ft	1,570.4462 ft
Point 7	37.90759 ft	1,570.4462 ft
Point 8	47.78792 ft	1,569.5319 ft
Point 9	51.63118 ft	1,569.5319 ft
Point 10	67.5664 ft	1,578.5213 ft
Point 11	75.18864 ft	1,583.4267 ft
Point 12	87.48988 ft	1,588.1811 ft
Point 13	93.29565 ft	1,589.0976 ft
Point 14	101.225 ft	1,589.0976 ft
Point 15	118.88445 ft	1,590.8225 ft
Point 16	128.16697 ft	1,593.3129 ft
Point 17	150.86599 ft	1,594.382 ft
Point 18	183.48481 ft	1,612.1044 ft
Point 19	218.04902 ft	1,621.4624 ft
Point 20	296.39961 ft	1,613.9428 ft
Point 21	273.74118 ft	1,613.9428 ft
Point 22	226.57688 ft	1,607.205 ft
Point 23	189.73656 ft	1,601.4453 ft
Point 24	83.26368 ft	1,576.6346 ft
Point 25	73.37741 ft	1,566.8992 ft
Point 26	61.22711 ft	1,560.4845 ft
Point 27	55.01151 ft	1,559.1114 ft
Point 28	50.20882 ft	1,559.1114 ft
Point 29	40.39802 ft	1,562.5221 ft

Point 30	35.19075 ft	1,565.3899 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-14° Seismic	16,15,14,13,24,25,26,27,28,29,30,6,5,4,3,2,20,21,22,23,17	22,957 ft²
Region 2	Fill	20,1,19,18,17,23,22,21	1,581.6 ft²
Region 3	Qal	13,12,11,10,9,8,7,6,30,29,28,27,26,25,24	632.57 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.43
Volume: 2,975.9579 ft³
Weight: 366,311.32 lbf
Resisting Force: 191,474.57 lbf
Activating Force: 133,922.71 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (37.237475, 1,570.4462) ft
Entry: (222.92994, 1,621.6326) ft
Radius: 88.990637 ft
Center: (119.50151, 1,634.4292) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	37.572532 ft	1,570.3074 ft	0 psf	139.20156 psf	74.014784 psf	350 psf	0 psf	Qal
Slice 2	40.377673 ft	1,569.1455 ft	0 psf	271.54075 psf	144.38078 psf	350 psf	0 psf	Qal
Slice 3	45.317838 ft	1,567.0992 ft	0 psf	496.86261 psf	264.18653 psf	350 psf	0 psf	Qal
Slice 4	49.70955 ft	1,565.2801 ft	0 psf	722.38276 psf	384.09773 psf	350 psf	0 psf	Qal
Slice 5	56.144844 ft	1,562.6145 ft	0 psf	1,461.3653 psf	777.0217 psf	350 psf	0 psf	Qal
Slice 6	61.605806 ft	1,560.9647 ft	0 psf	1,516.0901 psf	806.11941 psf	350 psf	0 psf	Qal
Slice 7	65.059752 ft	1,561.7662 ft	0 psf	1,689.6926 psf	581.86059 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 8	70.471905 ft	1,563.0222 ft	0 psf	1,927.7815 psf	663.8486 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 9	74.283025 ft	1,563.9066 ft	0 psf	2,113.336 psf	727.74596 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 10	79.22616 ft	1,565.0537 ft	0 psf	2,244.187 psf	772.80566 psf	375 psf	0 psf	Tsr 4-14° Seismic

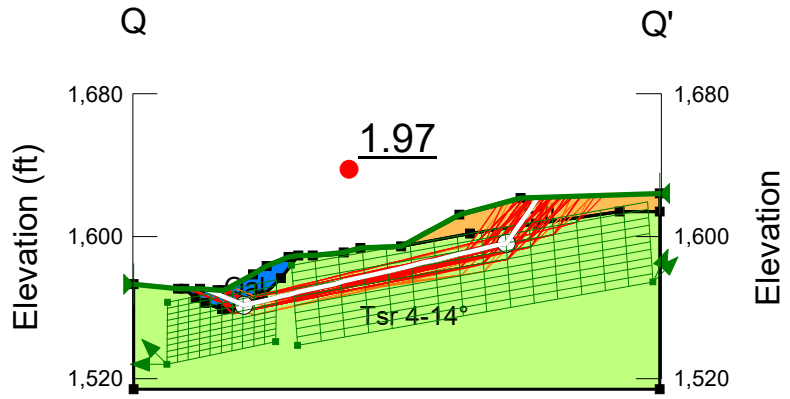
Slice 11	85.37678 ft	1,566.4811 ft	0 psf	2,376.6548 psf	818.4221 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 12	90.392765 ft	1,567.6451 ft	0 psf	2,413.2637 psf	831.02872 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 13	97.260325 ft	1,569.2388 ft	0 psf	2,293.7379 psf	789.86894 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 14	104.16824 ft	1,570.8418 ft	0 psf	2,137.9756 psf	736.23081 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 15	110.05473 ft	1,572.2079 ft	0 psf	2,044.3154 psf	703.97811 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 16	115.94121 ft	1,573.5739 ft	0 psf	1,950.6553 psf	671.7254 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 17	123.52571 ft	1,575.334 ft	0 psf	1,923.7328 psf	662.45443 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 18	131.00435 ft	1,577.0695 ft	0 psf	1,881.504 psf	647.91256 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 19	136.6791 ft	1,578.3864 ft	0 psf	1,757.2311 psf	605.11808 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 20	142.35386 ft	1,579.7032 ft	0 psf	1,632.9581 psf	562.32359 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 21	148.02861 ft	1,581.0201 ft	0 psf	1,508.6852 psf	519.5291 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 22	154.12787 ft	1,582.4355 ft	0 psf	1,561.1703 psf	537.60281 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 23	160.65164 ft	1,583.9495 ft	0 psf	1,790.4134 psf	616.54471 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 24	167.1754 ft	1,585.4634 ft	0 psf	2,019.6566 psf	695.48661 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 25	173.69916 ft	1,586.9773 ft	0 psf	2,248.8997 psf	774.42852 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 26	180.22293 ft	1,588.4912 ft	0 psf	2,478.1428 psf	853.37042 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 27	186.61068 ft	1,589.9736 ft	0 psf	2,605.7621 psf	897.31725 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 28	193.17934 ft	1,591.4979 ft	0 psf	2,632.6616 psf	906.58033 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 29	200.06489 ft	1,593.0958 ft	0 psf	2,660.4652 psf	916.15472 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 30	207.32256 ft	1,599.3429 ft	0 psf	1,067.5031 psf	667.04994 psf	600 psf	0 psf	Tsr 4-14° Seismic
Slice 31	214.59324 ft	1,609.7265 ft	0 psf	617.12456 psf	356.29703 psf	325 psf	0 psf	Fill
Slice 32	220.48948 ft	1,618.1472 ft	0 psf	53.431076 psf	30.848446 psf	325 psf	0 psf	Fill

3 -Translational Static Lower Slope

Section Q-Q Tr 68203 SSA.gsz 11/18/2020 08:11:09 AM

Section Q-Q Tr 68203 SSA.gsz

Horz Seismic Coef.: 0



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

3 -Translational Static Lower Slope

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 742
Date: 11/18/2020
Time: 08:11:09 AM
Tool Version: 10.1.0.18696
File Name: Section Q-Q Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 08:11:22 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

3 -Translational Static Lower Slope

Kind: SLOPE/W
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 1
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 4-14°

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.40013, 1,573.163) ft
Right Coordinate: (296.39961, 1,624.1943) ft

Slip Surface Block

Left Grid
- Upper Left: (19.68425, 1,562.7793) ft
- Lower Left: (19.29302, 1,527.9603) ft
- Lower Right: (80.58488, 1,540.8707) ft
- X Increments: 10
- Y Increments: 10
- Starting Angle: 135 °
- Ending Angle: 180 °
- Angle Increments: 2

Right Grid
- Upper Left: (89.45264, 1,583.775) ft
- Lower Left: (92.71285, 1,538.6538) ft
- Lower Right: (292.62864, 1,574.3856) ft
- X Increments: 15
- Y Increments: 10
- Angle Increments: 2

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	296.39961 ft	1,624.1943 ft
Point 2	296.39961 ft	1,513.9813 ft
Point 3	0.40013 ft	1,513.9813 ft
Point 4	0.40013 ft	1,573.163 ft
Point 5	25.53088 ft	1,570.4462 ft
Point 6	29.07786 ft	1,570.4462 ft
Point 7	37.90759 ft	1,570.4462 ft
Point 8	47.78792 ft	1,569.5319 ft
Point 9	51.63118 ft	1,569.5319 ft
Point 10	67.5664 ft	1,578.5213 ft
Point 11	75.18864 ft	1,583.4267 ft
Point 12	87.48988 ft	1,588.1811 ft
Point 13	93.29565 ft	1,589.0976 ft
Point 14	101.225 ft	1,589.0976 ft

Point 15	118.88445 ft	1,590.8225 ft
Point 16	128.16697 ft	1,593.3129 ft
Point 17	150.86599 ft	1,594.382 ft
Point 18	183.48481 ft	1,612.1044 ft
Point 19	218.04902 ft	1,621.4624 ft
Point 20	296.39961 ft	1,613.9428 ft
Point 21	273.74118 ft	1,613.9428 ft
Point 22	226.57688 ft	1,607.205 ft
Point 23	189.73656 ft	1,601.4453 ft
Point 24	83.26368 ft	1,576.6346 ft
Point 25	73.37741 ft	1,566.8992 ft
Point 26	61.22711 ft	1,560.4845 ft
Point 27	55.01151 ft	1,559.1114 ft
Point 28	50.20882 ft	1,559.1114 ft
Point 29	40.39802 ft	1,562.5221 ft
Point 30	35.19075 ft	1,565.3899 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-14°	16,15,14,13,24,25,26,27,28,29,30,6,5,4,3,2,20,21,22,23,17	22,957 ft²
Region 2	Fill	20,1,19,18,17,23,22,21	1,581.6 ft²
Region 3	Qal	13,12,11,10,9,8,7,6,30,29,28,27,26,25,24	632.57 ft²

Slip Results

Slip Surfaces Analysed: 76120 of 191664 converged

Current Slip Surface

Slip Surface: 133,997
Factor of Safety: 1.97
Volume: 3,006.891 ft³
Weight: 369,925.86 lbf
Resisting Force: 171,996.41 lbf
Activating Force: 87,258.374 lbf
Slip Rank: 1 of 191,664 slip surfaces
Exit: (41.324857, 1,570.13) ft
Entry: (227.99297, 1,621.8091) ft
Radius: 89.022334 ft
Center: (123.92837, 1,634.7289) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	44.556389 ft	1,568.7914 ft	0 psf	222.83861 psf	118.48539 psf	350 psf	0 psf	Qal
Slice 2	49.70955 ft	1,566.6569 ft	0 psf	470.69016 psf	250.2704 psf	350 psf	0 psf	Qal

Slice 3	54.341181 ft	1,564.7384 ft	0 psf	936.18748 psf	497.77971 psf	350 psf	0 psf	Qal
Slice 4	59.761182 ft	1,562.4934 ft	0 psf	1,652.217 psf	878.49936 psf	350 psf	0 psf	Qal
Slice 5	62.86427 ft	1,561.4636 ft	0 psf	1,586.2757 psf	843.43776 psf	350 psf	0 psf	Qal
Slice 6	65.411879 ft	1,562.0647 ft	0 psf	1,735.0365 psf	563.74752 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 7	70.471905 ft	1,563.2585 ft	0 psf	1,960.6598 psf	637.05699 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 8	74.283025 ft	1,564.1576 ft	0 psf	2,147.4791 psf	697.75827 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 9	79.22616 ft	1,565.3238 ft	0 psf	2,278.1726 psf	740.22314 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 10	85.37678 ft	1,566.775 ft	0 psf	2,409.9474 psf	783.03938 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 11	90.392765 ft	1,567.9584 ft	0 psf	2,444.822 psf	794.37082 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 12	97.260325 ft	1,569.5786 ft	0 psf	2,320.144 psf	753.86048 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 13	104.16824 ft	1,571.2084 ft	0 psf	2,158.6175 psf	701.37733 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 14	110.05473 ft	1,572.5972 ft	0 psf	2,060.6851 psf	669.55717 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 15	115.94121 ft	1,573.986 ft	0 psf	1,962.7527 psf	637.73701 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 16	123.52571 ft	1,575.7754 ft	0 psf	1,931.8607 psf	627.69958 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 17	131.00435 ft	1,577.5398 ft	0 psf	1,885.4609 psf	612.62339 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 18	136.6791 ft	1,578.8786 ft	0 psf	1,756.5131 psf	570.72569 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 19	142.35386 ft	1,580.2174 ft	0 psf	1,627.5652 psf	528.828 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 20	148.02861 ft	1,581.5563 ft	0 psf	1,498.6174 psf	486.9303 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 21	154.12787 ft	1,582.9953 ft	0 psf	1,549.124 psf	503.34089 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 22	160.65164 ft	1,584.5344 ft	0 psf	1,779.085 psf	578.05977 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 23	167.1754 ft	1,586.0735 ft	0 psf	2,009.0461 psf	652.77865 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 24	173.69916 ft	1,587.6127 ft	0 psf	2,239.0072 psf	727.49753 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 25	180.22293 ft	1,589.1518 ft	0 psf	2,468.9682 psf	802.21641 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 26	186.61068 ft	1,590.6589 ft	0 psf	2,595.7049 psf	843.39566 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 27	193.12283 ft	1,592.1953 ft	0 psf	2,619.783 psf	851.2191 psf	250.02 psf	0 psf	Tsr 4-14°

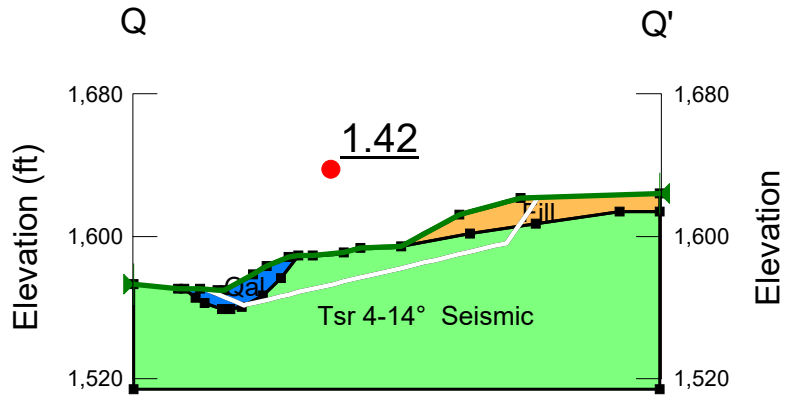
Slice 28	199.89536 ft	1,593.7931 ft	0 psf	2,644.4269 psf	859.22637 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 29	206.66789 ft	1,595.3909 ft	0 psf	2,669.0707 psf	867.23365 psf	250.02 psf	0 psf	Tsr 4-14°
Slice 30	213.36911 ft	1,600.9241 ft	0 psf	1,309.6393 psf	818.35344 psf	600 psf	0 psf	Tsr 4-14°
Slice 31	217.36654 ft	1,606.633 ft	0 psf	1,074.7406 psf	620.50177 psf	325 psf	0 psf	Fill
Slice 32	220.53501 ft	1,611.158 ft	0 psf	714.47712 psf	412.50356 psf	325 psf	0 psf	Fill
Slice 33	225.50698 ft	1,618.2588 ft	0 psf	127.75405 psf	73.758835 psf	325 psf	0 psf	Fill

3 -Translational Pseudostatic Lower Slope

Section Q-Q Tr 68203 SSA.gsz 11/18/2020 08:11:09 AM

Section Q-Q Tr 68203 SSA.gsz

Horz Seismic Coef.: 0.15



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 4-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 4-14° (Seismic)

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

2420 Grand Avenue, Vista, CA 92081
Phone 760-599-7000, Fax 760-599-7007

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **ACR**
Date: **Nov 2020**

3 -Translational Pseudostatic Lower Slope

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File Information

File Version: 10.01
Title: Slope Stability Analyses Cross-Section A-A'
Revision Number: 742
Date: 11/18/2020
Time: 08:11:09 AM
Tool Version: 10.1.0.18696
File Name: Section Q-Q Tr 68203 SSA.gsz
Directory: C:\Users\ARich\Desktop\Veluzat\
Last Solved Date: 11/18/2020
Last Solved Time: 08:11:22 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

3 -Translational Pseudostatic Lower Slope

Kind: SLOPE/W
Parent: 3 -Translational Static Lower Slope
Method: Janbu
Settings
- PWP Conditions from: (none)
- Unit Weight of Water: 62.4 pcf

Slip Surface
- Direction of movement: Right to Left
- Use Passive Mode: No
- Slip Surface Option: Critical Slip Surfaces from Other
- Critical slip surfaces saved: 1
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Advanced
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Number of Slices: 30
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °
Phi-B: 0 °

Tsr 4-14° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 4-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 4-14° (Seismic)
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.40013, 1,573.163) ft
Right Coordinate: (296.39961, 1,624.1943) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 19° bedding 4-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (3.99, 1)
- Data Point: (4, 0.5938)
- Data Point: (14, 0.5938)
- Data Point: (14.01, 1)

Tsr 375 bedding 4-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.625)
Data Point: (14, 0.625)
Data Point: (14.01, 1)

Geometry

Name: Default Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	296.39961 ft	1,624.1943 ft
Point 2	296.39961 ft	1,513.9813 ft
Point 3	0.40013 ft	1,513.9813 ft
Point 4	0.40013 ft	1,573.163 ft
Point 5	25.53088 ft	1,570.4462 ft
Point 6	29.07786 ft	1,570.4462 ft
Point 7	37.90759 ft	1,570.4462 ft
Point 8	47.78792 ft	1,569.5319 ft
Point 9	51.63118 ft	1,569.5319 ft
Point 10	67.5664 ft	1,578.5213 ft
Point 11	75.18864 ft	1,583.4267 ft
Point 12	87.48988 ft	1,588.1811 ft
Point 13	93.29565 ft	1,589.0976 ft
Point 14	101.225 ft	1,589.0976 ft
Point 15	118.88445 ft	1,590.8225 ft
Point 16	128.16697 ft	1,593.3129 ft
Point 17	150.86599 ft	1,594.382 ft
Point 18	183.48481 ft	1,612.1044 ft
Point 19	218.04902 ft	1,621.4624 ft
Point 20	296.39961 ft	1,613.9428 ft
Point 21	273.74118 ft	1,613.9428 ft
Point 22	226.57688 ft	1,607.205 ft
Point 23	189.73656 ft	1,601.4453 ft
Point 24	83.26368 ft	1,576.6346 ft
Point 25	73.37741 ft	1,566.8992 ft
Point 26	61.22711 ft	1,560.4845 ft
Point 27	55.01151 ft	1,559.1114 ft
Point 28	50.20882 ft	1,559.1114 ft
Point 29	40.39802 ft	1,562.5221 ft

Point 30	35.19075 ft	1,565.3899 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-14° Seismic	16,15,14,13,24,25,26,27,28,29,30,6,5,4,3,2,20,21,22,23,17	22,957 ft²
Region 2	Fill	20,1,19,18,17,23,22,21	1,581.6 ft²
Region 3	Qal	13,12,11,10,9,8,7,6,30,29,28,27,26,25,24	632.57 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.42
Volume: 3,006.891 ft³
Weight: 369,925.86 lbf
Resisting Force: 192,070.53 lbf
Activating Force: 135,589.66 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (41.324857, 1,570.13) ft
Entry: (227.99297, 1,621.8091) ft
Radius: 89.022334 ft
Center: (123.92837, 1,634.7289) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	44.556389 ft	1,568.7914 ft	0 psf	268.54535 psf	142.7881 psf	350 psf	0 psf	Qal
Slice 2	49.70955 ft	1,566.6569 ft	0 psf	529.25422 psf	281.40946 psf	350 psf	0 psf	Qal
Slice 3	54.341181 ft	1,564.7384 ft	0 psf	1,018.8992 psf	541.75833 psf	350 psf	0 psf	Qal
Slice 4	59.761182 ft	1,562.4934 ft	0 psf	1,772.0728 psf	942.22784 psf	350 psf	0 psf	Qal
Slice 5	62.86427 ft	1,561.4636 ft	0 psf	1,534.7964 psf	816.06572 psf	350 psf	0 psf	Qal
Slice 6	65.411879 ft	1,562.0647 ft	0 psf	1,673.9491 psf	576.4392 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 7	70.471905 ft	1,563.2585 ft	0 psf	1,895.6276 psf	652.77613 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 8	74.283025 ft	1,564.1576 ft	0 psf	2,079.1805 psf	715.9842 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 9	79.22616 ft	1,565.3238 ft	0 psf	2,207.5888 psf	760.20274 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 10	85.37678 ft	1,566.775 ft	0 psf	2,337.0596 psf	804.78717 psf	375 psf	0 psf	Tsr 4-14° Seismic

Slice 11	90.392765 ft	1,567.9584 ft	0 psf	2,371.3245 psf	816.58656 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 12	97.260325 ft	1,569.5786 ft	0 psf	2,248.8264 psf	774.40326 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 13	104.16824 ft	1,571.2084 ft	0 psf	2,090.1241 psf	719.75272 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 14	110.05473 ft	1,572.5972 ft	0 psf	1,993.904 psf	686.61848 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 15	115.94121 ft	1,573.986 ft	0 psf	1,897.6839 psf	653.48424 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 16	123.52571 ft	1,575.7754 ft	0 psf	1,867.332 psf	643.03229 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 17	131.00435 ft	1,577.5398 ft	0 psf	1,821.7435 psf	627.3335 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 18	136.6791 ft	1,578.8786 ft	0 psf	1,695.0502 psf	583.70555 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 19	142.35386 ft	1,580.2174 ft	0 psf	1,568.357 psf	540.0776 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 20	148.02861 ft	1,581.5563 ft	0 psf	1,441.6637 psf	496.44965 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 21	154.12787 ft	1,582.9953 ft	0 psf	1,491.2872 psf	513.53795 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 22	160.65164 ft	1,584.5344 ft	0 psf	1,717.2275 psf	591.3425 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 23	167.1754 ft	1,586.0735 ft	0 psf	1,943.1679 psf	669.14705 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 24	173.69916 ft	1,587.6127 ft	0 psf	2,169.1082 psf	746.9516 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 25	180.22293 ft	1,589.1518 ft	0 psf	2,395.0485 psf	824.75615 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 26	186.61068 ft	1,590.6589 ft	0 psf	2,519.5693 psf	867.63597 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 27	193.12283 ft	1,592.1953 ft	0 psf	2,543.2264 psf	875.7825 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 28	199.89536 ft	1,593.7931 ft	0 psf	2,567.4393 psf	884.12045 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 29	206.66789 ft	1,595.3909 ft	0 psf	2,591.6523 psf	892.4584 psf	375 psf	0 psf	Tsr 4-14° Seismic
Slice 30	213.36911 ft	1,600.9241 ft	0 psf	1,062.1554 psf	663.70834 psf	600 psf	0 psf	Tsr 4-14° Seismic
Slice 31	217.36654 ft	1,606.633 ft	0 psf	904.77364 psf	522.3713 psf	325 psf	0 psf	Fill
Slice 32	220.53501 ft	1,611.158 ft	0 psf	581.9007 psf	335.96053 psf	325 psf	0 psf	Fill
Slice 33	225.50698 ft	1,618.2588 ft	0 psf	56.071659 psf	32.372987 psf	325 psf	0 psf	Fill

APPENDIX G

LGC VALLEY, INC.

General Earthwork and Grading Specifications For Rough Grading

1.0 General

1.1 Intent: These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record: Prior to commencement of work, the owner shall employ a qualified Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to confirm that the attained level of compaction is being accomplished as specified. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 ***<u>The Earthwork Contractor</u>:*** The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the project plans and specifications. The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "equipment" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate personnel will be available for observation and testing. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified. It is the contractor's sole responsibility to provide proper fill compaction.

2.0 ***<u>Preparation of Areas to be Filled</u>***

2.1 ***<u>Clearing and Grubbing</u>:*** Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 10 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed. The contractor is responsible for all hazardous waste relating to his work. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Client should acquire the services of a qualified environmental assessor.

2.2 ***Processing:*** Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free from oversize material and the working surface is reasonably uniform, flat, and free from uneven features that would inhibit uniform compaction.

2.3 ***Overexcavation:*** In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 ***Benching:*** Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 ***Evaluation/Acceptance of Fill Areas:*** All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 ***General:*** Material to be used as fill shall be essentially free from organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material

3.2 ***Oversize:*** Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 ***Import:*** If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 ***Fill Layers:*** Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 ***Fill Moisture Conditioning:*** Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557-91).

4.3 ***Compaction of Fill:*** After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557-91). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 ***Compaction of Fill Slopes:*** In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557-91.

4.5 ***Compaction Testing:*** Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 ***Frequency of Compaction Testing:*** Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 ***Compaction Test Locations:*** The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

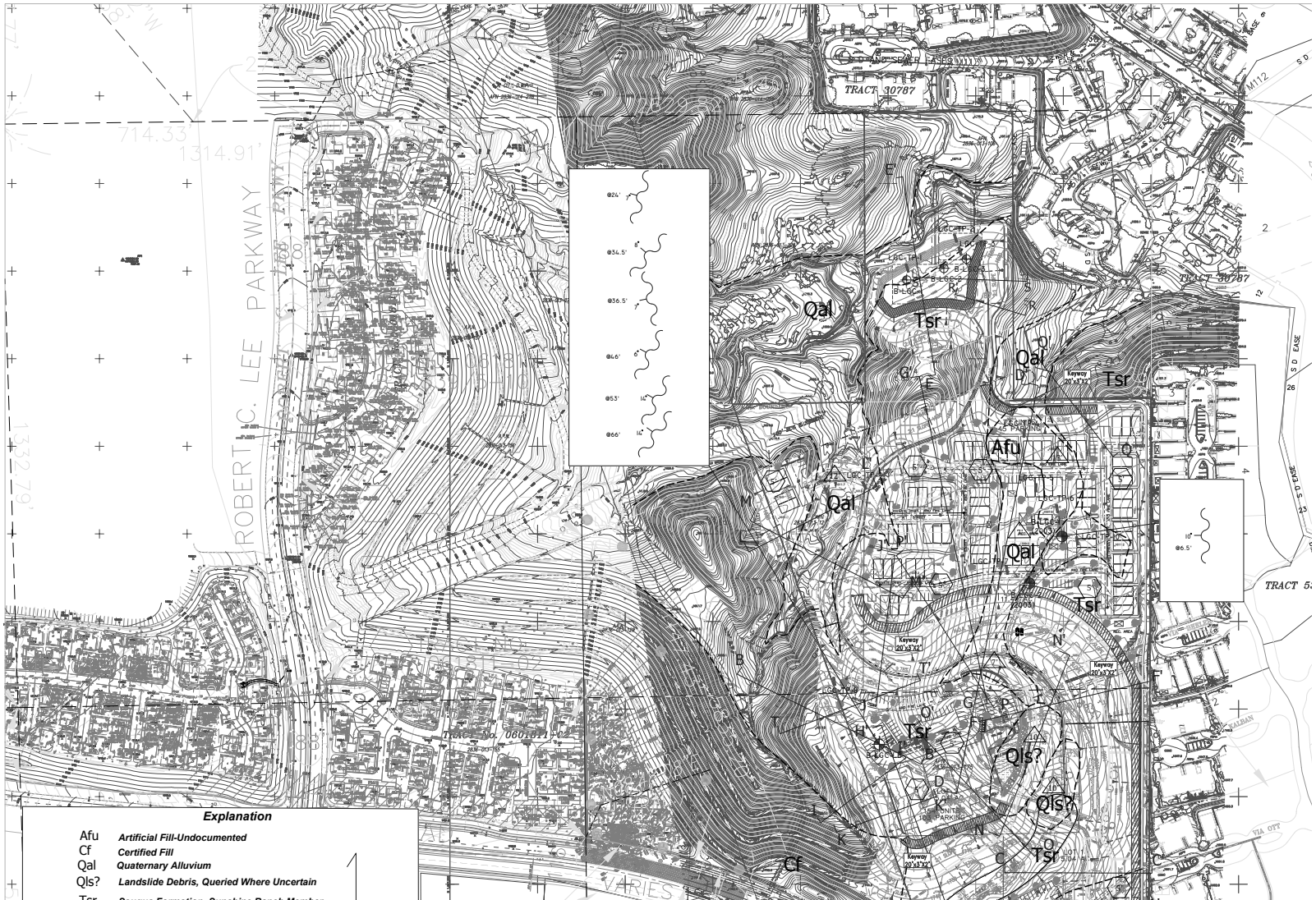
7.1 The Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

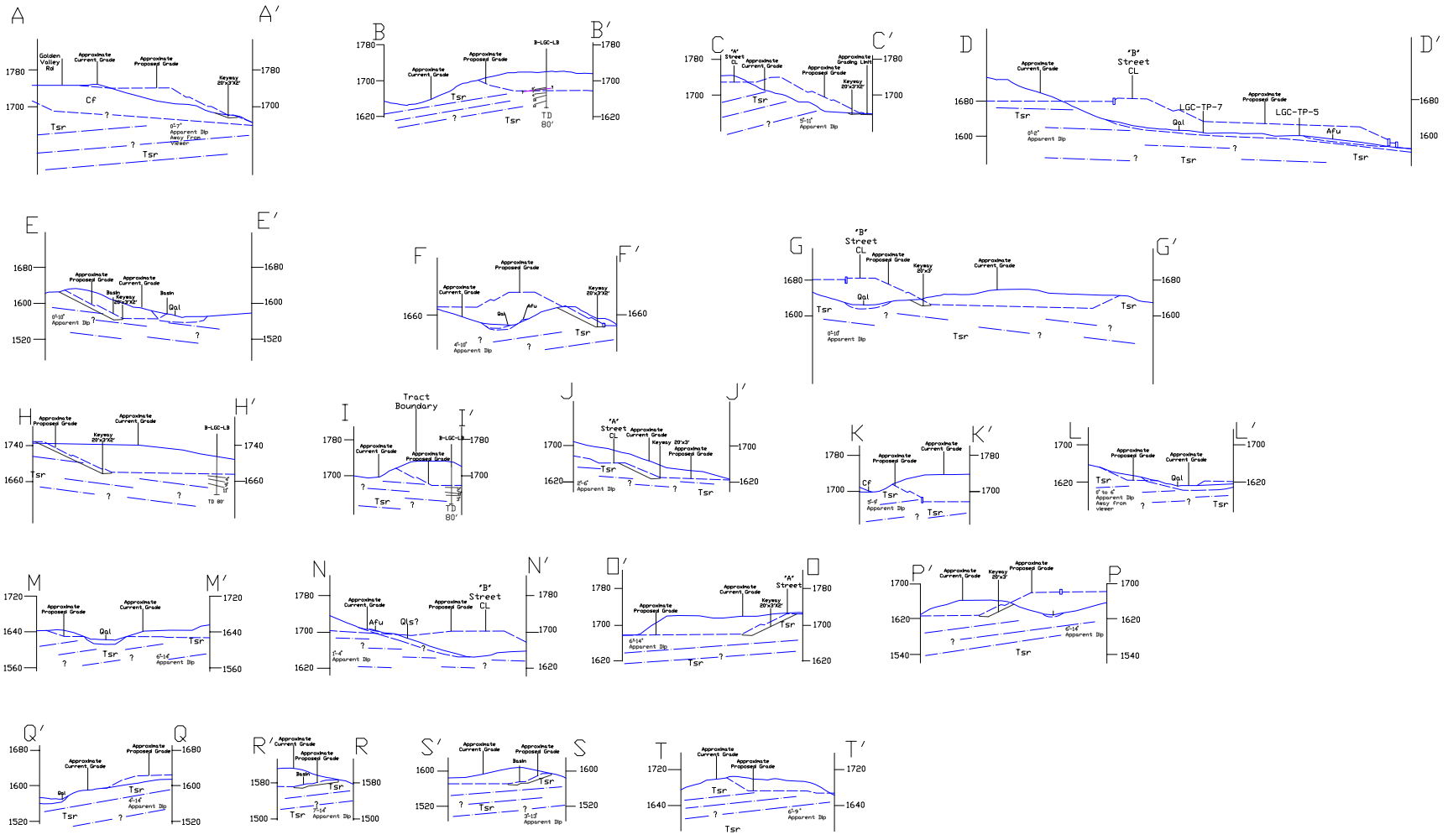
7.2 All bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

7.3 The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

7.4 The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.5 Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.


ROBERT C. LEE PARKWAY
TRACT 30787
Qal
Tsr
Afu
Cf
Qls?
Explanation
Afu Artificial Fill-Undocumented
Cf Certified Fill
Qal Quaternary Alluvium
Qls? Landslide Debris, Queried Where Uncertain
Tsr Sespe Formation, Soledad Rock Member



Cross Sections A-A', through T-T' Valuzzi Property Development Tentative Tract Map 68203 City of Santa Clarita, California	PLATE 2
LGC Valley, Inc.	PROJECT NAME: Valuzzi/LGC PROJECT NO.: 203003-07 ENG / GEOL: ADAMCHIK/KLK SCALE: 1" = 80' DATE: November 2020

APPENDIX E-2
Response to the City of Santa Clarita Review Sheet

LGC Valley, Inc.

Geotechnical Consulting

RESPONSE TO THE CITY OF SANTA CLARITA
REVIEW SHEET DATED JUNE 11, 2021
TENTATIVE TRACT MAP 62803
CITY OF SANTA CLARITA, CALIFORNIA

Dated: December 14, 2021

Project No. 203003-01

Prepared For:

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LGC Valley, Inc.

Geotechnical Consulting

December 14, 2021 Project No. 203003-01

Mr. and Mrs. Renaud and Sue Veluzat
c/o Mr. Steve Hunter
Land Design Consultants, Inc.
800 Royal Oaks Drive, Suite 104
Monrovia, California 91016

Subject: ***Response to the City of Santa Clarita Review Sheet Dated June 11, 2021, Tentative Tract Map 68203, City of Santa Clarita, California***

References: ***RTF&A, 2021, Review of LGC Valley, Inc. Geotechnical Report, Multi-Use Development, Tentative Tract Map 68203, dated November 19, 2020, Santa Clarita, California, Grading Plan Check No. 2021-006-650, Dated June 11, 2021.***

LGC Valley, Inc., 2020, Geotechnical Report for Multi-Use Development, Tentative Tract Map 68203, City of Santa Clarita, California, Project No. 063005-01, dated November 19, 2020.

Introduction

LGC Valley, Inc. (LGC) is pleased to present this response to the city of Santa Clarita, Engineering Services Division, geotechnical review sheet dated June 11, 2021 for the subject site. In addition to our responses to comments, we direct the reviewers to slight modifications to the site plan.

Generally, modifications to the plan include primarily local standard block retaining walls of six feet or less in height that have been added to the tops and toes of local slopes, commonly over relatively short lengths to increase pad area for buildings and parking. Most of the added walls surround the area of the proposed condominium area (Lot 3) which results in a slight shift to the access road. Two short block retaining walls are located adjacent to the 15-foot-wide access easement to the detention basin just past the end of the cul-de-sac of Lot 3. Two block retaining walls are proposed for the east side of Lot 1. Finally, two Keystone walls are proposed near Lot 1: at the end of the cul-de-sac and at the toe of slope. Both of these are within design fill zones.

Geology has been added to the geotechnical map, cross sections have been updated accordingly, slopes are shown with stability fills to reduce the potential of excessive surficial erosion of native cut soil and remedial removal depth estimates are provided. Dimensions for the stability fills are indicated on the site geotechnical map and associated cross sections. Additional information to respond to the referenced review comments are also provided on the geotechnical map and cross sections.

For ease of review, the comments are reiterated prior to each response. Copies of the City of Santa Clarita review sheet (RTF&A, 2021) is included in Appendix D of this response.

Geologic Review Sheet

Comment No. 1

"Geotechnical Map – Plate 1: The following review comments address issues and concerns related to data presented on Plate 1."

Comment No. 1a

"A review of geologic data presented in Leighton's 2006 As-Built Rough Grading Report for adjacent Tract 53419 indicates the presence of a questionable ancient landslide within Tract 53419 that encroaches into the eastern portion of TTM 68203 (northeast of LGC Test Pit TP-10 and in the area of LGC Cross Section Q-Q'). LGC has mapped this area as being underlain by bedrock units of the Sunshine Ranch Member of the Saugus Formation but has not conducted any subsurface exploration in this area to either confirm or dispute the existence of the questionable landslide. Conduct additional exploration within the Leighton mapped limits of the questionable landslide to ascertain the landslide existence within TTM 68203. The exploratory excavations should be of adequate quantity and depth to characterize the subsurface conditions and structure. Leighton's Geotechnical Cross Section DD-DD' suggests the landslide could be at least 70 feet deep beneath Tract 53419. In lieu of additional exploration provide verifiable documentation, such as exploratory excavations or investigation by other geotechnical consultants, demonstrating that a landslide does not exist within TTM 68203."

Response to Comment No. 1a

LGC has assumed the interpretations and findings as indicated within the Leighton 2006 report (L&A) are generally correct and transferred the data along the western edge of that report into the eastern margin of the subject site (Plate 1). Thus, we simply concur that the landslide exists in the northeastern corner of the site. However, we have modified the western edge of the Ancient Landslide (Qols) as presented in L&A, 2006 (landslide) to fit with site data and present the current interpretation on Plate 1. Basically, we conclude the landslide does not extend as far west as presumed in L&A 2006 due to the information within LGC-B-1, the information as mapped by L&A and based on review of recent cross sections prepared by us for this response.

To review our interpretation, several new cross sections were prepared (cross sections 1-1' through 4-4') which show good agreement of the interpretation to the data. Additionally, we updated cross section Q-Q' to aid in the interpretation of site conditions in this area.

Finally, we also transferred the L&A 2006 as-built keyway, basal rupture surface, numerous geologic attitudes, findings from borings and test pits, remedial removal bottoms and other geologic information from the 2006 report onto the subject map. This information presents a more coherent model of the geologic interpretation for the subject site.

Of note, we conclude the unit within the northern reaches of the site (cross sections E-E', R-R' and S-S') is bedrock of the Saugus formation. Field interpretations of test pits and the boring log performed by Allen E. Seward (AES, Appendix B), are muddled, questioned and not in line with expectations of the debris field at the toe of a landslide. As the area represented by the northern half of E-E' is not planned for modification, potential negative impacts are considered remote regardless of the mapped unit. This area will be field mapped and verified during site construction to confirm the interpretation given herein; additional mitigation upon inspection may be required.

To review potential slope instability, select cross sections (4-4' and Q-Q') were analyzed using shear strength values of various soil types from L&A 2003. We conclude the on-site landslide and other formational materials are the same as the adjacent site and thus the values used and approved for the adjacent site are valid for the subject site. Slope stability analyses are provided in Appendix C. From this analysis, a revised keyway was designed for the northeastern corner of the site as shown on the attached map and cross sections (Plates 1 and 2).

Comment No. 1b

"Structural geologic data (bedding) is limited to two locations within the entire site (Borings B-LGC-LB and LGC-LB-2). The paucity of bedding data does not adequately address potential geologic instabilities for all proposed TTM 68203 cut slopes. Additional structural data is needed to assess geologic conditions for the overall site. This could include data from past exploratory excavations onsite or from other consultants, if properly cited and referenced. Revise Cross Sections (Plate 2) accordingly to reflect additional structural data."

Response to Comment No1b

As indicated in our response to Comment No. 1a, we have transferred a significant amount of data from various L&A reports (References) that is useful and relevant to the subject site to aid with overall site interpretation of bedding orientation. The data indicates that bedding is typically striking to the northeast with relatively shallow dips to the northwest. The collected data is in good agreement with the overall structural orientation of bedrock in this area as presented by Dibblee (1996) and Saul and Wootton (1983) and our initial interpretation for the area.

Comment No. 1c

"Provide the logs for LGC's 2003 Borings LGC-1 and -2."

Response to Comment No. 1c

The requested logs are provided in Appendix B.

Comment No. 1d

"Identify the geologic unit in the northmost portion of TTM 68203 north of the alluvium (map unit "Qa;") and adjacent to Tract 30787."

Response to Comment No. 1d

Regional geologic maps (Appendix A) and our cursory review of the site leads us to interpret this area as bedrock of the Saugus formation, Sunshine Ranch member.

Comment No. 1e

"Please explain what is meant by "General Bedding Attitude". The reviewer understands "approximate bedding" or "questionable bedding" but is unclear what LGC is trying to convey with "General Bedding". This bedding data was presumably obtained from downhole logging of large-diameter exploratory borings where the bedding could be directly observed and measured, yet the description presented for bedding data on the Geotechnical Map implies a lack of confidence by LGC in the data. It is unclear how stability analyses for Cross Sections depicting "general bedding" can be considered conclusive analyses."

Response to Comment No. 1e

"General Bedding" is the same as "approximate bedding". This vernacular has been used by this firm for the past 18 years and was learned from a lengthy stay at Leighton and Associates where it was used thoroughly in numerous reports for at least several decades; the referenced L&A reports show this usage.

The term general bedding was used to indicate that bedding that could not be "hacked clean" to produce a flat, planar bedding surface upon which a Brunton or similar compass could be laid to garner a bedding attitude, though it represents bedding that is wholly indicative of the overall bedding trend.

Comment No. 1f

"Symbols for all borings on the Explanation should match the symbols for the respective borings on the Geotechnical Map."

Response to Comment No. 1f

The symbols on the map have been correlated to the Explanation.

Comment No. 2

"Cross Section – Plate 2: The following review comments address issues and concerns related to data presented on Plate 2.

Response to Comment No. 2

We have re-formatted the geotechnical cross sections for easier identification and read. Intersections where cross sections meet have been added. Additionally, cross sections 1-1' through 4-4' have been created and Q-Q' has been revised to adjust to the revised geologic interpretation in the northeastern area of the site. All relevant aspects of the previously prepared cross sections remain the same except as called out below.

Comment No.2a

"Cross Section C-C' does not depict map unit "Cf" as shown on Geotechnical Map, Plate 1.

Response to Comment No. 2a

The cross section has been corrected.

Comment No. 2b

"Subsurface unit below alluvium (unit "Qal") on Cross Section E-E' is not labeled. This unit also is unlabeled on Plate 1".

Response to Comment No. 2b

The cross section and map have been updated.

Comment No. 2c

"Unit "Qls" on Plate 1 is labeled as "Qal" on Cross Section F-F'. Unit "Afu" on Section F-F' is not shown on Plate 1. Correct map or section accordingly."

Response to Comment No. 2c

Cross sections and the geotechnical map have been updated accordingly.

Comment No. 2d

"Fix "Tsr" label on Cross Section H-H'.

Response to Comment No. 2d

Acknowledged. The label on cross section H-H' has been revised.

Comment No. 2e

"Cross Section I-I' does not depict map unit "Cf" as shown on Geotechnical Map, Plate 1.

Response to Comment No. 2e

Acknowledged. Cross section I-I' has been updated.

Comment No. 2f

"Unity "Afu" on Section N-N' is not shown on Plate 1. Correct map or section accordingly."

Response to Comment No. 2f

The drafting error has been corrected.

Comment No 2g

"Unit "Qal" on Cross Section P-P' not labeled."

Response to Comment No. 2g

Unit Qal has been added to the subject cross section.

Comment No. 2h

"Cross Section Q-Q' extends through area mapped as questionable ancient landslide by Leighton (2006). As discussed in Review Comment 1a above, evaluate possible landslide and revise Cross Section Q-Q' as needed."

Response to Comment No. 2h

Cross section Q-Q' has been updated to reflect the data indicated in the L&A 2006 report. The cross section has also been extended to the southeast for a better representation of site geologic conditions.

Comment No. 3

"Section 2.4 – Landslides: As discussed in Review Comment 1a above, conduct additional exploration within the mapped limits of the questionable landslide within eastern position of site to ascertain the landslide's existence within TTM 68203."

Response to Comment No. 3

Please see our response to Comment No. 1a. We accept the interpretations and existence of the ancient landslide as depicted in the Leighton and Associates reports, except as modified herein.

Comment No. 4

"Section 2.6 – Oil Wells: Show approximate location of Mobil Oil Corp. Well #4 on Geotechnical Map, Plate1."

Response to Comment No. 4

The approximate location of the subject well is indicated on Plate 1.

Comment No. 5

"Section 2.9 – Slope Stability: As discussed in Review Comment 1b above there is insufficient bedding data to justify the subsurface conditions depicted on Cross Section E-E' and Q-Q' and used in the respective analyses."

Response to Comment No. 5

With the addition of the data from the referenced reports, we conclude there is sufficient data and agreement with regard to overall geologic structure to present an interpretation for the site. We have revised slope stability analyses to reflect the additional data and interpretations derived therefrom. As there are no distinct changes to cross section E-E', our previous review of this cross section remains applicable.

However, we have revised the geologic interpretation for cross section Q-Q' (Plate 2). The results of the revised interpretation along with revised slope stability analysis results in the need for a 20-foot wide shear key along the north margin of the site (see Plate 1). Slope stability analysis supporting this design is provided in Appendix C of this response.

Comment No. 6

"Appendix B: Boring B-LGC-LB is labeled "B-LGC-LB" on Plates 1 and 2 but is designated in the logs as "LB-1". Correct the designation on Plates or log accordingly."

Response to Comment No. 6

The plates and logs have been corrected such that they are congruous.

Comment No. 7

"Review of the log for TP-4 appears to indicate that alluvium was encountered from 8 feet to the full trench depth of 13.5 feet. There is a note on TP-4 for total removal of all "Afu" and "Qal". The removal depths in the area of the other test pits also generally tend to confirm that complete removal of all "Qal" material is recommended. However, the recommended depth of removal indicated in the triangle in the vicinity of TP-4 is only 13 feet with the total depth of "Qal" apparently undetermined. If complete removal of "Qal" is recommended within the site grading limit it should be clearly shown on the plan or the required depth of removal of "Qal" should be clarified on the plan. In addition, the plan should be revised to indicate complete removal of all "Qal" material at TP-4 as recommended and indicated on the TP-4 test pit log.

Response to Comment No. 7

For clarity, all alluvium should be removed to competent soil which we conclude is either dense older landslide debris or bedrock. A note on the geotechnical map has been provided.

Comment No. 8

"For the slope stability calculations, the consultant appears to entirely rely on direct shear testing performed by others on a surrounding project. The only direct shear testing appears to have been done on a single shear remolded sample. Additional samples should be obtained for multi-shear direct shear testing of samples obtained from the subject site to verify the applicability of the utilized direct shear test parameters. Slope stability calculations should be updated, as appropriate, based on laboratory test results performed on site specific samples."

Response to Comment No. 8

Direct shear strength values used for slope stability calculations were based on approved values from RTF&A's January 6, 2003 report for grading near and into the subject site for compacted fills, alluvium, Saugus Formation cross-bedding strength, and clay bed along bedding strength. Based on our current review, additional data was used to update geologic conditions and interpret an older landslide in the northeastern portion of the site; therefore, we have used the approved shear strength values in L&A November 19, 2003 report for the subject site which consists of the same soils and units. The shear strength values used from L&A, 2003 are for the existing off-site fills, landslide plane/rupture surface, and landslide material. As the formational units are exactly the same, and these values have been approved for the immediately adjacent site, and the values appear reasonably conservative and in line with expectations for these units, we conclude they are acceptable for review of the subject site.

As a part of our geotechnical investigation in 2020, direct shear testing was performed on three bedrock samples, along with grain size distribution and Atterberg Limits performed on two clay/claystone bed samples collected from Boring LB-1. The direct shear testing of a sandstone bed at a depth of 50 feet in LB-1, resulted in a shear strength value of a Cohesion of 1,478 psf and a Friction Angle of 32 degrees for the ultimate strength. This value is greater than the values used in the slope stability analysis for bedrock cross-bedding strength of a cohesion of 600 psf and a Friction Angle of 32 degrees. Two direct shear tests, one of a siltstone sample and one of a claystone sample, resulted in an ultimate shear strength value of a cohesion ranging from 346 to 629 psf and a Friction Angle ranging from 20 to 25 degrees. These values are greater than the along bedding strength for clay beds used in the analysis of a cohesion of 250 psf, and a Friction Angle of 18 degrees. The direct shear plots are included in Appendix C.

Additionally, bag samples of clay/claystone layers collected from down hole logging of bucket auger boring LB-1 at depths of 22 and 36 feet were used to perform laboratory testing (Grain size distribution and Atterberg Limits) and strength correlations of Stark, Choi, and McCone (2005) to evaluate the fully softened secant friction angle for the residual shear strengths to confirm the values used in the slope stability for the along bedding strength. Based on the correlations, the values correlate very well and match the values used in the stability analysis of Cohesion of 250 psf, and Friction Angle of 18 degrees. The correlation plot is included in Appendix C.

Therefore, the values used in our analysis are considered applicable and the values are reasonably conservative and in line with expectations for these units, we conclude they are acceptable for review of the subject site.

Comment No. 9

The slope stability calculations should be revised, as appropriate, once the additional investigation and laboratory testing for the site is performed. Once the structural geologic conditions at the site are conclusively determined, additional review of the slope stability calculations will be performed."

Response to Comment No. 9

As we have not changed our geologic interpretations for most of the site, our previous slope stability analysis remains applicable.

However, additional slope stability analysis has been performed on representative cross-sections to evaluate the northeastern portion of the site with the interpreted existing older landslide configuration. Based on the revised geology in the northeastern portion of the site, four new cross-sections were developed, and one existing cross-section was updated, for site review of this area (Cross-sections 1-1' through 4-4' and Q-Q'). These cross-sections indicate the predominant geologic structure, the existing topography and the design profile and are presented on Plate 2. Of the five cross-sections, slope stability analyses were performed on two cross-sections that were considered representative and critical with regard to slope stability analysis. The results of the slope stability analysis are provided in Appendix C of this report; cross-sections 4-4' and Q-Q' were analyzed, while the remainder of the cross-sections were used to aid in the interpreted geology.

The slope stability analysis performed for Cross-Section 4-4' and Q-Q' considered potential failure surfaces along the landslide rupture surface and evaluated critical surfaces behind and in front of the key, along with the temporary stability of the proposed front and back cuts.

Slope stability analyses were conducted using the computer program Slope W. The Bishop's Method was used to analyze rotational failure modes and the Janbu or Spencer Method was used to analyze translational failure modes. A coefficient of horizontal acceleration of 0.15g (a factor-of-safety [FS] of 1.1) was used to evaluate the pseudostatic stability analyses.

Slope stability analyses performed for the site included an evaluation of the potential for translational and rotational modes of failure. For along bedding cases (generally for translational failure modes for out-of-slope bedding conditions), the along bedding clay beds strengths from previously approved reports and subsequently confirmed with correlations were used (Cohesion of 250 psf and Friction of 18 degrees – static case and 375 psf and 19 degrees for pseudostatic case). For the landslide rupture surface, a strength from the approved values used in L&A 2003 (cohesion of 100 psf and 8 degree angle of internal friction for static and 120 psf and 12 degrees for pseudostatic) were used.

Results of the slope stability analyses indicate adequate factors of safety greater than 1.5 and 1.1 (as applicable), for rotational and translational modes of failure, under static and pseudo-static loading conditions, respectively, *with* the design shear key recommendations provided herein. The attached Appendix C includes more detailed information with regard to shear strength parameters used in the slope stability analyses. Slope stability analysis results and documentation are also included in Appendix C.

Based on the analysis, we recommend that the a shear key having a 20 foot wide and approximately 25 to 45 foot deep (i.e. to a depth of a few feet below the rupture surface) key using a 2:1 (h:v) backcut, and 1:1 (h:v) front cut satisfies slope stability standards; based on the slope stability analysis with the keyway indicated above, a factor of safety (FS) greater than a 1.5 and 1.1 for static and pseud-static, respectively, is achieved.

However, review of the slope in front of the key (i.e. off-site area) indicates that critical surfaces do not meet standard criteria for the site and cannot be mitigated through other means. Thus, a structural setback (Factor of Safety equal to the 1.5/1.1 line) was established using cross-sections 4-4' and Q-Q'. This setback line is approximately 56 feet southward from the northern tract boundary in this area. The critical failure surface is included on cross-sections 4-4' and Q-Q'. In general, for any building encroaching into the structural setback (at this time one building in the northeastern corner is located in the structural setback) the building foundations should be deepened to be founded below the most critical failure surface associated with the structural setback line.

Finally, temporary slope stability analysis was performed for the proposed 2:1 (h:v) backcut and 1:1 (h:v) front cut, to determine that the temporary condition for the backcut results in a FS of greater than 1.25. Though the back cut meets this standard, review of the proposed 1:1 (h:v) front cut was found to be below a factor of safety of 1.25 for the temporary condition *with* complete excavation to the bottom of the keyway. Therefore, supplemental analysis was performed to determine the amount of material in the keyway that could be removed to still maintain a temporary factor of safety of 1.25.

Based on the supplemental analysis, the upper approximate 25 feet of the keyway excavation can be removed (to an approximate elevation of 1,586'). At this point, the remainder of the keyway should be excavated in slots, with a slot cut width of approximately 40-feet. This keyway for the slope defined by 4-4' and Q-Q' is approximately 200 feet in length. Side slopes for this notch should be at gradients of approximately 1:1 (h:v). For construction purposes, fill for each keyway slot should be brought back to an elevation 1,586 or higher prior to excavation of the next slot to reduce the time frame any backcut remains open during site construction.

As with all keyways, subdrains should be installed at the lowest possible elevation and then at intervals of 25-feet vertical or less, thereafter. Slope stability analysis results/graphical printouts are included in Appendix C.

Closure

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report. This response report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and/or project engineer and incorporated into the plans, and the necessary steps are taken to see that the contractor and/or subcontractor properly implements the recommendations in the field. The contractor and/or subcontractor should notify the owner if they consider any of the recommendations presented herein to be unsafe.

If you should have any questions, please do not hesitate to contact us. The undersigned can be reached at (661) 702-8474.

Respectfully submitted,

LGC Valley, Inc.

Basil Hattar, GE 2734
Principal Engineer

Matthew Hawley, CEG 2122
Principal Geologist

MCH/BIH

Attachments:

Plate 1 – Geotechnical Map
Plate 2 – Revised Geotechnical Cross Sections

Appendix A – References
Appendix B - Exploration Logs LGC 2003 and 2020, L&A 2003, and AES(Unpublished) from L&A 2003
Appendix C – Slope Stability Analysis and Direct Shear Data
Appendix D – City of Santa Clarita/RTF&A Review of LGC Valley, Inc. Geotechnical Report Multi-Use Development, Tentative Tract Map 68203, Dated November 19, 2020, Santa Clarita, California. Job Number 2021-006-650, Dated June 11, 2021.

Distribution: (1) Addressee, Via email

APPENDIX A
REFERENCES

Dibblee, 1996, Geologic Map of the Mint Canyon Quadrangle, Dibblee Geological Foundation Map #DF-57.

Lawson and Associates (LGC Valley), 2003, Report of Geotechnical Investigation for Veluzat Property, City of Santa Clarita, California, Project No. 033004-04, dated October 21, 2003.

Leighton and Associates, Inc., 2003a, Response to City of Santa Clarita Geotechnical Review Sheet prepared by R.T. Frankian & Associates, dated September 11, 2003, Proposed Golden Valley Estates Residential Development, Tract 53419, City of Santa Clarita, California, Project No. 06-0954-001, dated August 7, 2003.

_____, 2003b, Response to City of Santa Clarita Geotechnical Review Sheet prepared by R.T. Frankian & Associates, dated March 21, 2003, Proposed Golden Valley Estates Residential Development, Tract 53419, City of Santa Clarita, California, Project No. 06-0954-001, dated November 19, 2003.

_____, 2005, Review of Revised Rough Grading Plan for Tract 53419 and Summary of Conclusions and Recommendations for Proposed Residential Development, City of Santa Clarita, California, Project No. 061372-001, dated February 25, 2005.

_____, 2006, Geotechnical Report of As-Built Rough Grading, Lots 1 through 20 and 90 through 111, Tract 53419, Valle de Oro (Golden Valley Estates) Residential Development, Santa Clarita, California, Project No. 061372-006, dated December 11, 2006.

_____, 2007, Addendum Letter: Geotechnical Report of Rough Grading of the Proposed Recreation Area, Tract 53419, Valle de Oro (Golden Valley Estates) Residential Development, Santa Clarita, California, Project No. 061372-006, dated June 5, 2007.

LGC Valley, Inc., 2020, Geotechnical Report for Multi-Use Development, Tentative Tract Map 68203, City of Santa Clarita, California, Project No. 063005-01, dated November 19, 2020.

R.T. Frankian &Associates, 2003, Geotechnical Report of Observation and Testing As-Built Geologic Report, Rough Grading, Golden Valley Road Phase 1 and High School, Santa Clarita, California, Job No. 99-700-20, Vol. 1 and 2 of 2, dated January 6, 2003.

_____, 2005, Geotechnical Review of Leighton and Associates, Inc. Review of Revised Grading Plan for Tract 53419 and Summary of Conclusions and Recommendations for Proposed Residential Development, City of Santa Clarita, California, Report dated February 25, 2005, Project No. 061372-001, Santa Clarita, California, Job No. 2003-004-652, dated March 28, 2005.

_____, 2021, Review of LGC Valley, Inc. Geotechnical Report, Multi-Use Development, Tentative Tract Map 68203, dated November 19, 2020, Santa Clarita, California, Grading Plan Check No. 2021-006-650, Dated June 11, 2021.

Saul, R.B. and Wootton, 1983, Geology of the South Half of the Mint Canyon Quadrangle, Los Angeles County, California, CDMG, OFR 83-24 LA.

APPENDIX B

Exploration Logs LGC 2003 and 2020, L&A 2003, and AES(Unpublished) from L&A 2003

Exploration Logs LGC, 2003
Borings B-LGC-1 and B-LGC-2

Geotechnical Boring Log B-LGC-1

Date:	10/13/2003		Page: 1 of 2
Project Name:	Valuzat Property	Project Number: 033004-04	
Drilling Company:	Roy Brothers	Type of Rig: Cat 315B L Auger	
Drive Weight:	N/A	Drop: N/A	Hole Dia: 24"
Elevation of Top of Hole:	1,600' +	Hole Location: See Geotechnical Map	

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: MCH Sampled By: MCH
1,600	0								@ Surface: Topsoil: Dark brown silty CLAY, dry to damp, stiff; minor roothairs; some desiccation cracks.
1595	5			R-1					@5': Sespe Formation/Sunshine Ranch Member (Tsr): Greenish-brown silty SANDSTONE, damp, dense, fine to coarse-grained; weathered. @5.5' Sample R-1, same as above.
1590	10								@6.5': Gradational contact to sandy SILTSTONE, damp, stiff, massive; faint poorly-developed bedding dipping west at approximately 10°.
1585	15								@18': Yellow-brown sandy CONGLOMERATE, damp to wet, very dense, silty sand matrix, gravel and cobbles; seepage zone around entire boring from 18' to 28'. @19.5': Sample R-2; same as above.
1580	20			R-2					
1575	25								@28': Base of conglomerate. Greenish-brown sandy SILTSTONE, moist, stiff; approximately 1' thick over brown gravelly SANDSTONE, damp to moist, dense; some cobbles.
1570	30								

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Geotechnical Boring Log B-LGC-1

Date:	10/13/2003		Page: 2 of 2
Project Name:	Veluzat Property	Project Number: 033004-04	
Drilling Company:	Roy Brothers	Type of Rig: Cat 315B L Auger	
Drive Weight:	N/A	Drop: N/A	Hole Dia: 24"
Elevation of Top of Hole:	1,600' ±	Hole Location: See Geotechnical Map	

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: MCH Sampled By: MCH
1570	30								@31': Transition to greenish-blue unoxidized bedrock. Material appears same as above.
1565	35								@35': Cobbles and gravel decrease significantly. Generally, greenish-blue silty SANDSTONE, damp, very dense; massive
1560	40			R-3					
1555	45								
1550	50								Notes: Total depth drilled: 48' Seepage zone 18' to 28'. No clay seams, clay beds or rupture surfaces observed. Not logged below approximately 35 feet due to spalling soils. Boring backfilled with cuttings
1545	55								
1540	60								

LGC

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Geotechnical Boring Log B-LGC-2

Date:	10/13/03		Page: 1 of 2
Project Name:	Veluzat Property		Project Number: 033004-04
Drilling Company:	Roy Brothers		Type of Rig: Cat 315B L Auger
Drive Weight:	N/A		Drop: N/A Hole Dia: 24"
Elevation of Top of Hole:	1,610' +		Hole Location: See Geotechnical Map

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: MCH Sampled By: MCH
1,610	0								@ Surface: **Topsoil**: Medium brown silty CLAY, dry, medium stiff; minor rootlairs; some desiccation cracks.
									@4.5': Light grey to white sandy CLAY, dry to damp, medium stiff; weathered bedrock.
1605	5			R-1					@5.5': Sample R-1. Same as @4.5 @6': Becomes damp. @6.5': **Sauqus Formation/Sunshine Ranch Member (Tsr)**: Greenish-brown sandy SILTSTONE, damp, dense; weathered; mottled with white.
1600	10								@8': Greenish-brown silty SANDSTONE, damp, dense; massive; irregular gently westward dipping contact with sandy SILTSTONE above.
1595	15								@15.5': Greenish-brown silty SANDSTONE, damp, dense, medium-grained
				R-2					
1590	20								
1585	25								@25': massive with no internal structure.
1580	30								

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Geotechnical Boring Log B-LGC-2

Date:	10/13/03		Page: 2 of 2
Project Name:	Veluzat Property	Project Number: 033004-04	
Drilling Company:	Roy Brothers	Type of Rig: Cat 315B L Auger	
Drive Weight:	N/A	Drop: N/A	Hole Dia: 24"
Elevation of Top of Hole:	1,600' +	Hole Location: See Geotechnical Map	

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: MCH Sampled By: MCH
1580	30								@30': Transition to greenish-blue unoxidized bedrock. Material appears same as above.
1575	35								
1570	40			R-3					@40.5': Sample R-3: Greenish-blue silty SANDSTONE, damp to moist, dense; overall finer-grained than sandstone of R-2.
1565	45								
1560	50								Notes: Total Depth: 48' Seepage Zone @ approximately 47'. No clay seams, clay beds or rupture surfaces observed. Boring backfilled with cuttings
1555	55								
1550	60								

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APPENDIX B con't

Exploration Logs LGC, 2020
Borings LB-1, HS-1, HS-2, and HS-3, and Test Pits LGC-TP-1 thru LGC-TP-10

Geotechnical Boring Log LB-1

Date:	9/15/2020		**Page:** 1 of 3
Project Name:	Veluzat/LDC-Golden Valley		**Project Number:** 203003-01
Drilling Company:	Tri-Valley		**Type of Rig:** Bucket Auger
Drive Weight:			**Drop:** 12" **Hole Dia:** 24"
Elevation of Top of Hole:	1716+/-		**Hole Location:**

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION
									Logged By: NLK/MCH Sampled By: NLK
1716	0								**Top Soil:** 0'-Medium brown to dark brown, sandy SILT, dry, soft to medium stiff; roots, some gravel, porous. **Saugus Formation/Sunshine Ranch Member (Tsr):**
				Bulk 1 (1-5')					1'- Pale yellow-brown SILTSTONE, dry, hard; granitic cobbles, roots present, weathered.
1711	5			R1	1 4	101.2	10.9		5.5'- Same as above, caliche, root hairs. 7.5'- Medium brown SILTSTONE, dry, hard; gradational contact into CLAYSTONE with gravel and caliche, paleosol.
1706	10		Channel: N60E/34SE and N55E/36NW	R2	3 5	110.6	5.8		9.0'- Pale yellow SILTSTONE, dry to damp, hard; grading into very fine to coarse SANDSTONE. 11'- Orange-brown gravel SANDSTONE conglomerate, dry to damp, very dense; minor carbonate development.
			Channel: N10E/40NW and E/34S	Bulk 2 (10-15')					13'- Dark gray clayey SILTSTONE, damp, hard; caliche, roots, channel attitudes:N55E/36NW N60E/34SE.
1701	15			R3	3 4	107.7	14.7		14'- Pale gray medium to very coarse SANDSTONE, dry to damp, dense; roots, cross-cutting channel: N10E/40NW and E/34S. 15.5'- Dark brown-gray clayey SILTSTONE with caliche.
			Channel: N47E/64NW and S55W/36SW						17.5'- Pale yellow-orange medium to very coarse gravel SANDSTONE conglomerate: roots, cemented, gradational contact, channel attitudes: N47E/64NW and S55W/36SW.
1696	20			R4	4 6	108.6	11.3		18.7'- Pale yellow SILTSTONE grading into dark brown-gray CLAYSTONE, damp, hard; pencil sized roots observed. 19.5'-Light brown sandy SILTSTONE with pebbles. 20'- Very Dense/Hard; no roots observed. 21'- Caliche.
			B:N14E/7NW	B-1					22'- Dark brown to reddish-brown CLAYSTONE; caliche, paleosol, gradational contact, B:N14E/7NW.
1691	25		B:N20E/8SE	R5	10 13 for 1'	119.9	3.8		24'- Light gray, very coarse SANDSTONE; B: N20E/8SE. 26'- Light gray cemented gravel.
				Bulk 3 (22-27')					27'- Pale yellow-orange silty very fine sand grading into gravel/cobble conglomerate; cemented.
1686	30								

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Geotechnical Boring Log LB-1

Date:	9/15/2020		Page: 2 of 3
Project Name:	Veluzat/LDC-Golden Valley		Project Number: 203003-01
Drilling Company:	Tri-Valley		Type of Rig: Bucket Auger
Drive Weight:			Drop: 12" Hole Dia: 24"
Elevation of Top of Hole:	1716		Hole Location:

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION
									Logged By: NLK/MCH Sampled By: NLK
1686	30			R6 Bulk 4 (28-32')	23 27 for 3"	115.2	3.1		30'- Interbedded yellow-brown and orange fine to coarse SANDSTONES.
1681	35		B:N40E/8NW	R7	11 21	123.8	12.3		34.5'- Medium to dark brown clayey SILTSTONE; gradational contact, B: N40E/8NW.
			B:N12W/7SW	B-2					36.5'- Reddish-brown to red-purple CLAYSTONE, internally sheared, very steeply diping non plannar shears, B: N12W/7SW.
1676	40			R8	13 40	128.9	9.1		39.5'- Medium brown SILTSTONE. 40.5'- Caliche.
				Bulk 5 (35-40')					42'- Yellow-brown very fine SANDSTONE. 43.5'- Caliche.
1671	45		B:N30E/6NW	R9	7 14	110.8	19.3		44'- Medium brown-gray SILTSTONE. 46'- Reddish-brown CLAYSTONE; caliche, paleosol, gradational contact, B: N30E/6NW. 47'- Brown-gray SILTSTONE. 48.5'- Caliche.
1666	50			R10	23 20	136.3	2.8		50'- Pale yellow very fine SANDSTONE; cemented. 52'-Dark brown-gray SILTSTONE.
			B:N30E/14NW						53'- B:N30E/14NW
1661	55			R11	18 21 for 1"	112	13.2		56'- Yellow-gray silty fine SANDSTONE; gradational contact. 58'- Dark brown-gray clayey SILTSTONE, caliche.
1656	60								

Geotechnical Boring Log LB-1

Date:	9/15/2020		Page: 3 of 3
Project Name:	Veluzat/LDC-Golden Valley	Project Number:	203003-01
Drilling Company:	Tri-Valley	Type of Rig:	Bucket Auger
Drive Weight:		Drop: 12"	Hole Dia: 24"
Elevation of Top of Hole:	1716	Hole Location:	

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION
									Logged By: NLK/MCH Sampled By: NLK
1656	60			R12	15 23	123.0	11.9		60'- Interbedded yellow-gray and orange-brown fine to coarse SANDSTONE. 62'- Brown-gray SILTSTONE, caliche. 63.5'- Brown-gray silty CLAYSTONE transitioning to reddish gray color.
1651	65		B:N35E/14NW	R13	8 25	106.2	21		66'- Reddish brown silty CLAYSTONE; caliche at base, paleosol, transition to unoxidized, B: N35E/14NW. 67'- Blue-gray clayey SILTSTONE grading into dark brown-gray silty CLAYSTONE (4-6" thick).
1646	70			R14	13 34	127.9	7.9		68'- Blue-gray SILTSTONE;damp, hard; unoxidized, darkening with depth, massive. 70'- Same as above with gravel.
1641	75			R15	16 32	124.2	11.5		75'- Same as above, flecks of white.
1636	80			R16	22 32	115.8	16.7		80'- Same as above. Dark blue-gray.
1631	85								Total Depth 80.0' No groundwater encountered Backfilled 9/15/2020
1626	90								

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Geotechnical Boring Log HS-1

Date:	10/6/2020	**Page:** 1 of 1	
Project Name:	Veluza/LDC Golden Valley	**Project Number:** 203003-01	
Drilling Company:	Choice Drilling	**Type of Rig:** Hollow Stem	
Drive Weight: 140lbs		**Drop:** 30"	**Hole Dia:** 8"
Elevation of Top of Hole:	1583+/-	**Hole Location:**	

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: NLK Sampled By: NLK	Type of Test
1583	0							Topsoil: 0'-Medium to dark brown sandy SILT with gravel, dry, soft; rooted	
								Saugus Formation-Sunshine Ranch Member(Tsr): 2'- Pale yellow medium brown sandy SILTSTONE, dry, soft to medium stiff	
1578	5		SPT1	5 7 11				5'- Pale yellow brown silty fine to medium coarse SANDSTONE, dry, medium dense; some gravel 6'- Same as above with less gravel	
1573	10		SPT2	50/6				10'- Same as above, poor recovery, broken cobble in sampler, broken cobbles in cuttings, difficult to drill	
1568	15		SPT3	11 8 7				15'- Light to medium brown medium to very coarse SANDSTONE with some gravel, damp, medium dense 19'- Damp to moist	
1563	20		SPT4	8 6 6				20'- Same as above with caliche	
1558	25		SPT5	9 12 14				25'- Same as above, abundant caliche	
	30							Total Depth 26.5' No groundwater encounter, rechecked after 24hrs Backfilled 10/7/2020	

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Geotechnical Boring Log HS-2

Date:	10/6/2020	**Page:** 1 of 2	
Project Name:	Veluza/LDC Golden Valley	**Project Number:** 203003-01	
Drilling Company:	Choice Drilling	**Type of Rig:** Hollow Stem	
Drive Weight: 140lbs		**Drop:** 30"	**Hole Dia:** 8"
Elevation of Top of Hole:	1585+/-	**Hole Location:**	

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: NLK Sampled By: NLK	Type of Test
1585	0							Saugus Formation-Sunshine Ranch Member(Tsr): 0'- Pale yellow to light brown silty SANDSTONE	
1580	5		R1	18 50/6"				5'- Pale yellow to medium brown sandy SILTSTONE, dry to damp, hard; roots present, some pores observed 7'- Same as above, broken cobbles in cuttings, difficult to drill	
1575	10		R2	18 28 36				10'- Light brown to olive gray SILSTONE, dry to damp, hard; abundant caliche, stains from decomposed roots, no pores observed	
1570	15		R3	18 28 42				15'- Same as above, no roots observed, some rust coloration	
1565	20		R4	80/6"				20'- Olive green to gray clayey SILSTONE, damp to moist, hard; calich/ carbonate nodules, no pores observed	
1560	25		R5	38 50/5"				25'- Same as above 27'- Dark brown to olive green CLAYSTONE, damp to moist, hard; abundant caliche	
1555	30								

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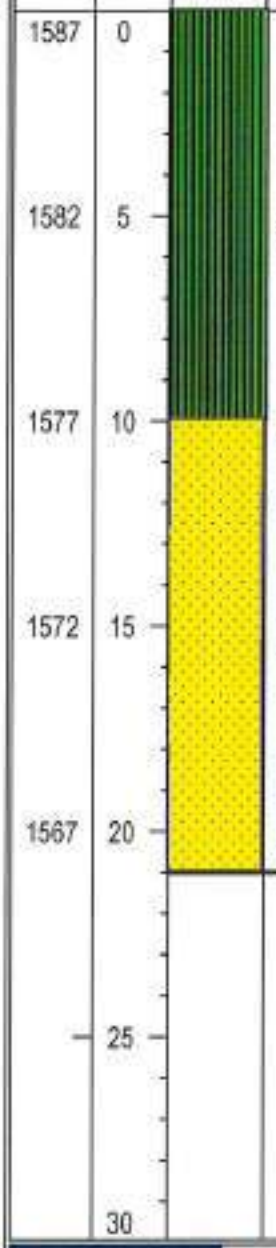
Geotechnical Boring Log HS-3

Date: 10/6/2020	**Page:** 1 of 1
Project Name: Veluza/LDC Golden Valley	**Project Number:** 203003-01
Drilling Company: Choice Drilling	**Type of Rig:** Hollow Stem
Drive Weight: 140lbs	**Drop:** 30" **Hole Dia:** 8"
Elevation of Top of Hole: 1587+/-	**Hole Location:**



Elevation (ft)	Depth (ft)	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
							Logged By: NLK Sampled By: NLK	
1587	0						Saugus Formation-Sunshine Ranch Member(Tsr): 0'- Reddish to medium brown, sandy SILSTONE, dry ,soft to medium stiff; some gravel, roots present	
1582	5	R1	28 38 43				5'- Medium brown gravelly sandy SILTSTONE, dry to damp,hard; porous in top half of sampler, minor caliche	
							8'- same as above, color change to pale yellow to light brown; no pores observed	
1577	10	R2	32 22 44				10'- Pale yellow to light brown silty veryfine to medium SANDSTONE, dry to damp, dense	
1572	15	R3	38 50/6"				15'- Pale yellow to very light gray mottled with rusty orange medium to very coarse SANDSTONE, dry to damp, very dense; cemented	
1567	20	R4	50/6"				20'- Olive green to gray sandy SILSTONE or silty fine SANDSTONE, damp, hard/very dense, rusty orange stains, slightly cemented	
	25						Total Depth 20' No groundwater observed Percolation well set. 3" perforated PVC with gravel and bentonite cap at 17' and solid pvc to surface with native soil backfilled annulus to surface.	
	30							

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LOG OF TRENCH: LGC-TP-1

Project Name:	Veluzat/LDC	Logged by:	NLK
Project Number:	203083-01	Elevation:	1583'+/-
Equipment:	Backhoe	Location/Grid:	

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION:	Geologic Test Pit

GEOLOGIC UNIT	USCS	Sample No.	ENGINEERING PROPERTIES Moisture (%)	Density (pcf)
Topsoil				
Qal				
Tsr				

Topsoil:
0-3.0': Dark brown to gray brown sandy SILT, dry, soft to medium stiff; heavily rooted, very porous

Quaternary Alluvium (Qal):
3.0-7.0': Medium to dark brown cobble-rich gravelly SAND, dry, medium dense to dense; abundant root hairs, very porous, weathered

Tertiary Saugus formation-Sunshine Ranch member (Tsr):
7.0-11.0': Pale brown interbedded sandy SILTSTONE and silty fine to medium SANDSTONE, approximately 4-6" beds, dump, hard/very dense; staining from decomposed roots, minor caliche

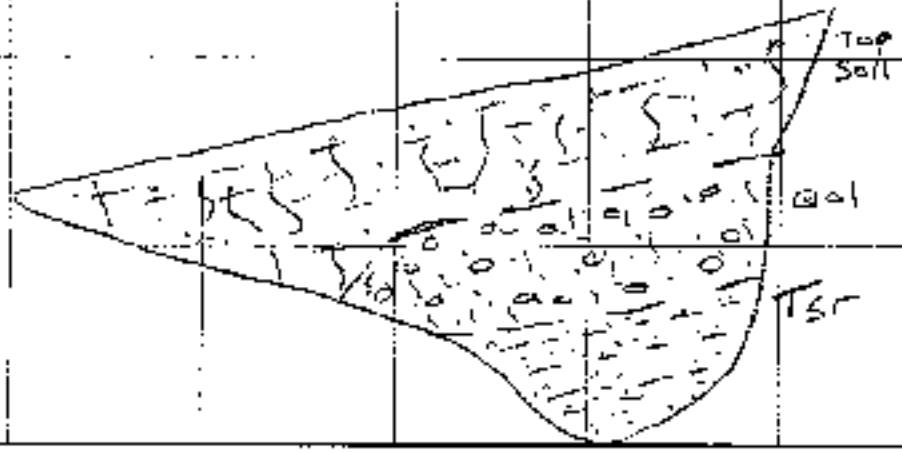
massive

9': no pores observed

GRAPHICAL REPRESENTATION: East side of test pit SCALE: 1"=5'

SURFACE SLOPE: 13N

TREND: N24W



Total Depth = 11 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-2

Project Name:	Volvzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES
Project Number:	203003-01	Elevation:	1580'+/-	
Equipment:	Backhoe	Location/Grid:		

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	Topsoil: 0-2'. Dark brown to gray medium to coarse sandy SILT, dry, soft; very porous, animal burrows, heavily rooted		Topsoil				
massive	Quaternary Alluvium (Qal): 2.0-T.D.: Pale yellow to medium brown interbedded silty SAND and sandy GRAVEL beds, dry to damp, firmness increases with depth, porous to bottom of trench 7': discontinuous cobble bed		Qal				

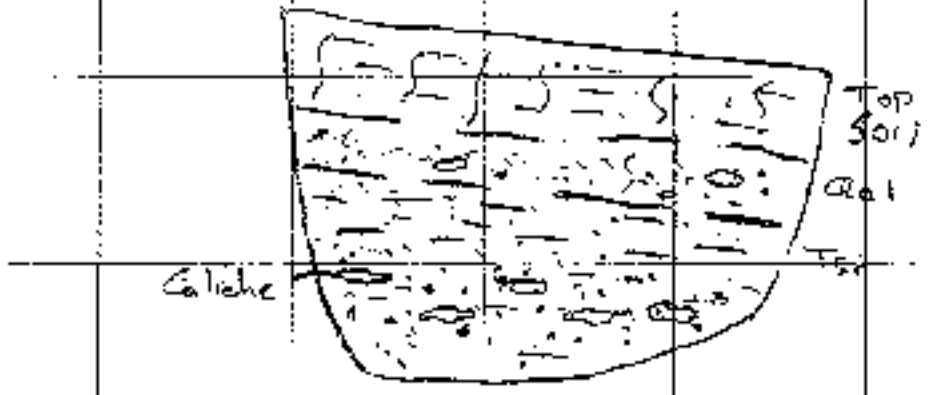
GRAPHICAL REPRESENTATION: West side of test pit | SCALE: 1"=5' | SURFACE SLOPE: 5N | TREND: N70W

Total Depth = 9 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-3

Project Name:	Velazet/LDC	Logged by:	NLK	ENGINEERING PROPERTIES				
Project Number:	203003-01	Elevation:	1585'+/-					
Equipment:	Backhoe	Location/Grid:						
GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION:	Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
massive	Topsoil: 0-2.5': Dark brown to gray brown sandy SILT, dry, soft to medium stiff; heavily rooted, very porous Quaternary Alluvium (Qal): 2.5': Light brown silty SAND with gravel, dry medium stiff; porous, rooted, some cobbles present Tertiary Sangus formation-Sunshine Ranch member (Tsr): 4.0': Light brown sandy SILT, dry to damp, medium stiff to stiff; some root hairs, porous, weathered 4.5': Density change noted by operator, less porous 6.0'-T.D.: Light brown to gray silty gravelly SANDSTONE, dry to damp, medium dense to dense; root hairs present, caliche, weathered, slightly porous 8.5': No pores observed			Topsoil Qal Tsr				

GRAPHICAL REPRESENTATION: West side of test pit | SCALE: 1"=5' | SURFACE SLOPE: 8N | TREND: N30W



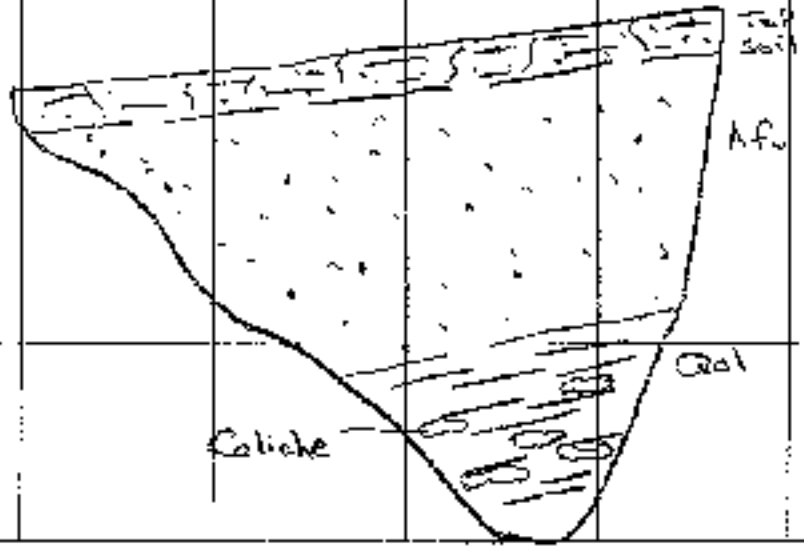
Total Depth = 9 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-4

Project Name:	Veluzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES
Project Number:	205003-01	Elevation:	1585' +/-	
Equipment:	Backhoe	Location/Grid:		

GEOLOGIC ATTITUDES	DATE 9/18/20 DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	Topsoil: 0-1': Medium to dark brown, sandy SILT, dry very soft to soft; pebble rich, rooted, porous	Topsoil				
	Artificial fill, undocumented (Afu): 1-8': Medium brown silty SAND with gravel; dry to damp, medium dense; abundant gypsum	Afu				
	Quaternary Alluvium (Qal): 8.0-13.5': Mottled medium gray and dark brown silty sandy CLAY, moist; gypsum 9' T.D.: Abundant caliche	Qal				
	Recommend total removal of all Afu and Qal					

GRAPHICAL REPRESENTATION: East side of test pit | SCALE: 1"=5' | SURFACE SLOPE: 7N | TREND: N31E



Total Depth = 13.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-5

Project Name	Velaza/LDC	Logged by:	NLK	ENGINEERING PROPERTIES				
Project Number:	200903-01	Elevation:	1590'+/-					
Equipment:	Backhoe	Location/Grid:						
GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION:	Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No	Moisture (%)	Density (pcf)
	Topsoil: 0-2.5': Medium to dark brown, sandy silty CLAY, dry to damp, soft, blocky soils, heavily rooted, 16" cobbles present Quaternary Alluvium (Qal): 2.5': Pale yellow to light gray SILT with caliche, damp to moist, soft to medium stiff; iron oxidation, root hairs, pores 4.5': Light orange to brown, very fine SAND, moist, medium dense; decomposed roots 5.0': Pale yellow to white-gray sandy silty CLAY with caliche, moist, soft, decomposed roots 5.5': Brown grey sandy SILT with caliche, moist medium stiff to stiff; pores present Tertiary Sangus formation-Sunshine Ranch member (Tsr): 8.5-T.D.: Mottled Orange and brown, silty medium to coarse SANDSTONE, moist, dense; no roots observed in cutting, very few pores, contractor noted density change: Minimum removal depth recommended 9'			Topsoil Qal Tsr				

GRAPHICAL REPRESENTATION: SCALE: 1"=5' SURFACE SLOPE: 9 N TREND: N5E

Total Depth = 9.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-6

Project Name:	Velazez/LDC	Logged by:	NLK	ENGINEERING PROPERTIES
Project Number:	203003-01	Elevation:	1595'+/-	
Equipment:	Backhoe	Location/Grid:		

GEOLOGIC ATTITUDES	DATE: 9/18/20 DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	Artificial fill- undocumented (Afu): 0-4': Dark brown silty SAND, dry to damp, loose to medium dense; buried roots and brush	Afu				
	Quaternary Alluvium (Qal): 4-6.5': Mottled pale yellow and light brown with gray gravel rich silty SAND with clay nodules, damp to moist, medium dense, cobble rich, abundant root hairs, porous 5.5': Caliche rich layer	Qal				
massive	Tertiary Sauges formation-Sunshine Ranch member (Tsr): 6.5-T.D.: Medium gray to olive gray sandy SILTSTONE, damp to moist, hard, caliche rich, 7': No pores observed Minimum recommended removal depth 7'	Tsr				

GRAPHICAL REPRESENTATION: West side of test pit | SCALE: 1"=5' | SURFACE SLOPE: Flat | TREND: N16W

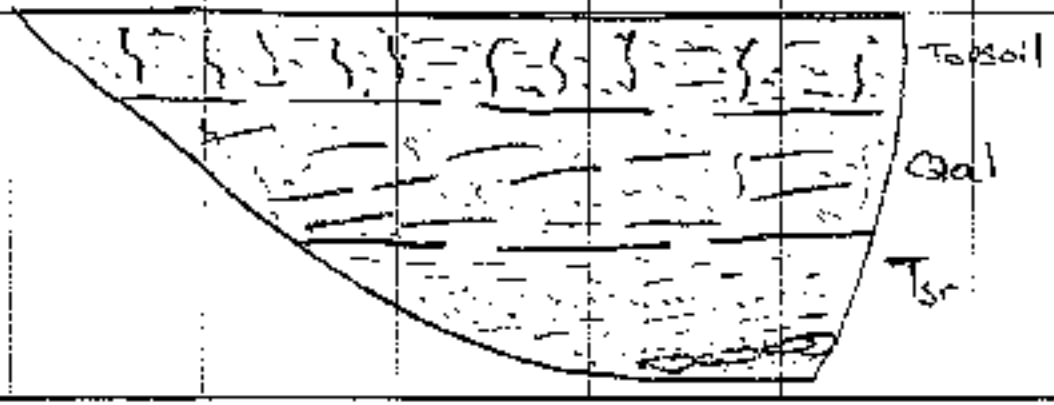
Total Depth = 8.5 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH LGC TT-7

Project Name:	Velzat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES
Project Number:	203003-01	Elevation:	1605'+/-	
Equipment:	Backhoe	Location/Grid:		

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
		Topsoil: 0-2.5': Dark brown to dark gray clayey silty SAND, dry, loose to medium dense; heavily rooted, blocky Quaternary Alluvium (Qal): 2.5': Dark brown to gray sandy CLAY, moist to wet, soft to medium stiff, calcium carbonate stringers, abundant root hairs, few pores observed, weathered Tertiary Sespe formation-Sunshine Ranch member (Tsr): 6.0'-9.5': Light brown to pale gray interbedded sandy SILTSTONE and medium to coarse SANDSTONE, damp to moist, hard/dense; no pores observed 8.0' -T.D.: Caliche rich lens Minimum removal depth recommended 7'	Topsoil Qal Tsr				

GRAPHICAL REPRESENTATION: East side of test pit | SCALE: 1"=5' | SURFACE SLOPE: Flat | TREND: N40E



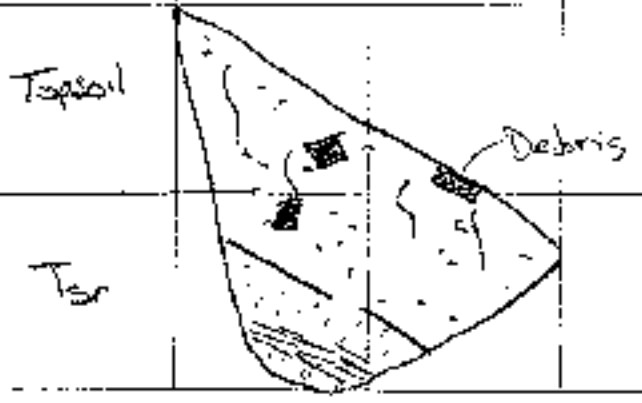
Total Depth = 9.5 Feet
No Ground Water Encountered
Backfilled 9/18/2020

LOG OF TRENCH: LGC-TP-8

Project Name:	Veluva/LDC	Logged by:	NLK	ENGINEERING PROPERTIES	
Project Number:	203003-03	Elevation:	1695 +/-		
Equipment:	Backhoe	Location/Grid:			

GEOLOGIC ATTITUDES	DATE: 9/18/20 DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
	Topsoil: 0-6.0': Brown to dark brown silty SAND, dry, medium dense to dense; heavily rooted, porous, abundant construction debris at surface and near surface	Topsoil				
massive	Tertiary Sauqus formation-Sunshine Ranch member (Tsr): 6-10' 6.0-10.0'. Orange brown silty SANDSTONE, dry, dense to very dense; heavily weathered, few pores 8.0'- T.D.: Dark brown CLAYSTONE lens approximately 10inches thick, heavily weathered, stains from decomposed roots	Tsr				

GRAPHICAL REPRESENTATION: East side of test pit | SCALE: 1"=5' | SURFACE SLOPE: 7N | TREND: N31E



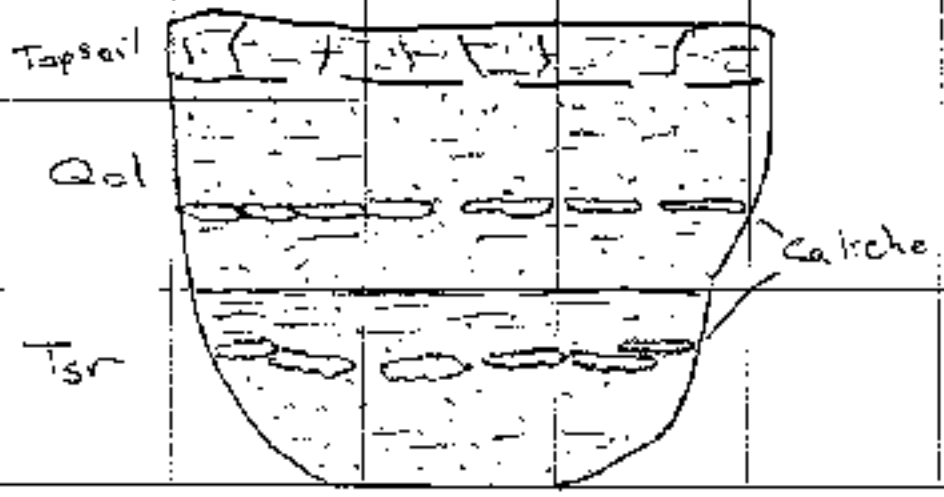
Total Depth = 10 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-9

Project Name:	Velazat/LDC	Logged by:	NLK	ENGINEERING PROPERTIES
Project Number:	203003-01	Elevation:	1615' +/-	
Equipment:	Backhoe	Location/Grid:		

GEOLOGIC ATTITUDES	DATE: 9/18/20	DESCRIPTION: Geologic Test Pit	GEOLOGIC UNIT	USCS	Sample No.	Moisture (%)	Density (pcf)
massive	<u>Topsoil:</u> 0-1.5': Medium to dark brown sandy SILT, dry, soft to medium stiff; heavily rooted, very porous <u>Quaternary Alluvium (Qal):</u> 1.5-7.0': Light brown interbedded sandy SILT and silty SANDS, dry to damp, medium stiff/medium dense; carbonate stringers, porous 5.0': Caliche rich cobble lens <u>Tertiary Sangre formation-Sunshine Ranch member (Tsr):</u> 7.0 12.0': Light brown to olive gray interbedded sandy SILTSTONE and silty SANDSTONE, dry to damp, hard/very dense 8.0': Abundant caliche 10.0': Minor pores still present 11.5': No pores observed, some carbonate stringers present Minimum recommended removal depth 12'	Topsoil Qal Tsr				

GRAPHICAL REPRESENTATION: West side of test pit | SCALE: 1"=5' | SURFACE SLOPE: Flat | TREND: N14W



Total Depth = 12 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

LOG OF TRENCH: LGC-TP-10

Project Name:	Veluzat/LDC	Logged by:	NLK
Project Number:	203003-01	Elevation:	1605'+/-
Equipment:	Backhoe	Location/Grid:	

DATE: 9/18/20 DESCRIPTION: Geologic Test Pit

GEOLOGIC ATTITUDES		GEOLOGIC UNIT	ENGINEERING PROPERTIES			
			USCS	Sample No.	Moisture (%)	Density (pcf)
	Topsoil: 0-2.0': Dark brown gravelly sandy SILT, dry, soft to medium stiff; heavily rooted, very porous, blocky soil	Topsoil				
	Quaternary Alluvium (Qal): 2.0-6.0': Medium brown to olive-gray interbedded silty SAND and sandy SILT, damp, stiff/dense; root hairs, slightly porous	Qal				
massive	Tertiary Sespe formation-Sunshine Ranch member (Tsr): 6.0-7.0': Medium brown to olive gray sandy SILTSTONE, damp, hard; caliche	Tsr				
	7.0-10.0': Medium brown to olive gray SILTSTONE, damp, hard, weathered, abundant caliche at upper contact Minimum recommended removal depth 7-8'					

GRAPHICAL REPRESENTATION: East side of test pit SCALE: 1"=5' SURFACE SLOPE: 9% TREND: N20W

Total Depth = 11 Feet
No Ground Water Encountered
Backfilled: 9/18/2020

APPENDIX B con't

Exploration Logs L&A, 2003
Borings B-1, B-2, and B-3, and
AES (unpublished) from L&A 2003-Boring B-7and Trench Log 28, 29, 30, and 40

GEOTECHNICAL BORING LOG B-1 (001)

Date 9-23-03 Sheet 1 of 3

Project T63419, Golden Valley Estates Project No. 060954-001

Drilling Co. Roy Brothers Drilling Type of Rig Flight Auger

Hole Diameter 24" Drive Weight 1767lbs(0-15ft), 1182(15-30), 757(30-45), 489(45-60) Drop 18"

Elevation Top of Hole 1633' Location

Logged By GM, CAA

Sampled By CAA

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class (U.S.C.S.)	DESCRIPTION	Type of Tests
	0								Qoa-Quaternary Older Landslide	
1630				B-1				SP	@0-2.5 SANDSTONE CONGLOMERATE: Light yellow-pale brown, dry, loose, porous.	
	5		B: N52E, 11NW	R-1	7			CL	@2.5ft CLAY: Medium brown, low-medium dense, low-medium moist, caliche lined contact with overlying conglomerate, abundant caliche pods and stringers, locally blocky, waxy luster, approx. 12"-16" thick. @4.0ft SANDY CLAYEY SILTSTONE: Olive-pale brown, low-medium moist, medium dense, few caliche stringers and coarse sand size grains. Gradational contact with overlying CLAY.	
1625										
	10			R-2	11			CL	@10ft CLAY: Medium brown, medium moist, medium dense, waxy luster, generally massive.	
1620			B: N48E, 10NW						@12ft CLAY: Red-brown, SILTY, non-plastic, approx. 4-6" thick. @12.5-15.0ft SILTY CLAY: Olive-light brown, abundant caliche pods, firm, dense, medium moist.	
	15		B: N26E, 9NW	R-3	11			SP	@15-18ft SANDSTONE with some GRAVEL: Yellow-orange, coarse grained very friable, generally massive.	
1615			B: N46E, 11NW						@18ft CLAY: Olive green, SILTY, caliche pods, approx. 2-3" thick. @18.5, 19.0, and 20.5 LIMEY beds: Broken but continuous around boring.	
	20			R-4	12			CL	@20.5ft SANDY CLAY: Red-brown, medium dense, medium moist. @20.5-25ft SANDY SILTSTONE: Yellow-pale brown, medium dense, medium moist.	
1610										
	25		B: N35E, 9NW	R-5	12			CL	@25ft CLAY: Red-brown, waxy luster, non-plastic, horizontals, locally blocky, abundant caliche pods, internally sheared, approx. 6-8" thick. @26ft Grades to SILTY CLAY: Olive-light brown, medium dense, medium moist.	
1605										
	30		B: N38E						@29ft CLAY: Blue-gray, waxy, bentonitic, un-oxidized, caliche pods, internally sheared, internally 3-5" thick.	

SAMPLE TYPES:
- B SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

TYPE OF TESTS:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- CU TRIAXIAL SHEAR
- EI EXPANSION INDEX
- RV R-VALUE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-1 (001)

Date 9-23-03 | Sheet 2 of 3

Project T53419, Golden Valley Estates | Project No. 060954-001

Drilling Co. Roy Brothers Drilling | Type of Rig Flight Auger

Hole Diameter 24" | Drive Weight 1767lbs(0-15ft), 1182(15-30), 757(30-45), 489(45-60) | Drop 18"

Elevation Top of Hole 1633' | Location

Logged By GIM, CAA

Sampled By CAA

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows per Foot	Dry Density pcf	Moisture Content, %	Soil Class (U.S.C.S.)	DESCRIPTION	Type of Tests
	30		N S							
			12NW	R-6	15			SP	@31ft CLAYEY SAND: Yellow-orange, iron stained, fine grained, gradational contact with overlying CLAY, moist-very moist.	
1600			B: N54E, 14NW						@32.5-35ft Grades to coarse grained CLAYEY SAND. Minor caving, very moist, massive, increasingly conglomeratic at the basal contact.	
	35			R-7	15			CL	@ 35ft CLAY: Red-brown, sandy, silty, wavy bedded, locally blocky, approx. 6" thick	
1595			B: N62E, 7NW						@37ft CLAYEY SAND with GRAVEL: Yellow-orange, sandstone conglomerate, GRAVEL up to 1/2" diameter, gradational contact with overlying CLAY.	
	40			R-8	18			CL	@ 39.5ft CLAY: Blue-gray, unoxidized CLAY, moist, medium dense, generally massive.	
1590									@41.5ft CLAYEY SAND: Yellow-orange, coarse-very coarse, grading to GRAVELLY @ the basal contact.	
	45								@45ft CLAY: Blue-gray, approx 8"-1' thick, non-plastic, moist, dense.	
			B: N46E, 15NW						@47ft CLAYEY SILTSTONE: Blue-gray, unoxidized, hard, dense, moist.	
1585	50			R-9	20			ML		
1580										
	55									
1575										
	60									

SAMPLE TYPES:
- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

TYPE OF TESTS:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- CU TRIAXIAL SHEAR
- EI EXPANSION INDEX
- RV R-VALUE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-1 (001)

Date 9-23-03 Sheet 3 of 3

Project T53419, Golden Valley Estates Project No. 060954-001

Drilling Co. Roy Brothers Drilling Type of Rig Flight Auger

Hole Diameter 24" Drive Weight 1767lbs(0-15ft), 1182(16-30), 757(30-45), 489(46-60) Drop 15"

Elevation Top of Hole 1633' Location

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
		N S							Logged By GIM, CAA Sampled By CAA	
	60			R-10	27			ML	@60ft Color change: Blue-gray unox. to yellow-orange oxidized material.	
1573									@62ft CLAYEY SAND with GRAVEL: Blue-gray, coarse grained, very wet, SEEPAGE and CAVING.	
	65									
1565										
	70			R-11	32			SP		
1560										
	75								Total depth drilled 70ft Total depth sampled 71ft Qoly to total depth Seepage encountered at 62ft Backfilled with cuttings Downhole logged to total depth	
1555										
	80									
1550										
	85									
1545										
	90									

SAMPLE TYPES:
- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

TYPE OF TESTS:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- CU TRIAXIAL SHEAR
- EI EXPANSION INDEX
- RV R-VALUE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-2 (001)

Date 9-24-03 Sheet 1 of 3

Project T53419, Golden Valley Estates Project No. 060854-001

Drilling Co. Roy Brothers Drilling Type of Rig Flight Auger

Hole Diameter 24" Drive Weight 1787lbs(0-15ft), 1182(15-30), 757(30-45), 489(45-60) Drop 18"

Elevation Top of Hole 1634' Location

Logged By GIM, CAA

Sampled By CAA

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class (U.S.C.S.)	DESCRIPTION	Type of Tests
	0								Qoh-Quaternary Older Landslide	
									@0-6 SILTY CLAYSTONE: light to medium-brown, low moist, low dense, abundant calcium carbonate pods	
				B-1				ML		
1630	5		B: N32E, 17NW	R-1	4			ML	@4.4ft Abrupt contact with gravelly coarse sand over medium-brown slightly clayey siltstone	
									@6.0-7.0ft increased sand content	
									ef. 1623'	
1625	10		B: N43W, 10NE C: N68E, 10NW S: N72E, 42NW C: N52E, 14NW	R-2	5			CL	@10-10.5ft CLAY, RUPTURE SURFACE, : medium brown/orange, 1/4-1/2" thick, sheared along upper contact; upper contact carbonate-lined, lower contact lined with gypsum	
									@11-11.5ft SANDSTONE: light buff brown	
1620									@11.5ft high angle iron stained surface; CLAY: medium brown, sheared clay, gypsum crystals	
									@13ft SANDSTONE: yellow orange, abrupt contact with overlying clay, some iron staining, poor to medium cementation	
	15			R-3	7			SP		
									@16.5ft CLAYEY SILTSTONE: light olive-brown, distinct upper contact	
1615									@17 & 18ft broken limey beds, continuous around hole	
	20		S: N60W, 42NE	R-4	11			ML	@20ft increased clay content; clayey sandstone SHEAR: High angle gypsum filled shear forming an abrupt contact between SILTY CLAY and overlying SAND.	
1610									@24ft CLAYEY SAND:	
	25			R-5	12			SP	@25ft SHEARS: High angle, discontinuous around boring, truncating on the underlying CLAY.	
			AB: N68E, 10NW						@26ft CLAY: Red-brown over blue-gray, wavy lustet, nonplastic, internally sheared, approx.10"-1' thick	
									@27.5ft CLAYEY SILTSTONE: Blue gray, medium moist, dense, unoxidized with abundant caliche pods	
1605	30									

SAMPLE TYPES:
- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

TYPE OF TESTS:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- CU TRIAXIAL SHEAR
- EI EXPANSION INDEX
- RV R-VALUE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-2 (001)

Date 9-24-03 Sheet 2 of 3

Project T53419, Golden Valley Estates Project No. 060854-001

Drilling Co. Roy Brothers Drilling Type of Rig Flight Auger

Hole Diameter 24" Drive Weight 1767lbs(0-15ft), 1182(15-30), 757(30-45), 489(45-60) Drop 18"

Elevation Top of Hole 1634' Location

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
									Logged By GM, CAA Sampled By CAA	
	30			R-6	13			ML-CL		
									@32ft CLAY: Blue-gray mottled with some red brown. Waxy luster, internally sheared, locally blocky, very similar to the CLAY at 26ft.	
1600									@33.5ft SILTSTONE: Blue-gray, dense, medium moist, same as material from 27.5-32ft. Some crude bedding with alternating modal percentages of SAND and CLAY.	
	35			R-7	13			ML		
1595										
	40			R-8	16			CL		
			B: N68E, 7NW						@42ft GRAVEL bed.	
1590										
	45		B: N74E, 10NW						@45ft GRAVEL bed. @43-47ft Moist walls of coarse grained beds and medium grained sandstone lenses up to 3" thick that pinch out into CLAYEY SILT matrix.	
1585										
	50			R-9	17			ML		
			B: N72E, 13NW						@52ft GRAVEL/COBBLE bed.	
1580										
	55									
1575										
	60									

SAMPLE TYPES:
- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

TYPE OF TESTS:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- CU TRIAXIAL SHEAR
- EI EXPANSION INDEX
- RV R-VALUE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-2 (001)

Date 8-24-03 Sheet 3 of 3

Project T53419, Golden Valley Estates Project No. 060954-001

Drilling Co. Roy Brothers Drilling Type of Rig Flight Auger

Hole Diameter 24" Drive Weight 1767lbs(0-15ft), 1182(15-30), 757(30-45), 489(45-60) Drop 18"

Elevation Top of Hole 1634' Location

Logged By GIM, CAA

Sampled By CAA

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
	60			R-10	22			ML		
1570	65								@63ft LIMEY bed	
1565	70			R-11	27			ML		
1560	75								Total depth drilled 70ft Total depth sampled 71ft Qalt to total depth No seepage or groundwater encountered Backfilled with cuttings Downhole logged to total depth	
1555	80									
1550	85									
1545	90									

SAMPLE TYPES:

- B SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- C GRAB SAMPLE
- SH SHELBY TUBE

TYPE OF TESTS:

- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- CU TRIAXIAL SHEAR
- EI EXPANSION INDEX
- RV R-VALUE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-3 (001)

Date 9-25-03 | Sheet 1 of 3
Project T53419, Golden Valley Estates | Project No. 060954-001
Drilling Co. Roy Brothers Drilling | Type of Rig Flight Auger
Hole Diameter 24" | Drive Weight 1767lbs(0-15ft), 1182(15-30), 757(30-45), 489(45-60) | Drop 18"
Elevation Top of Hole 1644' | Location

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
									Logged By GIM, CAA Sampled By CAA	
	0								Qcol-Quaternary Colluvium/Topsoil SANDY SILTY CLAY: Medium brown, loose, dry.	
				B-1				CL	Tsr-Tertiary Santa Rosa Formation CLAYEY SAND: Olive to light brown, low moisture, low density, abundant caliche at upper contact.	
1640	5			R-1	3			SP	@5ft SANDY SILTSTONE: Olive to medium brown, loose, dry, porous, visible root pores, caliche pods and stringers.	
									@7.5ft CLAY: Olive to light brown, increased density and moisture, gradational upper contact.	
1635	10			R-2	6			CL	@11ft LIMEY bed: Irregular, broken, continuous around boring.	
									@13ft SILTSTONE: Otherwise the same as above.	
1630									@14ft CLAYEY SAND: Otherwise the same as above.	
	15			R-3	8			SP	@15ft SILTSTONE: Firm, dense, otherwise the same as above.	
1625									@19ft LIMEY bed: Broken, continuous around boring. @19.5ft SANDY SILTSTONE: Same as @ 15ft.	
	20			R-4	9			ML		
1620										
	25			R-5	12			ML		
			N30E, 16NW						@26ft CLAYEY SANDSTONE CONGLOMERATE: Olive to light brown, coarse SAND and GRAVEL, subrounded, poorly interbedded.	
1615	30									

SAMPLE TYPES:
- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

TYPE OF TESTS:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- CU TRIAXIAL SHEAR
- EI EXPANSION INDEX
- RV R-VALUE

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-3 (001)

Date 9-25-03 | Sheet 2 of 3

Project T53419, Golden Valley Estates | Project No. 060954-001

Drilling Co. Roy Brothers Drilling | Type of Rig Flight Auger

Hole Diameter 24" | Drive Weight 1767lbs(0-15ft), 1182(15-30), 757(30-45), 489(45-60) | Drop 18"

Elevation Top of Hole 1644' | Location

Logged By GM, CAA

Sampled By CAA

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
	30		N35E, 15NW	R-6	13			ML	@31ft CLAY: Olive, locally blocky, waxy lustre, nonplastic, approx. 2" thick. @31.5ft CLAYEY SILTSTONE: Olive, dense, medium moist, containing broken limey beds.	
1610	35		N26E, 16NW	R-7	15			SP	@35ft LIMEY bed at gradational contact with underlying SAND. @35.9ft SAND: Yellow-orange, iron stained, dense, moist fine grained with some interstitial CLAY.	
1605	40		N43E, 13NW N10E, 14NW	R-8	20			CL	@39ft CLAY: Blue-gray, with white broken limey beds, jumbled, unevenly sheared, waxy luster, locally blocky, gradational upper contact. @42.5ft SANDY CLAYEY SILTSTONE: Color change to gray brown, dense, moist. @44ft Color change to blue-gray. @46ft Color change back to gray-brown.	
1600	45									
1595	50		N29E, 12NW	R-8	25			ML	@48.5ft CLAYEY SAND with GRAVEL: Yellow-light brown, dense, moist, fining up, with GRAVEL bed at the basal contact. @50ft CLAY: Gray-brown over blue-gray, dense, moist, abundant concretionary pods, waxy luster, 2-4" thick.	
1590	55								@53ft CLAYEY SILTSTONE: Medium gray, dense, medium moist.	
1585	60									

SAMPLE TYPES:
- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

TYPE OF TESTS:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- CU TRIAXIAL SHEAR
- EI EXPANSION INDEX
- RV R-VALUE

GEOTECHNICAL BORING LOG B-3 (001)

Date 9-25-03 Sheet 3 of 3

Project T53419, Golden Valley Estates Project No. 060954-001

Drilling Co. Roy Brothers Drilling Type of Rig Flight Auger

Hole Diameter 24" Drive Weight 1797lbs(0-15ft), 1182(15-30), 757(30-45), 489(45-60) Drop 18"

Elevation Top of Hole 1644' Location

Logged By GIM, CAA

Sampled By CAA

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
	60			R-9	30			ML	@61ft. LIMEY bed.	
1580	65			R-10	34			CL		
1575	70								Total depth drilled 65ft. Total depth sampled 66ft Qnb to total depth No seepage or groundwater encountered Backfilled with cuttings Downhole logged to total depth	
1570	75									
1565	80									
1560	85									
1555	90									

SAMPLE TYPES:

- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- SH SHELBY TUBE

TYPE OF TESTS:

- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- CU TRIAXIAL SHEAR
- EI EXPANSION INDEX
- RV R-VALUE

LEIGHTON AND ASSOCIATES, INC.

DRILL HOLE LOG

BORING NO. B-7

PROJECT: Lewisville East — JOB NO.: 99-1662-Y

DATE:

DRILLING COMPANY/DRILLER: Tri Valley Drilling / DAVE

METHOD OF DRILLING/HOLE DIAMETER (in.): 24" Bucket Auger

HAMMER TYPE: Trackhoe Bolly Bar — AVERAGE DROP (in.): 12"

DRIVING WEIGHTS: Same As B-1 thru 5

ELEVATION: — LOGGED BY: DSE/BJB/MES

DEPTH (Feet)	SAMPLE TYPE	BLOWS / 6"	GRAPHIC LOG	ATTITUDES	USCS SYMBOL	Description Soils: description; consistency/density; moisture; color; other Bedrock: color, lithology; hardness; moisture; other	Remarks
						Soil (0-4')	
						0-6" LIGHT BROWN-BROWN SILTY SANDY CLAY; FIRM; SLIGHTLY DAMP; ROOTS; ORG. DEBRIS STAIN	
						ALLUVIUM; QAL (6"-15')	
						6-6" GRAY-OLIVE-YELLOWISH-BROWN SANDY SILTSTONE WITH GRAVEL; SLIGHTLY SOFT AND WEATHERED; SLIGHTLY DAMP; PARTIALLY STRONGLY DISTURBED	
						6-3' DARK GREYISH-BROWN SANDY MUDSTONE SLIGHTLY WEATHERED BY DISTURBED SANDSTONE AND SILTSTONE STRINGERS; MUDSTONE SLIGHTLY SHEARED AND WEATHERED	
						@ 4.5' MOTTLED OLIVE-GRAY TO YELLOWISH-BROWN SANDY MUDSTONE	
						@ 6' GRADES TO YELLOWISH-BROWN PEBBLY SANDY MUDSTONE WITH SCATTERED CONCRETIONS & TEXTURES; LITHOLOGY SIMILAR ABOVE DSW	
						@ 12' GRADES SAME; STILL SLIGHTLY SOFT AND WEATHERED STRONG	
						LANDSLIDE?; QLS? (13'-75')	
						@ 15' IRREGULAR CONTACT WITH MOTTLED OLIVE-GRAY TO YELLOWISH-BROWN MUDSTONE; STIFF; DAMP; SMALL GRAVEL	
						@ 18' GRADES TO FINE SILTY SANDSTONE	
						@ 18.5' DISCONTINUOUS YELLOWISH-GRAY SANDSTONE INTERBED	
						@ 21' DISCONTINUOUS SANDSTONE INTERBED WITH BEDDING AS POORLY SORTED YELLOWISH-GRAY SILTY PEBBLY SANDSTONE; SLIGHTLY DAMP	
						@ 23' SHARP IRREGULAR CONTACT WITH OLIVE-GRAY TO BROWN FINE SANDY SILTSTONE	
						@ 24.5' OLIVE-GRAY SILTY SANDSTONE AND SANDY SILTSTONE WITH THIN, DISCONTINUOUS, YELLOWISH-GRAY SANDSTONE STRINGERS AND/OR BEDS	
						@ 28' MORE FRACTURES	
						@ 31' YELLOWISH-TO OLIVE-GRAY LAMINATED SILTSTONE AND FINE SANDY SILTSTONE; INTERBEDDED HARD TO HARD	
						@ 34' GRADES TO YELLOWISH-GRAY, MEDIUM-TO HARD-FRACTURED SANDSTONE	
						@ 37' FRACTURED CONTACT WITH OLIVE-GRAY FINE SANDY SILTSTONE AND SANDY SILTSTONE BEDS AND MORE DISCONTINUOUS BEDS	
						@ 39' BROWN PEBBLY SILTY SANDSTONE; BADLY SORTED	

PRELIMINARY LOG SUBJECT TO REVISION

Remarks: BIAS RINSED AS DRILLING WATER ON 5/11/99; @ 5' GRAB SAMP; @ 0-15' MIXED BAG SAMPLE; NO DISTINCT SHEAR PLANE; DISCONTINUOUS SAND BEDS ARRAY TO FORM SEMI-CONTINUOUS SAND SAMPLE BOREHOLE

Structure; pri-sec
Induration
Moisture
JOB NO. 99-112-5
LOGGED BY BLS/AGS

Firm
Stiff
Hard

Moderately Dense
Dense
Very Dense

Moist
Wet
Saturated

Sltst - siltstone
Ms - mudstone
Sh - Shale

Cl(y) - Clay (clayey)

PROJECT Tomerlins East Site

Trench Log No. 28

DATE

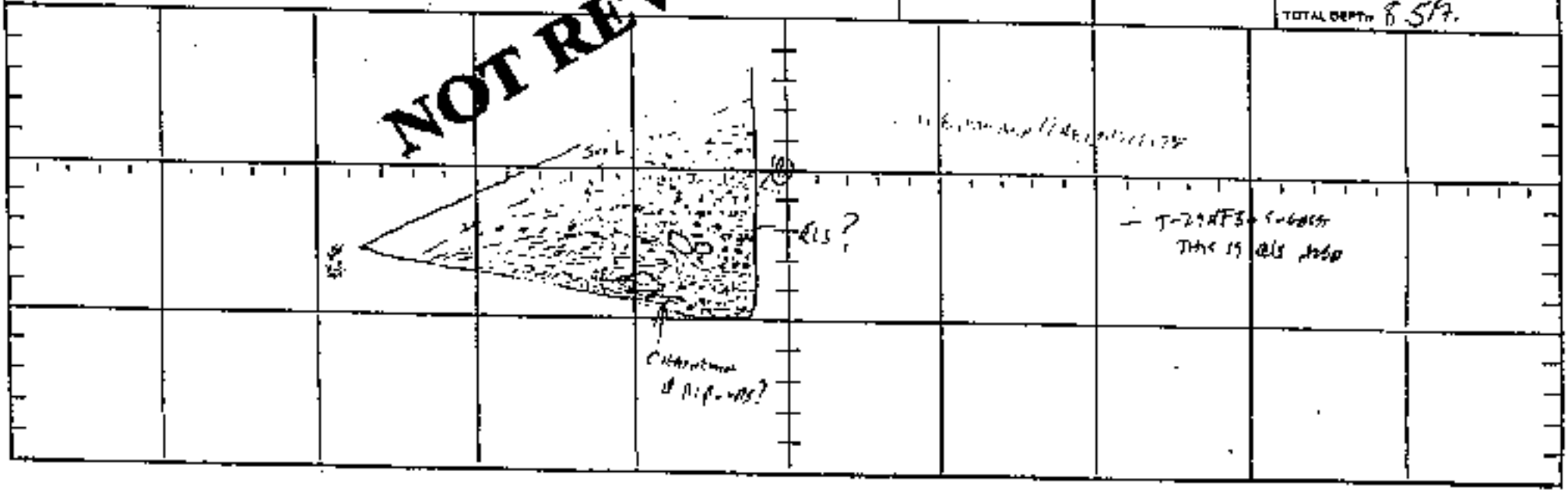
LITHOLOGY	BEDDING	OTHER	COMMENTS
0-1' Soil; Brown sandy pebbly silty; dry to moist 1-8.5' Knoxville? QLS?, yellowish-to light-to medium-brownish-gray sandstone, pebbly sandstone and pebbly to boul. mudstone/lithic, and laminated-thin sandstone and sandy mudstone; upper 3 ft. weathered and cracks affected, w/ vegetation roots below; slightly damp to damp in weathered zone,	APX N35E, 10 NW (some var)		BEDDING IS LAMINATION & DISCONTINUOUS NATURE THE RESULT OF SEDIMENTARY AND DEFORMATIONAL PROCESSES ACROSS MOISTURE NO GROUNDWATER NO CAVING TOTAL DEPTH 8.5ft.

PRELIMINARY DATA SUBJECT TO REVISION

NOT REVIEWED

SCALE 1" = 5'

N BLE



Co_site_____ s
Structure; pri-sec Firm
Induration Stiff
Moisture Hard

ss
Moderately Dense
Dense
Very Dense

amp
Hoist
Wet
Saturated

s co_ mer
Sltst - siltstone
Ms - mudstone
Sh - shale

(y) Si_ sil_
Cl(y) - Clay (clayey)

JOB NO. 99-1662-4

LOGGED BY GLS/AES

PROJECT Fumigation East Site

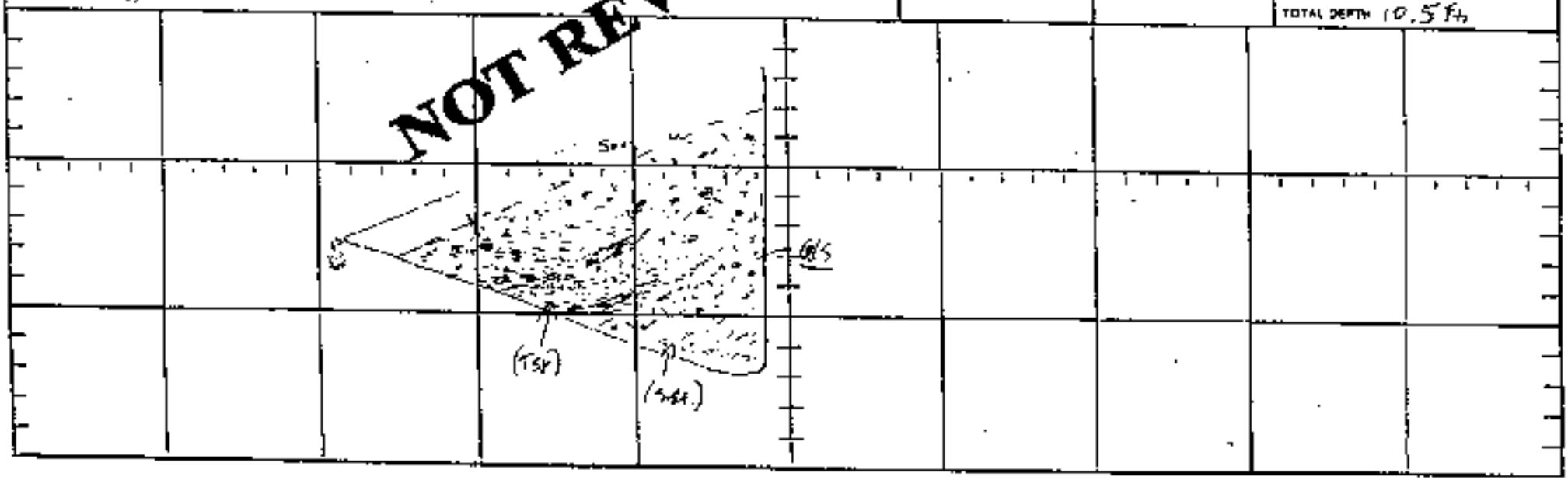
Trench Log No. 79

DATE

LITHOLOGY	BEDDING	OTHER	COMMENTS
0-1.5' Soil; Grayish-brown MOIST POORLY SORTED SAND; LOOSE TO FIRM, SLIGHTLY DAMP TO DAMP 1.5-10.5' SANDSTONE (SS), MIXTURE OF DISRUPTED TSF LITHOLOGIES, INCLUDING LIGHT-GRAY TO MEDIUM - BROWN MODERATELY AND VERY CARBONATE-RICH SILTSTONE AND SANDY SILTSTONE, AND POORLY SORTED YELLOWISH-GRAY TO GRAY SILTY POORLY SORTED SAND WITH SMALL PEBBLES AND CALICHIFICATION; MODERATELY DENSE TO VERY DENSE, SLIGHTLY DAMP, VERY DIFFICULT DIGGING IN UPPER 3FT			GLS CONSISTS OF DISTURBED AND SURFACE MATERIAL; POSSIBLE SURFACE FRACTURE NO GROUNDWATER OR CAVING TOTAL DEPTH 10.5 Ft

NOT REVIEWED
PRELIMINARY DATA SUBJECT TO REVISION

SCALE 1" = 5'



Composition: Soft
Structure; pri-sec: Firm
Induration: Stiff
Moisture: Hard

Loose
Moderately Dense
Dense
Very Dense

Damp
Moist
Wet
Saturated

Cg - conglomerate
Sltst - siltstone
Ms - mudstone
Sh - shale

Sdy (sandy) Slty (silty)
Cly) - Clay (clayey)

JOB NO. 99-1662-4

LOGGED BY GLS/PBS

PROJECT Tunneling East Side

DATE

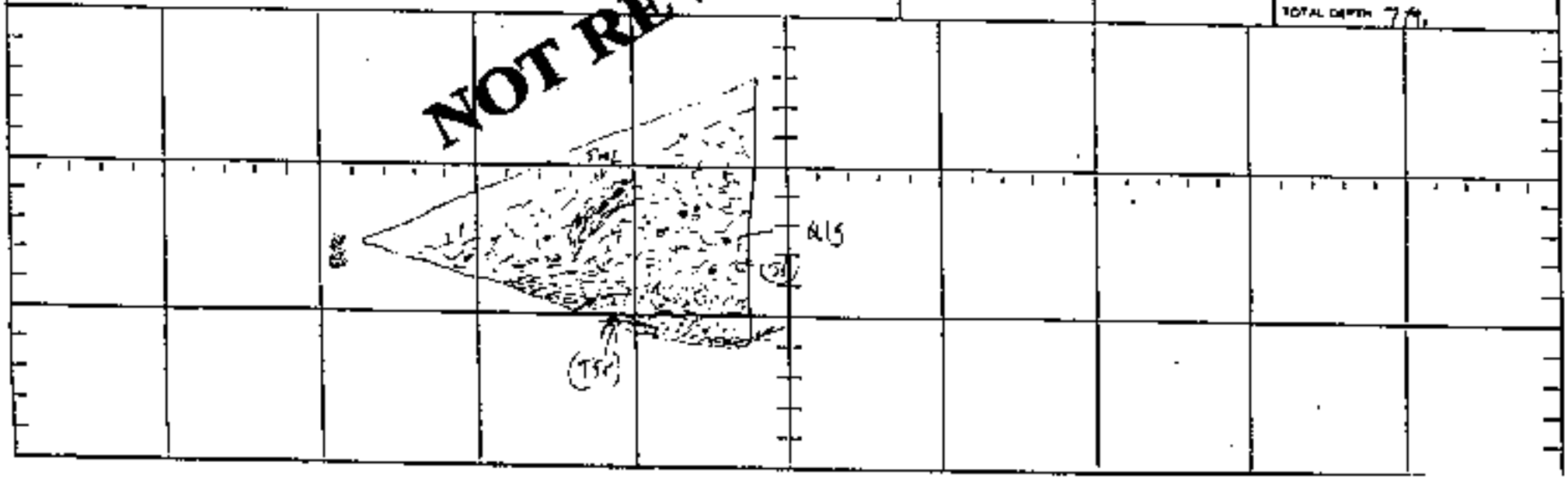
Trench Log No. 30

LITHOLOGY	BEDDING	OTHER	COMMENTS
0-1' Soil; Brown muddy peaty sand; soft; damp 1-9' Landslide; GLS; Disturbed mix of TSr bedrock and surficial material including olive-brown sandy silt and mudstone and yellowish-brown silty peaty sand with local pebbly, modification layers; stratification hard to determine; damp; fractures are common; bedding is hard to find and distinguish			No groundwater encountered TOTAL DEPTH 7'

NOT REVIEWED
PRELIMINARY DRAFT
SUBJECT TO REVISION

SCALE 1" = 5'

N42W



Composition — Soft
Structure; pri-sec — Firm
Induration — Stiff
Moisture — Hard

Loose — Damp
Moderately Dense — Moist
Dense — Wet
Very Dense — Saturated

Cg — Conglomerate
Sltst - siltstone
Ms - mudstone
Sh - shale

(y) — Sil. (silty)
Cly) - Clay (clayey)

JOB NO. 99-1662-4

LOGGED BY GLS/MES

Trench Log No. 10

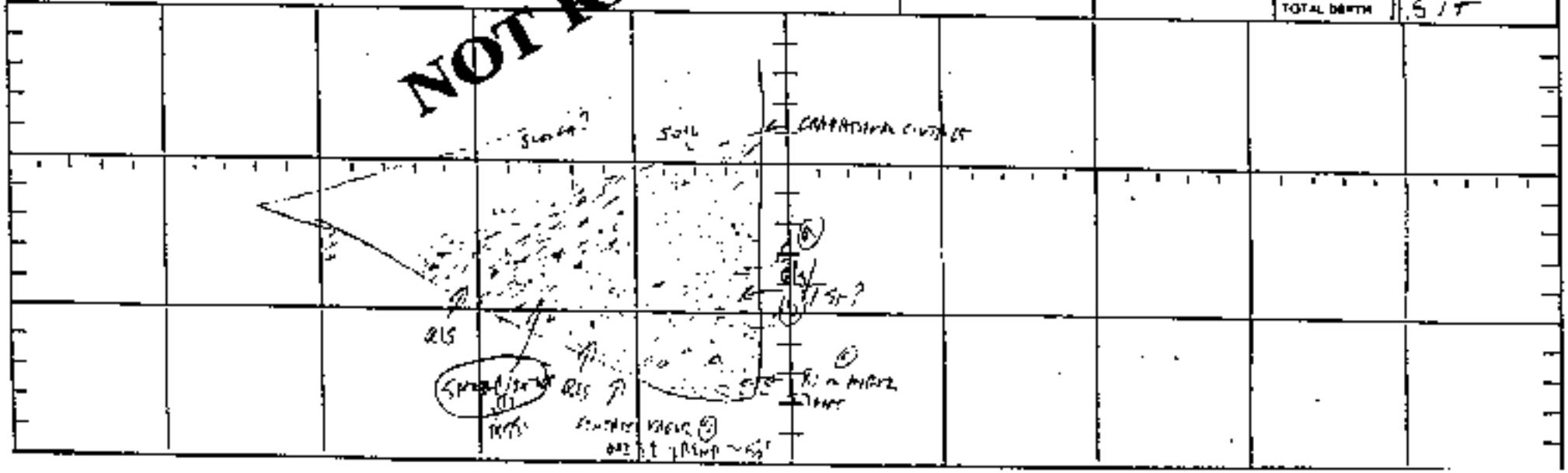
PROJECT Pinedrive East Site

DATE

LITHOLOGY	BEDDING	OTHER	COMMENTS
0 - 1' Slope?			Trenches 7 thru 10 Examined with a Trimble and logged on 9/16/99
1 - 2.5' Soil; Brown to moderate brown sandy mud; stiff; damp			
2.5 - 5.5' Landslide; OS, moderate brown mudstone and fine sandstone clasts to 10 cm. Brown siltstone bedding sandstone; moderately weak to strong; mudstone is moderately hard; damp; minor gouge pod		Orient ① N65E,43 NW Apc ② N25E,56 NW	
5.5 - 11.5' Landslide/ Bedrock; Qls? Tsr? Light brown-light gray clayey siltstone, yellowish-gray silty sandstone and yellowish-gray sandstone and pebble conglomerate w/ hard casings, brittle to moderately hard; sandstone is friable soft; damp	④ N75E,4 NW ⑤ N-S,5 W ⑥ Inclinometer		Bulk sample of sandy material collected.
			No groundwater encountered TOTAL DEPTH 11.5 ft

NOT REVIEWED
PRELIMINARY DRAFT
SUBJECT TO REVISION

SCALE 1" = 5'


N75W
Slope?
Soil
Colluvium
Qls?
Qls
Sandstone
Qls?
Sandstone
Qls?
Sandstone
Qls?

APPENDIX C

SLOPE STABILITY ANALYSIS

TABLE C-1
Design Shear Strength Parameters for Slope Stability Analyses

Material	Cohesion (lb/ft^2)		Angle of Internal Friction (Degrees)		Saturated Bulk Density (lb/ft^3)
	Ultimate	Peak	Ultimate	Peak	
Engineered Fill (Af)*	325	-	30	-	120
Alluvium (Qal)*	350	-	28	-	120
Existing Fill – Tract 53419**	237	-	30	-	125
Landslide Plane**	100	8	120	12	120
Landslide Material (Qols)**	160	30	200	33	125
Bedrock/Saugus Formation (Tsr) Along Bedding*	250	375	18	19	125
Bedrock/Saugus Formation (Tsr) Cross Bedding*	600	-	32	-	125

*Values from RTF&A, January 6, 2003
**Values for off-site existing fill, landslide rupture surface, and landslide material from Leighton and Associates, Inc, November 19, 2003 report for Tract 53419

TABLE C-2

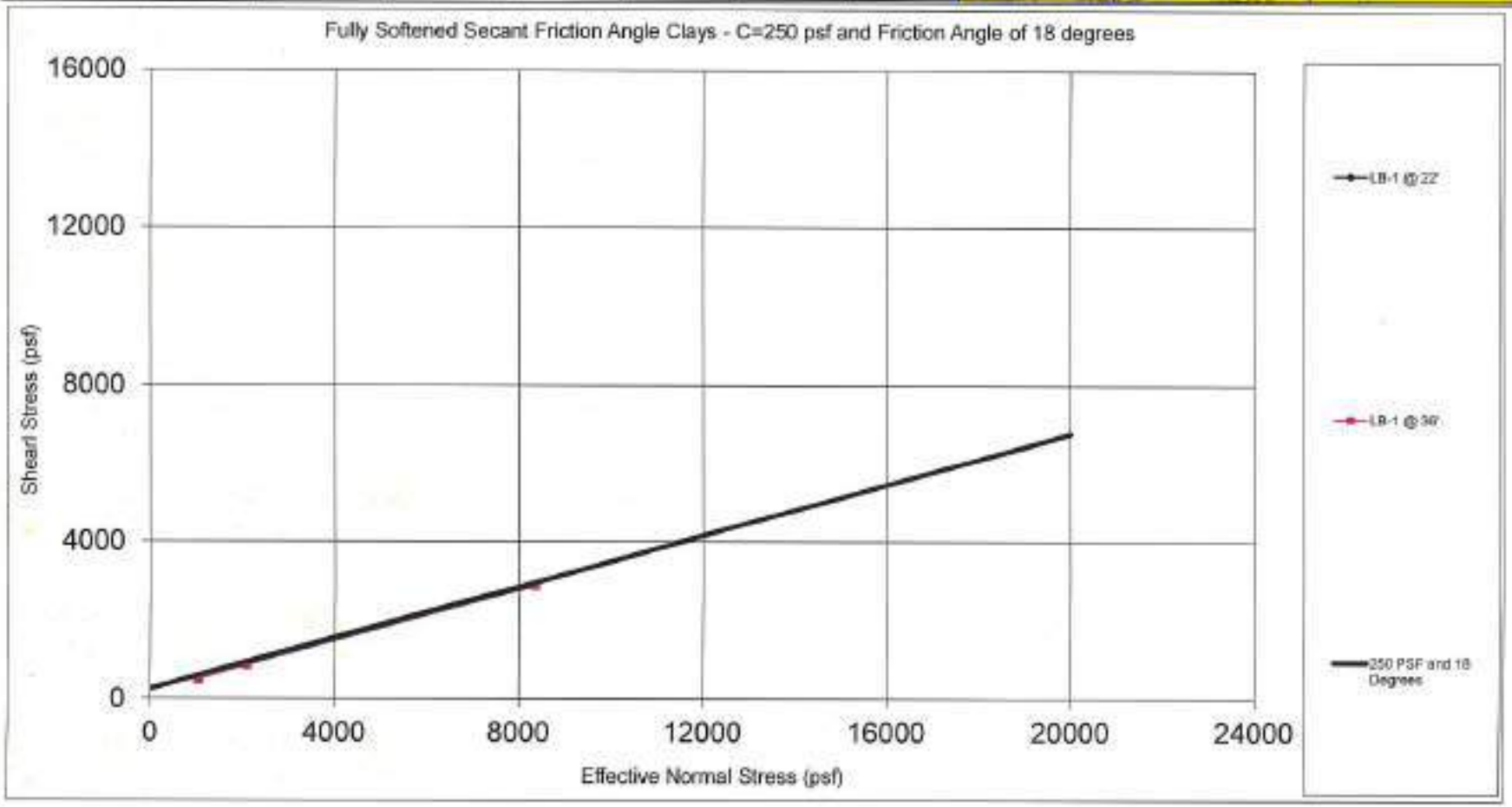
Summary of Slope Stability Analyses

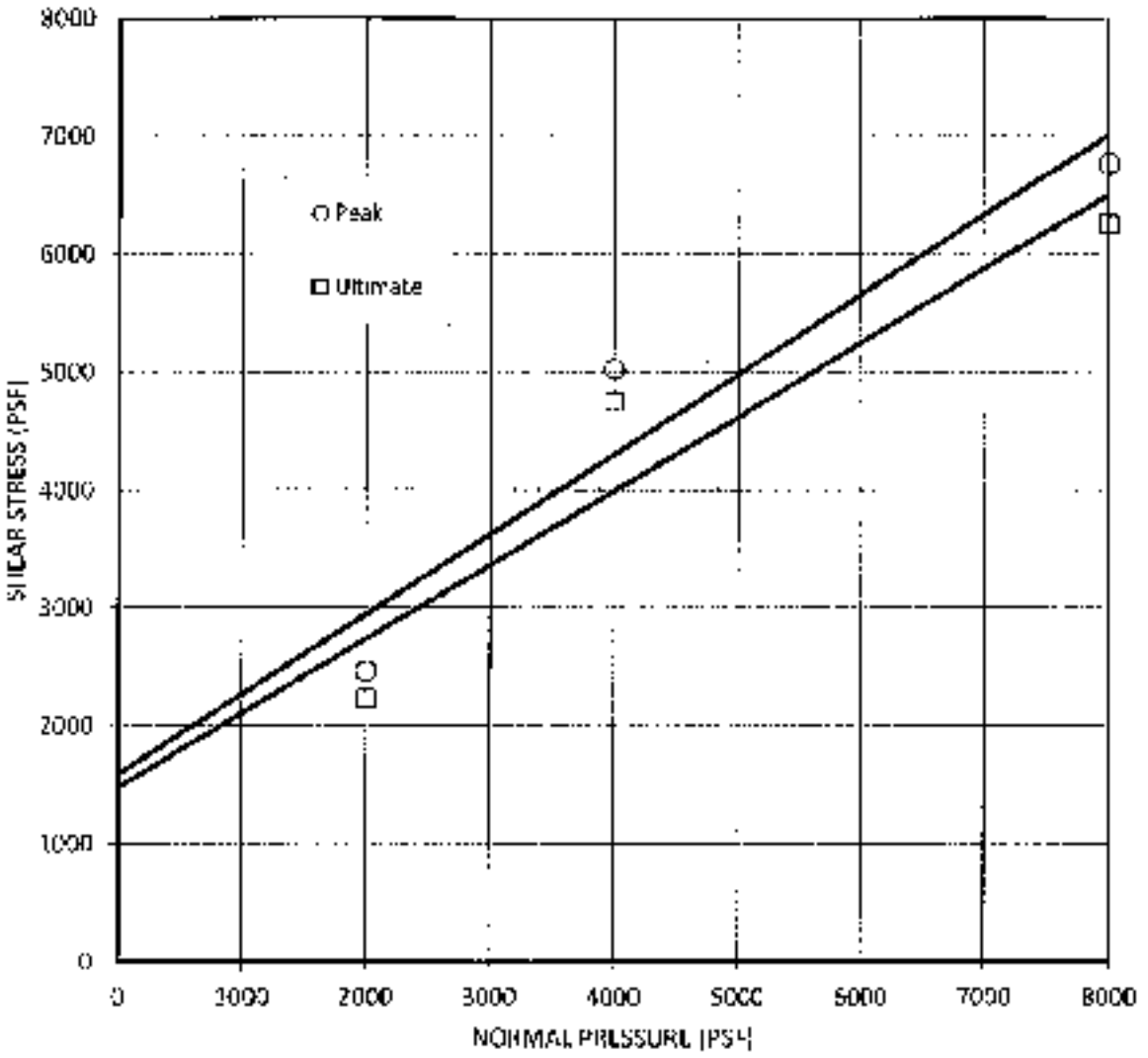
Cross-Section	Condition	Factor of Safety	Remarks
Q-Q’	Global Stability, Rotational, Static	1.93	Modified Bishop Method
Q-Q’	Global Stability, Rotational, Pseudostatic	1.34	Modified Bishop Method
Q-Q’	Global Stability, Translational, Static	2.20	Simplified Janbu Method
Q-Q’	Global Stability, Translational, Pseudostatic	1.40	Simplified Janbu Method
Q-Q’	Lower Slope Stability, Translational, Static	1.51	Spencer Method
Q-Q’	Lower Slope Stability, Translational, Pseudostatic	1.13	Spencer Method
Q-Q’	Left Temporary Stability, Rotational, Static	1.87	Modified Bishop Method
Q-Q’	Right Temporary Stability, Rotational, Static	1.39	Modified Bishop Method
Q-Q’	Right Temporary Stability, Translational, Static	1.26	Spencer Method
4-4’	Global Stability, Rotational, Static	1.89	Modified Bishop Method
4-4’	Global Stability, Rotational, Pseudostatic	1.41	Modified Bishop Method
4-4’	Global Stability, Translational, Static	1.52	Spencer Method
4-4’	Global Stability, Translational, Pseudostatic	1.12	Spencer Method
4-4’	Behind Key Stability, Translational, Static	1.93	Simplified Janbu Method
4-4’	Behind Key Stability, Translational, Pseudostatic	1.18	Simplified Janbu Method
4-4’	Left Temporary Stability, Rotational, Static	1.84	Modified Bishop Method
4-4’	Left Temporary Stability, Translational, Static	1.30	Simplified Janbu Method
4-4’	Right Temporary Stability, Rotational, Static	1.25	Modified Bishop Method

FULLY SOFTENED SECANT FRICTION ANGLE

STARK, CHOI, and Mccone (2005) Residual Strength Estimator

Sample Location		Stark & McCone (2001)						FULLY SOFTENED SECANT FRICTION ANGLE		
Boring/Depth	Number	CF (ASTM)	LL (ASTM)	CF Conv.	LL Conv.	CF (ball)	LL (ball)	1045 (50)	2090 (100)	8350 (400)
LB-1 @ 22'	1	64	60	1.11	1.41	71.0	84.6	25.5	22.2	19
LB-1 @ 36'	2	71	61	1.11	1.41	78.8	86.2	25.6	22.4	19.1





Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
LB-1	R-10	50.0	Rock	Bedrock	○	1590	34
					□	1478	32

SANDSTONE

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
2000	2.8	14.5
4000	2.8	12.0
8000	2.8	11.3

EGLAB, INC.

Project Name: Vollrath / LDC

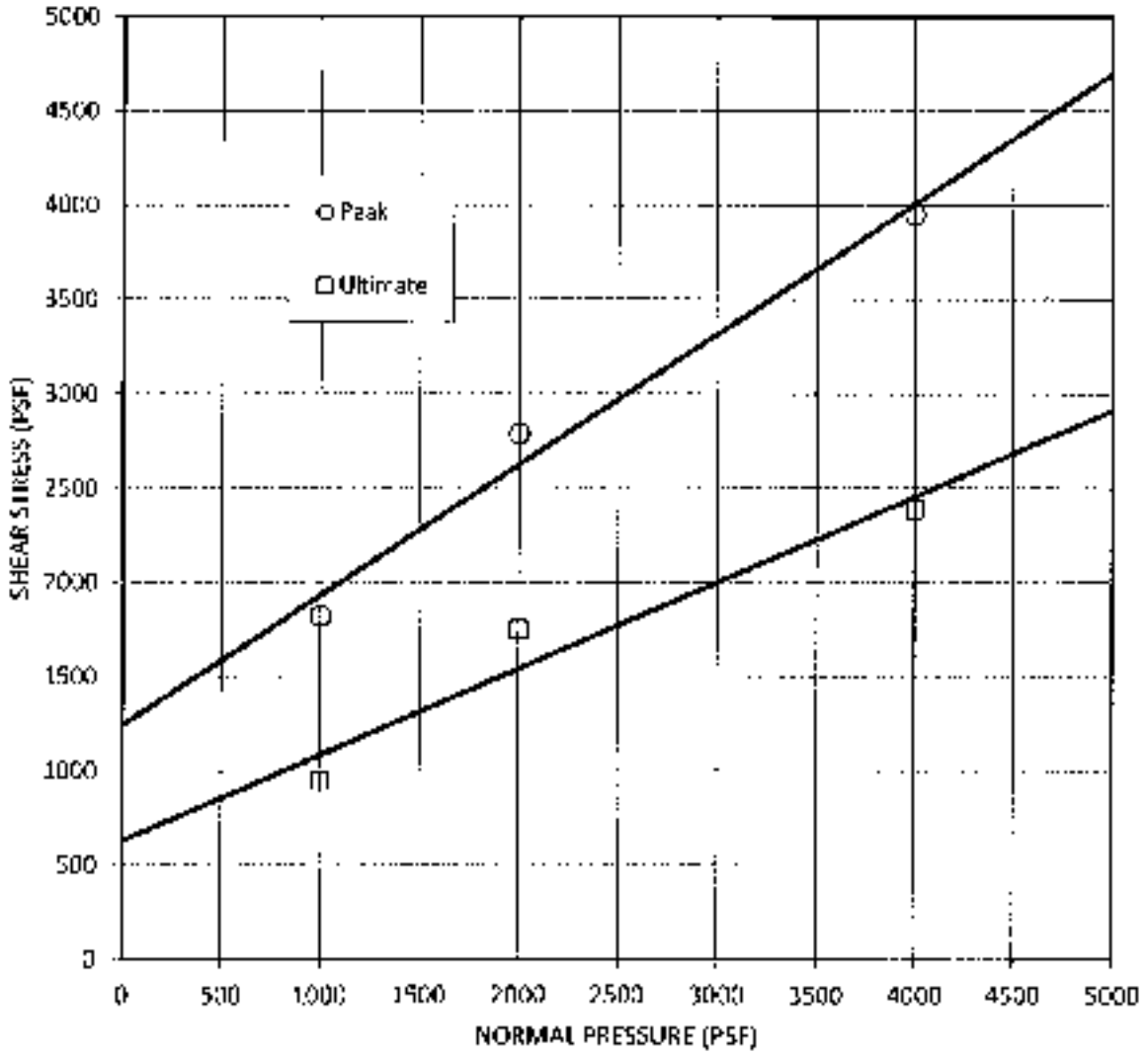
Client: LGC Valley, Inc.

Project No.: 308500-01

EGLAB Project No.: 20 009-011

DIRECT SHEAR

10/20 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
LB-1	R-9	45.0	Ring	Bedrock	○	1242	35
					□	629	25

SILTSTONE

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
1000	19.3	27.0
2000	19.3	23.7
4000	19.3	23.2

EGLAB, INC.

Project Name: Veluzat / LGC

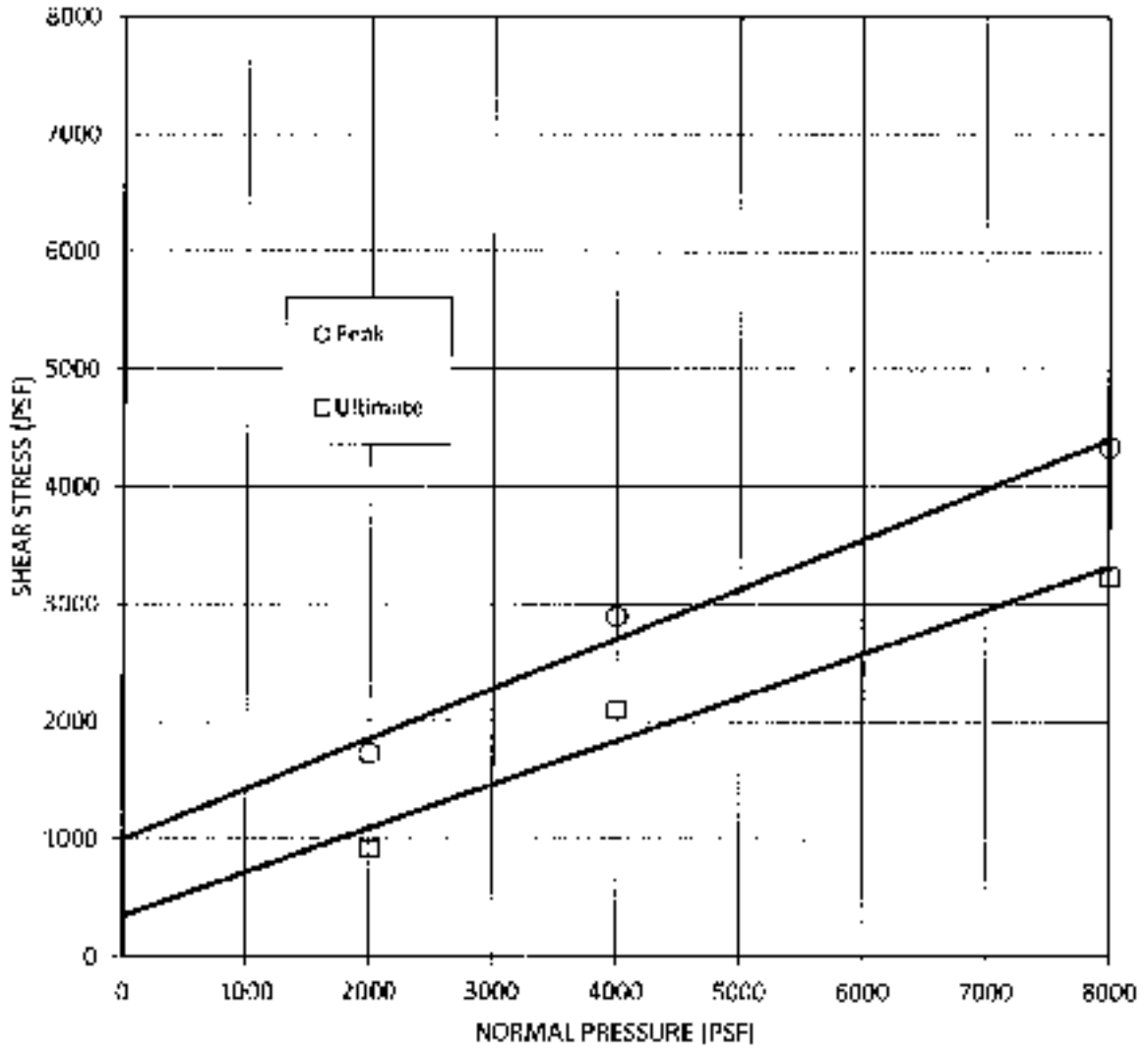
Client: LGC Valley, Inc.

Project No.: 205008-01

EGLAS Project No.: 20-069-011

DIRECT SHEAR

10/20 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
LB-1	R 13	65.0	Ring	Bedrock	○	1004	23
					□	346	20

CLAY STONE

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
2000	21.0	30.9
4000	21.0	31.4
8000	21.0	27.8

EGLAB, INC.

Project Name: Vellano / LDC
Client: SGC Valley, Inc.
Project No.: 209308 01
EGLAB Project No.: 20 009 011

DIRECT SHEAR

10/20 (ASTM D3080) Figure

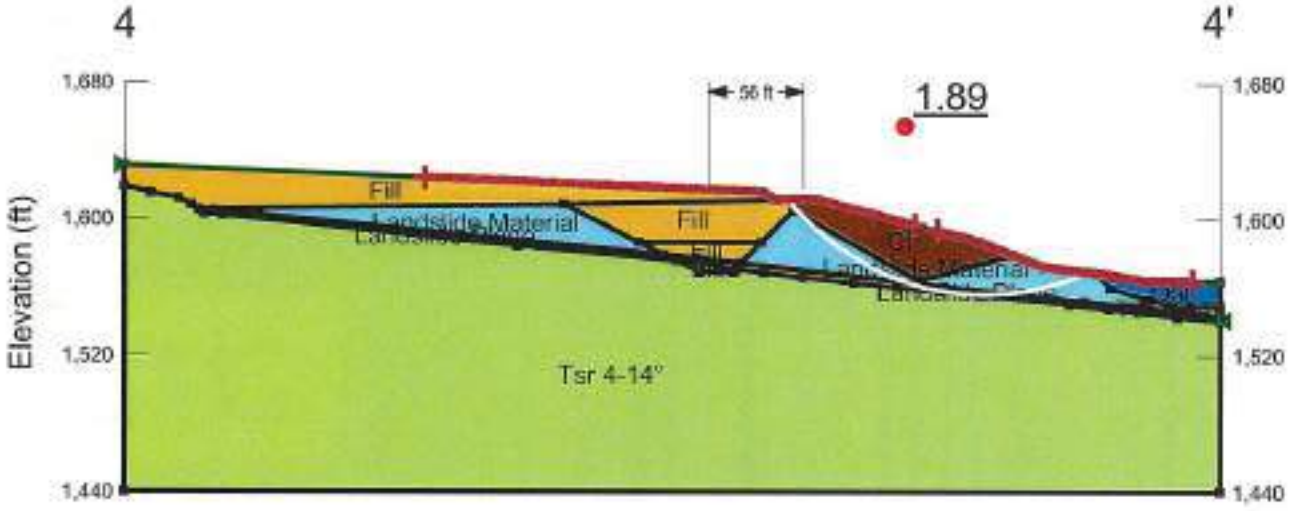
Section 4-4 Tr 68203 SSA MW 12-2 B.gsz

Horz Seismic Coef.: 0

1 -Rotational Static Global

Section 4-4 Tr 68203 SSA MW 12-2 B.gsz 12/02/2021 09:00:33 AM

Method: Bishop



Name: Cf
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 237 psf
Phi': 30 °

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Landslide Material
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 160 psf
Phi': 30 °

Name: Landslide Plane
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 8 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

28532 Constellation Rd, Valencia, CA 91355

Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	**203003-01**
Engineer:	**BIH / MW**
Date:	**Dec 2021**

1 -Rotational Static Global

File Information

File version: 10.0
Title: Model
Created By: Michael Wilson
Last Revised By: Michael Wilson
Revision Number: 203
Date: 1/10/2021
Time: 09:06:33 AM
Tool Version: 10.0.0.17401
File Name: Section A-A' for 08209 SSA NEW 12 2 8.gsz
Directory: P:\P NA_PROJECTS\Vertical Golden Valley Service Hydrologic Analysis\Vertical
Last Solved Date: 12/22/2020
Last Solved Time: 09:09:42 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Static Global

Slope/W
Method: Bishop
Settings
PWP Conditions Source: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack (none)
Distribution
Slice Calculation Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable difference in F of S: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 225 psf
Phi: 30 °
Phi-B: 0 °

Landslide Material

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 150 psf
Phi: 30 °
Phi-B: 0 °

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 300 psf
Phi: 5 °
Phi-B: 0 °

Tsr 4-14"

Model: Anisotropic Fit
Unit Weight: 125 pcf
Cohesion: 600 psf
Phi: 32 °
Phi-Anisotropic Strength Ratio: for 18° bedding 4-14"
Cohesion Anisotropic Strength Ratio: for 360 bedding 4-14"
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 450 psf
Phi: 28 °
Phi-B: 0 °

Cf

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 237 psf
Phi: 30 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (375.5182, 1,624.1512) ft
Left-Zone Right Coordinate: (467.30583, 1,596.3828) ft
Left-Zone Increment: 30
Right Type: Range
Right-Zone Left Coordinate: (477.16771, 1,592.807510) ft
Right-Zone Right Coordinate: (624.39845, 1,563.720) ft

Right Zone: [illegible]

Radius Increments: 10

Slip Surface Limits

Left Coordinate: (40.24894, 1,631.6796) ft

Right Coordinate: (611.09817, 1,540.4281) ft

Seismic Coefficients

Horz Seismic Coef.: 0

Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function

Function: Modifier Factor vs. Inclination

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 1

Data Points: Inclination (°), Modifier Factor

Data Point: (3.99, 1)

Data Point: (4, 0.6167)

Data Point: (14, 0.4167)

Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function

Function: Modifier Factor vs. Inclination

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 1

Data Points: Inclination (°), Modifier Factor

Data Point: (3.99, 1)

Data Point: (4, 0.5615)

Data Point: (14, [illegible])

Data Point: (14.01, 1)

Points

	X	Y
Point 1	53.82088 ft	1,611.9763 ft
Point 2	-0.00371 ft	1,619.1805 ft
Point 3	110.8173 ft	1,643.1167 ft
Point 4	641.00427 ft	1,440.0038 ft
Point 5	641.00427 ft	1,540.428 ft
Point 6	615.74964 ft	1,541.7550 ft
Point 7	575.40827 ft	1,547.4178 ft
Point 8	552.23805 ft	1,550.2826 ft

Point 9	508.66435 ft	1,555.3051 ft
Point 10	476.49747 ft	1,557.8325 ft
Point 11	453.21596 ft	1,560.3002 ft
Point 12	426.26243 ft	1,562.7313 ft
Point 13	406.2331 ft	1,566.0367 ft
Point 14	374.88573 ft	1,568.8201 ft
Point 15	357.56[illegible].41 ft	1,571.1093 ft
Point 16	451.74805 ft	1,568.0529 ft
Point 17	229.57587 ft	1,536.306 ft
Point 18	27.65409 ft	1,601.7885 ft
Point 19	46.86744 ft	1,604.5564 ft
Point 20	29.03055 ft	1,608.2571 ft
Point 21	15.41757 ft	1,615.1354 ft
Point 22	48.24017 ft	1,606.662 ft
Point 23	70.53956 ft	1,607.3499 ft
Point 24	92.5255 ft	1,604.8394 ft
Point 25	397.08526 ft	1,611.6503 ft
Point 26	300.26727 ft	1,574.2585 ft
Point 27	479.88467 ft	1,560.0107 ft
Point 28	508.32444 ft	1,551.9199 ft
Point 29	390.66019 ft	1,548.8337 ft
Point 30	558.94254 ft	1,557.9251 ft
Point 31	576.73492 ft	1,559.9277 ft
Point 32	569.29259 ft	1,568.308 ft
Point 33	558.[illegible].70 ft	1,571.8128 ft
Point 34	538.65[illegible].61 ft	1,578.0857 ft
Point 35	498.[illegible].32 ft	1,580.9956 ft
Point 36	404.[illegible] ft	1,611.2386 ft
Point 37	46.58[illegible] ft	1,604.[illegible] ft
Point 38	641.00013 ft	1,543.5288 ft
Point 39	596.71358 ft	1,565.7007 ft
Point 40	641.00013 ft	1,541.[illegible] ft
Point 41	641.[illegible] ft	1,548.[illegible] ft
Point 42	623.99618 ft	1,548.7304 ft
Point 43	612.80351 ft	1,549.[illegible] ft
Point 44	598.[illegible] ft	1,[illegible] ft
Point 45	458.[illegible] ft	1,564.[illegible] ft
Point 46	456.65414 ft	1,564.5273 ft
Point 47	380.67181 ft	1,511.2357 ft
Point 48	372.85338 ft	1,[illegible] ft
Point 49	-0.24894 ft	1,631.6796 ft
Point 50	372.42616 ft	1,585.6397 ft
Point 51	955.81187 ft	1,561.0616 ft
Point 52	259.08715 ft	1,608.6108 ft
Point 53	300.0785 ft	1,586.6357 ft
Point 54	815.13949 ft	1,575.4461 ft
Point 55	822.56821 ft	1,573.5858 ft

Regions

	Material	Points	Area
Region 1	Fill 4-14°	2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,1,2	86 458 ft²
Region 2	Landslide Material	23,24,25,26,27,28,29	2,193.3 ft²
Region 3	Landslide Material	26,27,28,29,30,31,32,33,34,35,43,44,50	9,668.7 ft²
Region 4	Landslide Plane	23,30,37,38,37,50,24,25	819.73 ft²
Region 5	Landslide Plane	15,26,27,28,29,35,36,37,38,9,10,11,12,13,14	4,81.57 ft²
Region 6	Soil	32,35,40,41,42,44,50,33	928.76 ft²
Region 7	Fill 4-14°	25,43,43,47,41,35	173.0e ft²
Region 8	Of	45,44,45,46,34,35,36	2,588.4 ft²
Region 9	Fill	47,48,49,2,21,20,22,52	5,588.6 ft²
Region 10	Fill	54 55,15,20	327.18 ft²
Region 11	Fill	52,55,50,44,25,47	4,506.3 ft²
Region 12	Fill	55,16,53,15	104.19 ft²
Region 13	Fill	50 5a,54,1b	571.13 ft²

Slip Results

Slip Surfaces Analyzed: 58893 of 98415 converged

Current Slip Surface

Slip Surface: 72,412
Factor of Safety: 1.39
Volume: 8,046.1378 ft³
Weight: 506,338.72 lb
Resisting Moment: 32,424,071 lbf ft
Activating Moment: 17,161,058 lbf ft
Slip Surface: Cut 98,415 slip surfaces
Left: (561.47979, 1,518.5003) ft
Entry: (587.79448, 1,611.4490) ft
Radius: 167.748 ft
Center: (502.96809, 1,703.2396) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	589.97107 ft	1,408.9581 ft	0 psf	72.136425 psf	43.640684 psf	325 psf	0 psf	Fill
Slice 2	595.71259 ft	1,404.5129 ft	0 psf	344.41357 psf	334.81670 psf	237 psf	0 psf	Of
Slice 3	395.10758 ft	1,401.7837 ft	0 psf	869.84108 psf	590.45099 psf	160 psf	0 psf	Landslide Material
Slice 4	400.61468 ft	1,397.4743 ft	11 psf	1,385.9764 psf	744.1125 psf	160 psf	0 psf	Landslide Material
Slice 5	407.1955 ft	1,392.4511 ft	0 psf	1,525.7221 psf	1,034.6565 psf	160 psf	0 psf	Landslide Material

Slice 5	[illegible] ft	[illegible] ft	[illegible]	[illegible] psf	[illegible] psf	[illegible]	[illegible]	Material
Slice 6	413.10234 ft	1,586.6128 ft	0 psf	2,205.5732 psf	1,270.3885 psf	160 psf	0 psf	Landslide Material
Slice 7	419.04617 ft	1,587.2594 ft	0 psf	2,547.8588 psf	1,468.6076 psf	160 psf	0 psf	Landslide Material
Slice 8	424.99 ft	1,578.481 ft	11 psf	2,583.7578 psf	1,641.8414 psf	160 psf	0 psf	Landslide Material
Slice 9	430.93585 ft	1,574.617 ft	0 psf	3,107.077 psf	1,788.8737 psf	160 psf	0 psf	Landslide Material
Slice 10	436.87766 ft	1,571.656 ft	0 psf	3,515.909 psf	1,975.4975 psf	160 psf	0 psf	Landslide Material
Slice 11	442.82149 ft	1,568.8521 ft	0 psf	3,929.661 psf	2,097.8362 psf	160 psf	0 psf	Landslide Material
Slice 12	448.76532 ft	1,566.2581 ft	0 psf	3,781.0193 psf	2,151.284 psf	160 psf	0 psf	Landslide Material
Slice 13	454.70915 ft	1,563.7156 ft	11 psf	3,820.9054 psf	2,205.6548 psf	160 psf	0 psf	Landslide Material
Slice 14	460.65843 ft	1,562.2585 ft	0 psf	4,188.8698 psf	568.20726 psf	100 psf	0 psf	Landslide Plane
Slice 15	464.40946 ft	1,560.9626 ft	0 psf	4,214.5398 psf	592.27732 psf	100 psf	0 psf	Landslide Plane
Slice 16	469.79147 ft	1,559.7677 ft	0 psf	4,241.7467 psf	592.04402 psf	100 psf	0 psf	Landslide Plane
Slice 17	475.05615 ft	1,558.4588 ft	0 psf	4,199.9778 psf	588.77782 psf	100 psf	0 psf	Landslide Plane
Slice 18	482.05638 ft	1,557.4586 ft	0 psf	4,120.2733 psf	578.09649 psf	100 psf	0 psf	Landslide Plane
Slice 19	486.99999 ft	1,556.0412 ft	0 psf	4,035.5976 psf	567.19658 psf	100 psf	0 psf	Landslide Plane
Slice 20	495.08591 ft	1,556.2192 ft	0 psf	3,502.274 psf	548.42864 psf	100 psf	0 psf	Landslide Plane
Slice 21	502.25607 ft	1,555.9014 ft	0 psf	3,668.0516 psf	515.53150 psf	100 psf	0 psf	Landslide Plane
Slice 22	508.13668 ft	1,556.0603 ft	0 psf	3,376.1683 psf	474.7784 psf	100 psf	0 psf	Landslide Plane
Slice 23	514.07588 ft	1,556.3689 ft	0 psf	3,060.8914 psf	429.79445 psf	100 psf	0 psf	Landslide Plane
Slice 24	517.81122 ft	1,556.0909 ft	0 psf	2,912.0847 psf	1,681.6803 psf	160 psf	0 psf	Landslide Material
Slice 25	521.04647 ft	1,557.202 ft	0 psf	2,675.904 psf	1,544.9085 psf	160 psf	0 psf	Landslide Material
Slice 26	526.5767 ft	1,556.7267 ft	0 psf	2,384.4528 psf	1,368.5921 psf	160 psf	0 psf	Landslide Material
Slice 27	535.29565 ft	1,559.5488 ft	0 psf	1,803.2662 psf	1,041.1165 psf	160 psf	0 psf	Landslide Material
Slice 28	541.67972 ft	1,561.1355 ft	0 psf	1,408.5155 psf	813.20653 psf	160 psf	0 psf	Landslide Material
Slice 29	547.87758 ft	1,562.9816 ft	0 psf	1,066.7059 psf	627.46154 psf	160 psf	0 psf	Landslide Material
Slice 30	554.11544 ft	1,565.1234 ft	0 psf	732.04529 psf	431.09914 psf	160 psf	0 psf	Landslide Material
Slide 31	560.35331 ft	1,567.2653 ft	0 psf	398.04416 psf	162.83528 psf	160 psf	0 psf	Landslide Material

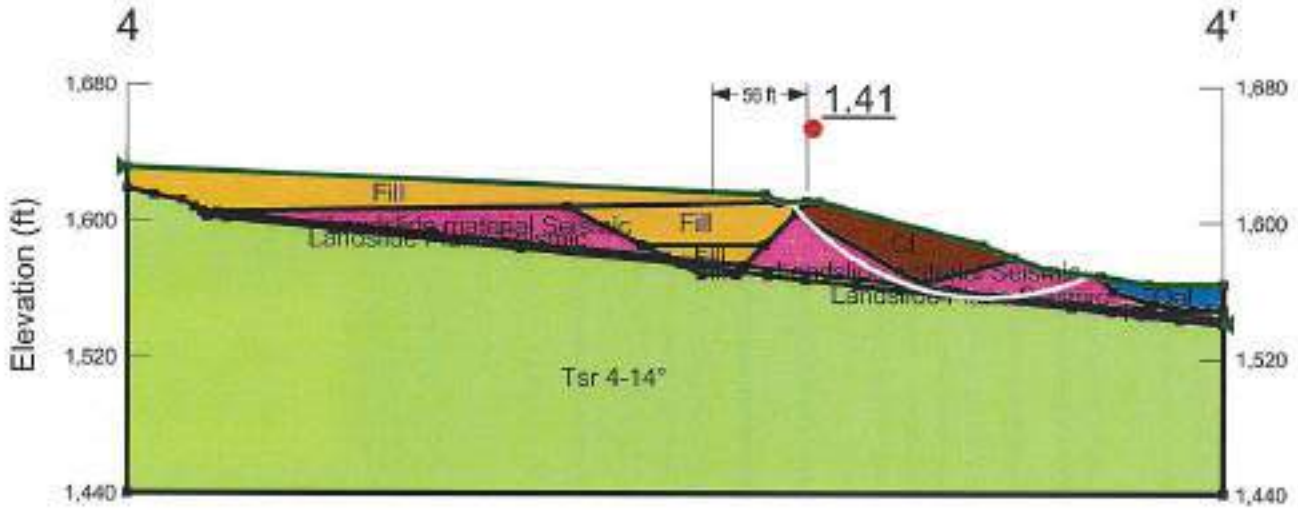
Section 4-4 Tr 68203 SSA MW 12-2 B.gsz

Horz Seismic Coef.: 0.15

1 -Rotational Pseudostatic Global

Section 4-4 Tr 68203 SSA MW 12-2 B.gsz 12/02/2021 09:00:33 AM

Method: Bishop



Name: Cf
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 297 psf
Phi: 30 °

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 325 psf
Phi: 30 °

Name: Landslide material Seismic
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 33 °

Name: Landslide Plane Seismic
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 120 psf
Phi: 12 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 350 psf
Phi: 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion: 600 psf
Phi: 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC Valley, Inc

GEOTECHNICAL CONSULTING

28532 Constellation Rd, Valencia, CA 91355
Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	203003-01
Engineer:	BIH / MW
Date:	Dec 2021

1 -Rotational Pseudostatic Global

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File Information

File Version: 10.00
Title: Valuga
Created By: Michel Wilson
Last Edited By: Michel Wilson
Revision Number: 203
Date: 12/02/2021
Time: 09:00:55 AM
Tool Version: 10.00.0.1401
File Name: Section 4-4 Tr 98303.55A MW 12.2.8.gpz
Directory: P:\FINAL PROJECTS\Valuga Golden Valley Terra Hwy\slope stability\Valuga\
Last Solved Date: 12/02/2021
Last Solved Time: 08:20:46 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Pseudostatic Global

Kind: SLOPE/W
Method: Bishop
Settings
Pore Water Surface: (None)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entire Slip Surface from Other
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Discretization
Left Side Discretization Option: Compare
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Numerical Solver Convergence Settings
Maximum Number of Iterations: 500
Tolerance: Minimum of Error: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 575 psf
Phi: 30 °
Phi-B: 0 °

Tgt 4-14"

Model: Anisotropic Fn
Unit Weight: 125 pcf
Cohesion: 5021 psf
Phi: 32 °
Phi Anisotropic Strength Fn: for 38° bedding 4-14"
Cohesion Anisotropic Strength Fn: for 250 bedding 4-14"
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 350 psf
Phi: 28 °
Phi-B: 0 °

Landslide material Seismic

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 28 °
Phi-B: 0 °

Qf

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 237 psf
Phi: 30 °
Phi-B: 0 °

Landslide Plane Seismic

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 125 psf
Phi: 32 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (-0.24894, 1,631.6796) ft
Right Coordinate: (941.1081, 1,510.0361) ft

Seismic Coefficients

Horizontal Seismic Coefficient: 0.15
Vertical Seismic Coefficient: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function Modifier Factors vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Anisotropic: 1
Data Point Information (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function Modifier Factors vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Anisotropic: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	31.88396 ft	1,611.9789 ft
Point 2	41.80471 ft	1,619.1815 ft
Point 3	0.00023 ft	1,440.0147 ft
Point 4	641.00437 ft	1,440.0028 ft
Point 5	641.00437 ft	1,540.1426 ft
Point 6	615.74960 ft	1,547.7576 ft
Point 7	575.79817 ft	1,547.4116 ft
Point 8	562.23805 ft	1,560.2826 ft
Point 9	501.05439 ft	1,565.9681 ft
Point 10	476.89747 ft	1,557.9326 ft
Point 11	451.22679 ft	1,560.8002 ft
Point 12	426.25241 ft	1,561.7211 ft
Point 13	396.71311 ft	1,566.2767 ft
Point 14	375.88071 ft	1,568.6201 ft
Point 15	357.59074 ft	1,571.2083 ft
Point 16	335.91083 ft	1,589.2519 ft
Point 17	329.67987 ft	1,584.305 ft
Point 18	317.74414 ft	1,601.7806 ft
Point 19	44.89249 ft	1,604.5064 ft
Point 20	39.23095 ft	1,608.7471 ft
Point 21	33.41757 ft	1,615.1373 ft
Point 22	46.24387 ft	1,605.002 ft
Point 23	78.51995 ft	1,601.4489 ft
Point 24	92.5259 ft	1,594.837 ft
Point 25	197.04626 ft	1,661.6503 ft
Point 26	308.25737 ft	1,646.2386 ft
Point 27	429.18847 ft	1,660.8167 ft
Point 28	551.31444 ft	1,661.4045 ft
Point 29	580.05015 ft	1,648.8837 ft
Point 30	598.94253 ft	1,667.5261 ft
Point 31	578.75483 ft	1,668.8973 ft
Point 32	509.19778 ft	1,665.308 ft
Point 33	538.52079 ft	1,671.6228 ft
Point 34	518.65161 ft	1,676.8857 ft
Point 35	429.47122 ft	1,680.5656 ft
Point 36	429.1860 ft	1,681.2386 ft
Point 37	46.38868 ft	1,601.025 ft
Point 38	641.00023 ft	1,548.5799 ft
Point 39	526.71358 ft	1,563.7007 ft
Point 40	641.00023 ft	1,565.7007 ft
Point 41	640.98727 ft	1,548.7503 ft
Point 42	623.39018 ft	1,548.7503 ft
Point 43	602.80351 ft	1,548.7503 ft
Point 44	390.72862 ft	1,605.2279 ft
Point 45	486.14739 ft	1,564.5727 ft
Point 46	448.65930 ft	1,564.5273 ft
Point 47	380.67181 ft	1,611.3957 ft
Point 48	372.85838 ft	1,615.6779 ft
Point 49	412.6894 ft	1,633.6796 ft
Point 50	372.42616 ft	1,585.6997 ft
Point 51	355.87187 ft	1,585.0618 ft
Point 52	356.08475 ft	1,608.6108 ft
Point 53	360.6786 ft	1,585.6357 ft
Point 54	435.19849 ft	1,575.3481 ft
Point 55	322.55302 ft	1,575.6656 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-14°	2,3,4,5,6,7,8,9,10,11,12,13,14,15,51,16,45,17,18,19,22,20,1,21	60.458 ft²
Region 2	Landslide Material Seismic	22,52,53,54,23,24	4,205.0 ft²
Region 3	Landslide Material Seismic	26,27,28,29,30,31,32,33,34,46,35,44,50	1,658.7 ft²
Region 4	Landslide Plane	24,39,37,38,36,55,54,25	815.73

	Seismic		ft²
Region 4	Landslide Plane Seismic	15,26,27,28,29,30,31,32,33,34	981.87 ft²
Region 5	Clay	32,39,40,41,42,43,50,51	828.75 ft²
Region 7	Sand Layer	33,48,49,42,41,18	1,711.14 ft²
Region 8	Clay	25,14,15,16,24,35,36	2,358.4 ft²
Region 9	Fill	47,18,19,2,21,1,20,22,52	5,386.6 ft²
Region 10	Fill	54,55,15,26	125.38 ft²
Region 11	Fill	52,13,53,44,23,17	2,936.3 ft²
Region 12	Fill	55,36,53,14	104.68 ft²
Region 13	Fill	56,53,54,35	121.47 ft²

Slip Results

Slip Surfaces Analyzed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.41
Volume: 4,076.7323 ft³
Weight: 508,389.71 lbf
Resisting Moment: 47,917,907 lbf-ft
Activating Moment: 26,558,004 lbf-ft
Slip Rank: 1 of 1 Slip Surfaces
Exit: (363.47223, 1,561.02626) ft
Entry: (307.79498, 1,611.4495) ft
Radius: 141.20575 ft
Center: (304.95809, 1,001.23961) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	369.57302 ft	1,608.0659 ft	0 psf	10.068815 psf	10.094571 psf	325 psf	0 psf	Fill
Slice 3	398.71313 ft	1,604.5138 ft	0 psf	468.42489 psf	200.67035 psf	250 psf	0 psf	Fill
Slice 5	426.26454 ft	1,603.7417 ft	0 psf	721.20152 psf	474.84857 psf	200 psf	0 psf	Landslide material Seismic
Slice 4	400.63643 ft	1,597.4545 ft	0 psf	1,115.1282 psf	424.21617 psf	200 psf	0 psf	Landslide material Seismic

Slice 5	407.15051 ft	1,591.4511 ft	0 psf	1,513.0334 psf	1,290.9048 psf	200 psf	0 psf	Landslide material Seismic
Slice 6	413.10234 ft	1,586.8171 ft	0 psf	1,978.6751 psf	1,284.9686 psf	200 psf	0 psf	Landslide material Seismic
Slice 7	419.04617 ft	1,582.2091 ft	0 psf	2,306.3523 psf	1,407.8215 psf	200 psf	0 psf	Landslide material Seismic
Slice 8	424.99 ft	1,578.941 ft	0 psf	2,502.3410 psf	1,580.0806 psf	200 psf	0 psf	Landslide material Seismic
Slice 9	430.93383 ft	1,574.0271 ft	0 psf	2,806.9172 psf	1,691.6457 psf	200 psf	0 psf	Landslide material Seismic
Slice 10	436.87746 ft	1,571.696 ft	0 psf	3,101.142 psf	2,001.2051 psf	200 psf	0 psf	Landslide material Seismic
Slice 11	442.82149 ft	1,568.8923 ft	0 psf	3,305.4758 psf	2,146.6031 psf	200 psf	0 psf	Landslide material Seismic
Slice 12	448.76532 ft	1,566.3243 ft	0 psf	3,460.6787 psf	2,202.1837 psf	200 psf	0 psf	Landslide material Seismic
Slice 13	454.70915 ft	1,564.1156 ft	0 psf	3,636.114 psf	2,454.3586 psf	200 psf	0 psf	Landslide material Seismic
Slice 14	460.43643 ft	1,562.2566 ft	0 psf	4,260.2849 psf	868.72916 psf	200 psf	0 psf	Landslide Plane Seismic
Slice 15	466.90346 ft	1,560.0948 ft	0 psf	4,123.5796 psf	838.28154 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 16	469.04147 ft	1,559.7677 ft	0 psf	4,156.4656 psf	839.06055 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 17	470.05514 ft	1,558.4098 ft	0 psf	4,125.7177 psf	836.94826 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 18	469.75918 ft	1,557.3596 ft	0 psf	4,073.6425 psf	835.87946 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 19	469.79595 ft	1,555.5912 ft	0 psf	4,000.1935 psf	833.89185 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 20	469.98963 ft	1,555.2132 ft	0 psf	3,984.6707 psf	834.73726 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 21	502.25607 ft	1,555.0734 ft	0 psf	3,944.4833 psf	739.94467 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 22	502.16586 ft	1,555.0203 ft	0 psf	3,868.1058 psf	725.23576 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 23	514.07586 ft	1,555.1019 ft	0 psf	3,878.7619 psf	656.27969 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 24	517.83172 ft	1,556.6404 ft	0 psf	2,986.852 psf	1,926.5534 psf	200 psf	0 psf	Landslide material Seismic
Slice 25	521.84647 ft	1,557.202 ft	0 psf	2,741.0757 psf	1,782.8429 psf	200 psf	0 psf	Landslide material Seismic

Slice 25	526.5263 ft	1,758.2167 ft	0 psf	2,918.783 psf	1,521.7199 psf	200 psf	0 psf	Landslide material Seismic
Slice 27	545.23563 ft	1,660.5444 ft	0 psf	3,007.3721 psf	1,225.6413 psf	200 psf	0 psf	Landslide material Seismic
Slice 28	541.62972 ft	1,561.7555 ft	0 psf	1,640.0573 psf	877.14893 psf	200 psf	0 psf	Landslide material Seismic
Slice 29	547.07728 ft	1,562.9816 ft	0 psf	1,171.3631 psf	760.60143 psf	200 psf	0 psf	Landslide material Seismic
Slice 30	546.17548 ft	1,565.134 ft	0 psf	786.65852 psf	510.88819 psf	200 psf	0 psf	Landslide material Seismic
Slice 31	550.3503 ft	1,567.0073 ft	0 psf	331.28851 psf	215.12855 psf	200 psf	0 psf	Landslide material Seismic

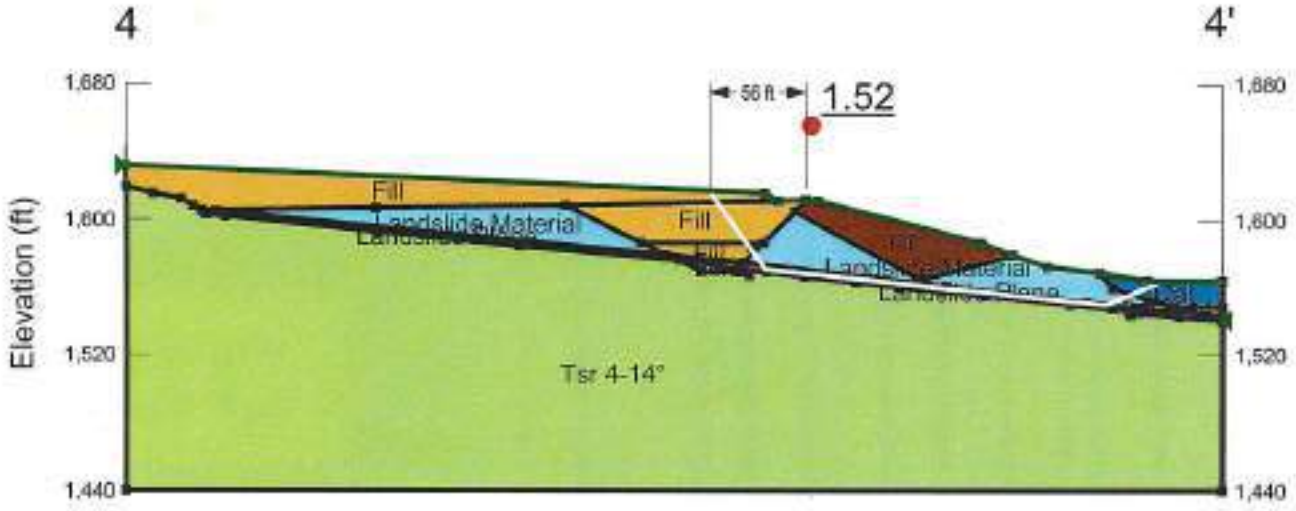
Section 4-4 Tr 68203 SSA MW 12-2 B.gsz

Horz Seismic Coef.: 0

2 -Translational Static Global (2)

Section 4-4 Tr 68203 SSA MW 12-2 B.gsz 12/02/2021 09:33:05 AM

Method: Spencer



Name: Cf
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 237 psf
Phi': 30 °

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Landslide Material
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 160 psf
Phi': 30 °

Name: Landslide Plane
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 8 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC Valley, Inc

GEOTECHNICAL CONSULTING

28532 Constellation Rd, Valencia, CA 91355
Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	203003-01
Engineer:	BIH / MW
Date:	Dec 2021

2 -Translational Static Global (2)

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File Information

File Version: 10.00
Title: Volume
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Last Edited By: Michel Wilson
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Tool Version: 10.0.8.17001
File Name: Section 4-4'-Ti-882021-SEA.slw
Directory: P:\PANL PROJECTS\Walnut Golden Valley Sierra Heights\Slope stability\
Last Solved Date: 12/02/2021
Last Solved Time: 09:33:08 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Static Global (2)

Analysis Type: 2D
Parent: 2 -Translational Static Global
Method: Sarma
Seismic
PWP Conditions from: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Circular Slip Surfaces from Grid
Circular slip surfaces used: All
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Discretization
Side Calculation Option: Constant
Advanced
Automatic Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 50
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable error: 0.005
Solution Settings
Search Method: Linear Search
Multi-Thread Janbu Corrected Setting: 0.2

Lambda
Lambda 1: 0
Lambda 2: 0.8
Lambda 3: 0.6
Lambda 4: 0.4
Lambda 5: 0.2
Lambda 6: 0
Lambda 7: 0.2
Lambda 8: 0.4
Lambda 9: 0.6
Lambda 10: 0.8
Lambda 11: 1

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 325 psf
Phi: 40°
Psi: 0°

Landslide Material

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 365 psf
Phi: 30°
Psi: 0°

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 8°
Psi: 0°

Tcr /I-14°

Model: Anisotropic Fn
Unit Weight: 125 pcf
Cohesion: 500 psf
Phi: 45°
Phi Anisotropic Strength Fn.: 0= 14° bedding 4-14°
D.A.: Cohesion Strength Fn.: To= 250 bedding 4-14°
Psi: 0°

Qal

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 350 psf
Phi: 28°
Psi: 0°

Cf

Model: Mohr-Coulomb
Unit Weight: 135 pcf
Cohesion': 237 psf
Phi': 30 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (-0.24894, 1,631.6796) ft
Right Coordinate: (641.00417, 1,540.428) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	31.83098 ft	1,611.9785 ft
Point 2	-0.00371 ft	1,619.1805 ft
Point 3	0.00023 ft	1,440.0147 ft
Point 4	641.00417 ft	1,440.0028 ft

Point 5	641.00417 ft	1,540.428 ft
Point 6	615.74964 ft	1,542.7559 ft
Point 7	575.78817 ft	1,547.4116 ft
Point 8	552.23805 ft	1,550.2826 ft
Point 9	501.90419 ft	1,555.3651 ft
Point 10	476.49747 ft	1,557.8326 ft
Point 11	451.21699 ft	1,560.3002 ft
Point 12	426.26241 ft	1,562.7211 ft
Point 13	396.2331 ft	1,566.0267 ft
Point 14	373.88571 ft	1,568.8201 ft
Point 15	357.59074 ft	1,571.0083 ft
Point 16	335.79889 ft	1,569.0519 ft
Point 17	229.67987 ft	1,584.305 ft
Point 18	57.65414 ft	1,601.7806 ft
Point 19	44.86249 ft	1,604.5964 ft
Point 20	39.23095 ft	1,608.2971 ft
Point 21	15.41757 ft	1,613.1354 ft
Point 22	43.24087 ft	1,605.662 ft
Point 23	78.51996 ft	1,602.3489 ft
Point 24	52.5256 ft	1,604.832 ft
Point 25	387.04626 ft	1,611.6503 ft
Point 26	360.26777 ft	1,574.2595 ft
Point 27	479.18847 ft	1,560.6167 ft
Point 28	561.32446 ft	1,551.9199 ft
Point 29	590.05015 ft	1,548.8937 ft
Point 30	598.94254 ft	1,552.5251 ft
Point 31	576.73483 ft	1,559.9272 ft
Point 32	569.19258 ft	1,568.308 ft
Point 33	538.52079 ft	1,571.6228 ft
Point 34	518.63161 ft	1,578.8857 ft
Point 35	499.30112 ft	1,586.5956 ft
Point 36	404.1866 ft	1,611.2336 ft
Point 37	46.38368 ft	1,603.0251 ft
Point 38	641.00023 ft	1,543.5239 ft
Point 39	596.71339 ft	1,563.7007 ft
Point 40	641.00023 ft	1,563.7007 ft
Point 41	640.98727 ft	1,548.7503 ft
Point 42	623.39618 ft	1,548.7503 ft
Point 43	612.80351 ft	1,548.7503 ft
Point 44	390.72862 ft	1,606.2275 ft
Point 45	483.14779 ft	1,564.5273 ft
Point 46	466.65914 ft	1,564.5273 ft
Point 47	380.67181 ft	1,611.2957 ft
Point 48	372.85818 ft	1,615.6776 ft
Point 49	-0.24894 ft	1,631.6796 ft
Point 50	372.42616 ft	1,586.6397 ft
Point 51	355.81187 ft	1,569.0616 ft
Point 52	256.66715 ft	1,608.6108 ft
Point 53	300.6785 ft	1,586.6357 ft

Point 54	315.19949 ft	1,579.3461 ft
Point 55	322.56302 ft	1,575.6656 ft
Point 56	359.16633 ft	1,568.9116 ft
Point 57	363.88936 ft	1,567.0833 ft
Point 58	364.8077 ft	1,583.9372 ft
Point 59	587.26023 ft	1,541.2602 ft
Point 60	145.99305 ft	1,606.6007 ft
Point 61	146.46109 ft	1,591.5797 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-14°	2,3,4,5,6,7,8,9,10,11,12,13,14,15,51,16,55,17,18,37,19,22,20,1,21	86,456 ft²
Region 2	Landslide Material	22,52,53,54,23,24	3,195.9 ft²
Region 3	Landslide Material	26,27,28,29,30,31,32,33,34,46,45,44,50	3,668.7 ft²
Region 4	Landslide Plane	22,19,37,18,17,55,54,24	819.73 ft²
Region 5	Landslide Plane	15,26,27,28,29,38,5,6,7,8,9,10,11,12,13,14	931.67 ft²
Region 6	Qal	32,39,40,41,42,43,30,31	828.76 ft²
Region 7	Tsr 4-14°	29,30,43,42,41,38	173.04 ft²
Region 8	Cf	25,44,45,46,34,35,36	2,388.4 ft²
Region 9	Fill	47,48,49,2,21,1,20,22,52	5,586.4 ft²
Region 10	Fill	54,55,15,26	127.38 ft²
Region 11	Fill	52,53,50,44,25,47	2,506.3 ft²
Region 12	Fill	55,16,51,15	104.48 ft²
Region 13	Fill	50,53,54,26	571.43 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.52
Volume: 7,354.6805 ft³
Weight: 912,195.49 lbf
Resisting Moment: 20,874,097 lbf-ft
Activating Moment: 13,675,788 lbf-ft
Resisting Force: 199,633.91 lbf
Activating Force: 131,749.65 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (606.08372, 1,563.7007) ft
Entry: (340.63515, 1,617.0596) ft
Radius: 117.82279 ft
Center: (481.40885, 1,630.3993) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	342.92198 ft	1,613.7937 ft	0 psf	60.280931 psf	34.803212 psf	325 psf	0 psf	Fill
Slice 2	349.39065 ft	1,604.5556 ft	0 psf	707.83398 psf	408.66814 psf	325 psf	0 psf	Fill
Slice 3	357.75405 ft	1,592.6113 ft	0 psf	1,545.0831 psf	892.05416 psf	325 psf	0 psf	Fill
Slice 4	364.11884 ft	1,583.5214 ft	0 psf	2,182.2067 psf	1,259.9207 psf	325 psf	0 psf	Fill
Slice 5	368.90441 ft	1,576.6869 ft	0 psf	2,706.1099 psf	1,597.0143 psf	160 psf	0 psf	Landslide Material
Slice 6	371.96055 ft	1,572.3137 ft	0 psf	4,163.2843 psf	585.11145 psf	100 psf	0 psf	Landslide Plane
Slice 7	372.64217 ft	1,571.3488 ft	0 psf	4,256.5074 psf	598.2131 psf	100 psf	0 psf	Landslide Plane
Slice 8	373.10937 ft	1,570.6816 ft	0 psf	4,308.4368 psf	605.5113 psf	100 psf	0 psf	Landslide Plane
Slice 9	377.01618 ft	1,569.9524 ft	0 psf	5,251.2515 psf	738.01577 psf	100 psf	0 psf	Landslide Plane
Slice 10	385.70022 ft	1,569.0724 ft	0 psf	5,173.8459 psf	727.13662 psf	100 psf	0 psf	Landslide Plane
Slice 11	393.88744 ft	1,568.2427 ft	0 psf	5,339.1484 psf	750.36837 psf	100 psf	0 psf	Landslide Plane
Slice 12	400.61643 ft	1,567.5608 ft	0 psf	5,422.1444 psf	762.0327 psf	100 psf	0 psf	Landslide Plane
Slice 13	408.19811 ft	1,566.7722 ft	0 psf	5,359.5206 psf	753.23149 psf	100 psf	0 psf	Landslide Plane
Slice 14	416.82114 ft	1,565.9186 ft	0 psf	5,195.8563 psf	730.22998 psf	100 psf	0 psf	Landslide Plane
Slice 15	425.24417 ft	1,565.065 ft	0 psf	5,032.192 psf	707.22847 psf	100 psf	0 psf	Landslide Plane
Slice 16	433.66719 ft	1,564.2114 ft	0 psf	4,868.5278 psf	684.22696 psf	100 psf	0 psf	Landslide Plane
Slice 17	442.09022 ft	1,563.3578 ft	0 psf	4,704.8635 psf	661.22544 psf	100 psf	0 psf	Landslide Plane
Slice 18	450.51325 ft	1,562.5042 ft	0 psf	4,541.1992 psf	638.22393 psf	100 psf	0 psf	Landslide Plane
Slice 19	458.93628 ft	1,561.6506 ft	0 psf	4,377.535 psf	615.22242 psf	100 psf	0 psf	Landslide Plane
Slice 20	464.90346 ft	1,561.0459 ft	0 psf	4,261.3891 psf	598.92729 psf	100 psf	0 psf	Landslide Plane
Slice 21	472.92381 ft	1,560.2331 ft	0 psf	4,105.7493 psf	577.02543 psf	100 psf	0 psf	Landslide Plane
Slice 22	484.21663 ft	1,559.0887 ft	0 psf	3,886.1033 psf	546.15621 psf	100 psf	0 psf	Landslide Plane
Slice 23	494.27206 ft	1,558.0606 ft	0 psf	3,690.2636 psf	518.63272 psf	100 psf	0 psf	Landslide Plane
Slice 24	504.13374 ft	1,557.0703 ft	0 psf	3,014.6965 psf	479.9043 psf	100 psf	0 psf	Landslide Plane
Slice 25	513.79899 ft	1,556.0908 ft	0 psf	3,059.4022 psf	429.97095 psf	100 psf	0 psf	Landslide Plane

Slice 26	523.6089 ft	1,555.0972 ft	0 psf	2,716.5776 psf	282.2253 psf	100 psf	0 psf	Unacceptable Plane
Slice 27	533.9485 ft	1,554.0856 ft	0 psf	2,675.5239 psf	336.66866 psf	100 psf	0 psf	Unacceptable Plane
Slice 28	542.8214 ft	1,553.2004 ft	0 psf	2,639.9857 psf	318.45746 psf	100 psf	0 psf	Unacceptable Plane
Slice 29	549.05261 ft	1,552.4701 ft	0 psf	2,774.2087 psf	312.59215 psf	100 psf	0 psf	Unacceptable Plane
Slice 30	553.69361 ft	1,551.8498 ft	0 psf	2,218.0618 psf	311.72689 psf	100 psf	0 psf	Unacceptable Plane
Slice 31	555.25851 ft	1,550.8758 ft	0 psf	2,211.7758 psf	310.84948 psf	100 psf	0 psf	Unacceptable Plane
Slice 32	551.38768 ft	1,550.2751 ft	0 psf	2,193.3035 psf	306.80017 psf	100 psf	0 psf	Unacceptable Plane
Slice 33	573.75843 ft	1,550.2111 ft	0 psf	2,454.3734 psf	345.40737 psf	100 psf	0 psf	Unacceptable Plane
Slice 34	575.53425 ft	1,550.0497 ft	0 psf	2,799.7019 psf	1,025.1503 psf	100 psf	0 psf	Unacceptable Material
Slice 35	582.3435 ft	1,550.0857 ft	0 psf	2,045.7942 psf	1,210.0036 psf	100 psf	0 psf	Unacceptable Material
Slice 36	592.33158 ft	1,550.0040 ft	0 psf	1,193.0034 psf	634.33134 psf	350 psf	0 psf	Ok
Slice 37	601.30855 ft	1,561.76 ft	0 psf	477.79821 psf	253.78397 psf	350 psf	0 psf	Ok

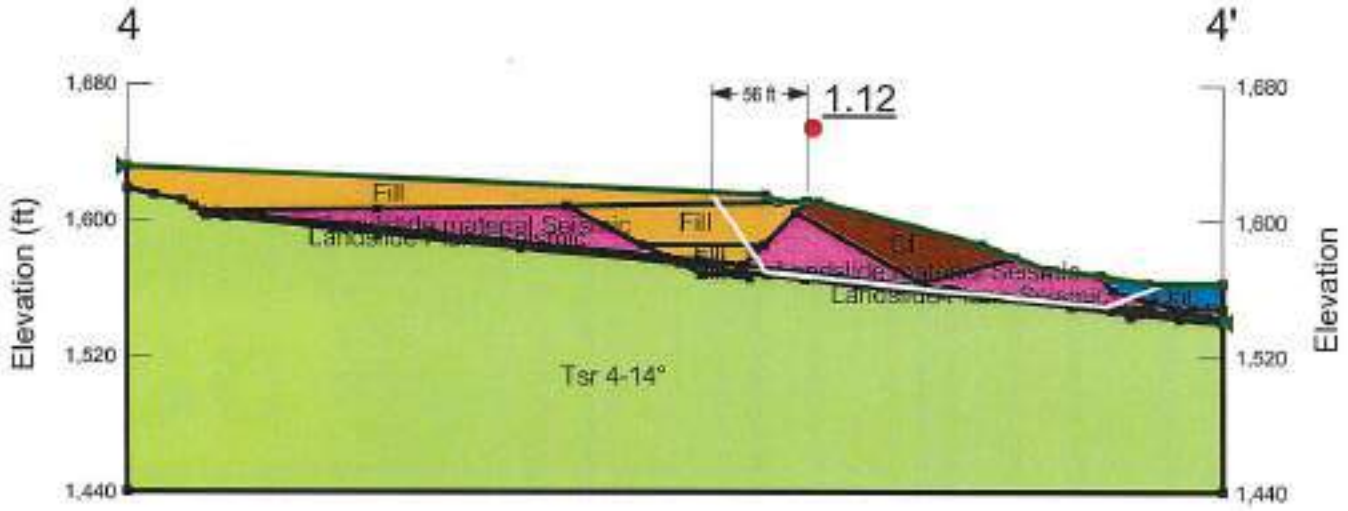
Section 4-4 Tr 68203 SSA MW 12-2 B.gsz

Horz Seismic Coef.: 0.15

2 -Translational Pseudostatic Global (2)

Section 4-4 Tr 68203 SSA MW 12-2 B.gsz 12/02/2021 09:33:05 AM

Method: Spencer



Name: Cf
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 237 psf
Phi': 30 °

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Landslide material Seismic
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 200 psf
Phi': 33 °

Name: Landslide Plane Seismic
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 120 psf
Phi': 12 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC Valley, Inc

GEOTECHNICAL CONSULTING

28532 Constellation Rd, Valencia, CA 91355
Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	203003-01
Engineer:	BIH / MW
Date:	Dec 2021

2 -Translational Pseudostatic Global (2)

File Information

File Version: 10.00
Title: Valmont
Created By: Michel Wilson
Last Modified By: Michel Wilson
Revision Number: 221
Date: 12/02/2021
Time: 09:11:05 AM
Tool Version: 10.0.1.1761
File Name: Section 4-4 Tr 8&20 SAR MW 12-2-0.gsz
Directory: P:\RIVAL PROJECTS\Valmont Golden Valley Slope Stability\Valmont\
Last Solved Date: 12/02/2021
Last Solved Time: 09:33:01 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Pseudostatic Global (2)

Kmit: SLOPE/W
Parent: 2 -Translational Static Global
Method: Spencer
Settings
PWP Conditions from: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Optical Slip Surface from Grid
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Distribution
Slice Distribution Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Iterations: 500
Tolerable Convergence: 0.01
Solution Settings
Search Method: Linear Search
Multiplier to Lambda Factor of Safety: 0.2

Lambda
Lambda 1: 1
Lambda 2: -0.3
Lambda 3: -0.6
Lambda 4: -0.4
Lambda 5: -0.7
Lambda 6: 0
Lambda 7: 0.2
Lambda 8: 0.4
Lambda 9: 0.6
Lambda 10: 0.8
Lambda 11: 1

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 325 psf
Phi: 30°
Phi-B: 0°

Tar 4-14"

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion: 600 psf
Phi: 32°
Fn-Anisotropic Strength Fn: Tar 135° bedding 4-14"
Fn-Anisotropic Strength Fn: Tar 250 bedding 4-14"
Phi-B: 0°

Opl

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 350 psf
Phi: 28°
Phi-B: 0°

Landslide material Seismic

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 33°
Phi-B: 0°

Cf

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 75 psf
Phi: 30°
Phi-B: 0°

Landslide Plane Seismic

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 120 psf
[illegible]

Slip Surface Limits

Left Coordinate: (-0.72[illegible], 1,651.6 [illegible]) ft
Right Coordinate: (641.03417, 1,540.4[illegible]) ft

Seismic Coefficients

Horizontal Coefficient: 0.15
Vertical Seismic Coefficient: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Point Coordinates (°), Modifier Factor
Data Point: (-90, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Point Coordinates (°), Modifier Factor
Data Point: (-90, 1)
Data Point: (4, 0.3611)
Data Point: (14, 0.3611)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	31.33098 ft	1,611.37781 ft
Point 2	-0.00371 ft	1,619.3806 ft
Point 3	-0.00426 ft	1,440.2147 ft
Point 4	641.03417 ft	1,440.2028 ft

Point 5	641.03417 ft	1,540.4[illegible] ft
Point 6	615.78904 ft	1,542.7559 ft
Point 7	575.78817 ft	1,547.4116 ft
Point 8	552.73603 ft	1,550.2835 ft
Point 9	501.36423 ft	1,556.1861 ft
Point 10	476.49047 ft	1,557.8325 ft
Point 11	457.21699 ft	1,560.3014 ft
Point 12	406.70793 ft	1,567.7741 ft
Point 13	395.2931 ft	1,566.0165 ft
Point 14	379.88573 ft	1,568.8101 ft
Point 15	357.59024 ft	1,571.[illegible] ft
Point 16	335.79889 ft	1,559.0513 ft
Point 17	329.57587 ft	1,594.306 ft
Point 18	57.65414 ft	1,621.7805 ft
Point 19	44.85249 ft	1,624.5964 ft
Point 20	39.74035 ft	1,628.2571 ft
Point 21	16.42757 ft	1,635.4364 ft
Point 22	43.24067 ft	1,636.662 ft
Point 23	78.51986 ft	1,637.7489 ft
Point 24	92.3256 ft	1,624.852 ft
Point 25	337.34626 ft	1,611.6501 ft
Point 26	380.26727 ft	1,624.2595 ft
Point 27	479.18867 ft	1,560.6107 ft
Point 28	501.32491 ft	1,561.9189 ft
Point 29	540.05215 ft	1,548.2837 ft
Point 30	558.64291 ft	1,551.9257 ft
Point 31	570.77483 ft	1,559.9277 ft
Point 32	569.[illegible].9058 ft	1,5[illegible].8[illegible] ft
Point 33	538.37079 ft	1,573.[illegible]726 ft
Point 34	519.63[illegible].87 ft	1,578.8857 ft
Point 35	499.30112 ft	1,586.9656 ft
Point 36	490.1866 ft	1,611.2336 ft
Point 37	46.38[illegible]8 ft	1,605.[illegible]55 ft
Point 38	641.[illegible]29 ft	1,543.5288 ft
Point 39	596.71389 ft	1,565.7007 ft
Point 40	641.00003 ft	1,561.4027 ft
Point 41	640.98[illegible] ft	1,548.[illegible]34 ft
Point 42	623.[illegible]38 ft	1,548.7534 ft
Point 43	612.90351 ft	1,545.7503 ft
Point 44	390.73852 ft	1,587.[illegible]55 ft
Point 45	463.14779 ft	1,564.4[illegible]3 ft
Point 46	456.65934 ft	1,564.5273 ft
Point 47	390.67181 ft	1,513.2087 ft
Point 48	372.65820 ft	1,615.0770 ft
Point 49	0.24894 ft	1,61[illegible].0[illegible] ft
Point 50	371.42[illegible] ft	1,586.[illegible]97 ft
Point 51	351.[illegible]87 ft	1,585.0[illegible]6 ft
Point 52	250.68775 ft	1,582.4108 ft
Point 53	300.67[illegible] ft	1,586.6[illegible] ft

Point 54	315.39979 ft	1,574.4481 ft
Point 55	323.50183 ft	1,575.6656 ft
Point 56	359.10634 ft	1,568.0116 ft
Point 57	361.88656 ft	1,567.6073 ft
Point 58	391.8077 ft	1,563.9372 ft
Point 59	387.20629 ft	1,545.2862 ft
Point 60	345.50308 ft	1,550.0067 ft
Point 61	344.49309 ft	1,591.5797 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-1-47	7,8,4,5,6,7,8,9,10,11,12 Lo,14,15,51,16,52,17,18,57,19,20,56,21	81,468 ft²
Region 2	Landslide material Seismic	22,52,53,54,23,24	5,486.8 ft²
Region 3	Landslide material Seismic	26,27,28,29,30,31,32,33,34,46,45,44,57	5,668.7 ft²
Region 4	Landslide Plane Seismic	22,52,51,35,55,54,24	810.79 ft²
Region 5	Landslide Plane Seismic	35,36,37,38,39,58,5,6,7,8,9,10,11,12,13,14	991.07 ft²
Region 6	Qal	32,39,40,41,42,43,30,31	828.76 ft²
Region 7	Tsr 4-1-47	20,30,43,42,41,58	176.84 ft²
Region 8	Cf	35,44,45,46,34,25,36	2,586.4 ft²
Region 9	Fs	47,48,49,2,21,1,20,22,50	5,580.4 ft²
Region 10	Fs	50,55,15,26	723.38 ft²
Region 11	Fs	54,56,50,44,25,47	7,505.3 ft²
Region 12	Fs	56,15,51,16	104.48 ft²
Region 13	Fs	50,53,54,26	572.43 ft²

Slip Results

Slip Surfaces Analyzed: 1 of 1 surfaces solved

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.03
Volume: 7,354.6805 ft³
Weight: 512,195.45 lb
Resisting Moment: 25,981,629 lb-ft
Activating Moment: 25,180,077 lb-ft

Resisting Force: 368,729.75 lb
Activating Force: 240,282.44 lb
Slip Surface: 1 of 1 slip surfaces
Exit: (604.08872, 1,563.7004) ft
Entry: (340.69515, 1,617.0986) ft
Radius: 317.82279 ft
Center: (451.42366, 1,830.5865) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Effective Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	340.49196 ft	1,617.7957 ft	0 psf	20.010815 psf	11.987901 psf	328 psf	0 psf	Fill
Slice 2	348.39026 ft	1,604.5556 ft	0 psf	142.13555 psf	119.60195 psf	225 psf	0 psf	Fill
Slice 3	357.77489 ft	1,592.6112 ft	0 psf	2,217.1355 psf	702.73334 psf	225 psf	0 psf	Fill
Slice 4	364.11834 ft	1,583.5214 ft	0 psf	1,740.8259 psf	595.98153 psf	225 psf	0 psf	Fill
Slice 5	368.90441 ft	1,576.6869 ft	0 psf	4,316.0872 psf	1,174.1706 psf	200 psf	0 psf	Landslide Material Seismic
Slice 6	371.08635 ft	1,573.5157 ft	0 psf	3,103.1573 psf	958.69657 psf	200 psf	0 psf	Landslide Plane Seismic
Slice 7	372.60217 ft	1,571.3488 ft	0 psf	3,373.1227 psf	674.46808 psf	200 psf	0 psf	Landslide Plane Seismic
Slice 8	374.10987 ft	1,570.8816 ft	0 psf	3,212.0852 psf	682.75232 psf	200 psf	0 psf	Landslide Plane Seismic
Slice 9	377.01618 ft	1,569.9514 ft	0 psf	5,127.8798 psf	1,065.9643 psf	181 psf	0 psf	Landslide Plane Seismic
Slice 10	381.70322 ft	1,568.3764 ft	0 psf	5,062.4709 psf	1,073.3356 psf	180 psf	0 psf	Landslide Plane Seismic
Slice 11	383.89744 ft	1,567.8417 ft	0 psf	5,213.4956 psf	1,108.1025 psf	180 psf	0 psf	Landslide Plane Seismic
Slice 12	386.81543 ft	1,567.0608 ft	0 psf	5,294.3453 psf	1,125.3478 psf	180 psf	0 psf	Landslide Plane Seismic
Slice 13	388.38863 ft	1,566.7732 ft	0 psf	5,233.3837 psf	1,112.3841 psf	181 psf	0 psf	Landslide Plane Seismic
Slice 14	416.62314 ft	1,565.9186 ft	0 psf	5,073.5138 psf	1,078.4337 psf	180 psf	0 psf	Landslide Plane Seismic
Slice 15	425.24413 ft	1,565.065 ft	0 psf	4,914.1819 psf	1,044.6054 psf	180 psf	0 psf	Landslide Plane Seismic
Slice 16	433.66719 ft	1,564.2134 ft	0 psf	4,755.052 psf	1,010.7175 psf	180 psf	0 psf	Landslide Plane Seismic
Slice 17	442.09021 ft	1,563.4578 ft	0 psf	4,595.4231 psf	976.83968 psf	181 psf	0 psf	Landslide Plane Seismic
Slice 18	450.51326 ft	1,562.7042 ft	0 psf	4,436.2442 psf	942.94137 psf	181 psf	0 psf	Landslide Plane Seismic
Slice 19	458.93604 ft	1,561.9566 ft	0 psf	4,276.7023 psf	909.05389 psf	180 psf	0 psf	Landslide Plane Seismic
Slice 20	467.90746 ft	1,561.0459 ft	0 psf	4,168.8162 psf	585.04645 psf	180 psf	0 psf	Landslide Plane Seismic

Slice 21	472.02381 ft	1,560.2331 ft	0 psf	4,012.0083 psf	852.77869 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 22	484.21663 ft	1,559.0887 ft	0 psf	3,798.0451 psf	807.29941 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 23	494.27296 ft	1,558.0596 ft	0 psf	3,607.2722 psf	766.70957 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 24	504.13374 ft	1,557.0703 ft	0 psf	3,338.8347 psf	709.69122 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 25	513.79899 ft	1,556.0908 ft	0 psf	2,992.7327 psf	636.12497 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 26	523.6089 ft	1,555.0973 ft	0 psf	2,661.7973 psf	565.78247 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 27	533.5485 ft	1,554.0894 ft	0 psf	2,346.0285 psf	498.66374 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 28	542.3214 ft	1,553.2004 ft	0 psf	2,185.1452 psf	464.46695 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 29	549.92261 ft	1,552.4301 ft	0 psf	2,179.1475 psf	463.1921 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 30	557.52383 ft	1,551.6598 ft	0 psf	2,173.1498 psf	461.91725 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 31	565.25851 ft	1,550.8759 ft	0 psf	2,167.0367 psf	460.61787 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 32	571.18788 ft	1,550.2751 ft	0 psf	2,130.0123 psf	454.66109 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 33	573.75841 ft	1,550.0111 ft	0 psf	2,811.0845 psf	597.51445 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 34	575.53425 ft	1,551.0467 ft	0 psf	4,146.9884 psf	2,693.0857 psf	200 psf	0 psf	Landslide material Seismic
Slice 35	582.3428 ft	1,553.8667 ft	0 psf	3,159.9123 psf	2,052.0711 psf	200 psf	0 psf	Landslide material Seismic
Slice 36	592.33158 ft	1,558.0044 ft	0 psf	1,707.7228 psf	908.01232 psf	350 psf	0 psf	Qal
Slice 37	601.39855 ft	1,561.76 ft	0 psf	784.69444 psf	417.22944 psf	350 psf	0 psf	Qal

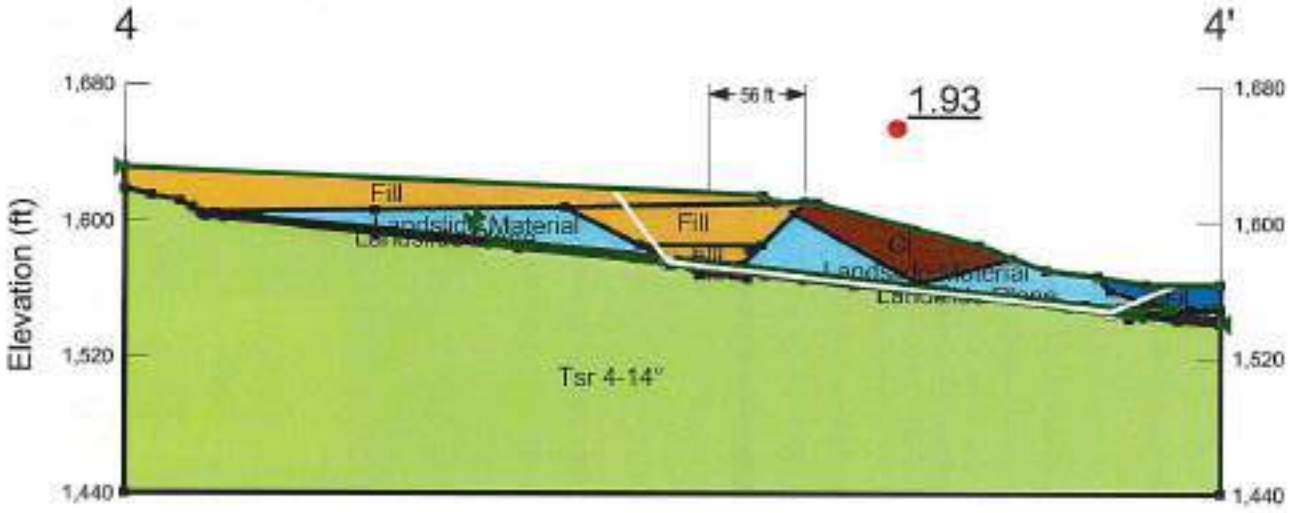
Section 4-4 Tr 68203 SSA MW 12-2 B.gsz

Horz Seismic Coef.: 0

3 -Translational Static behind key

Section 4-4 Tr 68203 SSA MW 12-2 B.gsz 12/02/2021 02:52:46 PM

Method: Janbu



Name: Cf
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 237 psf
Phi': 30 °

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Landslide Material
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 160 psf
Phi': 30 °

Name: Landslide Plane
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 8 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

28532 Constellation Rd, Valencia, CA 91355

Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	203003-01
Engineer:	BIH / MW
Date:	Dec 2021

3 -Translational Static behind key

Description: Long Meadow Subdivision, Golden Valley, Sierra County, California

File Information

File Version: 10.00
Title: Velocity
Created By: Mike Wilson
Last Edited By: Michael Wilson
Revision Number: 285
Date: 12/21/2021
Time: 02:32:46 PM
Tool Version: 10.0.1.17421
File Name: Section 4-4 Tr GB20 STA MW 12-9 B.gsz
Directory: P:\FINAL PROJECTS\Active\Golden Valley Sierra County\Slope stability\Materials\
Last Solved Date: 12/21/2021
Last Solved Time: 02:32:46 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

3 -Translational Static behind key

Slope: SLOPE/W
Method: Janbu
Settings
PWP Conditions from: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of Movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Block
Critical Slip Surfaces Saved: 1
Resist Tension Cracks: Yes
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Distribution
FoS Calculation Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 3,000
Tolerable difference in FoS: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 350 psf
Phi: 32 °
Phi-b: 0 °

Landslide Material

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 150 psf
Phi: 30 °
Phi-b: 0 °

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 8 °
Phi-b: 0 °

Tsr 4-14"

Model: Anisotropic Fn
Unit Weight: 125 pcf
Cohesion: 600 psf
Phi: 33 °
Phi (Isotropic Strength Fn.): Tsr 25° bedding 4-14"
Phi (Anisotropic Strength Fn.): Tsr 250 bedding 4-14"
Phi-b: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 350 psf
Phi: 28 °
Phi-b: 0 °

Qf

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 217 psf
Phi: 30 °
Phi-b: 0 °

Slip Surface Limits

Left Coordinate: (-0.24814, 3.83) ft
Right Coordinate: (54.08417, 1.560478) ft

Left Grid
- Upper Left: (717.44736, 1,596.7834) ft
- Lower Left: (737.14648, 1,586.8896) ft
- Lower Right: (2... 1482..., 1,574.1455) ft
- X Increments: 10
- Y Increments: 10
- Starting Angle: 115 °
- Ending Angle: 156 °
- Angle Increments: 5

Right Grid
- Upper Left: (995.55515, 1,648.4137) ft
- Lower Left: (995.0568, 1,647.6767) ft
- Lower Right: (1320.25287, 1,573.6775) ft
- X Increments: 15
- Y Increments: 10
- Angle Increments: 2

Seismic Coefficients

Horz Seismic Coef: 0
Vert Seismic Coef: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-11°

Model: Spline Data Point Function
Function: Modifier Factors vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Vertex Angle: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (3.99, 1)
- Data Point: (4, 0.9167)
- Data Point: (10, 0.2167)
- Data Point: (14.01, 0)

Tsr 16° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factors vs. Inclination
- Curve Fit to Data: 100 %
- Segment Curvature: 0 %

Vertex Angle: 1
Data Points: Inclination (°), Modifier Factor
- Data Point: (3.99, 1)
- Data Point: (4, 0.9625)
- Data Point: (14, 0.9625)
- Data Point: (14.01, 1)

Points

	X	Y
Point: 1	31.89098 ft	1,615.9785 ft
Point: 2	0.20372 ft	1,616.1218 ft
Point: 3	0.00013 ft	1,440.0349 ft
Point: 4	641.00417 ft	1,440.0028 ft
Point: 5	641.00417 ft	1,510.428 ft
Point: 6	615.76051 ft	1,542.7359 ft
Point: 7	575.78417 ft	1,561.4116 ft
Point: 8	552.23809 ft	1,550.2626 ft
Point: 9	501.36618 ft	1,536.3603 ft
Point: 10	476.40342 ft	1,537.8329 ft
Point: 11	451.21696 ft	1,550.3003 ft
Point: 12	426.26245 ft	1,562.7713 ft
Point: 13	396.7531 ft	1,568.0167 ft
Point: 14	373.38571 ft	1,568.8033 ft
Point: 15	357.59074 ft	1,571.0083 ft
Point: 16	335.72889 ft	1,569.0619 ft
Point: 17	239.67937 ft	1,566.4[illegible] ft
Point: 18	57.[illegible]14 ft	1,601.7[illegible] ft
Point: 19	44.86249 ft	1,604.5664 ft
Point: 20	36.25084 ft	1,605.2571 ft
Point: 21	15.41757 ft	1,615.1354 ft
Point: 22	11.24087 ft	1,615.867 ft
Point: 23	35.51995 ft	1,601.3489 ft
Point: 24	52.5256 ft	1,604.827 ft
Point: 25	297.04026 ft	1,611.0[illegible]3 ft
Point: 26	350.26277 ft	1,574.[illegible] ft
Point: 27	479.11884 ft	1,560.6157 ft
Point: 28	551.33448 ft	1,551.9139 ft
Point: 29	590.050[illegible] ft	1,545.8857 ft
Point: 30	598.94264 ft	1,[illegible].5251 ft
Point: 31	576.73466 ft	1,[illegible].0277 ft
Point: 32	560.19[illegible] ft	1,[illegible]1068 ft
Point: 33	538.[illegible]079 ft	1,572.6228 ft
Point: 34	518.03181 ft	1,575.8857 ft
Point: 35	499.40137 ft	1,[illegible]1956 ft
Point: 36	600.[illegible]4 ft	1,[illegible]2936 ft
Point: 37	66.38368 ft	1,[illegible]0251 ft
Point: 38	643.00045 ft	1,[illegible]9249 ft
Point: 39	5[illegible]1.[illegible]14 ft	1,[illegible]1007 ft
Point: 40	641.00029 ft	1,[illegible]1007 ft
Point: 41	610.98727 ft	1,548.3509 ft
Point: 42	623.30638 ft	1,[illegible].0539 ft
Point: 43	[illegible].02771 ft	1,[illegible]7509 ft
Point: 44	590.72862 ft	1,[illegible].2275 ft
Point: 45	462.14779 ft	1,[illegible].5273 ft
Point: 46	465.[illegible]4 ft	1,[illegible].5273 ft
Point: 47	396.07181 ft	1,[illegible].2957 ft
Point: 48	372.55818 ft	1,[illegible].6776 ft

Point 49	48.248994 ft	1,591.0791 ft
Point 50	502.49616 ft	1,586.6397 ft
Point 51	964.81187 ft	1,585.0616 ft
Point 52	756.65715 ft	1,588.6103 ft
Point 53	500.67165 ft	1,588.6953 ft
Point 54	310.13949 ft	1,575.3465 ft
Point 55	327.76302 ft	1,575.6458 ft
Point 56	350.15623 ft	1,586.9716 ft
Point 57	363.88936 ft	1,587.3853 ft
Point 58	364.8277 ft	1,583.9372 ft
Point 59	587.25023 ft	1,583.2602 ft
Point 60	145.01905 ft	1,606.0007 ft
Point 61	146.40109 ft	1,591.5797 ft

Regions

	Material	Points	Area
Region 1	Till 4-24°	4,14,5,6,7,8,9,10,11,12,13,14,15,16,26,25,17,18,27,19,22,20,21,23	85,450.69 ft²
Region 2	Landslide Material	23,52,53,54,23,24	3,195.6 ft²
Region 3	Landslide Material	26,27,28,29,30,31,0,49,48,47,45,44,50	3,683.7 ft²
Region 4	Landslide Plane	29,30,31,32,33,34,35	820.75 ft²
Region 5	Landslide Plane	35,36,37,38,39,40,5,6,7,8,9,10,11,12,13,14	931.67 ft²
Region 6	Silt	32,30,45,41,42,43,46,31	828.78 ft²
Region 7	Till 4-24°	29,30,41,42,41,46	172.94 ft²
Region 8	Silt	35,36,45,43,44,35,36	2,385.4 ft²
Region 9	Silt	42,46,45,2,21,1,20,22,51	5,586.9 ft²
Region 10	Silt	34,35,15,26	127.36 ft²
Region 11	Silt	52,53,5,4,41,42,47	3,626.3 ft²
Region 12	Silt	51,10,53,15	104.48 ft²
Region 13	Silt	50,52,54,26	571.43 ft²

Slip Results

Slip Surfaces Analyzed: 627 of 46464 converged

Current Slip Surface

Slip Surface: 22,097
Factor of safety: 1.25
Volume: 10,097.971 ft³
Weight: 1,241,810.6 lbf
Resisting Force: 339,161.76 lbf
Activating Force: 175,026.1 lbf
FS Ratio: 1 of 34,848 slices valid
Center: (284.90392, 1,615.4498) ft
Radius: 139.46544 ft
Domain: (457.9139, 1,651.387) ft

Slip Slices

	X	Y	PWP	Effective Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	285.6857 ft	1,614.4479 ft	0 psf	256.59016 psf	149.35495 psf	325 psf	0 psf	Till
Slice 2	296.77331 ft	1,605.8185 ft	0 psf	1,137.1392 psf	664.03838 psf	325 psf	0 psf	Till
Slice 3	305.54644 ft	1,599.0247 ft	0 psf	2,091.109 psf	1,210.1895 psf	325 psf	0 psf	Till
Slice 4	314.37457 ft	1,592.9951 ft	0 psf	3,071.5956 psf	1,658.0901 psf	325 psf	0 psf	Till
Slice 5	316.39265 ft	1,577.9209 ft	0 psf	4,384.8648 psf	829.77574 psf	100 psf	0 psf	Landslide Plane
Slice 6	315.07215 ft	1,575.2386 ft	0 psf	4,086.5408 psf	897.17257 psf	100 psf	0 psf	Landslide Plane
Slice 7	328.70209 ft	1,575.3010 ft	0 psf	4,894.5475 psf	2,935.5796 psf	325 psf	0 psf	Till
Slice 8	340.13176 ft	1,573.9877 ft	0 psf	4,090.8785 psf	2,881.4951 psf	325 psf	0 psf	Till
Slice 9	350.27178 ft	1,572.5835 ft	0 psf	5,087.7096 psf	3,047.3209 psf	325 psf	0 psf	Till
Slice 10	358.10309 ft	1,571.6067 ft	0 psf	5,253.4779 psf	743.81344 psf	100 psf	0 psf	Landslide Plane
Slice 11	366.90747 ft	1,570.5934 ft	0 psf	5,378.9216 psf	765.68613 psf	100 psf	0 psf	Landslide Plane
Slice 12	376.26489 ft	1,569.6098 ft	0 psf	5,280.0019 psf	772.28587 psf	100 psf	0 psf	Landslide Plane
Slice 13	385.70022 ft	1,568.8876 ft	0 psf	5,208.9405 psf	730.90732 psf	100 psf	0 psf	Landslide Plane
Slice 14	395.88744 ft	1,568.2489 ft	0 psf	5,276.746 psf	751.50737 psf	100 psf	0 psf	Landslide Plane
Slice 15	450.63643 ft	1,557.1579 ft	0 psf	5,466.2949 psf	768.10503 psf	100 psf	0 psf	Landslide Plane
Slice 16	461.0102 ft	1,556.1414 ft	0 psf	5,384.1587 psf	750.50135 psf	100 psf	0 psf	Landslide Plane
Slice 17	471.87498 ft	1,556.4351 ft	0 psf	5,106.7503 psf	726.01101 psf	100 psf	0 psf	Landslide Plane
Slice 18	483.68719 ft	1,559.5092 ft	0 psf	4,903.3684 psf	696.35067 psf	100 psf	0 psf	Landslide Plane
Slice 19	495.45943 ft	1,562.1932 ft	0 psf	4,757.0847 psf	666.88253 psf	100 psf	0 psf	Landslide Plane
Slice 20	457.28157 ft	1,560.8771 ft	0 psf	4,521.6603 psf	634.64999 psf	100 psf	0 psf	Landslide Plane
Slice 21	464.90546 ft	1,560.0301 ft	0 psf	4,387.8258 psf	615.94605 psf	100 psf	0 psf	Landslide Plane
Slice 22	477.47491 ft	1,559.126 ft	0 psf	4,256.5499 psf	595.58706 psf	100 psf	0 psf	Landslide Plane
Slice 23	484.31563 ft	1,557.9077 ft	0 psf	4,025.5659 psf	566.35031 psf	100 psf	0 psf	Landslide Plane

Slice 24	494.27296 ft	1,556.2638 ft	0 psf	3,845.7467 psf	540.48445 psf	100 psf	0 psf	Landslide Plane
Slice 25	504.13374 ft	1,555.6418 ft	0 psf	3,681.4304 psf	505.53777 psf	100 psf	0 psf	Landslide Plane
Slice 26	513.74859 ft	1,554.9661 ft	0 psf	3,236.9139 psf	474.913 psf	100 psf	0 psf	Landslide Plane
Slice 27	523.6235 ft	1,554.8718 ft	0 psf	2,908.1885 psf	408.71625 psf	100 psf	0 psf	Landslide Plane
Slice 28	535.5485 ft	1,552.382 ft	0 psf	2,564.7414 psf	364.73796 psf	100 psf	0 psf	Landslide Plane
Slice 29	546.04474 ft	1,551.1064 ft	0 psf	2,341.3845 psf	345.01403 psf	100 psf	0 psf	Landslide Plane
Slice 30	557.05566 ft	1,549.7039 ft	0 psf	2,046.8817 psf	343.81557 psf	100 psf	0 psf	Landslide Plane
Slice 31	565.25851 ft	1,548.823 ft	0 psf	2,449.7344 psf	344.9849 psf	100 psf	0 psf	Landslide Plane
Slice 32	572.95371 ft	1,547.963 ft	0 psf	2,807.1525 psf	328.74535 psf	100 psf	0 psf	Landslide Plane
Slice 33	579.46846 ft	1,548.6293 ft	0 psf	2,295.5 psf	423.81376 psf	100 psf	0 psf	Landslide Plane
Slice 34	587.84439 ft	1,552.1787 ft	0 psf	1,899.6134 psf	1,075.9671 psf	100 psf	0 psf	Landslide Material
Slice 35	595.07984 ft	1,555.0338 ft	0 psf	1,955.4141 psf	882.78386 psf	350 psf	0 psf	Bal
Slice 36	601.93952 ft	1,557.708 ft	0 psf	896.21427 psf	426.52556 psf	350 psf	0 psf	Bal
Slice 37	610.18098 ft	1,561.7031 ft	0 psf	865.16079 psf	168.24334 psf	350 psf	0 psf	Bal

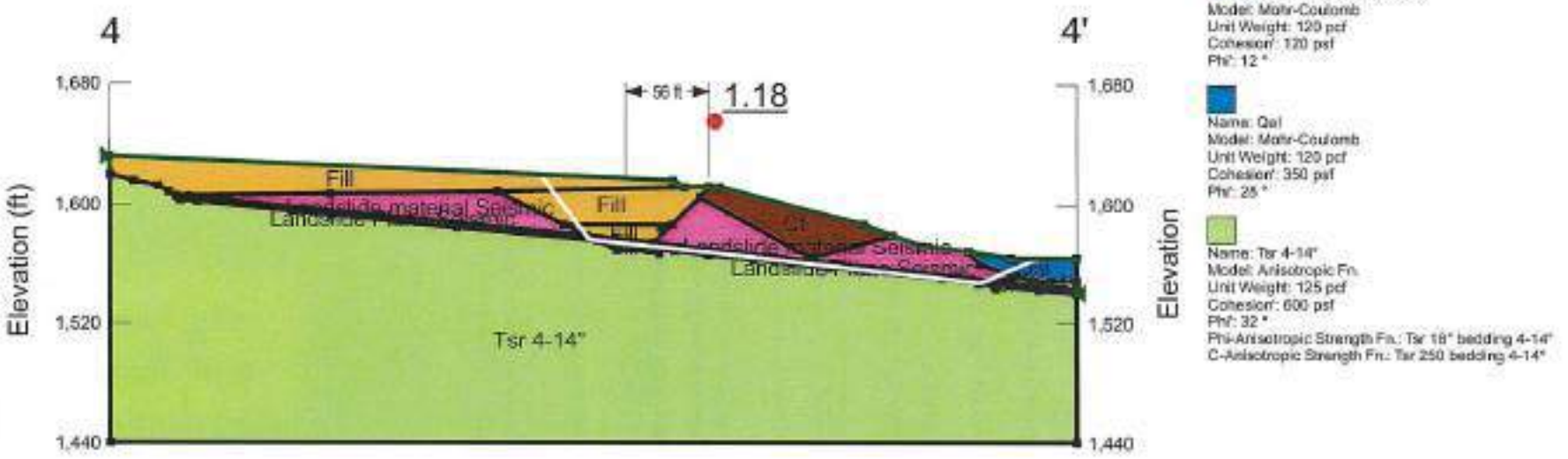
Section 4-4 Tr 68203 SSA MW 12-2 B.gsz

Horz Seismic Coef.: 0.15

3 -Translational Pseudostatic behind key

Section 4-4 Tr 68203 SSA MW 12-2 B.gsz 12/02/2021 02:52:46 PM

Method: Janbu



Name: Cf
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 237 psf
Phi': 30 °

Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Landslide material Seismic
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 200 psf
Phi': 33 °

Name: Landslide Plane Seismic
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 120 psf
Phi': 12 °

Name: Ql
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14"
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14"
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14"

LGC Valley, Inc

GEOTECHNICAL CONSULTING

28532 Constellation Rd, Valencia, CA 91355
Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	203003-01
Engineer:	BIH / MW
Date:	Dec 2021

3 -Translational Pseudostatic behind key

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File Information

File Version: 10.0C
Title: Normal
Created By: Michael Wilson
Last Edited By: Michael Wilson
Revision Number: 238
Date: 12/03/2021
Time: 07:52:46 PM
Tool Version: 10.010.0.7401
File Name: Section A-A Tr FS203 SSA NEW 12-2-21.gsz
Directory: P:\FINAL PROJECTS\Walnut Golden Valley Sierra Investors\Slope stability\Walnut\
Last Solved Date: 12/3/2021
Last Solved Time: 07:52:51 PM

Project Settings

Unit System: US Customary Units

Analysis Settings

3 -Translational Pseudostatic behind key

Kind: SLOPE/W
Param: 3 -Translational Static behind key
Method: Janbu
Settings
PWP Conditions from: [none]
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entire Slip Surfaces from Other
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: [none]
Slices
Slices Generation Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable Convergence: Default: 0.01

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 325 psf
Phi: 30 °
Phi-B: 0 °

Tor 4-14°

Model: Anisotropic fn
Unit Weight: 125 pcf
Cohesion: 600 psf
Phi: 32 °
Phi-Anisotropic Strength Fnc: for 18° bedding 4-14°
Phi-Anisotropic Strength Fnc: for 350 bedding 4-14°
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 250 psf
Phi: 28 °
Phi-B: 0 °

Landslide material Seismic

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 25 °
Phi-B: 0 °

Qf

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 287 psf
Phi: 30 °
Phi-B: 0 °

Landslide Plane Seismic

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 120 psf
Phi: 17 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (-0.24954, 1,631.6795) ft
Right Coordinate: (691.2842, 1,450.0261) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: (Inclination (°), Modifier Factor)
Data Point: (3.99, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.4167)
Data Point: (24.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: (Inclination (°), Modifier Factor)
Data Point: (3.99, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (24.01, 1)

Points

	X	Y
Point 1	31.85098 ft	1,611.07495 ft
Point 2	-0.281471 ft	1,634.18554 ft
Point 3	0.749794 ft	1,640.01317 ft
Point 4	641.00417 ft	1,440.09128 ft
Point 5	641.00417 ft	1,540.425 ft
Point 6	611.74854 ft	1,547.75519 ft
Point 7	575.78813 ft	1,547.81116 ft
Point 8	552.23805 ft	1,550.25826 ft
Point 9	501.06419 ft	1,555.36511 ft
Point 10	470.49787 ft	1,557.88226 ft
Point 11	451.21502 ft	1,559.30652 ft
Point 12	426.86814 ft	1,562.72113 ft
Point 13	396.2941 ft	1,560.02627 ft
Point 14	374.88371 ft	1,568.82003 ft
Point 15	357.55074 ft	1,571.00361 ft
Point 16	335.79169 ft	1,569.03115 ft
Point 17	329.07367 ft	1,584.905 ft
Point 18	57.654414 ft	1,611.7906 ft
Point 19	44.86448 ft	1,626.98611 ft
Point 20	28.29045 ft	1,608.29711 ft
Point 21	19.41757 ft	1,618.13541 ft
Point 22	43.24087 ft	1,640.5617 ft
Point 23	78.51998 ft	1,670.37488 ft
Point 24	52.5256 ft	1,604.552 ft
Point 25	397.04626 ft	1,611.56638 ft
Point 26	360.45777 ft	1,571.2458 ft
Point 27	674.18047 ft	1,580.6167 ft
Point 28	561.32444 ft	1,591.3199 ft
Point 29	590.05015 ft	1,568.8037 ft
Point 30	508.04256 ft	1,553.5251 ft
Point 31	470.73448 ft	1,589.8077 ft
Point 32	789.19258 ft	1,568.306 ft
Point 33	538.52079 ft	1,571.5226 ft
Point 34	508.67161 ft	1,578.8857 ft
Point 35	459.30112 ft	1,585.5056 ft
Point 36	404.1306 ft	1,611.1336 ft
Point 37	46.18164 ft	1,603.0951 ft
Point 38	641.09029 ft	1,563.5259 ft
Point 39	566.71539 ft	1,563.7007 ft
Point 40	641.00025 ft	1,563.7007 ft
Point 41	642.98727 ft	1,548.7503 ft
Point 42	675.39615 ft	1,548.7503 ft
Point 43	617.50561 ft	1,548.7503 ft
Point 44	590.72661 ft	1,611.7735 ft
Point 45	403.14779 ft	1,561.5179 ft
Point 46	465.59974 ft	1,564.5279 ft
Point 47	280.57381 ft	1,611.1957 ft
Point 48	371.85426 ft	1,615.8726 ft
Point 49	-0.24894 ft	1,631.6796 ft
Point 50	372.42616 ft	1,586.8882 ft
Point 51	350.81187 ft	1,589.6616 ft
Point 52	358.8875 ft	1,608.6108 ft
Point 53	300.5786 ft	1,586.6357 ft
Point 54	313.19549 ft	1,570.3461 ft
Point 55	321.56103 ft	1,575.0756 ft
Point 56	350.10603 ft	1,608.9116 ft
Point 57	309.88536 ft	1,567.0835 ft
Point 58	284.3077 ft	1,583.0372 ft
Point 59	287.16923 ft	1,543.2662 ft
Point 60	345.99305 ft	1,606.6007 ft
Point 61	299.46108 ft	1,550.8707 ft

Regions

	Material	Points	Area

Region 1	Tsf 4-14"	1,3 4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21	89,458 ft²
Region 2	Landslide material: Seismic	22,32,53,54,23,44	5,165.9 ft²
Region 3	Landslide material: Seismic	26,27,28,29,30,31,32,33,34,44,45,44,50	5,668.7 ft²
Region 4	Landslide Plane Seismic	37,38,39,38,37,51,58,24	619.73 ft²
Region 5	Landslide Plane Seismic	35,36,37,38,39,38,5,6,7,8,9,10,11,12,13,14	991.67 ft²
Region 6	Qal	32,39,40,41,42,43,50,21	828.75 ft²
Region 7	Tsf 4-14"	29,30,42,42,01,46	179.04 ft²
Region 8	QT	75,44,45,46,34,35,36	4,388.4 ft²
Region 9	Fill	47,48,49,1,2,3,4,5,6,7,8,9	5,585.4 ft²
Region 10	Fill	50,55,15,16	237.38 ft²
Region 11	Fill	52,53,50,43,25,47	2,305.3 ft²
Region 12	Fill	55,16,53,33	304.48 ft²
Region 13	Fill	50,33,54,26	571.43 ft²

Slip Results

Slip Surfaces Analyzed: 1 of 1 surfaces

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.18
Volume: 10,017.071 ft³
Weight: 1,241,917.2 lbf
Resisting Force: 466,505.78 lbf
Activating Force: 344,304.39 lbf
Slip Plane: 1 of 1 slip surfaces
Exit: (616.0035, 1,565.7007) ft
Entry: (384.00391, 1,619.4408) ft
Radius: 135.40564 ft
Center: (457.4938, 1,683.3871) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Seismic Strength	Base Material
Slice 1	288.6957 ft	1,610.4179 ft	0 psf	134.13011 psf	77.474869 psf	325 psf	0 psf	Fill
Slice 2	296.77381 ft	1,603.3966 ft	0 psf	390.55549 psf	514.71274 psf	325 psf	0 psf	Fill

2	ft	ft		psf	psi			
Slice 4	305.34434 ft	1,592.3237 ft	0 psf	2,016.3179 psf	977.59734 psi	325 psf	0 psf	Fill
Slice 6	312.87452 ft	1,587.0855 ft	0 psf	2,353.4234 psf	1,357.5834 psf	325 psf	0 psf	Fill
Slice 5	316.14365 ft	1,577.4089 ft	0 psf	3,787.2098 psf	804.0963 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 6	319.00945 ft	1,576.2395 ft	0 psf	4,687.4663 psf	1,040.868 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 7	325.00229 ft	1,575.3019 ft	0 psf	4,785.4947 psf	2,787.9056 psf	325 psf	0 psf	Fill
Slice 8	340.13726 ft	1,573.0477 ft	0 psf	4,880.2905 psf	2,813.3 psf	325 psf	0 psf	Fill
Slice 9	352.27133 ft	1,577.5634 ft	0 psf	4,675.3044 psf	9,877.4993 psf	325 psf	0 psf	Fill
Slice 10	363.30509 ft	1,578.8067 ft	0 psf	5,718.9167 psf	1,109.2051 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 11	366.51257 ft	1,579.0984 ft	0 psf	5,213.573 psf	1,028.8609 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 12	375.75499 ft	1,579.0593 ft	0 psf	5,213.1053 psf	1,204.3227 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 13	385.70022 ft	1,568.8635 ft	0 psf	5,334.3844 psf	1,091.4746 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 14	393.88764 ft	1,567.0481 ft	0 psf	5,309.7297 psf	1,029.1899 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 15	400.61645 ft	1,567.3874 ft	0 psf	5,394.1169 psf	1,147.6176 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 16	410.38174 ft	1,566.7424 ft	0 psf	5,316.2254 psf	1,179.9569 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 17	421.67495 ft	1,564.7254 ft	0 psf	5,209.1591 psf	1,084.7087 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 18	433.86779 ft	1,563.5092 ft	0 psf	4,890.2758 psf	1,039.4604 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 19	445.45943 ft	1,562.1532 ft	0 psf	4,677.4025 psf	994.23214 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 20	457.35107 ft	1,560.7771 ft	0 psf	4,464.5242 psf	948.06991 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 21	469.30348 ft	1,560.0231 ft	0 psf	4,326.3022 psf	919.69806 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 22	477.70383 ft	1,559.128 ft	0 psf	4,191.5071 psf	828.82802 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 23	484.21663 ft	1,557.8637 ft	0 psf	3,977.5256 psf	845.64476 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 24	491.47205 ft	1,556.7459 ft	0 psf	3,795.9515 psf	806.7448 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 25	504.33348 ft	1,555.8446 ft	0 psf	3,534.3156 psf	751.24153 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 26	513.79899 ft	1,554.5661 ft	0 psf	3,259.8142 psf	678.86624 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 27	523.4039 ft	1,553.4718 ft	0 psf	2,958.0145 psf	501.80662 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 28	538.3485 ft	1,552.362 ft	0 psf	2,519.9154 psf	564.16308 psf	120 psf	0 psf	Landslide Plane Seismic

Slice 29	585.89414 ft	1,551.0064 ft	0 psf	2,417.5464 psf	516.70581 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 30	587.09466 ft	1,549.9889 ft	0 psf	2,412.4852 psf	513.7856 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 31	583.23851 ft	1,548.823 ft	0 psf	2,415.7014 psf	514.48975 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 32	572.96371 ft	1,547.063 ft	0 psf	4,374.0096 psf	504.01139 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 33	571.49845 ft	1,546.0792 ft	0 psf	2,409.0876 psf	512.25968 psf	120 psf	0 psf	Landslide Plane Seismic
Slice 34	567.84418 ft	1,553.1067 ft	0 psf	2,157.7703 psf	1,401.2724 psf	700 psf	0 psf	Landslide material Seismic
Slice 35	585.37984 ft	1,555.0338 ft	0 psf	1,407.3627 psf	780.2212 psf	350 psf	0 psf	Qal
Slice 36	601.53592 ft	1,557.706 ft	0 psf	1,033.0439 psf	540.2702 psf	350 psf	0 psf	Qal
Slice 37	611.18489 ft	1,561.7081 ft	0 psf	444.32566 psf	226.27309 psf	350 psf	0 psf	Qal

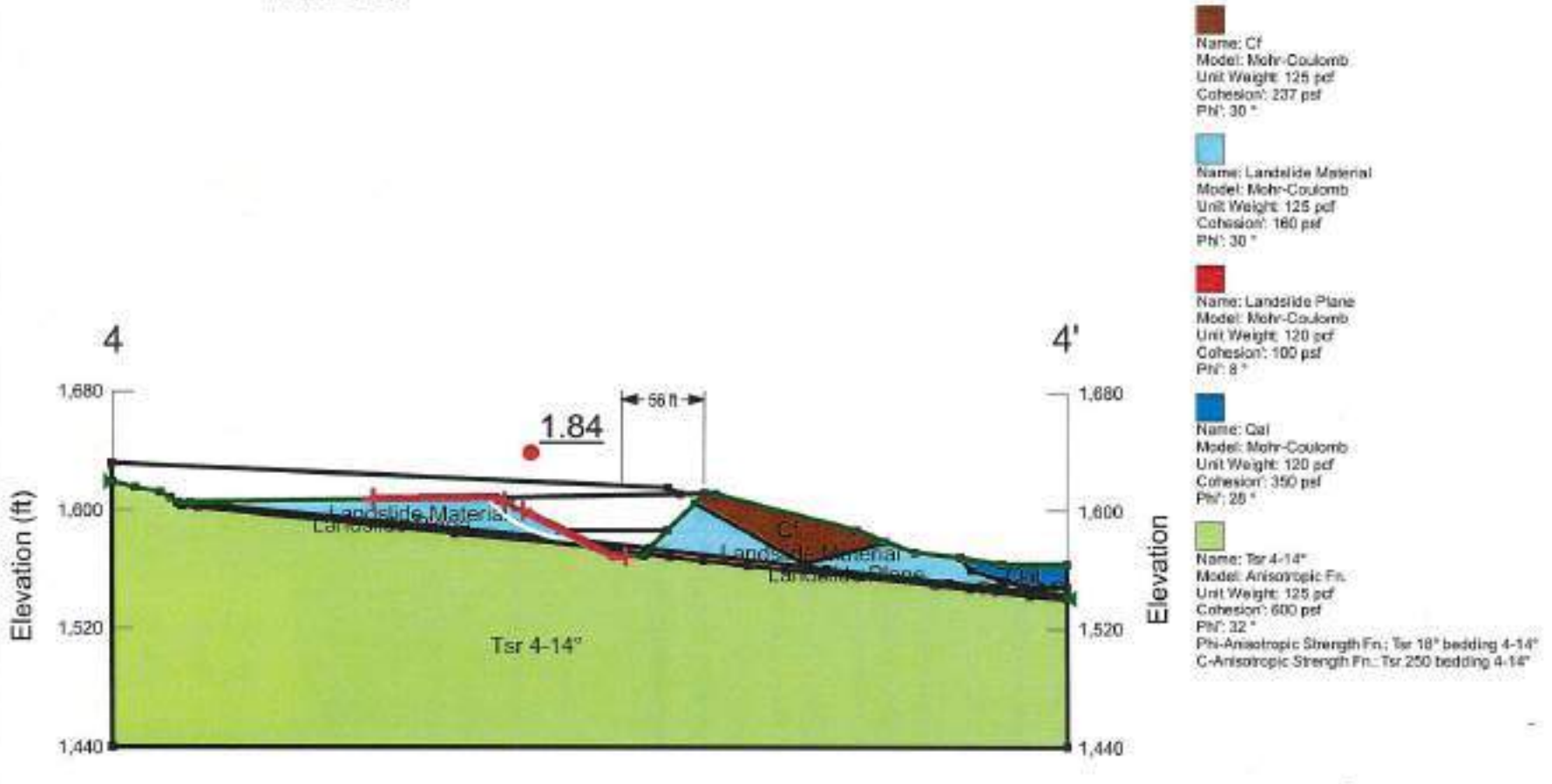
Section 4-4 Tr 68203 SSA MW 12-2 B.gsz

Horz Seismic Coef.: 0

4 -Rotational Static Temp Left

Section 4-4 Tr 68203 SSA MW 12-2 B.gsz 12/02/2021 08:08:37 AM

Method: Bishop



LGC Valley, Inc

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Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	203003-01
Engineer:	BIH / MW
Date:	Dec 2021

4 -Rotational Static Temp Left

Report generated using GeoStudio 2024.1.1.1444 on 12/8/2021 at 8:58:37 AM

File Information

File Version: 10.00
Title: Valborg
Created By: Michal Wilson
Last Edited By: Michal Wilson
Revision Number: 190
Date: 12/02/2021
Time: 09:05:37 AM
Total Version: 10.0.0.17401
3-4 Hilmar Section 1-6 in NAD83 USA Ft.gsz
Directory: P:\PMs_PROJECTS\Hilmar Golden Valley Sierra Rhyolope\Hilmar Golden Valley\Valborg\
Last Solved Date: 12/02/2021
Last Solved Time: 08:58:01 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

4 -Rotational Static Temp Left

Name: SLOPE/W
Method: Bishop
Settings
PWP Conditions from: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Distribution
FoS Calculation Option: Constant
Advanced
Geometry settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerance: Reference FoS: 0.01

Materials

Landslide Material

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 150 psf
Phi': 30 °
Phi-B: 0 °

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 8 °
Phi-B: 0 °

Tsr 4-14°

Model: Anisotropic Fn
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 52 °
Phi-B: Anisotropic Strength Fn 'Tsr 14° bedding 4-14'
Cohesion: Anisotropic Strength Fn 'Tsr 14° bedding 4-14'
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion': 350 psf
Phi': 28 °
Phi-B: 0 °

Qf

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 212 psf
Phi': 30 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (1174.8088, 1,607,479.5) ft
Left-Zone Right Coordinate: (262.89538, 1,605.0095) ft
Left-Zone Increments: 60
Right Type: Range
Right-Zone Left Coordinate: (271.70158, 1,599.611) ft
Right-Zone Right Coordinate: (340.81045, 1,598.0058) ft
Right-Zone Increments: 60
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (-0.00031, 1,634.1884) ft
Right Coordinate: (581.00417, 1,540.4281) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y Increment: 1
Data Points: Inclination [°], Modifier Factor
Data Point: (2.59, 1)
Data Point: (4, 0.4264)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y Increment: 1
Data Points: Inclination [°], Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.4264)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	31.85098 ft	1,611.9785 ft
Point 2	0.20371 ft	1,619.1805 ft
Point 3	[illegible]	[illegible]
Point 4	641.70417 ft	1,440.6028 ft
Point 5	641.70417 ft	1,540.628 ft
Point 6	615.74664 ft	1,542.7559 ft
Point 7	575.78812 ft	1,547.4116 ft
Point 8	552.29805 ft	1,550.2826 ft
Point 9	501.86412 ft	1,555.3661 ft
Point 10	470.45307 ft	1,557.3776 ft
Point 11	451.31594 ft	1,559.3062 ft
Point 12	436.20241 ft	1,562.7113 ft
Point 13	396.2531 ft	1,559.0207 ft
Point 14	373.88871 ft	1,558.8003 ft
Point 15	357.30074 ft	1,561.1068 ft
Point 16	335.70889 ft	1,560.0716 ft
Point 17	229.07557 ft	1,584.309 ft

Point 18	97.664014 ft	1,601.7806 ft
Point 19	44.86249 ft	1,605.2264 ft
Point 20	59.25245 ft	1,618.2431 ft
Point 21	35.41757 ft	1,615.7956 ft
Point 22	42.24507 ft	1,605.602 ft
Point 23	78.51996 ft	1,602.3498 ft
Point 24	52.0156 ft	1,606.853 ft
Point 25	437.04626 ft	1,611.6809 ft
Point 26	360.16777 ft	1,574.0946 ft
Point 27	472.1884 ft	1,580.6167 ft
Point 28	561.12414 ft	1,551.5159 ft
Point 29	540.05015 ft	1,548.8937 ft
Point 30	506.04756 ft	1,552.3251 ft
Point 31	570.71455 ft	1,545.5277 ft
Point 32	559.15258 ft	1,548.305 ft
Point 33	538.52079 ft	1,571.6228 ft
Point 34	518.63143 ft	1,578.8857 ft
Point 35	493.30112 ft	1,586.5966 ft
Point 36	464.1866 ft	1,611.2336 ft
Point 37	46.38368 ft	1,609.6291 ft
Point 38	503.00023 ft	1,548.5239 ft
Point 39	580.11539 ft	1,563.7007 ft
Point 40	541.00045 ft	1,563.7007 ft
Point 41	540.08727 ft	1,548.7503 ft
Point 42	521.29616 ft	1,563.7503 ft
Point 43	512.85551 ft	1,548.7503 ft
Point 44	390.72866 ft	1,619.4245 ft
Point 45	461.14779 ft	1,564.5773 ft
Point 46	466.65914 ft	1,564.5773 ft
Point 47	360.67181 ft	1,611.2957 ft
Point 48	503.65818 ft	1,615.4736 ft
Point 49	40.24894 ft	1,651.6796 ft
Point 50	372.42615 ft	1,586.6807 ft
Point 51	355.82187 ft	1,560.0616 ft
Point 52	356.58715 ft	1,564.4106 ft
Point 53	370.0785 ft	1,564.6844 ft
Point 54	315.19949 ft	1,539.2461 ft
Point 55	342.56502 ft	1,575.6656 ft

Regions

	Material	Points	Area
Region 1	Tsr 4-14°	1,2,4,5,6,7,8,9,10,11,12,13,14,15,51,16,55,17,18,37,19,22,20,1,21	26,458 ft²
Region 2	Candidate Material	22,51,53,54,23,24	4,290.9 ft²
Region 3	Candidate Material	49,21,38,39,40,41,42,43,44,45,46,47,48,50	3,568.1 ft²
Region 4	Candidate Plane	22,15,37,16,17,56,54,24	410.7 ft²
Region 5	Candidate Plane	35,26,27,28,25,58,5,6,7,8,9,10,11,12,55,14	441.6 ft²
Region 6	Oil	3,3,3,40,41,42,43,44,53	838.7 ft²

Region 7	fpr 1=[C*	29,30,35,42,41,48	175.04 ft²
Region 8	CF	25,44,45,46,34,35,36	2,358.4 ft²
Region 9		47,48,42,2,27,1,29,32,52	5,556.1 ft²
Region 10		54,55,15,23	127.38 ft²
Region 11		52,53,50,44,25,51	7,506.3 ft²
Region 12		56,16,51,13	102.48 ft²
Region 13		50,54,24,25	571.45 ft²

Slip Results

Slip Surfaces Analyzed: 79059 of 86415 converged

Current Slip Surface

Slip Surface: 84 Slid
Factor of Safety: 1.84
Volume: 451,97284 ft³
Weight: 56,496.606 lbf
Resisting Moment: 3,151,691.3 lbf-ft
Activating Moment: 1,711,641.1 lbf-ft
Slip Rank: 1 of 86,415 slip surfaces
Exit: (315.08679, 1,580.6017) ft
Entry: (291.21984, 1,608.3353) ft
Radius: 75.125402 ft
Center: (309.86952, 1,615.4575) ft

Slip Slices

	X	Y	PWP	Raw Normal Stress	Mobilized Strength	Cohesive Strength	Friction Strength	Base Material
Slice 1	282.13106 ft	1,607.4801 ft	0 psf	24.794751 psf	14.315279 psi	100 psf	0 psf	Landslide Material
Slice 2	283.95349 ft	1,605.1364 ft	0 psf	238.91514 psf	137.90422 psi	100 psf	0 psf	Landslide Material
Slice 3	285.77591 ft	1,602.8927 ft	0 psf	435.61617 psf	285.79172 psi	100 psf	0 psf	Landslide Material
Slice 4	287.73656 ft	1,601.406 ft	0 psf	576.98627 psf	333.12218 psi	100 psf	0 psf	Landslide Material
Slice 5	289.82939 ft	1,599.409 ft	0 psf	679.74009 psf	387.43365 psi	100 psf	0 psf	Landslide Material
Slice 6	291.92412 ft	1,597.4535 ft	0 psf	770.32958 psf	444.75305 psi	100 psf	0 psf	Landslide Material
Slice 7	294.01905 ft	1,595.4968 ft	0 psf	848.2519 psf	489.83803 psi	100 psf	0 psf	Landslide Material
Slice 8	296.11397 ft	1,593.5177 ft	0 psf	917.16408 psf	529.62493 psi	100 psf	0 psf	Landslide Material
Slice 9	298.20889 ft	1,592.9075 ft	0 psf	974.39642 psf	562.66886 psi	100 psf	0 psf	Landslide Material

Slice 10	270.30252 ft	1,601.5196 ft	0 psf	1,021.3408 psf	589.6887 psf	100 psf	0 psf	Landslide Material
Slice 11	272.30883 ft	1,599.3867 ft	0 psf	1,059.4281 psf	611.68572 psf	100 psf	0 psf	Landslide Material
Slice 12	274.44417 ft	1,597.2041 ft	0 psf	1,085.8648 psf	626.94891 psf	100 psf	0 psf	Landslide Material
Slice 13	276.5084 ft	1,595.1254 ft	0 psf	1,104.8967 psf	637.94678 psf	100 psf	0 psf	Landslide Material
Slice 14	278.68282 ft	1,593.1318 ft	0 psf	1,117.7037 psf	645.35385 psf	100 psf	0 psf	Landslide Material
Slice 15	280.77765 ft	1,591.2133 ft	0 psf	1,112.525 psf	642.37665 psf	100 psf	0 psf	Landslide Material
Slice 16	282.87248 ft	1,589.2932 ft	0 psf	1,109.8352 psf	637.13638 psf	100 psf	0 psf	Landslide Material
Slice 17	284.9673 ft	1,587.5851 ft	0 psf	1,085.3065 psf	626.94026 psf	100 psf	0 psf	Landslide Material
Slice 18	287.06213 ft	1,585.8926 ft	0 psf	1,059.5459 psf	611.71429 psf	100 psf	0 psf	Landslide Material
Slice 19	289.15696 ft	1,584.2078 ft	0 psf	1,024.552 psf	591.52145 psf	100 psf	0 psf	Landslide Material
Slice 20	291.25178 ft	1,582.6887 ft	0 psf	981.05658 psf	566.38766 psf	100 psf	0 psf	Landslide Material
Slice 21	293.34661 ft	1,582.384 ft	0 psf	938.90335 psf	542.03757 psf	100 psf	0 psf	Landslide Material
Slice 22	295.44144 ft	1,582.0792 ft	0 psf	898.35185 psf	501.84506 psf	100 psf	0 psf	Landslide Material
Slice 23	297.53625 ft	1,581.8623 ft	0 psf	799.156 psf	461.39467 psf	100 psf	0 psf	Landslide Material
Slice 24	299.63108 ft	1,581.6483 ft	0 psf	721.36755 psf	416.48682 psf	100 psf	0 psf	Landslide Material
Slice 25	301.71359 ft	1,580.7856 ft	0 psf	635.036 psf	366.67241 psi	100 psf	0 psf	Landslide Material
Slice 26	303.78357 ft	1,580.5678 ft	0 psf	540.2577 psf	312.01504 psi	100 psf	0 psf	Landslide Material
Slice 27	305.85582 ft	1,580.4477 ft	0 psf	438.7209 psf	253.1497 psi	100 psf	0 psf	Landslide Material
Slice 28	307.92807 ft	1,580.3648 ft	0 psf	324.27321 psf	187.21522 psi	100 psf	0 psf	Landslide Material
Slice 29	309.99917 ft	1,580.3393 ft	0 psf	202.72555 psf	117.04965 psi	100 psf	0 psf	Landslide Material
Slice 30	312.06614 ft	1,580.3397 ft	0 psf	77.400826 psf	44.688862 psi	100 psf	0 psf	Landslide Material

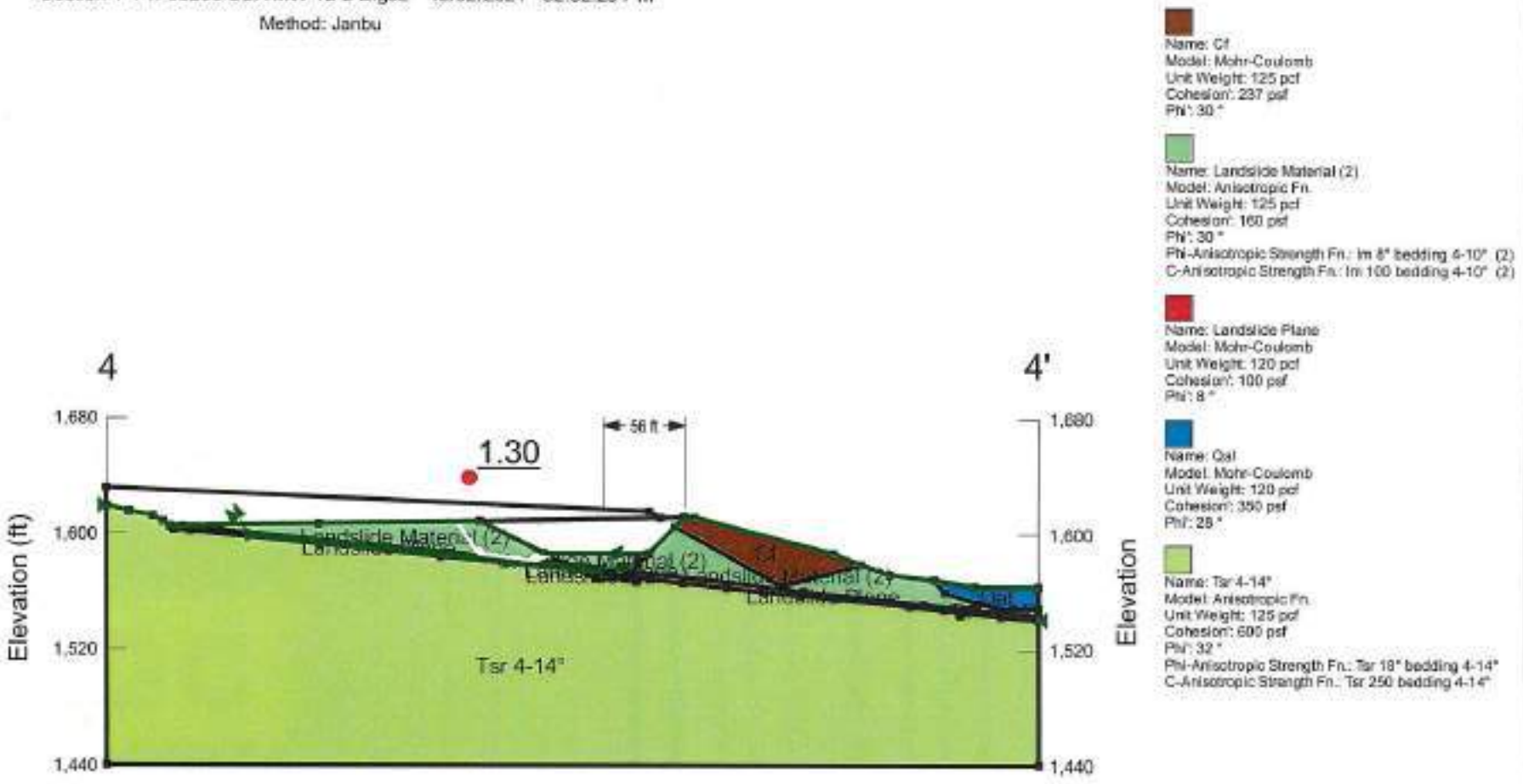
Section 4-4 Tr 68203 SSA MW 12-2 B.gsz

Horz Seismic Coef.: 0

6 -Translational Static Temp Left

Section 4-4 Tr 68203 SSA MW 12-2 B.gsz 12/02/2021 02:52:29 PM

Method: Janbu



LGC

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GEOTECHNICAL CONSULTING

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Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	203003-01
Engineer:	BIH / MW
Date:	Dec 2021

6 -Translational Static Temp Left

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File Information

File Version: 10.002
Title: Version
Created By: Michel Wilson
Last Edited By: Michel Wilson
Revision Number: 237
Date: 12/02/2021
Time: 02:52:29 PM
Tool Version: 10.010.0.7440
File Name: Section 4-4 Tr(8200 SSR MW 12 2 21.gsz
Directory: P:\PROJECTS\Valley Center Golden Valley Sierra Heights\Slope stability\Valley\
Last Solved Date: 12/02/2021
Last Solved Time: 02:52:35 PM

Project Settings

Units System: U.S. Customary Units

Analysis Settings

6 -Translational Static Temp Left

Kind: SLOPE/W
Method: Janbu
Settings
PWP Conditions from: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Left to Right
Use Passed Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Restrict Block Crossings: Yes
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Distribution
F of S Distribution Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable difference in F of S: 0.01

Materials

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 400 psf
Phi: 8 °
Phi-B: 0 °

Tsr 4-14°

Model: Anisotropic Fn
Unit Weight: 125 pcf
Cohesion: 600 psf
Phi: 32 °
Phi-Anisotropic Strength Fn: Tsr 18° bedding 4-14°
Cohesion Anisotropic Strength Fn: Tsr 220 bedding 4-14°
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 350 psf
Phi: 28 °
Phi-B: 0 °

Cf

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 287 psf
Phi: 30 °
Phi-B: 0 °

Landslide Material (2)

Model: Anisotropic Fn
Unit Weight: 125 pcf
Cohesion: 360 psf
Phi: 30 °
Phi-Anisotropic Strength Fn: Tsr 18° bedding 4-14° (2)
Cohesion Anisotropic Strength Fn: Tsr 100 bedding 4-14° (2)
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (-6,830.171, 1,615.380) ft
Right Coordinate: (641.0417, 1,640.428) ft

Slip Surface Block

Left Grid
Upper Left: (96.11729, 1,631.0417) ft
Lower Left: (96.11808, 1,558.8205) ft
Lower Right: (274.0688, 1,579.279) ft

Y Increments: 10
X Increments: 10
Starting Angle: 135°
Ending Angle: 135°
Angle Increments: 1
Right Grid
Upper Left: (275.42273, 1,583.6582) ft
Lower Left: (275.42273, 1,573.0785) ft
Lower Right: (340.7139, 1,573.0785) ft
X Increments: 10
Y Increments: 10
Angle Increments: 1

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (-90, 1)
Data Point: (-1, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 10° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (-90, 1)
Data Point: (-1, 0.5625)
Data Point: (1.1, 0.5625)
Data Point: (14.01, 1)

Im 100 bedding 4-10° (2)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (-90.01, 1)

Data Point: (-1.1, 0.525)
Data Point: (1.1, 0.525)
Data Point: (90, 1)

Im 8° bedding 4-10° (2)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (-90.01, 1)
Data Point: (-90, 0.26)
Data Point: (-8.1, 0.26)
Data Point: (0, 1)

Points

	X	Y
Point 1	341.88099 ft	1,611.2785 ft
Point 2	0.00871 ft	1,610.9815 ft
Point 3	0.00023 ft	1,607.0187 ft
Point 4	340.00417 ft	1,440.0028 ft
Point 5	341.00417 ft	1,540.428 ft
Point 6	515.74964 ft	1,542.7559 ft
Point 7	575.79817 ft	1,547.4116 ft
Point 8	552.73899 ft	1,550.2926 ft
Point 9	501.96419 ft	1,556.3651 ft
Point 10	476.49067 ft	1,557.8076 ft
Point 11	451.21599 ft	1,560.6202 ft
Point 12	426.26241 ft	1,562.7211 ft
Point 13	396.3361 ft	1,566.0267 ft
Point 14	371.08971 ft	1,568.8201 ft
Point 15	342.59074 ft	1,571.0782 ft
Point 16	333.70889 ft	1,569.0519 ft
Point 17	325.67087 ft	1,569.035 ft
Point 18	57.65824 ft	1,601.7806 ft
Point 19	44.85249 ft	1,604.5964 ft
Point 20	39.23026 ft	1,606.2273 ft
Point 21	15.43257 ft	1,615.0364 ft
Point 22	49.24087 ft	1,606.662 ft
Point 23	78.51996 ft	1,602.3489 ft
Point 24	52.5355 ft	1,604.892 ft
Point 25	337.00628 ft	1,621.0503 ft
Point 26	360.26777 ft	1,594.2595 ft
Point 27	475.18843 ft	1,560.6167 ft
Point 28	468.12464 ft	1,551.9749 ft
Point 29	590.20015 ft	1,548.8937 ft
Point 30	598.94254 ft	1,592.5751 ft
Point 31	576.73483 ft	1,559.9277 ft

Point 52	569.59258 ft	1,568.306 ft
Point 53	568.520078 ft	1,570.6279 ft
Point 54	570.4401 ft	1,578.8853 ft
Point 55	499.30112 ft	1,586.5955 ft
Point 56	409.1866 ft	1,601.2116 ft
Point 57	46.98268 ft	1,609.0251 ft
Point 58	641.00029 ft	1,543.5735 ft
Point 59	396.71339 ft	1,543.7207 ft
Point 60	642.00023 ft	1,528.7207 ft
Point 61	640.69727 ft	1,548.7503 ft
Point 62	628.39618 ft	1,548.7503 ft
Point 63	612.80351 ft	1,548.7506 ft
Point 64	390.72862 ft	1,605.2275 ft
Point 65	483.24729 ft	1,568.5771 ft
Point 66	469.60914 ft	1,564.5275 ft
Point 67	360.67181 ft	1,611.2967 ft
Point 68	372.259832 ft	1,615.6776 ft
Point 69	-0.14824 ft	1,611.6796 ft
Point 70	372.42616 ft	1,566.6387 ft
Point 71	356.81287 ft	1,569.1061 ft
Point 72	356.63711 ft	1,608.6308 ft
Point 73	300.6786 ft	1,586.6367 ft
Point 74	315.10849 ft	1,579.9961 ft
Point 75	322.58302 ft	1,575.6556 ft
Point 76	350.16633 ft	1,568.9115 ft
Point 77	363.89036 ft	1,567.0434 ft
Point 78	364.8077 ft	1,562.9172 ft
Point 79	567.26023 ft	1,543.2503 ft
Point 80	145.99305 ft	1,606.6301 ft
Point 81	146.461178 ft	1,551.5777 ft

Regions

	Material	Points	Area
Region 1	Top 4-1/4"	2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,55,17,18,37,19,20,21,1	86,978 ft²
Region 2	Landslide Material (2)	22,23,53,54,21,24	3,195.9 ft²
Region 3	Landslide Material (2)	26,27,28,29,30,31,32,33,34,48,49,44,25	3,668.7 ft²
Region 4	Landslide Plane	22,19,52,18,17,51,56,24	819.73 ft²
Region 5	Landslide Plane	35,36,37,38,39,40,5,6,7,8,9,10,11,12,13,14	983.67 ft²
Region 6	Clay	32,33,40,41,42,43,30,31	878.06 ft²
Region 7	Top 4-1/4"	29,30,43,42,41,28	1,133.04 ft²
Region 8	Clay	25,44,45,46,34,26,26	2,382.4 ft²

Region 9		47,45,49,2,21,1,20,22,52	1,554.4 ft²
Region 10	Landslide Plane	50,55,15,26	227.38 ft²
Region 11		54,56,50,44,25,47	2,518.3 ft²
Region 12	Landslide Plane	55,15,51,25	704.28 ft²
Region 13	Landslide Material (2)	30,33,54,26	572.43 ft²

Slip Results

Slip Surface Analysis: 1076 of 11970 converged

Current Slip Surface

Slip Surface: 905
Factor of Safety: 1.30
Volume: 810.57226 ft³
Weight: 102,866.89 lbf
Resisting Force: 29,194.862 lbf
Activating Force: 22,429.47 lbf
Slip Point: 8 of 11,979 slip surfaces
Exit: (306.02075, 1,582.454) ft
Entry: (240.14672, 1,608.3623) ft
Radius: 36.141706 ft
Center: (278.84649, 1,615.8384) ft

Slip Slices

	X	Y	Pwp	Base Normal Stress	Frictional Strength	Cohesive Strength	Shear Strength	Base Material
Slice 1	241.16887 ft	1,606.7508 ft	0 psf	11.143807 psf	2.4782743 psf	144 psf	0 psf	Landslide Material (2)
Slice 2	243.50562 ft	1,603.5838 ft	0 psf	259.24512 psf	151.40725 psf	160 psf	0 psf	Landslide Material (2)
Slice 3	247.24057 ft	1,600.3849 ft	0 psf	508.53841 psf	298.6363 psf	160 psf	0 psf	Landslide Material (2)
Slice 4	247.98552 ft	1,597.1859 ft	0 psf	756.4337 psf	458.38512 psf	160 psf	0 psf	Landslide Material (2)
Slice 5	250.22545 ft	1,593.9869 ft	0 psf	1,002.328 psf	578.60459 psf	160 psf	0 psf	Landslide Material (2)
Slice 6	252.4654 ft	1,590.788 ft	0 psf	1,248.0223 psf	726.17939 psf	160 psf	0 psf	Landslide Material (2)
Slice 7	254.70535 ft	1,587.589 ft	0 psf	1,495.7166 psf	873.97376 psf	160 psf	0 psf	Landslide Material (2)
Slice 8	256.25623 ft	1,585.2916 ft	0 psf	2,794.4905 psf	382.38603 psf	100 psf	0 psf	Landslide Material (2)
Slice 9	257.31078 ft	1,583.7889 ft	0 psf	2,748.2467 psf	375.91908 psf	100 psf	0 psf	Landslide Material (2)
Slice 10	260.05685 ft	1,586.3101 ft	0 psf	2,636.4644 psf	361.1507 psf	100 psf	0 psf	Landslide

	ft	ft		psf	psf			Material [2]
Slice 11	263.807107 ft	1,589.2693 ft	0 psf	2,529.6825 psf	946.38636 psf	100 psf	0 psf	Landslide Material [2]
Slice 12	264.54979 ft	1,585.0393 ft	0 psf	2,420.8593 psf	931.62202 psf	100 psf	0 psf	Landslide Material [2]
Slice 13	266.75626 ft	1,584.7593 ft	0 psf	2,314.1774 psf	918.85764 psf	100 psf	0 psf	Landslide Material [2]
Slice 14	269.04273 ft	1,584.52 ft	0 psf	2,208.2263 psf	907.09158 psf	100 psf	0 psf	Landslide Material [2]
Slice 15	271.2892 ft	1,584.2702 ft	0 psf	2,097.5529 psf	897.329 psf	100 psf	0 psf	Landslide Material [2]
Slice 16	273.53567 ft	1,584.0204 ft	0 psf	1,989.7706 psf	272.56856 psf	100 psf	0 psf	Landslide Material [2]
Slice 17	275.78214 ft	1,583.7706 ft	0 psf	1,881.9883 psf	257.80032 psf	100 psf	0 psf	Landslide Material [2]
Slice 18	278.02861 ft	1,583.5208 ft	0 psf	1,774.2059 psf	243.03208 psf	100 psf	0 psf	Landslide Material [2]
Slice 19	280.27508 ft	1,583.271 ft	0 psf	1,666.4235 psf	228.26384 psf	100 psf	0 psf	Landslide Material [2]
Slice 20	282.52155 ft	1,583.0212 ft	0 psf	1,558.6413 psf	213.5073 psf	100 psf	0 psf	Landslide Material [2]
Slice 21	284.76802 ft	1,582.7715 ft	0 psf	1,450.859 psf	198.74296 psf	100 psf	0 psf	Landslide Material [2]
Slice 22	287.01449 ft	1,582.5217 ft	0 psf	1,343.0767 psf	183.97852 psf	100 psf	0 psf	Landslide Material [2]
Slice 23	289.26096 ft	1,582.2719 ft	0 psf	1,235.2944 psf	169.21408 psf	100 psf	0 psf	Landslide Material [2]
Slice 24	291.50743 ft	1,582.0221 ft	0 psf	1,127.5121 psf	154.44964 psf	100 psf	0 psf	Landslide Material [2]
Slice 25	293.7539 ft	1,581.7723 ft	0 psf	1,019.7298 psf	139.6852 psf	100 psf	0 psf	Landslide Material [2]
Slice 26	296.00037 ft	1,581.5225 ft	0 psf	911.9474 psf	124.92076 psf	100 psf	0 psf	Landslide Material [2]
Slice 27	298.24684 ft	1,581.2728 ft	0 psf	804.1651 psf	110.15632 psf	100 psf	0 psf	Landslide Material [2]
Slice 28	300.49331 ft	1,581.023 ft	0 psf	696.3827 psf	95.391884 psf	100 psf	0 psf	Landslide Material [2]
Slice 29	302.73978 ft	1,580.7732 ft	0 psf	588.6004 psf	80.627444 psf	100 psf	0 psf	Landslide Material [2]
Slice 30	304.98625 ft	1,580.5234 ft	0 psf	480.8181 psf	65.863004 psf	100 psf	0 psf	Landslide Material [2]
Slice 31	307.23272 ft	1,580.2736 ft	0 psf	373.0358 psf	51.098564 psf	100 psf	0 psf	Landslide Material [2]

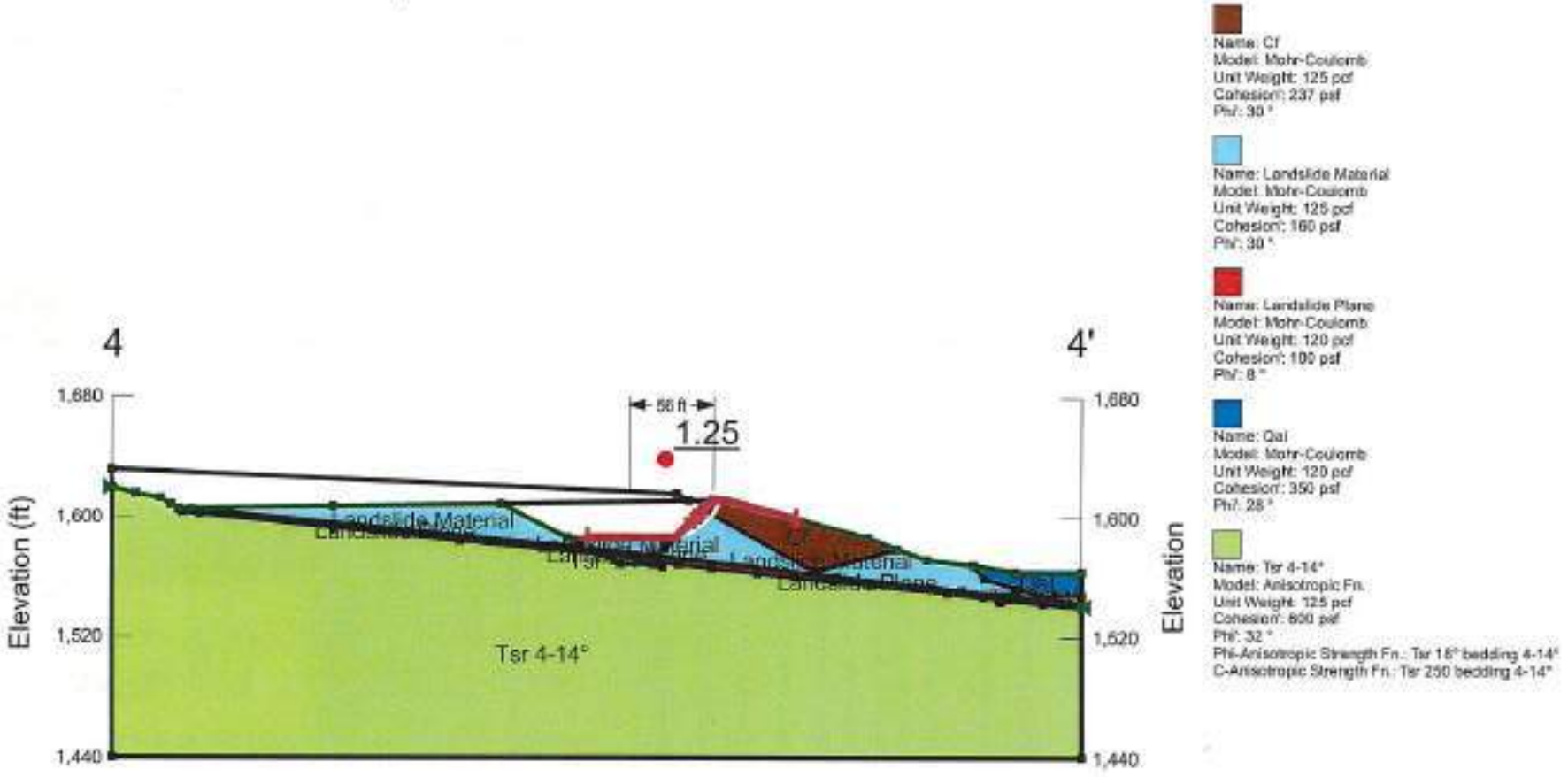
Section 4-4 Tr 68203 SSA MW 12-2 B.gsz

Horz Seismic Coef.: 0

7 -Rotational Static Temp Right

Section 4-4 Tr 68203 SSA MW 12-2 B.gsz 12/02/2021 03:08:59 PM

Method: Bishop



LGC

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Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	**203003-01**
Engineer:	**BIH / MW**
Date:	**Dec 2021**

7 -Rotational Static Temp Right

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File Information

File Version: 10.001
Units: Imperial
Created By: Michal Wilson
Last Saved By: Michal Wilson
Revision Number: 249
Date: 12/2/2021
Time: 03:05:10 PM
Tool Version: 10.0.0.17401
File Name: Section 4-4 Tsr 08203 SSA MW 12-1 Right
Directory: D:\FINAL PROJECTS\Valuair Golden Valley Sierra Rock\slope stability\valuair\
Last Solved Date: 12/02/2021
Last Solved Time: 03:05:10 PM

Project Settings

Units System: U.S. Customary Units

Analysis Settings

7 -Rotational Static Temp Right

Kind: SLOPE/W
Method: Bishop
Settings
PWP Conditions from: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of Movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical Slip Surface Search: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Optimization
Factor of Safety Calculation Options Constant
Advanced
Locations Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable Difference in F of S: 0.01

Materials

Landslide Material

Model: Mohr-Coulomb
Unit Weight: 135 pcf
Cohesion: 100 psf
Phi: 30 °
Phi-B: 0 °

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 135 pcf
Cohesion: 100 psf
Phi: 8 °
Phi-B: 0 °

Tsr 4-14"

Model: Anisotropic Fn
Unit Weight: 135 pcf
Cohesion: 600 psf
Phi: 30 °
Phi-Anisotropic Strength Fn: Tsr 10° bedding 4-14"
Phi-Anisotropic Strength Fn: Tsr 250 bedding 4-14"
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 350 psf
Phi: 28 °
Phi-B: 0 °

Cl

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 30 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left Zone Left Coordinate: (514,855.6, 1,536,636.4) ft
Left Zone Right Coordinate: (514,910.8, 1,599,022.) ft
Left Zone Increment: 80
Right Type: Range
Right Zone Left Coordinate: (588,073.5, 1,602,488.6) ft
Right Zone Right Coordinate: (451,642.2, 1,598,940.6) ft
Right Zone Increment: 80
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (-0.00371, 1,610,126.5) ft
Right Coordinate: (641,004.17, 1,540,428.) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14"

Model: Spline Data Point Function
Function Modifier Relative to Horizontal
Curve Fit to Data: 100%
Segment Curvature: 0%
Y Intercept: 1
Data Points: (Orientation (°), Modifier Factor)
Data Point: (-5.99, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18" bedding 4-14"

Model: Spline Data Point Function
Function Modifier Relative to Horizontal
Curve Fit to Data: 100%
Segment Curvature: 0%
Y Intercept: 1
Data Points: (Orientation (°), Modifier Factor)
Data Point: (-5.99, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	31.89098 ft	1,613.9755 ft
Point 2	-0.03571 ft	1,619.1801 ft
Point 3	0.07023 ft	1,440.0014 ft
Point 4	641.00423 ft	1,440.0018 ft
Point 5	641.00417 ft	1,540.4426 ft
Point 6	575.74964 ft	1,563.7559 ft
Point 7	575.78817 ft	1,547.4136 ft
Point 8	552.23805 ft	1,550.2826 ft
Point 9	501.06420 ft	1,556.4651 ft
Point 10	476.45747 ft	1,557.6306 ft
Point 11	451.21599 ft	1,560.3002 ft
Point 12	426.06143 ft	1,562.7211 ft
Point 13	396.2991 ft	1,566.0267 ft
Point 14	373.6877 ft	1,568.8261 ft
Point 15	357.59994 ft	1,571.0083 ft
Point 16	338.70988 ft	1,569.0510 ft
Point 17	325.67067 ft	1,568.335 ft

Point 18	57.65414 ft	1,601.7806 ft
Point 19	44.86649 ft	1,604.5964 ft
Point 20	49.24094 ft	1,608.2971 ft
Point 21	55.47757 ft	1,615.1354 ft
Point 22	63.24083 ft	1,605.862 ft
Point 23	76.57446 ft	1,602.3489 ft
Point 24	97.5256 ft	1,601.832 ft
Point 25	397.04508 ft	1,611.6503 ft
Point 26	380.76077 ft	1,574.2595 ft
Point 27	479.18827 ft	1,560.6167 ft
Point 28	561.82444 ft	1,551.9295 ft
Point 29	580.05015 ft	1,548.8997 ft
Point 30	599.64756 ft	1,579.5251 ft
Point 31	576.73483 ft	1,580.0777 ft
Point 32	560.10258 ft	1,568.206 ft
Point 33	538.52079 ft	1,571.0226 ft
Point 34	518.68161 ft	1,578.8857 ft
Point 35	496.30112 ft	1,586.5766 ft
Point 36	484.1830 ft	1,611.2436 ft
Point 37	46.58868 ft	1,603.0251 ft
Point 38	641.00013 ft	1,545.5291 ft
Point 39	641.71188 ft	1,545.7007 ft
Point 40	641.00423 ft	1,563.2007 ft
Point 41	640.98727 ft	1,548.7503 ft
Point 42	629.39018 ft	1,548.7503 ft
Point 43	612.80352 ft	1,548.7501 ft
Point 44	591.47017 ft	1,565.2375 ft
Point 45	563.14779 ft	1,564.5213 ft
Point 46	466.65914 ft	1,564.5273 ft
Point 47	310.67181 ft	1,611.7417 ft
Point 48	107.85818 ft	1,615.6376 ft
Point 49	-0.26484 ft	1,631.0796 ft
Point 50	372.42616 ft	1,585.5307 ft
Point 51	355.03147 ft	1,589.7616 ft
Point 52	256.68725 ft	1,589.5138 ft
Point 53	300.6785 ft	1,585.6217 ft
Point 54	315.19849 ft	1,570.2481 ft
Point 55	332.54327 ft	1,575.8056 ft
Point 56	359.15073 ft	1,586.3116 ft
Point 57	363.83036 ft	1,587.2893 ft
Point 58	364.8077 ft	1,583.6932 ft
Point 59	347.21015 ft	1,593.2662 ft
Point 60	145.99965 ft	1,606.5007 ft
Point 61	146.46109 ft	1,590.5757 ft

Regions

	Material	Points	Area

Region 1	Slide Name	4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25	86,950 ft²
Region 2	Landslide Material	21,22,23,24,25,26	1,286.8 ft²
Region 3	Landslide Material	25,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50	3,386.7 ft²
Region 4	Landslide Name	23,28,27,26,27,25,24,27	809.75 ft²
Region 5	Landslide Name	13,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100,101,102,103,104,105,106,107,108,109,110,111,112,113,114,115,116,117,118,119,120,121,122,123,124,125,126,127,128,129,130,131,132,133,134,135,136,137,138,139,140,141,142,143,144,145,146,147,148,149,150,151,152,153,154,155,156,157,158,159,160,161,162,163,164,165,166,167,168,169,170,171,172,173,174,175,176,177,178,179,180,181,182,183,184,185,186,187,188,189,190,191,192,193,194,195,196,197,198,199,200,201,202,203,204,205,206,207,208,209,210,211,212,213,214,215,216,217,218,219,220,221,222,223,224,225,226,227,228,229,230,231,232,233,234,235,236,237,238,239,240,241,242,243,244,245,246,247,248,249,250,251,252,253,254,255,256,257,258,259,260,261,262,263,264,265,266,267,268,269,270,271,272,273,274,275,276,277,278,279,280,281,282,283,284,285,286,287,288,289,290,291,292,293,294,295,296,297,298,299,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,319,320,321,322,323,324,325,326,327,328,329,330,331,332,333,334,335,336,337,338,339,340,341,342,343,344,345,346,347,348,349,350,351,352,353,354,355,356,357,358,359,360,361,362,363,364,365,366,367,368,369,370,371,372,373,374,375,376,377,378,379,380,381,382,383,384,385,386,387,388,389,390,391,392,393,394,395,396,397,398,399,400,401,402,403,404,405,406,407,408,409,410,411,412,413,414,415,416,417,418,419,420,421,422,423,424,425,426,427,428,429,430,431,432,433,434,435,436,437,438,439,440,441,442,443,444,445,446,447,448,449,450,451,452,453,454,455,456,457,458,459,460,461,462,463,464,465,466,467,468,469,470,471,472,473,474,475,476,477,478,479,480,481,482,483,484,485,486,487,488,489,490,491,492,493,494,495,496,497,498,499,500,501,502,503,504,505,506,507,508,509,510,511,512,513,514,515,516,517,518,519,520,521,522,523,524,525,526,527,528,529,530,531,532,533,534,535,536,537,538,539,540,541,542,543,544,545,546,547,548,549,550,551,552,553,554,555,556,557,558,559,560,561,562,563,564,565,566,567,568,569,570,571,572,573,574,575,576,577,578,579,580,581,582,583,584,585,586,587,588,589,590,591,592,593,594,595,596,597,598,599,600,601,602,603,604,605,606,607,608,609,610,611,612,613,614,615,616,617,618,619,620,621,622,623,624,625,626,627,628,629,630,631,632,633,634,635,636,637,638,639,640,641,642,643,644,645,646,647,648,649,650,651,652,653,654,655,656,657,658,659,660,661,662,663,664,665,666,667,668,669,670,671,672,673,674,675,676,677,678,679,680,681,682,683,684,685,686,687,688,689,690,691,692,693,694,695,696,697,698,699,700,701,702,703,704,705,706,707,708,709,710,711,712,713,714,715,716,717,718,719,720,721,722,723,724,725,726,727,728,729,730,731,732,733,734,735,736,737,738,739,740,741,742,743,744,745,746,747,748,749,750,751,752,753,754,755,756,757,758,759,760,761,762,763,764,765,766,767,768,769,770,771,772,773,774,775,776,777,778,779,780,781,782,783,784,785,786,787,788,789,790,791,792,793,794,795,796,797,798,799,800,801,802,803,804,805,806,807,808,809,810,811,812,813,814,815,816,817,818,819,820,821,822,823,824,825,826,827,828,829,830,831,832,833,834,835,836,837,838,839,840,841,842,843,844,845,846,847,848,849,850,851,852,853,854,855,856,857,858,859,860,861,862,863,864,865,866,867,868,869,870,871,872,873,874,875,876,877,878,879,880,881,882,883,884,885,886,887,888,889,890,891,892,893,894,895,896,897,898,899,900,901,902,903,904,905,906,907,908,909,910,911,912,913,914,915,916,917,918,919,920,921,922,923,924,925,926,927,928,929,930,931,932,933,934,935,936,937,938,939,940,941,942,943,944,945,946,947,948,949,950,951,952,953,954,955,956,957,958,959,960,961,962,963,964,965,966,967,968,969,970,971,972,973,974,975,976,977,978,979,980,981,982,983,984,985,986,987,988,989,990,991,992,993,994,995,996,997,998,999,1000,1001,1002,1003,1004,1005,1006,1007,1008,1009,1010,1011,1012,1013,1014,1015,1016,1017,1018,1019,1020,1021,1022,1023,1024,1025,1026,1027,1028,1029,1030,1031,1032,1033,1034,1035,1036,1037,1038,1039,1040,1041,1042,1043,1044,1045,1046,1047,1048,1049,1050,1051,1052,1053,1054,1055,1056,1057,1058,1059,1060,1061,1062,1063,1064,1065,1066,1067,1068,1069,1070,1071,1072,1073,1074,1075,1076,1077,1078,1079,1080,1081,1082,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1109,1110,1111,1112,1113,1114,1115,1116,1117,1118,1119,1120,1121,1122,1123,1124,1125,1126,1127,1128,1129,1130,1131,1132,1133,1134,1135,1136,1137,1138,1139,1140,1141,1142,1143,1144,1145,1146,1147,1148,1149,1150,1151,1152,1153,1154,1155,1156,1157,1158,1159,1160,1161,1162,1163,1164,1165,1166,1167,1168,1169,1170,1171,1172,1173,1174,1175,1176,1177,1178,1179,1180,1181,1182,1183,1184,1185,1186,1187,1188,1189,1190,1191,1192,1193,1194,1195,1196,1197,1198,1199,1200,1201,1202,1203,1204,1205,1206,1207,1208,1209,1210,1211,1212,1213,1214,1215,1216,1217,1218,1219,1220,1221,1222,1223,1224,1225,1226,1227,1228,1229,1230,1231,1232,1233,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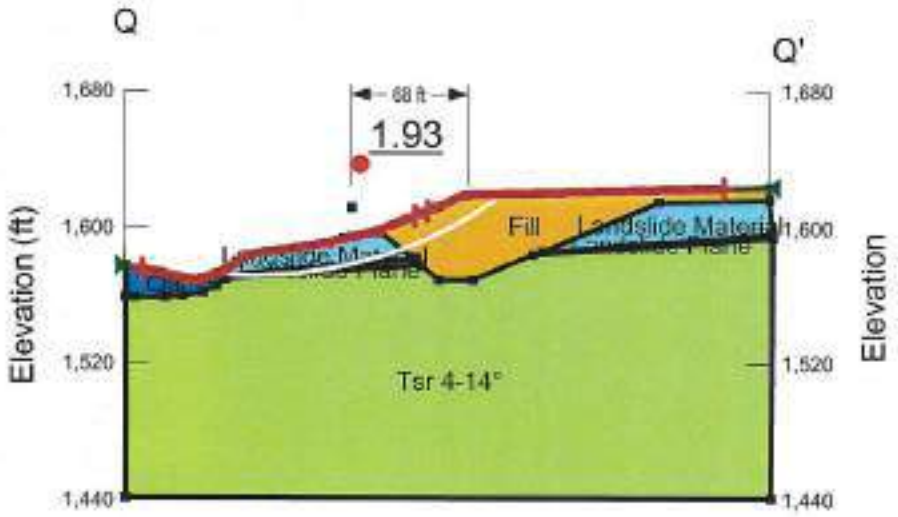
Section Q-Q Tr 68203 SSA.gsz

1 -Rotational Static Global

Section Q-Q Tr 68203 SSA.gsz 12/02/2021 11:01:15 AM

Horz Seismic Coef.: 0

Method: Bishop



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Landslide Material
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 160 psf
Phi': 30 °

Name: Landslide Plane
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 8 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC Valley, Inc
GEOTECHNICAL CONSULTING
28532 Constellation Rd, Valencia, CA 91355
Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No: **203003-01**
Engineer: **BIH / MW**
Date: **Dec 2021**

1 -Rotational Static Global

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File Information

File Version: 10.00
Title: Slope Stability Analysis Cross-Section A-A'
Last Edited By: Michael Wagar
Revision Number: 307
Date: 12/02/2021
Time: 11:01:15 AM
Tool Version: 10.0.0.17401
File Name: Section I-I2 Tr-NM2019 SM.gsz
Directory: P:\FINAL PROJECTS\Verdun Golden Valley Senior Housing\Slope Stability\Rotational\
Last Solved Date: 12/02/2021
Last Solved Time: 11:02:00 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

1 -Rotational Static Global

Name: SLOPE/W
Method: Bishop
Settings
PWP Conditions from: [None]
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Number of slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: [none]
Distributed
Pseudo-Static Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum number of iterations: 100
Tolerable difference in FoS: 0.001

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 325 psf
Phi: 33 °
Phi-B: 0 °

Landslide Material

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 100 psf
Phi: 30 °
Phi-B: 0 °

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 8 °
Phi-B: 0 °

Tyr 4-14"

Model: Anisotropic Fn
Unit Weight: 121 pcf
Cohesion: 600 psf
Phi: 32 °
Phi-B: Isotropic Strength Fn: Tyr 36" bedding 4-14"
Cohesion Strength Fn: Tyr 250 bedding 4-14"
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 350 psf
Phi: 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (30.12652, 1,775.0709) ft
Left-Zone Right Coordinate: (166.1416, 1,606.403) ft
Left Zone Increments: 30
Right Type: Range
Right-Zone Left Coordinate: (376.56661, 1,608.4597) ft
Right-Zone Right Coordinate: (398.08016, 1,572.9466) ft
Right-Zone Increments: 30
Radius Increments: 14

Slip Surface Limits

Left Coordinate: (0.400123, 1,573.10921) ft
Right Coordinate: (377.18468, 1,623.2981) ft

Seismic Coefficients

Horz Seismic Coef: 0
Vert Seismic Coef: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function Modifier Factors: Interpolation
Curve Fit to Data: 100%
Segment Curvature: 0%
Y-Intercept: 1
Data Points: Interpolation (°), Modifier Factor
Data Point: (0.00, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.1667)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function Modifier Factors: Interpolation
Curve Fit to Data: 100%
Segment Curvature: 0%
Y-Intercept: 1
Data Points: Interpolation (°), Modifier Factor
Data Point: (0.00, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	373.18469 ft	1,523.1981 ft
Point 2	377.62911 ft	1,445.4794 ft
Point 3	0.6001 3 ft	1,441.4571 ft
Point 4	0.40013 ft	1,177.1092 ft
Point 5	91.45527 ft	1,186.317 0 ft
Point 6	101.2256 ft	1,193.7736 ft
Point 7	118.88445 ft	1,196.8225 ft
Point 8	126.16607 ft	1,198.3129 ft
Point 9	146.38772 ft	1,197.0540 ft
Point 10	189.48491 ft	1,612.1044 ft
Point 11	200.36811 ft	1,612.9615 ft
Point 12	83.26368 ft	1,585.7947 ft
Point 13	75.03741 ft	1,583.3239 ft
Point 14	65.46957 ft	1,580.4585 ft
Point 15	59.38023 ft	1,574.2579 ft
Point 16	52.62533 ft	1,572.0565 ft
Point 17	370.87902 ft	1,610.2245 ft

Point 18	10.62065 ft	1,574.4027 ft
Point 19	20.39967 ft	1,577.7868 ft
Point 20	37.16047 ft	1,583.83 ft
Point 21	40.72588 ft	1,585.0069 ft
Point 22	46.04806 ft	1,586.6778 ft
Point 24	59.39023 ft	1,589.7502 ft
Point 26	59.63774 ft	1,585.1545 ft
Point 25	46.12224 ft	1,581.7618 ft
Point 28	43.80782 ft	1,559.4438 ft
Point 29	24.0[illegible]716 ft	1,558.3515 ft
Point 28	3.70797 ft	1,558.3515 ft
Point 26	0.40213 ft	1,559.1275 ft
Point 30	27.4089 ft	1,571.098[illegible] ft
Point 31	30.39023 ft	1,571.9412 ft
Point 32	370.61775 ft	1,586.2618 ft
Point 33	308.08641 ft	1,581.7751 ft
Point 34	117.48229 ft	1,594.1591 ft
Point 35	153.48382 ft	1,589.0091 ft
Point 36	208.4937 ft	1,589.0091 ft
Point 37	132.4874 ft	1,6[illegible].635 ft
Point 38	148.70559 ft	1,598.1047 ft
Point 39	312.48[illegible]6 ft	1,574.7879 ft
Point 40	173.06129 ft	1,577.7341 ft
Point 41	238.69251 ft	1,58[illegible].56 ft
Point 42	244.24975 ft	1,586.1214 ft
Point 43	150.1307 ft	1,581.6405 ft

Regions

	Material	Points	Area
Region 1	Fill	17,1,11,10,38,43,40,35,36,41,42,34	3,436.8 ft²
Region 2	Soil	4,29,28,27,26,25,24,23,31,15,16,27,21,20,30,19,18	591.48 ft²
Region 3	Tsr 4-14°	24,25,26,27,28,29,0,2,33,41,36,35,42,23	31,709 ft²
Region 4	Landslide Plane	23,40,43,31	326 ft²
Region 5	Landslide Material	17,30,42,32	2,227 ft²
Region 6	Landslide Plane	32,42,43,33	314.58 ft²
Region 7	Landslide Material	38,9,34,8,7,6,5,12,13,14,15,31,43	1,923.3 ft²

Slip Results

Slip Surfaces Analyzed: 97480 of 98415 converged

Current Slip Surface

Slip Surface: 27,049
Factor of Safety: 1.59
Volume: 2,380.9768 ft³
Weight: 297,000 [illegible] lbf
Resisting Moment: 32,179,231 lbf-ft

Activating Moment: 16,625,502 lbf-ft
Slip Rank: 1 of 98,415 slip surfaces
Exit: (54.768925, 1,572.4928) ft
Entry: (221.02472, 1,619.4564) ft
Radius: 242.97533 ft
Center: (76.161262, 1,814.5246) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	57.079578 ft	1,572.3108 ft	0 psf	145.09132 psf	77.146423 psf	350 psf	0 psf	Cal
Slice 2	60.017384 ft	1,572.087 ft	0 psf	348.58907 psf	201.25799 psf	160 psf	0 psf	Landslide Material
Slice 3	63.057054 ft	1,571.9149 ft	0 psf	675.91116 psf	94.993119 psf	100 psf	0 psf	Landslide Plane
Slice 4	69.42349 ft	1,571.6749 ft	0 psf	1,202.2705 psf	168.9681 psf	100 psf	0 psf	Landslide Plane
Slice 5	75.848977 ft	1,571.5621 ft	0 psf	1,537.0564 psf	216.01919 psf	100 psf	0 psf	Landslide Plane
Slice 6	80.792113 ft	1,571.606 ft	0 psf	1,676.8938 psf	235.67205 psf	100 psf	0 psf	Landslide Plane
Slice 7	87.359475 ft	1,571.8421 ft	0 psf	1,752.6197 psf	246.31463 psf	100 psf	0 psf	Landslide Plane
Slice 8	93.897703 ft	1,572.2099 ft	0 psf	1,782.6648 psf	250.5372 psf	100 psf	0 psf	Landslide Plane
Slice 9	98.787567 ft	1,572.617 ft	0 psf	1,818.8419 psf	255.62156 psf	100 psf	0 psf	Landslide Plane
Slice 10	104.16824 ft	1,573.187 ft	0 psf	1,852.8171 psf	260.39646 psf	100 psf	0 psf	Landslide Plane
Slice 11	110.05473 ft	1,573.9432 ft	0 psf	1,881.7832 psf	264.46738 psf	100 psf	0 psf	Landslide Plane
Slice 12	115.94121 ft	1,574.8464 ft	0 psf	1,898.175 psf	266.0684 psf	100 psf	0 psf	Landslide Plane
Slice 13	121.20608 ft	1,575.7727 ft	0 psf	1,916.5838 psf	269.35828 psf	100 psf	0 psf	Landslide Plane
Slice 14	125.84634 ft	1,576.6953 ft	0 psf	1,955.147 psf	274.77799 psf	100 psf	0 psf	Landslide Plane
Slice 15	129.79263 ft	1,577.548 ft	0 psf	1,967.174 psf	276.46828 psf	100 psf	0 psf	Landslide Plane
Slice 16	131.95029 ft	1,578.0414 ft	0 psf	1,855.9094 psf	1,071.5618 psf	160 psf	0 psf	Landslide Material
Slice 17	134.79986 ft	1,578.7433 ft	0 psf	1,834.8508 psf	1,059.3516 psf	160 psf	0 psf	Landslide Material
Slice 18	139.43501 ft	1,579.9448 ft	0 psf	1,793.7173 psf	1,035.6031 psf	160 psf	0 psf	Landslide Material
Slice 19	144.07016 ft	1,581.2446 ft	0 psf	1,741.566 psf	1,005.4936 psf	160 psf	0 psf	Landslide Material
Slice 20	147.58181 ft	1,582.2865 ft	0 psf	1,723.1761 psf	994.87617 psf	160 psf	0 psf	Landslide Material
Slice 21	152.03313 ft	1,583.7244 ft	0 psf	1,735.1276 psf	1,001.7764 psf	160 psf	0 psf	Landslide Material

Slice 22	158.54762 ft	1,585.9693 ft	0 psf	1,726.3542 psf	996.71108 psf	160 psf	0 psf	Landslide Material
Slice 23	164.51486 ft	1,588.2014 ft	0 psf	1,683.3883 psf	971.80469 psf	325 psf	0 psf	Fill
Slice 24	169.93484 ft	1,590.3932 ft	0 psf	1,667.4617 psf	962.70941 psf	325 psf	0 psf	Fill
Slice 25	175.35483 ft	1,592.7891 ft	0 psf	1,634.9507 psf	943.93923 psf	325 psf	0 psf	Fill
Slice 26	180.77482 ft	1,595.244 ft	0 psf	1,585.6765 psf	915.49074 psf	325 psf	0 psf	Fill
Slice 27	186.2987 ft	1,597.9679 ft	0 psf	1,517.9522 psf	876.39011 psf	325 psf	0 psf	Fill
Slice 28	191.92647 ft	1,600.9241 ft	0 psf	1,430.8588 psf	826.10674 psf	325 psf	0 psf	Fill
Slice 29	197.55424 ft	1,604.0722 ft	0 psf	1,324.8763 psf	764.91767 psf	325 psf	0 psf	Fill
Slice 30	202.95019 ft	1,607.275 ft	0 psf	1,105.4651 psf	638.24058 psf	325 psf	0 psf	Fill
Slice 31	208.11434 ft	1,610.5248 ft	0 psf	776.36965 psf	448.23723 psf	325 psf	0 psf	Fill
Slice 32	213.27849 ft	1,613.9602 ft	0 psf	434.04523 psf	250.59613 psf	325 psf	0 psf	Fill
Slice 33	218.44264 ft	1,617.5909 ft	0 psf	78.298871 psf	45.205874 psf	325 psf	0 psf	Fill

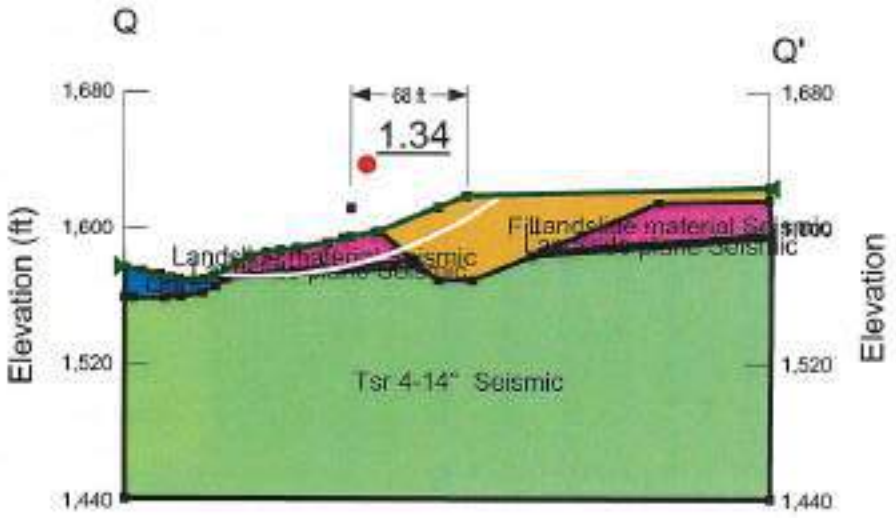
Section Q-Q Tr 68203 SSA.gsz

1 -Rotational Pseudostatic Global

Section Q-Q Tr 68203 SSA.gsz 12/02/2021 11:01:15 AM

Horz Seismic Coef.: 0.15

Method: Bishop



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Landslide material Seismic
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 200 psf
Phi': 33 °

Name: Landslide plane Seismic
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 120 psf
Phi': 12 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 4-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 4-14° (Seismic)

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

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Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	**203003-01**
Engineer:	**BIH / MW**
Date:	**Dec 2021**

1 -Rotational Pseudostatic Global

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File Information

File Version: 10.0C
Title: Slope Stability Analysis Cross-Section A-A'
Last Edited By: Michael Wilson
Revision Number: 762
Date: 12/02/2021
Time: 11:01:15 AM
Tool Version: 10.010.1701
File Name: Section Q-Q' in 85215 Mylar.gsz
Directory: P:\CIVIL PROJECTS\Waterloo Golden Valley Storm Pond\Slope Stability\Rocscience\
Last Solved Date: 12/02/2021
Last Solved Time: 11:02:26 AM

Project Settings

Units System: US Customary Units

Analysis Settings

1 -Rotational Pseudostatic Global

Kind: SLOPE/W
Perform 1 -Rotational Pseudostatic Global
Method: Bishop
Settings
PWP Conditions from: [none]
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Critical Slip Surfaces from Either
Number of slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: [none]
Discretization
Side Function Option: Constant
Interslice force function: Half-Sine
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerance: Difference in FoS: 0.001

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 125 psf
Phi: 30°
Phi-B: 0°

Tsr 4-14° Seismic

Model: Anisotropic Fn
Unit Weight: 125 pcf
Cohesion: 600 psf
Phi: 32°
Phi-Anisotropic Strength Fn: Tsr 19° bedding 4-14° (Seismic)
C-Anisotropic Strength Fn: Tsr 19° bedding 4-14° (Seismic)
Phi-B: 0°

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 350 psf
Phi: 28°
Phi-B: 0°

Landslide material Seismic

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 18°
Phi-B: 0°

Landslide plane Seismic

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 120 psf
Phi: 12°
Phi-B: 0°

Slip Surface Limits

Left Coordinate: (0.00115, 1,577.10) ft
Right Coordinate: (377.14659, 1,674.19) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 19° bedding 4-14° (Seismic)

Model: Spline Data Point Function

Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.5938)
Data Point: (14, 0.5938)
Data Point: (14.01, 1)

Tsr 375 bedding 4-14° (Seismic)

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.625)
Data Point: (14, 0.625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	577.18469 ft	1,623.1981 ft
Point 2	577.62811 ft	1,440.679 ft
Point 3	0.40013 ft	1,441.6571 ft
Point 4	0.40013 ft	1,577.1092 ft
Point 5	91.45527 ft	1,586.317 ft
Point 6	101.225 ft	1,587.7728 ft
Point 7	118.88445 ft	1,590.8225 ft
Point 8	128.16697 ft	1,593.3129 ft
Point 9	146.38773 ft	1,597.0549 ft
Point 10	183.48481 ft	1,612.1044 ft
Point 11	200.36812 ft	1,618.9615 ft
Point 12	83.26368 ft	1,585.7347 ft
Point 13	73.37741 ft	1,583.3239 ft
Point 14	65.46957 ft	1,579.2885 ft
Point 15	59.39023 ft	1,574.2573 ft
Point 16	53.62533 ft	1,572.0562 ft
Point 17	376.97992 ft	1,616.2249 ft
Point 18	10.52665 ft	1,574.9827 ft
Point 19	20.96962 ft	1,572.7898 ft
Point 20	32.16047 ft	1,569.85 ft
Point 21	40.70588 ft	1,568.8039 ft
Point 22	46.93606 ft	1,569.6778 ft
Point 23	59.39023 ft	1,569.7502 ft
Point 24	53.67774 ft	1,565.1645 ft
Point 25	46.12224 ft	1,561.758 ft
Point 26	33.80832 ft	1,559.4433 ft

Point 27	24.06714 ft	1,558.8515 ft
Point 28	5.76797 ft	1,558.3515 ft
Point 29	0.40013 ft	1,559.1376 ft
Point 30	27.4092 ft	1,571.0981 ft
Point 31	59.39023 ft	1,571.9412 ft
Point 32	379.01775 ft	1,596.3618 ft
Point 33	378.98641 ft	1,593.7713 ft
Point 34	132.48229 ft	1,594.1991 ft
Point 35	183.49392 ft	1,569.0091 ft
Point 36	209.4937 ft	1,569.0091 ft
Point 37	132.4874 ft	1,621.855 ft
Point 38	148.77589 ft	1,598.0237 ft
Point 39	312.48593 ft	1,614.7808 ft
Point 40	173.06129 ft	1,577.7341 ft
Point 41	238.49261 ft	1,583.7056 ft
Point 42	244.24075 ft	1,586.1213 ft
Point 43	169.11071 ft	1,581.0425 ft

Regions

	Material	Points	Area
Region 1	Fill	17,1,11,10,38,43,40,35,36,41,42,39	5,236.8 ft²
Region 2	Qal	4,29,28,27,26,25,24,23,31,15,16,22,21,20,30,19,18	691.49 ft²
Region 3	Tsr 4-14° Seismic	24,25,26,27,28,29,3,2,33,41,36,35,40,23	51,405 ft²
Region 4	Landslide plane Seismic	23,40,43,31	324 ft²
Region 5	Landslide material Seismic	17,39,42,32	2,223.8 ft²
Region 6	Landslide plane Seismic	32,42,41,33	314.98 ft²
Region 7	Landslide material Seismic	38,9,34,8,7,6,5,12,13,14,15,31,43	1,327.2 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.34
Volume: 2,180.0788 ft³
Weight: 267,666.15 lbf
Resisting Moment: 34,398,825 lbf-ft
Activating Moment: 25,607,568 lbf-ft
Slip Rank: 1 of 1 slip surfaces
Exit: (54.768925, 1,572.4928) ft
Entry: (221.02472, 1,619.4564) ft
Radius: 242.97533 ft
Center: (76.161262, 1,814.5246) ft

Slip Slices

	X	Y	PWP	Base Normal	Frictional Strength	Cohesive Strength	Suction Strength	Base Material

Slice 1	57.079578 ft	1,577.3108 ft	0 psf	132.05808 psf	51.332076 psf	350 psf	0 psf	Cal
Slice 2	80.017184 ft	1,577.067 ft	0 psf	357.35328 psf	281.13778 psf	200 psf	0 psf	Landslide material Seismic
Slice 3	69.057051 ft	1,571.9149 ft	0 psf	681.09086 psf	344.77224 psf	120 psf	0 psf	Landslide plane Seismic
Slice 4	69.42339 ft	1,571.6749 ft	0 psf	1,206.177 psf	776.31083 psf	120 psf	0 psf	Landslide plane Seismic
Slice 5	45.848077 ft	1,571.3641 ft	0 psf	1,557.2734 psf	826.75755 psf	120 psf	0 psf	Landslide plane Seismic
Slice 6	80.747178 ft	1,571.188 ft	0 psf	1,673.4593 psf	835.75475 psf	120 psf	0 psf	Landslide plane Seismic
Slice 7	87.359473 ft	1,571.8421 ft	0 psf	1,744.0434 psf	870.73634 psf	120 psf	0 psf	Landslide plane Seismic
Slice 8	93.887708 ft	1,572.2069 ft	0 psf	1,788.0335 psf	875.96845 psf	120 psf	0 psf	Landslide plane Seismic
Slice 9	96.782567 ft	1,572.317 ft	0 psf	1,801.6726 psf	870.03985 psf	120 psf	0 psf	Landslide plane Seismic
Slice 10	104.15809 ft	1,573.182 ft	0 psf	1,830.512 psf	885.03793 psf	120 psf	0 psf	Landslide plane Seismic
Slice 11	110.05473 ft	1,573.9492 ft	0 psf	1,854.4683 psf	884.17939 psf	120 psf	0 psf	Landslide plane Seismic
Slice 12	125.94121 ft	1,574.8464 ft	0 psf	1,850.0525 psf	885.53174 psf	120 psf	0 psf	Landslide plane Seismic
Slice 13	121.20608 ft	1,575.7527 ft	0 psf	1,839.7252 psf	885.54058 psf	120 psf	0 psf	Landslide plane Seismic
Slice 14	125.84634 ft	1,576.6551 ft	0 psf	1,915.7967 psf	886.79855 psf	120 psf	0 psf	Landslide plane Seismic
Slice 15	179.79209 ft	1,577.548 ft	0 psf	1,922.2734 psf	885.58122 psf	120 psf	0 psf	Landslide plane Seismic
Slice 16	131.07029 ft	1,578.0414 ft	0 psf	1,768.52 psf	1,143.1308 psf	400 psf	0 psf	Landslide material Seismic
Slice 17	146.79495 ft	1,578.7433 ft	0 psf	1,745.0521 psf	1,133.3501 psf	200 psf	0 psf	Landslide material Seismic
Slice 18	139.43501 ft	1,579.9443 ft	0 psf	1,669.8084 psf	1,085.5406 psf	200 psf	0 psf	Landslide material Seismic
Slice 19	144.07016 ft	1,581.2446 ft	0 psf	1,642.7935 psf	1,066.8036 psf	200 psf	0 psf	Landslide material Seismic
Slice 20	147.58181 ft	1,582.7869 ft	0 psf	1,623.5993 psf	1,054.2972 psf	200 psf	0 psf	Landslide material Seismic
Slice 21	153.03113 ft	1,584.7264 ft	0 psf	1,629.0058 psf	1,058.0807 psf	200 psf	0 psf	Landslide material Seismic
Slice 22	158.54767 ft	1,586.9698 ft	0 psf	1,648.5242 psf	1,069.46078 psf	200 psf	0 psf	Landslide material Seismic

Slice 23	164.31466 ft	1,589.3974 ft	0 psf	1,585.0781 psf	815.14525 psf	325 psf	0 psf	Fill
Slice 24	160.03481 ft	1,590.9872 ft	0 psf	1,559.9129 psf	802.02554 psf	325 psf	0 psf	Fill
Slice 25	170.45484 ft	1,592.7991 ft	0 psf	1,527.0055 psf	681.6269 psf	325 psf	0 psf	Fill
Slice 26	181.77483 ft	1,595.264 ft	0 psf	1,474.3095 psf	653.19011 psf	325 psf	0 psf	Fill
Slice 27	180.2987 ft	1,597.9679 ft	0 psf	1,404.2401 psf	616.74415 psf	325 psf	0 psf	Fill
Slice 28	191.93647 ft	1,600.9201 ft	0 psf	1,330.1115 psf	799.8573 psf	325 psf	0 psf	Fill
Slice 29	197.55424 ft	1,604.0727 ft	0 psf	1,230.6286 psf	696.95865 psf	325 psf	0 psf	Fill
Slice 30	232.09619 ft	1,607.275 ft	0 psf	999.63006 psf	577.14823 psf	325 psf	0 psf	Fill
Slice 31	208.31458 ft	1,610.5248 ft	0 psf	867.61858 psf	976.98563 psf	325 psf	0 psf	Fill
Slice 32	213.37843 ft	1,613.9602 ft	0 psf	805.16032 psf	910.7779 psf	325 psf	0 psf	Fill
Slice 33	218.44264 ft	1,617.5969 ft	0 psf	92.01228 psf	19.462298 psf	325 psf	0 psf	Fill

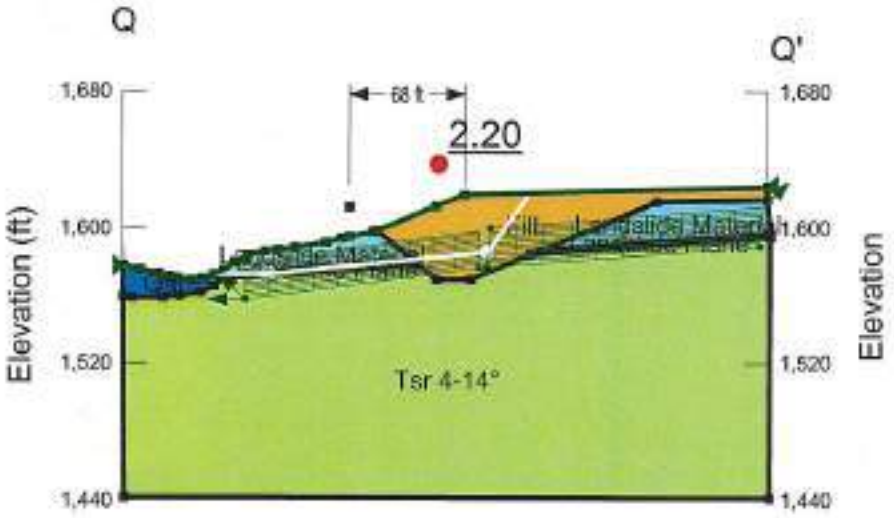
Section Q-Q Tr 68203 SSA.gsz

2 -Translational Static Global

Section Q-Q Tr 68203 SSA.gsz 12/02/2021 11:01:15 AM

Horz Seismic Coef.: 0

Method: Janbu



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Landslide Material
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 160 psf
Phi': 30 °

Name: Landslide Plane
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 8 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC Valley, Inc
GEOTECHNICAL CONSULTING
28532 Constellation Rd, Valencia, CA 91355
Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	**203003-01**
Engineer:	**BIH / MW**
Date:	**Dec 2021**

2 -Translational Static Global

Report generated using GeoStudio 2023.1.1 (build 12.1.1.15910). © 1991-2021 GEO-SLOPE International Ltd.

File Information

File version: 10.00
Title: Slope Stability Analysis, Cross-Section A-A'
Last Edited By: Michael Wilson
Revision Number: 262
Date: 12/02/2021
Time: 11:03:19 AM
GeoStudio Version: 10.0.0.17401
File Name: Section A-A' Tr 68301 SSA.gsz
Directory: P:\FINAL PROJECTS\Wilson Golden Valley Sierra Way\Slope stability\Wilson\
Last Solved Date: 12/02/2021
Last Solved Time: 11:03:19 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Static Global

Kind: SLOPE/W
Method: Spencer
Settings
PWP Conditions From: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Restrict Block Crossing: No
Optimize Critical Slip Surface location: No
Tension Crack Option: (none)
Interslice
FoS Calculation Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 50
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable Difference in FoS: 0.001

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 35 °
Phi-b: 0 °

Landslide Material

Model: Mohr-Coulomb
Unit Weight: 135 pcf
Cohesion': 140 psf
Phi': 30 °
Phi-b: 0 °

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion': 100 psf
Phi': 8 °
Phi-b: 0 °

Tsr 4-14'

Model: Anisotropic
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 0 °
Phi-Anisotropic Strength Fn: Tsr 14° bedding 4-14'
Cohesion-Ratio Strength Fn: Tsr 2Nil bedding 4-14'
Phi-b: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion': 150 psf
Phi': 25 °
Phi-b: 0 °

Slip Surface Limits

Left Coordinate: (1,400.1, 1,577.1092) ft
Right Coordinate: (377.18469, 1,523.1981) ft

Slip Surface Block

Left Grid
Upper Left: (721.77135, 1,570.0512) ft
Lower Left: (721.19404, 1,557.4194) ft
Lower Right: (708.24638, 1,575.9681) ft
X Increments: 10
Y Increments: 10
Starting Angle: 135 °
Ending Angle: 180 °
Angle Increments: 2

Right Grid:
Upper Left: (234.85706, 1,589.0000) ft
Lower Left: (311.5427, 1,575.7704) ft
Lower Right: (372.4378, 1,558.098) ft
X Increments: 10
Y Increments: 10
Angle Increments: 2

Seismic Coefficients

Horizontal Coefficient: 0
Vertical Coefficient: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Mode: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y Intercept: 1
Data Points: Inclination [°], Modifier Factor
Data Point: (-9.99, 1)
Data Point: (4, 0.4107)
Data Point: (84, 0.4107)
Data Point: (84.01, 1)

Tsr 18° bedding 4-14°

Mode: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y Intercept: 1
Data Points: Inclination [°], Modifier Factor
Data Point: (-9.99, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	377.28482 ft	1,605.1981 ft
Point 2	372.4281 ft	1,440.675 ft
Point 3	0.40014 ft	1,441.6571 ft
Point 4	0.40014 ft	1,537.1042 ft
Point 5	91.65327 ft	1,586.317 ft
Point 6	101.225 ft	1,587.7728 ft
Point 7	118.86446 ft	1,589.8225 ft
Point 8	128.1669 ft	1,588.5549 ft
Point 9	140.36773 ft	1,587.0569 ft

Point 20	183.48481 ft	1,512.1044 ft
Point 21	200.36812 ft	1,508.5015 ft
Point 22	61.16769 ft	1,565.7347 ft
Point 23	79.37743 ft	1,582.2239 ft
Point 24	65.46957 ft	1,574.2862 ft
Point 25	29.19623 ft	1,574.4573 ft
Point 26	59.62533 ft	1,572.0564 ft
Point 27	376.97013 ft	1,616.2249 ft
Point 28	10.52686 ft	1,574.5827 ft
Point 29	20.90662 ft	1,572.7898 ft
Point 30	31.16447 ft	1,561.66 ft
Point 31	40.70568 ft	1,568.8014 ft
Point 32	46.09686 ft	1,565.0779 ft
Point 33	59.84023 ft	1,569.7502 ft
Point 34	53.57774 ft	1,561.1645 ft
Point 35	46.32104 ft	1,561.7045 ft
Point 36	54.88692 ft	1,556.4483 ft
Point 37	28.06714 ft	1,568.5535 ft
Point 38	5.75757 ft	1,568.4535 ft
Point 39	0.40014 ft	1,575.1376 ft
Point 40	27.4062 ft	1,571.0981 ft
Point 41	59.39023 ft	1,571.5412 ft
Point 42	370.01775 ft	1,596.1038 ft
Point 43	378.89641 ft	1,589.7738 ft
Point 44	132.48229 ft	1,594.1051 ft
Point 45	184.49501 ft	1,603.0091 ft
Point 46	203.4537 ft	1,599.0091 ft
Point 47	192.4874 ft	1,611.456 ft
Point 48	145.77589 ft	1,598.0237 ft
Point 49	312.48503 ft	1,614.7868 ft
Point 50	372.56129 ft	1,577.7741 ft
Point 51	238.48203 ft	1,583.7016 ft
Point 52	244.24975 ft	1,586.1213 ft
Point 53	304.11471 ft	1,582.0425 ft

Regions

	Material	Points	Area
Region 1	Fill	37,3,31,30,38,43,42,35,36,41,42,39	5,246.8 ft²
Region 2	Clay	4,26,28,27,26,24,23,31,15,15,22,21,20,30,19,18	981.40 ft²
Region 3	Tsr < 14°	24,25,26,27,28,29,1,2,35,41,36,35,40,23	31,405 ft²
Region 4	Landside Plane	23,43,44,31	324 ft²
Region 5	Landside Material	27,39,42,32	2,223.4 ft²
Region 6	Landside Plane	32,42,41,33	314.95 ft²
Region 7	Landside Material	38,5,3,4,8,7,6,9,12,13,14,15,31,45	4,327.2 ft²

Slip Results

Slip Surfaces Analyzed: 203565 of 1.616e+6 converged

Current Slip Surface

Slip Surface: 79,823
Factor of Safety: 1.20
Volume: 3,128,888 ft³
Weight: 437,244,xxx lbf
Resisting Force: 178,315,411 lbf
Activating Force: 87,933,927 lbf
Slip Rank: 1 of 131,760 slip surfaces
Exit: (147,987.159, 1,572.1545) ft
Entry: (237.8157, 1,619.3558) ft
Radius: 85.07467 ft
Center: (-36.63286, 1,631.7460) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	50.6843764 ft	1,572.1943 ft	0 psf	323.773 psf	65.851.5558 psf	100 psf	0 psf	Landslide Plane
Slice 2	50.916152 ft	1,572.1943 ft	0 psf	415.7258 psf	240.03601 psf	100 psf	0 psf	Landslide Plane
Slice 3	63.956822 ft	1,573.1943 ft	0 psf	729.54557 psf	102.58859 psf	100 psf	0 psf	Landslide Plane
Slice 4	69.47549 ft	1,573.1943 ft	11 psf	1,135.0857 psf	159.65649 psf	100 psf	0 psf	Landslide Plane
Slice 5	75.843977 ft	1,573.1943 ft	0 psf	1,460.8407 psf	205.40805 psf	100 psf	0 psf	Landslide Plane
Slice 6	80.792113 ft	1,573.1943 ft	0 psf	1,649.6956 psf	226.43581 psf	100 psf	11 psf	Landslide Plane
Slice 7	84.254723 ft	1,573.1943 ft	0 psf	1,620.303 psf	237.81768 psf	100 psf	0 psf	Landslide Plane
Slice 8	88.317519 ft	1,573.1943 ft	0 psf	1,674.262 psf	235.30218 psf	100 psf	0 psf	Landslide Plane
Slice 9	93.827724 ft	1,573.1943 ft	0 psf	1,678.0987 psf	235.84154 psf	100 psf	0 psf	Landslide Plane
Slice 10	98.782557 ft	1,573.1943 ft	0 psf	1,737.9415 psf	244.23455 psf	100 psf	0 psf	Landslide Plane
Slice 11	104.16824 ft	1,574.0944 ft	0 psf	1,749.5607 psf	245.87829 psf	100 psf	0 psf	Landslide Plane
Slice 12	110.05478 ft	1,574.0834 ft	0 psf	1,802.7773 psf	254.36385 psf	100 psf	0 psf	Landslide Plane
Slice 13	116.94121 ft	1,575.2801 ft	0 psf	1,856.0539 psf	260.85137 psf	100 psf	0 psf	Landslide Plane
Slice 14	121.40608 ft	1,575.8674 ft	0 psf	1,931.2488 psf	271.41537 psf	100 psf	0 psf	Landslide Plane
Slice 15	125.84634 ft	1,576.2756 ft	0 psf	2,028.362 psf	285.06768 psf	100 psf	0 psf	Landslide Plane
Slice 16	130.87466 ft	1,576.7262 ft	0 psf	2,105.2012 psf	295.86279 psf	100 psf	0 psf	Landslide Plane
Slice 17	135.95905 ft	1,577.2025 ft	0 psf	2,179.0566 psf	306.24943 psf	100 psf	0 psf	Landslide Plane
Slice	142.95137	1,577.9814	0 psf	2,270.3079	319.09635	100 psf	0 psf	Landslide

18	ft	ft		psf	psf			Plane
Slice 19	147.56181 ft	1,578.4605 ft	0 psf	2,161.1365 psf	301.83587 psf	100 psf	0 psf	Landslide Plane
Slice 20	152.16503 ft	1,578.8817 ft	0 psf	2,214.3304 psf	353.3695 psf	100 psf	0 psf	Landslide Plane
Slice 21	158.94031 ft	1,579.6091 ft	11 psf	2,231.0026 psf	383.68537 psf	100 psf	0 psf	Landslide Plane
Slice 22	165.42257 ft	1,580.2987 ft	0 psf	2,305.7047 psf	414.80164 psf	100 psf	11 psf	Landslide Plane
Slice 23	169.33835 ft	1,580.6475 ft	0 psf	2,061.7741 psf	430.39726 psf	100 psf	0 psf	Landslide Plane
Slice 24	173.03789 ft	1,581.02 ft	0 psf	1,324.524 psf	1,309.94aR psf	125 psf	0 psf	Fill
Slice 25	180.0025 ft	1,581.7203 ft	0 psf	3,379.0159 psf	1,947.4116 psf	525 psf	0 psf	Fill
Slice 26	186.2587 ft	1,582.3731 ft	11 psf	3,387.8127 psf	2,077.1693 psf	525 psf	0 psf	Fill
Slice 27	191.97647 ft	1,583.0189 ft	11 psf	3,398.3044 psf	2,199.4031 psf	525 psf	11 psf	Fill
Slice 28	197.56424 ft	1,583.4866 ft	0 psf	3,400.0151 psf	2,309.4104 psf	175 psf	0 psf	Fill
Slice 29	203.64284 ft	1,584.0857 ft	0 psf	4,071.2486 psf	2,310.5565 psf	325 psf	0 psf	Fill
Slice 30	210.10757 ft	1,584.7561 ft	0 psf	4,012.6139 psf	2,316.6826 psf	325 psf	0 psf	Fill
Slice 31	216.52119 ft	1,585.4417 ft	0 psf	2,460.7048 psf	1,420.296 psf	425 psf	0 psf	Fill
Slice 32	222.69685 ft	1,586.1248 ft	0 psf	1,713.3975 psf	989.23453 psf	325 psf	0 psf	Fill
Slice 33	228.58971 ft	1,606.5184 ft	0 psf	956.70031 psf	552.3a51 psf	325 psf	0 psf	Fill
Slice 34	234.77301 ft	1,615.512 ft	0 psf	520.14338 psf	327.39567 psf	325 psf	0 psf	Fill

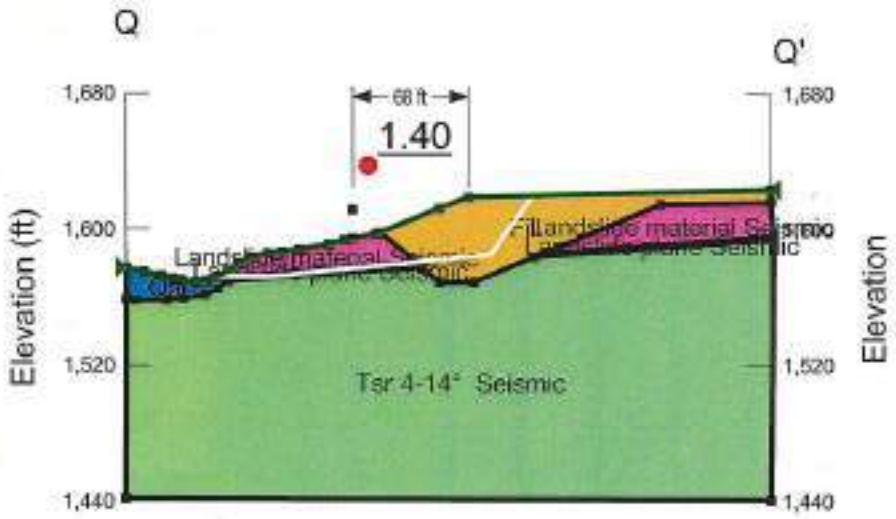
Section Q-Q Tr 68203 SSA.gsz

2 -Translational Pseudostatic Global

Section Q-Q Tr 68203 SSA.gsz 12/02/2021 11:01:15 AM

Horz Seismic Coef.: 0.15

Method: Janbu



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Landslide material Seismic
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 200 psf
Phi': 33 °

Name: Landslide plane Seismic
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 120 psf
Phi': 12 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 4-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 4-14° (Seismic)

LGC

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Tentative Tract 68203
Santa Clarita, CA

Project No:	**203003-01**
Engineer:	**BIH / MW**
Date:	**Dec 2021**

2 -Translational Pseudostatic Global

File Information

Rocscience Inc.
Title: Slope Stability Analysis Cross-section A-A'
Last Edited By: Michal Valenta
Revision Number: 202
Date: 12/02/2021
Time: 11:02:15 AM
Tool Version: RS2 9.017401
File Name: Section A-A' 168203 SEA.gsz
Directory: P:\FINAL\PROJECTS\Walnut Golden Valley Dams Rev\Slope stability\Version\
Last Solved Date: 12/02/2021
Last Solved Time: 11:02:20 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

2 -Translational Pseudostatic Global

Grid: Grid1
Parent: 2 -Translational Static Global
Method: Janbu
Settings
PWP Conditions From: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of Movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Circular Slip Surfaces from Lines
Circular Slip Surfaces Convex: Yes
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Distributed
FoS Distribution Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable Difference in FoS: 0.005

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 325 psf
Phi: 35 °
Phi-B: 0 °

Tsr 4-14° Seismic

Model: Anisotropic Fn.
Unit Weight: 135 pcf
Cohesion: 600 psf
Phi: 32 °
Pre-Anisotropic Strength Fn.: Tsr 19° bedding 4-14° (Seismic)
Orthotropic Strength Fn.: Tsr 375 bedding 4-14° (Seismic)
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 350 psf
Phi: 28 °
Phi-B: 0 °

Landslide material Seismic

Model: Mohr-Coulomb
Unit Weight: 135 pcf
Cohesion: 200 psf
Phi: 33 °
Phi-B: 0 °

Landslide plane Seismic

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 120 psf
Phi: 17 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0.499013, 1.577.10921) ft
Right Coordinate: (577.2844, 1.622.1061) ft

Seismic Coefficients

Horz Seismic Coef.: 0.15
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 19° bedding 4-14° (Seismic)

Model: Spline Data Point Function

Function: Modifier Factor vs. Orientation:
Curve Fit Function: 100%
Segment Curvature: 0%
Points Count: 4
Data Points: Orientation (°), Modifier Factor
Data Point: (-0.95, 1)
Data Point: (4, 0.9658)
Data Point: (14, 0.9946)
Data Point: (18.01, 1)

Tsr 375 bedding 4-14° [Seismic]

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination:
Curve Fit Function: 100%
Segment Curvature: 0%
Points Count: 4
Data Points: Inclination (°), Modifier Factor
Data Point: (3.91, 1)
Data Point: (6, 0.9485)
Data Point: (14, 0.825)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	377.18458 ft	1,625.1987 ft
Point 2	377.63811 ft	1,442.679 ft
Point 3	0.40013 ft	1,441.6777 ft
Point 4	0.40013 ft	1,577.1702 ft
Point 5	91.48523 ft	1,585.317 ft
Point 6	101.215 ft	1,597.7728 ft
Point 7	128.88415 ft	1,593.8225 ft
Point 8	128.15657 ft	1,593.8158 ft
Point 9	145.35778 ft	1,597.2546 ft
Point 10	183.48481 ft	1,612.1044 ft
Point 11	200.9581 ft	1,618.9615 ft
Point 12	83.20388 ft	1,585.7347 ft
Point 13	70.17701 ft	1,583.9238 ft
Point 14	65.40907 ft	1,579.7981 ft
Point 15	59.39023 ft	1,574.7141 ft
Point 16	51.67551 ft	1,572.7552 ft
Point 17	376.87952 ft	1,615.2249 ft
Point 18	376.52665 ft	1,571.3827 ft
Point 19	376.97463 ft	1,572.7688 ft
Point 20	377.18458 ft	1,582.85 ft
Point 21	40.70482 ft	1,568.8050 ft
Point 22	46.05836 ft	1,569.5778 ft
Point 23	59.39023 ft	1,574.7102 ft
Point 24	53.677 ft	1,566.3645 ft
Point 25	46.72224 ft	1,561.75 ft
Point 26	35.80632 ft	1,559.4415 ft

Point 27	24.00714 ft	1,558.3615 ft
Point 28	3.76797 ft	1,558.3545 ft
Point 29	0.40013 ft	1,560.1176 ft
Point 30	27.4098 ft	1,571.0596 ft
Point 31	69.59003 ft	1,571.9412 ft
Point 32	109.01173 ft	1,585.3548 ft
Point 33	128.08841 ft	1,593.7707 ft
Point 34	132.48775 ft	1,594.1901 ft
Point 35	183.49392 ft	1,569.0011 ft
Point 36	203.4965 ft	1,569.8041 ft
Point 37	152.48674 ft	1,611.655 ft
Point 38	148.77585 ft	1,598.0237 ft
Point 39	312.48599 ft	1,614.7806 ft
Point 40	174.06139 ft	1,577.7324 ft
Point 41	248.4936 ft	1,583.7066 ft
Point 42	264.26075 ft	1,586.1213 ft
Point 43	160.810 ft	1,581.8624 ft

Regions

	Material	Points	Area
Region 1	rib	17,1,11,10,38,43,40,36,26,41,42,39	5,296.8 ft²
Region 2	Qal	4,10,28,27,24,25,34,33,31,15,16,22,21,20,30,19,18	681.69 ft²
Region 3	Tsr 4-14° Seismic	24,25,29,37,38,25,1,2,32,41,30,35,40,23	51,409 ft²
Region 4	Landslide plane Search	23,40,43,31	624 ft²
Region 5	Landslide material Seismic	17,35,42,32	2,221.6 ft²
Region 6	Landslide plane Search	17,42,43,39	814.38 ft²
Region 7	Landslide material Seismic	36,9,34,8,7,6,5,12,13,14,15,31,43	1,627.2 ft²

Slip Results

Slip Surfaces Analyzed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.49
Volume: 3,528.634 ft³
Weight: 440,094.65 lbs
Resisting Force: 190,194.91 lbf
Activating Force: 136,067.35 lbf
Slip Surface Left Side Points:
Top: (53.387258, 1,572.1982) ft
Entry: (287.5167, 1,610.8586) ft
Radius: 86.0155802 ft
Center: (359.69286, 1,631.3759) ft

Slip Slices

	X	Y	PWP	User Normal	Fractional Strength	Cohesive Strength	Suction Strength	Base Material

Slice 1	96.6628591 ft	1,573.3943 ft	0 psf	179.773 psf	69.813998 psf	350 psf	0 psf	Ok!
Slice 2	60.916152 ft	1,573.3943 ft	0 psf	411.77174 psf	208.47389 psf	200 psf	0 psf	Landslide material Seismic
Slice 3	63.954523 ft	1,573.1943 ft	0 psf	723.54557 psf	155.2687 psf	150 psf	0 psf	Landslide plane Seismic
Slice 4	68.42349 ft	1,573.1943 ft	0 psf	1,135.0857 psf	242.48247 psf	320 psf	0 psf	Landslide plane Seismic
Slice 5	75.348977 ft	1,573.1943 ft	0 psf	1,460.9707 psf	410.10892 psf	170 psf	0 psf	Landslide plane Seismic
Slice 6	80.792113 ft	1,573.1943 ft	0 psf	1,818.9496 psf	542.1301 psf	320 psf	0 psf	Landslide plane Seismic
Slice 7	84.254721 ft	1,573.1943 ft	0 psf	2,082.905 psf	359.71011 psf	320 psf	0 psf	Landslide plane Seismic
Slice 8	88.350518 ft	1,573.1943 ft	0 psf	2,051.6488 psf	351.51503 psf	320 psf	0 psf	Landslide plane Seismic
Slice 9	94.997703 ft	1,573.0643 ft	0 psf	2,659.4151 psf	352.72764 psf	320 psf	0 psf	Landslide plane Seismic
Slice 10	98.792587 ft	1,573.5652 ft	0 psf	3,149.3104 psf	494.03535 psf	170 psf	0 psf	Landslide plane Seismic
Slice 11	104.19024 ft	1,574.0976 ft	0 psf	2,373.2306 psf	367.77159 psf	320 psf	0 psf	Landslide plane Seismic
Slice 12	110.09473 ft	1,574.0884 ft	0 psf	2,788.0423 psf	378.59758 psf	320 psf	0 psf	Landslide plane Seismic
Slice 13	115.94121 ft	1,573.5831 ft	0 psf	2,636.8541 psf	350.22283 psf	320 psf	0 psf	Landslide plane Seismic
Slice 14	121.20508 ft	1,573.8093 ft	0 psf	1,510.3036 psf	456.08640 psf	320 psf	0 psf	Landslide plane Seismic
Slice 15	126.96534 ft	1,574.4760 ft	0 psf	2,006.5687 psf	606.07897 psf	320 psf	0 psf	Landslide plane Seismic
Slice 16	130.34463 ft	1,574.7251 ft	0 psf	2,082.8267 psf	442.73847 psf	320 psf	0 psf	Landslide plane Seismic
Slice 17	136.96405 ft	1,573.2925 ft	0 psf	2,356.9975 psf	458.27992 psf	320 psf	0 psf	Landslide plane Seismic
Slice 18	143.91197 ft	1,573.9814 ft	0 psf	2,265.3859 psf	437.48440 psf	320 psf	0 psf	Landslide plane Seismic
Slice 19	147.58181 ft	1,574.4609 ft	0 psf	2,386.5257 psf	464.64637 psf	320 psf	0 psf	Landslide plane Seismic
Slice 20	152.16503 ft	1,574.9217 ft	0 psf	2,485.4849 psf	508.03671 psf	320 psf	0 psf	Landslide plane Seismic
Slice 21	156.6468 ft	1,575.8851 ft	0 psf	2,702.2343 psf	576.27754 psf	320 psf	0 psf	Landslide plane Seismic
Slice 22	160.72567 ft	1,580.2815 ft	0 psf	2,516.2037 psf	629.92849 psf	320 psf	0 psf	Landslide plane Seismic
Slice 23	164.83315 ft	1,580.4876 ft	0 psf	3,031.2031 psf	644.25928 psf	320 psf	0 psf	Landslide plane Seismic
Slice 24	173.03398 ft	1,581.02 ft	0 psf	3,070.8666 psf	1,772.9674 psf	325 psf	0 psf	Ok
Slice 25	180.0095 ft	1,581.7203 ft	0 psf	3,315.7456 psf	1,014.5467 psf	325 psf	0 psf	Ok
Slice	186.2587	1,582.3533	0 psf	3,517.2717	2,042.2407	325 psf	0 psf	Ok

Slice 27	191.92647 ft	1,581.90 ft	0 psf	3,755.4132 psf	2,156.6015 psf	325 psf	0 psf	Ok!
Slice 28	197.56424 ft	1,583.4866 ft	0 psf	3,993.0228 psf	2,271.6782 psf	325 psf	0 psf	Ok!
Slice 29	203.64.844 ft	1,588.0967 ft	0 psf	4,009.8589 psf	2,311.5059 psf	325 psf	0 psf	Ok!
Slice 30	210.19.717 ft	1,584.7551 ft	0 psf	3,545.0358 psf	2,278.2446 psf	325 psf	0 psf	Ok!
Slice 31	216.51.105 ft	1,589.4312 ft	0 psf	2,045.4466 psf	1,263.9536 psf	325 psf	0 psf	Ok!
Slice 32	222.76835 ft	1,595.1242 ft	0 psf	2,405.016 psf	931.16016 psf	325 psf	0 psf	Ok!
Slice 33	225.08571 ft	1,606.6384 ft	0 psf	758.51774 psf	458.51912 psf	325 psf	0 psf	Ok!
Slice 34	134.77904 ft	1,614.557 ft	0 psf	734.05681 psf	65.853882 psf	325 psf	0 psf	Ok!

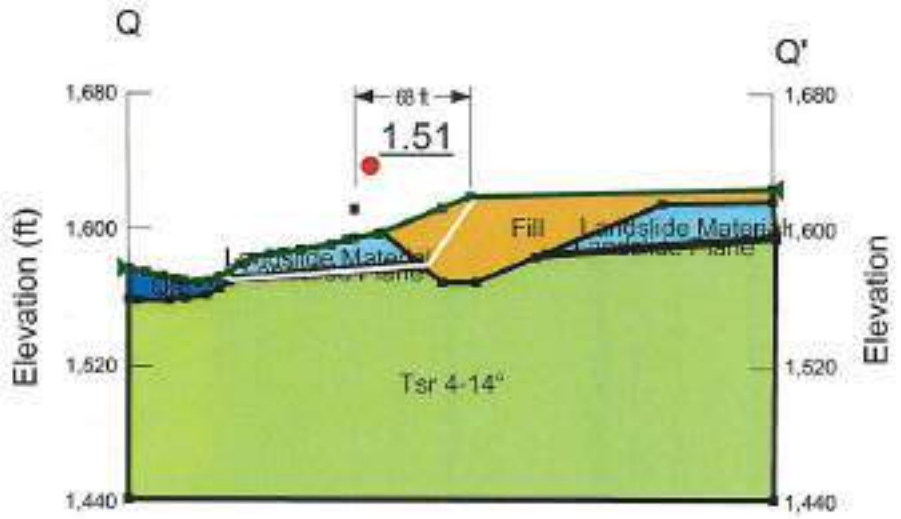
Section Q-Q Tr 68203 SSA.gsz

3 -Translational Static Lower Slope (2)

Section Q-Q Tr 68203 SSA.gsz 12/02/2021 11:17:44 AM

Horz Seismic Coef.: 0

Method: Spencer



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Landslide Material
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 160 psf
Phi': 30 °

Name: Landslide Plane
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 8 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

28532 Constellation Rd, Valencia, CA 91355

Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	**203003-01**
Engineer:	**BIH / MW**
Date:	**Dec 2021**

3 -Translational Static Lower Slope (2)

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File Information

File Version: 10.00
Title: Slope Stability Analysis Cross-Section A-A'
Last Edited By: Michael Wilson
Revision Number: 780
Date: 12/02/2021
Time: 11:17:44 AM
Tool Version: 10.0.2.17403
File Name: Section D-D'F 08200 SSA.gsz
Directory: P:\FINAL PROJECTS\Walnut Cañon Valley Sierra Way\slope stability\Revised\
Last Solved Date: 12/02/2021
Last Solved Time: 11:17:58 AM

Project Settings

Units System: U.S. Customary Units

Analysis Settings

3 -Translational Static Lower Slope (2)

Slide: SLOPE/W
Material: 3 -Translational Static Lower Slope
Method: Spencer
Settings
PWP Conditions from: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Grid and Tangent Surfaces from Driver
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Distribution
Slice Calculation Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 50
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable Difference in F.o.S: 0.001
Solution Settings
Search Method: Linear Search
Max. Distance of Lambda Factor of Safety: 0.2
Lambda

Lambda 1: -1
Lambda 2: -0.8
Lambda 3: -0.6
Lambda 4: -0.4
Lambda 5: -0.2
Lambda 6: 0
Lambda 7: 0.2
Lambda 8: 0.4
Lambda 9: 0.6
Lambda 10: 0.8
Lambda 11: 1

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 30°
Phi-B: 0°

Landslide Material

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 140 psf
Phi: 30°
Phi-B: 0°

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 0°
Phi-B: 0°

Tsr 4-14"

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion: 500 psf
Phi: 32°
Phi-Anisotropic Strength Fn. for 0° bedding: 4-14"
Cohesion-Anisotropic Strength Fn. for 250 bedding: 4-14"
Phi-B: 0°

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 350 psf
Phi: 28°
Phi-B: 0°

Slip Surface Limits

Left Coordinate: (0.40013, 1,577.1092) ft
Right Coordinate: (377.18469, 1,623.1981) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	377.18469 ft	1,623.1981 ft
Point 2	377.62811 ft	1,440.679 ft
Point 3	0.40013 ft	1,441.8571 ft
Point 4	0.40013 ft	1,577.1092 ft
Point 5	91.45527 ft	1,585.317 ft
Point 6	101.225 ft	1,587.7728 ft
Point 7	118.88445 ft	1,590.8225 ft
Point 8	128.16697 ft	1,593.3129 ft
Point 9	146.38773 ft	1,597.0649 ft
Point 10	183.48481 ft	1,612.1044 ft
Point 11	200.36812 ft	1,618.9615 ft
Point 12	83.26368 ft	1,585.7347 ft

Point 13	75.37741 ft	1,583.3139 ft
Point 14	65.40857 ft	1,579.2885 ft
Point 15	59.39023 ft	1,574.2573 ft
Point 16	59.62533 ft	1,572.0562 ft
Point 17	376.97992 ft	1,616.2249 ft
Point 18	10.52665 ft	1,574.9827 ft
Point 19	20.96962 ft	1,572.7898 ft
Point 20	32.16047 ft	1,569.85 ft
Point 21	40.70588 ft	1,568.8039 ft
Point 22	46.93606 ft	1,569.6778 ft
Point 23	59.39023 ft	1,569.7502 ft
Point 24	53.67774 ft	1,565.1645 ft
Point 25	46.12224 ft	1,561.758 ft
Point 26	33.80632 ft	1,559.4433 ft
Point 27	24.06714 ft	1,558.3515 ft
Point 28	5.76797 ft	1,558.3515 ft
Point 29	0.40013 ft	1,559.1376 ft
Point 30	27.4092 ft	1,571.0981 ft
Point 31	59.39023 ft	1,571.9412 ft
Point 32	379.01775 ft	1,596.3618 ft
Point 33	378.98641 ft	1,593.7733 ft
Point 34	152.48229 ft	1,594.1991 ft
Point 35	183.49392 ft	1,569.0091 ft
Point 36	203.4937 ft	1,569.0091 ft
Point 37	182.4874 ft	1,611.655 ft
Point 38	148.77589 ft	1,598.0237 ft
Point 39	312.48593 ft	1,614.7808 ft
Point 40	173.06129 ft	1,577.7341 ft
Point 41	238.49261 ft	1,583.7056 ft
Point 42	244.24975 ft	1,586.1213 ft
Point 43	169.11071 ft	1,581.0425 ft

Regions

	Material	Points	Area
Region 1	Fill	17,1,11,10,38,43,40,35,36,41,42,39	5,236.8 ft²
Region 2	Qal	4,29,28,27,26,25,24,23,31,15,16,22,21,20,30,19,18	691.49 ft²
Region 3	Tsr 4-14°	24,25,26,27,28,29,3,2,33,41,36,35,40,23	51,405 ft²
Region 4	Landslide Plane	23,40,43,31	324 ft²
Region 5	Landslide Material	17,39,42,32	2,223.8 ft²
Region 6	Landslide Plane	32,42,41,33	334.98 ft²
Region 7	Landslide Material	38,9,34,8,7,6,5,12,13,14,15,31,43	1,327.2 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.51
Volume: 2,439.8865 ft³
Weight: 299,420.01 lbf
Resisting Moment: 6,363,599.2 lbf-ft
Activating Moment: 4,223,909.2 lbf-ft
Resisting Force: 80,084.012 lbf
Activating Force: 53,284.984 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (55.19029, 1,572.6537) ft
Entry: (203.64079, 1,619.0399) ft
Radius: 75.956626 ft
Center: (118.54485, 1,630.6385) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	57.29026 ft	1,571.7839 ft	0 psf	530.43849 psf	282.03915 psf	350 psf	0 psf	Clay
Slice 2	60.228211 ft	1,570.5669 ft	0 psf	698.00697 psf	98.098482 psf	100 psf	0 psf	Landslide Plane
Slice 3	63.267881 ft	1,570.393 ft	0 psf	882.54536 psf	124.03366 psf	100 psf	0 psf	Landslide Plane
Slice 4	67.44653 ft	1,570.7216 ft	0 psf	1,194.0812 psf	167.81717 psf	100 psf	0 psf	Landslide Plane
Slice 5	71.40045 ft	1,571.0325 ft	0 psf	1,408.5463 psf	197.6772 psf	100 psf	0 psf	Landslide Plane
Slice 6	75.848977 ft	1,571.3823 ft	0 psf	1,563.5778 psf	219.74653 psf	100 psf	0 psf	Landslide Plane
Slice 7	80.792113 ft	1,571.7711 ft	0 psf	1,665.1755 psf	234.02516 psf	100 psf	0 psf	Landslide Plane
Slice 8	85.311577 ft	1,572.1265 ft	0 psf	1,714.0041 psf	240.88756 psf	100 psf	0 psf	Landslide Plane
Slice 9	89.407373 ft	1,572.4486 ft	0 psf	1,710.0633 psf	240.33375 psf	100 psf	0 psf	Landslide Plane
Slice 10	93.897703 ft	1,572.8017 ft	0 psf	1,729.4454 psf	243.0577 psf	100 psf	0 psf	Landslide Plane
Slice 11	98.782567 ft	1,573.1858 ft	0 psf	1,772.1503 psf	249.05948 psf	100 psf	0 psf	Landslide Plane
Slice 12	103.43243 ft	1,573.5515 ft	0 psf	1,819.3114 psf	255.68754 psf	100 psf	0 psf	Landslide Plane
Slice 13	107.84729 ft	1,573.8986 ft	0 psf	1,870.9287 psf	262.94188 psf	100 psf	0 psf	Landslide Plane
Slice 14	112.26216 ft	1,574.2458 ft	0 psf	1,922.546 psf	270.19622 psf	100 psf	0 psf	Landslide Plane
Slice 15	116.67702 ft	1,574.593 ft	0 psf	1,974.1633 psf	277.45056 psf	100 psf	0 psf	Landslide Plane
Slice 16	121.20508 ft	1,574.9491 ft	0 psf	2,054.7305 psf	288.77353 psf	100 psf	0 psf	Landslide Plane
Slice 17	125.84634 ft	1,575.3141 ft	0 psf	2,164.2474 psf	304.16514 psf	100 psf	0 psf	Landslide Plane

Slice 18	130.32463 ft	1,575.6662 ft	0 psf	2,253.0101 psf	316.63993 psf	100 psf	0 psf	Landslide Plane
Slice 19	134.79886 ft	1,576.0182 ft	0 psf	2,323.5421 psf	326.55254 psf	100 psf	0 psf	Landslide Plane
Slice 20	139.43501 ft	1,576.3827 ft	0 psf	2,396.5975 psf	336.81982 psf	100 psf	0 psf	Landslide Plane
Slice 21	144.07016 ft	1,576.7472 ft	0 psf	2,469.653 psf	347.08709 psf	100 psf	0 psf	Landslide Plane
Slice 22	147.58181 ft	1,577.0233 ft	0 psf	2,554.7853 psf	359.05166 psf	100 psf	0 psf	Landslide Plane
Slice 23	151.31774 ft	1,577.3171 ft	0 psf	2,691.1485 psf	378.21626 psf	100 psf	0 psf	Landslide Plane
Slice 24	156.40145 ft	1,577.7169 ft	0 psf	2,866.6657 psf	402.8836 psf	100 psf	0 psf	Landslide Plane
Slice 25	161.48515 ft	1,578.1166 ft	0 psf	3,042.183 psf	427.55093 psf	100 psf	0 psf	Landslide Plane
Slice 26	166.56886 ft	1,578.5164 ft	0 psf	3,217.7002 psf	452.21827 psf	100 psf	0 psf	Landslide Plane
Slice 27	170.38035 ft	1,578.8162 ft	0 psf	3,355.0997 psf	471.52851 psf	100 psf	0 psf	Landslide Plane
Slice 28	173.71136 ft	1,579.0781 ft	0 psf	3,686.9915 psf	2,128.6855 psf	325 psf	0 psf	Fill
Slice 29	177.70075 ft	1,581.9937 ft	0 psf	1,709.8512 psf	987.18303 psf	325 psf	0 psf	Fill
Slice 30	181.55679 ft	1,587.5007 ft	0 psf	1,447.0203 psf	835.43755 psf	325 psf	0 psf	Fill
Slice 31	186.2987 ft	1,594.3728 ft	0 psf	1,123.8957 psf	648.88149 psf	325 psf	0 psf	Fill
Slice 32	191.92647 ft	1,602.3101 ft	0 psf	740.47746 psf	427.51486 psf	325 psf	0 psf	Fill
Slice 33	197.55424 ft	1,610.3474 ft	0 psf	357.05921 psf	206.14823 psf	325 psf	0 psf	Fill
Slice 34	202.00446 ft	1,616.703 ft	0 psf	12.177042 psf	7.0304187 psf	325 psf	0 psf	Fill

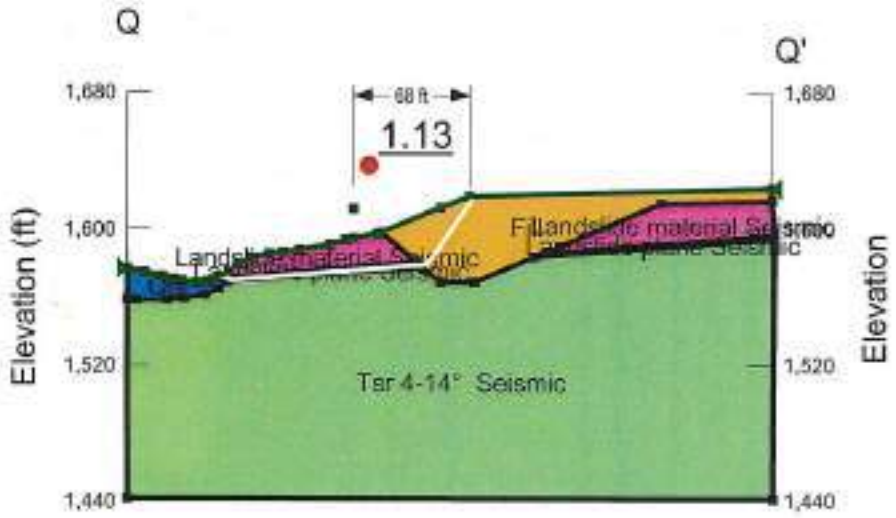
Section Q-Q Tr 68203 SSA.gsz

3 -Translational Pseudostatic Lower Slope

Section Q-Q Tr 68203 SSA.gsz 12/02/2021 11:17:44 AM

Horz Seismic Coef.: 0.15

Method: Spencer



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 325 psf
Phi': 30 °

Name: Landslide material Seismic
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 200 psf
Phi': 33 °

Name: Landslide plane Seismic
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 120 psf
Phi': 12 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14° Seismic
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 19° bedding 4-14° (Seismic)
C-Anisotropic Strength Fn.: Tsr 375 bedding 4-14° (Seismic)

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

28532 Constellation Rd, Valencia, CA 91355

Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	**203003-01**
Engineer:	**BIH / MW**
Date:	**Dec 2021**

3 -Translational Pseudostatic Lower Slope

Report generated using GeoStudio 2020.1 (Compute Build 11.1.1.40888) on 12/22/2021 3:58 PM

File Information

File Version: 10.00
Title: Slope Stability Analysis Cross Section A-A'
Last Edited By: Michael Wilson
Revision Number: 760
Date: 12/07/2021
Time: 11:17:44 AM
Tool Version: 10.0.1.17410
File Name: Section G GLTR 082019 SSA.gsz
Directory: J:\FINAL PROJECTS\Walnut Golden Valley Storage Facility\slope stability\Walnut\
Last Solved Date: 12/07/2021
Last Solved Time: 11:17:58 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

3 -Translational Pseudostatic Lower Slope

Kind: SLOPE/W
Parent: 3 -Translational Static Lower Slope (1)
Method: Spencer
Settings
PWP Conditions from: Ignore
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Critical Slip Surfaces from Other
Critical Slip Surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: Ignore
Distribution
1 of 5 Equation Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum number of Iterations: 100
Tolerable difference in F of S: 0.01
Solution Settings
Search Method: Grid Search
Multi-Stage at Lambda Factor of Safety: 0.2
Lambda:
Lambda 1: 1
Lambda 2: -0.8
Lambda 3: -0.6
Lambda 4: -0.4
Lambda 5: -0.2
Lambda 6: 0
Lambda 7: 0.2
Lambda 8: 0.4
Lambda 9: 0.6
Lambda 10: 0.8
Lambda 11: 1

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 300 psf
Phi: 30°
Phi-B: 0°

Tsr 4-14° Seismic

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 32°
Pre-Transmissic Strength Fn.: Tsr 19° bedding 4-14° (Seismic)
Cross-Isotropic Strength Fn.: Tsr 375 bedding 4-14° Seismic
Phi-B: 0°

Qal

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 300 psf
Phi: 28°
Phi-B: 0°

Landslide material Seismic

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 33°
Phi-B: 0°

Landslide plane Seismic

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 120 psf
Phi: 12°
Phi-B: 0°

Slip Surface Limits

Left Coordinate: (0.40013, 1,577.10892) ft
Right Coordinate: (377.15468, 1,623.13611) ft

Seismic Coefficients

Horizontal Seismic Coefficient: 0.15
Vertical Seismic Coefficient: 0

Anisotropic Strength Functions

Tsr 19° bedding 4-14° [Seismic]

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Point Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (-90, 1)
Data Point: (4, 0.5938)
Data Point: (14, 0.4918)
Data Point: (14.01, 1)

Tsr 375 bedding 4-14° [Seismic]

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Point Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (-90, 1)
Data Point: (4, 0.625)
Data Point: (14, 0.625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	377.15468 ft	1,623.1361 ft
Point 2	377.62811 ft	1,619.6[illegible] ft
Point 3	0.40013 ft	1,593.[illegible] ft
Point 4	0.40013 ft	1,577.10892 ft
Point 5	91.65537 ft	1,580.317 ft
Point 6	101.2[illegible] ft	1,587.7776 ft
Point 7	118.88445 ft	1,590.6[illegible] ft
Point 8	128.15657 ft	1,589.3[illegible] ft
Point 9	146.39779 ft	1,587.3545 ft
Point 10	183.48481 ft	1,612.1044 ft
Point 11	202.36812 ft	1,615.2[illegible] ft
Point 12	83.26368 ft	1,585.7347 ft

Point 13	49.37741 ft	1,583.2249 ft
Point 14	66.4[illegible] ft	1,579.2885 ft
Point 15	59.39023 ft	1,574.7573 ft
Point 16	59.42533 ft	1,572.0562 ft
Point 17	378.0709[illegible] ft	1,616.1269 ft
Point 18	38.52605 ft	1,574.9827 ft
Point 19	30.96962 ft	1,572.7808 ft
Point 20	32.[illegible]047 ft	1,569.45 ft
Point 21	40.70583 ft	1,568.8039 ft
Point 22	40.69606 ft	1,569.6778 ft
Point 23	58.30623 ft	1,567.7566 ft
Point 24	51.97776 ft	1,566.1645 ft
Point 25	46.1227[illegible] ft	1,561.268 ft
Point 26	33.80632 ft	1,[illegible]4.4[illegible] ft
Point 27	24.06714 ft	1,559.[illegible] ft
Point 28	1.79797 ft	1,558.[illegible] ft
Point 29	0.40013 ft	1,[illegible]8.1[illegible] ft
Point 30	2.[illegible]8[illegible] ft	1,[illegible]1.[illegible] ft
Point 31	58.[illegible]4 ft	1,571.9[illegible] ft
Point 32	378.01775 ft	1,596.3618 ft
Point 33	378.[illegible]3 ft	1,594.[illegible] ft
Point 34	357.[illegible]5 ft	1,594.[illegible] ft
Point 35	181.69[illegible] ft	1,569.[illegible] ft
Point 36	203.4937 ft	1,569.[illegible] ft
Point 37	232.4874 ft	1,[illegible] ft
Point 38	268.[illegible] ft	1,[illegible] ft
Point 39	312.48593 ft	1,[illegible] ft
Point 40	272.66[illegible] ft	1,577.7[illegible] ft
Point 41	228.49[illegible] ft	1,583.[illegible] ft
Point 42	244.24975 ft	1,586.12[illegible] ft
Point 43	268.31071 ft	1,585.[illegible] ft

Regions

	Material	Points	Area
Region 1	Fill	17,1,31,19,34,43,40,35,36,41,42,29	5,226.6 ft²
Region 2	Clay	4,29,28,27,25,26,24,33,31,15,16,22,21,20,30,19,18	891.49 ft²
Region 3	Tsr 4-14° Seismic	29,25,26,[illegible],28,26,[illegible],44,45,46,[illegible],40,42	51,485 ft²
Region 4	Jardinio plane Seismic	23,40,41,17	324 ft²
Region 5	Jardinio material Seismic	17,39,43,23	2,223.8 ft²
Region 6	Jardinio plane Seismic	32,42,43,23	314.98 ft²
Region 7	Jardinio material Seismic	38,0,3[illegible],8,7,6,5,12,13,14,15,21,37	1,737.2 ft²

Slip Results

Slip Surfaces Analyzed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 3.13
Volume: 2,435.8665 ft³
Weight: 299,470.01 lbf
Resisting Moment: 7,121,059,918 lbf-ft
Activating Moment: 2,280,147,616 lbf-ft
Resisting Force: 97,991,812 lbf
Activating Force: 31,317,661 lbf
Slice Width: 1 of 1 slip surfaces
Exit: (35.13028, 1,572.6537) ft
Entry: (203.6402, 1,622.0329) ft
Radius: 15.556626 ft
Center: (118.54485, 1,549.6161) ft

Slip Slices

	X	Y	Pw	Base Normal Stress	Frictional Strength	Cohesive Strength	Surface Strength	Side Material
Slice 1	57.20926 ft	1,571.7829 ft	0 psf	1,402.2833 psf	747.87725 psi	350 psf	0 psf	Qa
Slice 2	60.126831 ft	1,570.3369 ft	0 psf	1,655.7966 psf	774.86018 psi	130 psf	0 psf	Landslide plane Seismic
Slice 3	63.267881 ft	1,570.398 ft	0 psf	868.22914 psf	190.9345 psf	120 psf	0 psf	Landslide plane Seismic
Slice 4	66.648071 ft	1,570.7216 ft	0 psf	1,157.704 psf	254.57984 psf	120 psf	0 psf	Landslide plane Seismic
Slice 5	70.07085 ft	1,571.0525 ft	0 psf	1,401.0436 psf	307.00291 psf	120 psf	0 psf	Landslide plane Seismic
Slice 6	73.849109 ft	1,571.3895 ft	0 psf	1,552.8067 psf	333.07617 psf	120 psf	0 psf	Landslide plane Seismic
Slice 7	80.292113 ft	1,571.7711 ft	0 psf	1,630.5601 psf	350.89736 psf	120 psf	0 psf	Landslide plane Seismic
Slice 8	85.313577 ft	1,572.1305 ft	0 psf	1,697.4983 psf	360.91439 psf	120 psf	0 psf	Landslide plane Seismic
Slice 9	89.497038 ft	1,572.4486 ft	0 psf	1,699.7101 psf	360.3092 psf	120 psf	0 psf	Landslide plane Seismic
Slice 10	93.687703 ft	1,572.8017 ft	0 psf	1,710.3418 psf	363.06149 psf	120 psf	0 psf	Landslide plane Seismic
Slice 11	98.383967 ft	1,573.1858 ft	0 psf	1,705.4934 psf	361.94577 psf	120 psf	0 psf	Landslide plane Seismic
Slice 12	103.48243 ft	1,573.5515 ft	0 psf	1,708.7787 psf	362.61158 psf	120 psf	0 psf	Landslide plane Seismic
Slice 13	107.84739 ft	1,573.8268 ft	0 psf	1,840.3479 psf	391.87642 psf	130 psf	0 psf	Landslide plane Seismic
Slice 14	112.25916 ft	1,574.2456 ft	0 psf	1,857.9669 psf	403.42525 psf	130 psf	0 psf	Landslide plane Seismic
Slice 15	116.67702 ft	1,574.659 ft	0 psf	1,947.5586 psf	413.07309 psf	120 psf	0 psf	Landslide plane Seismic
Slice 16	121.26548 ft	1,574.9401 ft	0 psf	2,175.1149 psf	461.34417 psf	120 psf	0 psf	Landslide plane Seismic
Slice	125.94634	1,575.3543	0 psf	2,143.6307	457.81251	120 psf	0 psf	Landslide

Slice 17	130.49369 ft	1,575.1662 ft	0 psf	2,215.6369 psf	479.94077 psf	120 psf	0 psf	Landslide plane Seismic
Slice 18	134.79586 ft	1,576.0162 ft	0 psf	2,283.4387 psf	495.39978 psf	120 psf	0 psf	Landslide plane Seismic
Slice 19	138.43301 ft	1,576.3827 ft	0 psf	2,309.6896 psf	500.78702 psf	120 psf	0 psf	Landslide plane Seismic
Slice 20	141.07016 ft	1,576.7637 ft	0 psf	2,429.6025 psf	515.21426 psf	120 psf	0 psf	Landslide plane Seismic
Slice 21	147.38161 ft	1,577.2233 ft	0 psf	2,506.759 psf	532.60014 psf	120 psf	0 psf	Landslide plane Seismic
Slice 22	151.41774 ft	1,577.7171 ft	0 psf	2,636.613 psf	560.4729 psf	120 psf	0 psf	Landslide plane Seismic
Slice 23	156.40145 ft	1,577.3164 ft	0 psf	2,809.4951 psf	596.9349 psf	120 psf	0 psf	Landslide plane Seismic
Slice 24	161.48515 ft	1,578.3166 ft	0 psf	2,978.2573 psf	633.1975 psf	120 psf	0 psf	Landslide plane Seismic
Slice 25	166.56886 ft	1,578.5164 ft	0 psf	3,142.5794 psf	668.06089 psf	120 psf	0 psf	Landslide plane Seismic
Slice 26	171.98083 ft	1,578.6162 ft	0 psf	3,270.0505 psf	695.19533 psf	120 psf	0 psf	Landslide plane Seismic
Slice 27	178.71186 ft	1,579.2781 ft	0 psf	4,287.3237 psf	2,435.2898 psf	325 psf	0 psf	Fill
Slice 28	177.70075 ft	1,581.3917 ft	0 psf	3,240.4651 psf	716.18281 psf	975 psf	0 psf	Fill
Slice 29	181.35679 ft	1,582.5857 ft	0 psf	3,049.0187 psf	805.17086 psf	825 psf	0 psf	Fill
Slice 30	186.2987 ft	1,584.2726 ft	0 psf	2,856.06187 psf	470.92202 psf	975 psf	0 psf	Fill
Slice 31	191.02647 ft	1,602.3101 ft	0 psf	717.09148 psf	210.43692 psf	975 psf	0 psf	Fill
Slice 32	197.05454 ft	1,611.3674 ft	0 psf	259.72208 psf	145.99561 psf	825 psf	0 psf	Fill
Slice 33	202.08846 ft	1,610.703 ft	0 psf	0.6803608 psf	5.5847502 psi	975 psf	0 psf	Fill

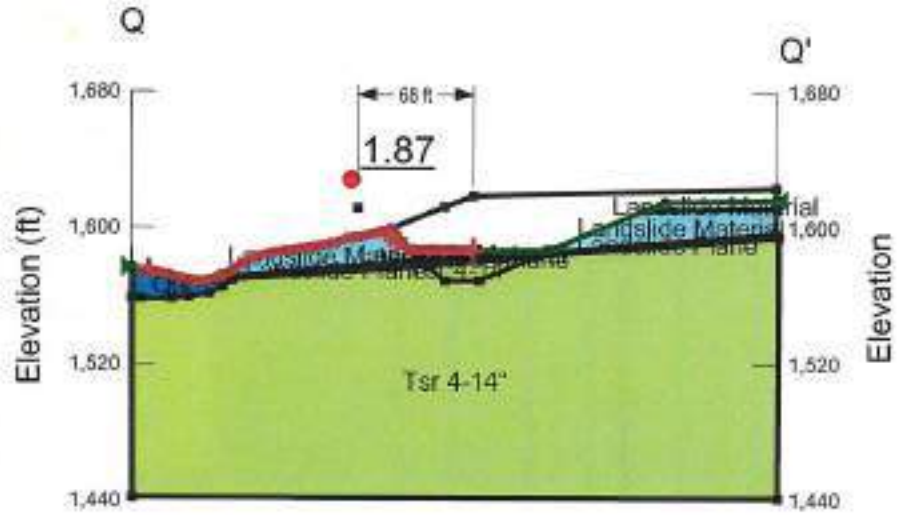
Section Q-Q Tr 68203 SSA.gsz

4 -Rotational Static Temp Left

Section Q-Q Tr 68203 SSA.gsz 12/02/2021 12:26:00 PM

Horz Seismic Coef.: 0

Method: Bishop



Name: Landslide Material
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 160 psf
Phi': 30 °

Name: Landslide Plane
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 8 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

28532 Constellation Rd, Valencia, CA 91355
Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	**203003-01**
Engineer:	**BIH / MW**
Date:	**Dec 2021**

4 -Rotational Static Temp Left

Slope Stability Analysis software by Rocscience www.rocscience.com

File Information

File Version: 10.02
Title: Slope Stability Analysis Cross Section A-A'
Last Saved by: Michal Wilson
Project Number: 764
Date: 12/02/2021
Time: 12:26:00 PM
Tool Version: 10.0.0.17401
File Name: Section C-C Tr 68203 SSA.gsz
Directory: P:\FINAL PROJECTS\Valley Center Valley Center\Slope Stability\Revised\
Last Solved Date: 12/02/2021
Last Solved Time: 12:26:12 PM

Project Settings

Units System: U.S. Customary Units

Analysis Settings

4 -Rotational Static Temp Left

Kind: SLOPE/W
Method: Bishop
Settings
PWP Conditions from: (none)
Unit Weight of Water: 62.6 pcf
Slip Surface
Direction of movement: Left to Right
Use Passed Mode: No
Slip Surface Option: Entry and Exit
Number of slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Method: (none)
Interslice
FoS Calculation Option: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable Difference in FoS: 0.001

Materials

Landslide Material

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 260 psf
Phi: 30 °
Psi: 0 °

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 8 °
Psi: 0 °

Tsr 4-14"

Model: Anisotropic
Unit Weight: 125 pcf
Cohesion: 500 psf
Phi: 32 °
Phi-Anisotropic Strength Ratio: Tsr 18" bedding 4-14"
Cohesion-Isotropic Strength Ratio: Tsr 150 bedding 4-14"
Psi: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 350 psf
Phi: 28 °
Psi: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (10.10652, 1,575.07) ft
Left-Zone Right Coordinate: (151.34881, 1,595.871) ft
Left-Zone Increment: 20
Right Type: Range
Right-Zone Left Coordinate: (154.77177, 1,591.015) ft
Right-Zone Right Coordinate: (377.59422, 1,626.5271) ft
Right-Zone Increment: 30
Radius Increments: 20

Slip Surface Limits

Left Coordinate: (0.42013, 1,577.1082) ft
Right Coordinate: (377.84041, 1,626.2269) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Interval: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.41667)
Data Point: (14, 0.41667)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Interval: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.56818)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	577.13463 ft	1,593.2961 ft
Point 2	575.02811 ft	1,440.679 ft
Point 3	574.0016 ft	1,441.8671 ft
Point 4	573.9013 ft	1,577.1092 ft
Point 5	81.45527 ft	1,596.217 ft
Point 6	101.1225 ft	1,587.7718 ft
Point 7	118.83415 ft	1,582.8225 ft
Point 8	128.16647 ft	1,593.3124 ft
Point 9	146.58778 ft	1,597.0549 ft
Point 10	193.48431 ft	1,611.3044 ft
Point 11	200.76813 ft	1,618.5015 ft
Point 12	93.26368 ft	1,585.7347 ft
Point 13	93.37741 ft	1,593.1239 ft
Point 14	86.76057 ft	1,579.3855 ft
Point 15	57.89079 ft	1,574.2573 ft
Point 16	58.63553 ft	1,572.6562 ft
Point 17	577.84041 ft	1,616.2249 ft
Point 18	30.52016 ft	1,574.5827 ft
Point 19	20.99962 ft	1,572.7836 ft
Point 20	31.19047 ft	1,569.85 ft
Point 21	40.70588 ft	1,568.8039 ft

Point 22	46.93668 ft	1,569.6778 ft
Point 23	50.39023 ft	1,569.7201 ft
Point 24	58.67749 ft	1,569.7645 ft
Point 25	48.17774 ft	1,561.758 ft
Point 26	71.80432 ft	1,559.4439 ft
Point 27	24.06754 ft	1,558.3515 ft
Point 28	5.70787 ft	1,558.9513 ft
Point 29	0.4053 ft	1,579.1375 ft
Point 30	27.4092 ft	1,571.0781 ft
Point 31	59.20125 ft	1,571.9412 ft
Point 32	379.90582 ft	1,590.3616 ft
Point 33	378.98641 ft	1,593.7734 ft
Point 34	152.48229 ft	1,546.1981 ft
Point 35	184.49497 ft	1,569.0081 ft
Point 36	203.6937 ft	1,569.0081 ft
Point 37	152.18574 ft	1,621.615 ft
Point 38	146.75484 ft	1,598.0232 ft
Point 39	317.88593 ft	1,614.7802 ft
Point 40	173.06129 ft	1,577.7347 ft
Point 41	283.49261 ft	1,585.4294 ft
Point 42	248.74575 ft	1,586.1213 ft
Point 43	159.11071 ft	1,581.0495 ft
Point 44	152.30821 ft	1,586.648 ft
Point 45	246.125.46 ft	1,586.6571 ft
Point 46	377.021.92 ft	1,613.5626 ft
Point 47	370.31956 ft	1,605.7157 ft
Point 48	377.023 ft	1,613.56.5 ft

Regions

	Material	Points	Area
Region 1	Fill	4,29,28,27,26,25,24,23,31,15,16,22,21,30,30,19,18	643.44 ft²
Region 2	Tsr 4-14°	24,25,26,27,28,29,3,2,33,41,36,35,40,23	13,479 ft²
Region 3	Landslide Plane	45,40,41,41	324 ft²
Region 4	Landslide Material	48,17,34,47,24	396.24 ft²
Region 5	Landslide Plane	32,42,41,35	423.67 ft²
Region 6	Landslide Material	38,9,34,8,7,6,5,12,13,14,15,31,43,44	1,077 ft²
Region 7	Landslide Material	44,43,42,45	249 ft²
Region 8		1,1,11,10,38,46,45,47,39	2,330.7 ft²
Region 9	Tsr 4-14°	35,35,41,10	467.66 ft²
Region 10	Landslide Plane	43,40,41,42	336.17 ft²
Region 11	Landslide Material	47,45,42,37,48,46	1,664.7 ft²

Slip Results

Slip Surfaces Analyzed: 32874 of 35425 converged

Current Slip Surface

Slip Surface: 99,819
Factor of Safety: 1.87
Volume: 53.324885 ft³
Weight: 6,665.6106 lbf
Resisting Moment: 113,225.93 lbf-ft
Activating Moment: 60,475.438 lbf-ft
Slip Rank: 1 of 98,415 slip surfaces
Exit: (162.3969, 1,586.6491) ft
Entry: (146.74133, 1,597.1983) ft
Radius: 17.180604 ft
Center: (162.59103, 1,603.8286) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	146.99563 ft	1,596.6461 ft	0 psf	-61.865926 psf	-35.718909 psf	160 psf	0 psf	Landslide Material
Slice 2	147.50429 ft	1,595.6262 ft	0 psf	50.072301 psf	28.909256 psf	160 psf	0 psf	Landslide Material
Slice 3	148.01293 ft	1,594.75 ft	0 psf	156.37683 psf	90.284205 psf	160 psf	0 psf	Landslide Material
Slice 4	148.52157 ft	1,593.9784 ft	0 psf	257.74396 psf	148.80855 psf	160 psf	0 psf	Landslide Material
Slice 5	149.03783 ft	1,593.2786 ft	0 psf	327.02733 psf	188.80932 psf	160 psf	0 psf	Landslide Material
Slice 6	149.56172 ft	1,592.6371 ft	0 psf	362.28364 psf	209.16456 psf	160 psf	0 psf	Landslide Material
Slice 7	150.0856 ft	1,592.054 ft	0 psf	391.15407 psf	225.83291 psf	160 psf	0 psf	Landslide Material
Slice 8	150.60949 ft	1,591.5208 ft	0 psf	414.37435 psf	239.23914 psf	160 psf	0 psf	Landslide Material
Slice 9	151.13337 ft	1,591.0313 ft	0 psf	432.51289 psf	249.71143 psf	160 psf	0 psf	Landslide Material
Slice 10	151.65726 ft	1,590.5806 ft	0 psf	446.01882 psf	257.50909 psf	160 psf	0 psf	Landslide Material
Slice 11	152.18114 ft	1,590.1648 ft	0 psf	455.25334 psf	262.84064 psf	160 psf	0 psf	Landslide Material
Slice 12	152.70503 ft	1,589.7809 ft	0 psf	460.51088 psf	265.87608 psf	160 psf	0 psf	Landslide Material
Slice 13	153.22891 ft	1,589.4263 ft	0 psf	462.0339 psf	266.75539 psf	160 psf	0 psf	Landslide Material
Slice 14	153.7528 ft	1,589.0989 ft	0 psf	460.02355 psf	265.59472 psf	160 psf	0 psf	Landslide Material
Slice 15	154.27668 ft	1,588.7968 ft	0 psf	454.64751 psf	262.49080 psf	160 psf	0 psf	Landslide Material
Slice 16	154.80057 ft	1,588.5186 ft	0 psf	446.04576 psf	257.52464 psf	160 psf	0 psf	Landslide Material
Slice 17	155.32445 ft	1,588.263 ft	0 psf	434.33506 psf	250.76346 psf	160 psf	0 psf	Landslide Material
Slice	155.84834	1,588.029	0 psf	419.61234	242.2633	160 psf	0 psf	Landslide

18	ft	ft		psf	psf			Material
Slice 19	156.37222 ft	1,587.8155 ft	0 psf	401.95731 psf	232.07016 psf	160 psf	0 psf	Landslide Material
Slice 20	156.89611 ft	1,587.6217 ft	0 psf	381.43447 psf	220.2213 psf	160 psf	0 psf	Landslide Material
Slice 21	157.41999 ft	1,587.447 ft	0 psf	358.09472 psf	206.74608 psf	160 psf	0 psf	Landslide Material
Slice 22	157.94388 ft	1,587.2907 ft	0 psf	331.9765 psf	191.66672 psf	160 psf	0 psf	Landslide Material
Slice 23	158.46776 ft	1,587.1523 ft	0 psf	303.10875 psf	174.99876 psf	160 psf	0 psf	Landslide Material
Slice 24	158.99165 ft	1,587.0314 ft	0 psf	271.50148 psf	156.75145 psf	160 psf	0 psf	Landslide Material
Slice 25	159.51553 ft	1,586.9276 ft	0 psf	237.16623 psf	136.92799 psf	160 psf	0 psf	Landslide Material
Slice 26	160.03942 ft	1,586.8406 ft	0 psf	200.0963 psf	115.52565 psf	160 psf	0 psf	Landslide Material
Slice 27	160.5633 ft	1,586.7701 ft	0 psf	160.27673 psf	92.535834 psf	160 psf	0 psf	Landslide Material
Slice 28	161.08719 ft	1,586.716 ft	0 psf	117.6822 psf	67.943847 psf	160 psf	0 psf	Landslide Material
Slice 29	161.61107 ft	1,586.678 ft	0 psf	72.276656 psf	41.728947 psf	160 psf	0 psf	Landslide Material
Slice 30	162.13496 ft	1,586.6561 ft	0 psf	24.012837 psf	13.863818 psf	160 psf	0 psf	Landslide Material

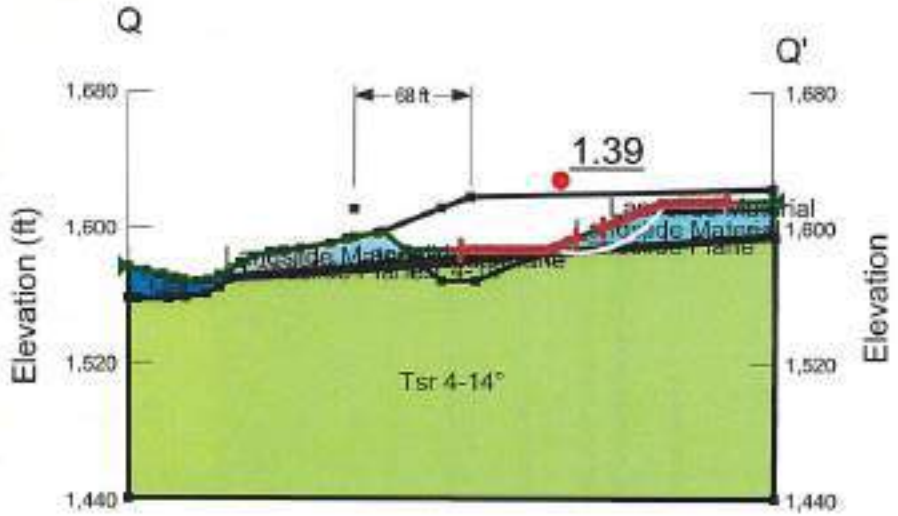
Section Q-Q Tr 68203 SSA.gsz

5 -Rotational Static Temp Right

Section Q-Q Tr 68203 SSA.gsz 12/02/2021 12:26:00 PM

Horz Seismic Coef.: 0

Method: Bishop



Name: Landslide Material
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 160 psf
Phi': 30 °

Name: Landslide Plane
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 8 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC

LGC Valley, Inc

GEOTECHNICAL CONSULTING

28532 Constellation Rd, Valencia, CA 91355
Phone 661-702-8474, Fax 661-702-8475

Tentative Tract 68203
Santa Clarita, CA

Project No:	**203003-01**
Engineer:	**BIH / MW**
Date:	**Dec 2021**

5 -Rotational Static Temp Right

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File Information

File version: 10.00
Title: Slope Stability Analysis Cross-Section 6-6'
Last Edited By: Mitchell Wilson
Revision Number: 754
Date: 12/01/2023
Time: 12:25:30 PM
Tool Version: 10.0.0.17401
File Name: Section C-C' Tr 6&2CD SSA.gsz
Directory: P:\FINAL PROJECTS\Vacant Golden Valley Sierra Way\slope stability\Vetwash\
Last Solved Date: 12/02/2023
Last Solved Time: 12:26:03 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

5 -Rotational Static Temp Right

Kind: SLOPE/W
Method: Bishop
Settings
PWP Conditions from: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of Movement: Right to Left
Use Passe Mode: No
Slip Surface Option: Entry and Exit
Critical slips per Search Grid: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Distribution
# of Slices per Section Option: Constant
Advanced
Locations Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable difference in FoS: 0.001

Materials

Landslide Material

Model: Mohr-Coulomb
Unit Weight: 145 pcf
Cohesion: 150 psf
Phi: 30 °
Phi-B: 0 °

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion: 100 psf
Phi: 8 °
Phi-B: 0 °

Tsr 4-14*

Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion: 600 psf
Phi: 37 °
Phi-Anisotropic Strength Fn: For 37° bedding 4-14*
Cohesion-Anisotropic Strength Fn: For 37° bedding 4-14*
Phi-B: 0 °

Qal

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion: 250 psf
Phi: 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left Zone Left Coordinate: (134,750.76, 1,558.48) ft
Left Zone Right Coordinate: (262.00856, 1,593.3811) ft
Left Zone Increments: 80
Right Type: Range
Right Zone Left Coordinate: (377.27726, 1,599.9966) ft
Right Zone Right Coordinate: (350.15741, 1,615.0192) ft
Right Zone Increments: 150
Radius Increments: 14

Slip Surface Limits

Left Coordinate: (0.40013, 1,577.1092) ft
Right Coordinate: (377.86041, 1,616.2249) ft

Seismic Coefficients

Horz Seismic Coef.: 0
Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (0.99, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (0.99, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	577.18480 ft	1,525.1481 ft
Point 2	577.60381 ft	1,440.679 ft
Point 3	0.40013 ft	1,441.6573 ft
Point 4	0.40013 ft	1,577.1042 ft
Point 5	93.455277 ft	1,586.727 ft
Point 6	102.225 ft	1,587.7728 ft
Point 7	138.88445 ft	1,590.0729 ft
Point 8	138.16697 ft	1,593.3125 ft
Point 9	146.34279 ft	1,597.0509 ft
Point 10	183.48451 ft	1,613.1044 ft
Point 11	209.35832 ft	1,618.9115 ft
Point 12	87.20365 ft	1,581.7347 ft
Point 13	78.37741 ft	1,581.3228 ft
Point 14	65.46957 ft	1,575.2882 ft
Point 15	59.33023 ft	1,574.2373 ft
Point 16	59.025 ft	1,572.0562 ft
Point 17	577.84041 ft	1,515.2268 ft
Point 18	30.50668 ft	1,574.3877 ft
Point 19	30.50667 ft	1,572.7098 ft
Point 20	32.50047 ft	1,569.85 ft
Point 21	40.72568 ft	1,568.8194 ft
Point 22	46.52606 ft	1,569.3778 ft
Point 23	50.33023 ft	1,568.7562 ft
Point 24	53.67774 ft	1,565.7645 ft
Point 25	48.12214 ft	1,561.738 ft
Point 26	37.83032 ft	1,559.1433 ft
Point 27	20.26714 ft	1,554.3515 ft
Point 28	5.76737 ft	1,553.35.5 ft
Point 29	0.40013 ft	1,554.1379 ft
Point 30	7.7409 ft	1,571.0981 ft
Point 31	59.39073 ft	1,571.9412 ft
Point 32	379.96592 ft	1,596.36.8 ft
Point 33	375.99641 ft	1,595.7745 ft
Point 34	381.48724 ft	1,591.1451 ft
Point 35	381.44742 ft	1,594.0051 ft
Point 36	201.4937 ft	1,569.0081 ft
Point 37	132.4874 ft	1,631.256 ft
Point 38	146.77589 ft	1,598.0917 ft
Point 39	417.68503 ft	1,613.7868 ft
Point 40	174.30129 ft	1,577.7341 ft
Point 41	238.40761 ft	1,585.7456 ft
Point 42	231.79975 ft	1,586.1213 ft
Point 43	209.31077 ft	1,581.0425 ft
Point 44	162.38821 ft	1,597.648 ft
Point 45	245.52586 ft	1,588.6971 ft
Point 46	377.02192 ft	1,611.5426 ft
Point 47	300.41966 ft	1,629.716 ft
Point 48	377.683 ft	1,612.5675 ft

Regions

	Material	Points	Area
Region 1	Qa	4,29,28,27,26,25,24,23,31,15,16,22,21,20,30,29	601.49 ft²
Region 2	Tsr 4-14°	24,25,26,27,28,29,3,2,38,47,36,35,48,37	51.405 ft²
Region 3	Landslide Plane	33,40,41,31	324 ft²
Region 4	Landslide Mixed	48,37,39,47,46	436.84 ft²
Region 5	Landslide Plane	32,42,41,33	722.07 ft²
Region 6	Landslide Material	38,6,34,8,7,5,5,12,13,14,15,42,48,44	1,227.2 ft²
Region 7	Landslide Material	44,45,43,46	249.91 ft²
Region 8		17,1,11,10,28,44,45,37,39	4,350.7 ft²
Region 9	Tsr 4-14°	35,36,41,40	468.56 ft²
Region 10	Landslide Plane	43,40,41,31	186.13 ft²
Region 11	Landslide Material	47,45,42,34,48,46	1,804.2 ft²

Slip Results

Slip Surfaces Analyzed: 91667 of 98415 converged

Current Slip Surface

Slip Surface: 75,968
Factor of Safety: 1.30
Volume: 628.1208 ft³
Weight: 75,820.8 lbs/ft
Resisting Moment: 2,124,133.4 lbf-ft
Activating Moment: 1,630,786.7 lbf-ft
Slip Surface 1 of 96,475 slip surfaces.
Left: (247.7687ft, 1,587.5997) ft
Entry: (314.1288, 1,614.2171) ft
Radius: 59.483451 ft
Center: (262.99028, 1,643.1191) ft

Slip Slices

	X	Y	Pore Pressure	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	242.75027 ft	1,587.3565 ft	0 psf	326.76624 psf	71.052037 psf	160 psf	0 psf	Landslide Material
Slice 2	250.75934 ft	1,586.906 ft	0 psf	391.37401 psf	148.63837 psf	160 psf	0 psf	Landslide Material
Slice 3	258.67852 ft	1,586.4562 ft	0 psf	421.49981 psf	98.33795 psf	100 psf	0 psf	Landslide Plane
Slice 4	266.52779 ft	1,586.1651 ft	0 psf	576.42279 psf	87.07394 psf	100 psf	0 psf	Landslide Plane
Slice 5	267.81 ft	1,586.5101 ft	0 psf	719.77268 psf	301.55792 psf	100 psf	0 psf	Landslide Plane
Slice 6	259.54222 ft	1,585.7451 ft	0 psf	851.83979 psf	119.73716 psf	100 psf	0 psf	Landslide Plane
Slice 7	251.7745 ft	1,585.0946 ft	0 psf	977.7967 psf	496.73937 psf	100 psf	0 psf	Landslide Plane
Slice 8	264.00875 ft	1,585.6525 ft	0 psf	1,082.7628 psf	557.17269 psf	100 psf	0 psf	Landslide Plane
Slice 9	256.236 ft	1,585.7345 ft	0 psf	1,181.486.7 psf	606.70615 psf	100 psf	0 psf	Landslide Plane
Slice 10	268.37.23 ft	1,585.5906 ft	0 psf	1,270.2647 psf	375.52215 psf	100 psf	0 psf	Landslide Plane
Slice 11	270.7035 ft	1,585.353 ft	0 psf	1,347.7742 psf	389.0273 psf	100 psf	0 psf	Landslide Plane
Slice 12	272.91456 ft	1,585.4969 ft	0 psf	1,414.4429 psf	398.78699 psf	100 psf	0 psf	Landslide Plane
Slice 13	275.16401 ft	1,586.514 ft	0 psf	1,470.1491 psf	406.61545 psf	100 psf	0 psf	Landslide Plane
Slice 14	277.46636 ft	1,587.4242 ft	0 psf	1,514.7536 psf	417.69194 psf	100 psf	0 psf	Landslide Plane
Slice 15	279.65251 ft	1,588.0844 ft	0 psf	1,547.968 psf	21.755524 psf	100 psf	0 psf	Landslide Plane
Slice 16	281.86476 ft	1,588.7554 ft	0 psf	1,569.6785 psf	720.78784 psf	100 psf	0 psf	Landslide Plane
Slice 17	284.07881 ft	1,589.5.01 ft	0 psf	1,001.2448 psf	728.08606 psf	100 psf	0 psf	Landslide Material
Slice	286.29465	1,590.403	0 psf	1,378.077	796.60424	160 psf	0 psf	Landslide

	ft	ft		psf	psf			Material
Slice 19	288.4303 ft	1,591.5644 ft	0 psf	1,549.4510 psf	775.64213 psf	160 psf	0 psf	Landslide Material
Slice 20	290.6.035 ft	1,592.0741 ft	0 psf	1,597.3179 psf	769.00687 psf	160 psf	0 psf	Landslide Material
Slice 21	292.79019 ft	1,592.6748 ft	0 psf	1,639.3588 psf	735.54434 psf	160 psf	0 psf	Landslide Material
Slice 22	294.97804 ft	1,593.009 ft	0 psf	1,669.233 psf	670.05.00 psf	160 psf	0 psf	Landslide Material
Slice 23	297.14989 ft	1,593.4722 ft	0 psf	1,686.5162 psf	625.33043 psf	160 psf	0 psf	Landslide Material
Slice 24	299.32974 ft	1,588.082 ft	0 psf	980.168238 psf	571.5245 psf	160 psf	0 psf	Landslide Material
Slice 25	301.47066 ft	1,589.8382 ft	0 psf	984.4209 psf	908.99064 psf	160 psf	0 psf	Landslide Material
Slice 26	303.57267 ft	1,590.9968 ft	0 psf	764.1696 psf	841.13952 psf	160 psf	0 psf	Landslide Material
Slice 27	305.67468 ft	1,003.7607 ft	0 psf	630.75865 psf	864.15668 psf	160 psf	0 psf	Landslide Material
Slice 28	307.77668 ft	1,006.0599 ft	0 psf	482.5758 psf	478.9368 psf	160 psf	0 psf	Landslide Material
Slice 29	309.87869 ft	1,608.6673 ft	0 psf	317.07999 psf	183.09767 psf	160 psf	0 psf	Landslide Material
Slice 30	311.70781 ft	1,611.0941 ft	0 psf	161.11219 psf	93.094774 psf	160 psf	0 psf	Landslide Material
Slice 31	313.20735 ft	1,614.5.01 ft	0 psf	-11.002271 psf	-7.5210935 psf	160 psf	0 psf	Landslide Material

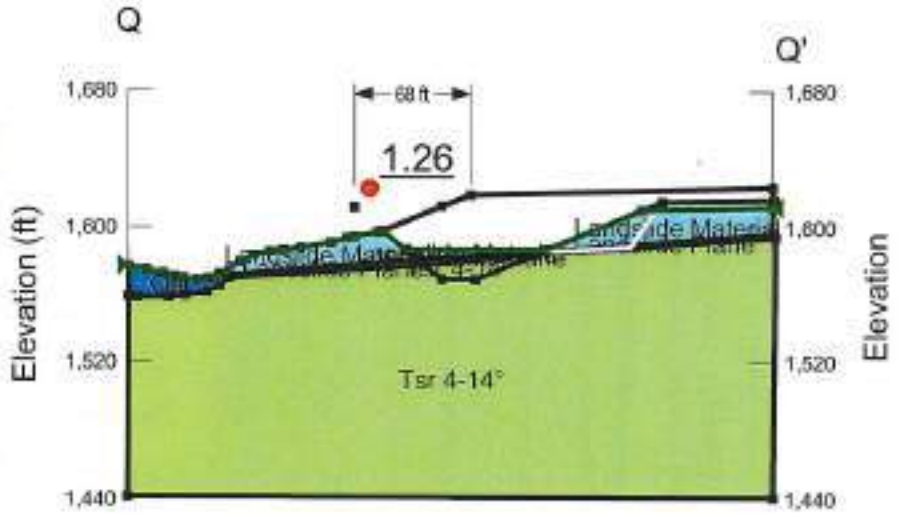
Section Q-Q Tr 68203 SSA.gsz

6 -Translational Static Temp Right (2)

Section Q-Q Tr 68203 SSA.gsz 12/02/2021 01:06:11 PM

Horz Seismic Coef.: 0

Method: Spencer



Name: Landslide Material
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 160 psf
Phi': 30 °

Name: Landslide Plane
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 8 °

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28 °

Name: Tsr 4-14°
Model: Anisotropic Fn.
Unit Weight: 125 pcf
Cohesion': 600 psf
Phi': 32 °
Phi-Anisotropic Strength Fn.: Tsr 18° bedding 4-14°
C-Anisotropic Strength Fn.: Tsr 250 bedding 4-14°

LGC

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Tentative Tract 68203
Santa Clarita, CA

Project No:	**203003-01**
Engineer:	**BIH / MW**
Date:	**Dec 2021**

6 -Translational Static Temp Right (2)

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File Information

File Version: 10.03
Title: Slope Stability Analysis Cross-Section A-A'
Last Edited By: Michael Wilson
Revision Number: 758
Date: 12/02/2021
Time: 01:06:11 PM
Test Version: 10.0.0.27401
File Name: Section C-C' Tr 68200 SSA.gsz
Directory: P:\PINNACLE PROJECTS\Work\West Golden Valley Siena Ave\slope stability\Volume1\
User Solved Date: 12/02/2021
User Solved Time: 01:06:10 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

6 -Translational Static Temp Right (2)

Kind: SLOPE/W
Method: 6 -Translational Static Temp Right
Method: Spencer
Settings
PWP Conditions from: (none)
Unit Weight of Water: 62.4 pcf
Slip Surface
Direction of movement: Right to Left
Use Passive Mode: No
Slip Surface Option: Other Slip Surfaces from Other
Starting slip surfaces saved: 1
Optimize Critical Slip Surface Location: No
Tension Crack Option: (none)
Discretization
Full Solution Options: Constant
Advanced
Geometry Settings
Minimum Slip Surface Depth: 0.1 ft
Number of Slices: 30
Factor of Safety Convergence Settings
Maximum Number of Iterations: 150
Tolerance Difference In F of S: 0.01
Solution Settings
Solver Method: Linear Search
Slice Check at Lambda Factor of Safety: 0.2
Lambda: 0.1

Lambda 1: 1
Lambda 2: 0.8
Lambda 3: 0.6
Lambda 4: 0.4
Lambda 5: 0.2
Lambda 6: 0
Lambda 7: 0.2
Lambda 8: 0.4
Lambda 9: 0.6
Lambda 10: 0.8
Lambda 11: 1

Materials

Landslide Material

Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion': 160 psf
Phi': 31°
Phi-B: 0°

Landslide Plane

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 100 psf
Phi': 0°
Phi-B: 0°

Tsr 4-14"

Model: Anisotropic Fn
Unit Weight: 125 pcf
Cohesion: 600 psf
Phi: 32°
Phi-Anisotropic Strength Fn: Tsr 18" bedding 4-14"
Cohesion-Anisotropic Strength Fn: Tsr 25C bedding 4-14"
Phi-B: 0°

Qal

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 350 psf
Phi': 28°
Phi-B: 0°

Slip Surface Limits

Left Coordinate: (0.49013, 1,577.1205) ft
Right Coordinate: (577.87', 1,681.9575) ft

Seismic Coefficients

Horz Seismic Coef.: 0

Vert Seismic Coef.: 0

Anisotropic Strength Functions

Tsr 250 bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.4167)
Data Point: (14, 0.4167)
Data Point: (14.01, 1)

Tsr 18° bedding 4-14°

Model: Spline Data Point Function
Function: Modifier Factor vs. Inclination
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 1
Data Points: Inclination (°), Modifier Factor
Data Point: (3.99, 1)
Data Point: (4, 0.5625)
Data Point: (14, 0.5625)
Data Point: (14.01, 1)

Points

	X	Y
Point 1	377.18469 ft	1,623.1981 ft
Point 2	377.62811 ft	1,440.679 ft
Point 3	0.40013 ft	1,441.6571 ft
Point 4	0.40013 ft	1,577.1092 ft
Point 5	91.45527 ft	1,586.317 ft
Point 6	101.225 ft	1,587.7728 ft
Point 7	118.88445 ft	1,590.8225 ft
Point 8	128.16697 ft	1,593.3129 ft
Point 9	146.38773 ft	1,597.0549 ft
Point 10	183.48481 ft	1,612.1044 ft
Point 11	200.38812 ft	1,618.9815 ft
Point 12	83.26368 ft	1,585.7347 ft
Point 13	73.37741 ft	1,583.3239 ft
Point 14	65.46957 ft	1,579.2885 ft
Point 15	59.39023 ft	1,574.2573 ft
Point 16	53.62533 ft	1,572.0562 ft
Point 17	377.84041 ft	1,616.2249 ft
Point 18	10.52665 ft	1,574.9827 ft
Point 19	20.96962 ft	1,572.7898 ft

Point 20	32.16047 ft	1,569.85 ft
Point 21	40.70588 ft	1,568.8039 ft
Point 22	46.93606 ft	1,569.6778 ft
Point 23	59.39023 ft	1,569.7502 ft
Point 24	53.67774 ft	1,565.1645 ft
Point 25	46.12224 ft	1,561.758 ft
Point 26	33.80632 ft	1,559.4433 ft
Point 27	24.06714 ft	1,558.3515 ft
Point 28	5.76797 ft	1,558.3515 ft
Point 29	0.40013 ft	1,559.1376 ft
Point 30	27.4092 ft	1,571.0981 ft
Point 31	59.39023 ft	1,571.9412 ft
Point 32	376.95582 ft	1,596.3618 ft
Point 33	378.98641 ft	1,593.7733 ft
Point 34	132.48329 ft	1,594.1991 ft
Point 35	183.49392 ft	1,569.0091 ft
Point 36	203.4937 ft	1,569.0091 ft
Point 37	132.4874 ft	1,611.655 ft
Point 38	148.77589 ft	1,598.0237 ft
Point 39	312.48593 ft	1,614.7808 ft
Point 40	173.06129 ft	1,577.7341 ft
Point 41	238.49261 ft	1,583.7056 ft
Point 42	244.24975 ft	1,586.1213 ft
Point 43	169.11071 ft	1,581.0425 ft
Point 44	162.39821 ft	1,586.648 ft
Point 45	245.52536 ft	1,586.6571 ft
Point 46	377.02192 ft	1,611.5626 ft
Point 47	300.41966 ft	1,609.7157 ft
Point 48	377.633 ft	1,611.5675 ft

Regions

	Material	Points	Area
Region 1	Qal	4,29,28,27,26,25,24,23,31,15,16,22,21,20,30,19,18	691.49 ft²
Region 2	Tsr 4-14°	24,25,26,27,28,29,3,2,33,41,36,35,40,23	51,405 ft²
Region 3	Landslide Plane	23,40,43,31	324 ft²
Region 4		48,17,39,47,46	336.04 ft²
Region 5	Landslide Plane	32,42,41,33	322.87 ft²
Region 6	Landslide Material	38,9,34,8,7,6,5,12,13,14,15,31,43,44	1,327.2 ft²
Region 7	Landslide Material	44,43,42,45	249.91 ft²
Region 8		17,1,11,10,38,44,45,47,39	4,330.7 ft²
Region 9	Tsr 4-14°	35,36,41,40	463.56 ft²
Region 10	Landslide Plane	43,40,41,42	196.17 ft²
Region 11	Landslide Material	47,45,42,32,48,46	1,864.7 ft²

Slip Results

Slip Surfaces Analysed: 1 of 1 converged

Current Slip Surface

Slip Surface: 1
Factor of Safety: 1.26
Volume: 619.63512 ft³
Weight: 77,207.35 lbf
Resisting Moment: 803,332 lbf-ft
Activating Moment: 638,997.43 lbf-ft
Resisting Force: 20,280.093 lbf
Activating Force: 16,176.912 lbf
Slip Rank: 1 of 1 slip surfaces
Exit: (245.41542, 1,586.6571) ft
Entry: (308.86269, 1,609.9191) ft
Radius: 35.360416 ft
Center: (270.74245, 1,615.7348) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	245.44309 ft	1,586.6456 ft	0 psf	146.31086 psf	84.472615 psf	160 psf	0 psf	Landslide Material
Slice 2	245.45806 ft	1,586.6229 ft	0 psf	151.14371 psf	87.262859 psf	160 psf	0 psf	Landslide Material
Slice 3	245.92405 ft	1,586.4464 ft	0 psf	224.1209 psf	129.39626 psf	160 psf	0 psf	Landslide Material
Slice 4	246.92148 ft	1,586.0333 ft	0 psf	247.16027 psf	34.73611 psf	100 psf	0 psf	Landslide Plane
Slice 5	248.57276 ft	1,585.8459 ft	0 psf	275.98261 psf	38.786826 psf	100 psf	0 psf	Landslide Plane
Slice 6	250.67783 ft	1,585.9671 ft	0 psf	371.84858 psf	52.25991 psf	100 psf	0 psf	Landslide Plane
Slice 7	252.7829 ft	1,586.0884 ft	0 psf	467.71456 psf	65.732995 psf	100 psf	0 psf	Landslide Plane
Slice 8	254.88798 ft	1,586.2097 ft	0 psf	563.58054 psf	79.206079 psf	100 psf	0 psf	Landslide Plane
Slice 9	256.99305 ft	1,586.3309 ft	0 psf	659.44651 psf	92.679163 psf	100 psf	0 psf	Landslide Plane
Slice 10	259.09813 ft	1,586.4522 ft	0 psf	755.31249 psf	106.15225 psf	100 psf	0 psf	Landslide Plane
Slice 11	261.2032 ft	1,586.5734 ft	0 psf	851.17846 psf	119.62533 psf	100 psf	0 psf	Landslide Plane
Slice 12	263.30827 ft	1,586.6947 ft	0 psf	947.04444 psf	133.09842 psf	100 psf	0 psf	Landslide Plane
Slice 13	265.41335 ft	1,586.816 ft	0 psf	1,042.9104 psf	146.5715 psf	100 psf	0 psf	Landslide Plane
Slice 14	267.51842 ft	1,586.9372 ft	0 psf	1,138.7764 psf	160.04458 psf	100 psf	0 psf	Landslide Plane
Slice 15	269.6235 ft	1,587.0585 ft	0 psf	1,234.6424 psf	173.51767 psf	100 psf	0 psf	Landslide Plane
Slice 16	271.72857 ft	1,587.1798 ft	0 psf	1,330.5083 psf	186.99075 psf	100 psf	0 psf	Landslide Plane
Slice 17	273.83364 ft	1,587.301 ft	0 psf	1,426.3743 psf	200.46384 psf	100 psf	0 psf	Landslide Plane
Slice 18	275.93872 ft	1,587.4223 ft	0 psf	1,522.2403 psf	213.93692 psf	100 psf	0 psf	Landslide Plane
Slice 19	278.04379 ft	1,587.5435 ft	0 psf	1,618.1063 psf	227.41001 psf	100 psf	0 psf	Landslide Plane
Slice 20	280.14887 ft	1,587.6648 ft	0 psf	1,713.9722 psf	240.88309 psf	100 psf	0 psf	Landslide Plane
Slice 21	282.25394 ft	1,587.7861 ft	0 psf	1,809.8382 psf	254.35617 psf	100 psf	0 psf	Landslide Plane
Slice 22	284.35901 ft	1,587.9073 ft	0 psf	1,905.7042 psf	267.82926 psf	100 psf	0 psf	Landslide Plane
Slice 23	286.46409 ft	1,588.0286 ft	0 psf	2,001.5702 psf	281.30234 psf	100 psf	0 psf	Landslide Plane
Slice 24	288.56916 ft	1,588.1498 ft	0 psf	2,097.4361 psf	294.77543 psf	100 psf	0 psf	Landslide Plane
Slice 25	290.67424 ft	1,588.2711 ft	0 psf	2,193.3021 psf	308.24851 psf	100 psf	0 psf	Landslide Plane
Slice 26	292.77931 ft	1,588.3924 ft	0 psf	2,289.1681 psf	321.72159 psf	100 psf	0 psf	Landslide Plane
Slice 27	294.88492 ft	1,589.2429 ft	0 psf	1,440.7042 psf	202.48339 psf	100 psf	0 psf	Landslide Plane
Slice 28	295.89161 ft	1,591.3375 ft	0 psf	1,007.7699 psf	581.83621 psf	160 psf	0 psf	Landslide Material
Slice 29	297.67883 ft	1,593.9471 ft	0 psf	886.27719 psf	511.69237 psf	160 psf	0 psf	Landslide Material
Slice 30	299.50605 ft	1,596.5566 ft	0 psf	764.7845 psf	441.54854 psf	160 psf	0 psf	Landslide Material
Slice 31	301.47504 ft	1,599.3686 ft	0 psf	606.30422 psf	350.0499 psf	160 psf	0 psf	Landslide Material
Slice 32	303.58579 ft	1,602.3811 ft	0 psf	410.89635 psf	237.19647 psf	160 psf	0 psf	Landslide Material
Slice 33	305.69655 ft	1,605.3976 ft	0 psf	215.36847 psf	124.34305 psf	160 psf	0 psf	Landslide Material
Slice 34	307.80731 ft	1,608.412 ft	0 psf	19.900604 psf	11.489619 psf	160 psf	0 psf	Landslide Material

12/3/21, 4:00 PM E - Translational Static Temp Right (2)

file:///P:/FINAL PROJECTS/Valuce Golden Valley Sierra Heyrilope stability/Valuce/Section G-G Ti 68303 SSA - E -Translational Static Temp Right (3... 6/6

APPENDIX D

RTF&A, Review of LGC Valley, Inc. Geotechnical Report, Multi-Use Development, Tentative Tract Map 68203, dated November 19, 2020, Santa Clarita, California, Grading Plan Check No. 2021-006-650, Dated June 11, 2021.

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

June 11, 2021

City of Santa Clarita
Engineering Services Division
23920 Valencia Boulevard
Valencia, California 91355

Job No. 2021-006-650

Attention: Mr. Balvinder Sandhu
Senior Engineer

Subject: Review of LGC Valley, Inc. Geotechnical Report
Multi-Use Development
Tentative Tract Map 68203
Dated November 19, 2021
Santa Clarita, California

References: See attached

Ladies/Gentlemen:

R.T. Frankian & Associates (RTF&A) has prepared this report presenting the results of our review of the LGC Valley, Inc. (LGC), report titled *Geotechnical Report for Multi-Use Development, Tentative Tract Map 68203, City of Santa Clarita, California*, dated November 19, 2021. The LGC report was prepared for Renaud and Sue Veluzat to evaluate the proposed project from a geotechnical engineering standpoint, and to determine geotechnical constraints associated with the proposed development.

Based on our review of the LGC report, we recommend that the above referenced report and remedial plans for the subject site not be approved by the City of Santa Clarita, from a geologic and geotechnical standpoint.

Our professional services have been performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for the City of Santa Clarita and is based solely on review of the referenced documents and plans provided by the City of

Santa Clarita and the Project Geotechnical Consultant for the subject site, without the benefit of subsurface exploration or geotechnical laboratory testing.

REVIEW COMMENTS

As part of the review of the LGC report RTF&A also reviewed other geotechnical/geologic reports pertinent to Tentative Tract Map 68203 (TTM 68203) and surrounding properties. Significant to TTM 68203 are geotechnical reports prepared by Leighton and Associates, Inc. (Leighton) for Tract 53419 (Valle di Oro) located immediately east of TTM 68203. RTF&A provided peer review of the Leighton Tract 53419 reports for the City of Santa Clarita. The various reports reviewed in preparation of this letter are listed in the attached References.

1. **Geotechnical Map – Plate 1**: The following review comments address issues and concerns related to data presented on Plate 1.

    a. A review of geologic data presented in Leighton's 2006 As-Built Rough Grading Report for adjacent Tract 53419 indicates the presence of a questionable ancient landslide within Tract 53419 that encroaches into the eastern portion of TTM 68203 (northeast of LGC Test Pit TP-10 and in the area of LGC Cross Section Q-Q'). LGC has mapped this area as being underlain by bedrock units of the Sunshine Ranch Member of the Saugus Formation but has not conducted any subsurface exploration in this area to either confirm or dispute the existence of the questionable landslide. Conduct additional exploration within the Leighton mapped limits of the questionable landslide to ascertain the landslide existence within TTM 68203. The exploratory excavations should be of adequate quantity and depth to characterize the subsurface conditions and structure. Leighton's Geotechnical Cross Section DD-DD' suggests the landslide could be at least 70 feet deep beneath Tract 53419. In lieu of additional exploration provide verifiable documentation, such as exploratory excavations or investigations by other geotechnical consultants, demonstrating that a landslide does not exist within TTM 68203.

    b. Structural geologic data (bedding) is limited to two locations within the entire site (Borings B-LGC-LB and LGC-LB-2). The paucity of bedding data does not adequately address potential geologic instabilities for all proposed TTM 68203 cut slopes. Additional structural data is needed to assess geologic conditions for the overall site. This could include data from past exploratory excavations onsite or from other consultants, if properly cited and referenced. Revise Cross Sections (Plate 2) accordingly to reflect additional structural data.

c. Provide the logs for LGC's 2003 Borings LGC-1 and -2.

d. Identify the geologic unit in the northernmost portion of TTM 68203 north of the alluvium (map unit "Qal") and adjacent to Tract 30787.

e. Please explain what is meant by "General Bedding Attitude". The reviewer understands "approximate bedding" or "questionable bedding" but is unclear what LGC is trying to convey with "General Bedding". This bedding data was presumably obtained from downhole logging of large-diameter exploratory borings where the bedding could be directly observed and measured, yet the description presented for bedding data on the Geotechnical Map implies a lack confidence by LGC in the data. It is unclear how stability analyses for Cross Sections depicting "general bedding" can be considered conclusive analyses.

f. Symbols for all borings on the "Explanation" should match the symbols for the respective borings on the Geotechnical Map.

2. **Cross Sections – Plate 2**: The following review comments address issues and concerns related to data presented on Plate 2.

a. Cross Section C-C' does not depict map unit "Cf" as shown on Geotechnical Map, Plate 1.

b. Subsurface unit below alluvium (unit "Qal") on Cross Section E-E' is not labeled. This unit also is unlabeled on Plate 1.

c. Unit "Qls" on Plate 1 is labeled as "Qal" on Cross Section F-F'. Unit "Afu" on Section F-F' is not shown on Plate 1. Correct map or section accordingly.

d. Fix "Tsr" label on Cross Section H-H'.

e. Cross Section I'I' does not depict map unit "Cf" as shown on Geotechnical Map, Plate 1.

f. Unit "Afu" on Section N-N' is not shown on Plate 1. Correct map or section accordingly.

g. Unit "Qal" on Cross Section P-P' not labeled.

h. Cross Section Q-Q' extends through area mapped as questionable ancient landslide by Leighton (2006). As discussed in Review Comment 1a above, evaluate possible landslide and revise Cross Section Q-Q' as needed.

3. **Section 2.4 – Landslides**: As discussed in Review Comment 1a above, conduct additional exploration within the mapped limits of the questionable landslide within eastern portion of site to ascertain the landslide's existence within TTM 68203.

4. **Section 2.6 – Oil Wells**: Show approximate location of Mobil Oil Corp. Well #4 on Geotechnical Map, Plate 1.

5. **Section 2.9 – Slope Stability**: As discussed in Review Comment 1b above there is insufficient bedding data to justify the subsurface conditions depicted on Cross Sections E-E' and Q-Q' and used in the respective analyses.

6. **Appendix B**: Boring B-LGC-LB is labeled "B-LGC-LB" on Plates 1 and 2 but is designated in the logs as "LB-1". Correct the designation on Plates or log accordingly.

7. Review of the log for TP-4 appears to indicate that alluvium was encountered from 8 feet to the full trench depth of 13.5 feet. There is a note on TP-4 for total removal of all "Afu" and "Qal". The removal depths in the area of the other tests pits also generally tend to confirm that complete removal of all "Qal" material is recommended. However, the recommended depth of removal indicated in the triangle in the vicinity of TP-4 is only 13 feet with the total depth of "Qal" apparently undetermined. If complete removal of "Qal" is recommended within the site grading limit it should be clearly shown on the plan or the required depth of removal of "Qal" should be clarified on the plan. In addition, the plan should be revised to indicate complete removal of all "Qal" material at TP-4 as recommended and indicated on theTP-4 test pit log.

8. For the slope stability calculations, the consultant appears to entirely rely on direct shear testing performed by others on a surrounding project. The only direct shear testing appears to have been done on single shear remolded samples. Additional samples should be obtained for multi-shear direct shear testing of samples obtained from the subject site to verify the applicabililty of the utilized direct shear test parameters. Slope stability calculations should be updated, as appropriate, based on the laboratory test results performed on site specific samples.

9. The slope stability calculations should be revised, as appropriate, once the additional investigation and laboratory testing for the site is performed. Once the structural geologic

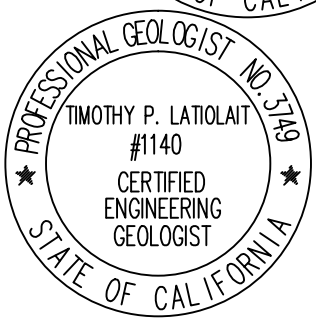
conditions at the site are conclusively determined, additional review of the slope stability calculations will be performed.

Should you have any questions regarding this review, please do not hesitate to call our office.

Respectfully submitted,

R. T. FRANKIAN & ASSOCIATES

by: Alan W. Rasplicka
Principal Geotechnical Engineer



and: Timothy P. Latiolait
Principal Engineering Geologist

TPL/AWR/jh

Attachment: References

REFERENCES

Dibblee, T. W., Jr., 1996, "Geologic Map of the Mint Canyon Quadrangle, Los Angeles County, California," Dibblee Geological Foundation Map DF-57.

LGC Valley, Inc., 2021, "Geotechnical Report for Multi-Use Development, Tentative Tract Map 68203, City of Santa Clarita, California," for Renaud and Sue Veluzat, Project No. 203003-01.

Leighton and Associates, Inc., 2003, "Response to City of Santa Clarita Geotechnical Review Sheet Prepared by R.T. Frankian & Associates, Dated March 21, 2003, Proposed Golden Valley Estates Residential Development, Tract 53419, City of Santa Clarita, California, Project Number 06-0954-001, dated August 7, 2003."

Leighton and Associates, Inc., 2005, "Review of Revised Rough Grading Plan for Tract 53419 and Summary of Conclusions and Recommendations for Proposed Residential Development, City of Santa Clarita, California, Project Number 061372-001, dated February 25, 2005.

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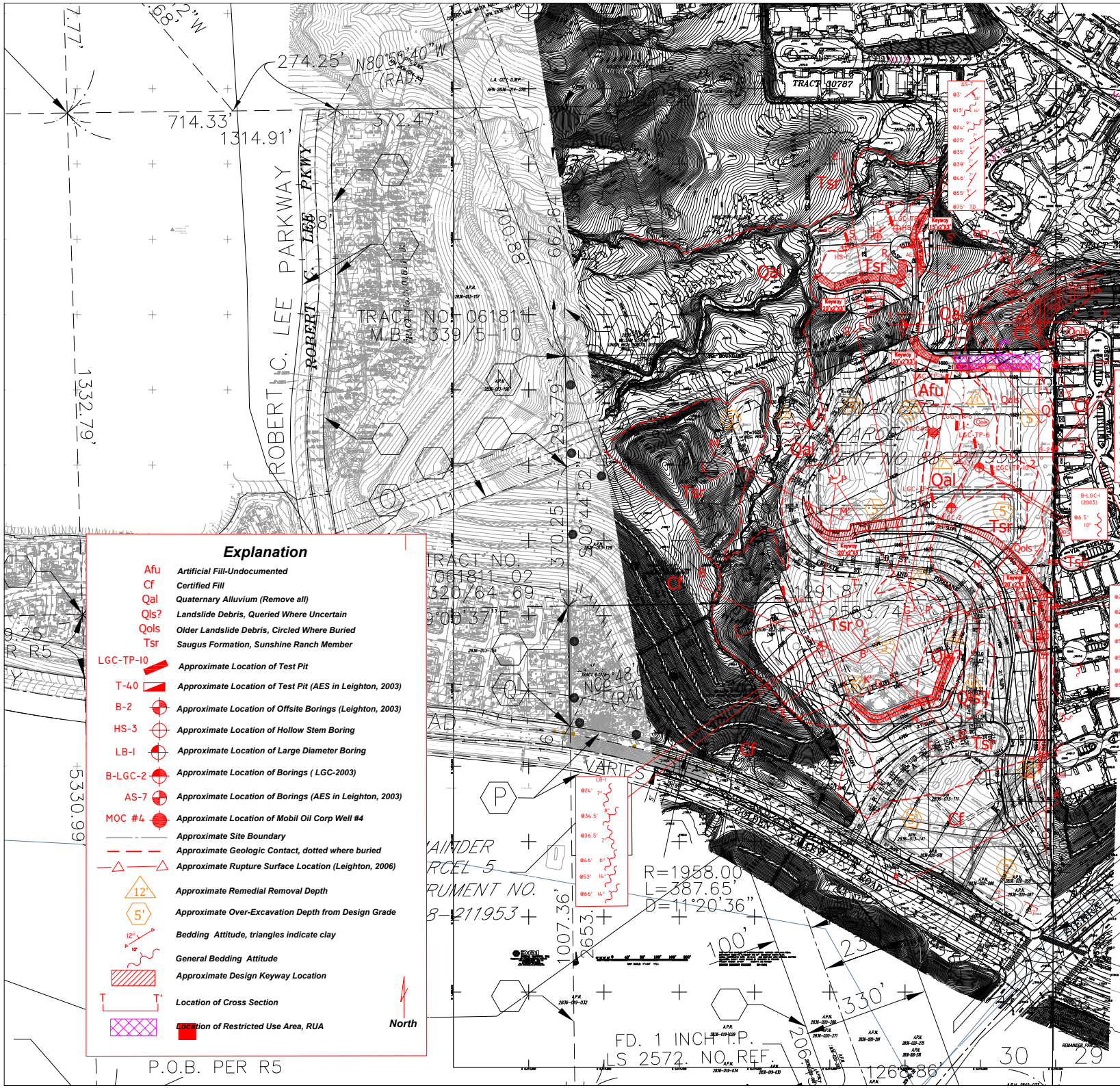
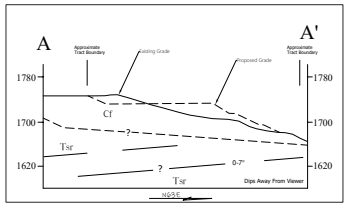
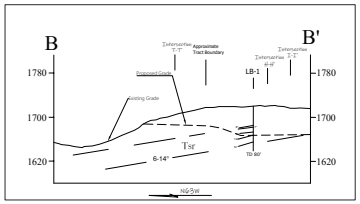
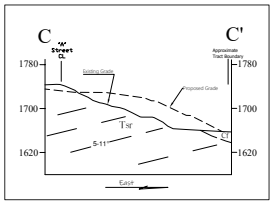
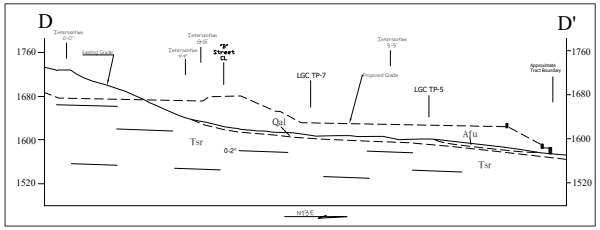
Saul, R.B., and Wooten, T.M., 1983, "Geology of the South Half of the Mint Canyon Quadrangle, Los Angeles County, California," California Division of Mines and Geology Open File Report 83-24LA.

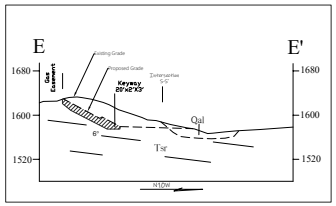

Explanation
Afu Artificial Fill-Undocumented
Cf Certified Fill
Qal Quaternary Alluvium (Remove all)
Qls? Landslide Debris, Queried Where Uncertain
Qols Older Landslide Debris, Circled Where Buried
Tsr Saugus Formation, Sunshine Ranch Member
LGC-TP-I0 Approximate Location of Test Pit
T-40 Approximate Location of Test Pit (AES in Leighton, 2003)
B-2 Approximate Location of Offsite Borings (Leighton, 2003)
HS-3 Approximate Location of Hollow Stem Boring
LB-I Approximate Location of Large Diameter Boring
B-LGC-2 Approximate Location of Borings (LGC-2003)
AS-7 Approximate Location of Borings (AES in Leighton, 2003)
MOC #4 Approximate Location of Mobil Oil Corp Well #4
Approximate Site Boundary
Approximate Geologic Contact, dotted where buried
Approximate Rupture Surface Location (Leighton, 2006)
12' Approximate Remedial Removal Depth
5' Approximate Over-Excavation Depth from Design Grade
Bedding Attitude, triangles indicate clay
General Bedding Attitude
Approximate Design Keyway Location
T T' Location of Cross Section
Location of Restricted Use Area, RUA
North
ROBERT C. LEE PARKWAY
TRACT NO. 061811
M.B. 1339/5-10
TRACT NO. 061811-02
320/64-69
TRACT 30787
274.25'
N80°50'40"W
(RAD)
714.33'
1314.91'
372.47'
662.87'
700.88'
1332.79'
5330.99'
293.79'
370.25'
1291.87'
2583.74'
1007.36'
2653.
R=1958.00'
L=387.65'
D=11°20'36"
100'
330'
1260.86'
FD. 1 INCH I.P.
LS 2572. NO REF.
P.O.B. PER R5
VARIES
PARCEL 2
REMAINDER
PARCEL 5
INSTRUMENT NO.
88-211953
Afu
Qal
Tsr
Cf
Qols
P
Q
R
S
T
29
30

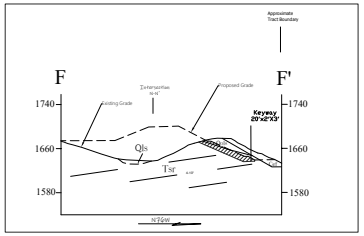


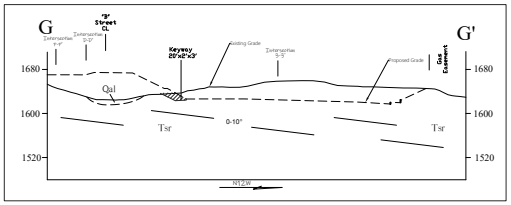


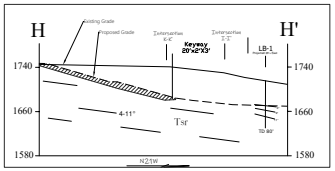


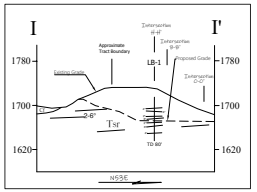


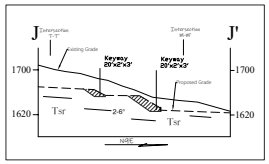


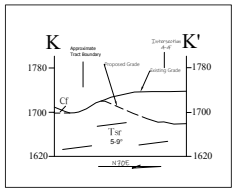


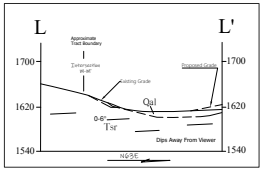


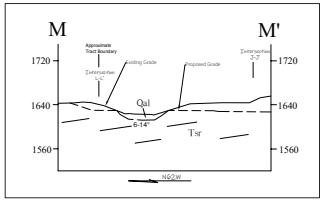


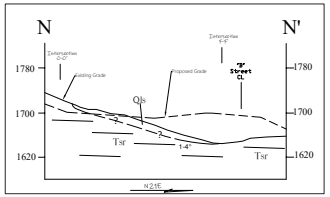


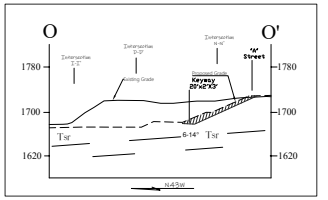


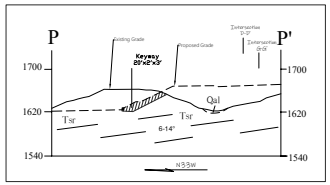


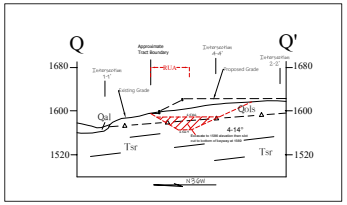


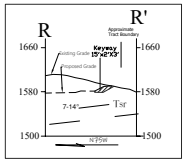


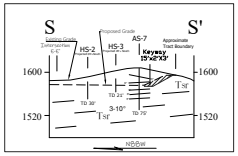


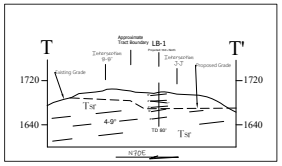


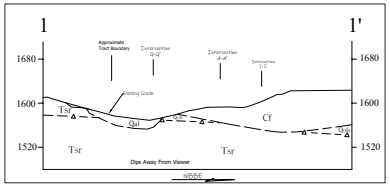


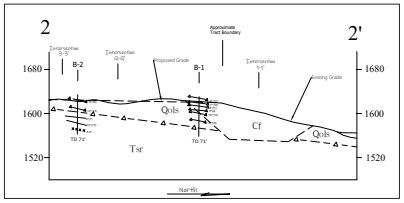


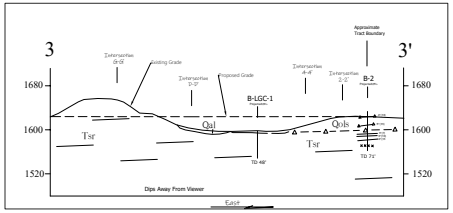


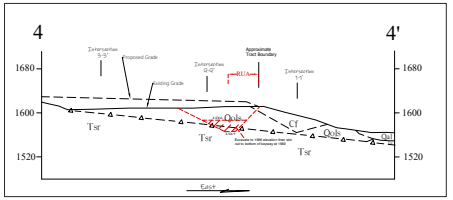












LGC Valley, Inc. 28532 Constellation Road Valencia, CA 91355 TEL. (661) 702-8474 FAX (661) 702-8475	***Geologic Cross Sections A-A', through T-T' and 1-1' through 4-4'***	CLIENT: Valuzat	CIVIL ENGINEER: LDC	PROJECT NAME	TTM 68203
				PROJECT NO.	203003-01
				ENG. / GEOL.	BIH/MCH
				SCALE	1" = 80'
				DATE	November 2021
					PLATE 2

APPENDIX F
Hydrology Report

HYDROLOGY REPORT

FOR

Tentative Tract No. 68203

Santa Clarita, CA
ESTU2024000177
HYD24-00002

PREPARED FOR:

VELUZAT PRODUCTIONS
24715 OAK CREEK
NEWHALL, CA 91321

DATE:
10/29/2024

LDC project # 92020-019

LAND DESIGN CONSULTANTS, INC.
Land Planning, Civil Engineering, Surveying & Environmental Services

800 Royal Oaks Drive, Suite 104, Monrovia, CA 91016, Tel. (626) 578-7000 Fax (626) 578-7373

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PRE-DEVELOPMENT HYDROLOGY MAP

PRE-DEVELOPMENT HYDROLOGY TABLE

PRE-DEVELOPMENT IMPERVIOUSNESS TABLE

Appendix C:

POST-DEVELOPMENT HYDROLOGY MAP

POST-DEVELOPMENT HYDROLOGY TABLE

POST-DEVELOPMENT IMPERVIOUSNESS TABLE

HYDROMODIFICATION COMPARISON & SUMMARY TABLE

MTD 1614 AND MTD 1699 ON-SITE FLOW COMPARISON TABLE

Appendix D:

HYDROCALC PRINT-OUTS FOR PRE-DEVELOPMENT CONDITION

Appendix E:

HYDROCALC PRINT-OUTS FOR POST-DEVELOPMENT CONDITION

Appendix F:

DRAFT TENTATIVE TRACT MAP No. 68203 SITE PLAN

(FOR INFORMATION PURPOSES ONLY, NOT FOR APPROVAL)

INTRODUCTION

Tentative Tract No. 68203 is a proposed development in the City of Santa Clarita consisting of 3 major Pads/Lots; Hotel Lot, Senior Assistant Lot, and Condominium Lot, on approximately 27 acres. The proposed Tract is bounded by single family homes to the north, east & west, and Golden Valley Road & Sierra Highway to the south.

Hydrology Report:

This report has been prepared for the Hydrology Report for the above-described development. This report addresses the issues of hydromodification and whether. mitigation measures for any increases in runoff flow rates, increases in flow velocity, etc., will be required for this project.

The "L.I.D. Report" will be separate from this report submitted during the engineering phase. It will address all issues regarding the retention and infiltration of SWQDv , pre-treatment of storm water BMPs and related issues.

For purposes of analysis, the total existing drainage area can be divided into three major drainage basins and five additional minor drainage basins:

Major Drainage Basin 1:

In the pre-developed condition, (Subareas 1A-6A) the runoff from the 16.68 acres of drainage area consists of a combination of on-site and off-site areas. These areas surface flow along the natural canyon through the tract boundary which then outlet into an offsite existing 60" inlet (PD 1453) at the northeastern side of the site at point #1.

In the pre-developed condition, the 50-year burned and bulked flow is 79.30 cfs.

In the post-developed condition, (Subareas 1A-39A) the runoff from the 26.32 acres of drainage area from the roadway, the assisted living site, the western portion of the condominium site, and the surrounding slopes are to be collected in a privately maintained storm drain system which includes an underground detention facility with a storage volume of 2.7817 ac.-ft. to meet the hydromodification requirements.

This privately maintained storm drain system will outlet to the natural canyon which will then continue to outlet to the offsite existing 60" inlet (PD 1453) at the northeastern side of the site at point #1. The proposed storm drain system with the underground detention facilities is not eligible for transfer to Los Angeles County Flood Control

District. The LACFCD requires upstream and downstream control over their storm drain system. (LACDPW email 7/24/24).

In the post-developed condition, based on preliminary routing calculations through the proposed detention facility, the 50-year burned and bulked flow is expected to be 74.62 cfs. *This analysis shows that the hydromodification requirement is met for Major Drainage Basin 1 with the proposed detention facility.*

The final detention facility calculations and design shall be prepared and reviewed during final engineering and the design shall ensure that the post-developed condition flowrates shall be less than the flowrates in pre-developed condition.

Major Drainage Basin 2:

In the pre-developed condition, (Subarea 1B) the runoff from the 11.10 acres surface flows through a natural canyon thru the tract boundary which then outlets offsite into an existing 36" inlet (PD 1453) at the mid northeastern side of the site at point #2.

In the pre-developed condition, the 50-year burned and bulked flow is 50.65 cfs.

In the post-developed condition, (Subareas 1I-5I) the runoff from the 4.48 acres of drainage area from the eastern portion of the condominium site and the surrounding slopes are to be collected in a privately maintained storm drain system which will outlet to the natural canyon which will then continue to outlet to the offsite existing 36" inlet (PD 1453) at the mid northeastern side of the site at point #2.

In the post-developed condition, the 50-year clear flow is 16.48 cfs. *This analysis shows that the hydromodification requirement is met without the need for detention storage upstream of point #2.*

Major Drainage Basin 3:

In the pre-developed condition, (Subarea 1C) the runoff from the 5.35 acres surface flows through a natural canyon which then outlets onsite into an existing 36" inlet (MTD 1699) at the southeastern side of the site at point #3.

In the pre-developed condition, the 50-year burned and bulked flow is 27.24 cfs.

In the post-developed condition, (Subareas 1J-4J) the runoff from the 3.55 acres of drainage area from the hotel site and the surrounding slopes are to be collected in a

privately maintained storm drain system which will outlet directly into proposed re-aligned (MTD 1699) at the southeastern side of the site at point #3.

In the post-developed condition, the 50-year clear flow is 15.81 cfs. *This analysis shows that the hydromodification requirement is met without the need for detention storage upstream of point #3.*

With this report we are requesting permission to realign and connect to the existing public storm drain system (MTD 1699).

Minor Drainage Basin 4:

In the pre-developed condition, (Subarea 1D) the runoff from the 0.58 acres surface flows through a natural canyon which then outlets offsite into an existing offsite 36" x 48" inlet (Tr. 53419 rough grading plan) at the south mid-eastern side of the site at point #4.

In the pre-developed condition, the 50-year burned and bulked flow is 2.90 cfs.

In the post-developed condition, (Subarea 1K) the runoff from 0.46 acres of drainage area from a portion of the proposed developed slope easterly of the cul-de-sac of 'A St." are to be collected in a privately maintained slope drain which will outlet offsite into an existing offsite 36" x 48" inlet (Tr. 53419 rough grading plan) at the south mid-eastern side of the site at point #4.

In the post-developed condition, the 50-year clear flow is 1.66 cfs.
This analysis shows that the hydromodification requirement is met without the need for detention storage upstream of point #4.

Minor Drainage Basin 5:

In the pre-developed condition, (Subarea 1E) the runoff from the 0.45 acres surface flows through a natural canyon which then outlets offsite into an existing offsite inlet (Tr. 53419 rough grading plan) at the south mid-eastern side of the site at point #4.

In the pre-developed condition, the 50-year burned and bulked flow is 1.66 cfs.

In the post-developed condition, (Subarea 1L) the runoff from 0.19 acres of drainage area from a portion of the proposed developed slope northeasterly of the cul-de-sac of 'A St." are to be collected in a privately maintained slope drain which will outlet offsite

into an existing offsite inlet (Tr. 53419 rough grading plan) at the south mid-eastern side of the site at point #5.

In the post-developed condition, the 50-year clear flow is 0.69 cfs.
This analysis shows that the hydromodification requirement is met without the need for detention storage upstream of point #5.

Minor Drainage Basin 6:

In the pre-developed condition, (Subarea 1F) the runoff from the 0.42 acres surface flows through an existing ditch along the north side of Golden Valley Road on the south east side of the site which then outlets offsite at point #6 and then enters Sierra Highway along the frontage of adjacent Tract 53419.

In the pre-developed condition, the 50-year burned and bulked flow is 1.92 cfs.

In the post-developed condition, no flow is proposed to outlet to point #6.

Minor Drainage Basin 7:

In the pre-developed condition, (Subarea 1G) the runoff from the 0.44 acres surface flows through an existing ditch along the easterly tract boundary which then outlets offsite at point #7.

In the pre-developed condition, the 50-year burned and bulked flow is 2.01 cfs.

In the post-developed condition, no flow is proposed to outlet to point #7.

Minor Drainage Basin 8:

In the pre-developed condition, (Subarea 1H) the runoff from the 0.63 acres surface flows through a natural canyon which then outlets offsite into an existing offsite inlet (Tr. 30787) at the most northly side of the site at point #8.

In the pre-developed condition, the 50-year burned and bulked flow is 3.16 cfs.

In the post-developed condition, (Subarea 1M) the runoff from 0.63 acres of drainage area will remain undeveloped and will continue to flow through a natural canyon which then outlets offsite into an existing offsite inlet (Tr. 30787) at the most northly side of the site at point #8.

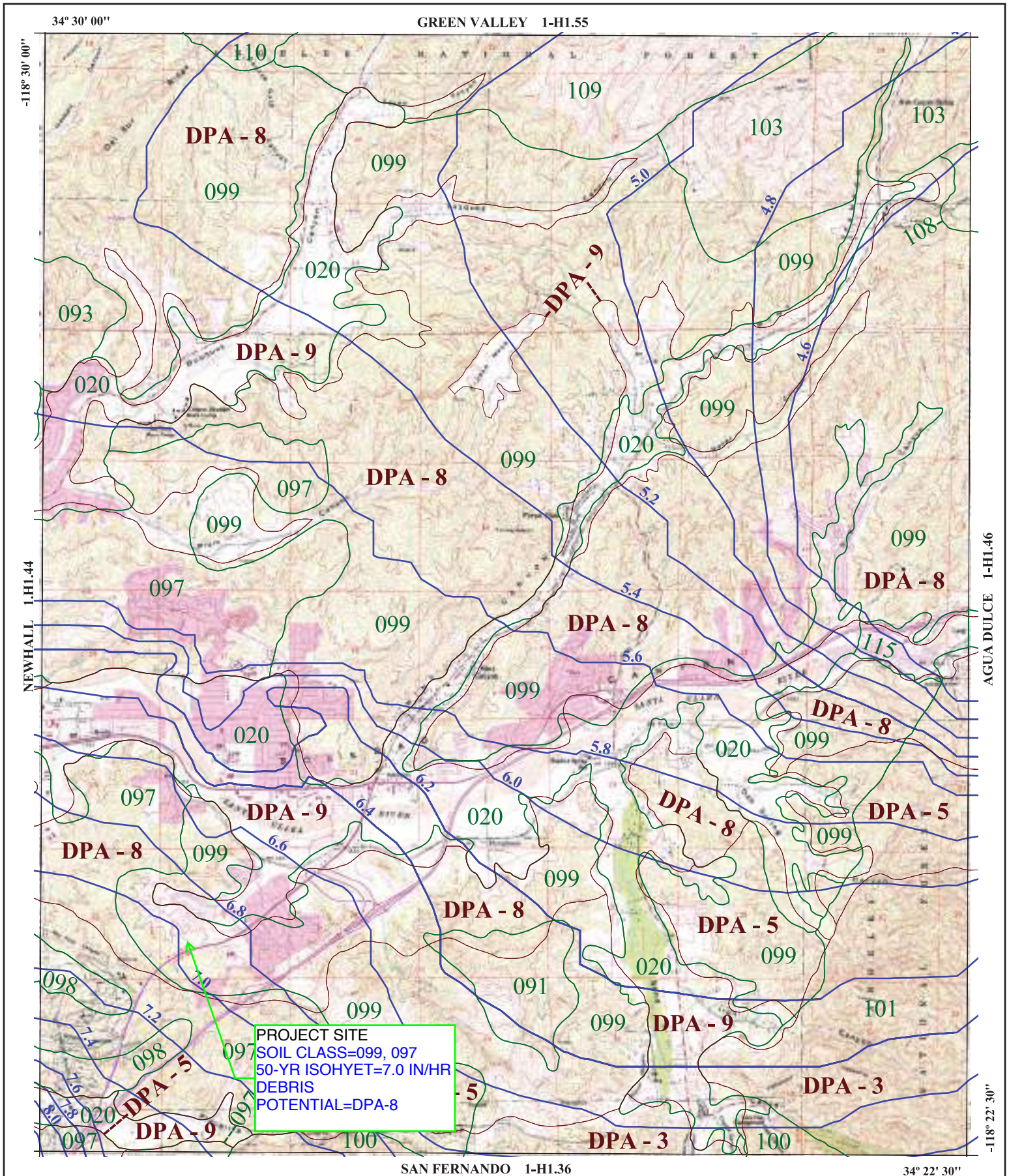
In the post-developed condition, the 50-year clear flow shall remain 3.16 cfs.

The hydrologic data used in this report is based on the LACDPW's Hydrology and Sedimentation Manual. The manual guidelines require that the developed areas shall be designed for 25-year frequency. LACDPW's computer program, HydroCalc was utilized to calculate the time of concentration and peak flows. Other hydrological parameters are the site soil classification of 099 and 50-year isohyets are 7.0 inches of rainfall.

The draft Tentative Tract Map No. 68203 Site Plan has been included in Appendix F for information purposes only and is not for approval.

Appendix A

HYDROLOGIC REFERENCES


34° 30' 00"
GREEN VALLEY 1-H1.55
-118° 30' 00"
NEWHALL 1.H1.44
AGUA DULCE 1-H1.46
-118° 22' 30"
SAN FERNANDO 1-H1.36
34° 22' 30"
DPA - 8
DPA - 9
DPA - 5
DPA - 3
PROJECT SITE
SOIL CLASS=099, 097
50-YR ISOHYET=7.0 IN/HR
DEBRIS
POTENTIAL=DPA-8
016
SOIL CLASSIFICATION AREA
7.2
INCHES OF RAINFALL
DPA - 6
DEBRIS POTENTIAL AREA
1 0 1 2 Miles
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714
MINT CANYON
50-YEAR 24-HOUR ISOHYET
1-H1.45
PUBLIC WORKS

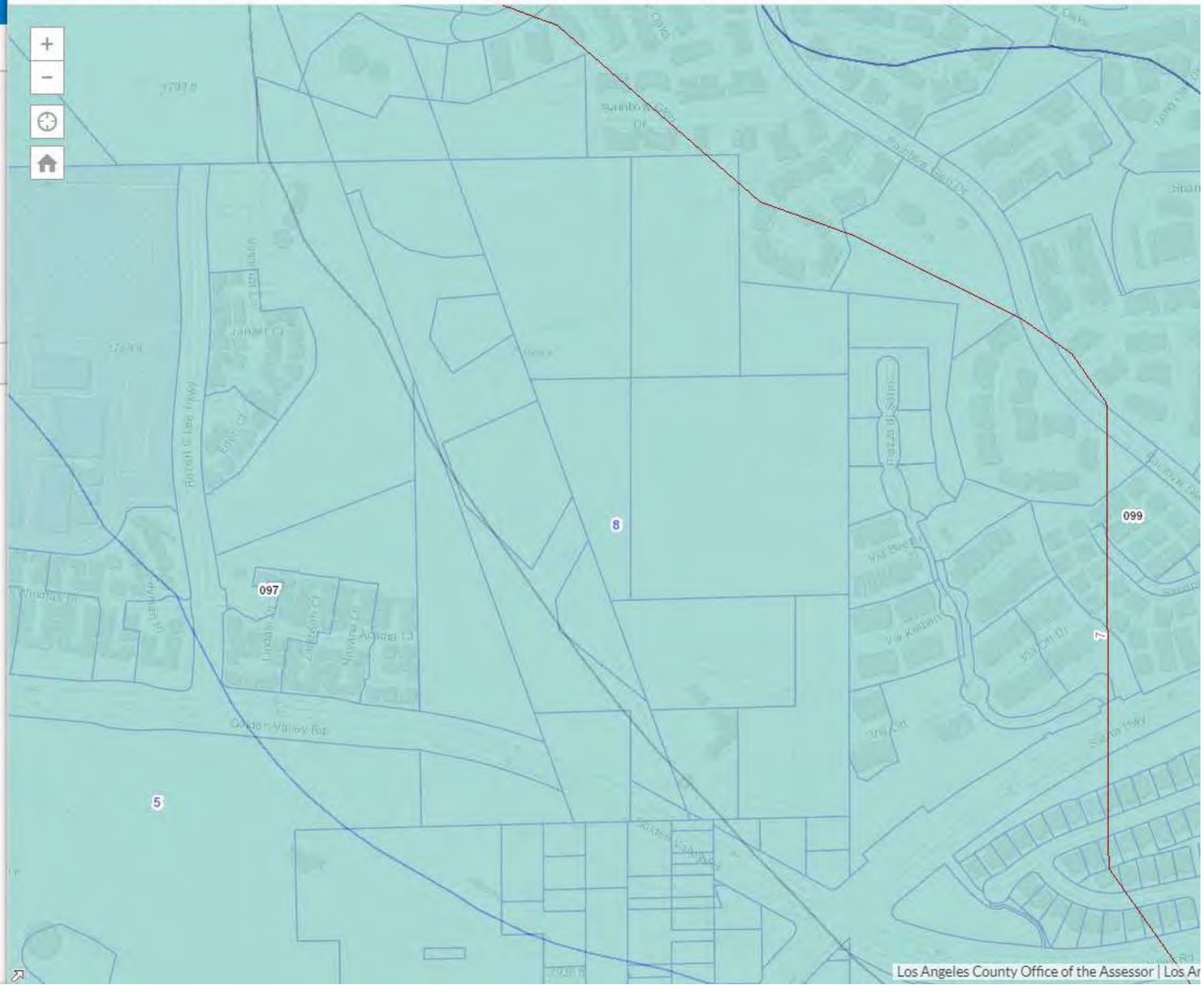
lacounty.maps.arcgis.com/apps/PublicInformation/index.html?appid=cd5ec68b636f4e47bbba5b8e9307be1e

About | Legend | Layers

Layers

- [x] Hydrology GIS
  - [x] 50yr Two Tenths (Rainfall)
  - [x] DPA Zones
  - [x] Soils 2004
  - [ ] Final 85th Percentile, 24-hr Rainfall
  - [ ] 1-year, 1-hour Rainfall Intensity
  - [ ] Final 95th Percentile, 24-hr Rainfall
- [x] LA County Parcels

LA County Hydrology Map



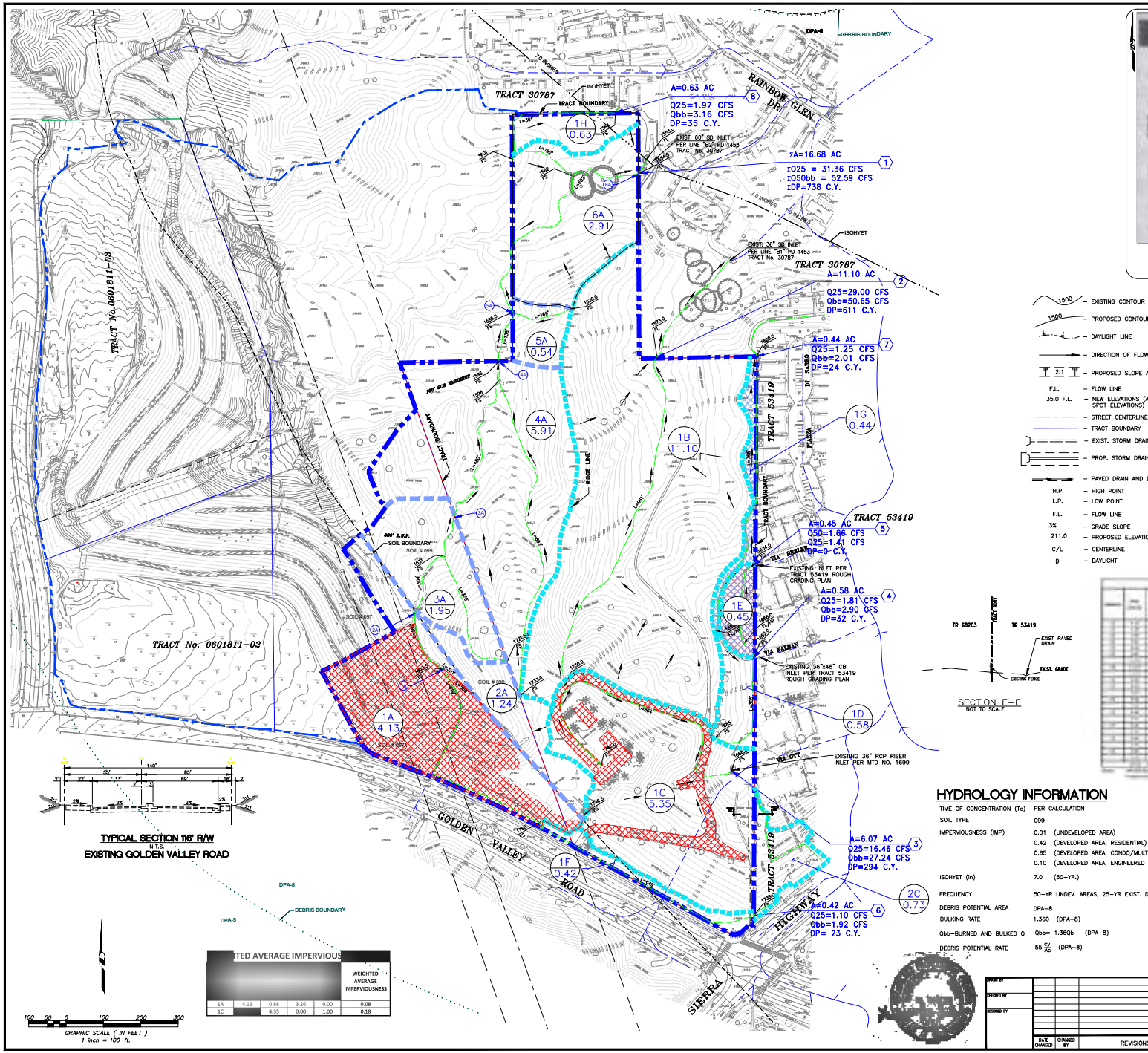
Los Angeles County Office of the Assessor | Los An

Appendix B

PRE-DEVELOPMENT HYDROLOGY MAP

PRE-DEVELOPMENT HYDROLOGY TABLE

PRE-DEVELOPMENT IMPERVIOUSNESS TABLE


TRACT 30787
TRACT BOUNDARY
ISOHYET
RAINBOW GLEN DR.
DEBRIS BOUNDARY
DPA-8
A=0.63 AC
Q25=1.97 CFS
Qbb=3.16 CFS
DP=35 C.Y.
1H 0.63
EXIST. 60" SD INLET PER LINE "B2" PD 1453 TRACT No. 30787
ΣA=16.68 AC
ΣQ25 = 31.36 CFS
ΣQ50bb = 52.59 CFS
ΣDP=738 C.Y.
6A 2.91
EXIST. 36" SD INLET PER LINE "B1" PD 1453 TRACT No. 30787
TRACT 30787
A=11.10 AC
Q25=29.00 CFS
Qbb=50.65 CFS
DP=611 C.Y.
TRACT No.0601811-03
5A 0.54
A=0.44 AC
Q25=1.25 CFS
Qbb=2.01 CFS
DP=24 C.Y.
4A 5.91
1B 11.10
1G 0.44
TRACT 53419
TRACT BOUNDARY
RIDGE LINE
330' A.R.P.
SOIL BOUNDARY
SOIL # 099
TRACT 53419
A=0.45 AC
Q50=1.66 CFS
Q25=1.40 CFS
DP=0 C.Y.
VIA REESER
EXISTING INLET PER TRACT 53419 ROUGH GRADING PLAN
3A 1.95
TRACT No. 0601811-02
A=0.58 AC
Q25=1.81 CFS
Qbb=2.90 CFS
DP=32 C.Y.
1E 0.45
VIA KATRAN
EXISTING 36"x48" CB INLET PER TRACT 53419 ROUGH GRADING PLAN
2A 1.24
1A 4.13
1D 0.58
VIA OTT
EXISTING 36" RCP RISER INLET PER MTD NO. 1699
1C 5.35
A=6.07 AC
Q25=16.46 CFS
Qbb=27.24 CFS
DP=294 C.Y.
GOLDEN VALLEY ROAD
1F 0.42
TRACT 53419
HIGHWAY
2C 0.73
A=0.42 AC
Q25=1.10 CFS
Qbb=1.92 CFS
DP= 23 C.Y.
SIERRA
TR 68203
TR 53419
EXIST. PAVED DRAIN
EXIST. GRADE
EXISTING FENCE
SECTION E-E
NOT TO SCALE
TYPICAL SECTION 116' R/W
N.T.S.
EXISTING GOLDEN VALLEY ROAD
DPA-8
DPA-5
DEBRIS BOUNDARY
WEIGHTED AVERAGE IMPERVIOUSNESS
1A 4.13 0.88 3.26 0.00 0.08
1C 4.35 0.00 1.00 0.18
GRAPHIC SCALE (IN FEET)
1 inch = 100 ft.
EXISTING CONTOUR
PROPOSED CONTOUR
DAYLIGHT LINE
DIRECTION OF FLOW
PROPOSED SLOPE
FLOW LINE
NEW ELEVATIONS
SPOT ELEVATIONS)
STREET CENTERLINE
TRACT BOUNDARY
EXIST. STORM DRAIN
PROP. STORM DRAIN
PAVED DRAIN AND
HIGH POINT
LOW POINT
FLOW LINE
GRADE SLOPE
PROPOSED ELEVATIO
CENTERLINE
DAYLIGHT
HYDROLOGY INFORMATION
TIME OF CONCENTRATION (Tc) PER CALCULATION
SOIL TYPE 099
IMPERVIOUSNESS (IMP) 0.01 (UNDEVELOPED AREA)
0.42 (DEVELOPED AREA, RESIDENTIAL)
0.65 (DEVELOPED AREA, CONDO/MULT
0.10 (DEVELOPED AREA, ENGINEERED
ISOHYET (in) 7.0 (50-YR.)
FREQUENCY 50-YR UNDEV. AREAS, 25-YR EXIST. D
DEBRIS POTENTIAL AREA DPA-8
BULKING RATE 1.360 (DPA-8)
Qbb-BURNED AND BULKED Q Qbb= 1.36Qb (DPA-8)
DEBRIS POTENTIAL RATE 55 CY/AC (DPA-8)
DRAWN BY
CHECKED BY
DESIGNED BY
DATE CHANGED
CHANGED BY
REVISIONS

ON-SITE PRE-DEVELOPMENT HYDROLOGY TABLE:

Subarea	Area (acres)	%imp	Soil Type	Length (ft)	Slope (ft/ft)	Tc-calculated 25 yr (min.)	Q25 (cfs)	Tc-calculated 50 yr (min.)	Q50* clear (cfs)	Q50* Burned (cfs)	Q50* Burned and bulked (cfs)	Debris Production (CY)
1A	4.13	0.08	97	619	0.156	5	11.66	5	13.51	14.04	19.09	**48
2A	1.24	0.01	99	559	0.149	5	3.87	5	4.46	4.56	6.20	68
3A	1.95	0.01	99	370	0.245	5	6.09	5	7.02	7.18	9.76	107
4A	5.91	0.01	99	893	0.151	6	16.78	6	19.37	19.83	26.97	325
5A	0.54	0.01	99	169	0.266	5	1.69	5	1.94	1.99	2.71	30
6A	2.91	0.01	99	192	0.203	5	9.09	5	10.47	10.71	14.57	160
	16.68	Totals to Local Watershed Outlet Point #1					**49.18**		56.77	**58.31**	**79.30**	**738**
1B	11.10	0.01	99	961	0.163	7	29.00	6	36.38	37.24	50.65	611
	11.10	Totals to Local Watershed Outlet Point #2					**29.00**		36.38	**37.24**	**50.65**	**611**
1C	5.35	0.18	99	864	0.100	7	14.17	6	17.69	18.09	24.60	294
2C	0.73	0.10	99	359	0.200	5	2.29	5	2.64	2.64	2.64	N.A.
	6.07	Totals to Local Watershed Outlet Point #3					**16.46**		**20.33**	**20.73**	**27.24**	**294**
1D	0.58	0.01	99	305	0.108	5	1.81	5	2.09	2.13	2.90	294
	0.58	Totals to Local Watershed Outlet Point #4					**1.81**		2.09	**2.13**	**2.90**	**294**
1E	0.45	0.10	99	224	0.100	5	1.41	5	1.62	1.66	N.A.	N.A.
	0.45	Totals to Local Watershed Outlet Point #5					**1.41**		1.62	**1.66**	N.A.	N.A.
1F	0.42	0.01	99	649	0.036	7	1.10	6	1.38	1.41	1.92	23
	0.42	Totals to Local Watershed Outlet Point #6					**1.10**		1.38	**1.41**	**1.92**	**23**
1G	0.44	0.01	99	765	0.078	6	1.25	6	1.44	1.48	2.01	24
	0.44	Totals to Local Watershed Outlet Point #7					**1.25**		1.44	**1.48**	**2.01**	**24**
1H	0.63	0.01	99	361	0.103	5	1.97	5	2.27	2.32	3.16	35
	0.63	Totals to Local Watershed Outlet Point #8					**1.97**		2.27	**2.32**	**3.16**	**35**

36.38 **=Total Site Drainage Area**

Notes: * All Q50 flowrates are clear flows for existing developed areas and are burned flows or burned and bulked flows for undeveloped areas.

** Debris Production for Subarea 1A is based on an Undeveloped Area = 0.88 Ac.

WEIGHTED AVERAGE IMPERVIOUSNESS:

Subarea	Area (acres)	AREA UN. DEV. 0.01 (AC.)	AREA DEV. SLOPE 0.10 (AC.)	AREA DEV. ROADS 0.90 (AC.)	WEIGHTED AVERAGE IMPERVIOUSNESS
1A	4.13	0.88	3.26	0.00	0.08
1C	5.35	4.35	0.00	1.00	0.18

Appendix C

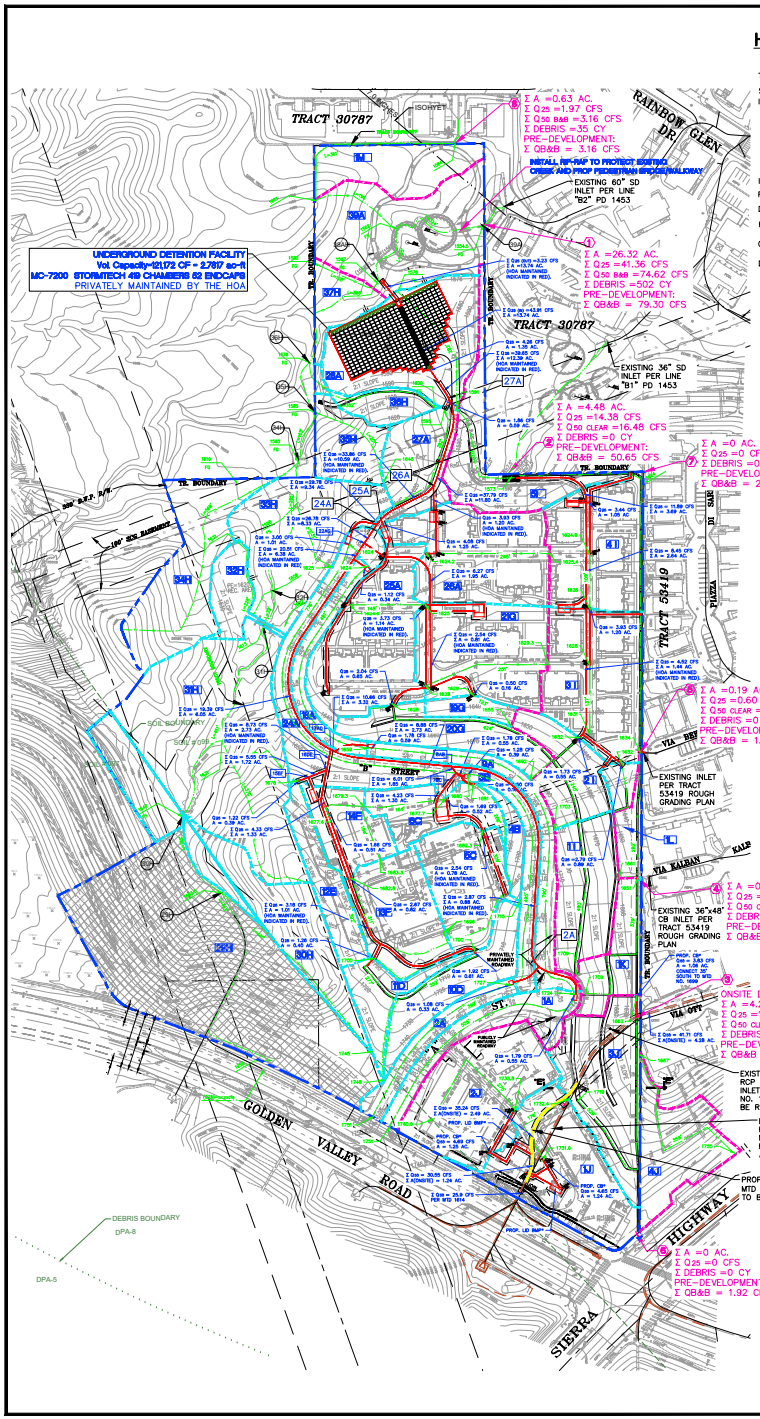
POST-DEVELOPMENT HYDROLOGY MAP

POST-DEVELOPMENT HYDROLOGY TABLE

POST-DEVELOPMENT IMPERVIOUSNESS TABLE

HYDROMODIFICATION COMPARISON & SUMMARY TABLE

MTD 1614 AND MTD 1699 ON-SITE FLOW COMPARISON TABLE

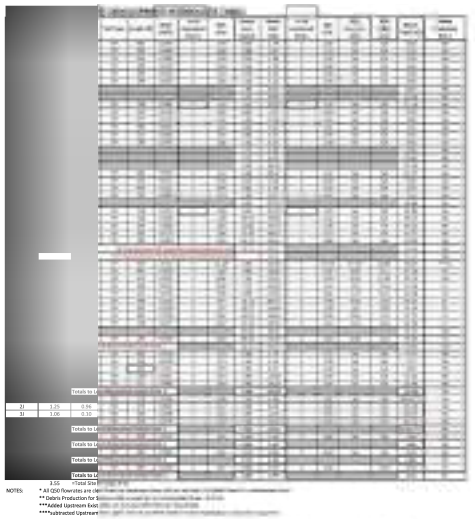


HYDROLOGY INFORMATION

TIME OF CONCENTRATION (Tc)	PER CALCULATION
SOIL TYPES	099, 097
IMPERVIOUSNESS (IMP)	0.01 (UNDEVELOPED AREA) 0.90 (DEVELOPED ST/ROADS) 0.96 (DEVELOPED AREA, HOTEL) 0.74 (DEVELOPED AREA, ASSISTED LIVING) 0.86 (DEVELOPED AREA, CONDOMINIUM) 0.10 (DEVELOPED AREA, ENGINEERED SLOPES) 0.10 (DEVELOPED AREA, PARK)
ISOHYET (in)	7.0 (50-YR.)
FREQUENCY	50-YR.
DEBRIS POTENTIAL AREA	DPA-8
BULKING RATE	1.360 (DPA-8)
Qbb-BURNED AND BULKED Q	Qbb= 1.36Qb (DPA-8)
DEBRIS POTENTIAL RATE	55 CY/AC (DPA-8)

LEGEND:

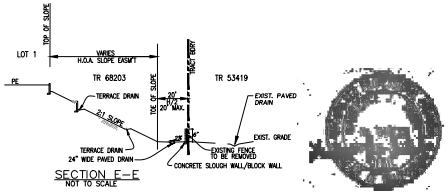
- 1500 – EXISTING CONTOUR LINE
- 1500 – PROPOSED CONTOUR LINE
- DAYLIGHT LINE
- DIRECTION OF FLOW
- 2:1 – PROPOSED SLOPE
- F.L. – FLOW LINE
- 35.0 F.L. – NEW ELEVATIONS
- STREET CENTERLINE
- TRACT BOUNDARY
- EXIST. STORM DRAIN
- PAVED DRAIN AND DOWNDRAIN
- H.P. – HIGH POINT
- L.P. – LOW POINT
- F.L. – FLOW LINE
- 3% – GRADE SLOPE
- 211.0 – PROPOSED ELEVATION
- C/L – CENTERLINE
- ℄ – DAYLIGHT
- ③ – LOCAL WATERSHED OUTLET POINT AT TRACT BOUNDARY
- PROP. CB* – PROPOSED PRIVATELY MAINTAINED CATCH BASIN
- PROP. LID BMP* – PROPOSED PRIVATELY MAINTAINED LID BMP
- PROP. STORM DRAIN TO BE MAINTAINED BY LACFCD
- PROP. STORM DRAIN TO BE PRIVATELY MAINTAINED BY THE HOMEOWNERS ASSOCIATION
- DRAINAGE AREA BOUNDARY
- SUBAREA OF LOCAL WATERSHED
- LOCAL WATERSHED BOUNDARY
- 1.0 AC – DRAINAGE AREA DIVERSION
- ΣQ – SUM OF Q (c.f.s.)
- ΣA – SUM OF AREA (AC)
- 3A – SUB-AREA ACREAGE
- Q25 – 25 YR. DEVELOPED Q (c.f.s.)
- Q50 – 50 YR. DEVELOPED Q (c.f.s.)
- Q50bb – 50 YR. BURNED AND BULKED Q (c.f.s.)
- Q50 – 50 YR. DEVELOPED Q (c.f.s.)
- DP – DEBRIS POTENTIAL (C.Y.)
- EXIST. DEVELOPED AREA



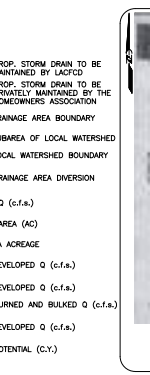
NOTES:
* All Q50 flowrates are in cfs
** Debris Production for
*** Added Upstream Exist
**** Subtracted Upstream

MTD 1614 AND MTD 1699 ON-SITE FLOW COMPARISON SUMMARY TABLE

50-YR			50-YR (BURNED FOR UNDEV. AREAS)			50-YR (B&B FOR UNDEV. AREAS)		
EXISTING CONDITION	PROPOSED CONDITION	COMPARISON	EXISTING CONDITION	PROPOSED CONDITION	COMPARISON	EXISTING CONDITION	PROPOSED CONDITION	COMPARISON
FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)
20.33	15.81	-4.52	20.73	15.81	-4.9200	27.24	15.81	-11.43



SECTION E–E
NOT TO SCALE



NOTES:

1. THE HYDROMODIFICA
PROJECTS STORM WAT
WATERSHED OUTLET I
2. LID MAP, CALCULATIO
3. NOT WITHIN A FEMA F
4. NOT WITHIN COUNTY
5. EXCEPT FOR THE REAL
(MTD 1614) (INDICATE
INFRASTRUCTURE ARI
ASSOCIATION (HOA) (I

DRAWN BY
CHECKED BY
DESIGNED BY

DATE CHANGED	CHANGED BY	REVISIONS

POST DEVELOPMENT HYDROLOGY TABLE:

Subarea	Area (acres)	%imp or (W.A.I.)	Soil Type	Length (ft)	Slope (ft/ft)	Tc-25 calculated (min.)	Q25 (cfs)	Reach Area (acres)	Reach Q25 (cfs)	Tc-50 calculated (min.)	Q50 (cfs)	Q50 (burned) (cfs)	Q50 (b&b) (cfs)	Reach *Q50 (cfs)	Debris Production (C.Y.)
1A	0.55	0.76	99	491	0.053	5	1.79	0.55	1.79	5	2.05	NA	NA	2.05	NA
2A	0.33	0.90	99	399	0.060	5	1.08	0.88	2.87	5	1.24	NA	NA	3.29	NA
3B	0.39	0.90	99	495	0.095	5	1.28	0.39	1.28	5	1.46	NA	NA	1.46	NA
4B	0.16	0.10	99	266	0.128	5	0.50	0.55	1.78	5	0.58	NA	NA	2.04	NA
5C	0.78	0.74	99	309	0.044	5	2.54	0.78	2.54	5	2.90	NA	NA	2.90	NA
6C	0.52	0.74	99	164	0.010	5	1.69	1.30	4.23	5	1.93	NA	NA	4.83	NA
7BC								1.85	6.01					6.87	NA
8AB								2.73	8.88					10.16	NA
9A	0.59	0.90	99	790	0.082	6	1.78	3.32	10.66	6	2.03	NA	NA	12.19	NA
10D	0.61	0.10	99	352	0.136	5	1.92	0.61	1.92	5	2.20	NA	NA	2.20	NA
11D	0.40	0.10	99	277	0.173	5	1.26	1.01	3.18	5	1.45	NA	NA	3.65	NA
12E	0.39	0.10	99	392	0.056	5	1.22	0.39	1.22	5	1.41	NA	NA	1.41	NA
13F	0.82	0.74	99	311	0.043	5	2.67	0.82	2.67	5	3.05	NA	NA	3.05	NA
14F	0.51	0.74	99	184	0.032	5	1.66	1.33	4.33	5	1.90	NA	NA	4.95	NA
15EF								1.72	5.55					6.36	NA
16DE								2.73	8.73					10.01	NA
17AD								6.05	19.39					22.20	NA
18A	0.34	0.90	99	481	0.073	5	1.12	6.38	20.51	5	1.27	NA	NA	23.47	NA
19G	0.16	0.10	99	123	0.211	5	0.50	0.16	0.50	5	0.58	NA	NA	0.58	NA
20G	0.65	0.10	99	424	0.151	5	2.04	0.81	2.54	5	2.35	NA	NA	2.93	NA
21G	1.14	0.86	99	251	0.005	5	3.73	1.95	6.27	5	4.26	NA	NA	7.19	NA
22AG								8.33	26.78					30.66	NA
24A	1.01	0.67	99	776	0.072	6	3.00	9.34	29.78	6	3.43	NA	NA	34.09	NA
25A	1.25	0.81	99	148	0.005	5	4.08	10.59	33.86	5	4.66	NA	NA	38.75	NA
26A	1.20	0.86	99	245	0.005	5	3.93	11.80	37.79	5	4.48	NA	NA	43.23	NA
27A	0.59	0.21	99	292	0.170	5	1.86	12.39	39.65	5	2.14	NA	NA	45.37	NA
28A	1.35	0.17	99	282	0.053	5	4.26	13.74	43.91	5	4.89	NA	NA	50.26	NA
28A IN	IN Downstream UG Detention System(HydroCalc):							13.74	43.91					50.26	NA
28A OUT	OUT Downstream UG Detention System(HydroCad):								3.23					13.11	NA
29H	4.04	0.08	97	443	0.213	5	11.40	4.04	11.40	5	13.22	13.73	18.67	18.67	**32
30H	0.82	0.01	99	441	0.183	5	2.56	4.85	13.96	5	2.95	3.02	4.11	22.78	45
31H	2.58	0.01	99	451	0.075	5	8.06	7.43	22.02	5	9.29	9.50	12.92	35.70	142
32H	0.31	0.14	99	228	0.101	5	0.98	7.75	23.00	5	1.12	1.15	1.56	37.26	17
33H	1.28	0.03	99	131	0.195	5	4.00	9.02	27.00	5	4.61	4.72	6.42	43.68	70
34H	1.11	0.01	99	568	0.166	5	3.47	10.13	30.47	5	4.00	4.09	5.56	49.25	61
35H	0.44	0.01	99	201	0.298	5	1.37	10.57	31.84	5	1.58	1.62	2.20	51.45	24
36H	0.26	0.09	99	302	0.098	5	0.82	10.83	32.66	5	0.94	0.96	1.31	52.75	14
37H	0.31	0.01	99	128	0.117	5	0.97	11.14	33.63	5	1.12	1.14	1.55	54.30	17
38AH								24.88	36.86					67.41	423
39A	1.44	0.01	99	192	0.203	5	4.50	26.32	41.36	5	5.18	5.30	7.21	74.62	79
		Totals to Local Watershed Outlet Point 1						26.32	41.36					74.62	502
1I	0.89	0.10	99	493	0.156	5	2.79	0.89	2.79	5	3.22	NA	NA	3.22	NA
2I	0.55	0.10	99	245	0.290	5	1.73	1.44	4.52	5	1.99	NA	NA	5.21	NA
3I	1.20	0.86	99	137	0.017	5	3.93	2.64	8.45	5	4.48	NA	NA	9.69	NA
4I	1.05	0.86	99	109	0.017	5	3.44	3.69	11.89	5	3.92	NA	NA	13.61	NA
5I	0.79	0.18	99	211	0.085	5	2.49	4.48	14.38	5	2.87	NA	NA	16.48	NA
		Totals to Local Watershed Outlet Point 2						4.48	14.38					16.48	NA
1J	1.24	0.96	99	176	0.005	5	4.08	1.24	4.08	5	4.65	NA	NA	30.55***	NA
2J	1.25	0.96	99	275	0.022	5	4.12	2.49	8.20	5	4.69	NA	NA	35.24	NA
3J	1.06	0.10	99	529	0.108	5	3.33	3.55	11.53	5	3.83	NA	NA	39.07	NA
4J	0.73	0.10	99	359	0.250	5	2.29	4.28	13.82	5	2.64	NA	NA	41.71	NA
		Totals to Local Watershed Outlet Point 3						4.28	13.82					15.81****	NA
1K	0.46	0.10	99	339	0.171	5	1.44	0.46	1.44	5	1.66	NA	NA	1.66	NA
		Totals to Local Watershed Outlet Point 4						0.46	1.44					1.66	NA
1L	0.19	0.10	99	282	0.092	5	0.60	0.19	0.60	5	0.69	NA	NA	0.69	NA
		Totals to Local Watershed Outlet Point 5						0.19	0.60					0.69	NA
1M	0.63	0.01	99	361	0.103	5	1.97	0.63	1.97	5	2.32		3.16	3.16	35
		Totals to Local Watershed Outlet Point 8						0.63	1.97					3.16	35

3.55 =Total Site Drainage Area

NOTES: * All Q50 flowrates are clear flows for developed areas and are burned and bulked flows for undeveloped areas.

** Debris Production for Subarea 29H is based on an Undeveloped Area = 0.57 Ac.

***Added Upstream Exist. Q50= 25.9 cfs per MTD 1614 for Reach Q50.

****subtracted Upstream Exist. Q50= 25.9 cfs per MTD 1614 for hydromodification comparison at point 3.

WEIGHTED AVERAGE IMPERVIOUSNESS:

Subarea	Area (acres)	AREA DEV. SLOPE 0.10 (AC.)	AREA SENIOR ASSIST. 0.74 (AC.)	AREA CONDO 0.86 (AC.)	AREA RD. 0.90 (AC.)	AREA UNDEV. 0.01 (AC.)	AREA PARK 0.10 (AC.)	WEIGHTED AVERAGE IMPERVIOUSNESS
1A	0.55	0.10	0.00	0.00	0.45	0.00	0.00	0.76
24A	1.01	0.29	0.00	0.00	0.72	0.00	0.00	0.67
25A	1.25	0.09	0.00	1.17	0.00	0.00	0.00	0.81
27A	0.59	0.16	0.00	0.00	0.11	0.32	0.00	0.21
28A	1.35	0.42	0.00	0.00	0.13	0.00	0.81	0.17
29H	4.04	3.21	0.00	0.00	0.00	0.83	0.00	0.08
32H	0.31	0.15	0.00	0.00	0.02	0.00	0.14	0.14
33H	1.28	0.27	0.00	0.00	0.00	1.01	0.00	0.03
36H	0.26	0.24	0.00	0.00	0.00	0.02	0.00	0.09
5H	0.79	0.56	0.00	0.00	0.09	0.14	0.00	0.18

HYDROMODIFICATION COMPARISON TABLE

STORM FREQUENCY	25-YR		50-YR (B&B FOR UNDEV. AREAS)	
CONDITION	EXISTING CONDITION	POST-DEVELOPMENT CONDITION	EXISTING CONDITION	POST-DEVELOPMENT CONDITION
LOCAL WATERSHED OUTLET POINT	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)
1	49.18	41.36	79.30	74.62
2	29.00	14.38	50.65	16.48
3	16.46	13.82	27.24	15.81
4	1.81	1.44	2.90	1.66
5	1.41	0.60	1.66	0.69
6	1.10	0.00	1.92	0.00
7	1.25	0.00	2.01	0.00
8	1.97	1.97	3.16	3.16

MTD 1614 AND MTD 1699 ON-SITE FLOW COMPARISON SUMMARY TABLE

50-YR			50-YR (BURNED FOR UNDEV. AREAS)			50-YR (B&B FOR UNDEV. AREAS)		
EXISTING CONDITION	PROPOSED CONDITION	COMPARISON	EXISTING CONDITION	PROPOSED CONDITION	COMPARISON	EXISTING CONDITION	PROPOSED CONDITION	COMPARISON
FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)	FLOWRATE (cfs)
20.33	15.81	-4.52	20.73	15.81	-4.9200	27.24	15.81	-11.43

Appendix D

HYDROCALC PRINT-OUTS FOR PRE-DEVELOPMENT CONDITION

Peak Flow Hydrologic Analysis

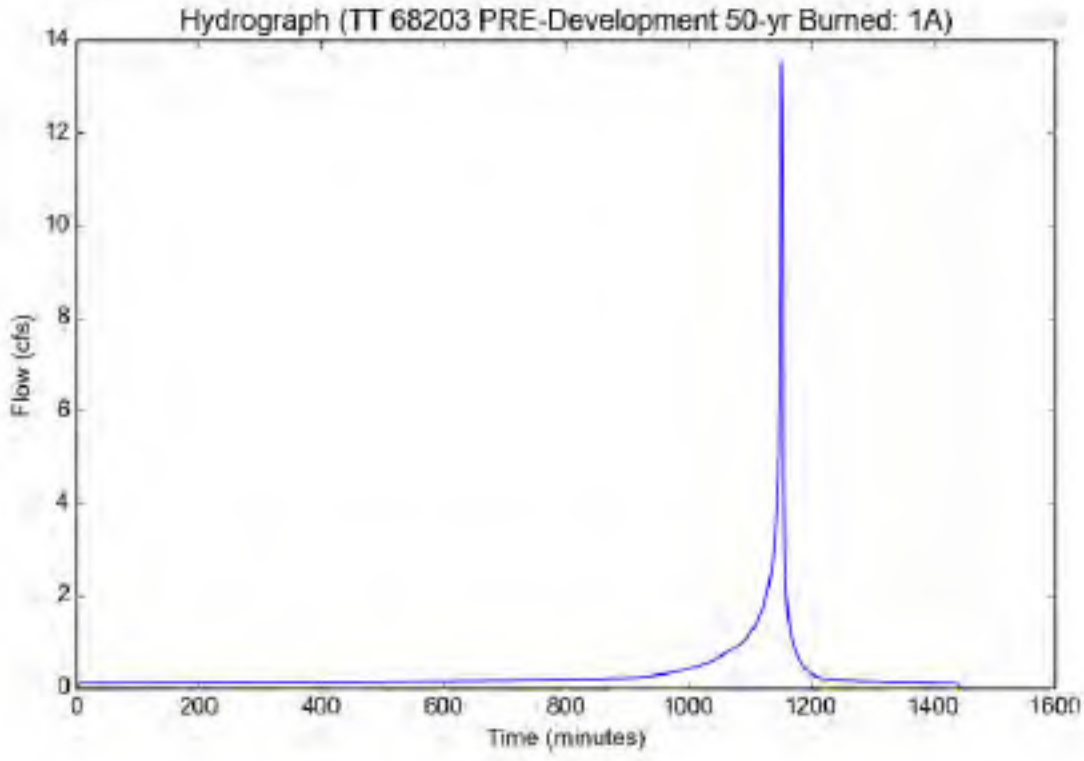
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	1A
Area (ac)	4.13
Flow Path Length (ft)	619.0
Flow Path Slope (vft/hft)	0.156
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.08
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.7731
Developed Runoff Coefficient (Cd)	0.7832
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	13.5097
Burned Peak Flow Rate (cfs)	14.0371
24-Hr Clear Runoff Volume (ac-ft)	0.6734
24-Hr Clear Runoff Volume (cu-ft)	29331.9888



Peak Flow Hydrologic Analysis

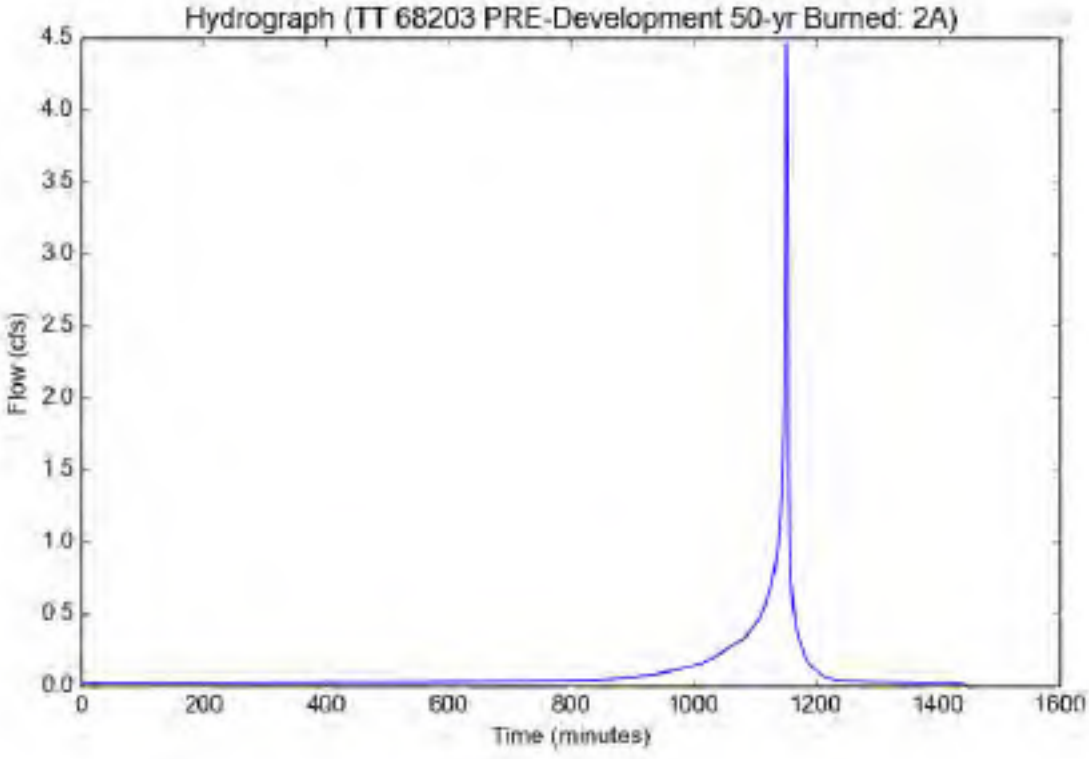
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	2A
Area (ac)	1.24
Flow Path Length (ft)	559.0
Flow Path Slope (vft/hft)	0.149
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.4635
Burned Peak Flow Rate (cfs)	4.5644
24-Hr Clear Runoff Volume (ac-ft)	0.2024
24-Hr Clear Runoff Volume (cu-ft)	8815.446



Peak Flow Hydrologic Analysis

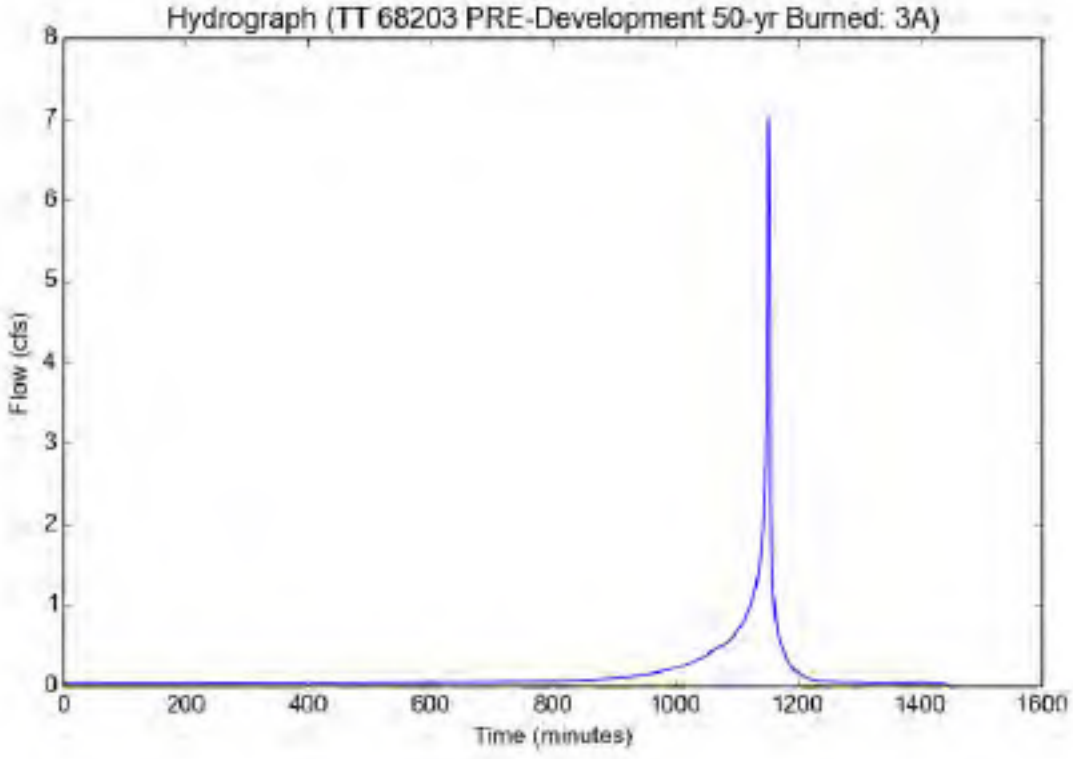
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	3A
Area (ac)	1.95
Flow Path Length (ft)	370.0
Flow Path Slope (vft/hft)	0.245
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.0192
Burned Peak Flow Rate (cfs)	7.1778
24-Hr Clear Runoff Volume (ac-ft)	0.3183
24-Hr Clear Runoff Volume (cu-ft)	13862.9998



Peak Flow Hydrologic Analysis

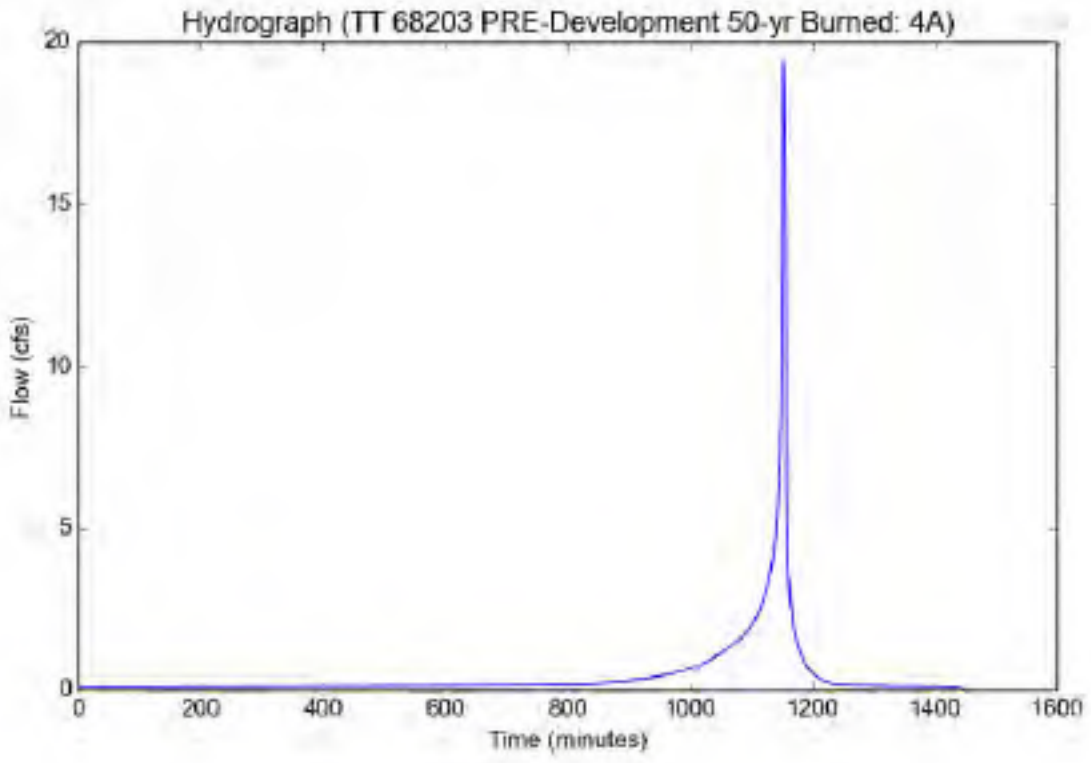
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	4A
Area (ac)	5.91
Flow Path Length (ft)	893.0
Flow Path Slope (vft/hft)	0.151
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	3.8334
Undeveloped Runoff Coefficient (Cu)	0.8546
Developed Runoff Coefficient (Cd)	0.8551
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	19.3718
Burned Peak Flow Rate (cfs)	19.8292
24-Hr Clear Runoff Volume (ac-ft)	0.9645
24-Hr Clear Runoff Volume (cu-ft)	42012.2325



Peak Flow Hydrologic Analysis

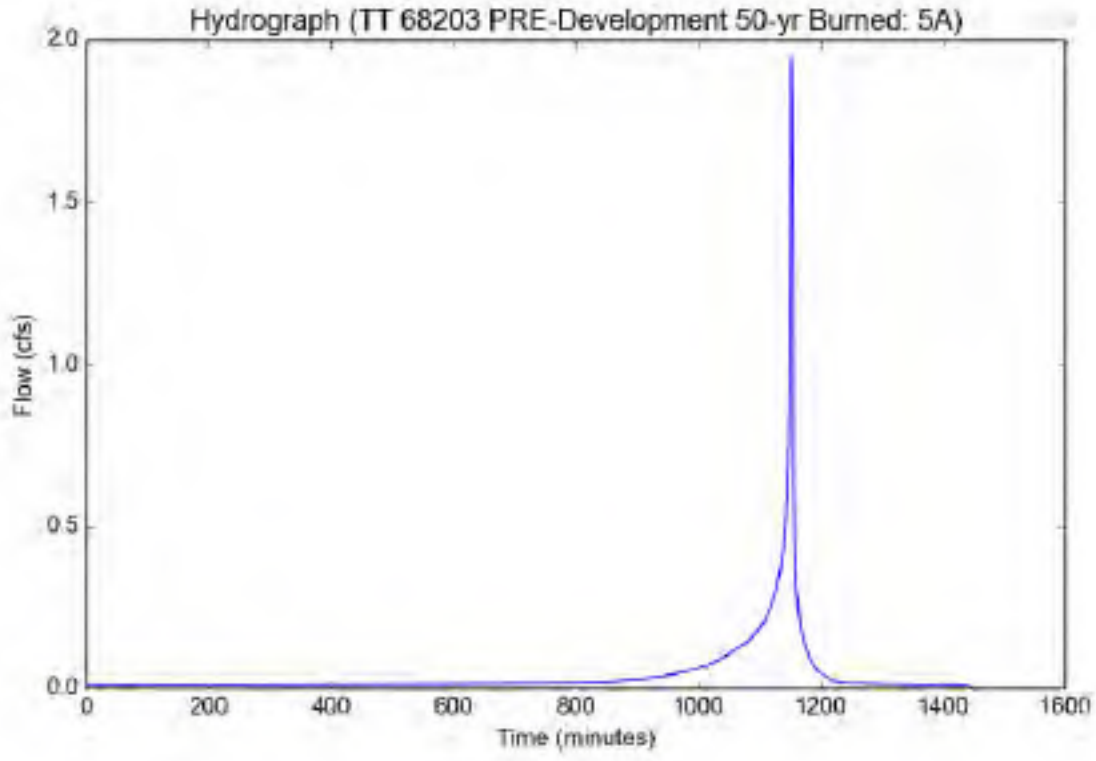
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	5A
Area (ac)	0.54
Flow Path Length (ft)	169.0
Flow Path Slope (vft/hft)	0.266
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.9438
Burned Peak Flow Rate (cfs)	1.9877
24-Hr Clear Runoff Volume (ac-ft)	0.0881
24-Hr Clear Runoff Volume (cu-ft)	3838.9846



Peak Flow Hydrologic Analysis

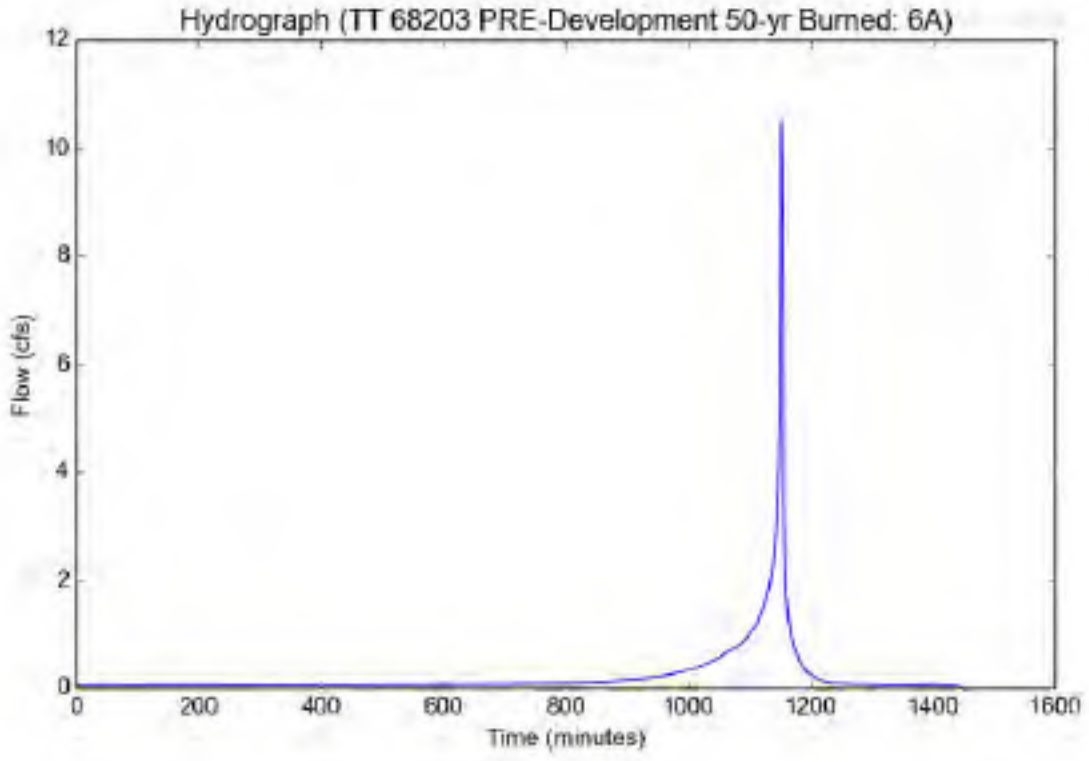
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	6A
Area (ac)	2.91
Flow Path Length (ft)	192.0
Flow Path Slope (vft/hft)	0.203
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	10.4748
Burned Peak Flow Rate (cfs)	10.7115
24-Hr Clear Runoff Volume (ac-ft)	0.4749
24-Hr Clear Runoff Volume (cu-ft)	20687.8612



Peak Flow Hydrologic Analysis

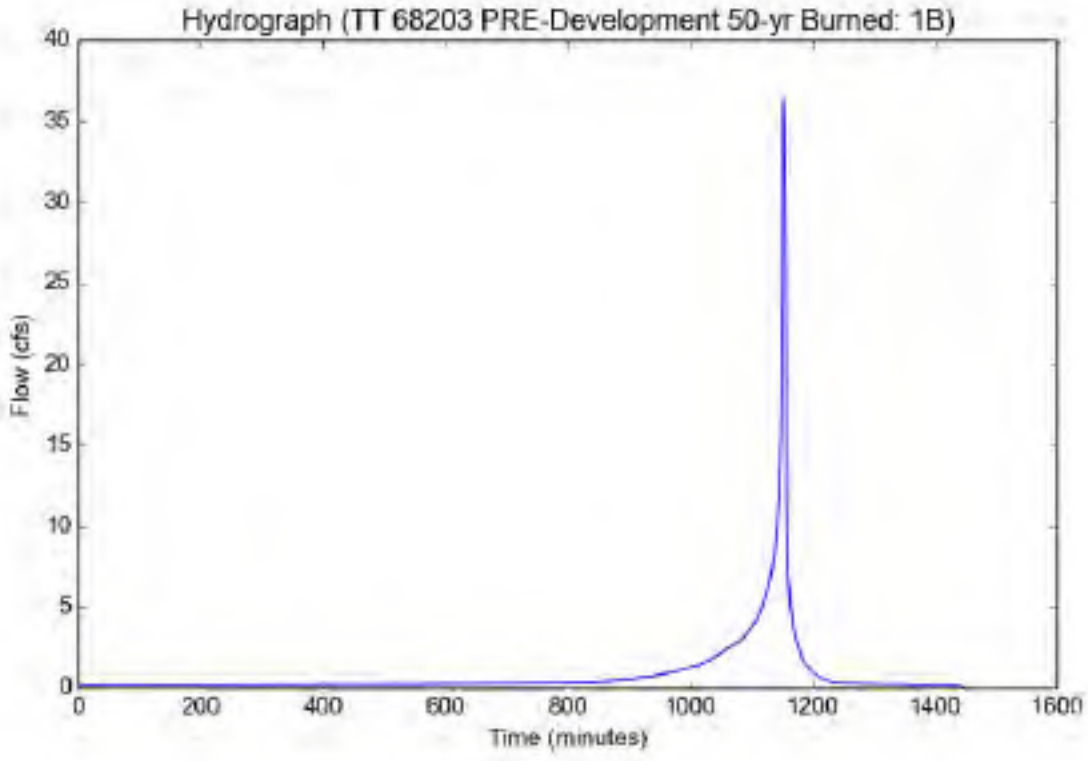
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	1B
Area (ac)	11.1
Flow Path Length (ft)	961.0
Flow Path Slope (vft/hft)	0.163
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	3.8334
Undeveloped Runoff Coefficient (Cu)	0.8546
Developed Runoff Coefficient (Cd)	0.8551
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	36.3835
Burned Peak Flow Rate (cfs)	37.2426
24-Hr Clear Runoff Volume (ac-ft)	1.8114
24-Hr Clear Runoff Volume (cu-ft)	78906.2234



Peak Flow Hydrologic Analysis

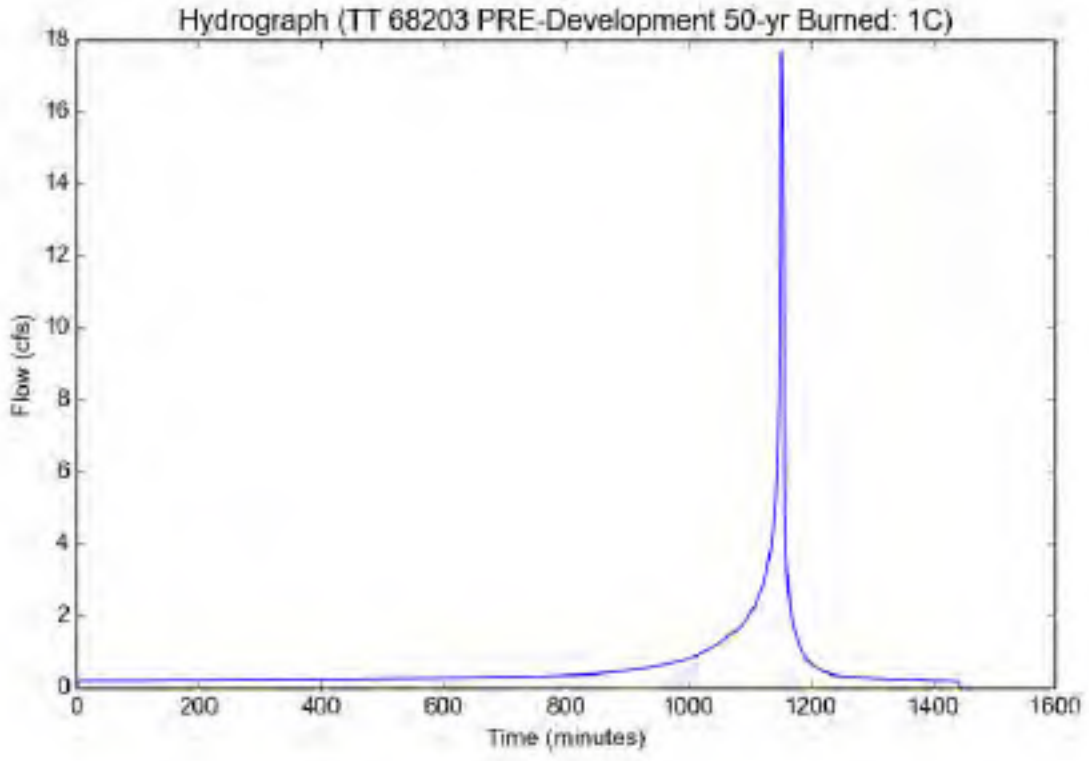
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	1C
Area (ac)	5.35
Flow Path Length (ft)	864.0
Flow Path Slope (vft/hft)	0.1
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.18
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	3.8334
Undeveloped Runoff Coefficient (Cu)	0.8546
Developed Runoff Coefficient (Cd)	0.8628
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	17.6945
Burned Peak Flow Rate (cfs)	18.0865
24-Hr Clear Runoff Volume (ac-ft)	1.2015
24-Hr Clear Runoff Volume (cu-ft)	52336.5649



Peak Flow Hydrologic Analysis

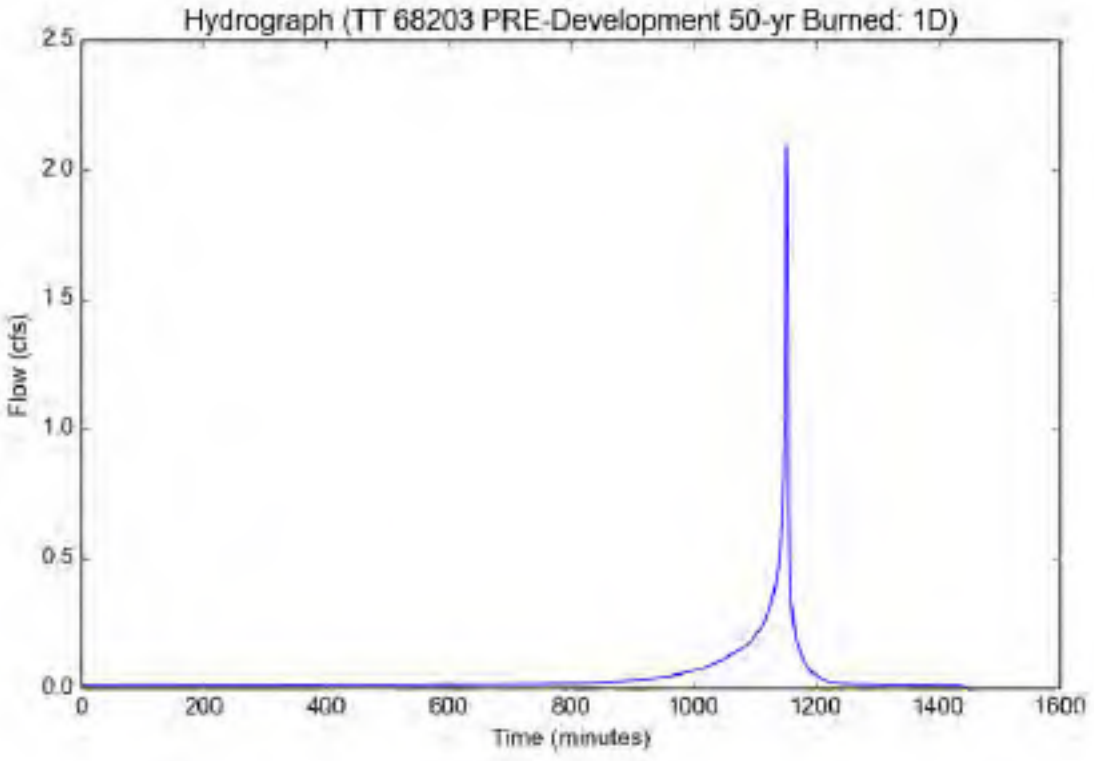
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	1D
Area (ac)	0.58
Flow Path Length (ft)	305.0
Flow Path Slope (vft/hft)	0.108
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.0878
Burned Peak Flow Rate (cfs)	2.1349
24-Hr Clear Runoff Volume (ac-ft)	0.0947
24-Hr Clear Runoff Volume (cu-ft)	4123.3538



Peak Flow Hydrologic Analysis

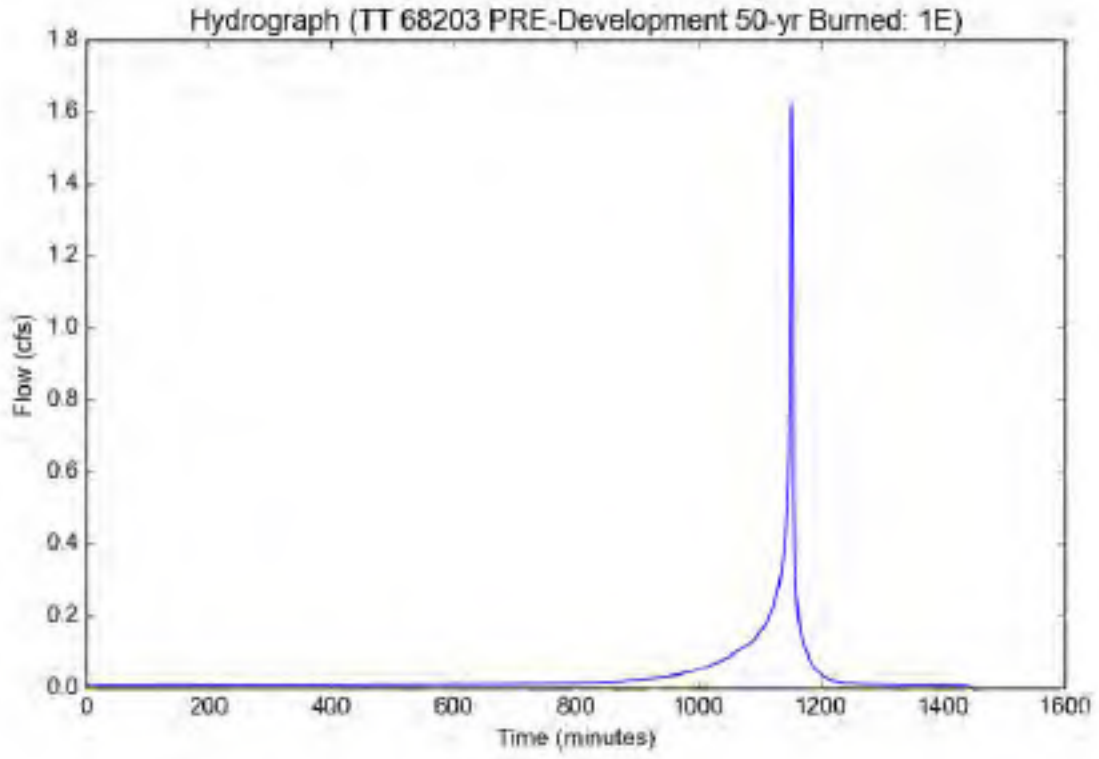
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	1E
Area (ac)	0.45
Flow Path Length (ft)	224.0
Flow Path Slope (vft/hft)	0.1
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.6198
Burned Peak Flow Rate (cfs)	1.6564
24-Hr Clear Runoff Volume (ac-ft)	0.0734
24-Hr Clear Runoff Volume (cu-ft)	3199.1538



Peak Flow Hydrologic Analysis

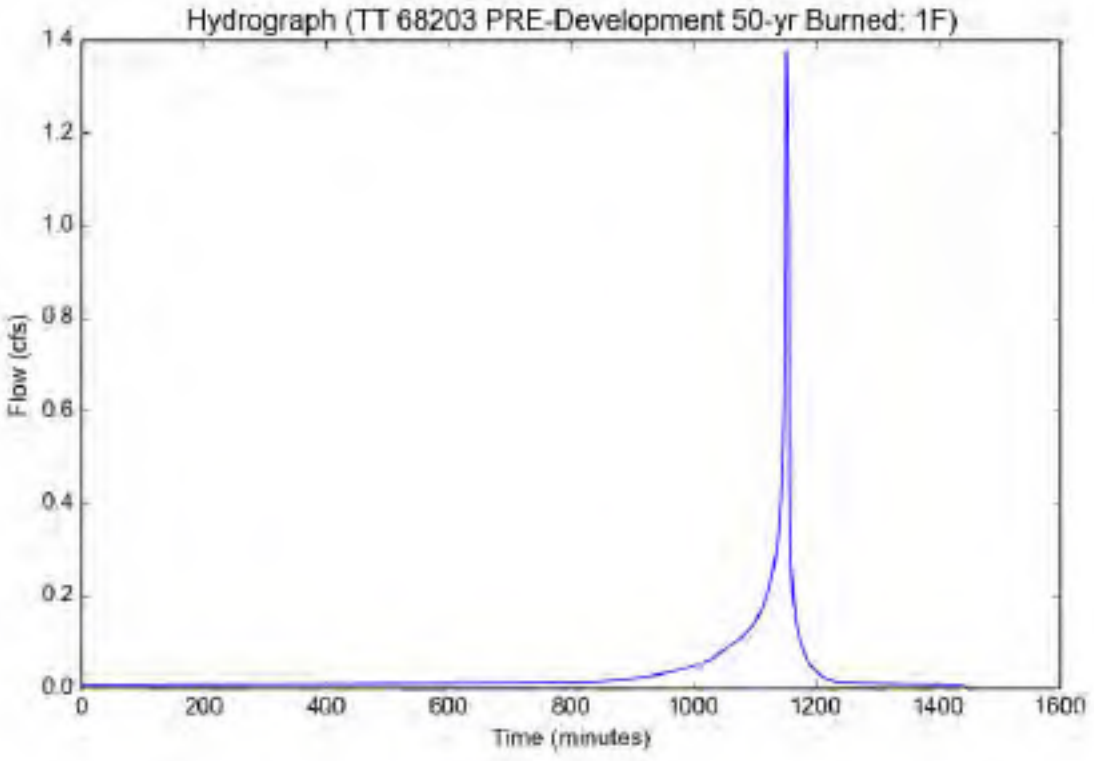
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	1F
Area (ac)	0.42
Flow Path Length (ft)	649.0
Flow Path Slope (vft/hft)	0.036
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	3.8334
Undeveloped Runoff Coefficient (Cu)	0.8546
Developed Runoff Coefficient (Cd)	0.8551
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.3767
Burned Peak Flow Rate (cfs)	1.4092
24-Hr Clear Runoff Volume (ac-ft)	0.0685
24-Hr Clear Runoff Volume (cu-ft)	2985.6409



Peak Flow Hydrologic Analysis

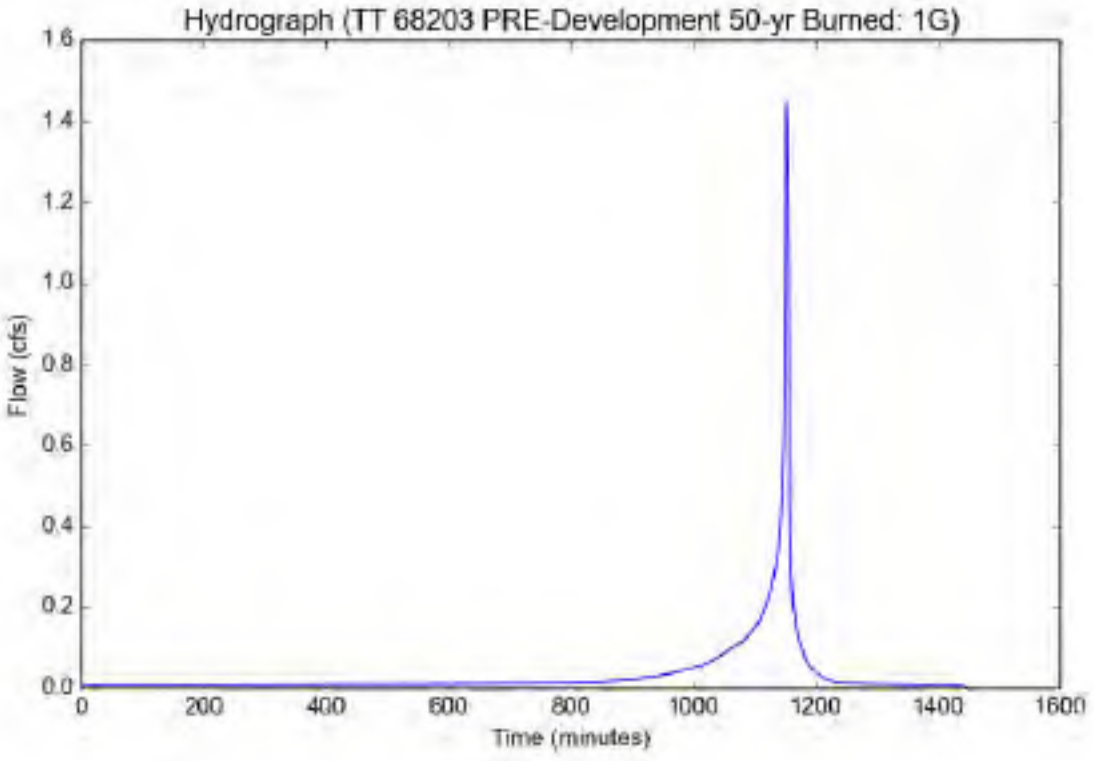
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	1G
Area (ac)	0.44
Flow Path Length (ft)	765.0
Flow Path Slope (vft/hft)	0.078
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	3.8334
Undeveloped Runoff Coefficient (Cu)	0.8546
Developed Runoff Coefficient (Cd)	0.8551
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.4422
Burned Peak Flow Rate (cfs)	1.4763
24-Hr Clear Runoff Volume (ac-ft)	0.0718
24-Hr Clear Runoff Volume (cu-ft)	3127.8143



Peak Flow Hydrologic Analysis

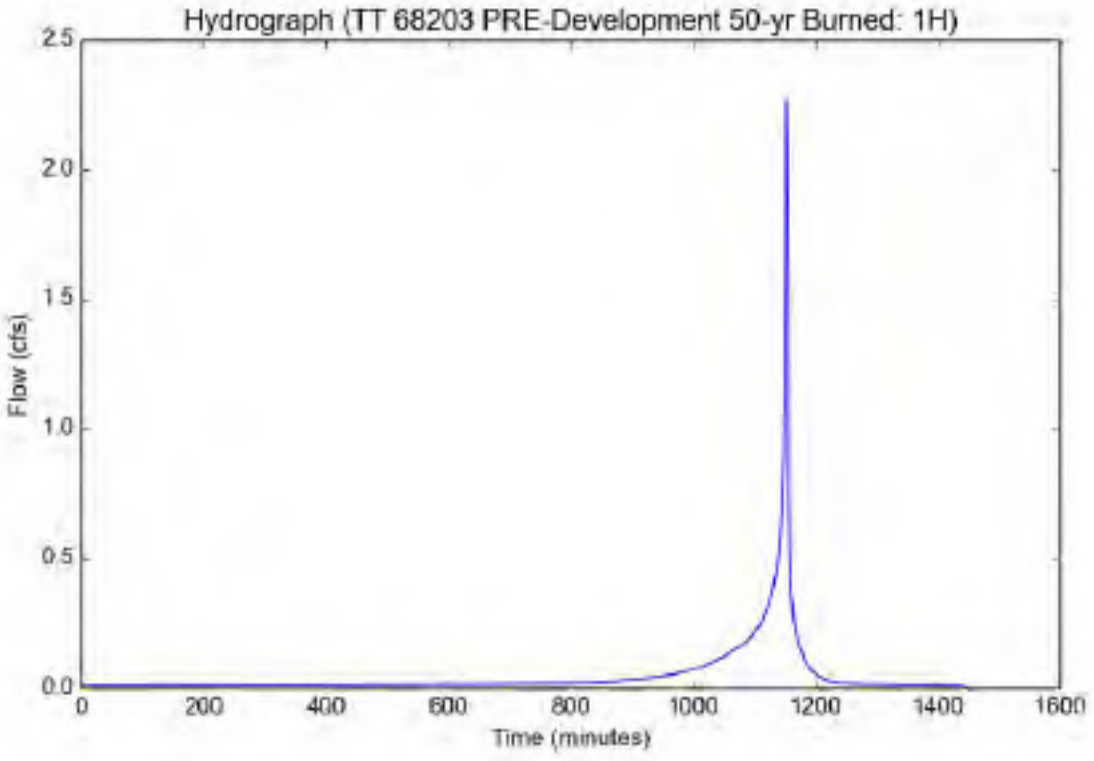
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 50-yr Burned
Subarea ID	1H
Area (ac)	0.63
Flow Path Length (ft)	361.0
Flow Path Slope (vft/hft)	0.103
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.2677
Burned Peak Flow Rate (cfs)	2.319
24-Hr Clear Runoff Volume (ac-ft)	0.1028
24-Hr Clear Runoff Volume (cu-ft)	4478.8153



Peak Flow Hydrologic Analysis

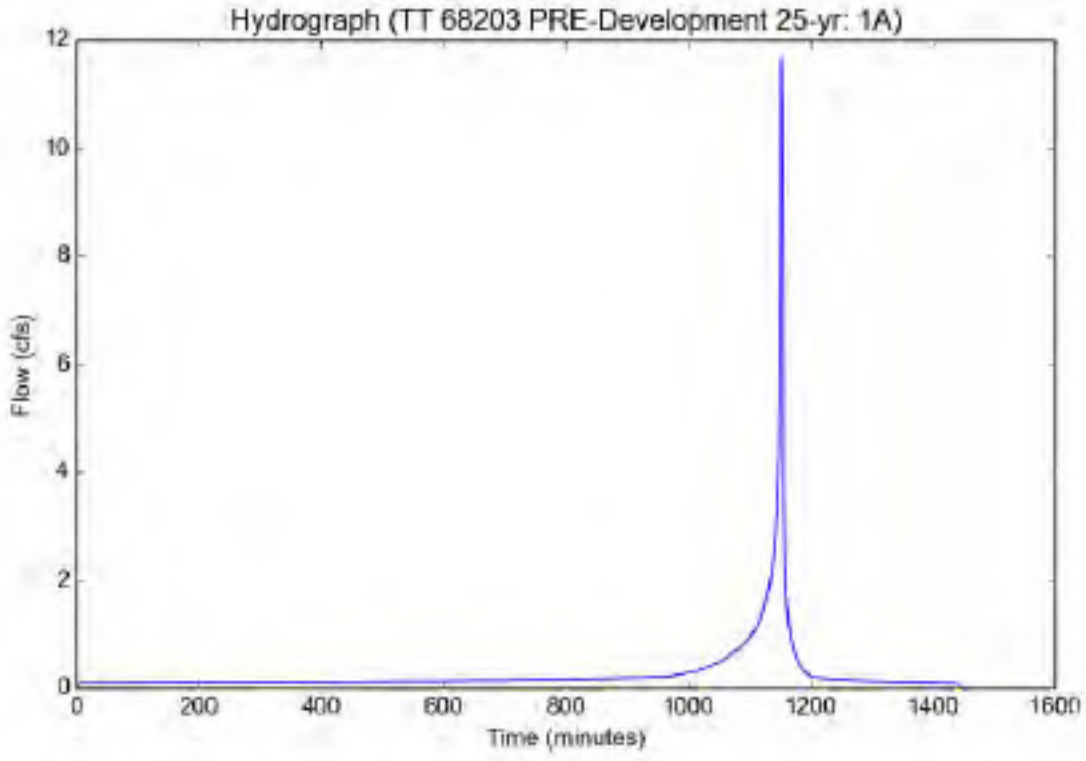
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	1A
Area (ac)	4.13
Flow Path Length (ft)	619.0
Flow Path Slope (vft/hft)	0.156
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.08
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.7583
Developed Runoff Coefficient (Cd)	0.7697
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	11.656
Burned Peak Flow Rate (cfs)	11.656
24-Hr Clear Runoff Volume (ac-ft)	0.5572
24-Hr Clear Runoff Volume (cu-ft)	24273.6987



Peak Flow Hydrologic Analysis

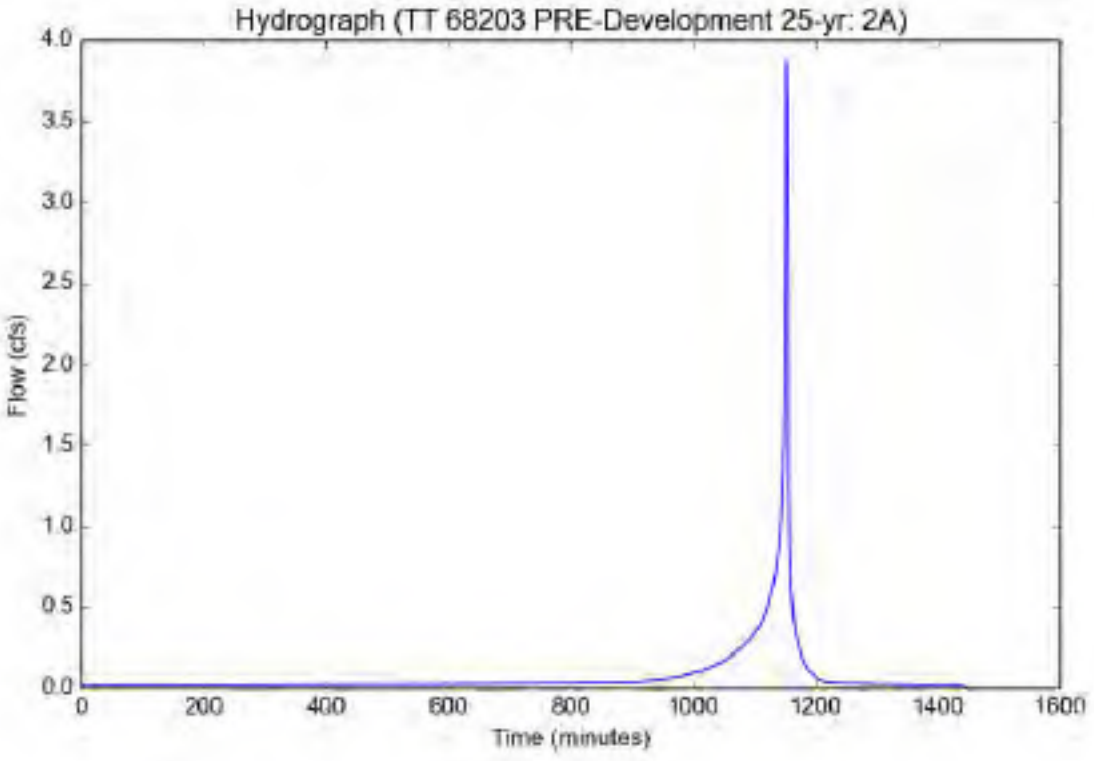
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	2A
Area (ac)	1.24
Flow Path Length (ft)	559.0
Flow Path Slope (vft/hft)	0.149
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.8728
Burned Peak Flow Rate (cfs)	3.8728
24-Hr Clear Runoff Volume (ac-ft)	0.1627
24-Hr Clear Runoff Volume (cu-ft)	7087.2252



Peak Flow Hydrologic Analysis

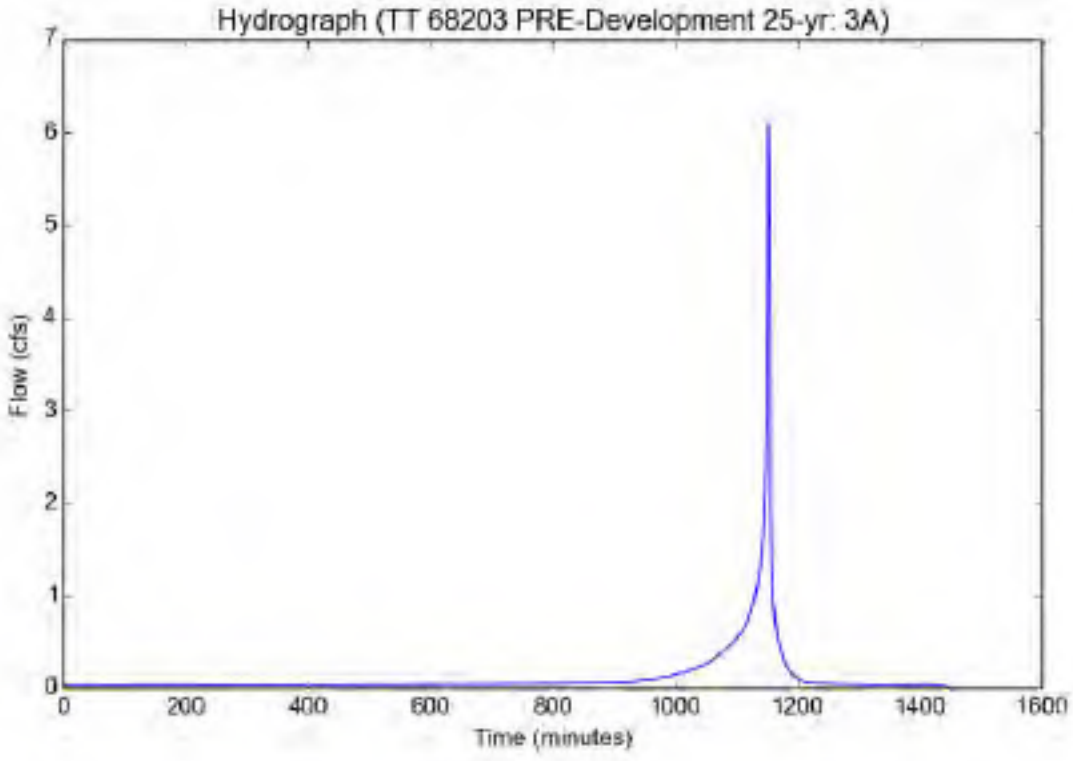
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	3A
Area (ac)	1.95
Flow Path Length (ft)	370.0
Flow Path Slope (vft/hft)	0.245
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.0903
Burned Peak Flow Rate (cfs)	6.0903
24-Hr Clear Runoff Volume (ac-ft)	0.2559
24-Hr Clear Runoff Volume (cu-ft)	11145.2332



Peak Flow Hydrologic Analysis

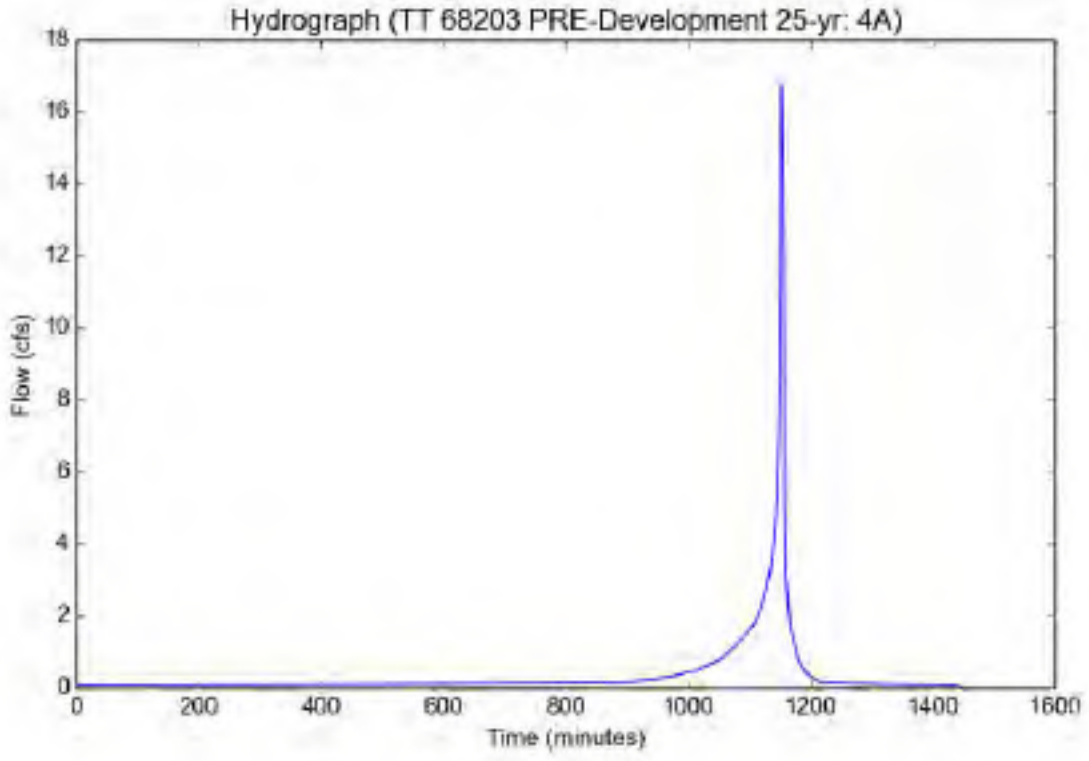
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	4A
Area (ac)	5.91
Flow Path Length (ft)	893.0
Flow Path Slope (vft/hft)	0.151
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.3657
Undeveloped Runoff Coefficient (Cu)	0.8428
Developed Runoff Coefficient (Cd)	0.8434
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	16.7763
Burned Peak Flow Rate (cfs)	16.7763
24-Hr Clear Runoff Volume (ac-ft)	0.7752
24-Hr Clear Runoff Volume (cu-ft)	33767.9736



Peak Flow Hydrologic Analysis

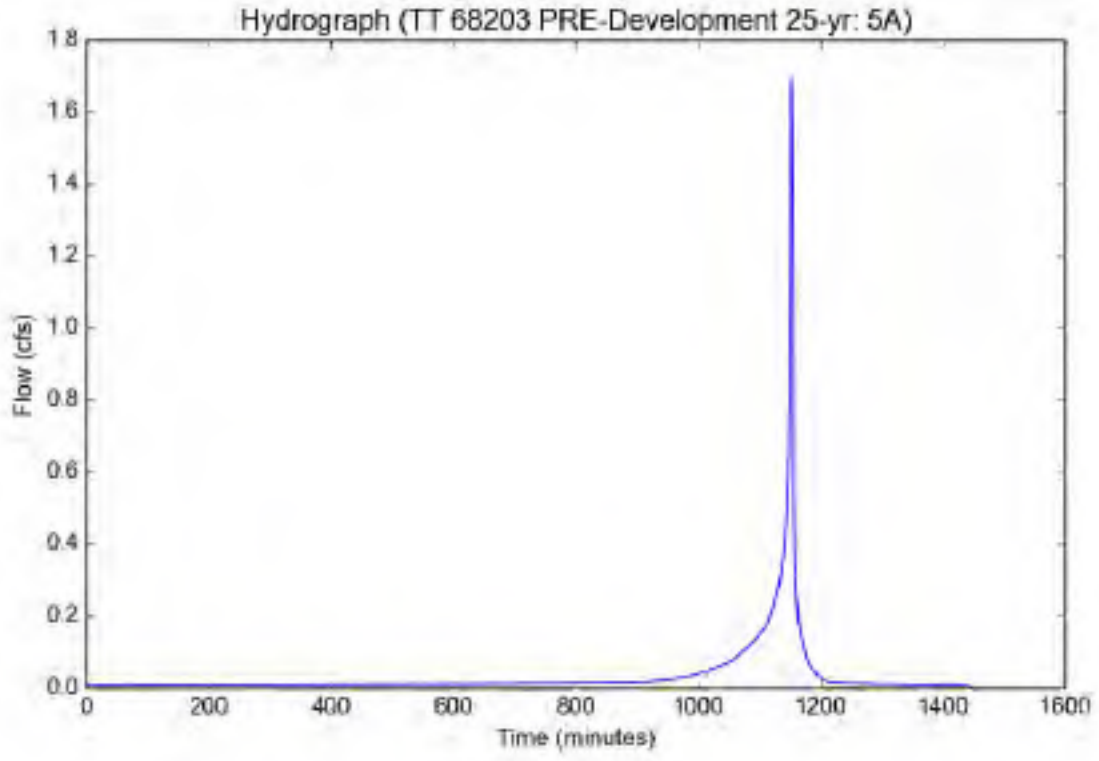
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	5A
Area (ac)	0.54
Flow Path Length (ft)	169.0
Flow Path Slope (vft/hft)	0.266
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.6865
Burned Peak Flow Rate (cfs)	1.6865
24-Hr Clear Runoff Volume (ac-ft)	0.0709
24-Hr Clear Runoff Volume (cu-ft)	3086.3723



Peak Flow Hydrologic Analysis

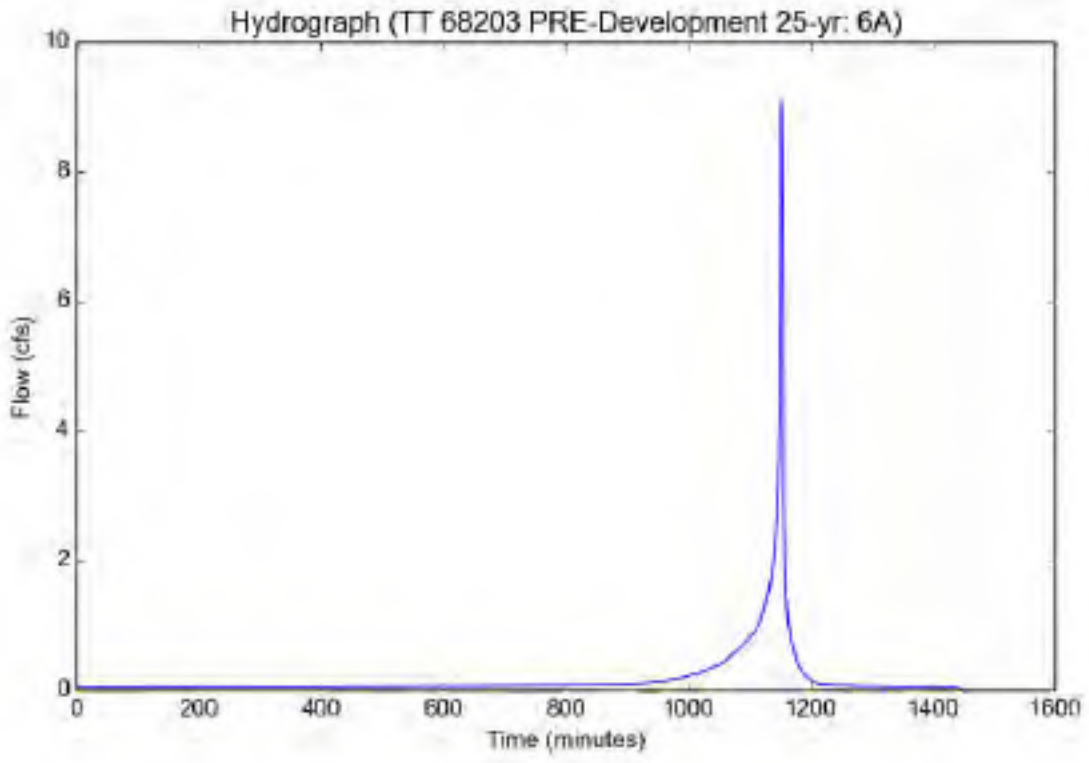
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	6A
Area (ac)	2.91
Flow Path Length (ft)	192.0
Flow Path Slope (vft/hft)	0.203
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	9.0886
Burned Peak Flow Rate (cfs)	9.0886
24-Hr Clear Runoff Volume (ac-ft)	0.3818
24-Hr Clear Runoff Volume (cu-ft)	16632.1172



Peak Flow Hydrologic Analysis

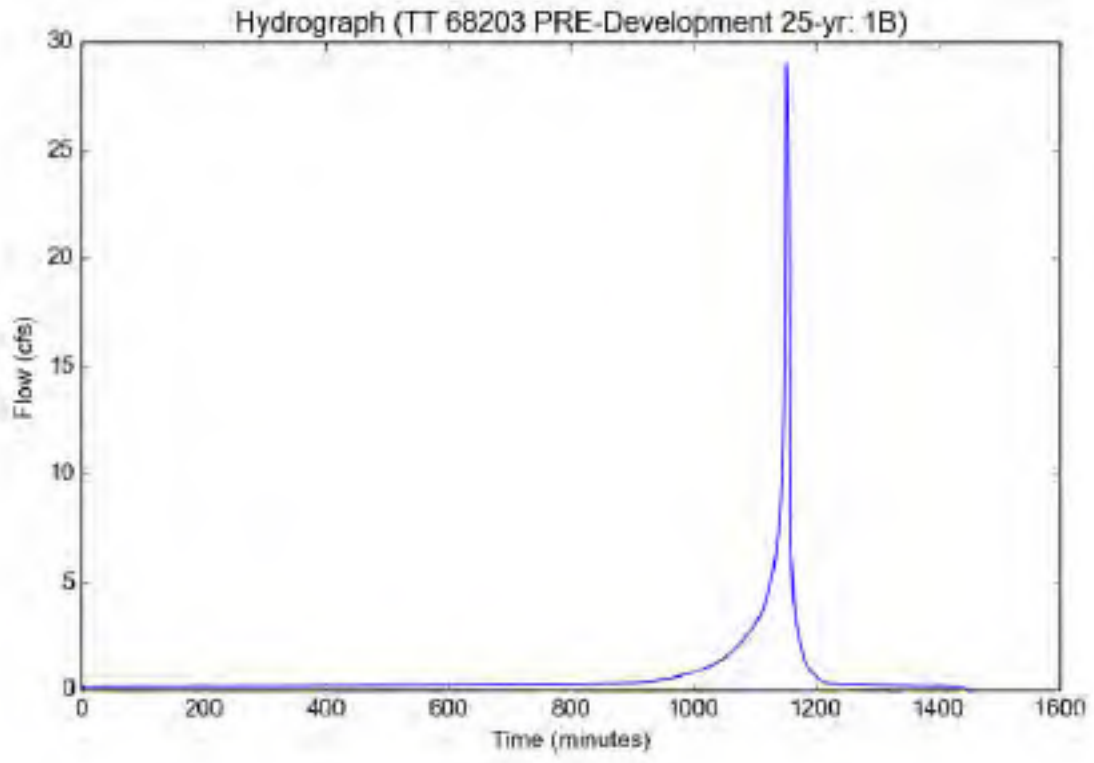
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	1B
Area (ac)	11.1
Flow Path Length (ft)	961.0
Flow Path Slope (vft/hft)	0.163
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.1305
Undeveloped Runoff Coefficient (Cu)	0.8339
Developed Runoff Coefficient (Cd)	0.8346
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	29.0003
Burned Peak Flow Rate (cfs)	29.0003
24-Hr Clear Runoff Volume (ac-ft)	1.4555
24-Hr Clear Runoff Volume (cu-ft)	63402.2397



Peak Flow Hydrologic Analysis

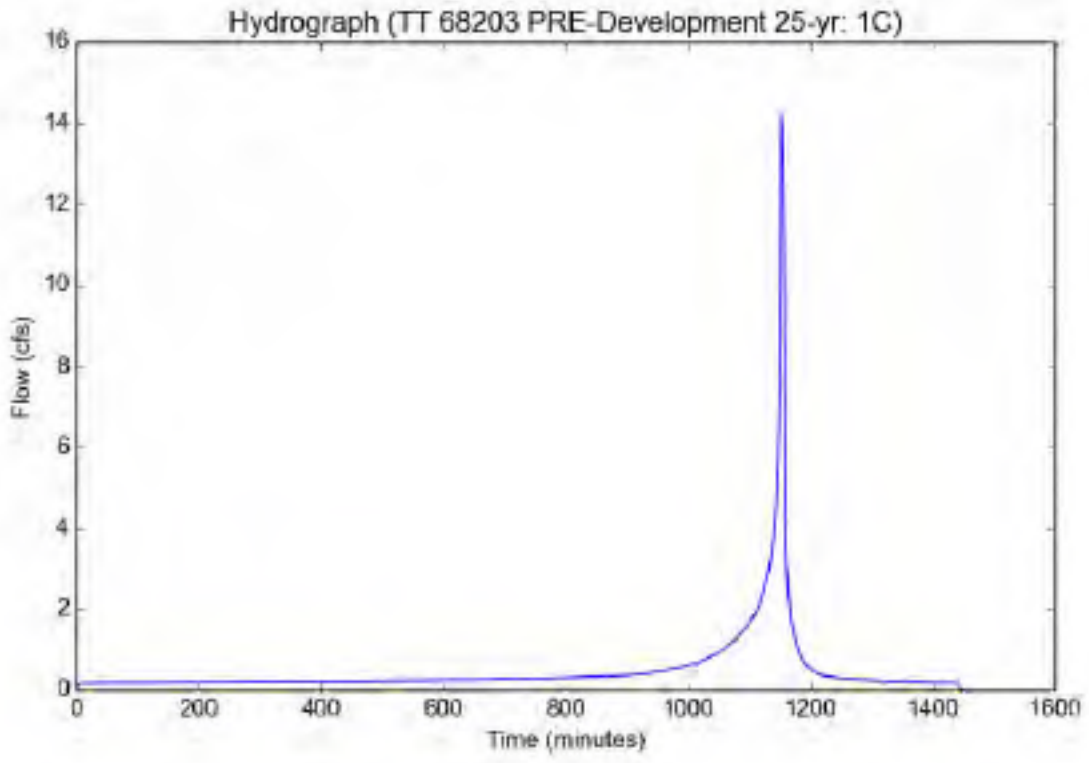
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	1C
Area (ac)	5.35
Flow Path Length (ft)	864.0
Flow Path Slope (vft/hft)	0.1
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.18
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.1305
Undeveloped Runoff Coefficient (Cu)	0.8339
Developed Runoff Coefficient (Cd)	0.8458
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	14.1658
Burned Peak Flow Rate (cfs)	14.1658
24-Hr Clear Runoff Volume (ac-ft)	1.001
24-Hr Clear Runoff Volume (cu-ft)	43605.1369



Peak Flow Hydrologic Analysis

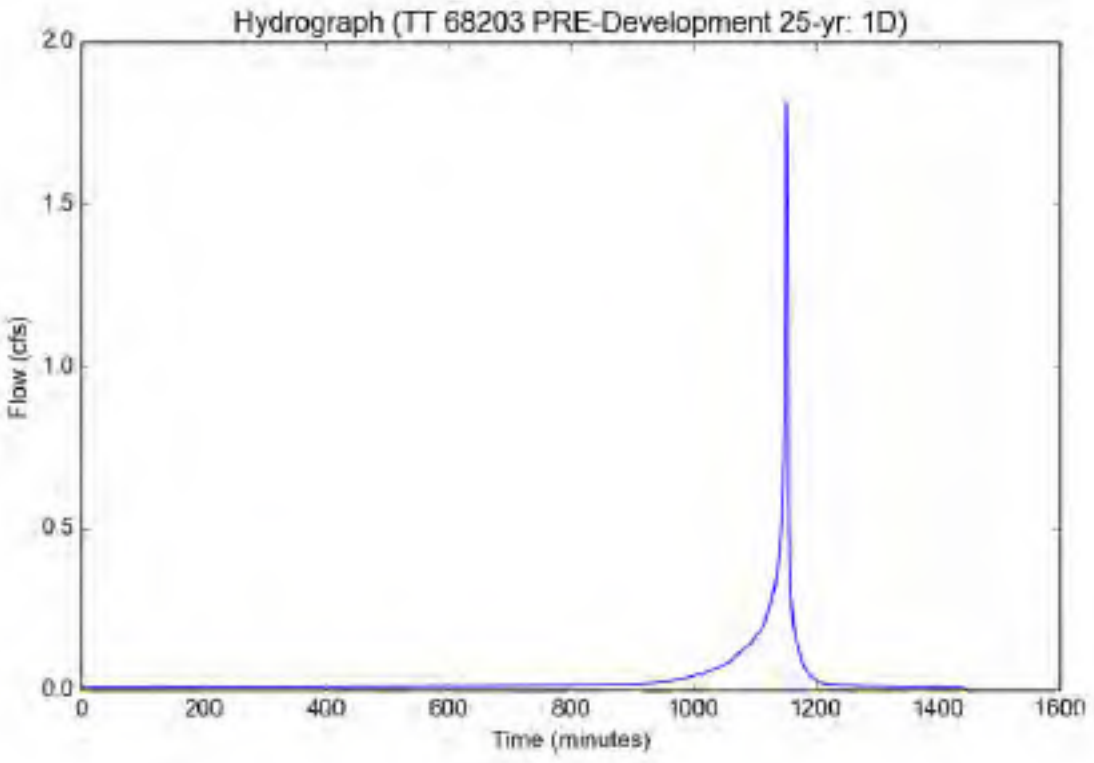
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	1D
Area (ac)	0.58
Flow Path Length (ft)	305.0
Flow Path Slope (vft/hft)	0.108
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.8115
Burned Peak Flow Rate (cfs)	1.8115
24-Hr Clear Runoff Volume (ac-ft)	0.0761
24-Hr Clear Runoff Volume (cu-ft)	3314.9924



Peak Flow Hydrologic Analysis

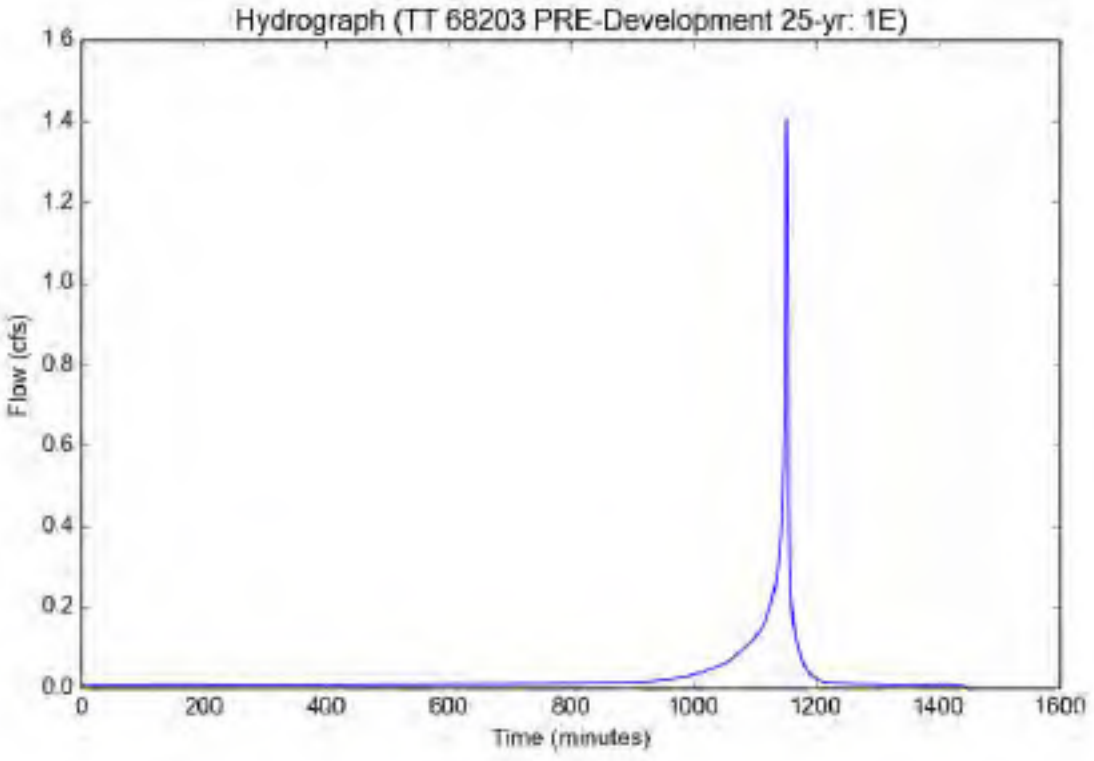
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	1E
Area (ac)	0.45
Flow Path Length (ft)	224.0
Flow Path Slope (vft/hft)	0.1
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.4055
Burned Peak Flow Rate (cfs)	1.4055
24-Hr Clear Runoff Volume (ac-ft)	0.059
24-Hr Clear Runoff Volume (cu-ft)	2571.9769



Peak Flow Hydrologic Analysis

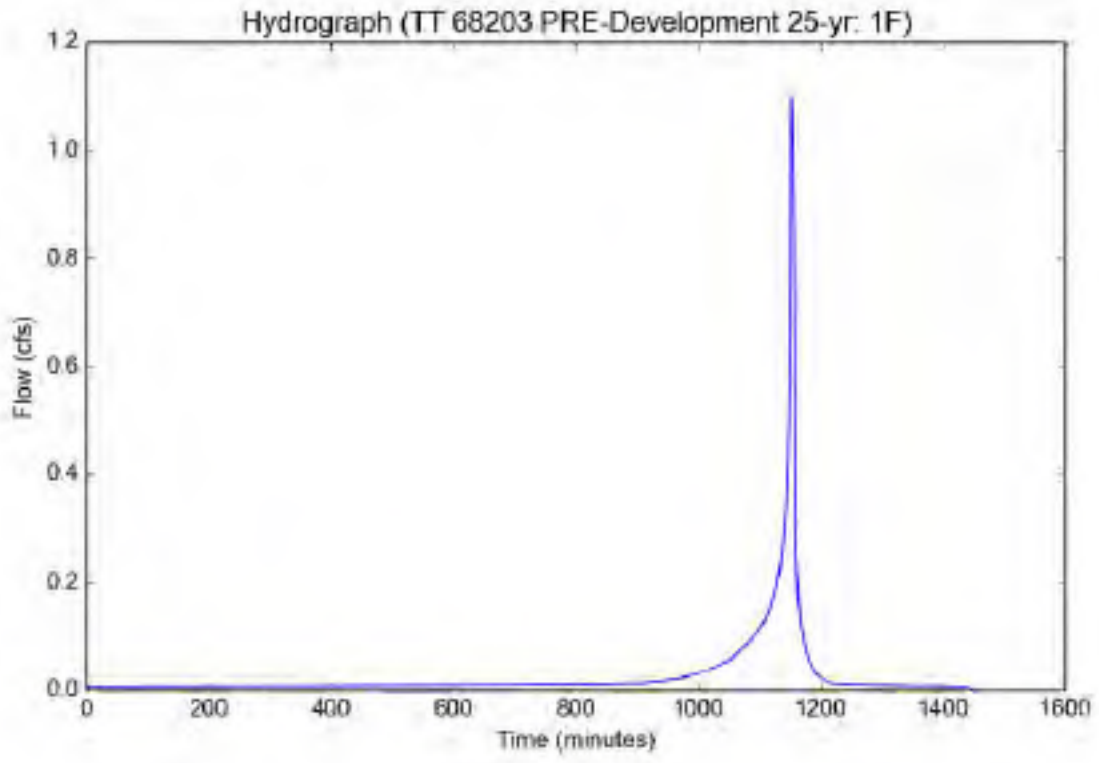
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	1F
Area (ac)	0.42
Flow Path Length (ft)	649.0
Flow Path Slope (vft/hft)	0.036
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.1305
Undeveloped Runoff Coefficient (Cu)	0.8339
Developed Runoff Coefficient (Cd)	0.8346
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	1.0973
Burned Peak Flow Rate (cfs)	1.0973
24-Hr Clear Runoff Volume (ac-ft)	0.0551
24-Hr Clear Runoff Volume (cu-ft)	2399.0037



Peak Flow Hydrologic Analysis

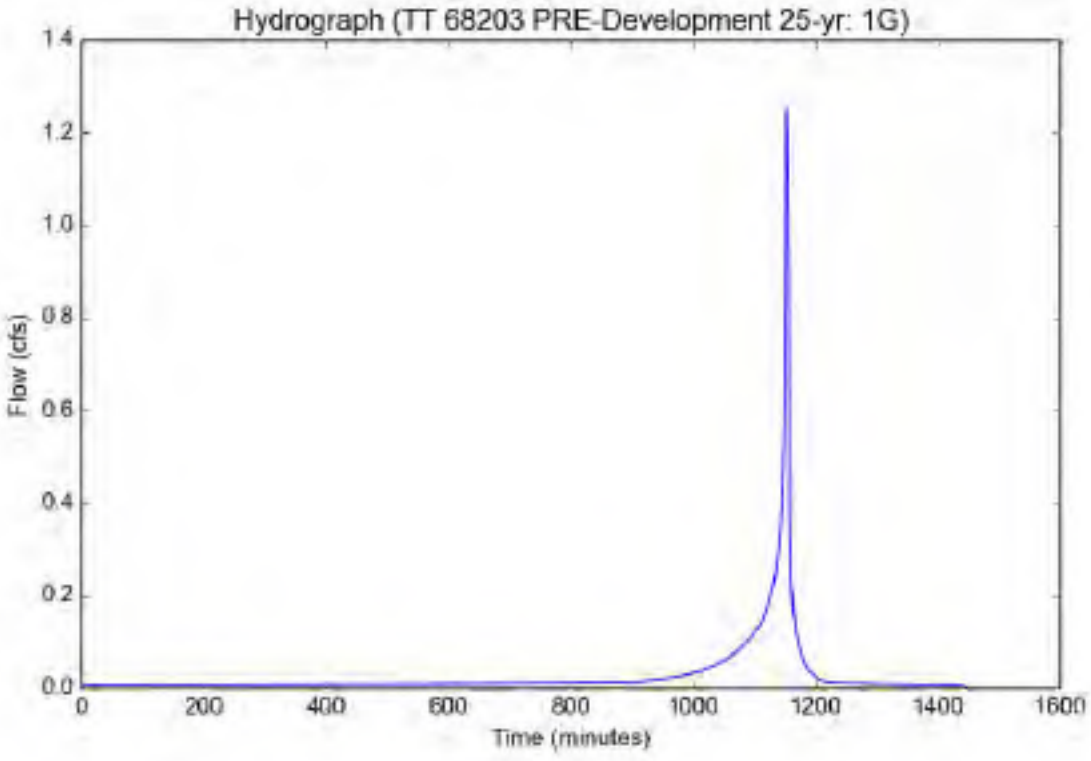
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	1G
Area (ac)	0.44
Flow Path Length (ft)	765.0
Flow Path Slope (vft/hft)	0.078
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.3657
Undeveloped Runoff Coefficient (Cu)	0.8428
Developed Runoff Coefficient (Cd)	0.8434
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.249
Burned Peak Flow Rate (cfs)	1.249
24-Hr Clear Runoff Volume (ac-ft)	0.0577
24-Hr Clear Runoff Volume (cu-ft)	2514.0285



Peak Flow Hydrologic Analysis

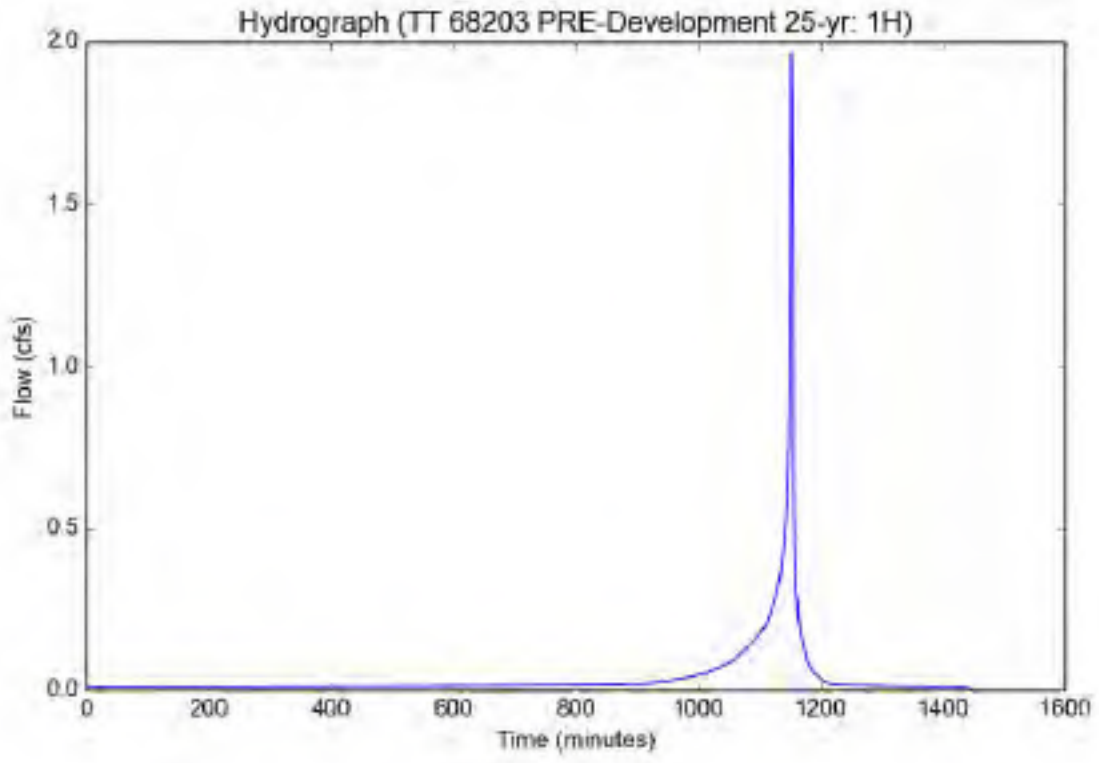
File location: E:/LS_Civil 3d Projects/92020-019 Santa Clarita G V Rd and Sierra Hwy/Hydrology/Hydrocalc/TT 68203 PRE-Development Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 PRE-Development 25-yr
Subarea ID	1H
Area (ac)	0.63
Flow Path Length (ft)	361.0
Flow Path Slope (vft/hft)	0.103
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.9676
Burned Peak Flow Rate (cfs)	1.9676
24-Hr Clear Runoff Volume (ac-ft)	0.0827
24-Hr Clear Runoff Volume (cu-ft)	3600.7676



Appendix E:

HYDROCALC PRINT-OUTS FOR POST-DEVELOPMENT CONDITION

Peak Flow Hydrologic Analysis

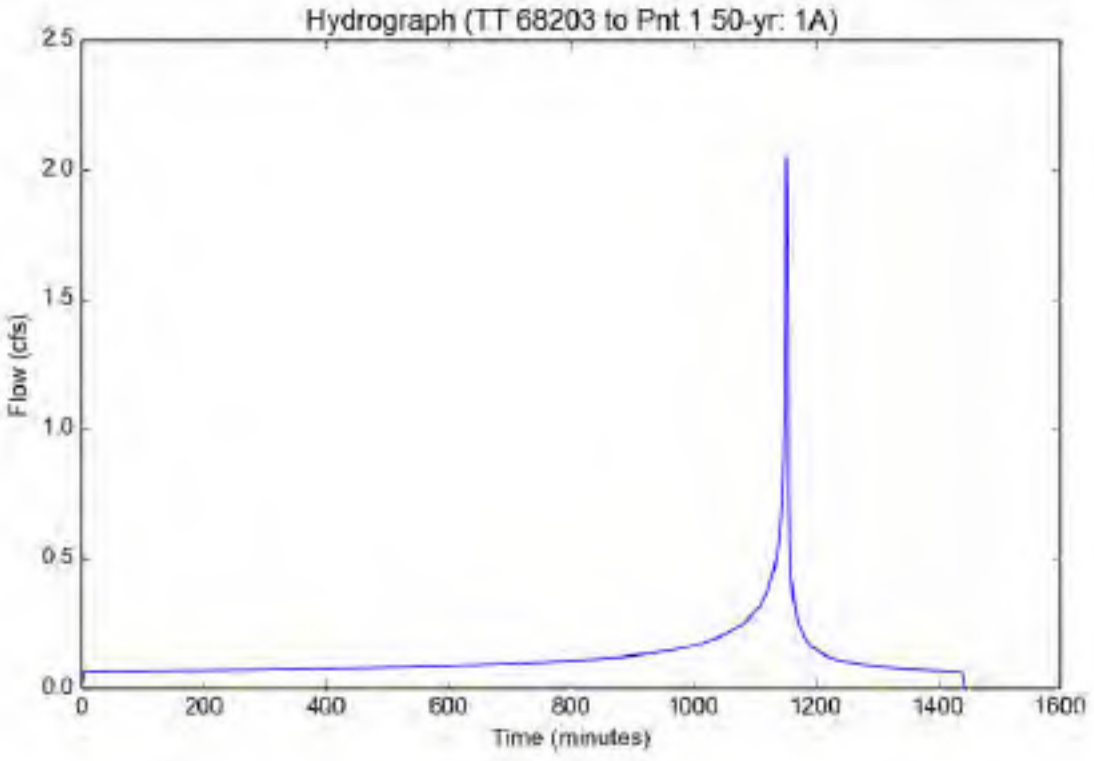
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	1A
Area (ac)	0.55
Flow Path Length (ft)	491.0
Flow Path Slope (vft/hft)	0.053
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.76
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8908
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.0461
Burned Peak Flow Rate (cfs)	2.0461
24-Hr Clear Runoff Volume (ac-ft)	0.2387
24-Hr Clear Runoff Volume (cu-ft)	10397.9004



Peak Flow Hydrologic Analysis

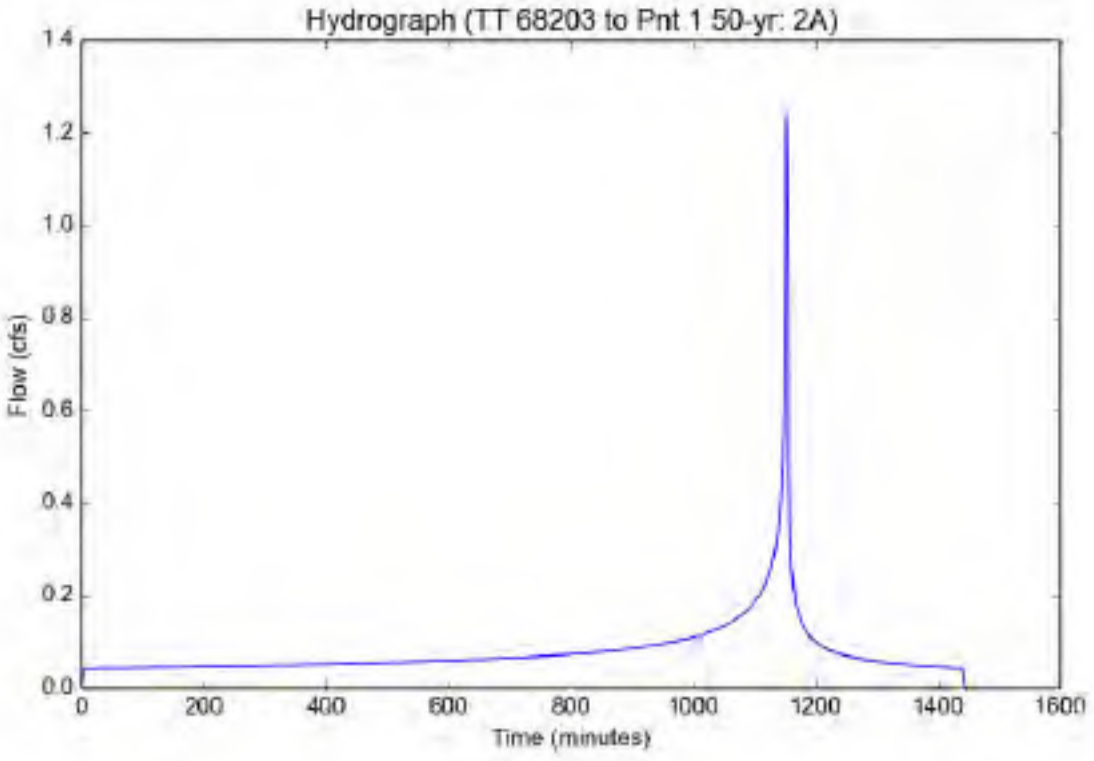
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	2A
Area (ac)	0.33
Flow Path Length (ft)	399.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.9
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8962
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.2351
Burned Peak Flow Rate (cfs)	1.2351
24-Hr Clear Runoff Volume (ac-ft)	0.1599
24-Hr Clear Runoff Volume (cu-ft)	6965.3765



Peak Flow Hydrologic Analysis

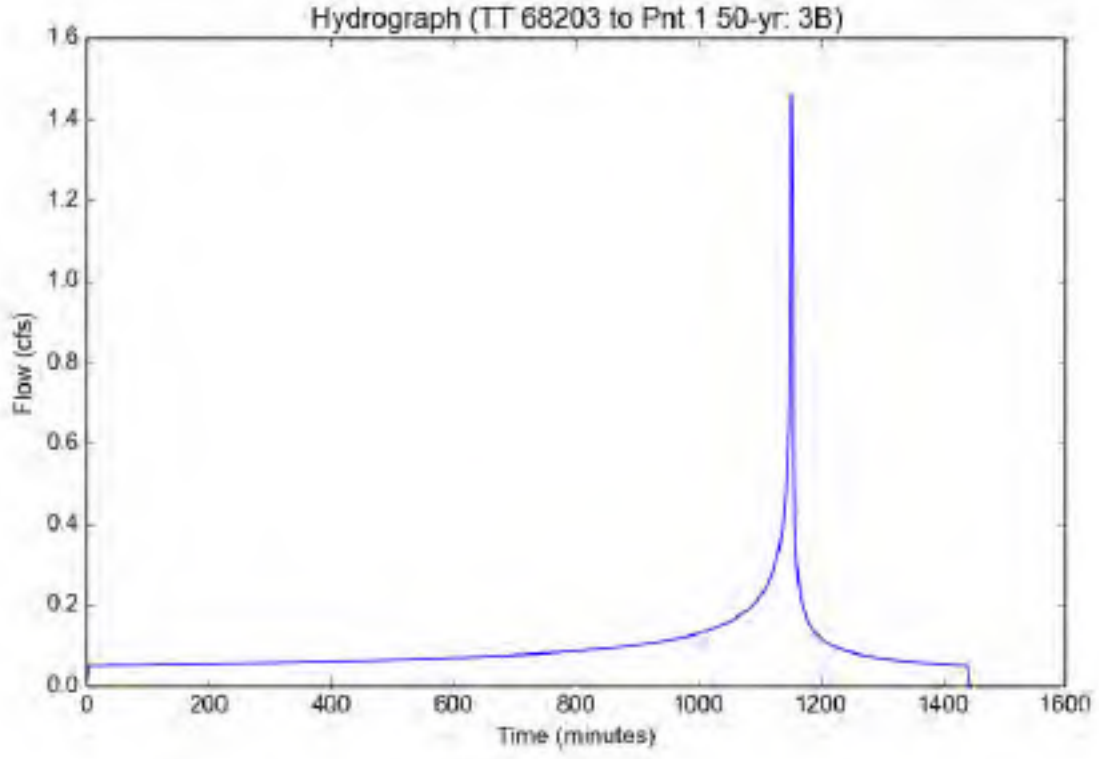
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	3B
Area (ac)	0.39
Flow Path Length (ft)	495.0
Flow Path Slope (vft/hft)	0.095
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.9
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8962
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.4596
Burned Peak Flow Rate (cfs)	1.4596
24-Hr Clear Runoff Volume (ac-ft)	0.189
24-Hr Clear Runoff Volume (cu-ft)	8231.8085



Peak Flow Hydrologic Analysis

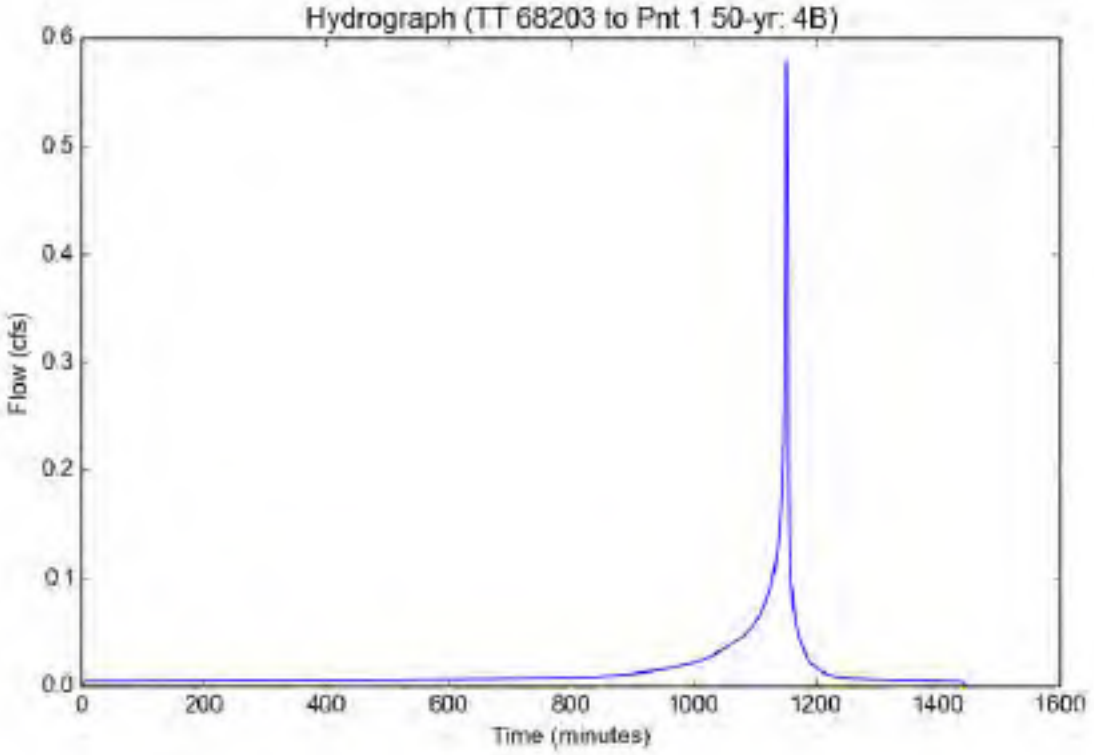
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	4B
Area (ac)	0.16
Flow Path Length (ft)	266.0
Flow Path Slope (vft/hft)	0.128
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.5782
Burned Peak Flow Rate (cfs)	0.5782
24-Hr Clear Runoff Volume (ac-ft)	0.0313
24-Hr Clear Runoff Volume (cu-ft)	1363.9609



Peak Flow Hydrologic Analysis

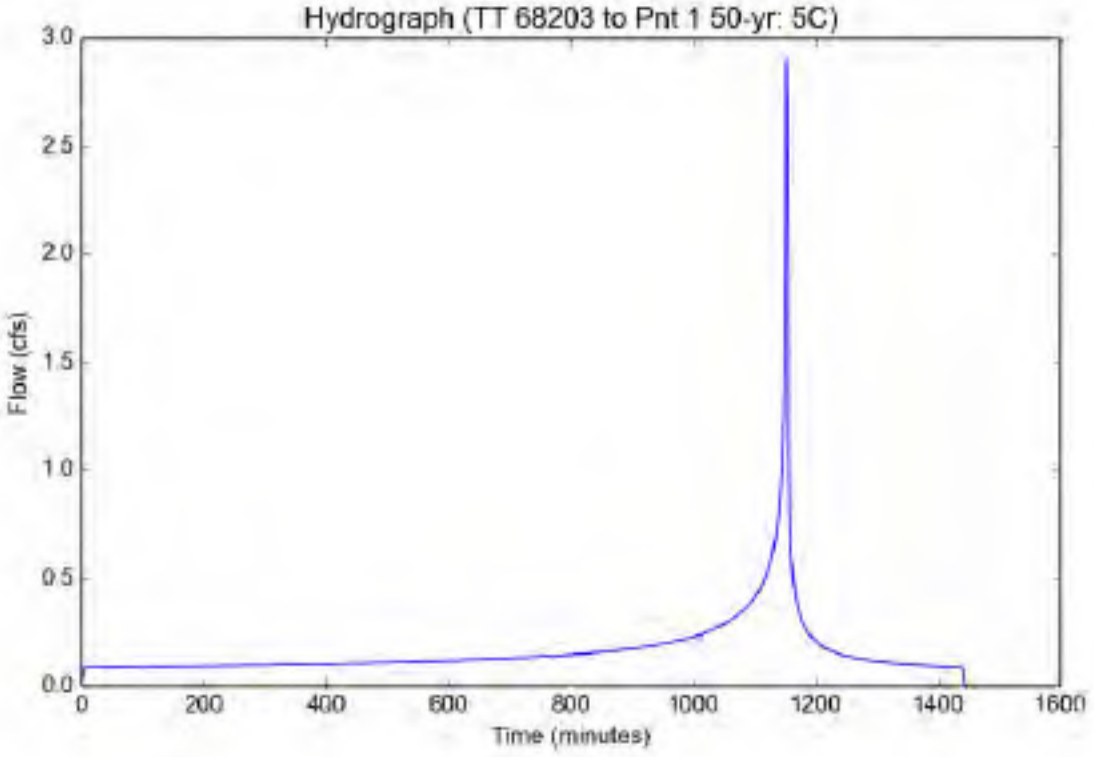
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	5C
Area (ac)	0.78
Flow Path Length (ft)	309.0
Flow Path Slope (vft/hft)	0.044
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.74
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.89
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.8992
Burned Peak Flow Rate (cfs)	2.8992
24-Hr Clear Runoff Volume (ac-ft)	0.3329
24-Hr Clear Runoff Volume (cu-ft)	14500.7556



Peak Flow Hydrologic Analysis

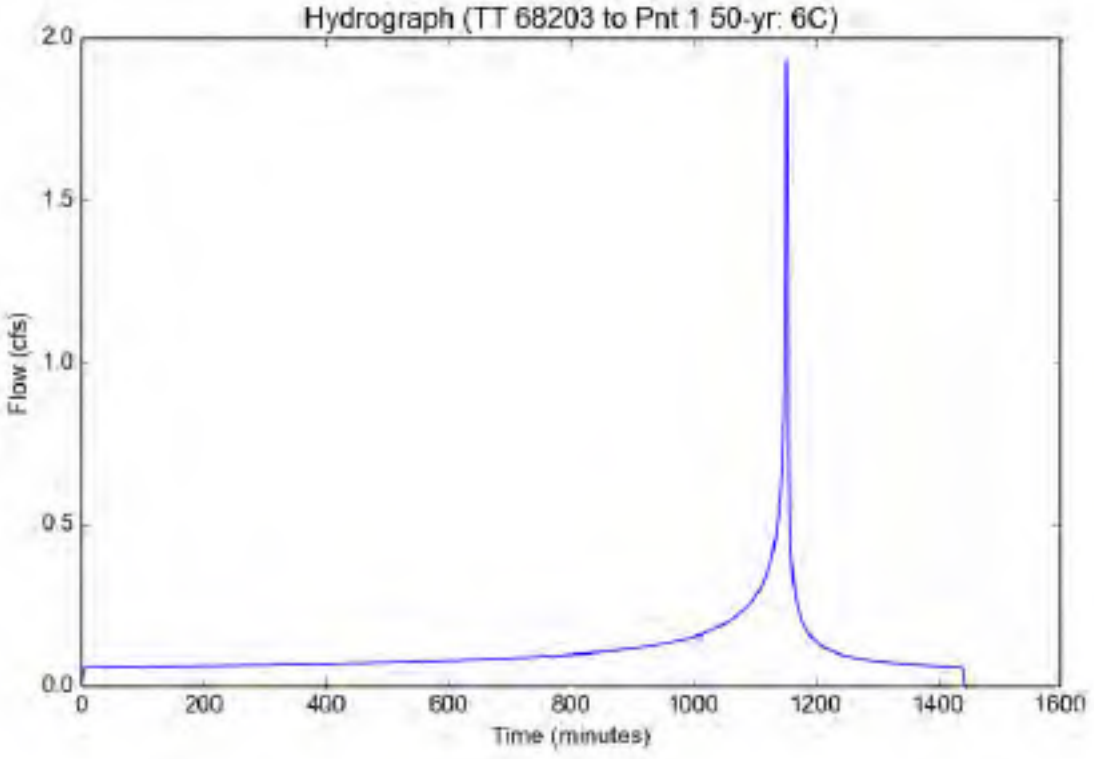
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	6C
Area (ac)	0.52
Flow Path Length (ft)	164.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.74
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.89
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.9328
Burned Peak Flow Rate (cfs)	1.9328
24-Hr Clear Runoff Volume (ac-ft)	0.2219
24-Hr Clear Runoff Volume (cu-ft)	9667.1704



Peak Flow Hydrologic Analysis

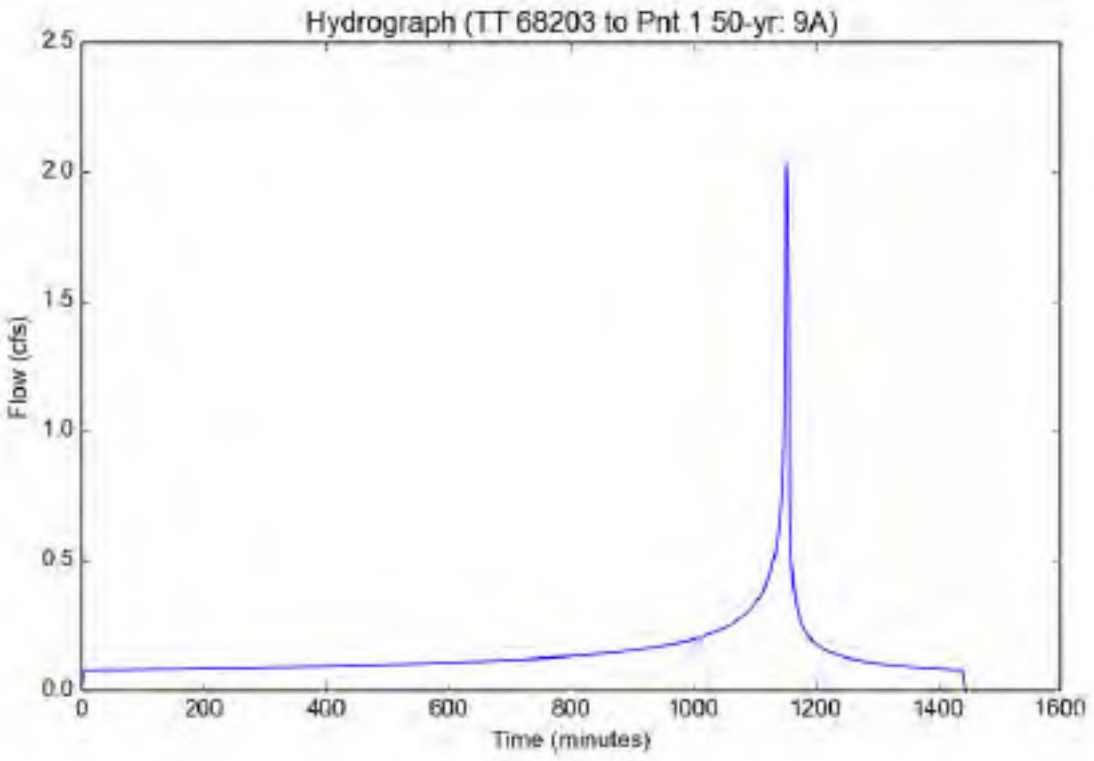
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	9A
Area (ac)	0.59
Flow Path Length (ft)	790.0
Flow Path Slope (vft/hft)	0.082
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.9
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	3.8334
Undeveloped Runoff Coefficient (Cu)	0.8546
Developed Runoff Coefficient (Cd)	0.8955
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	2.0253
Burned Peak Flow Rate (cfs)	2.0253
24-Hr Clear Runoff Volume (ac-ft)	0.2859
24-Hr Clear Runoff Volume (cu-ft)	12453.217



Peak Flow Hydrologic Analysis

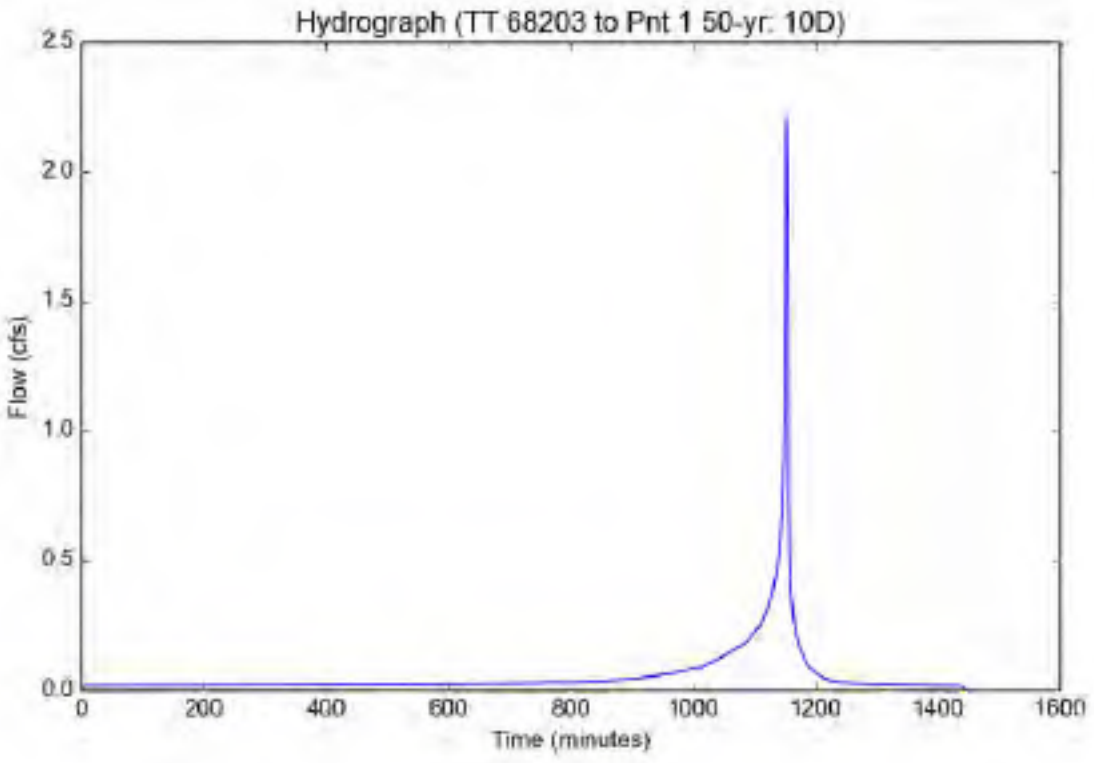
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	10D
Area (ac)	0.61
Flow Path Length (ft)	352.0
Flow Path Slope (vft/hft)	0.136
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.2046
Burned Peak Flow Rate (cfs)	2.2046
24-Hr Clear Runoff Volume (ac-ft)	0.1194
24-Hr Clear Runoff Volume (cu-ft)	5200.101



Peak Flow Hydrologic Analysis

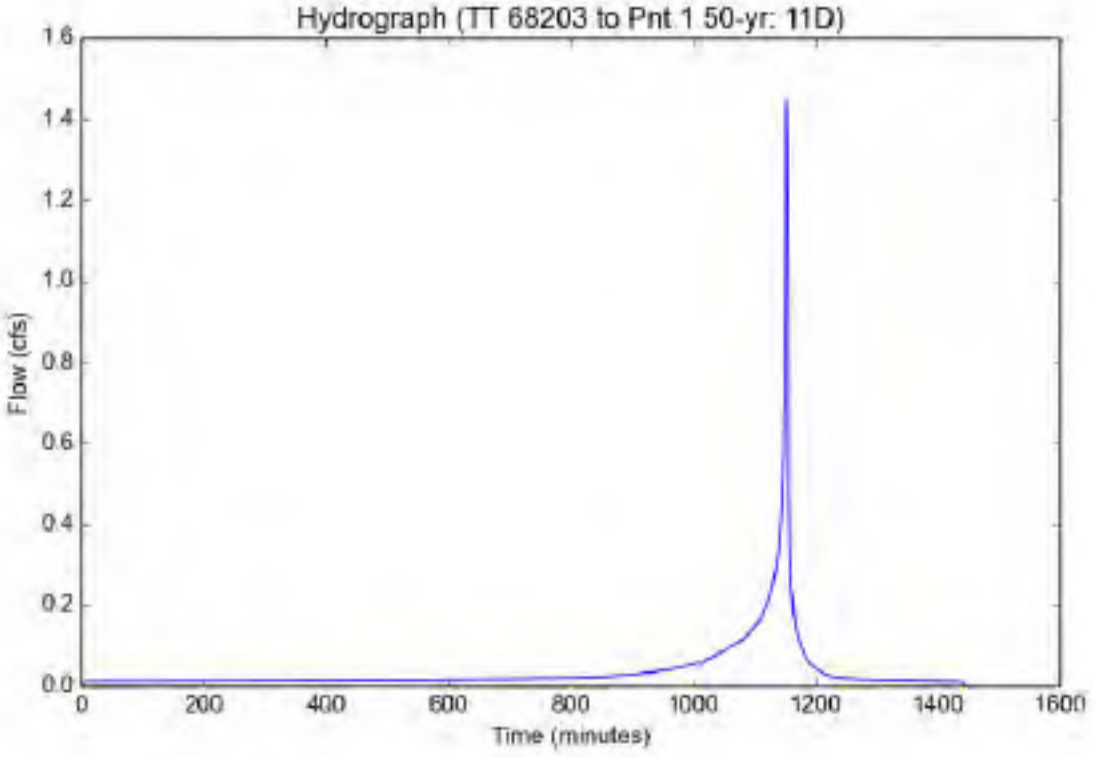
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	11D
Area (ac)	0.4
Flow Path Length (ft)	277.0
Flow Path Slope (vft/hft)	0.173
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.4456
Burned Peak Flow Rate (cfs)	1.4456
24-Hr Clear Runoff Volume (ac-ft)	0.0783
24-Hr Clear Runoff Volume (cu-ft)	3409.9023



Peak Flow Hydrologic Analysis

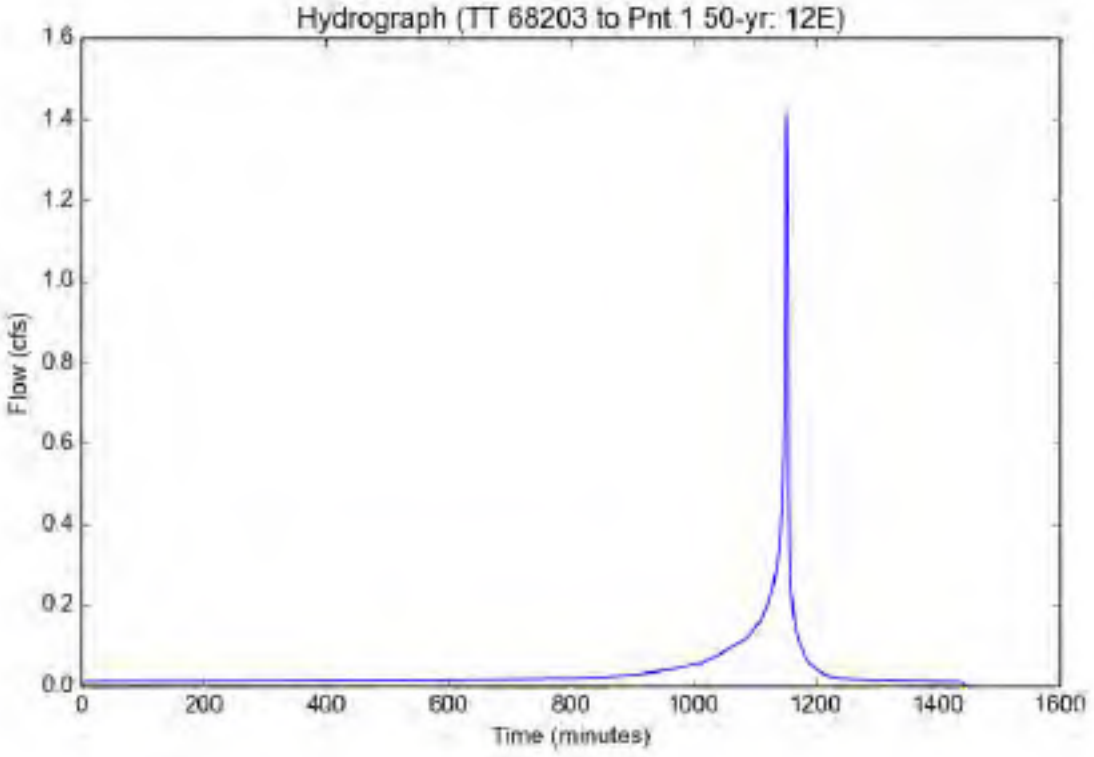
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	12E
Area (ac)	0.39
Flow Path Length (ft)	392.0
Flow Path Slope (vft/hft)	0.056
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.4095
Burned Peak Flow Rate (cfs)	1.4095
24-Hr Clear Runoff Volume (ac-ft)	0.0763
24-Hr Clear Runoff Volume (cu-ft)	3324.6548



Peak Flow Hydrologic Analysis

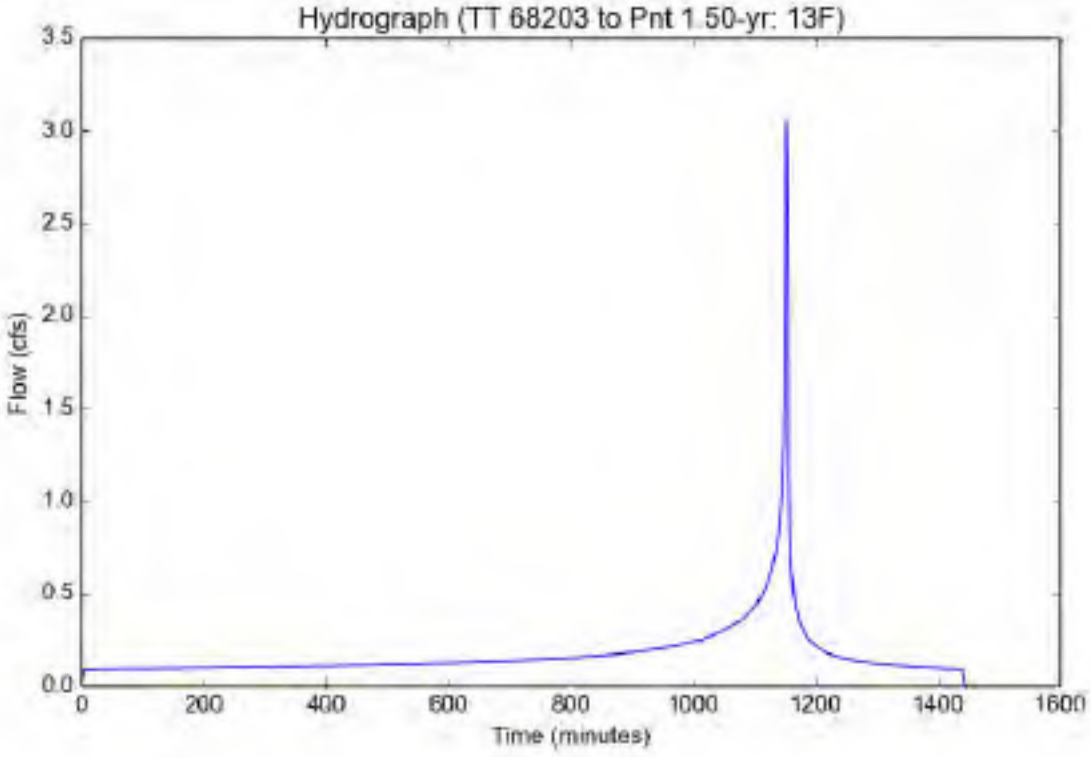
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	13F
Area (ac)	0.82
Flow Path Length (ft)	311.0
Flow Path Slope (vft/hft)	0.043
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.74
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.89
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.0479
Burned Peak Flow Rate (cfs)	3.0479
24-Hr Clear Runoff Volume (ac-ft)	0.35
24-Hr Clear Runoff Volume (cu-ft)	15244.3841



Peak Flow Hydrologic Analysis

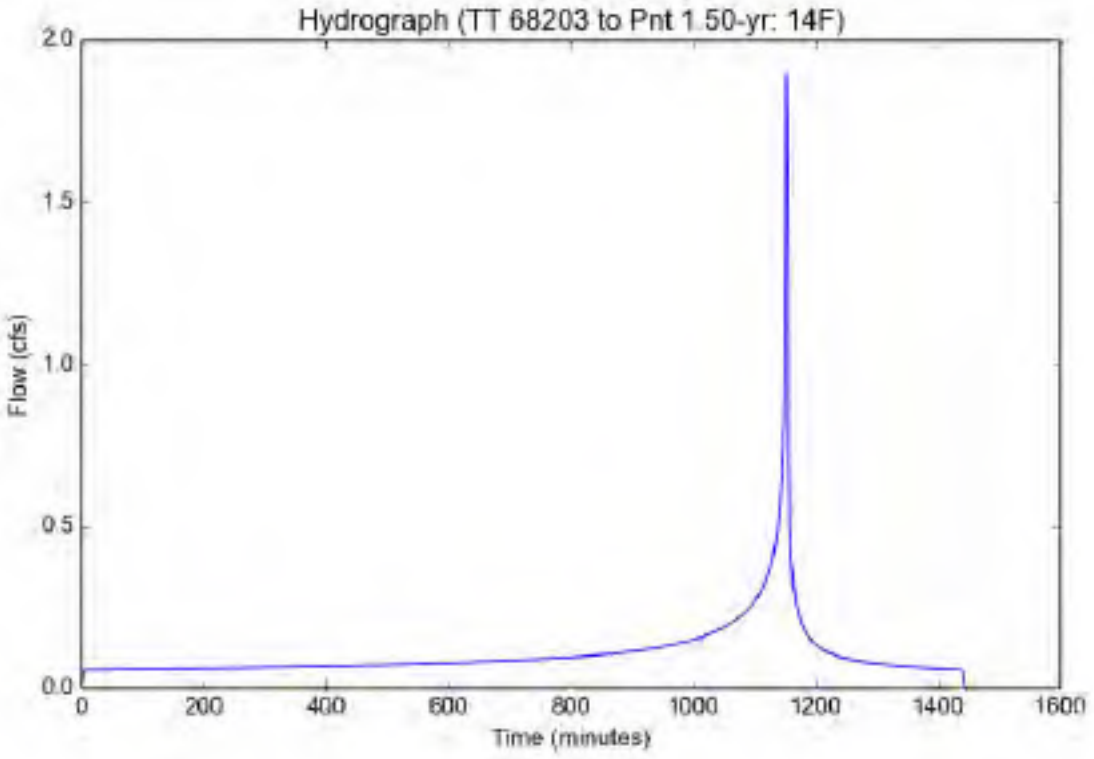
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	14F
Area (ac)	0.51
Flow Path Length (ft)	184.0
Flow Path Slope (vft/hft)	0.032
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.74
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.89
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.8956
Burned Peak Flow Rate (cfs)	1.8956
24-Hr Clear Runoff Volume (ac-ft)	0.2177
24-Hr Clear Runoff Volume (cu-ft)	9481.2633



Peak Flow Hydrologic Analysis

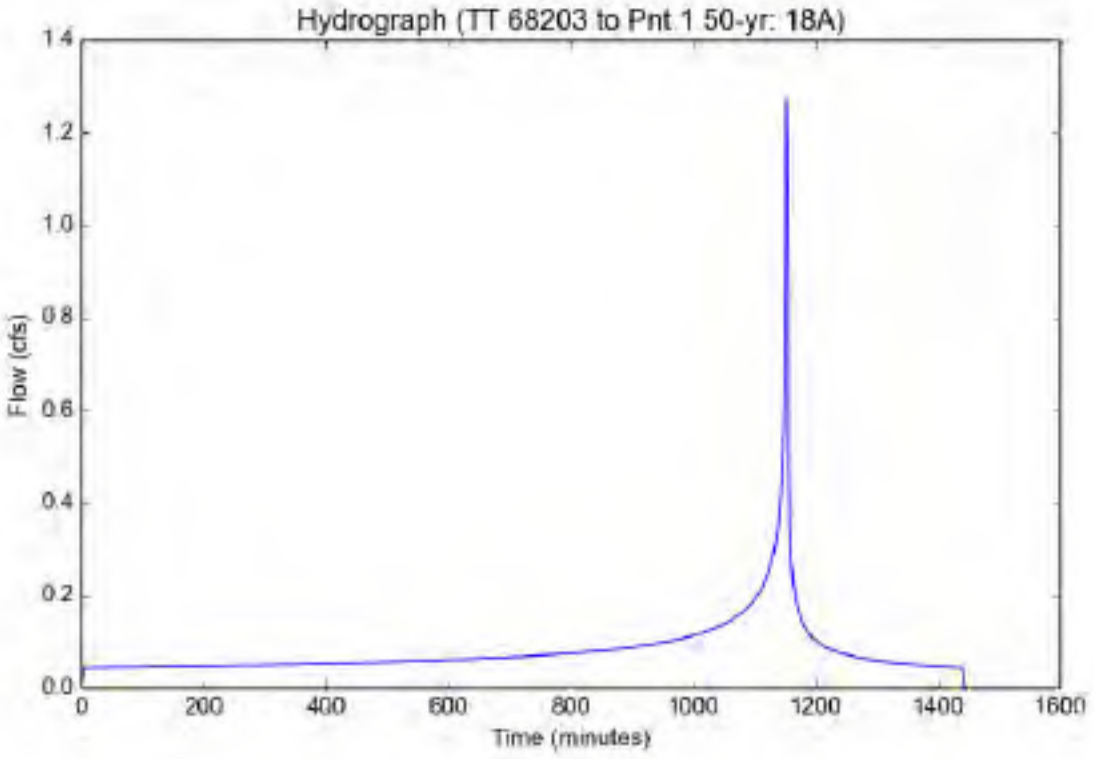
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	18A
Area (ac)	0.34
Flow Path Length (ft)	481.0
Flow Path Slope (vft/hft)	0.073
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.9
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8962
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.2725
Burned Peak Flow Rate (cfs)	1.2725
24-Hr Clear Runoff Volume (ac-ft)	0.1647
24-Hr Clear Runoff Volume (cu-ft)	7176.4485



Peak Flow Hydrologic Analysis

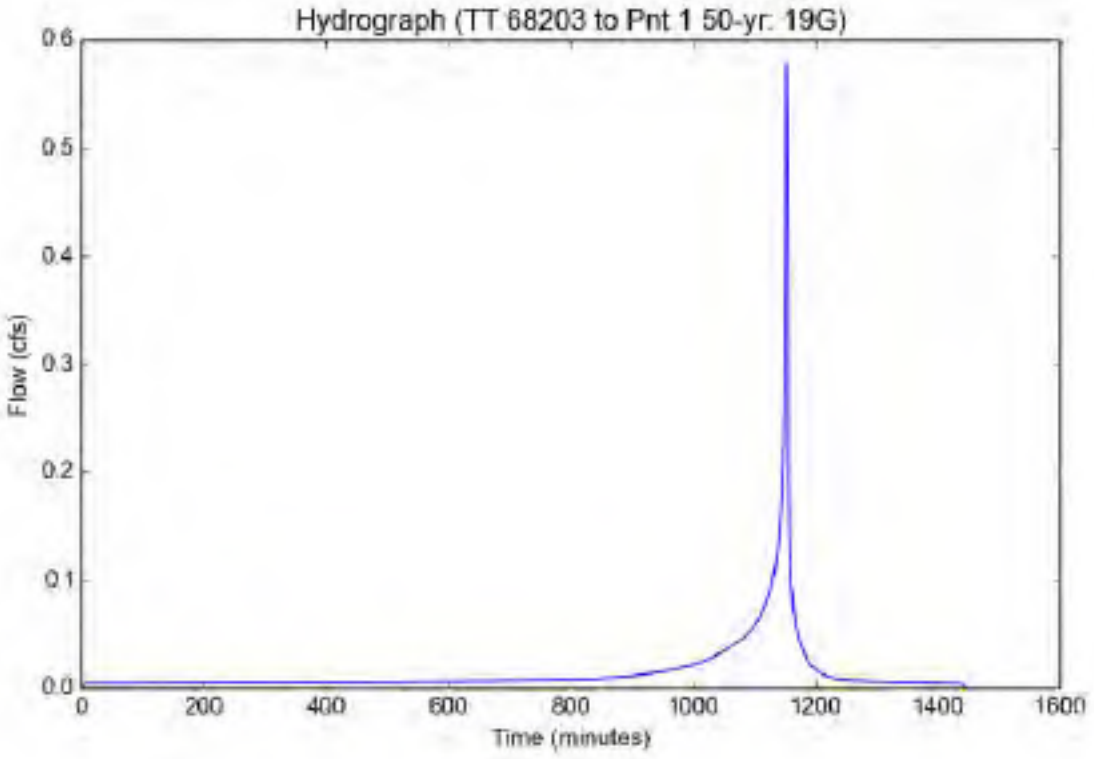
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	19G
Area (ac)	0.16
Flow Path Length (ft)	123.0
Flow Path Slope (vft/hft)	0.211
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.5782
Burned Peak Flow Rate (cfs)	0.5782
24-Hr Clear Runoff Volume (ac-ft)	0.0313
24-Hr Clear Runoff Volume (cu-ft)	1363.9609



Peak Flow Hydrologic Analysis

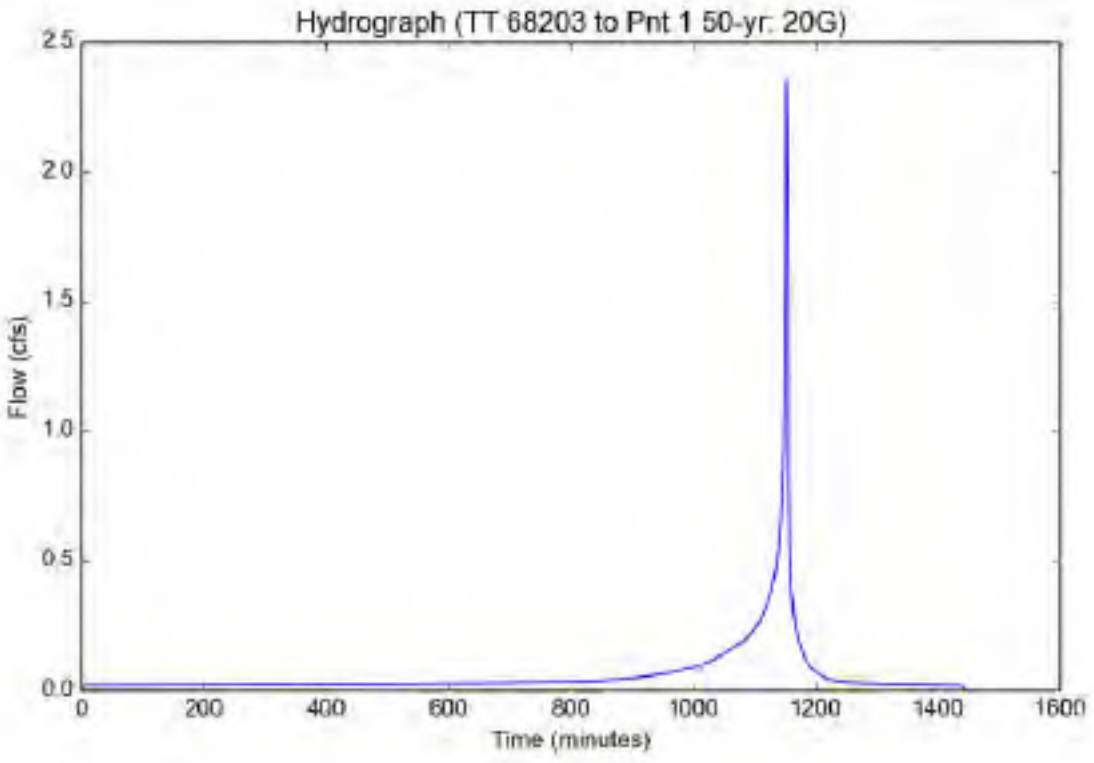
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	20G
Area (ac)	0.65
Flow Path Length (ft)	424.0
Flow Path Slope (vft/hft)	0.151
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.3491
Burned Peak Flow Rate (cfs)	2.3491
24-Hr Clear Runoff Volume (ac-ft)	0.1272
24-Hr Clear Runoff Volume (cu-ft)	5541.0913



Peak Flow Hydrologic Analysis

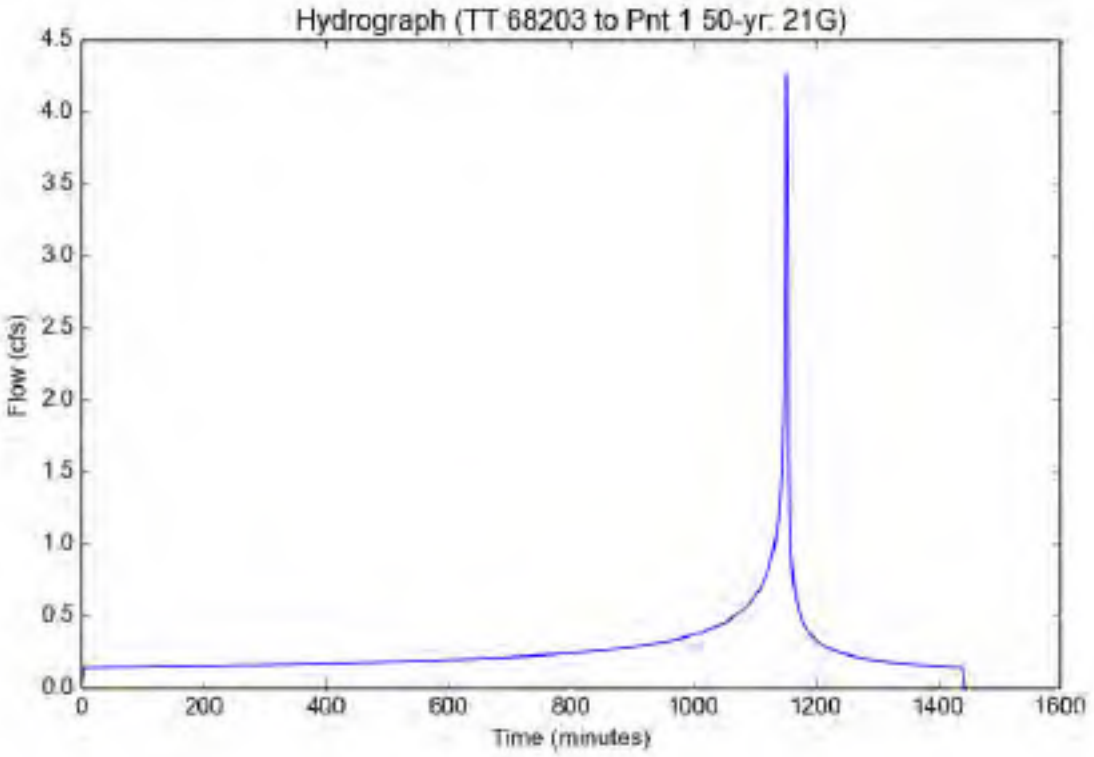
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	21G
Area (ac)	1.14
Flow Path Length (ft)	251.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.86
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8946
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.2593
Burned Peak Flow Rate (cfs)	4.2593
24-Hr Clear Runoff Volume (ac-ft)	0.5359
24-Hr Clear Runoff Volume (cu-ft)	23345.0102



Peak Flow Hydrologic Analysis

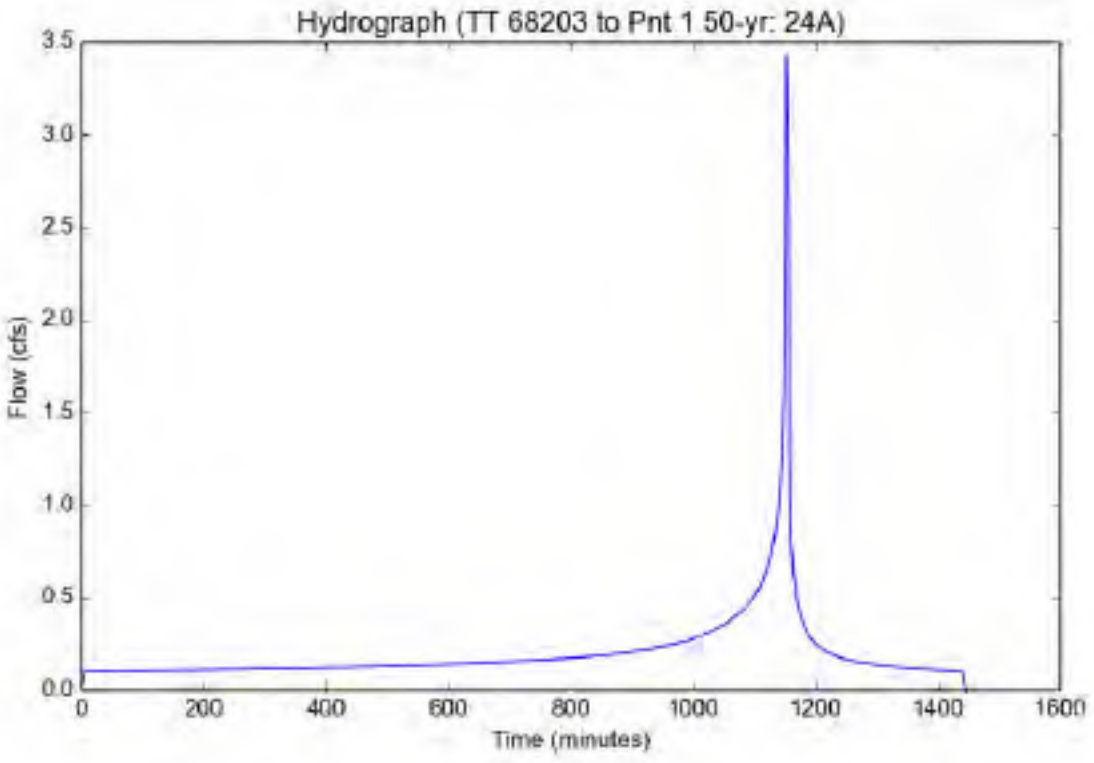
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	24A
Area (ac)	1.01
Flow Path Length (ft)	776.0
Flow Path Slope (vft/hft)	0.072
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.67
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	3.8334
Undeveloped Runoff Coefficient (Cu)	0.8546
Developed Runoff Coefficient (Cd)	0.885
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.4266
Burned Peak Flow Rate (cfs)	3.4266
24-Hr Clear Runoff Volume (ac-ft)	0.4055
24-Hr Clear Runoff Volume (cu-ft)	17664.4587



Peak Flow Hydrologic Analysis

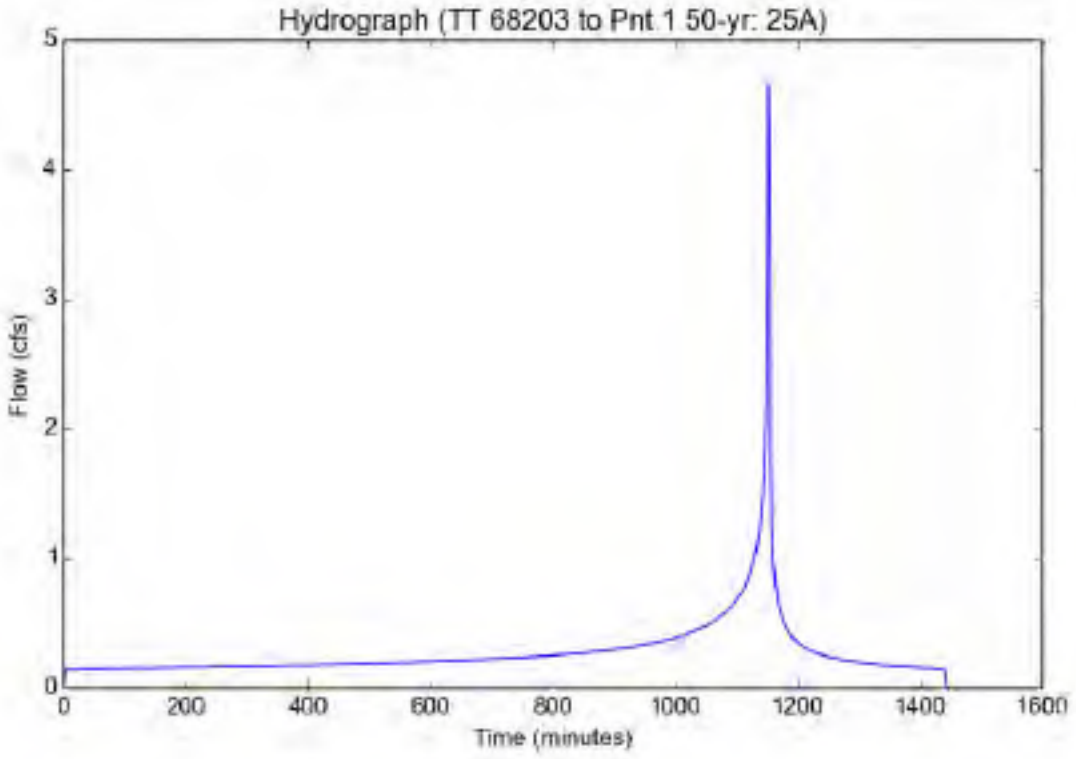
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	25A
Area (ac)	1.25
Flow Path Length (ft)	148.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.81
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8927
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.6603
Burned Peak Flow Rate (cfs)	4.6603
24-Hr Clear Runoff Volume (ac-ft)	0.5651
24-Hr Clear Runoff Volume (cu-ft)	24614.5953



Peak Flow Hydrologic Analysis

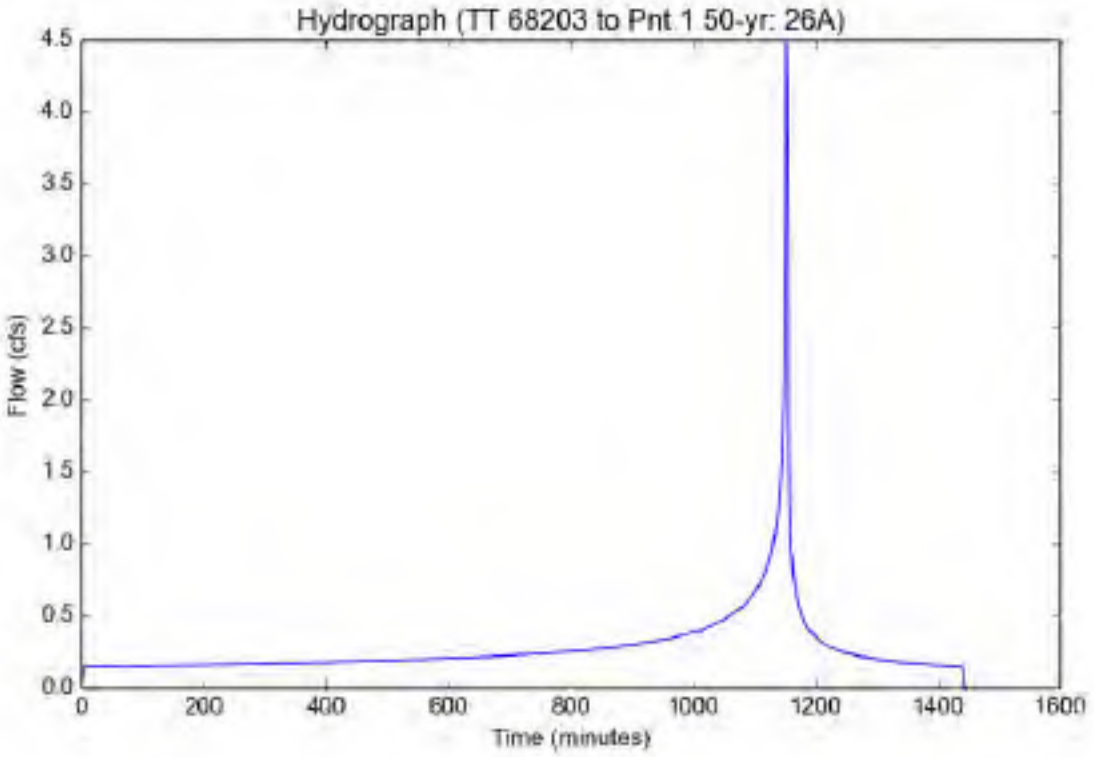
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	26A
Area (ac)	1.2
Flow Path Length (ft)	245.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.86
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8946
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.4835
Burned Peak Flow Rate (cfs)	4.4835
24-Hr Clear Runoff Volume (ac-ft)	0.5641
24-Hr Clear Runoff Volume (cu-ft)	24573.6949



Peak Flow Hydrologic Analysis

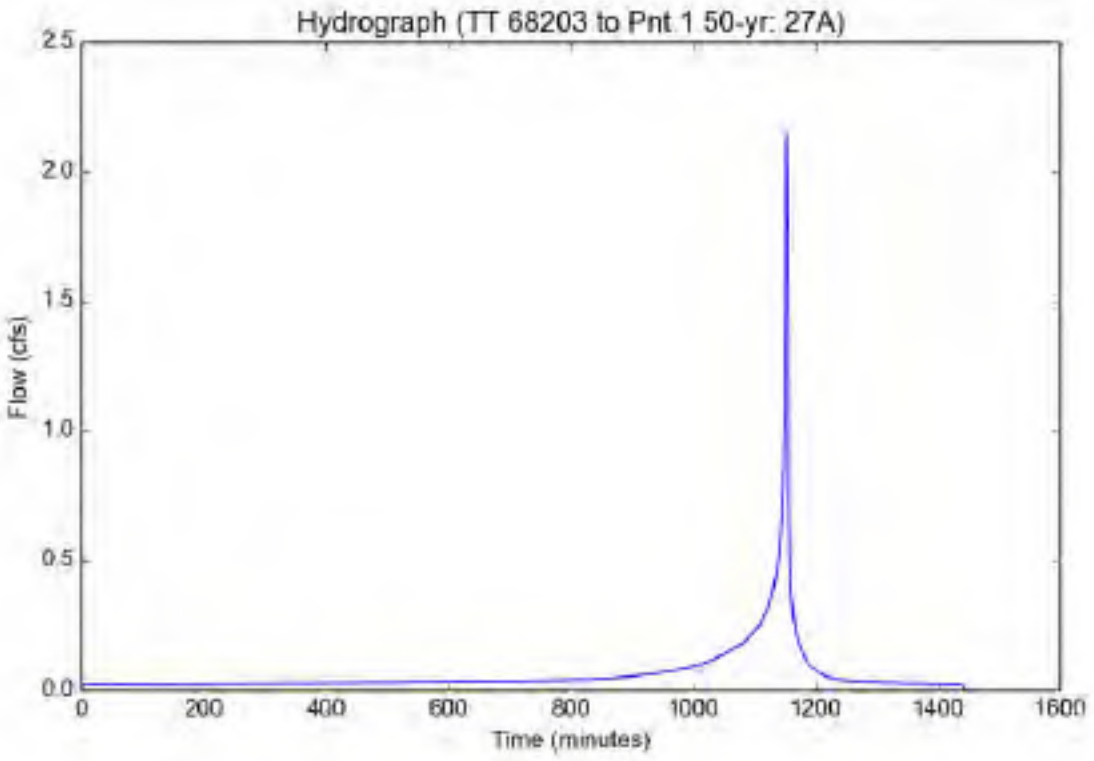
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	27A
Area (ac)	0.59
Flow Path Length (ft)	292.0
Flow Path Slope (vft/hft)	0.17
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.18
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8684
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.1399
Burned Peak Flow Rate (cfs)	2.1399
24-Hr Clear Runoff Volume (ac-ft)	0.1325
24-Hr Clear Runoff Volume (cu-ft)	5771.9702



Peak Flow Hydrologic Analysis

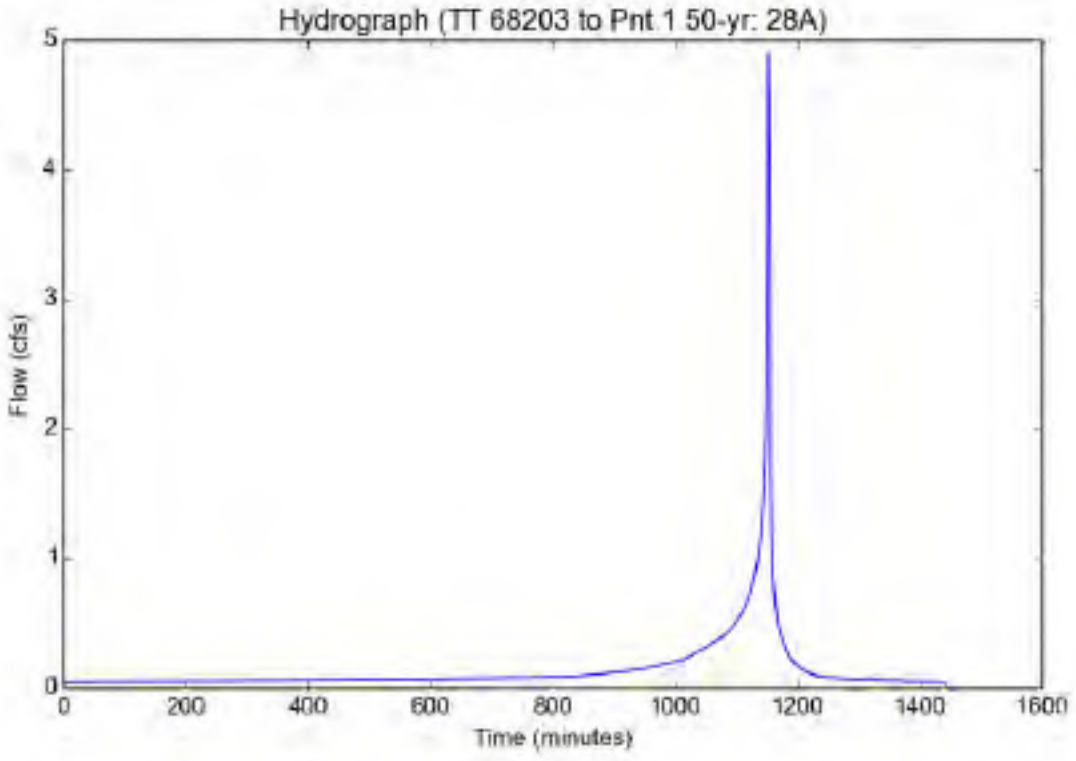
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	28A
Area (ac)	1.35
Flow Path Length (ft)	282.0
Flow Path Slope (vft/hft)	0.053
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.17
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.868
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.8942
Burned Peak Flow Rate (cfs)	4.8942
24-Hr Clear Runoff Volume (ac-ft)	0.2983
24-Hr Clear Runoff Volume (cu-ft)	12994.7217



Peak Flow Hydrologic Analysis

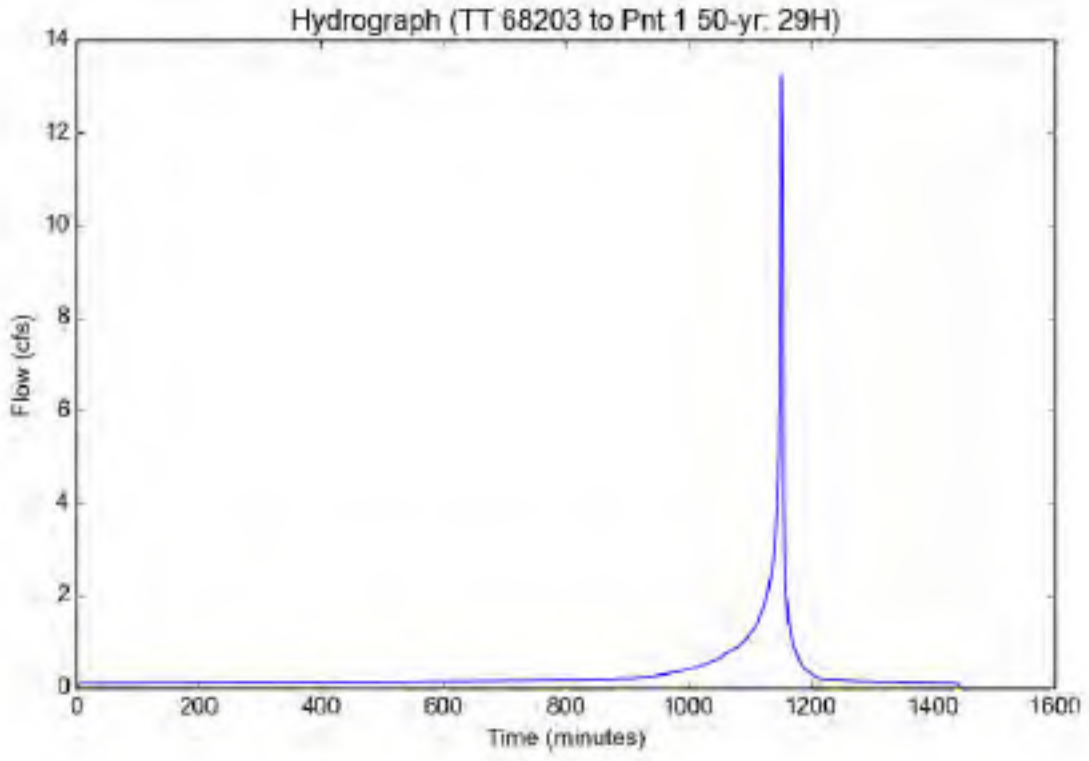
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	29H
Area (ac)	4.04
Flow Path Length (ft)	443.0
Flow Path Slope (vft/hft)	0.213
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.08
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.7731
Developed Runoff Coefficient (Cd)	0.7832
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	13.2153
Burned Peak Flow Rate (cfs)	13.7312
24-Hr Clear Runoff Volume (ac-ft)	0.6587
24-Hr Clear Runoff Volume (cu-ft)	28692.7929



Peak Flow Hydrologic Analysis

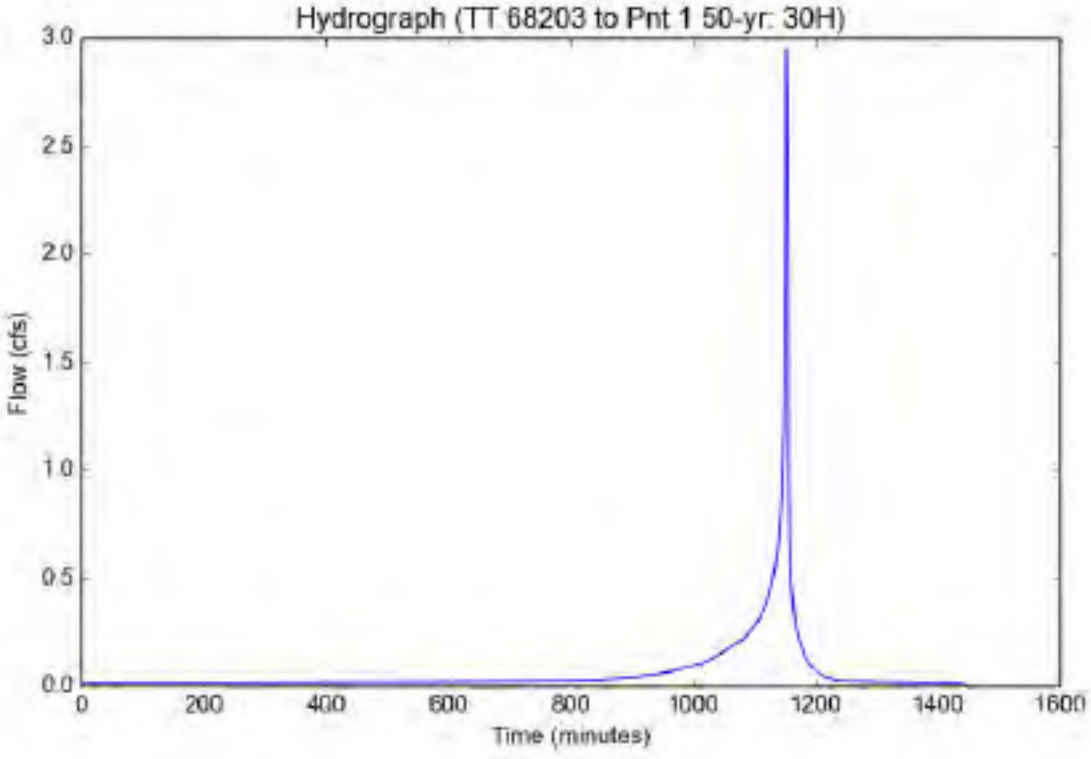
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	30H
Area (ac)	0.82
Flow Path Length (ft)	441.0
Flow Path Slope (vft/hft)	0.183
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.9517
Burned Peak Flow Rate (cfs)	3.0184
24-Hr Clear Runoff Volume (ac-ft)	0.1338
24-Hr Clear Runoff Volume (cu-ft)	5829.5691



Peak Flow Hydrologic Analysis

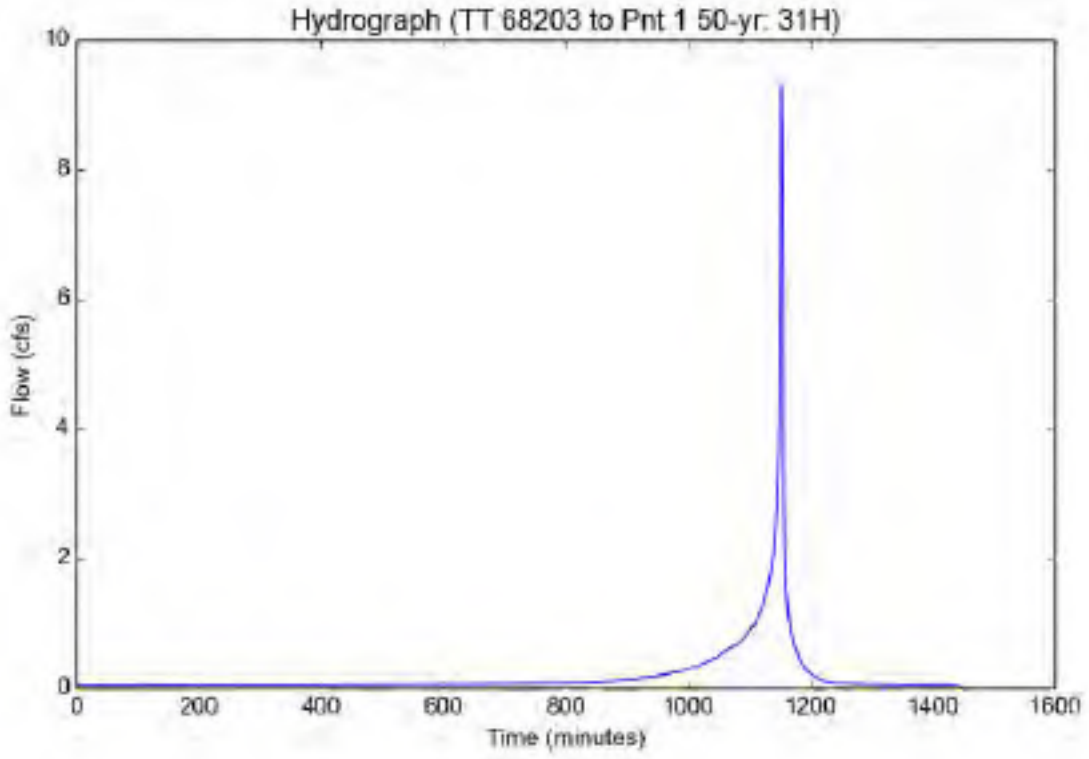
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	31H
Area (ac)	2.58
Flow Path Length (ft)	451.0
Flow Path Slope (vft/hft)	0.075
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	9.2869
Burned Peak Flow Rate (cfs)	9.4968
24-Hr Clear Runoff Volume (ac-ft)	0.4211
24-Hr Clear Runoff Volume (cu-ft)	18341.8151



Peak Flow Hydrologic Analysis

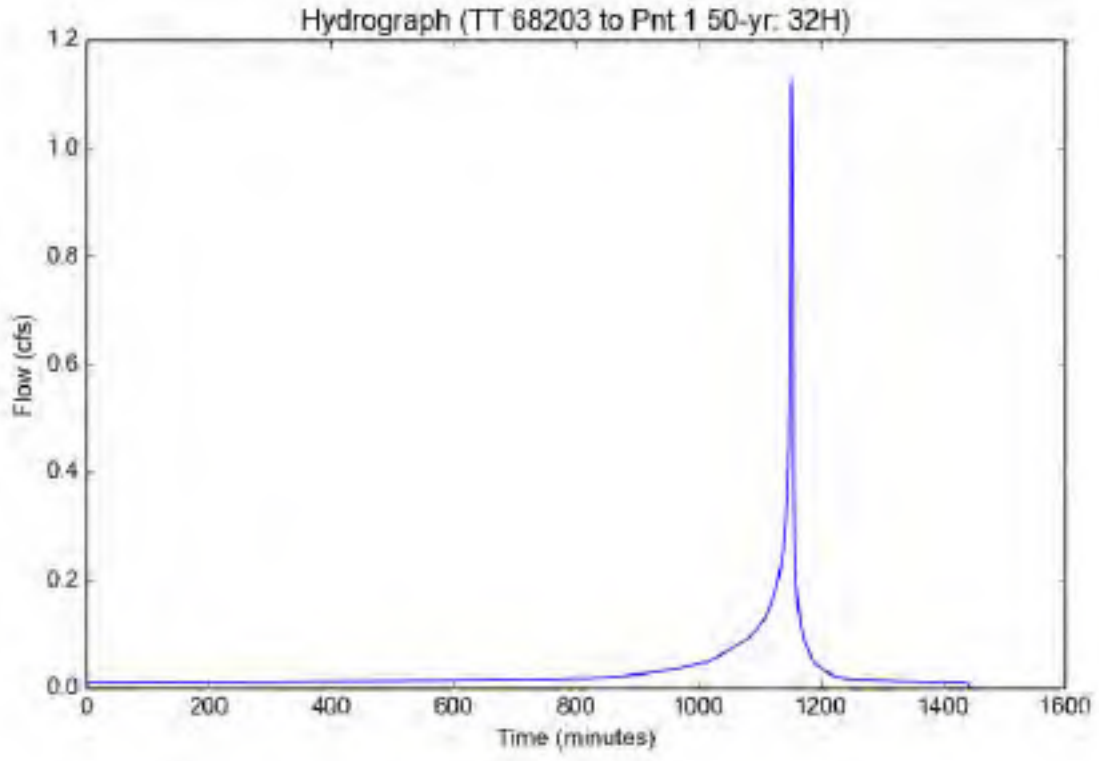
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	32H
Area (ac)	0.31
Flow Path Length (ft)	228.0
Flow Path Slope (vft/hft)	0.101
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.14
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8669
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.1223
Burned Peak Flow Rate (cfs)	1.1467
24-Hr Clear Runoff Volume (ac-ft)	0.0651
24-Hr Clear Runoff Volume (cu-ft)	2837.7022



Peak Flow Hydrologic Analysis

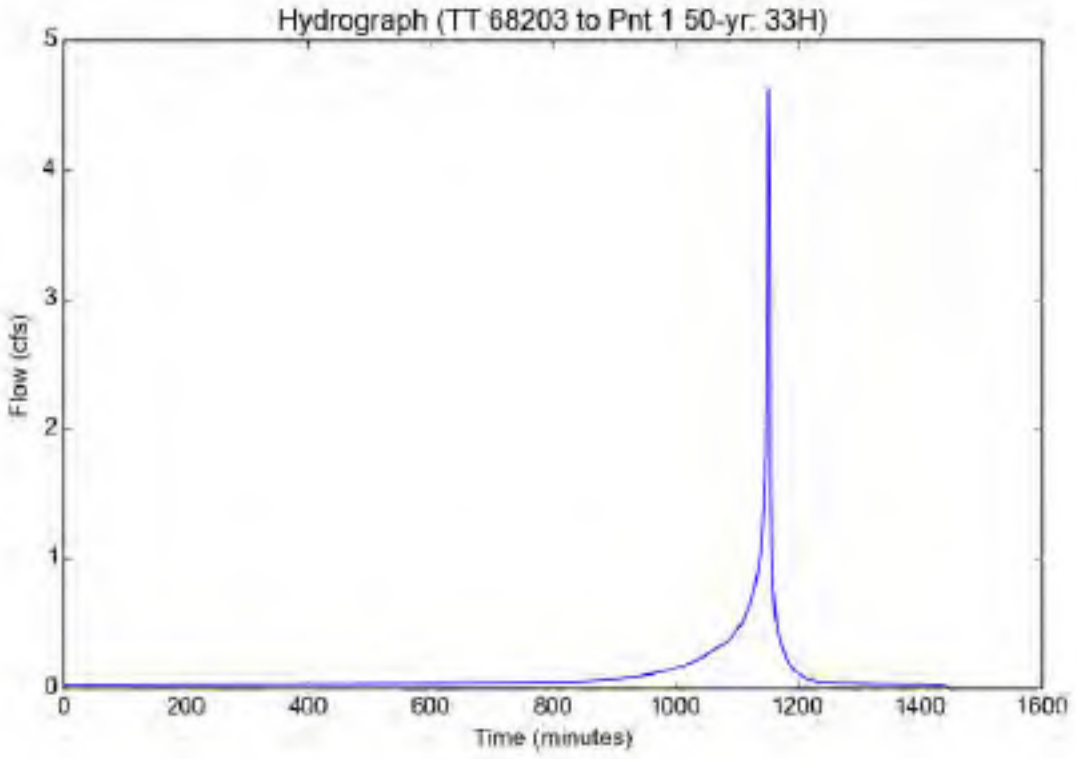
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	33H
Area (ac)	1.28
Flow Path Length (ft)	131.0
Flow Path Slope (vft/hft)	0.195
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.03
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8627
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.6116
Burned Peak Flow Rate (cfs)	4.7151
24-Hr Clear Runoff Volume (ac-ft)	0.2181
24-Hr Clear Runoff Volume (cu-ft)	9502.4535



Peak Flow Hydrologic Analysis

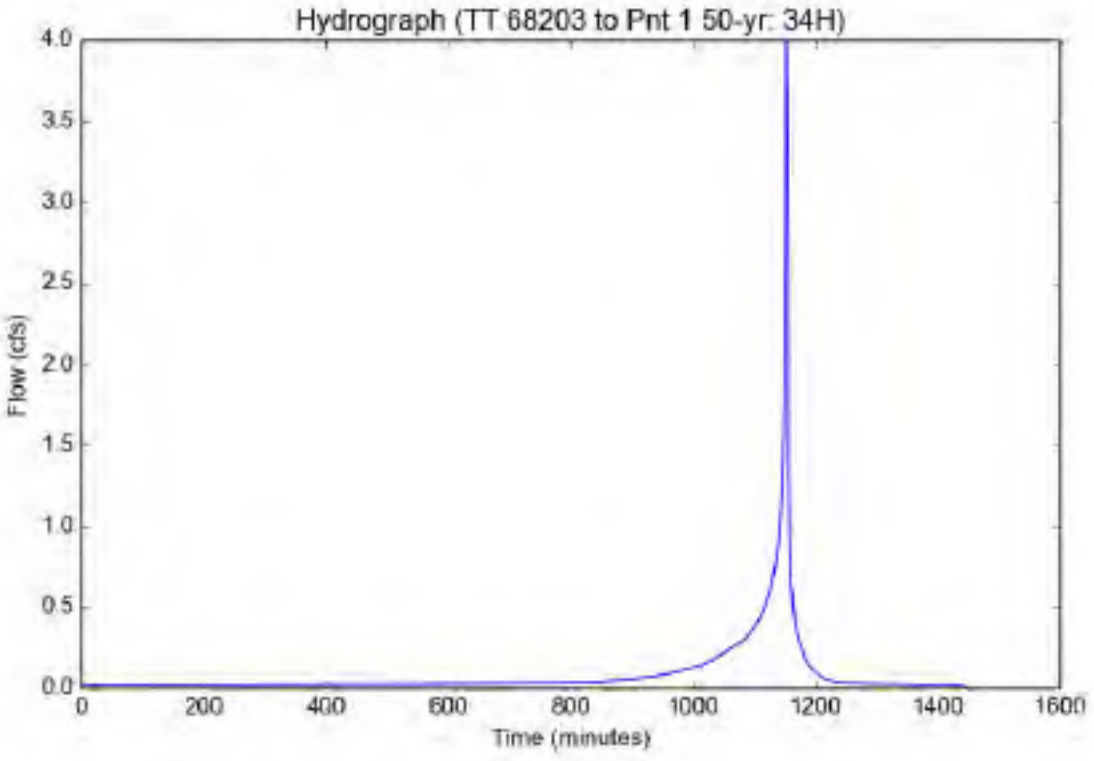
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	34H
Area (ac)	1.11
Flow Path Length (ft)	568.0
Flow Path Slope (vft/hft)	0.166
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.9955
Burned Peak Flow Rate (cfs)	4.0858
24-Hr Clear Runoff Volume (ac-ft)	0.1812
24-Hr Clear Runoff Volume (cu-ft)	7891.246



Peak Flow Hydrologic Analysis

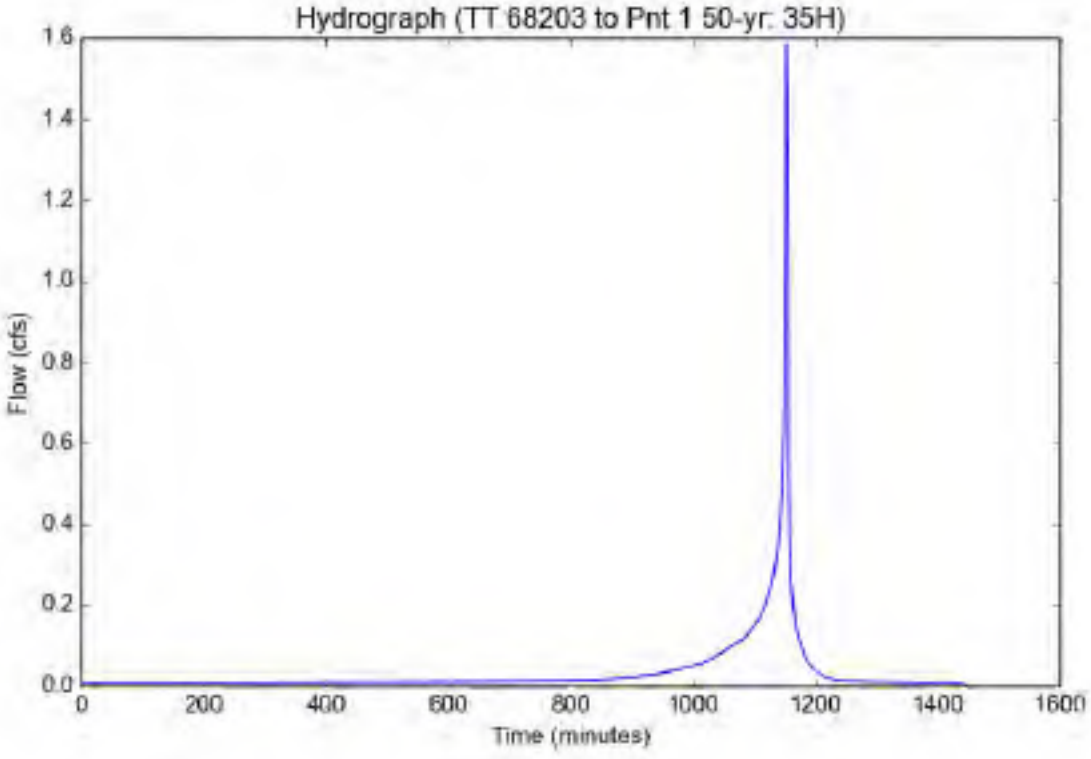
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	35H
Area (ac)	0.44
Flow Path Length (ft)	201.0
Flow Path Slope (vft/hft)	0.298
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.5838
Burned Peak Flow Rate (cfs)	1.6196
24-Hr Clear Runoff Volume (ac-ft)	0.0718
24-Hr Clear Runoff Volume (cu-ft)	3128.0615



Peak Flow Hydrologic Analysis

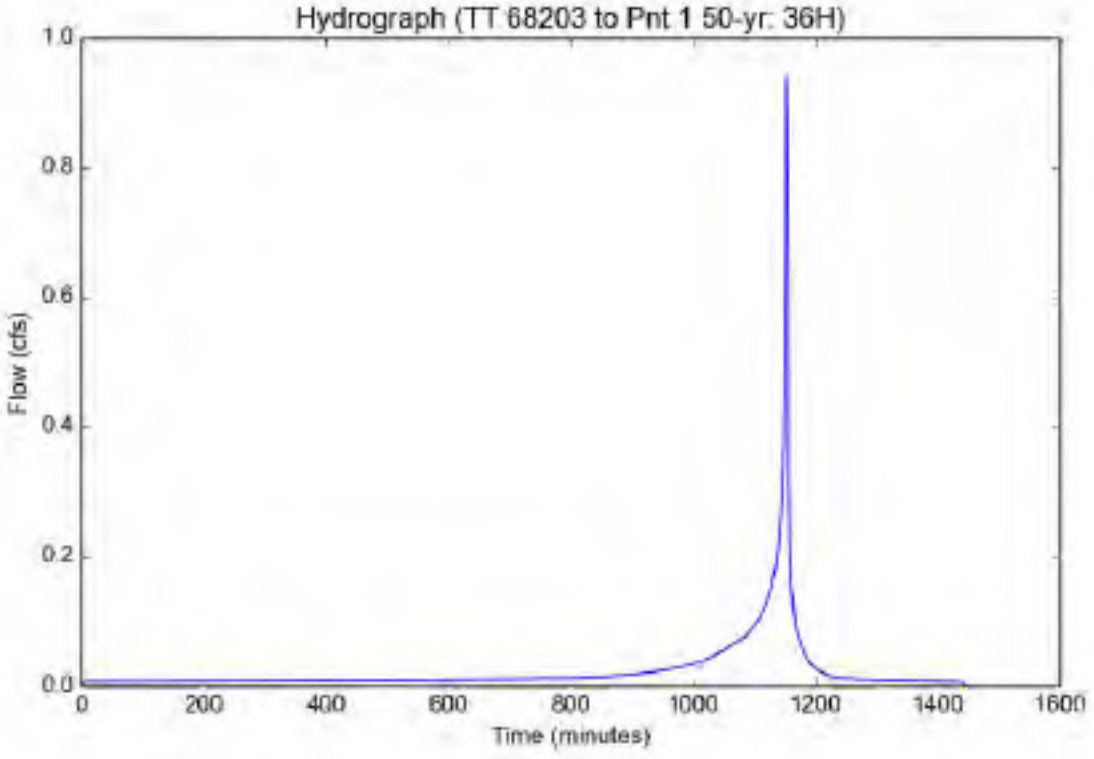
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	36H
Area (ac)	0.26
Flow Path Length (ft)	302.0
Flow Path Slope (vft/hft)	0.098
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.09
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.865
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.9392
Burned Peak Flow Rate (cfs)	0.9599
24-Hr Clear Runoff Volume (ac-ft)	0.0499
24-Hr Clear Runoff Volume (cu-ft)	2175.5436



Peak Flow Hydrologic Analysis

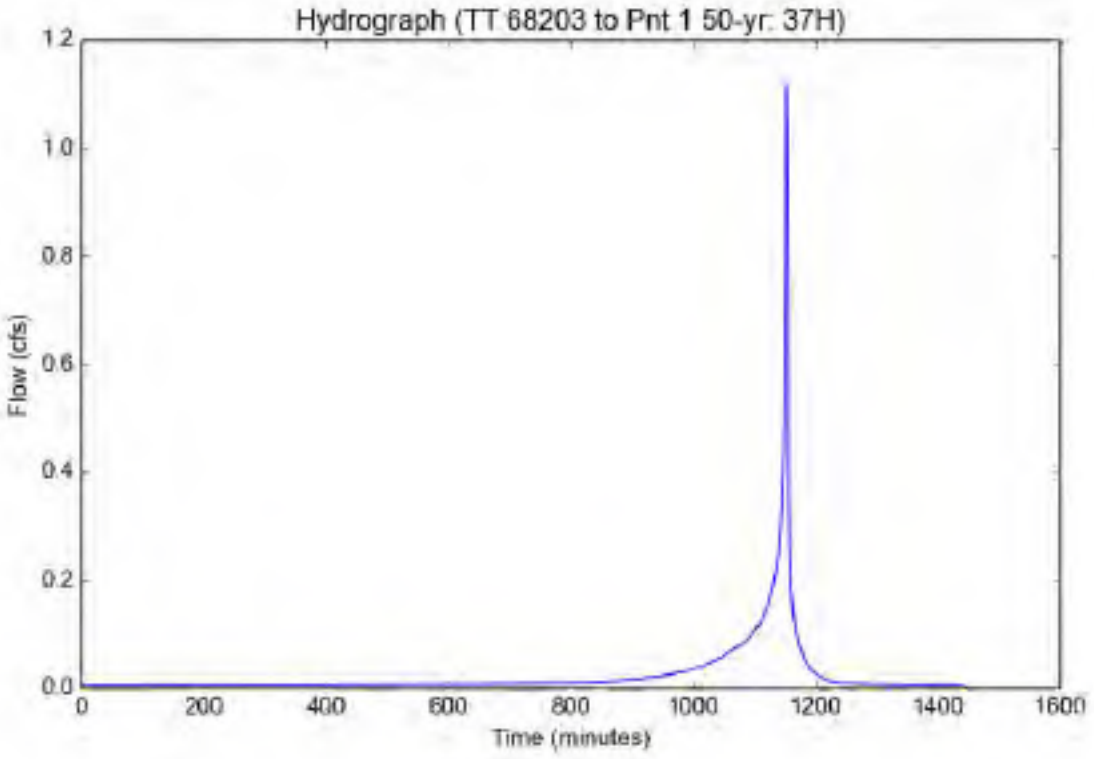
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	37H
Area (ac)	0.31
Flow Path Length (ft)	128.0
Flow Path Slope (vft/hft)	0.117
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.1159
Burned Peak Flow Rate (cfs)	1.1411
24-Hr Clear Runoff Volume (ac-ft)	0.0506
24-Hr Clear Runoff Volume (cu-ft)	2203.8615



Peak Flow Hydrologic Analysis

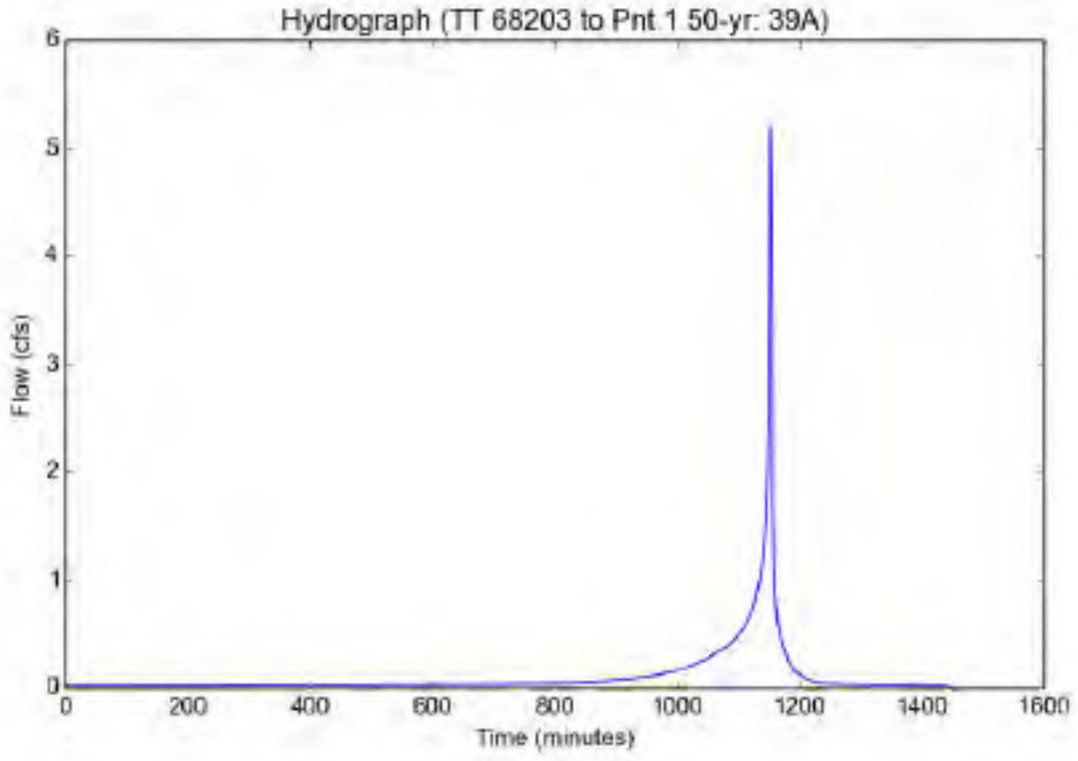
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 50-yr
Subarea ID	39A
Area (ac)	1.44
Flow Path Length (ft)	192.0
Flow Path Slope (vft/hft)	0.203
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.1834
Burned Peak Flow Rate (cfs)	5.3006
24-Hr Clear Runoff Volume (ac-ft)	0.235
24-Hr Clear Runoff Volume (cu-ft)	10237.2922



Peak Flow Hydrologic Analysis

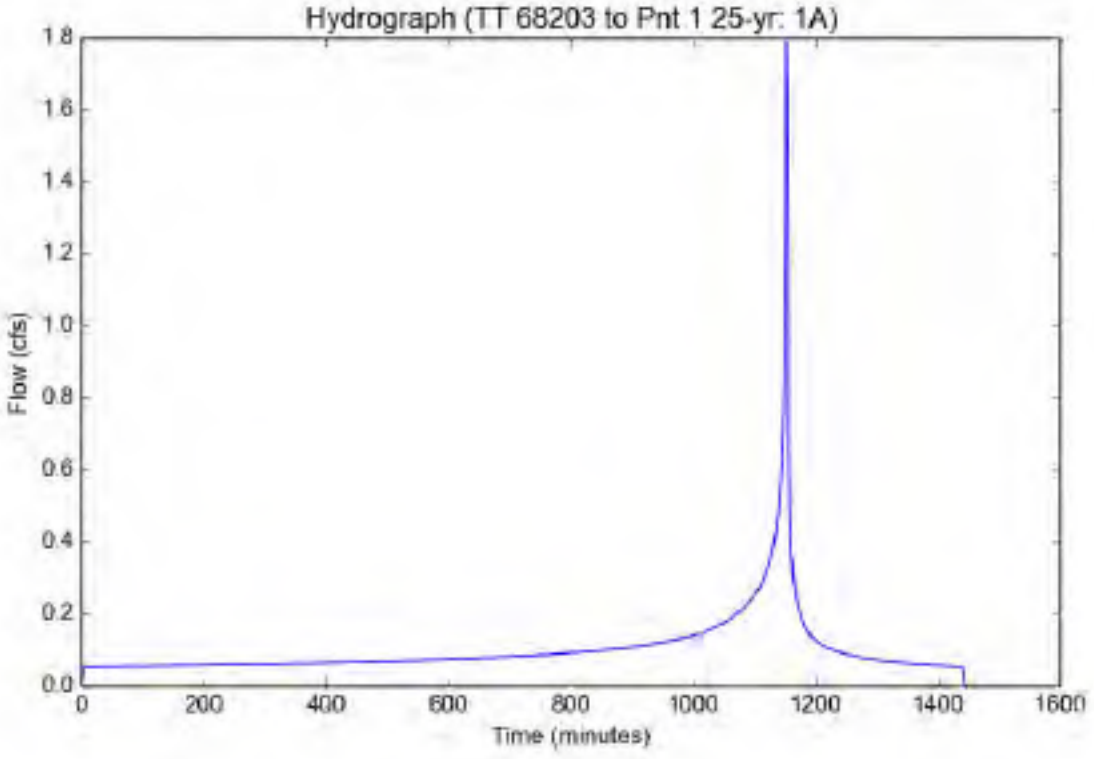
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	1A
Area (ac)	0.55
Flow Path Length (ft)	491.0
Flow Path Slope (vft/hft)	0.053
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.76
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8883
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.7915
Burned Peak Flow Rate (cfs)	1.7915
24-Hr Clear Runoff Volume (ac-ft)	0.208
24-Hr Clear Runoff Volume (cu-ft)	9059.1698



Peak Flow Hydrologic Analysis

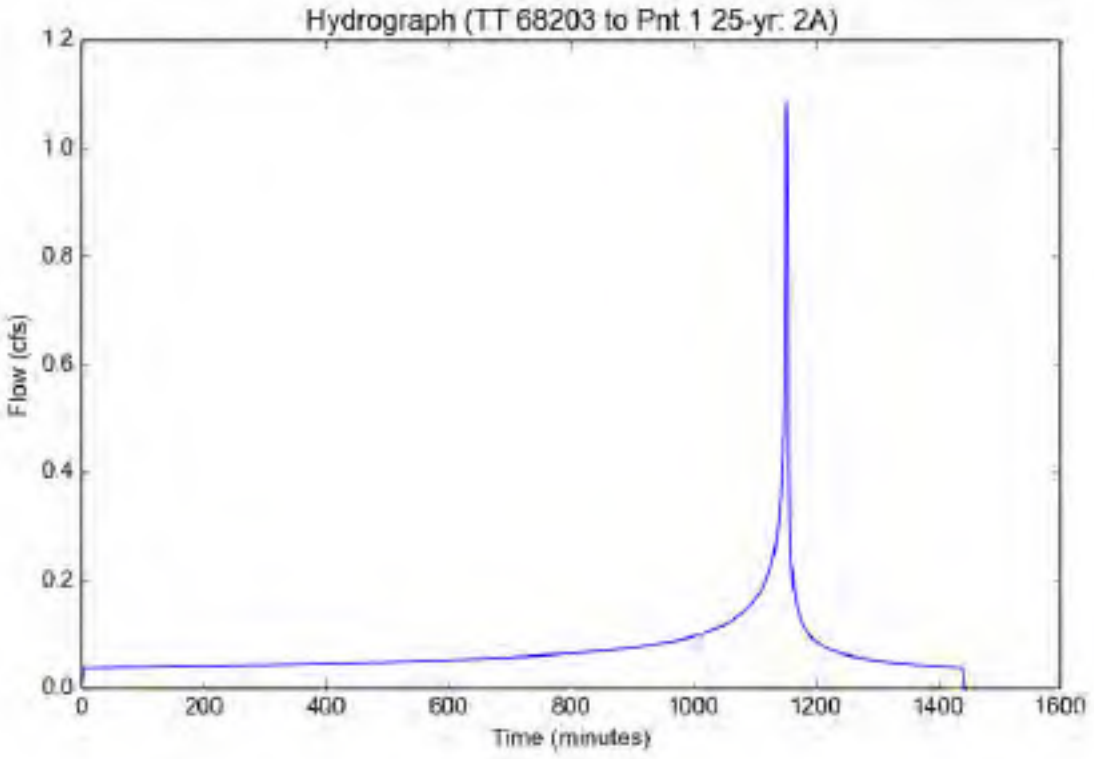
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	2A
Area (ac)	0.33
Flow Path Length (ft)	399.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.9
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8951
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.0832
Burned Peak Flow Rate (cfs)	1.0832
24-Hr Clear Runoff Volume (ac-ft)	0.14
24-Hr Clear Runoff Volume (cu-ft)	6098.0539



Peak Flow Hydrologic Analysis

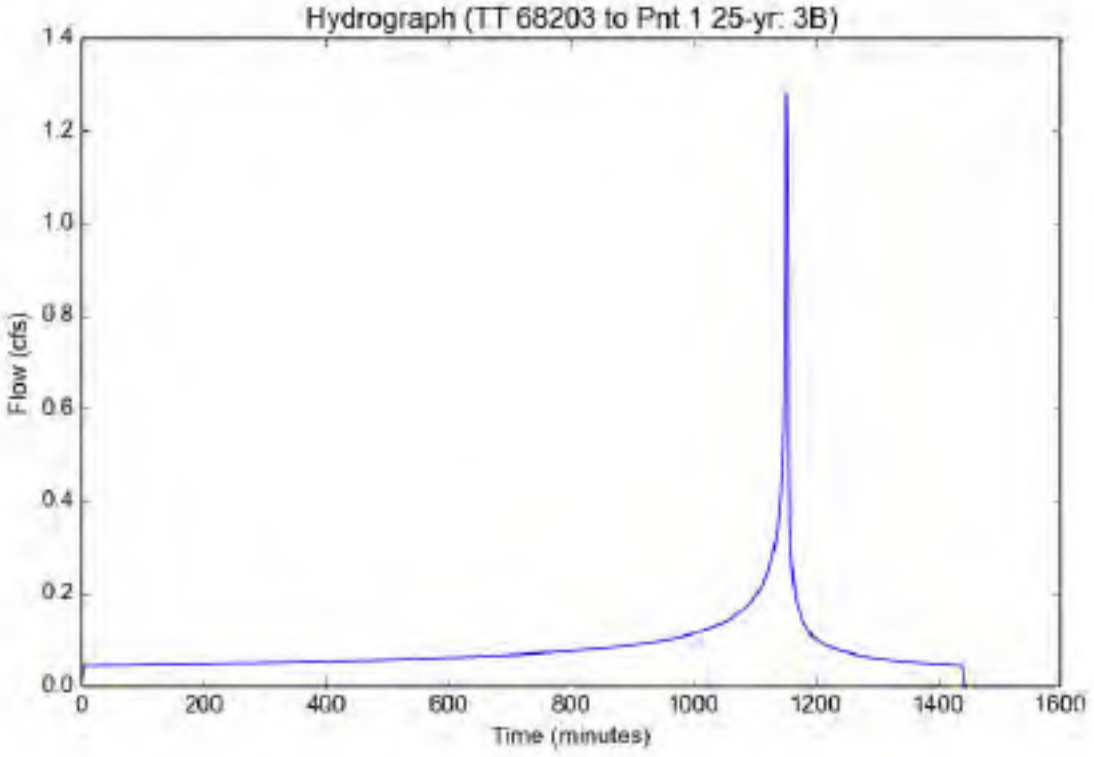
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	3B
Area (ac)	0.39
Flow Path Length (ft)	495.0
Flow Path Slope (vft/hft)	0.095
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.9
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8951
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.2801
Burned Peak Flow Rate (cfs)	1.2801
24-Hr Clear Runoff Volume (ac-ft)	0.1654
24-Hr Clear Runoff Volume (cu-ft)	7206.7909



Peak Flow Hydrologic Analysis

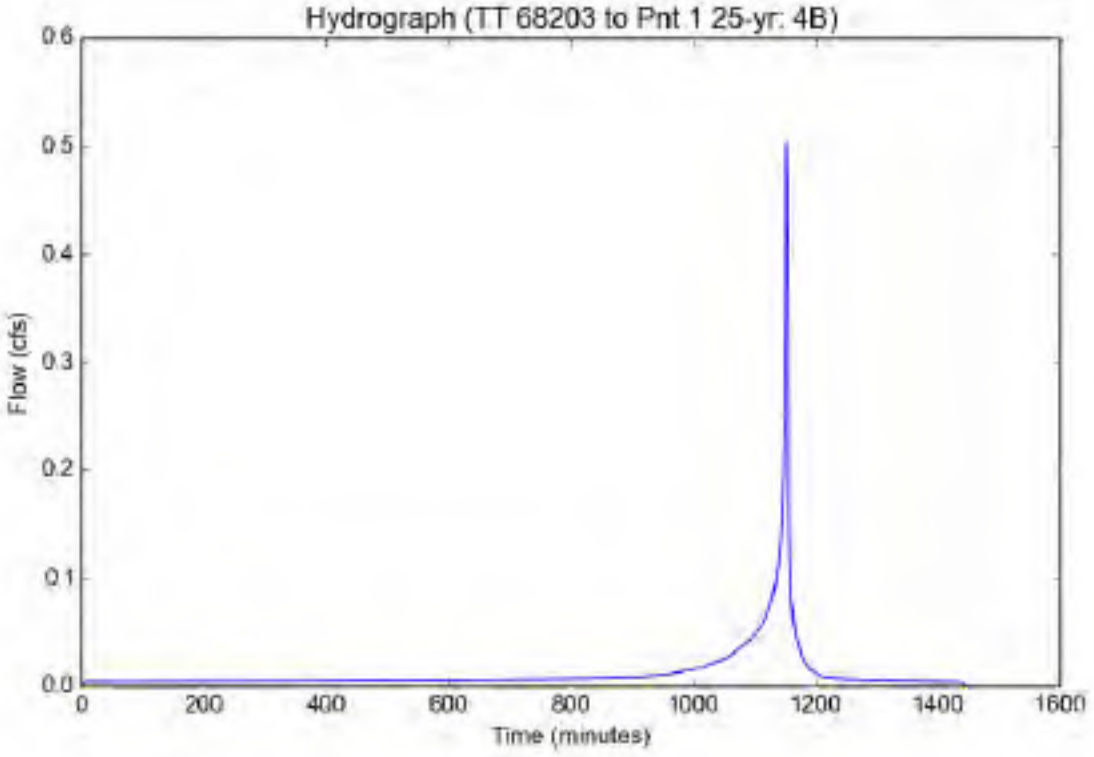
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	4B
Area (ac)	0.16
Flow Path Length (ft)	266.0
Flow Path Slope (vft/hft)	0.128
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.5023
Burned Peak Flow Rate (cfs)	0.5023
24-Hr Clear Runoff Volume (ac-ft)	0.0257
24-Hr Clear Runoff Volume (cu-ft)	1120.9904



Peak Flow Hydrologic Analysis

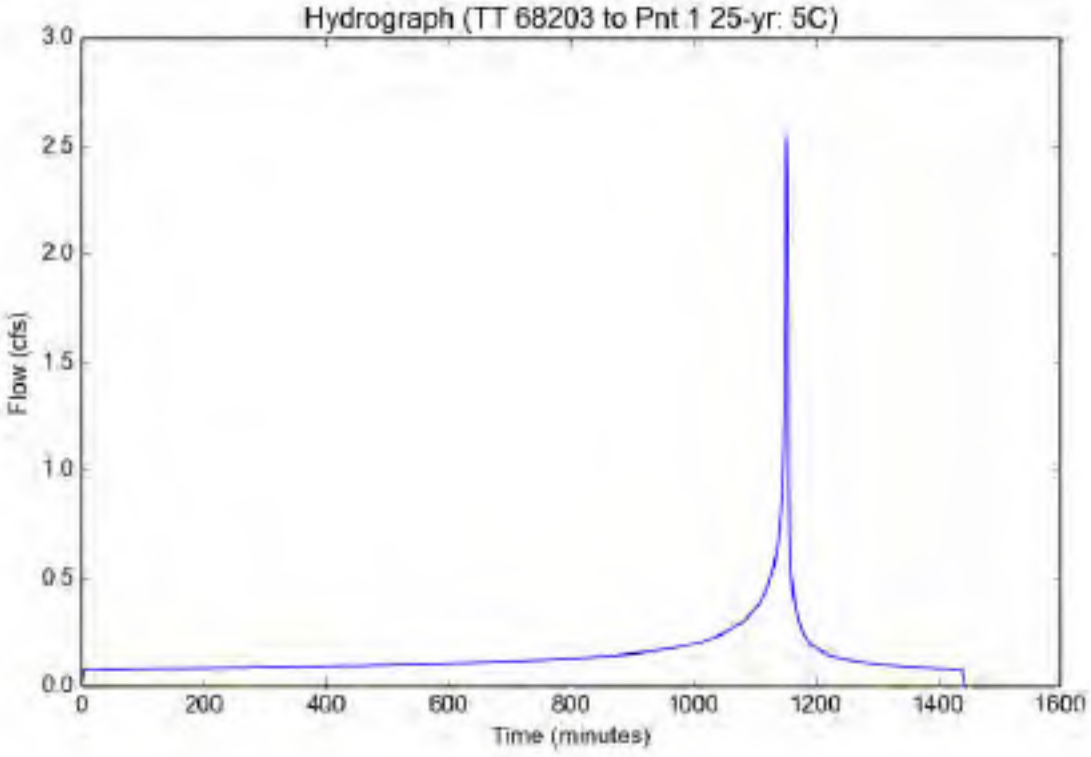
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	5C
Area (ac)	0.78
Flow Path Length (ft)	309.0
Flow Path Slope (vft/hft)	0.044
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.74
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8873
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.5379
Burned Peak Flow Rate (cfs)	2.5379
24-Hr Clear Runoff Volume (ac-ft)	0.2898
24-Hr Clear Runoff Volume (cu-ft)	12623.8311



Peak Flow Hydrologic Analysis

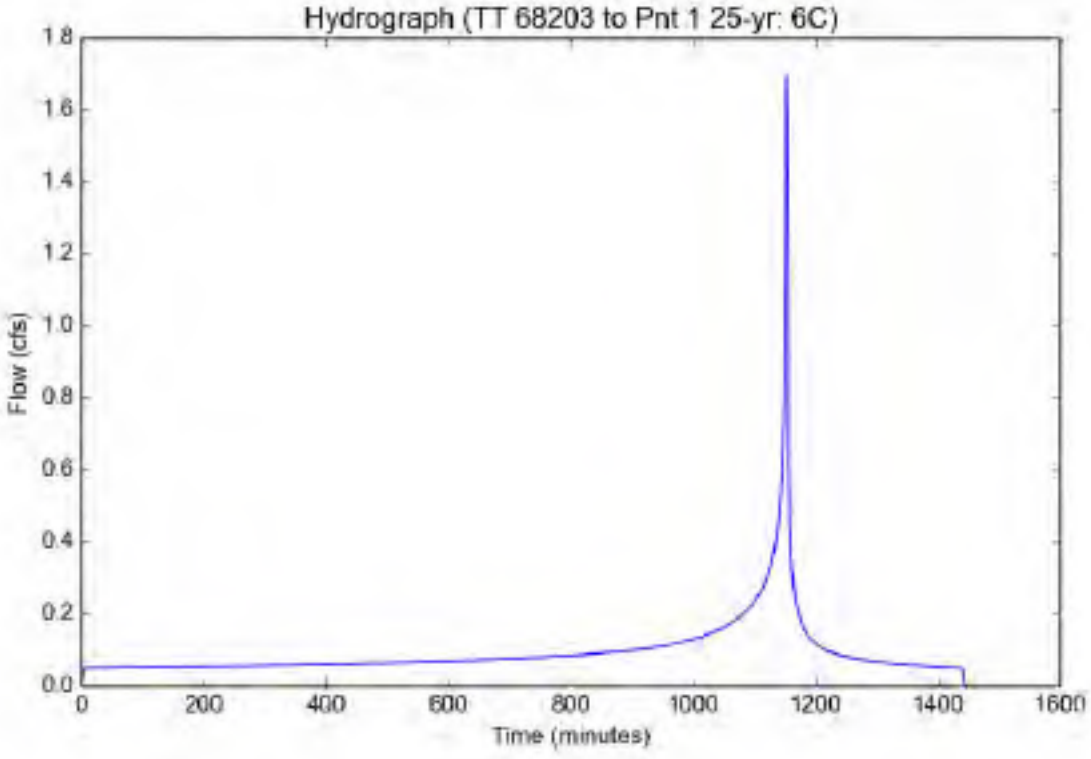
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	6C
Area (ac)	0.52
Flow Path Length (ft)	164.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.74
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8873
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.6919
Burned Peak Flow Rate (cfs)	1.6919
24-Hr Clear Runoff Volume (ac-ft)	0.1932
24-Hr Clear Runoff Volume (cu-ft)	8415.8874



Peak Flow Hydrologic Analysis

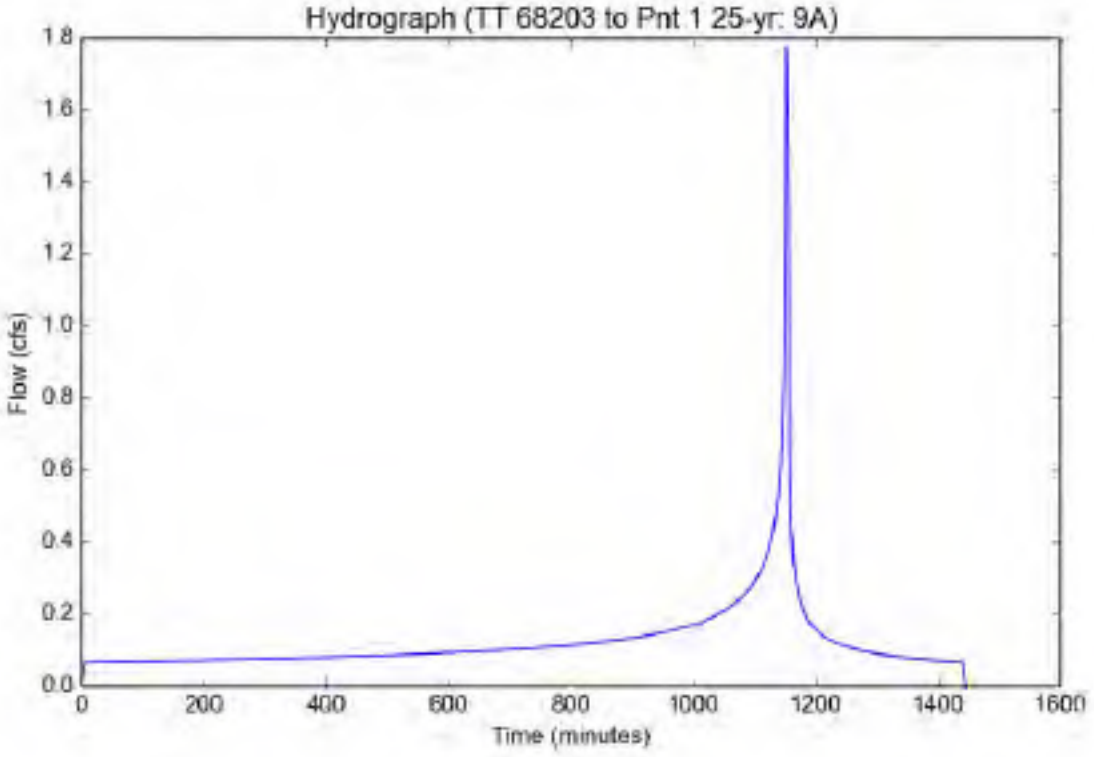
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	9A
Area (ac)	0.59
Flow Path Length (ft)	790.0
Flow Path Slope (vft/hft)	0.082
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.9
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.3657
Undeveloped Runoff Coefficient (Cu)	0.8428
Developed Runoff Coefficient (Cd)	0.8943
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.7759
Burned Peak Flow Rate (cfs)	1.7759
24-Hr Clear Runoff Volume (ac-ft)	0.2503
24-Hr Clear Runoff Volume (cu-ft)	10902.4751



Peak Flow Hydrologic Analysis

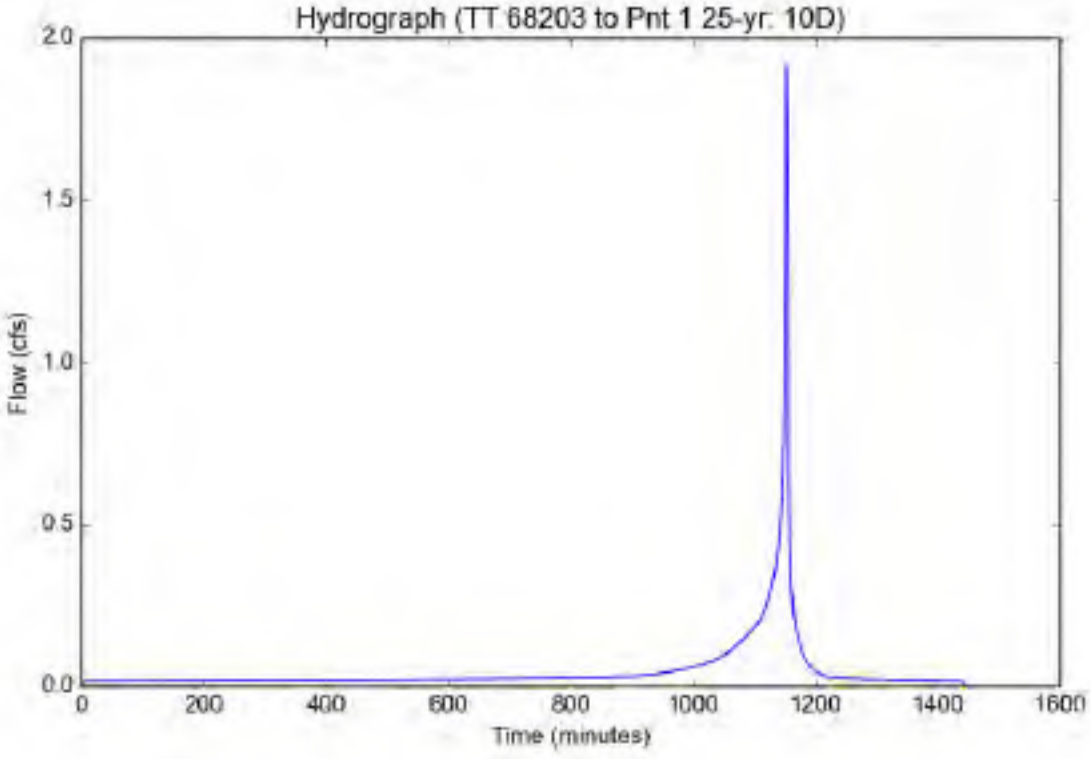
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	10D
Area (ac)	0.61
Flow Path Length (ft)	352.0
Flow Path Slope (vft/hft)	0.136
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.915
Burned Peak Flow Rate (cfs)	1.915
24-Hr Clear Runoff Volume (ac-ft)	0.0981
24-Hr Clear Runoff Volume (cu-ft)	4273.7758



Peak Flow Hydrologic Analysis

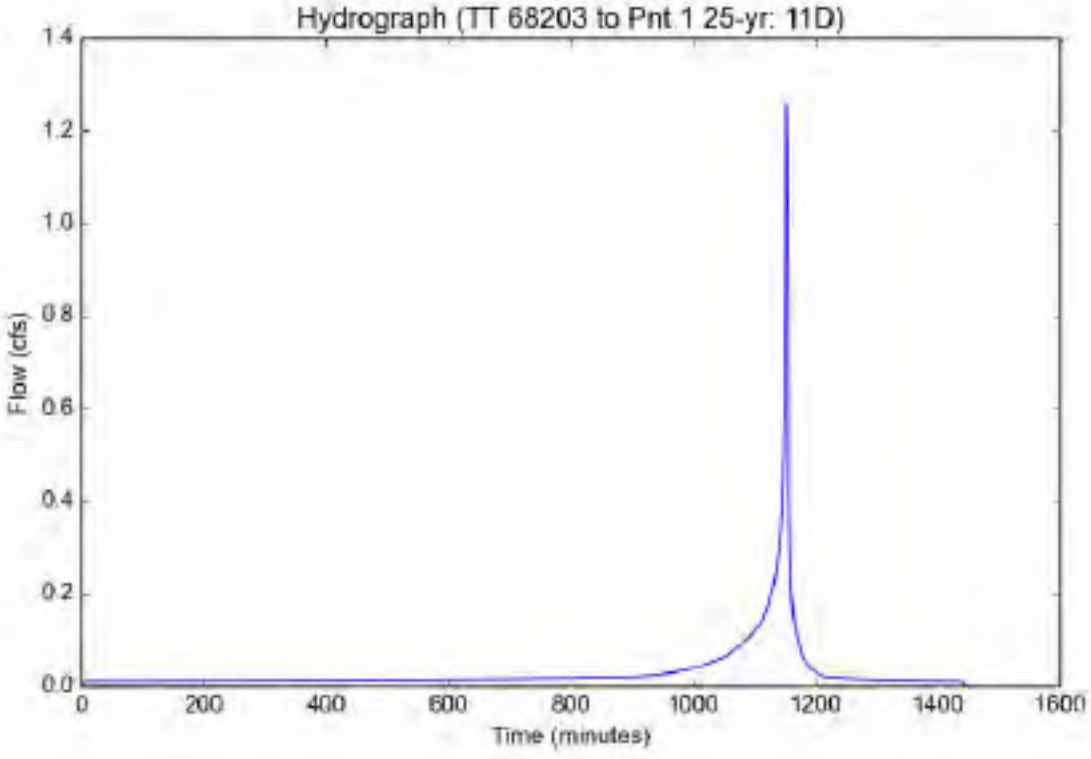
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	11D
Area (ac)	0.4
Flow Path Length (ft)	277.0
Flow Path Slope (vft/hft)	0.173
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.2557
Burned Peak Flow Rate (cfs)	1.2557
24-Hr Clear Runoff Volume (ac-ft)	0.0643
24-Hr Clear Runoff Volume (cu-ft)	2802.4759



Peak Flow Hydrologic Analysis

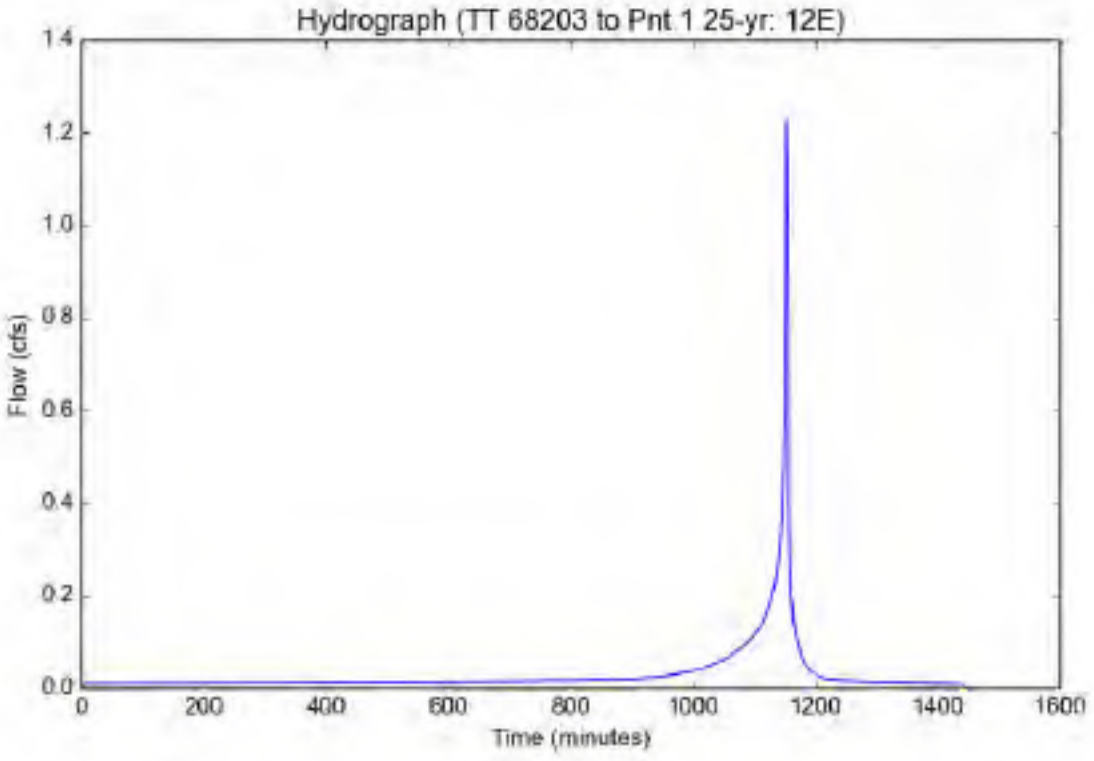
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	12E
Area (ac)	0.39
Flow Path Length (ft)	392.0
Flow Path Slope (vft/hft)	0.056
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.2243
Burned Peak Flow Rate (cfs)	1.2243
24-Hr Clear Runoff Volume (ac-ft)	0.0627
24-Hr Clear Runoff Volume (cu-ft)	2732.414



Peak Flow Hydrologic Analysis

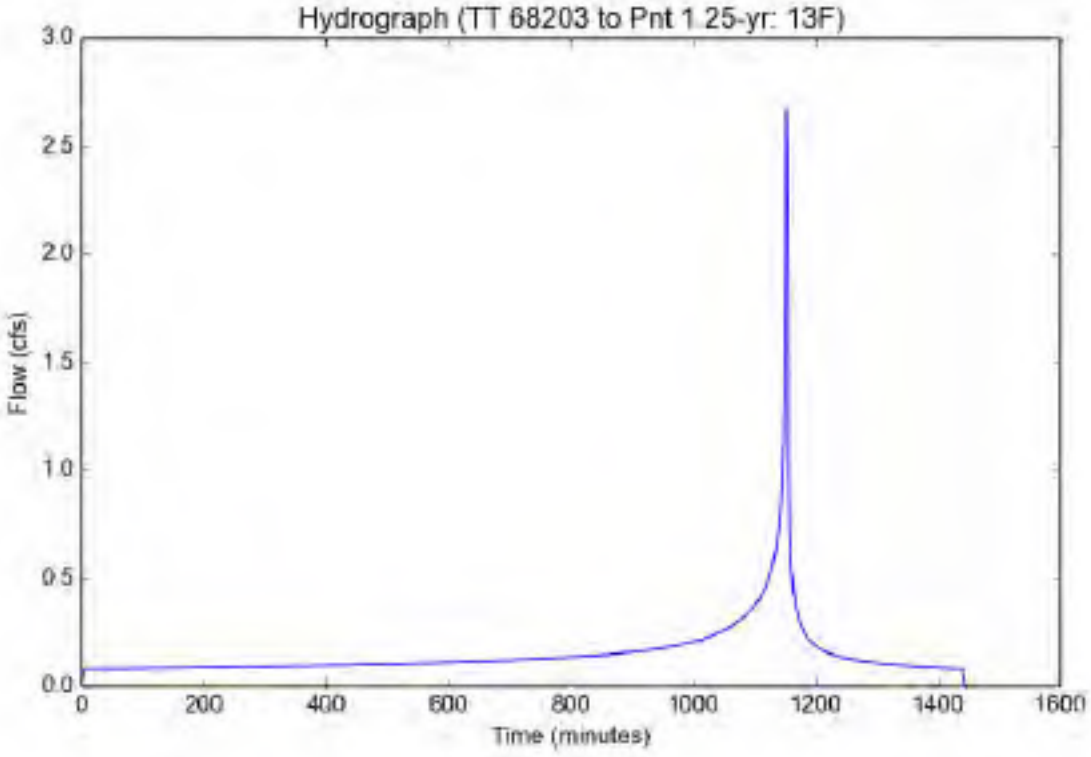
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	13F
Area (ac)	0.82
Flow Path Length (ft)	311.0
Flow Path Slope (vft/hft)	0.043
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.74
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8873
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.668
Burned Peak Flow Rate (cfs)	2.668
24-Hr Clear Runoff Volume (ac-ft)	0.3047
24-Hr Clear Runoff Volume (cu-ft)	13271.207



Peak Flow Hydrologic Analysis

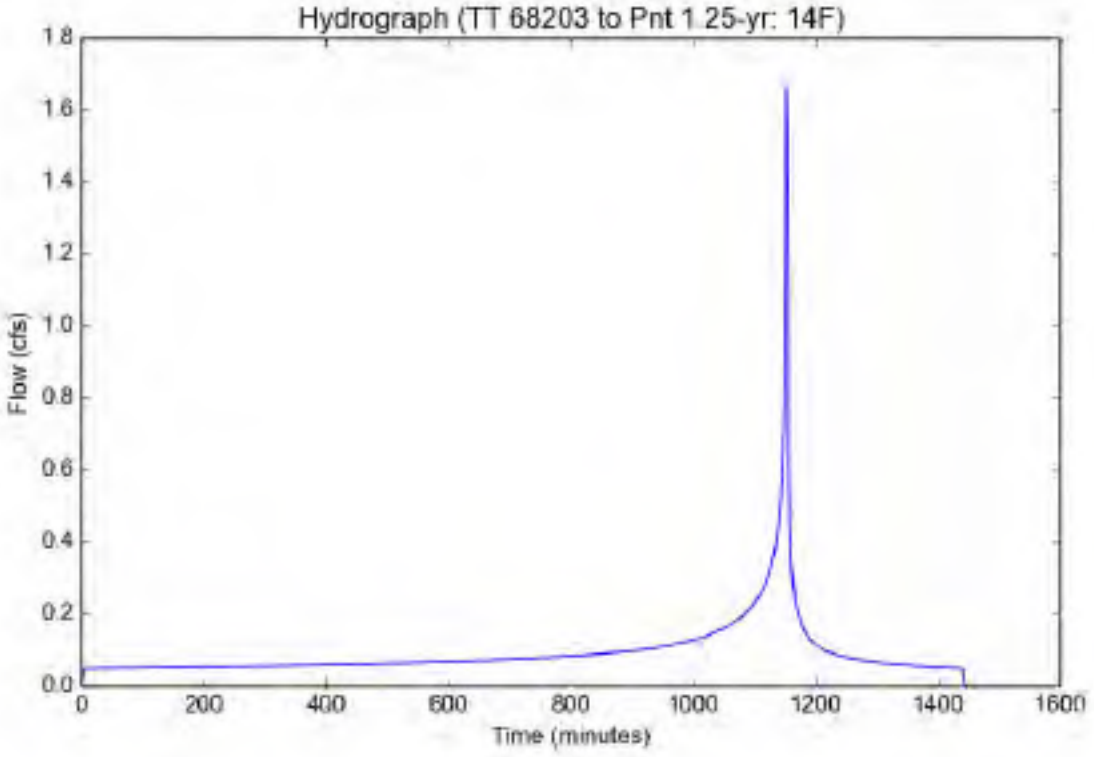
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	14F
Area (ac)	0.51
Flow Path Length (ft)	184.0
Flow Path Slope (vft/hft)	0.032
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.74
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8873
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.6594
Burned Peak Flow Rate (cfs)	1.6594
24-Hr Clear Runoff Volume (ac-ft)	0.1895
24-Hr Clear Runoff Volume (cu-ft)	8254.0434



Peak Flow Hydrologic Analysis

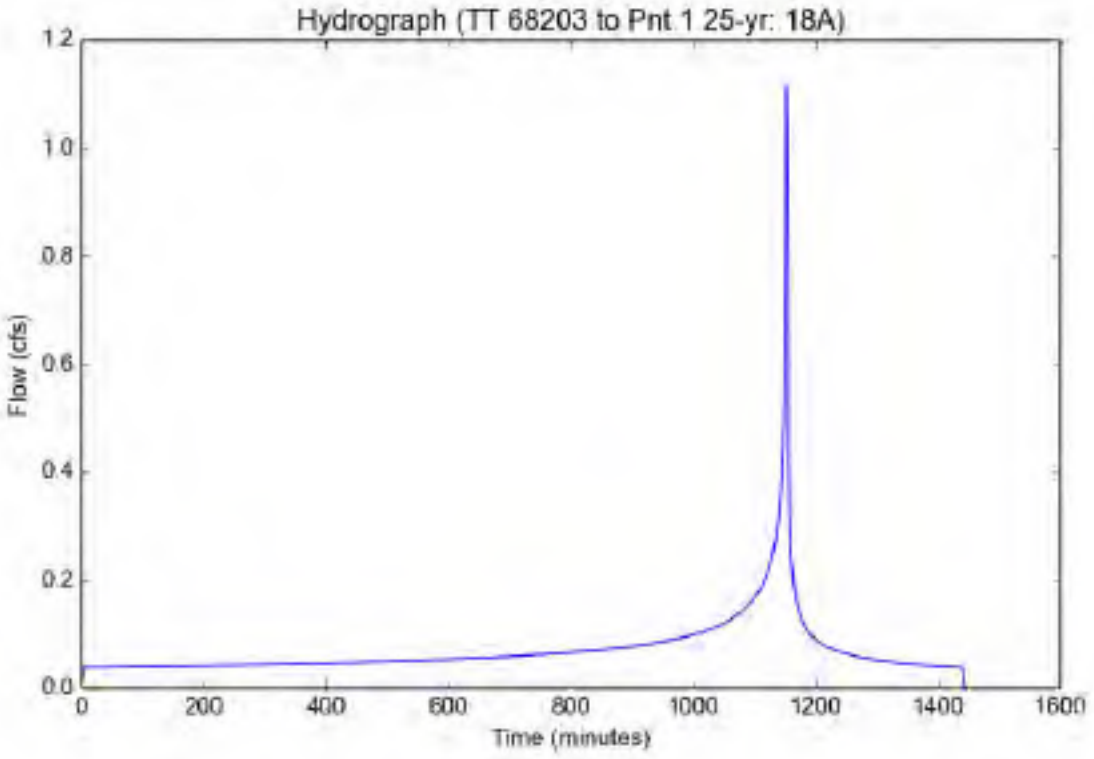
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	18A
Area (ac)	0.34
Flow Path Length (ft)	481.0
Flow Path Slope (vft/hft)	0.073
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.9
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8951
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.116
Burned Peak Flow Rate (cfs)	1.116
24-Hr Clear Runoff Volume (ac-ft)	0.1442
24-Hr Clear Runoff Volume (cu-ft)	6282.8434



Peak Flow Hydrologic Analysis

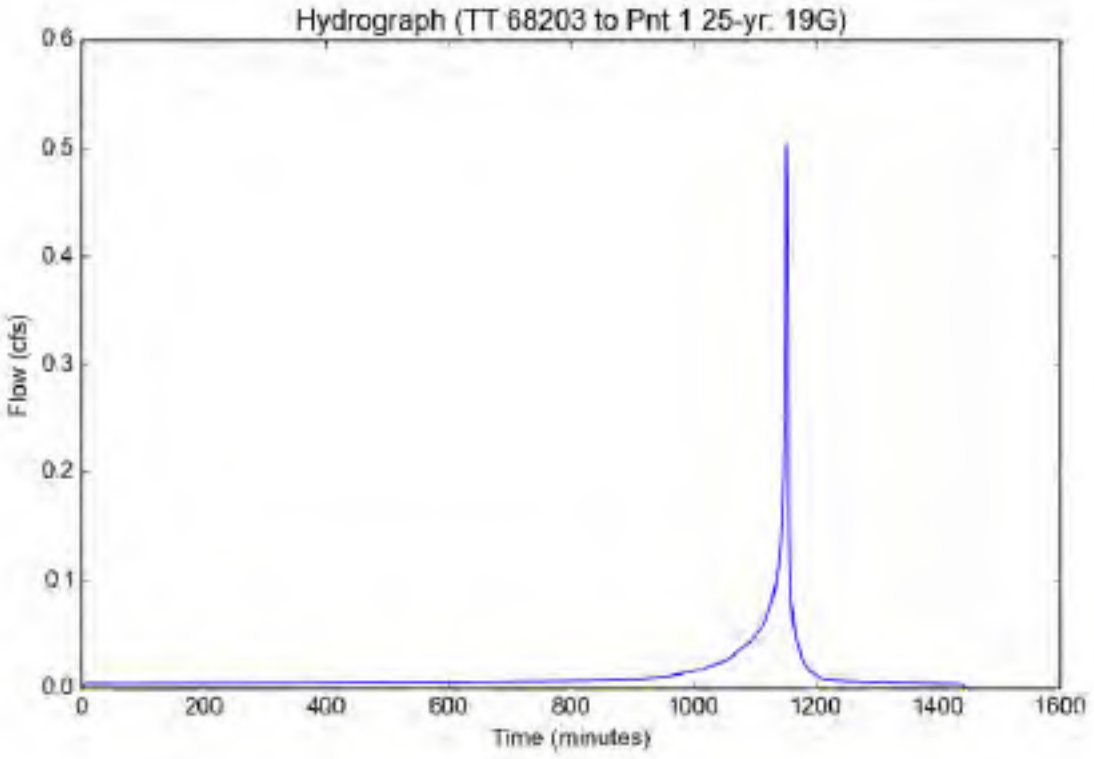
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	19G
Area (ac)	0.16
Flow Path Length (ft)	123.0
Flow Path Slope (vft/hft)	0.211
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.5023
Burned Peak Flow Rate (cfs)	0.5023
24-Hr Clear Runoff Volume (ac-ft)	0.0257
24-Hr Clear Runoff Volume (cu-ft)	1120.9904



Peak Flow Hydrologic Analysis

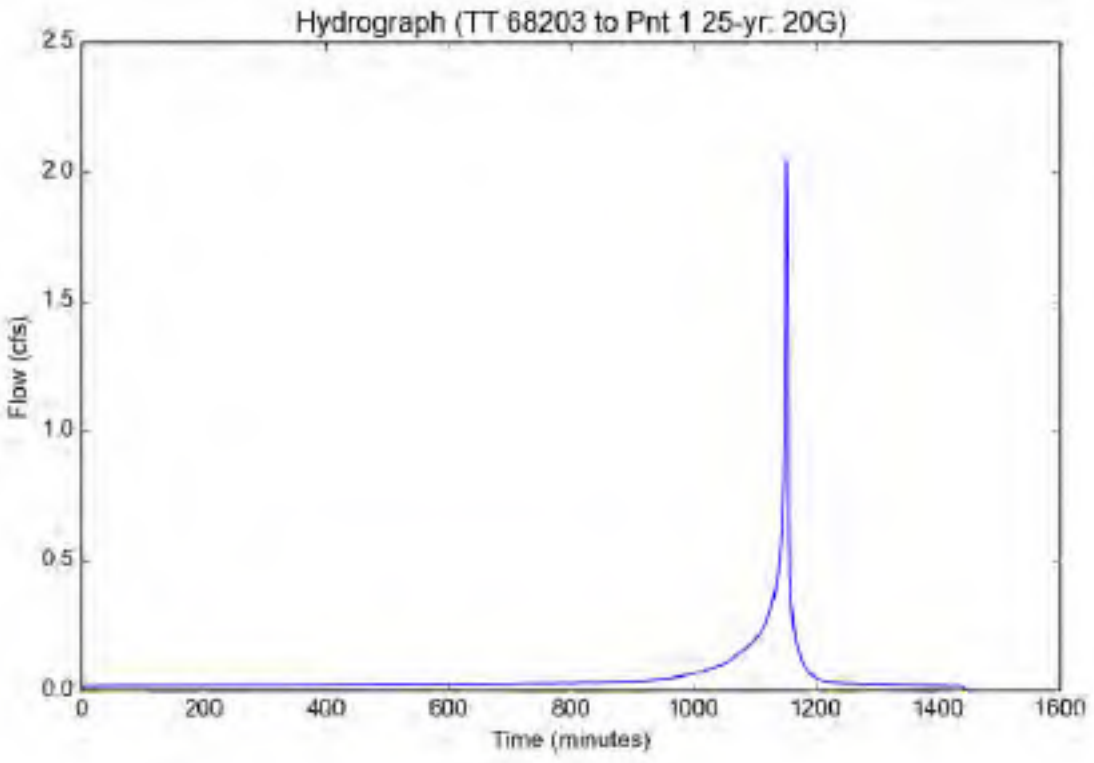
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	20G
Area (ac)	0.65
Flow Path Length (ft)	424.0
Flow Path Slope (vft/hft)	0.151
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.0406
Burned Peak Flow Rate (cfs)	2.0406
24-Hr Clear Runoff Volume (ac-ft)	0.1045
24-Hr Clear Runoff Volume (cu-ft)	4554.0234



Peak Flow Hydrologic Analysis

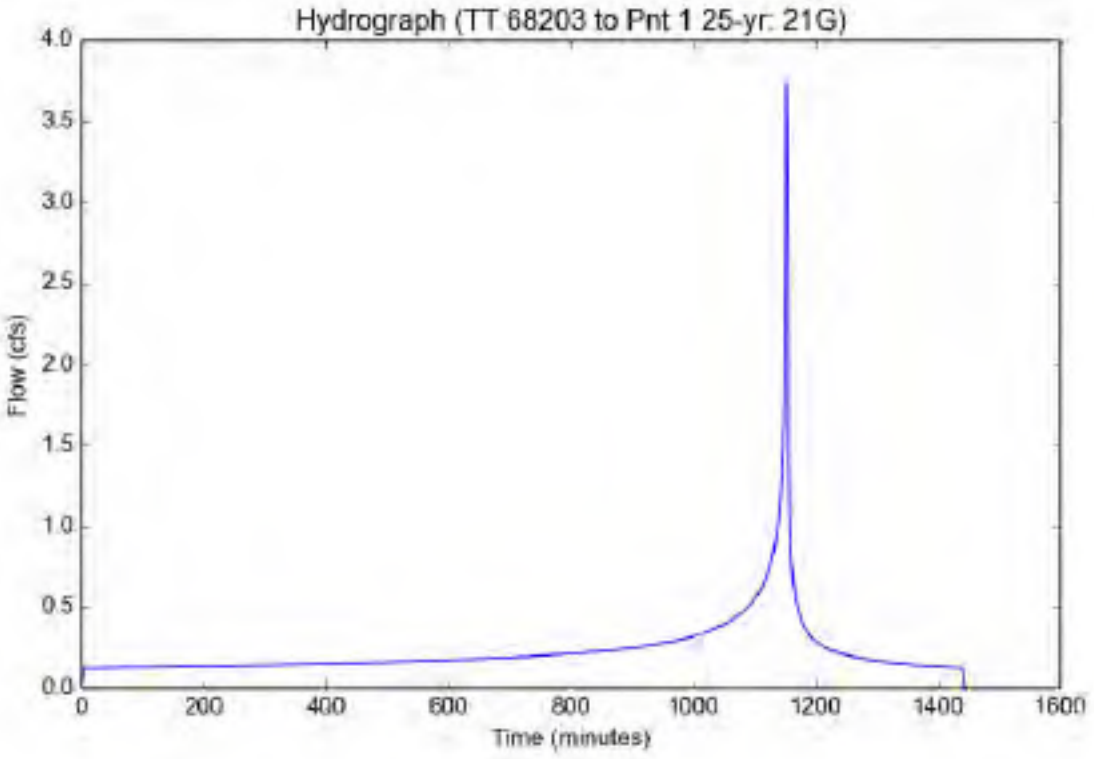
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	21G
Area (ac)	1.14
Flow Path Length (ft)	251.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.86
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8932
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.7337
Burned Peak Flow Rate (cfs)	3.7337
24-Hr Clear Runoff Volume (ac-ft)	0.4686
24-Hr Clear Runoff Volume (cu-ft)	20412.0568



Peak Flow Hydrologic Analysis

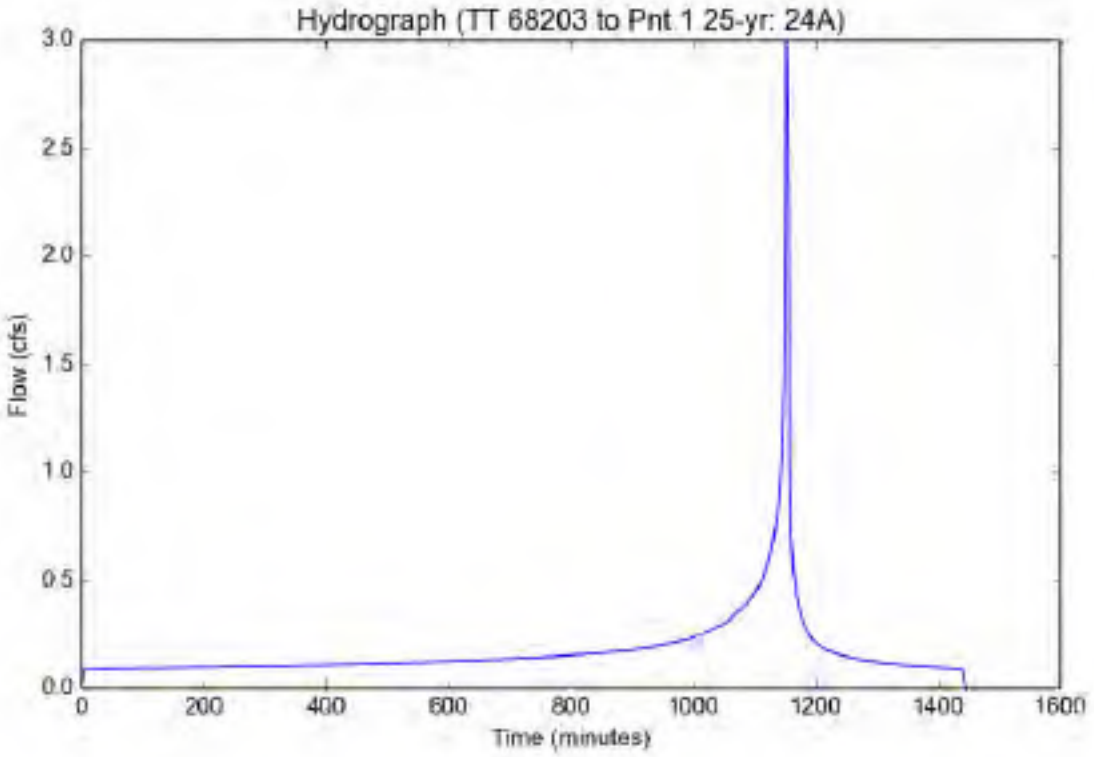
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	24A
Area (ac)	1.01
Flow Path Length (ft)	776.0
Flow Path Slope (vft/hft)	0.072
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.67
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.3657
Undeveloped Runoff Coefficient (Cu)	0.8428
Developed Runoff Coefficient (Cd)	0.8811
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	2.9953
Burned Peak Flow Rate (cfs)	2.9953
24-Hr Clear Runoff Volume (ac-ft)	0.352
24-Hr Clear Runoff Volume (cu-ft)	15331.7324



Peak Flow Hydrologic Analysis

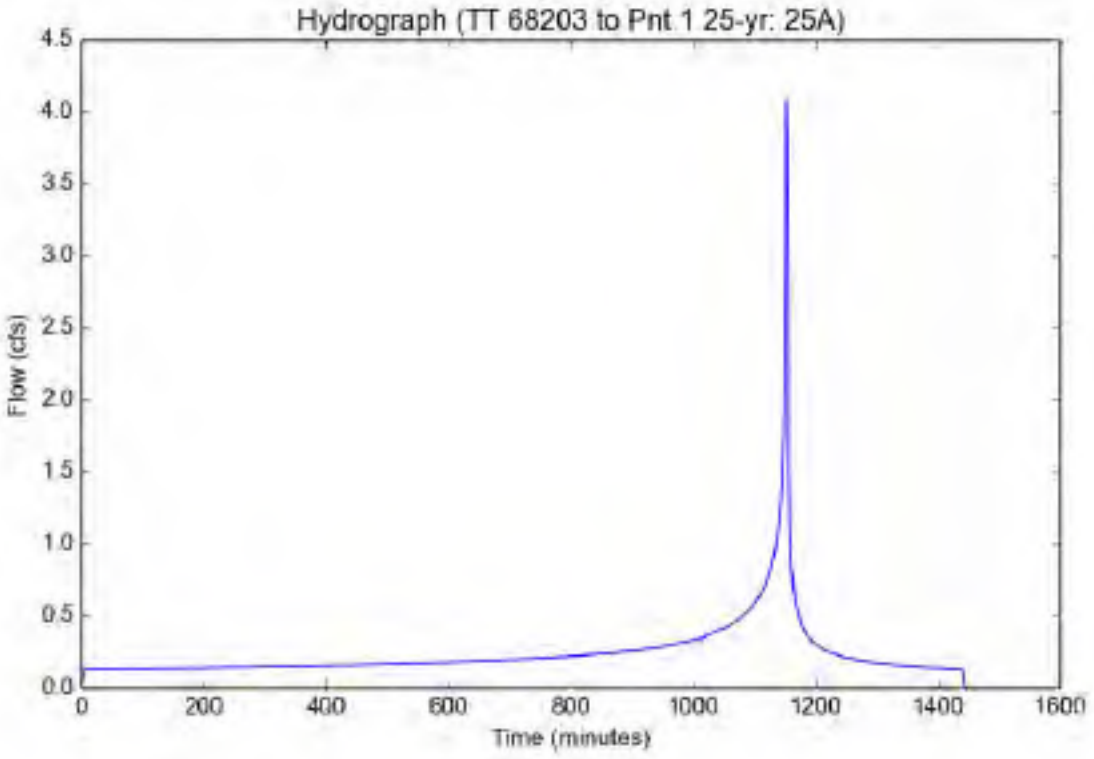
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	25A
Area (ac)	1.25
Flow Path Length (ft)	148.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.81
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8907
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.0828
Burned Peak Flow Rate (cfs)	4.0828
24-Hr Clear Runoff Volume (ac-ft)	0.4932
24-Hr Clear Runoff Volume (cu-ft)	21485.3318



Peak Flow Hydrologic Analysis

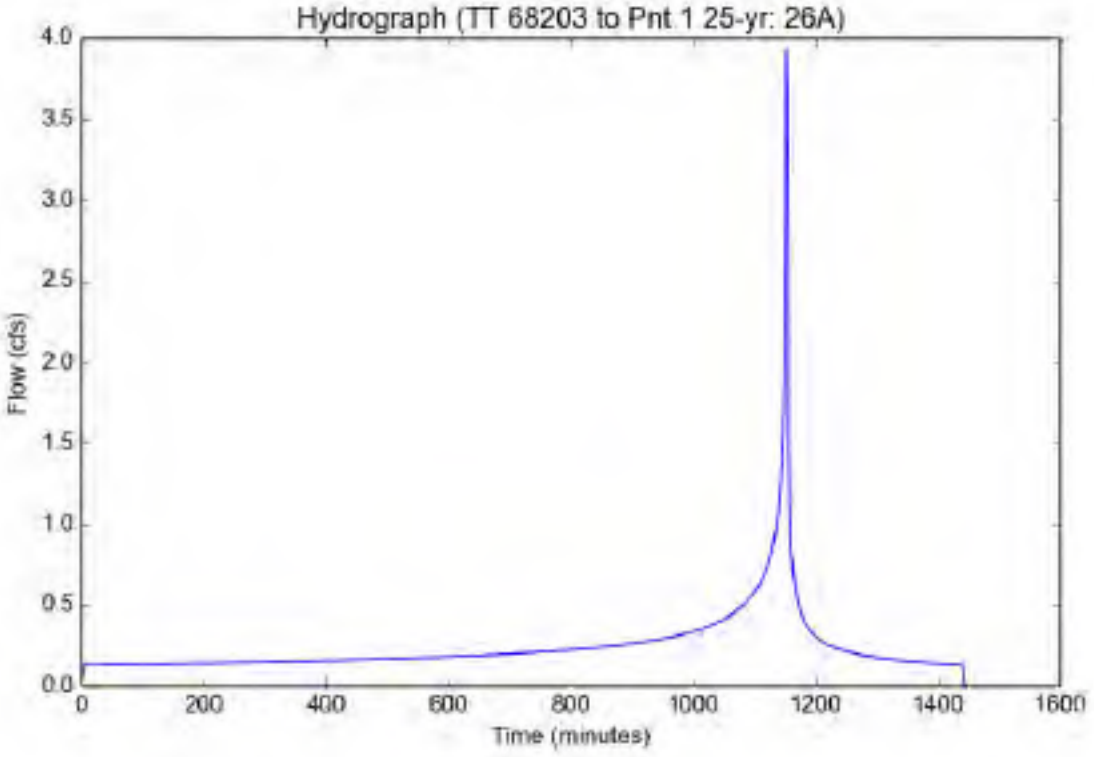
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	26A
Area (ac)	1.2
Flow Path Length (ft)	245.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.86
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8932
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.9302
Burned Peak Flow Rate (cfs)	3.9302
24-Hr Clear Runoff Volume (ac-ft)	0.4933
24-Hr Clear Runoff Volume (cu-ft)	21486.3756



Peak Flow Hydrologic Analysis

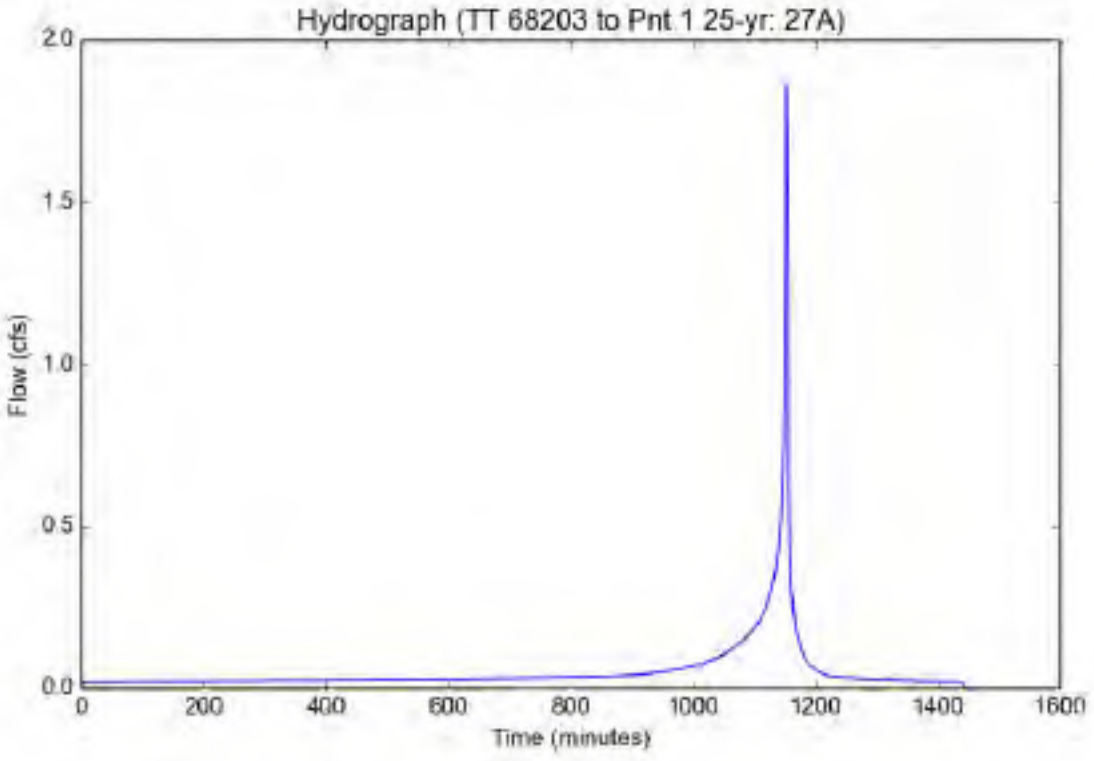
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	27A
Area (ac)	0.59
Flow Path Length (ft)	292.0
Flow Path Slope (vft/hft)	0.17
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.18
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.8606
Burned Peak Flow Rate (cfs)	1.8606
24-Hr Clear Runoff Volume (ac-ft)	0.1104
24-Hr Clear Runoff Volume (cu-ft)	4810.5449



Peak Flow Hydrologic Analysis

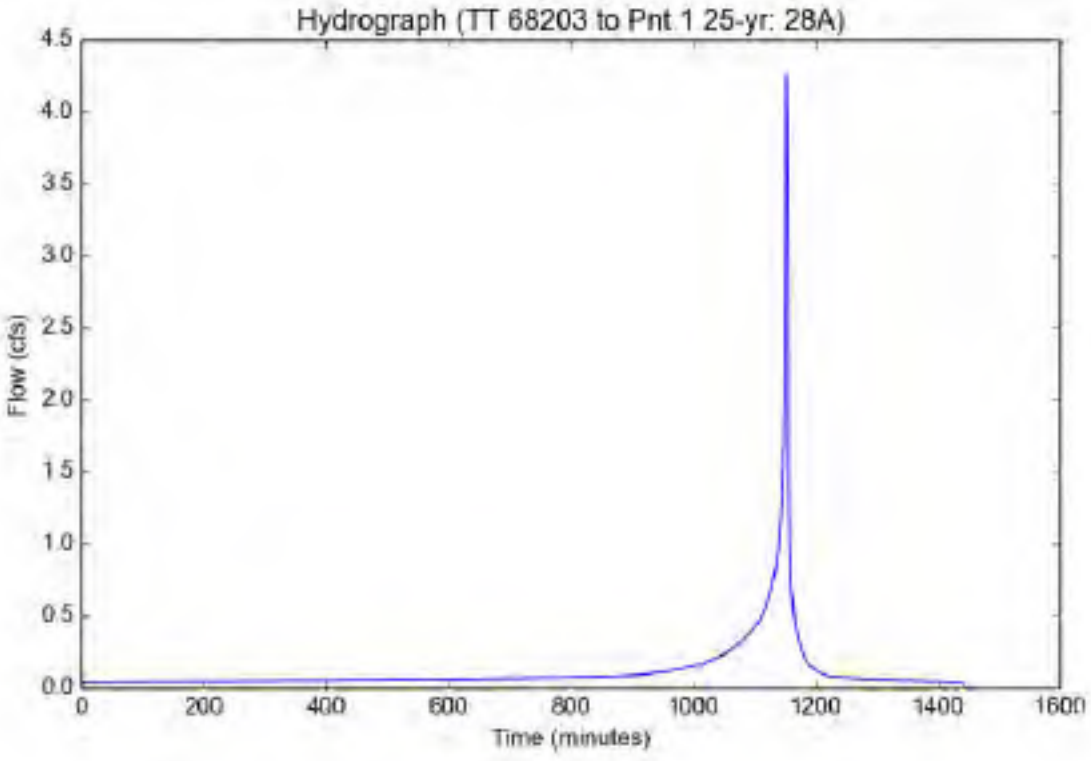
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	28A
Area (ac)	1.35
Flow Path Length (ft)	282.0
Flow Path Slope (vft/hft)	0.053
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.17
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8595
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.255
Burned Peak Flow Rate (cfs)	4.255
24-Hr Clear Runoff Volume (ac-ft)	0.2482
24-Hr Clear Runoff Volume (cu-ft)	10813.5762



Peak Flow Hydrologic Analysis

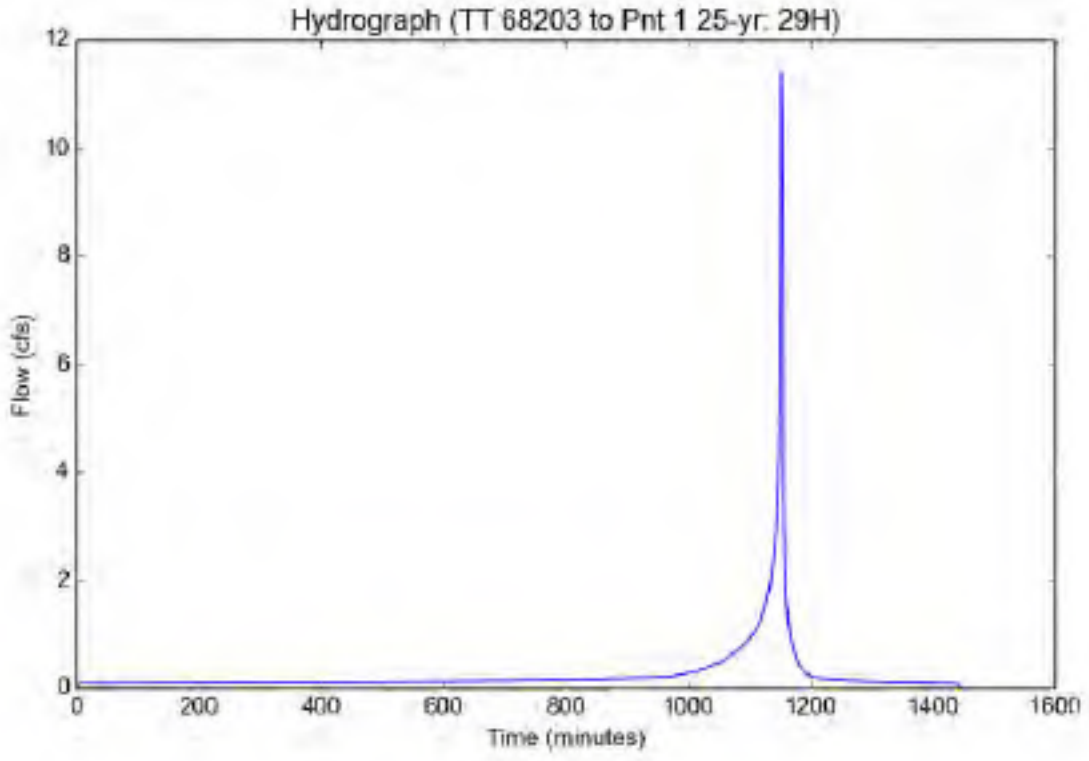
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	29H
Area (ac)	4.04
Flow Path Length (ft)	443.0
Flow Path Slope (vft/hft)	0.213
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.08
Soil Type	97
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.7583
Developed Runoff Coefficient (Cd)	0.7697
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	11.4019
Burned Peak Flow Rate (cfs)	11.4019
24-Hr Clear Runoff Volume (ac-ft)	0.5451
24-Hr Clear Runoff Volume (cu-ft)	23744.7319



Peak Flow Hydrologic Analysis

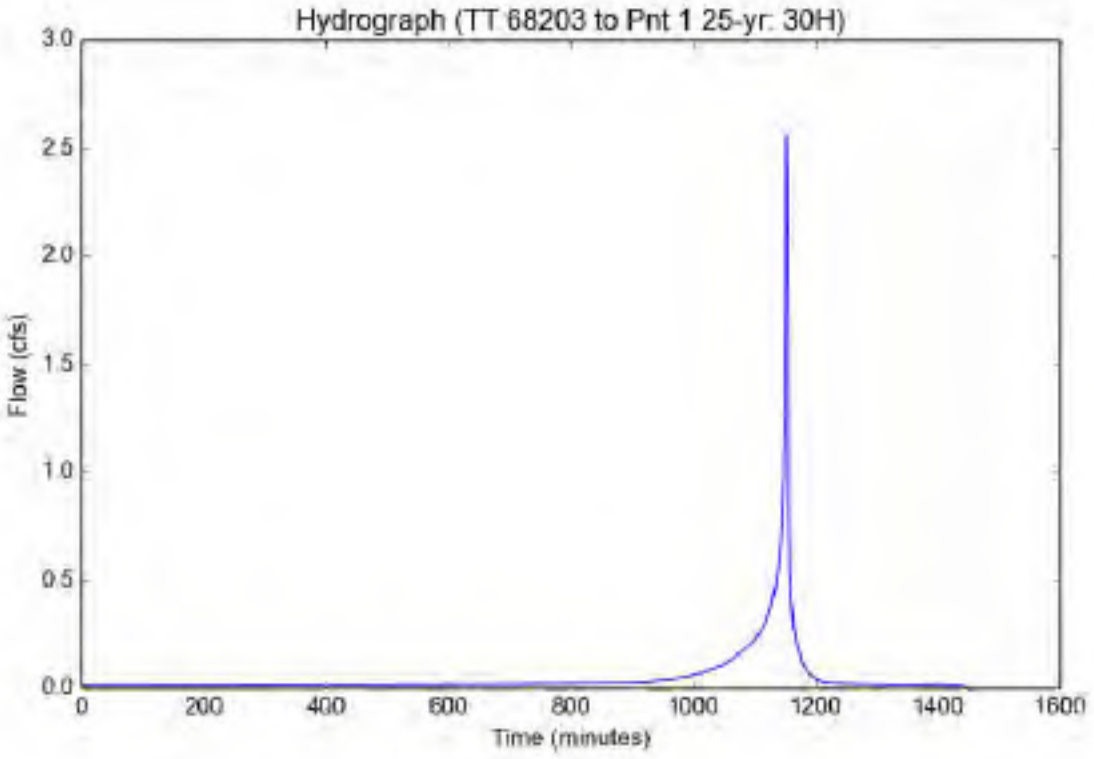
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	30H
Area (ac)	0.82
Flow Path Length (ft)	441.0
Flow Path Slope (vft/hft)	0.183
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.561
Burned Peak Flow Rate (cfs)	2.561
24-Hr Clear Runoff Volume (ac-ft)	0.1076
24-Hr Clear Runoff Volume (cu-ft)	4686.7134



Peak Flow Hydrologic Analysis

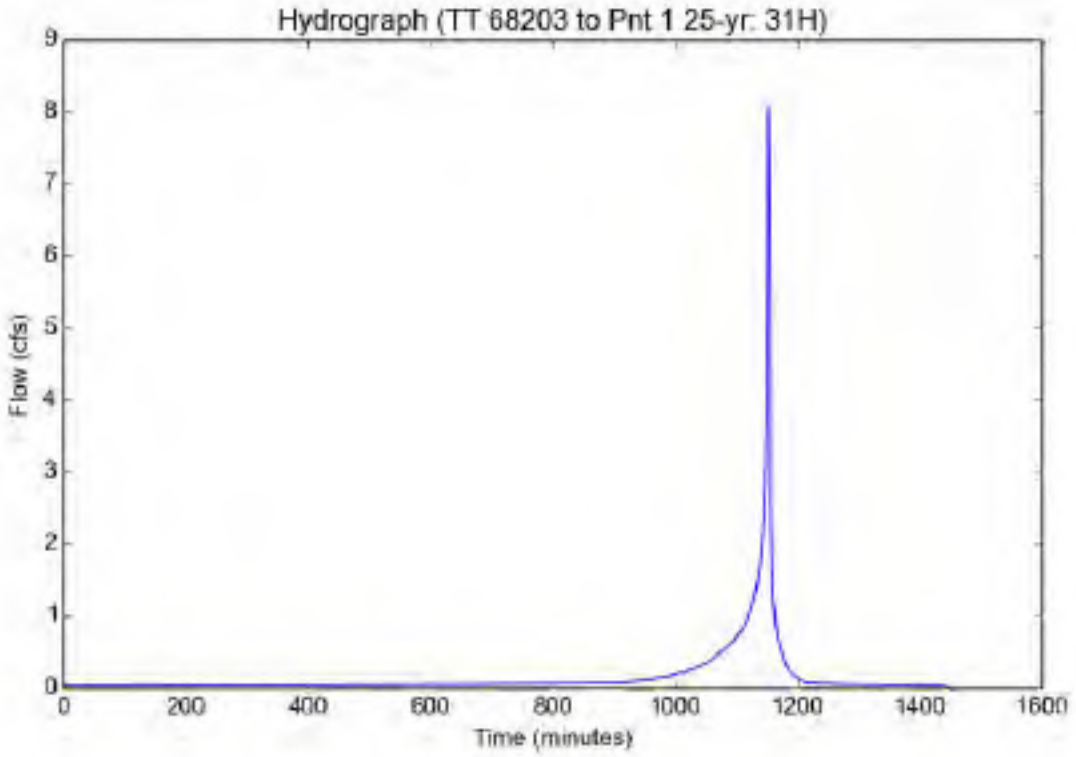
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	31H
Area (ac)	2.58
Flow Path Length (ft)	451.0
Flow Path Slope (vft/hft)	0.075
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	8.0579
Burned Peak Flow Rate (cfs)	8.0579
24-Hr Clear Runoff Volume (ac-ft)	0.3385
24-Hr Clear Runoff Volume (cu-ft)	14746.0008



Peak Flow Hydrologic Analysis

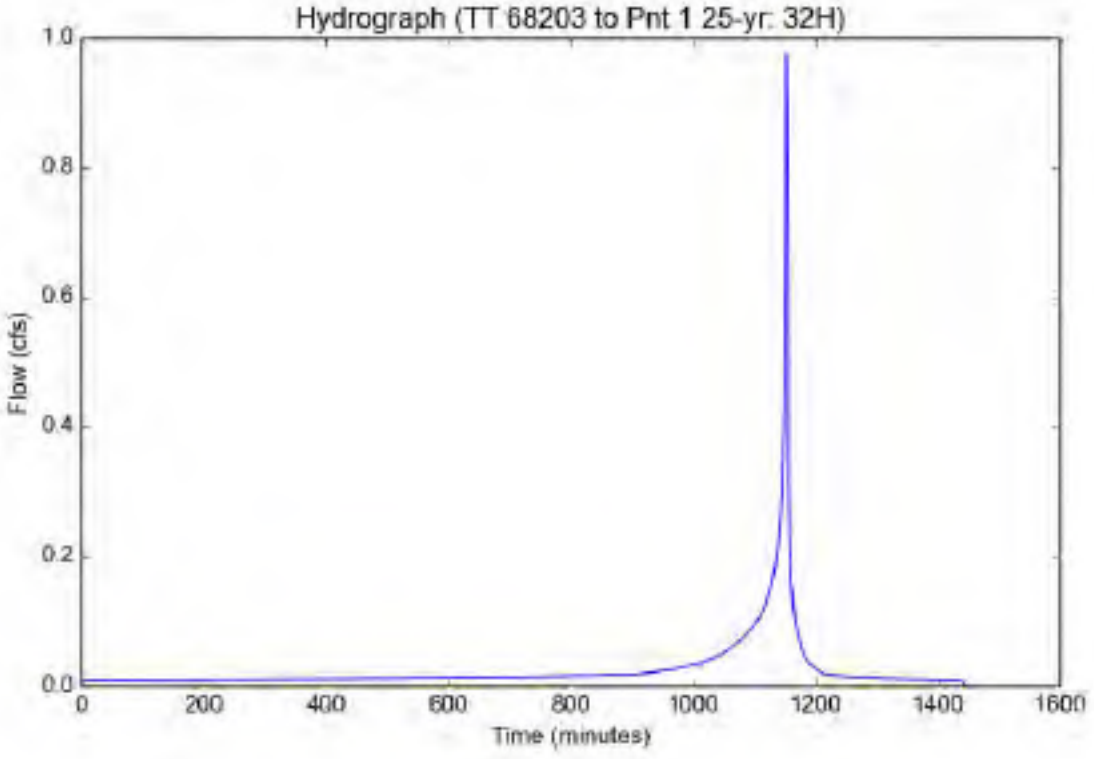
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	32H
Area (ac)	0.31
Flow Path Length (ft)	228.0
Flow Path Slope (vft/hft)	0.101
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.14
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8581
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.9754
Burned Peak Flow Rate (cfs)	0.9754
24-Hr Clear Runoff Volume (ac-ft)	0.0539
24-Hr Clear Runoff Volume (cu-ft)	2349.7466



Peak Flow Hydrologic Analysis

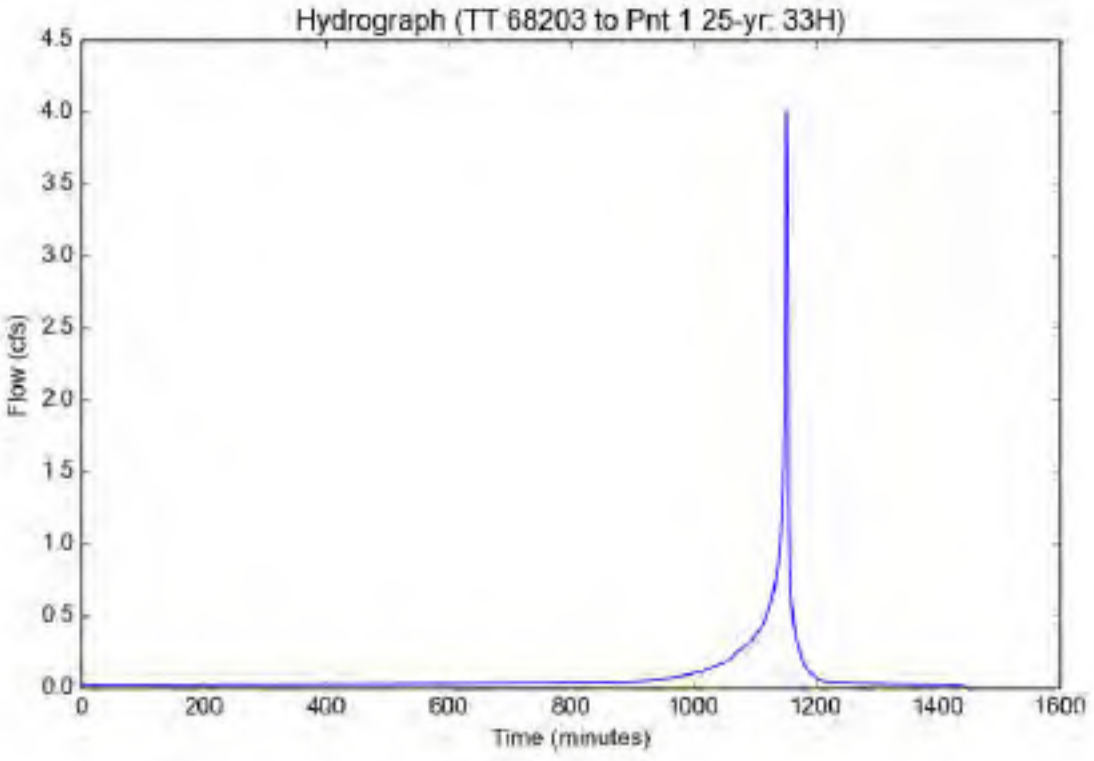
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	33H
Area (ac)	1.28
Flow Path Length (ft)	131.0
Flow Path Slope (vft/hft)	0.195
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.03
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8527
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.0023
Burned Peak Flow Rate (cfs)	4.0023
24-Hr Clear Runoff Volume (ac-ft)	0.1764
24-Hr Clear Runoff Volume (cu-ft)	7682.9737



Peak Flow Hydrologic Analysis

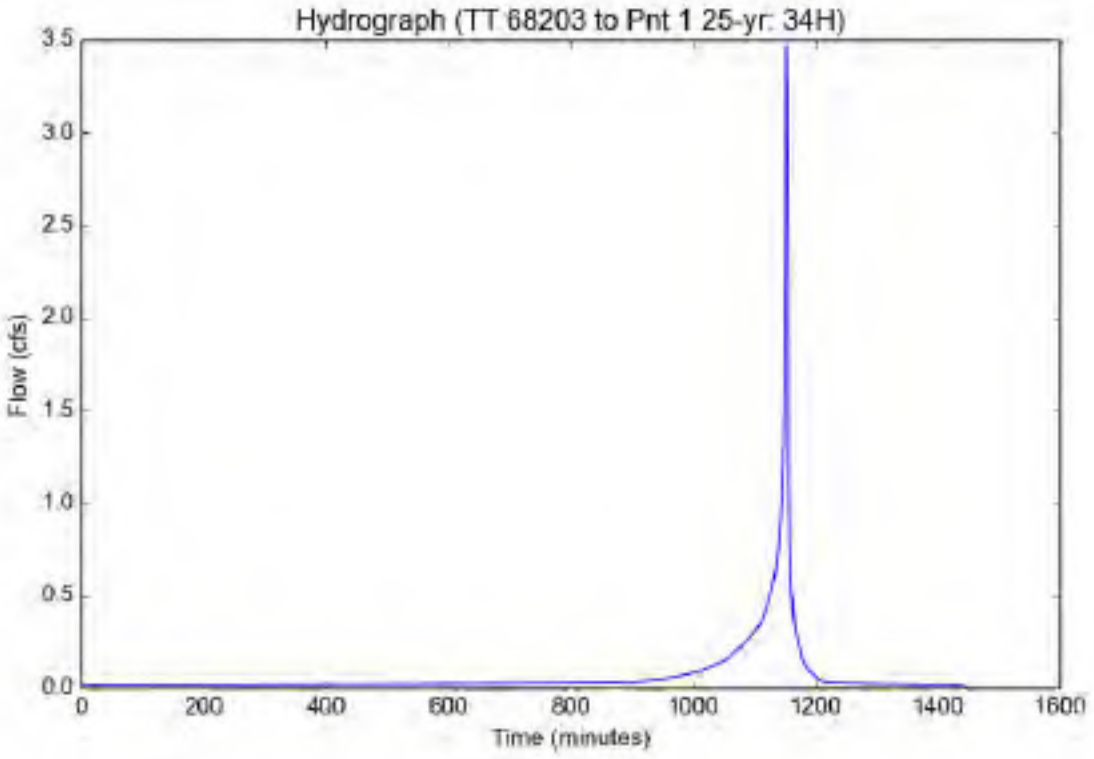
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	34H
Area (ac)	1.11
Flow Path Length (ft)	568.0
Flow Path Slope (vft/hft)	0.166
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.4668
Burned Peak Flow Rate (cfs)	3.4668
24-Hr Clear Runoff Volume (ac-ft)	0.1456
24-Hr Clear Runoff Volume (cu-ft)	6344.2097



Peak Flow Hydrologic Analysis

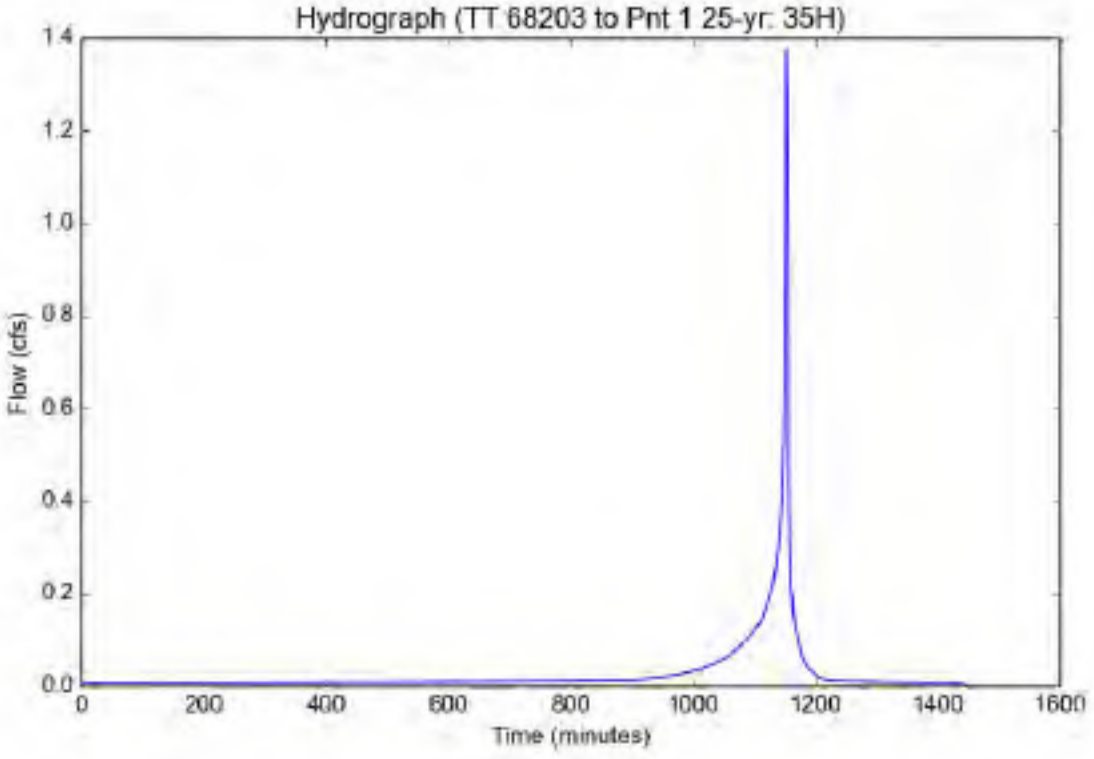
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	35H
Area (ac)	0.44
Flow Path Length (ft)	201.0
Flow Path Slope (vft/hft)	0.298
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.3742
Burned Peak Flow Rate (cfs)	1.3742
24-Hr Clear Runoff Volume (ac-ft)	0.0577
24-Hr Clear Runoff Volume (cu-ft)	2514.8218



Peak Flow Hydrologic Analysis

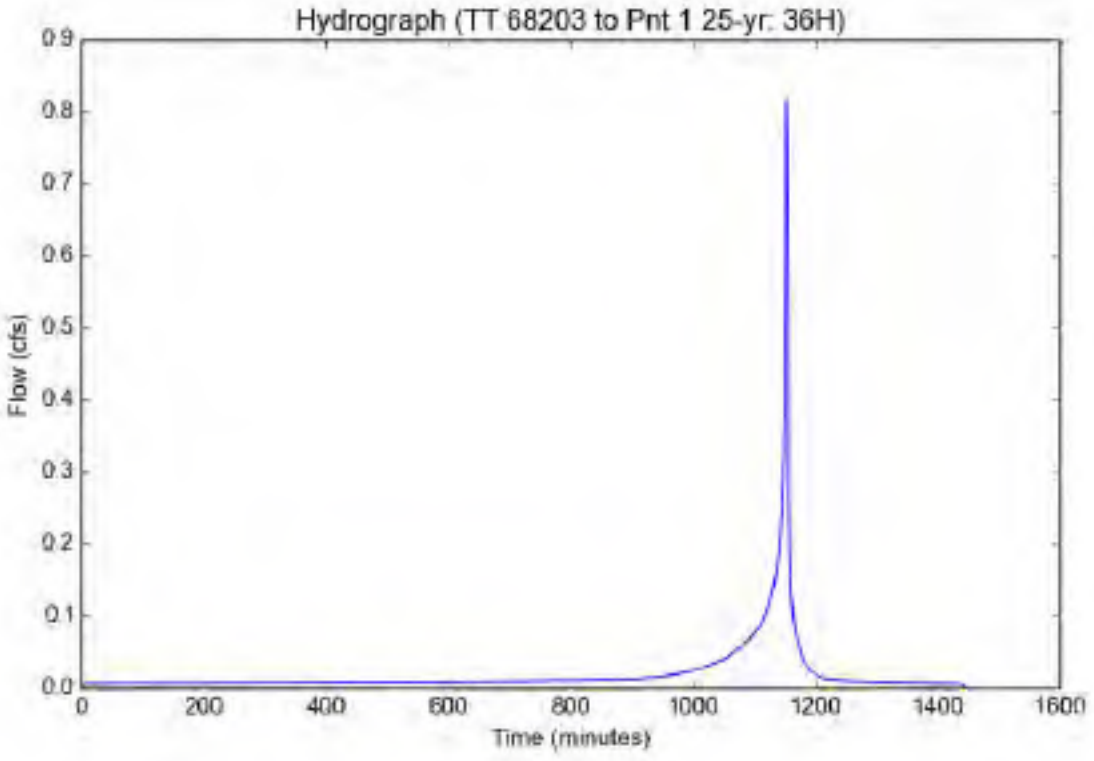
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	36H
Area (ac)	0.26
Flow Path Length (ft)	302.0
Flow Path Slope (vft/hft)	0.098
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.09
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8556
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.8158
Burned Peak Flow Rate (cfs)	0.8158
24-Hr Clear Runoff Volume (ac-ft)	0.041
24-Hr Clear Runoff Volume (cu-ft)	1784.3229



Peak Flow Hydrologic Analysis

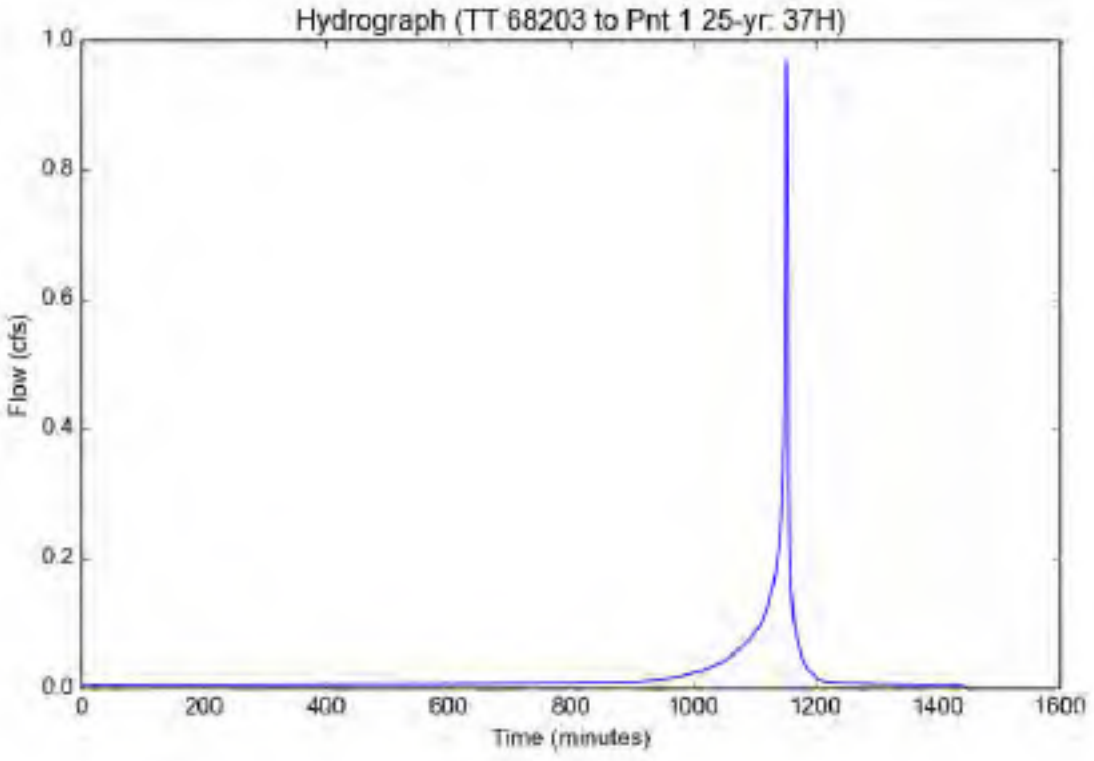
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	37H
Area (ac)	0.31
Flow Path Length (ft)	128.0
Flow Path Slope (vft/hft)	0.117
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.9682
Burned Peak Flow Rate (cfs)	0.9682
24-Hr Clear Runoff Volume (ac-ft)	0.0407
24-Hr Clear Runoff Volume (cu-ft)	1771.8063



Peak Flow Hydrologic Analysis

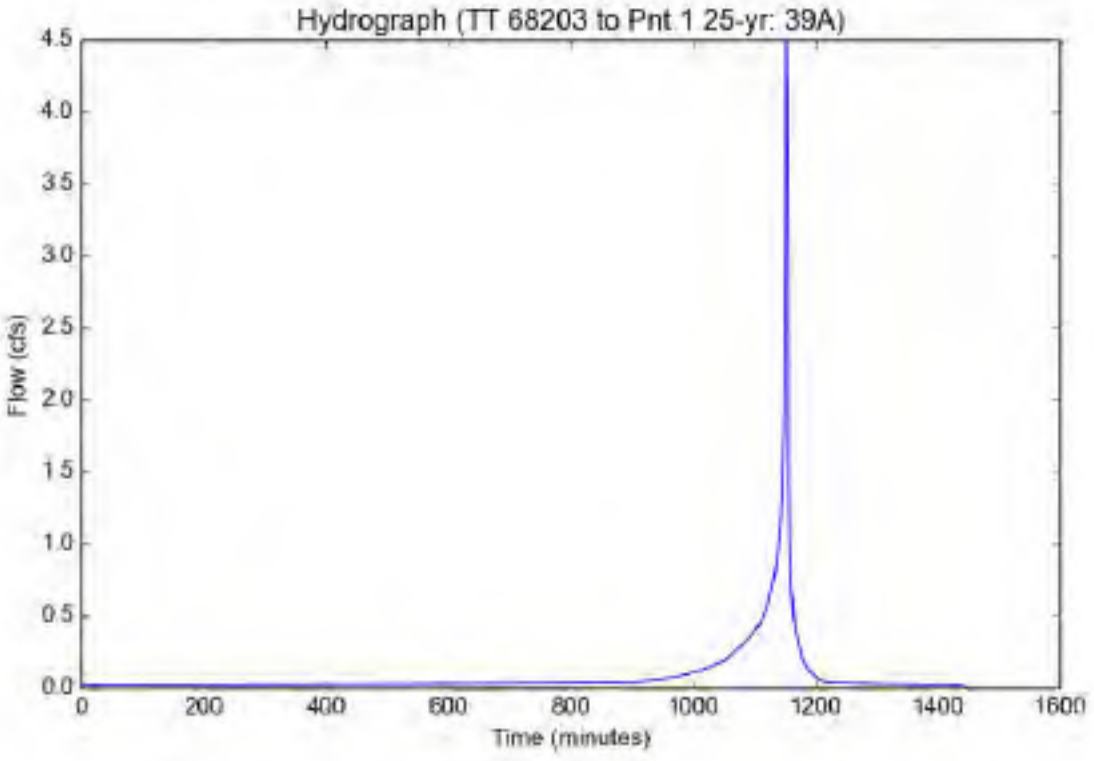
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 1 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to Pnt 1 25-yr
Subarea ID	39A
Area (ac)	1.44
Flow Path Length (ft)	192.0
Flow Path Slope (vft/hft)	0.203
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.4974
Burned Peak Flow Rate (cfs)	4.4974
24-Hr Clear Runoff Volume (ac-ft)	0.1889
24-Hr Clear Runoff Volume (cu-ft)	8230.326



Peak Flow Hydrologic Analysis

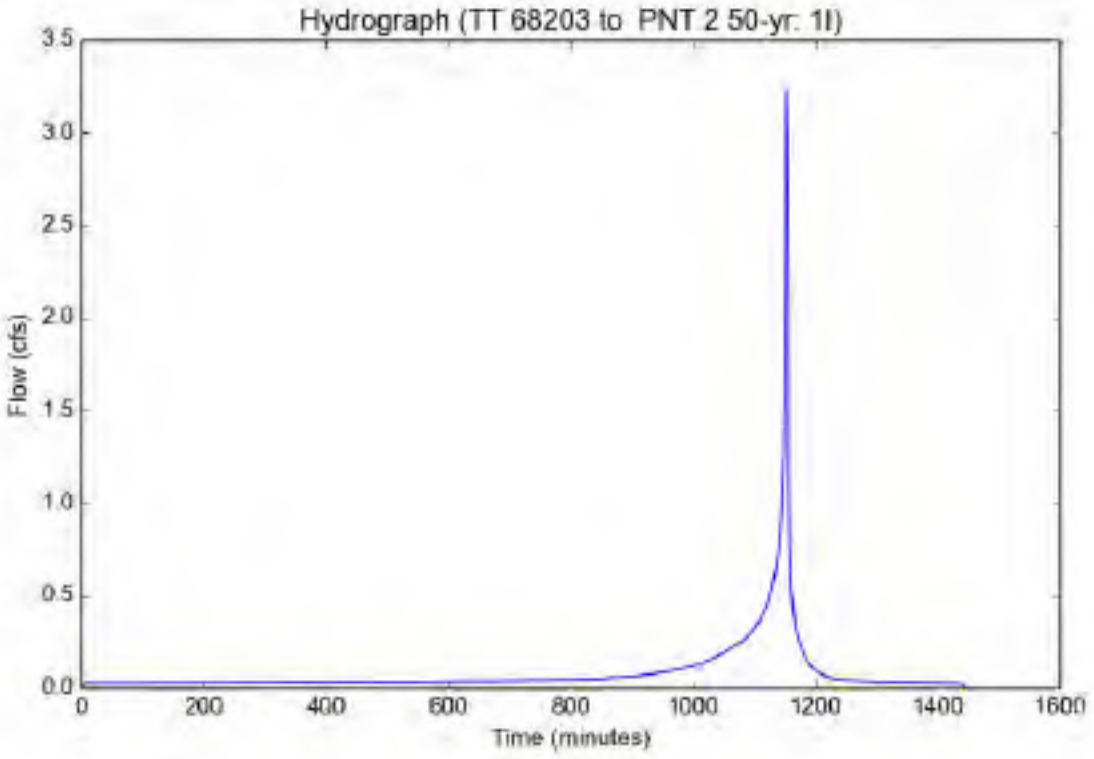
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 2 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 2 50-yr
Subarea ID	1I
Area (ac)	0.89
Flow Path Length (ft)	493.0
Flow Path Slope (vft/hft)	0.156
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.2165
Burned Peak Flow Rate (cfs)	3.2165
24-Hr Clear Runoff Volume (ac-ft)	0.1742
24-Hr Clear Runoff Volume (cu-ft)	7587.0327



Peak Flow Hydrologic Analysis

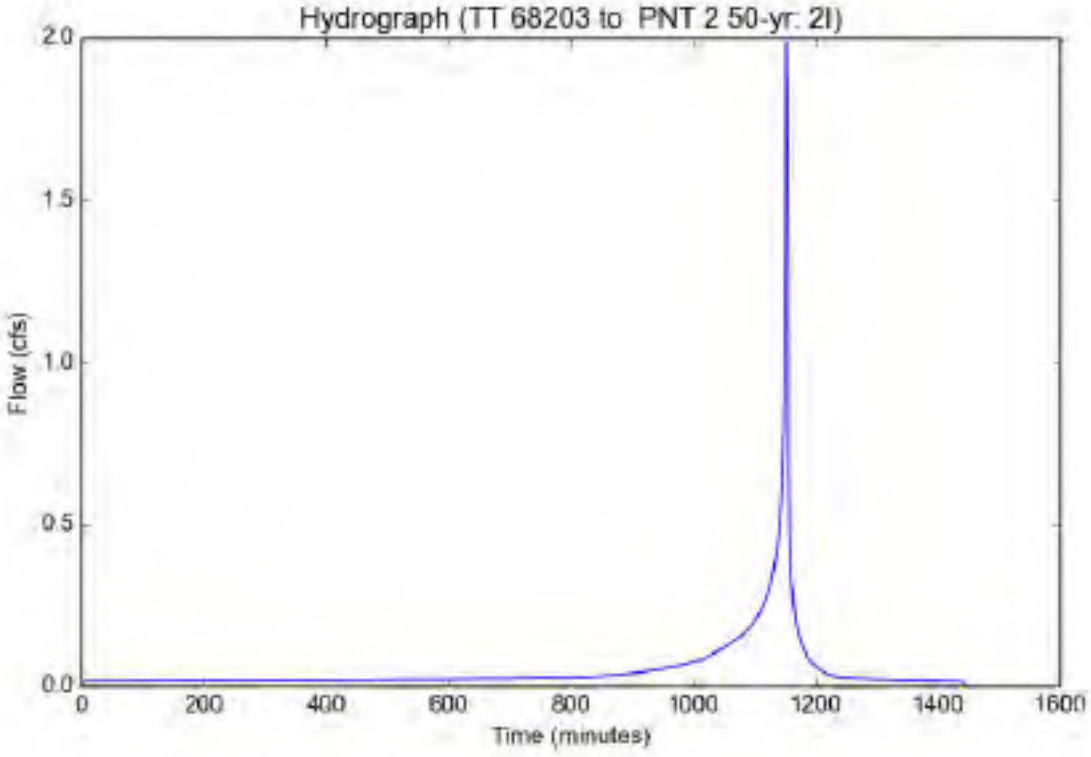
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 2 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 2 50-yr
Subarea ID	2I
Area (ac)	0.55
Flow Path Length (ft)	245.0
Flow Path Slope (vft/hft)	0.29
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.9877
Burned Peak Flow Rate (cfs)	1.9877
24-Hr Clear Runoff Volume (ac-ft)	0.1076
24-Hr Clear Runoff Volume (cu-ft)	4688.6157



Peak Flow Hydrologic Analysis

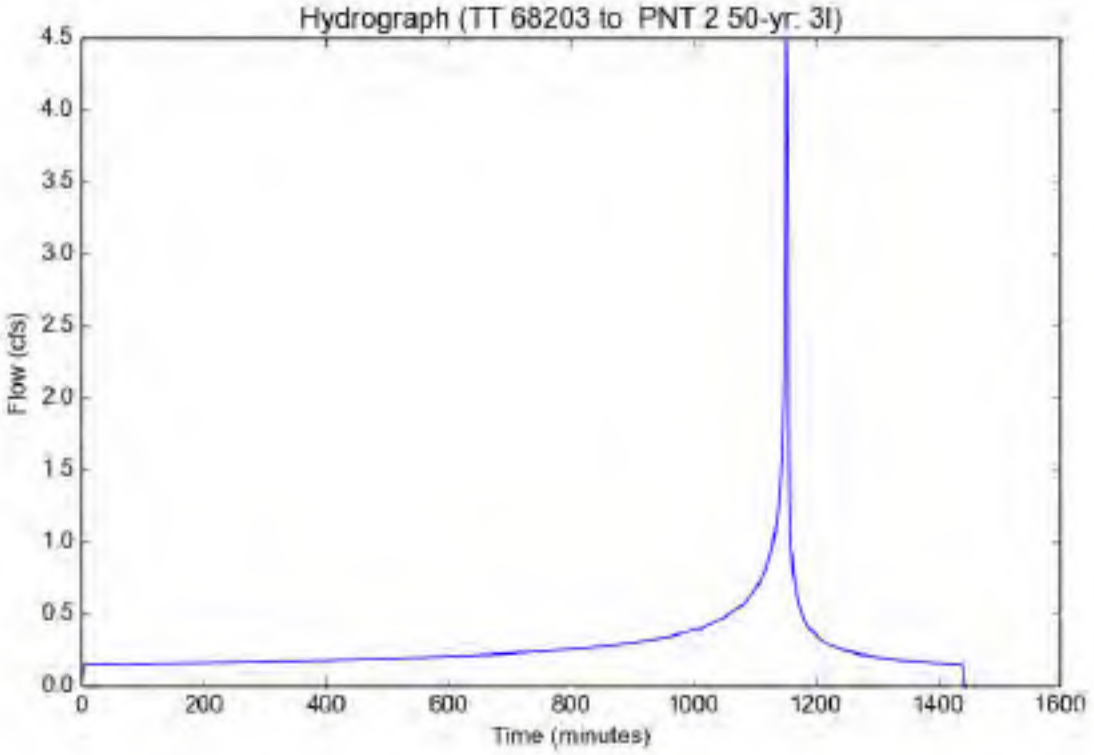
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 2 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 2 50-yr
Subarea ID	3I
Area (ac)	1.2
Flow Path Length (ft)	137.0
Flow Path Slope (vft/hft)	0.017
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.86
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8946
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.4835
Burned Peak Flow Rate (cfs)	4.4835
24-Hr Clear Runoff Volume (ac-ft)	0.5641
24-Hr Clear Runoff Volume (cu-ft)	24573.6949



Peak Flow Hydrologic Analysis

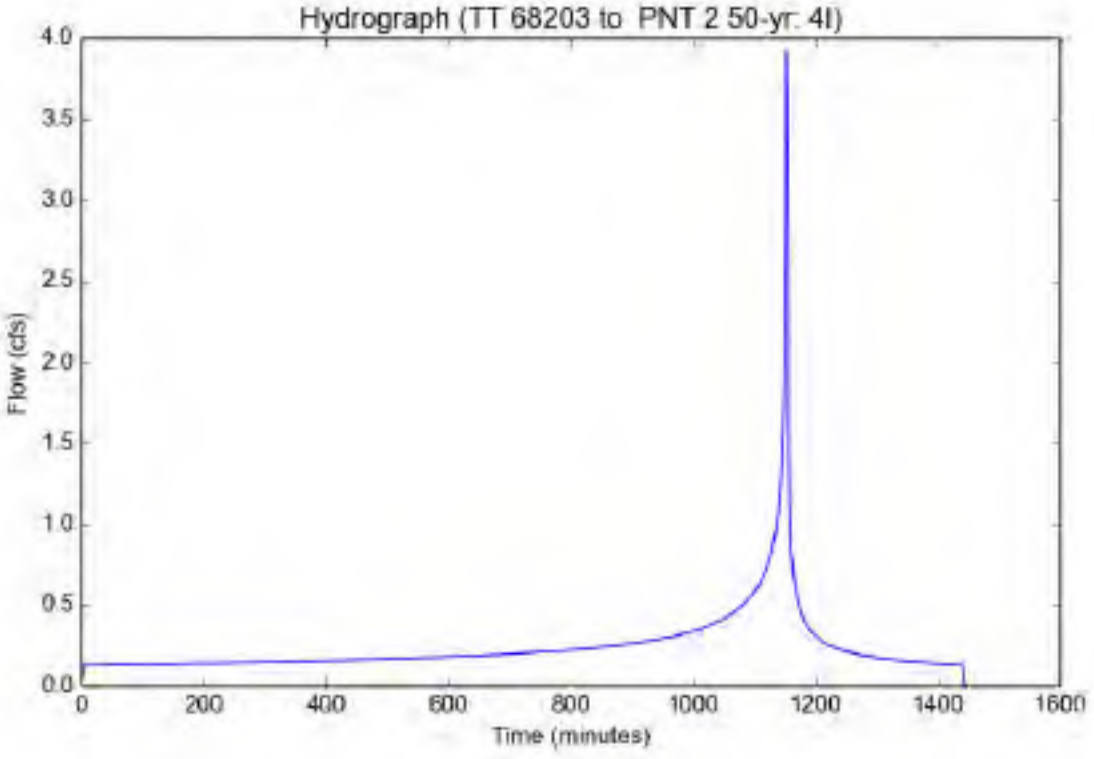
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 2 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 2 50-yr
Subarea ID	4I
Area (ac)	1.05
Flow Path Length (ft)	109.0
Flow Path Slope (vft/hft)	0.017
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.86
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8946
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.9231
Burned Peak Flow Rate (cfs)	3.9231
24-Hr Clear Runoff Volume (ac-ft)	0.4936
24-Hr Clear Runoff Volume (cu-ft)	21501.9831



Peak Flow Hydrologic Analysis

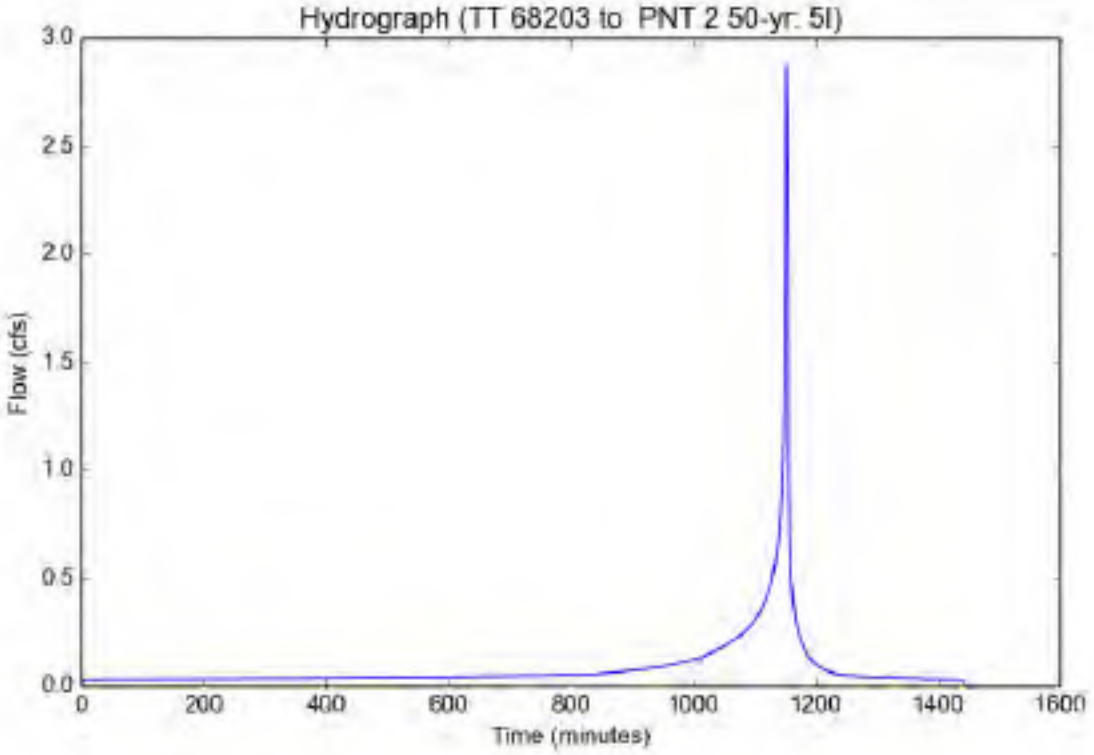
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 2 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 2 50-yr
Subarea ID	5I
Area (ac)	0.79
Flow Path Length (ft)	211.0
Flow Path Slope (vft/hft)	0.085
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.18
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8684
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.8653
Burned Peak Flow Rate (cfs)	2.8653
24-Hr Clear Runoff Volume (ac-ft)	0.1774
24-Hr Clear Runoff Volume (cu-ft)	7728.5703



Peak Flow Hydrologic Analysis

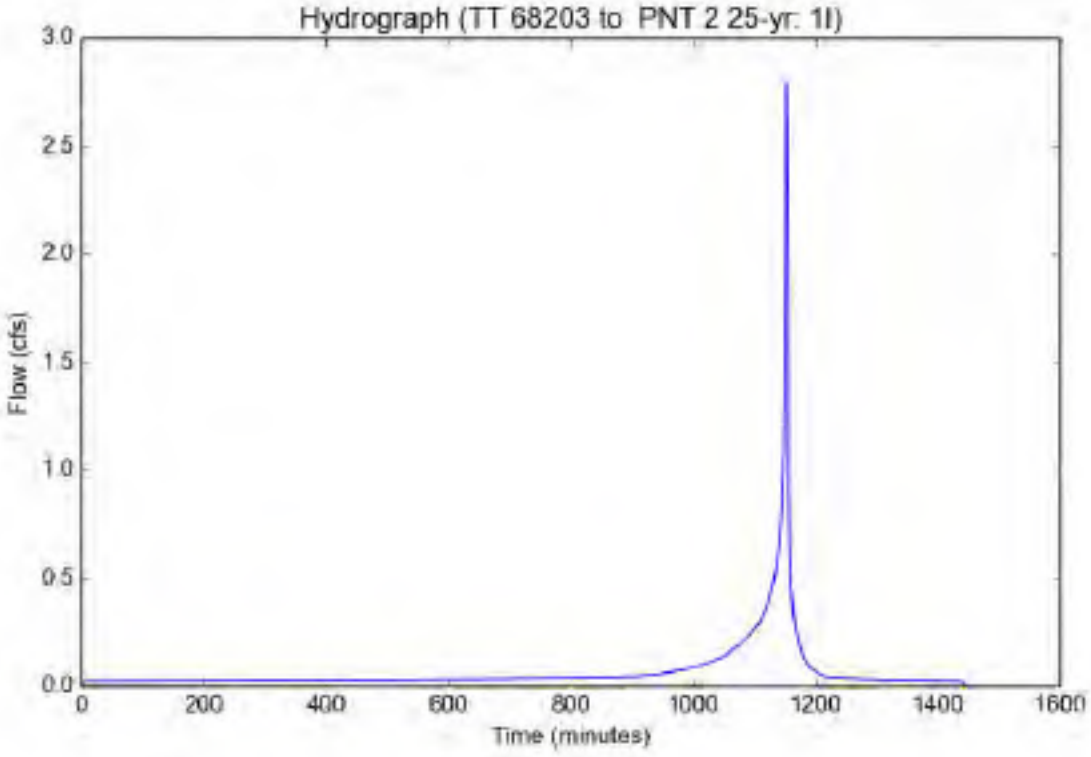
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 2 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 2 25-yr
Subarea ID	1I
Area (ac)	0.89
Flow Path Length (ft)	493.0
Flow Path Slope (vft/hft)	0.156
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.794
Burned Peak Flow Rate (cfs)	2.794
24-Hr Clear Runoff Volume (ac-ft)	0.1431
24-Hr Clear Runoff Volume (cu-ft)	6235.509



Peak Flow Hydrologic Analysis

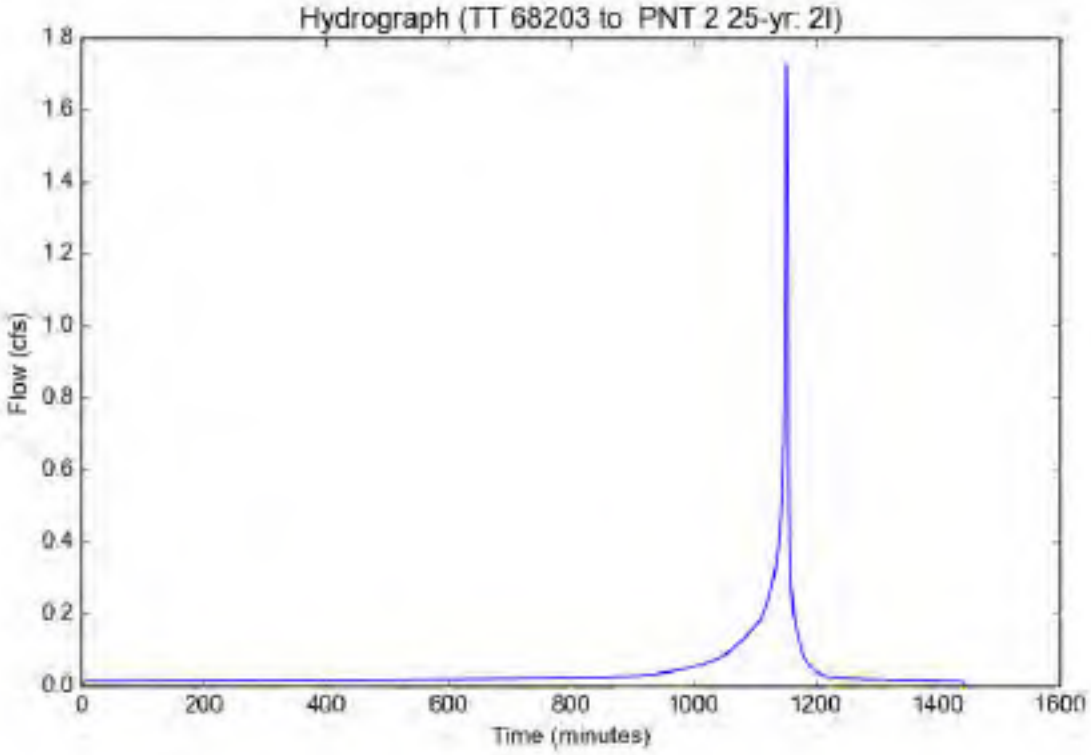
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 2 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 2 25-yr
Subarea ID	2I
Area (ac)	0.55
Flow Path Length (ft)	245.0
Flow Path Slope (vft/hft)	0.29
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.7266
Burned Peak Flow Rate (cfs)	1.7266
24-Hr Clear Runoff Volume (ac-ft)	0.0885
24-Hr Clear Runoff Volume (cu-ft)	3853.4044



Peak Flow Hydrologic Analysis

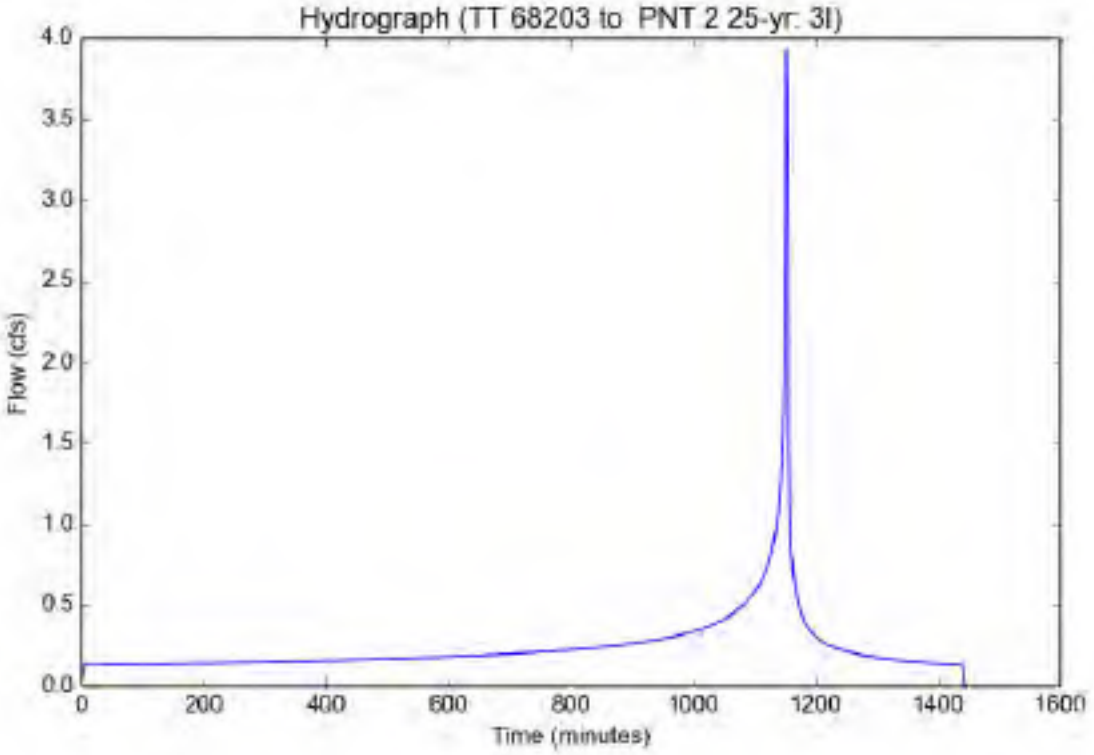
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 2 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 2 25-yr
Subarea ID	3I
Area (ac)	1.2
Flow Path Length (ft)	137.0
Flow Path Slope (vft/hft)	0.017
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.86
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8932
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.9302
Burned Peak Flow Rate (cfs)	3.9302
24-Hr Clear Runoff Volume (ac-ft)	0.4933
24-Hr Clear Runoff Volume (cu-ft)	21486.3756



Peak Flow Hydrologic Analysis

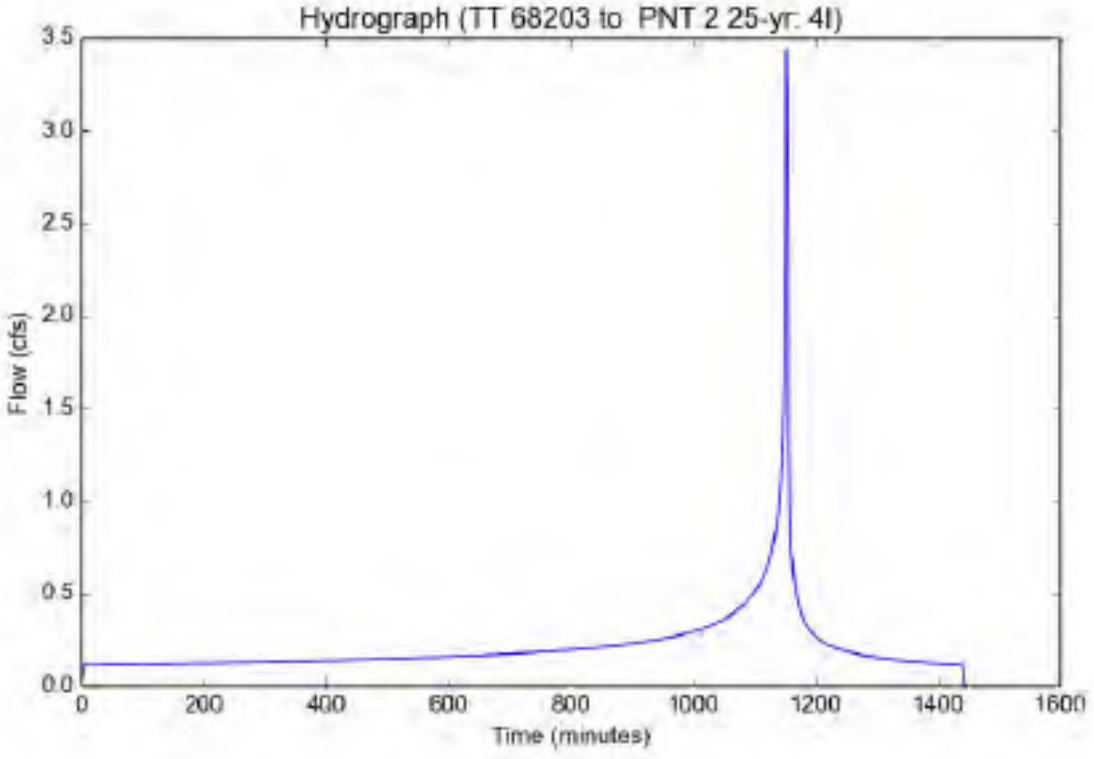
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 2 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 2 25-yr
Subarea ID	4I
Area (ac)	1.05
Flow Path Length (ft)	109.0
Flow Path Slope (vft/hft)	0.017
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.86
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8932
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.4389
Burned Peak Flow Rate (cfs)	3.4389
24-Hr Clear Runoff Volume (ac-ft)	0.4316
24-Hr Clear Runoff Volume (cu-ft)	18800.5787



Peak Flow Hydrologic Analysis

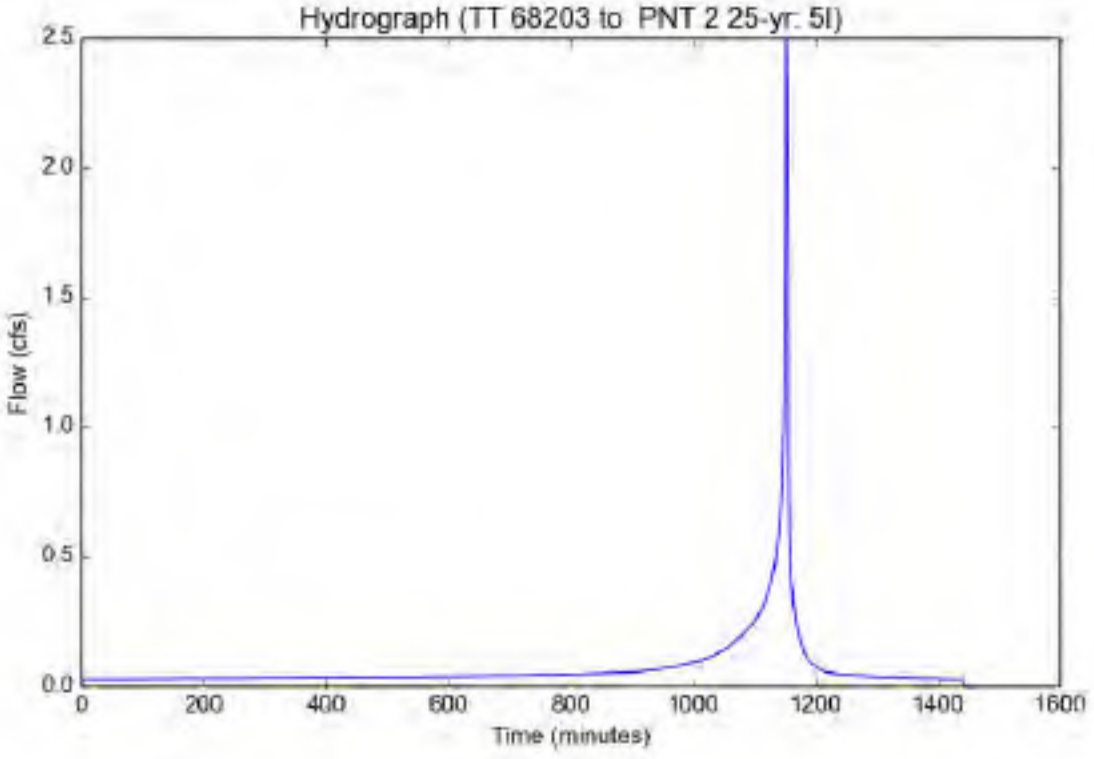
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 2 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 2 25-yr
Subarea ID	5I
Area (ac)	0.79
Flow Path Length (ft)	211.0
Flow Path Slope (vft/hft)	0.085
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.18
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.4914
Burned Peak Flow Rate (cfs)	2.4914
24-Hr Clear Runoff Volume (ac-ft)	0.1479
24-Hr Clear Runoff Volume (cu-ft)	6441.2381



Peak Flow Hydrologic Analysis

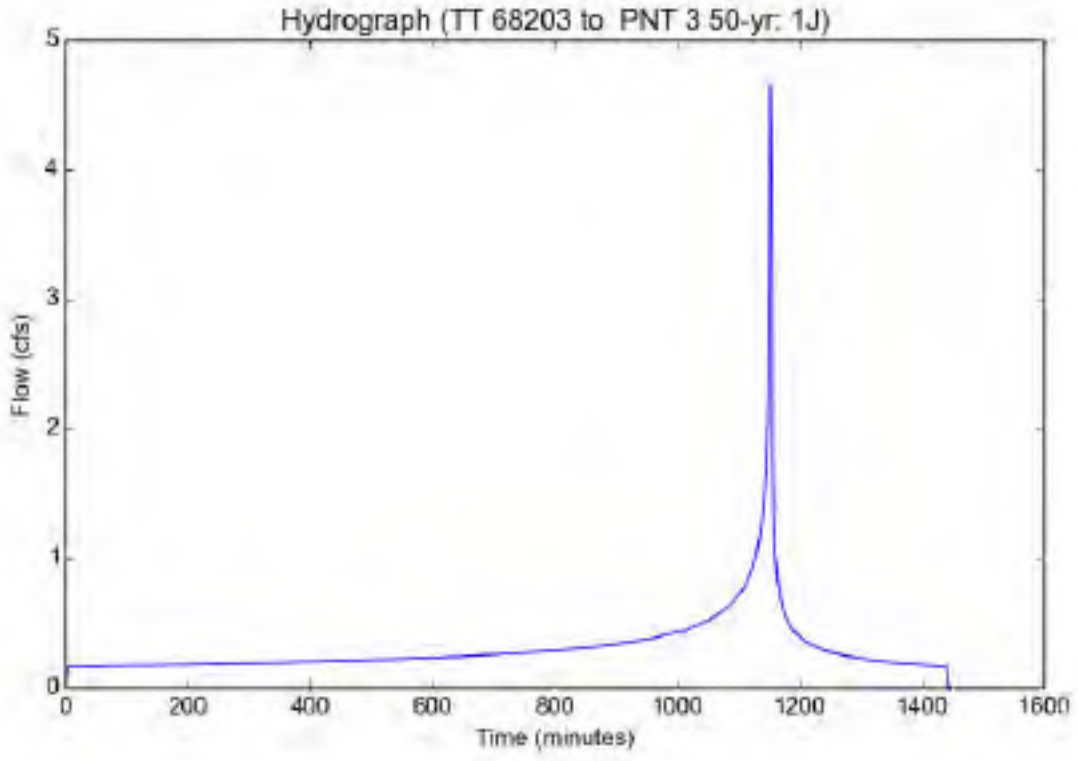
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 3 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 3 50-yr
Subarea ID	1J
Area (ac)	1.24
Flow Path Length (ft)	176.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.96
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8985
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.6529
Burned Peak Flow Rate (cfs)	4.6529
24-Hr Clear Runoff Volume (ac-ft)	0.6277
24-Hr Clear Runoff Volume (cu-ft)	27343.0972



Peak Flow Hydrologic Analysis

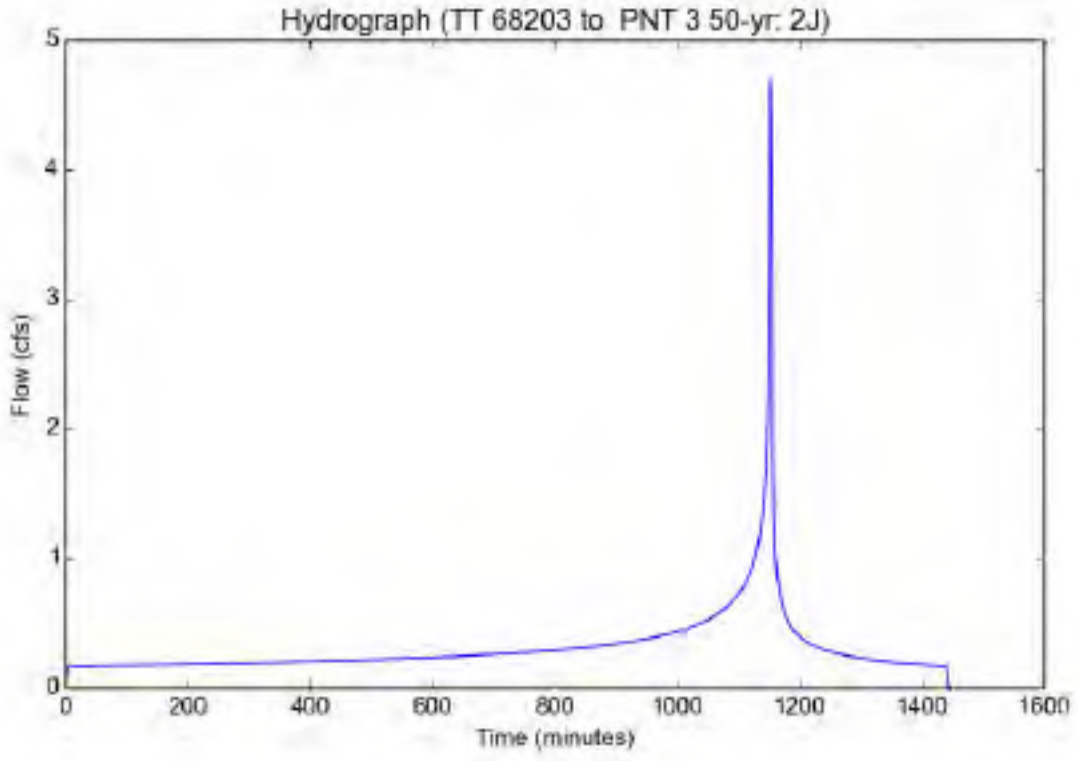
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 3 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 3 50-yr
Subarea ID	2J
Area (ac)	1.25
Flow Path Length (ft)	275.0
Flow Path Slope (vft/hft)	0.022
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.96
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8985
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.6904
Burned Peak Flow Rate (cfs)	4.6904
24-Hr Clear Runoff Volume (ac-ft)	0.6328
24-Hr Clear Runoff Volume (cu-ft)	27563.606



Peak Flow Hydrologic Analysis

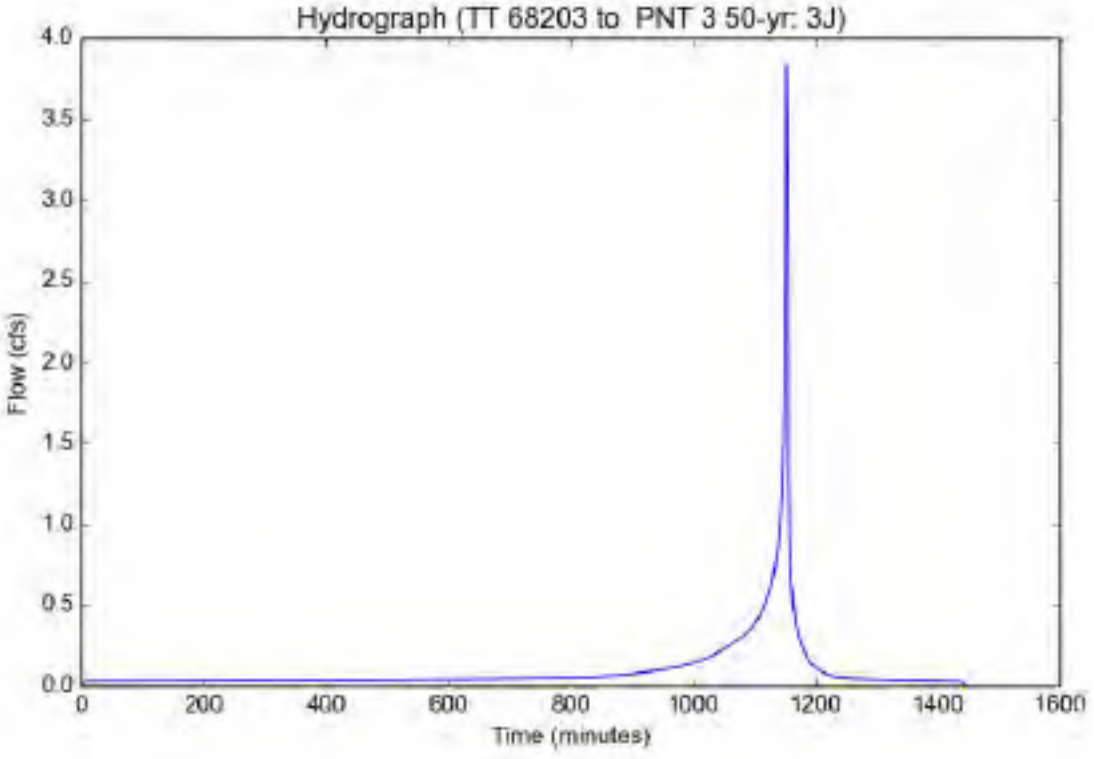
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 3 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 3 50-yr
Subarea ID	3J
Area (ac)	1.06
Flow Path Length (ft)	529.0
Flow Path Slope (vft/hft)	0.108
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.8309
Burned Peak Flow Rate (cfs)	3.8309
24-Hr Clear Runoff Volume (ac-ft)	0.2074
24-Hr Clear Runoff Volume (cu-ft)	9036.2411



Peak Flow Hydrologic Analysis

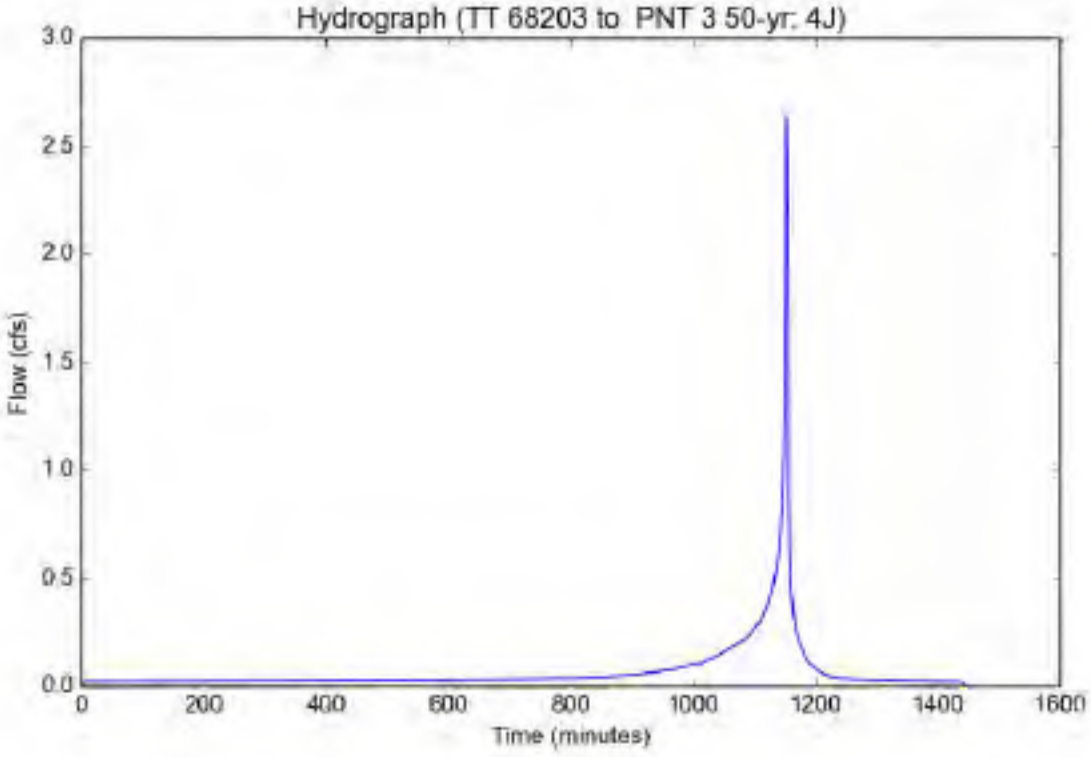
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 3 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 3 50-yr
Subarea ID	4J
Area (ac)	0.73
Flow Path Length (ft)	359.0
Flow Path Slope (vft/hft)	0.25
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.6383
Burned Peak Flow Rate (cfs)	2.6383
24-Hr Clear Runoff Volume (ac-ft)	0.1429
24-Hr Clear Runoff Volume (cu-ft)	6223.0717



Peak Flow Hydrologic Analysis

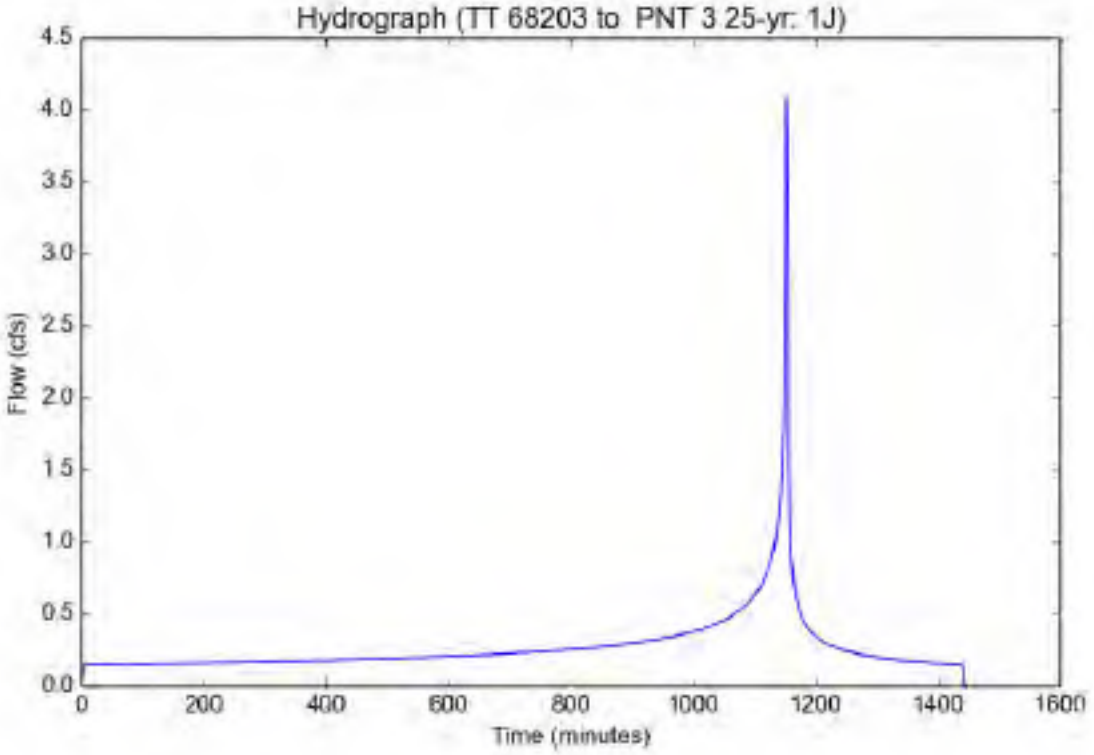
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 3 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 3 25-yr
Subarea ID	1J
Area (ac)	1.24
Flow Path Length (ft)	176.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.96
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8981
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.0834
Burned Peak Flow Rate (cfs)	4.0834
24-Hr Clear Runoff Volume (ac-ft)	0.5505
24-Hr Clear Runoff Volume (cu-ft)	23980.8661



Peak Flow Hydrologic Analysis

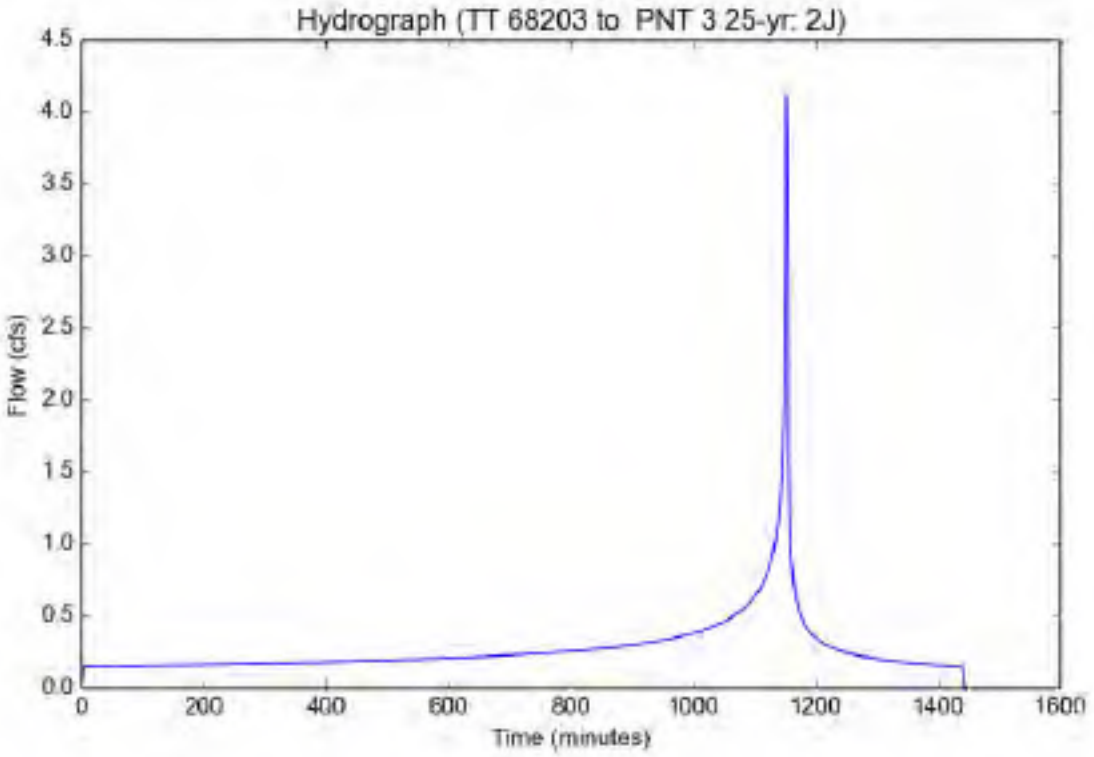
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 3 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 3 25-yr
Subarea ID	2J
Area (ac)	1.25
Flow Path Length (ft)	275.0
Flow Path Slope (vft/hft)	0.022
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.96
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8981
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.1163
Burned Peak Flow Rate (cfs)	4.1163
24-Hr Clear Runoff Volume (ac-ft)	0.555
24-Hr Clear Runoff Volume (cu-ft)	24174.2602



Peak Flow Hydrologic Analysis

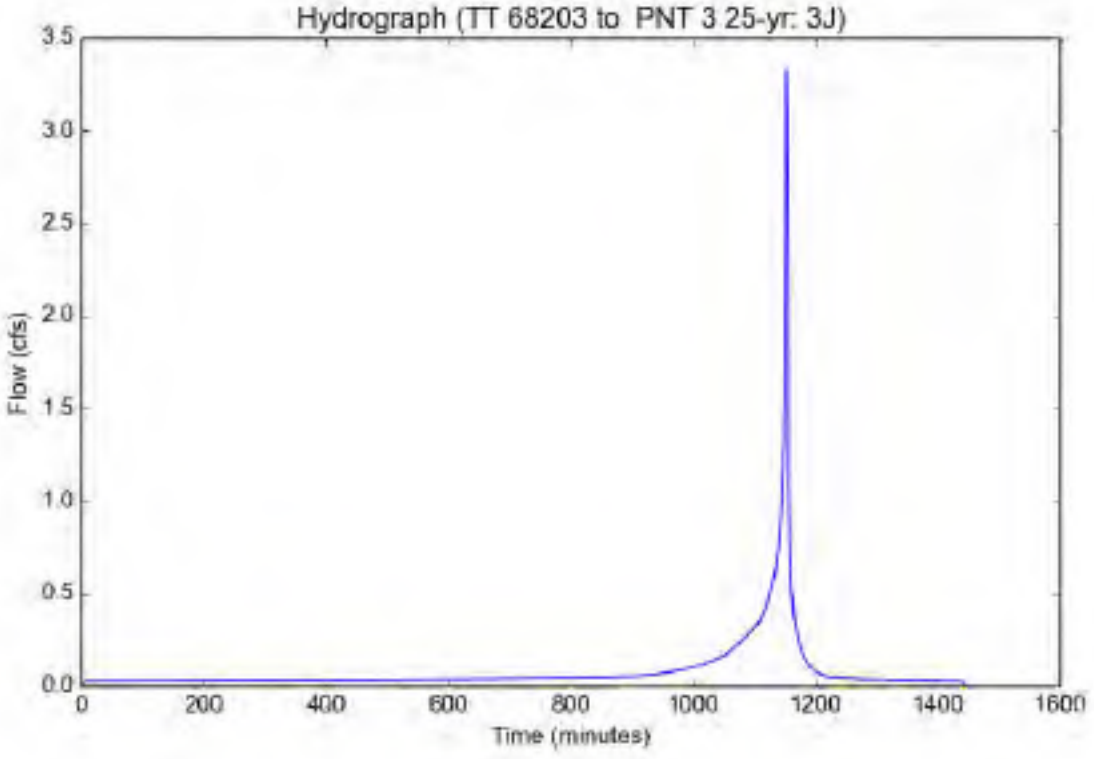
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 3 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 3 25-yr
Subarea ID	3J
Area (ac)	1.06
Flow Path Length (ft)	529.0
Flow Path Slope (vft/hft)	0.108
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.3277
Burned Peak Flow Rate (cfs)	3.3277
24-Hr Clear Runoff Volume (ac-ft)	0.1705
24-Hr Clear Runoff Volume (cu-ft)	7426.5612



Peak Flow Hydrologic Analysis

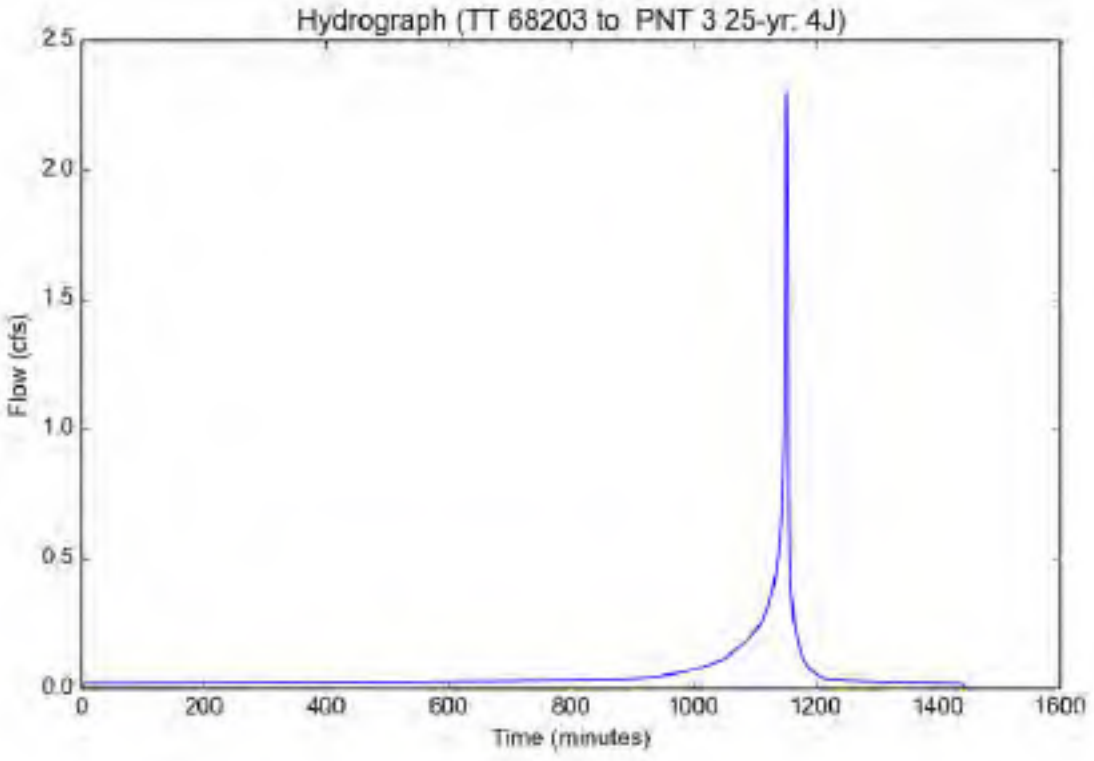
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL to PNT 3 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 to PNT 3 25-yr
Subarea ID	4J
Area (ac)	0.73
Flow Path Length (ft)	359.0
Flow Path Slope (vft/hft)	0.25
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.2917
Burned Peak Flow Rate (cfs)	2.2917
24-Hr Clear Runoff Volume (ac-ft)	0.1174
24-Hr Clear Runoff Volume (cu-ft)	5114.5186



Peak Flow Hydrologic Analysis

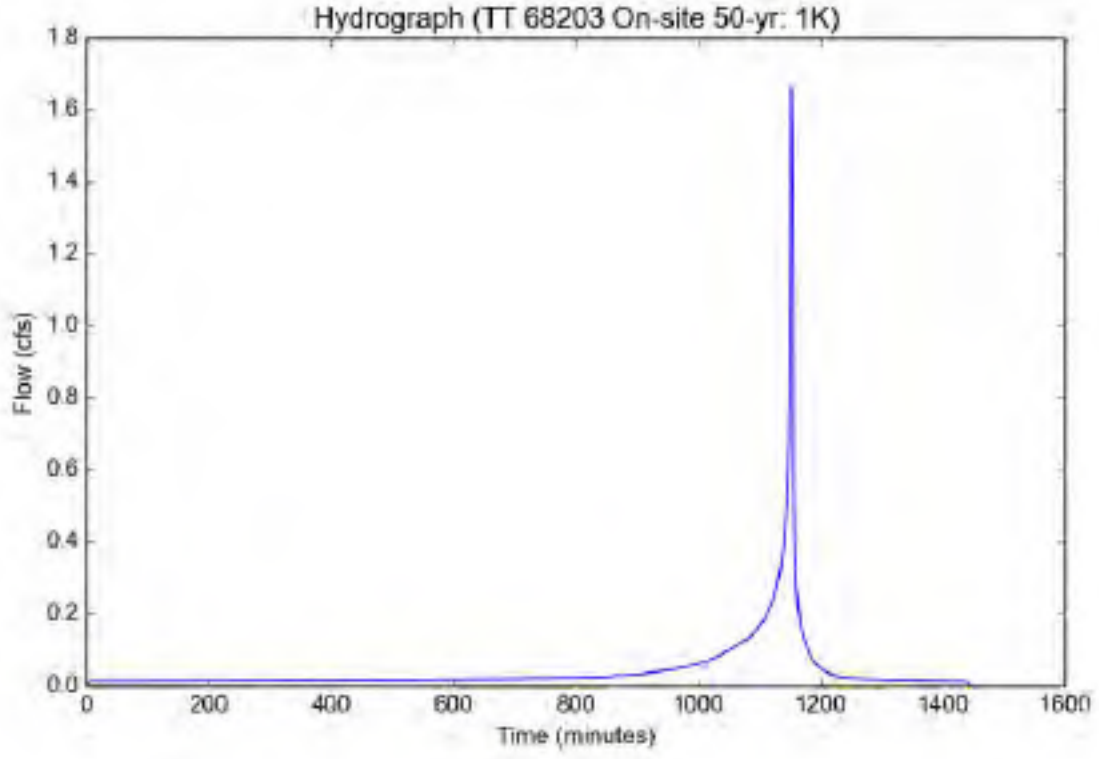
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL PNT 4 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 On-site 50-yr
Subarea ID	1K
Area (ac)	0.46
Flow Path Length (ft)	339.0
Flow Path Slope (vft/hft)	0.171
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.6625
Burned Peak Flow Rate (cfs)	1.6625
24-Hr Clear Runoff Volume (ac-ft)	0.09
24-Hr Clear Runoff Volume (cu-ft)	3921.3877



Peak Flow Hydrologic Analysis

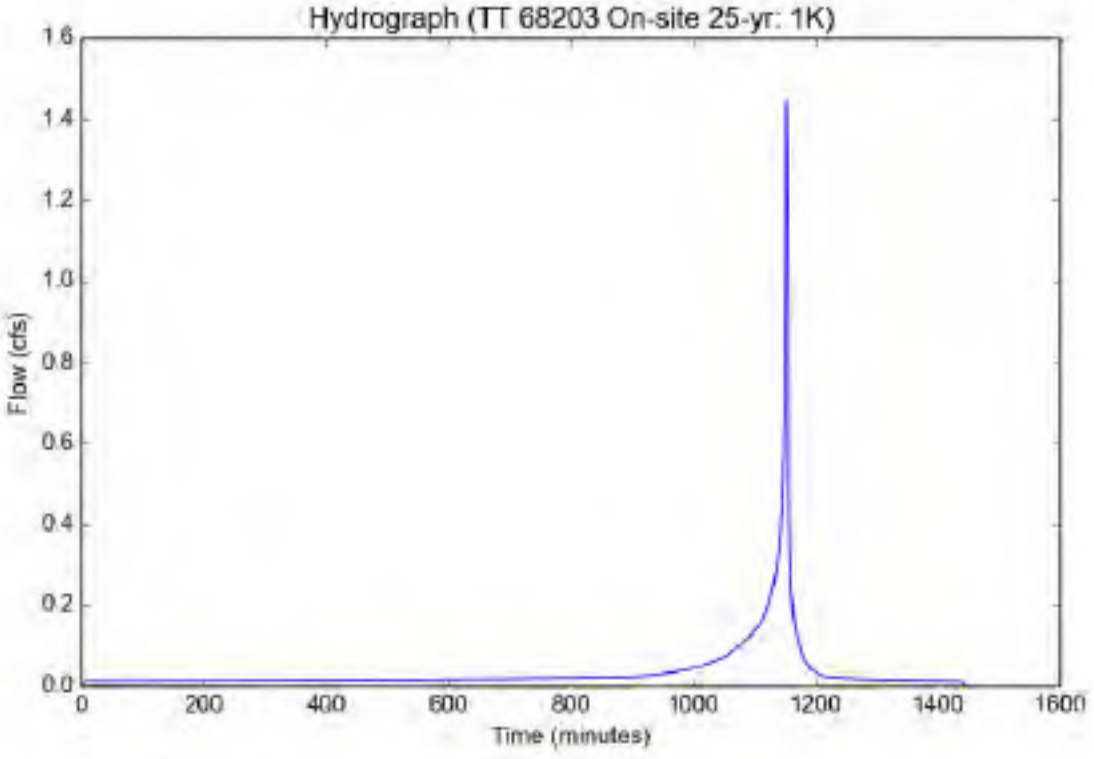
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL PNT 4 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 On-site 25-yr
Subarea ID	1K
Area (ac)	0.46
Flow Path Length (ft)	339.0
Flow Path Slope (vft/hft)	0.171
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.4441
Burned Peak Flow Rate (cfs)	1.4441
24-Hr Clear Runoff Volume (ac-ft)	0.074
24-Hr Clear Runoff Volume (cu-ft)	3222.8473



Peak Flow Hydrologic Analysis

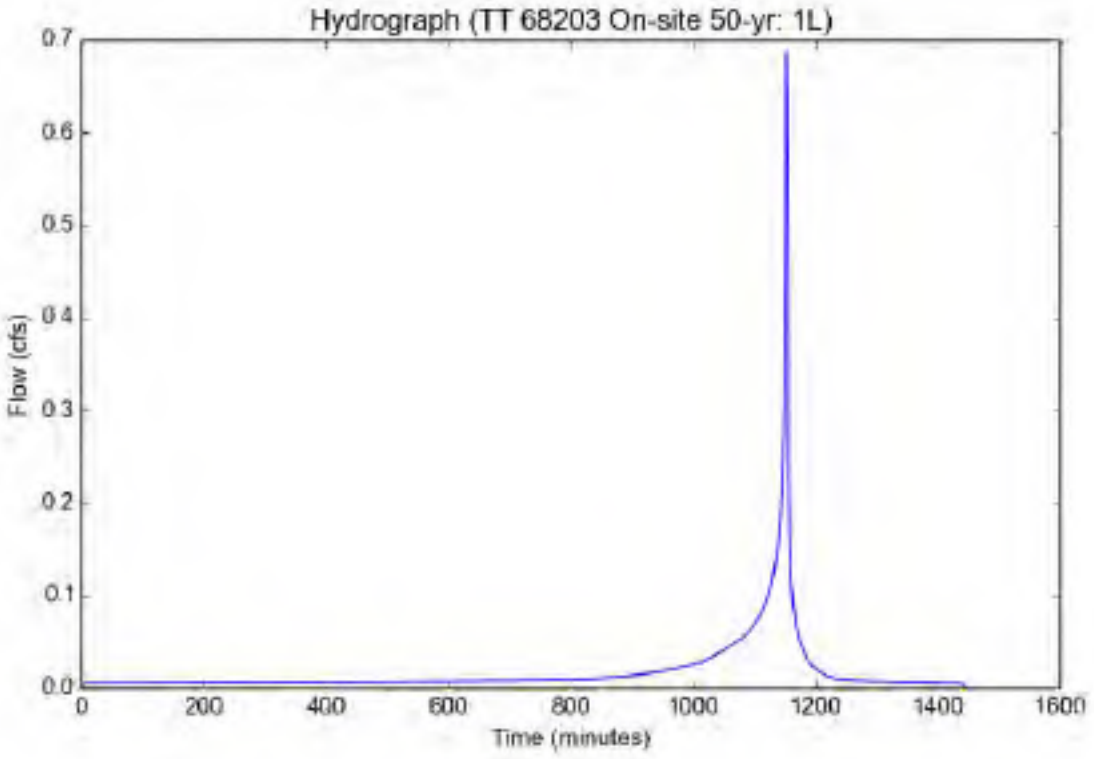
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL PNT 5 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 On-site 50-yr
Subarea ID	1L
Area (ac)	0.19
Flow Path Length (ft)	282.0
Flow Path Slope (vft/hft)	0.092
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.6867
Burned Peak Flow Rate (cfs)	0.6867
24-Hr Clear Runoff Volume (ac-ft)	0.0372
24-Hr Clear Runoff Volume (cu-ft)	1619.7036



Peak Flow Hydrologic Analysis

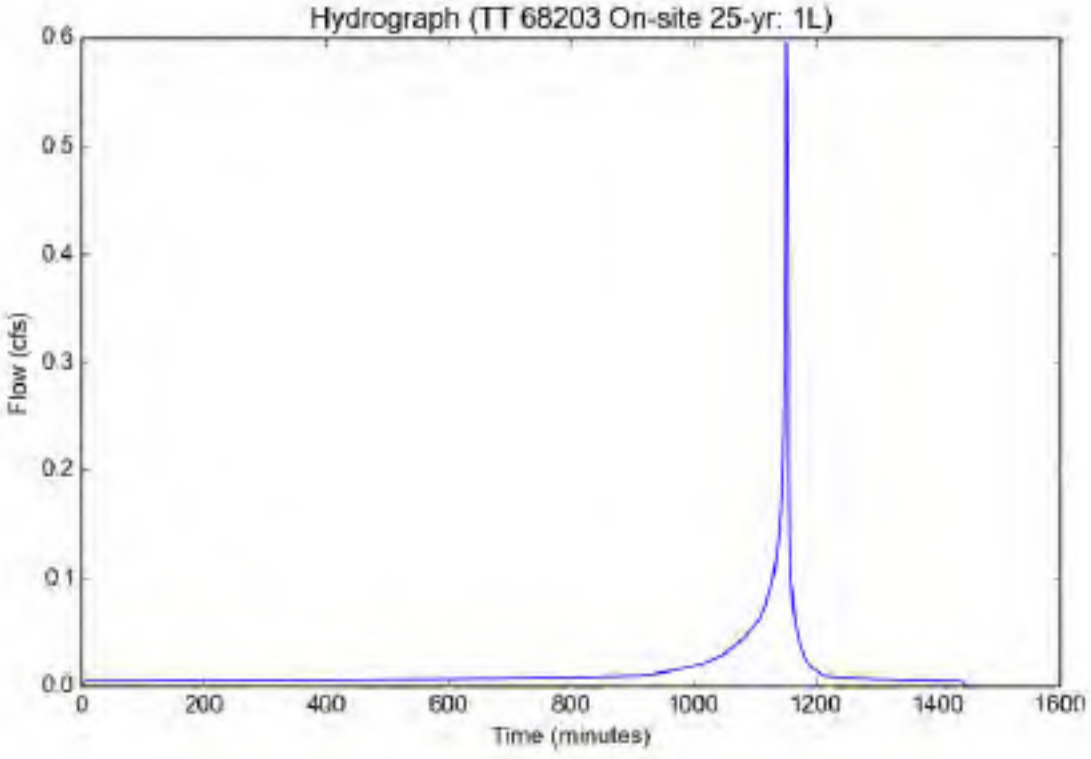
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL PNT 5 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 On-site 25-yr
Subarea ID	1L
Area (ac)	0.19
Flow Path Length (ft)	282.0
Flow Path Slope (vft/hft)	0.092
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.5965
Burned Peak Flow Rate (cfs)	0.5965
24-Hr Clear Runoff Volume (ac-ft)	0.0306
24-Hr Clear Runoff Volume (cu-ft)	1331.1761



Peak Flow Hydrologic Analysis

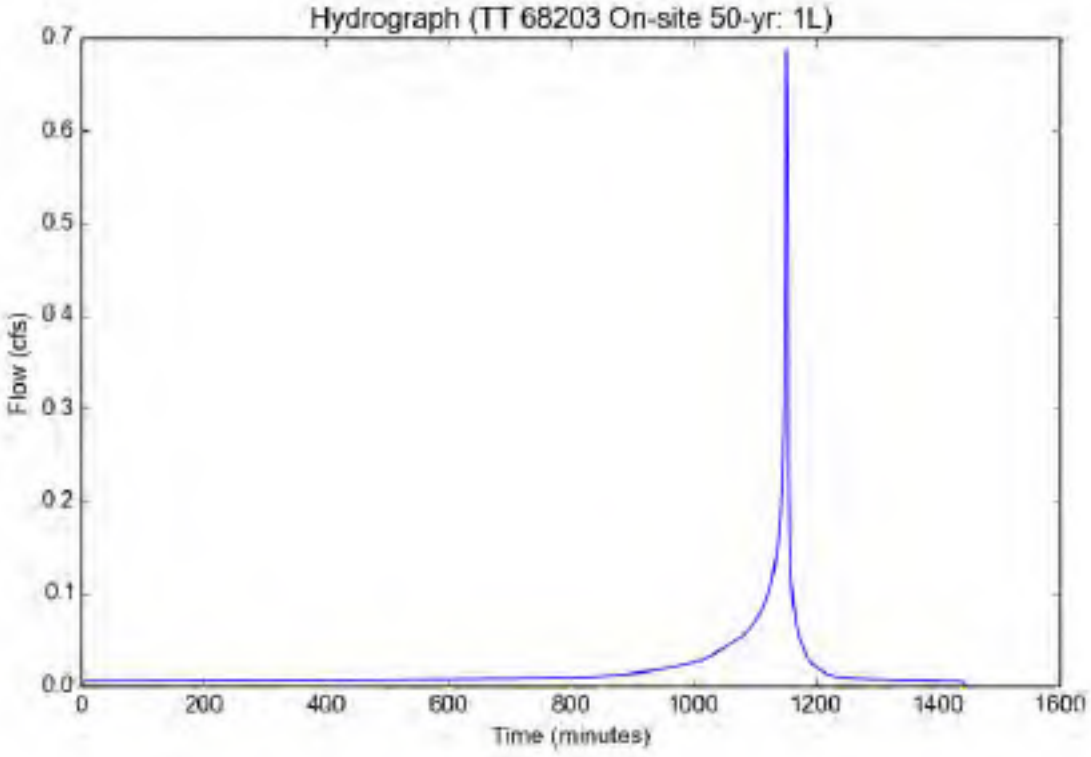
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL PNT 5 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 On-site 50-yr
Subarea ID	1L
Area (ac)	0.19
Flow Path Length (ft)	240.0
Flow Path Slope (vft/hft)	0.04
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8654
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.6867
Burned Peak Flow Rate (cfs)	0.6867
24-Hr Clear Runoff Volume (ac-ft)	0.0372
24-Hr Clear Runoff Volume (cu-ft)	1619.7036



Peak Flow Hydrologic Analysis

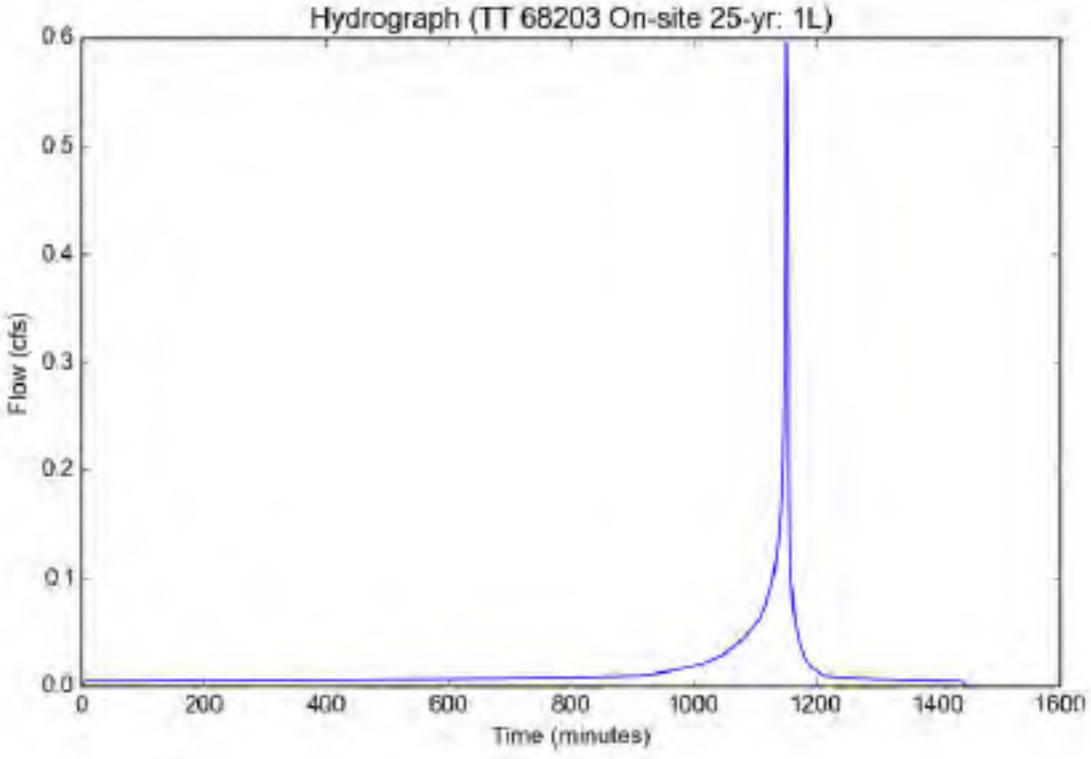
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL PNT 5 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 On-site 25-yr
Subarea ID	1L
Area (ac)	0.19
Flow Path Length (ft)	240.0
Flow Path Slope (vft/hft)	0.04
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.1
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8561
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.5965
Burned Peak Flow Rate (cfs)	0.5965
24-Hr Clear Runoff Volume (ac-ft)	0.0306
24-Hr Clear Runoff Volume (cu-ft)	1331.1761



Peak Flow Hydrologic Analysis

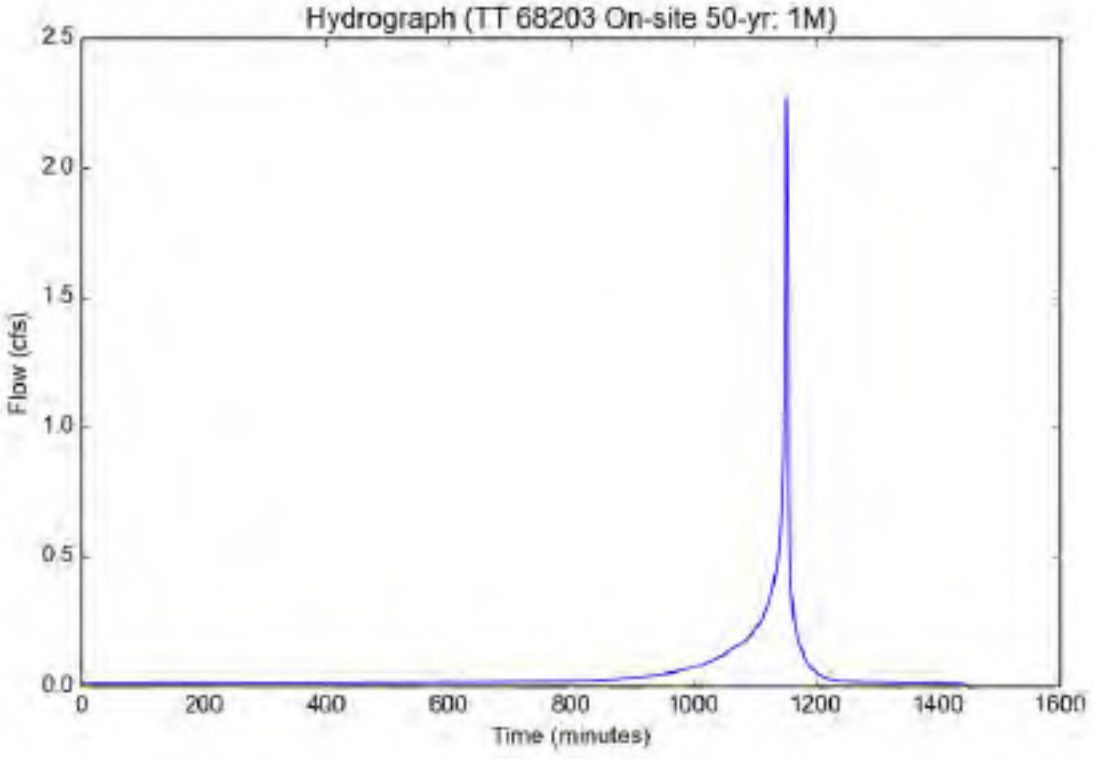
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL PNT 8 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 On-site 50-yr
Subarea ID	1M
Area (ac)	0.63
Flow Path Length (ft)	361.0
Flow Path Slope (vft/hft)	0.103
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	50-yr
Fire Factor	scr
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.0
Peak Intensity (in/hr)	4.1764
Undeveloped Runoff Coefficient (Cu)	0.8615
Developed Runoff Coefficient (Cd)	0.8619
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.2677
Burned Peak Flow Rate (cfs)	2.319
24-Hr Clear Runoff Volume (ac-ft)	0.1028
24-Hr Clear Runoff Volume (cu-ft)	4478.8153



Peak Flow Hydrologic Analysis

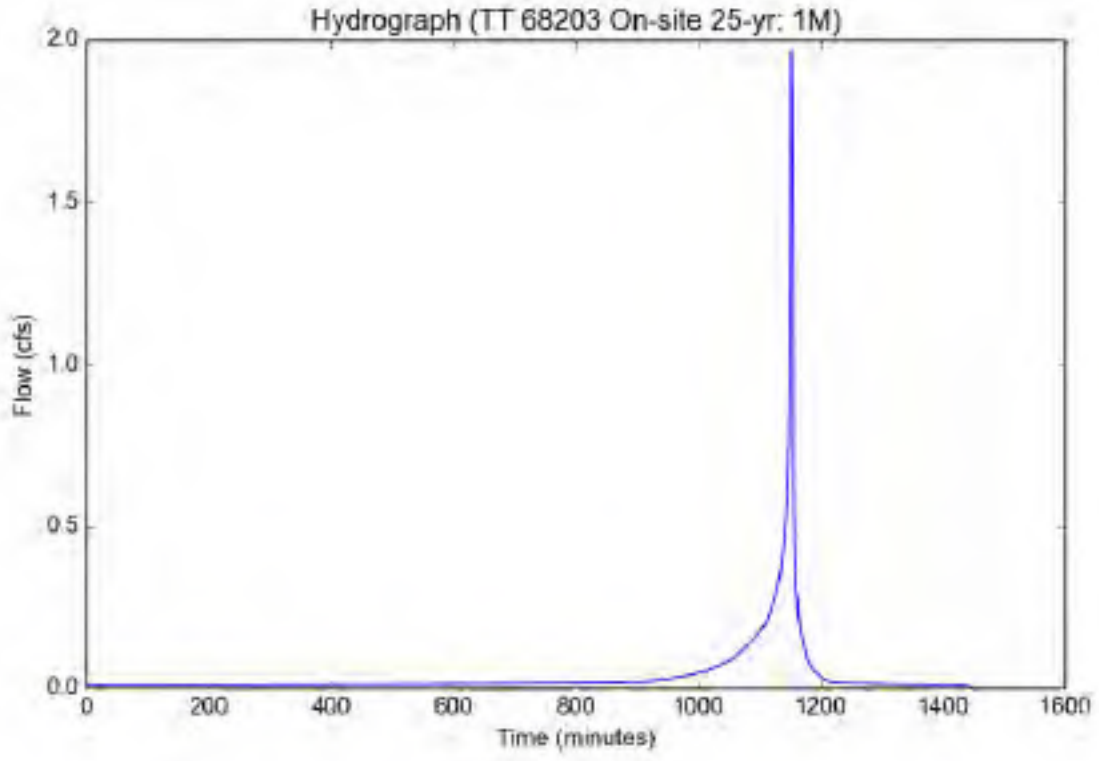
File location: J:/Civil 3D Projects/92020019/50_Sheet Sets/10_Hydrology/Hydrocalc/TT 68203 POST TOTAL PNT 8 Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	TT 68203 On-site 25-yr
Subarea ID	1M
Area (ac)	0.63
Flow Path Length (ft)	361.0
Flow Path Slope (vft/hft)	0.103
50-yr Rainfall Depth (in)	7.0
Percent Impervious	0.01
Soil Type	99
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	6.146
Peak Intensity (in/hr)	3.6669
Undeveloped Runoff Coefficient (Cu)	0.8513
Developed Runoff Coefficient (Cd)	0.8517
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.9676
Burned Peak Flow Rate (cfs)	1.9676
24-Hr Clear Runoff Volume (ac-ft)	0.0827
24-Hr Clear Runoff Volume (cu-ft)	3600.7676



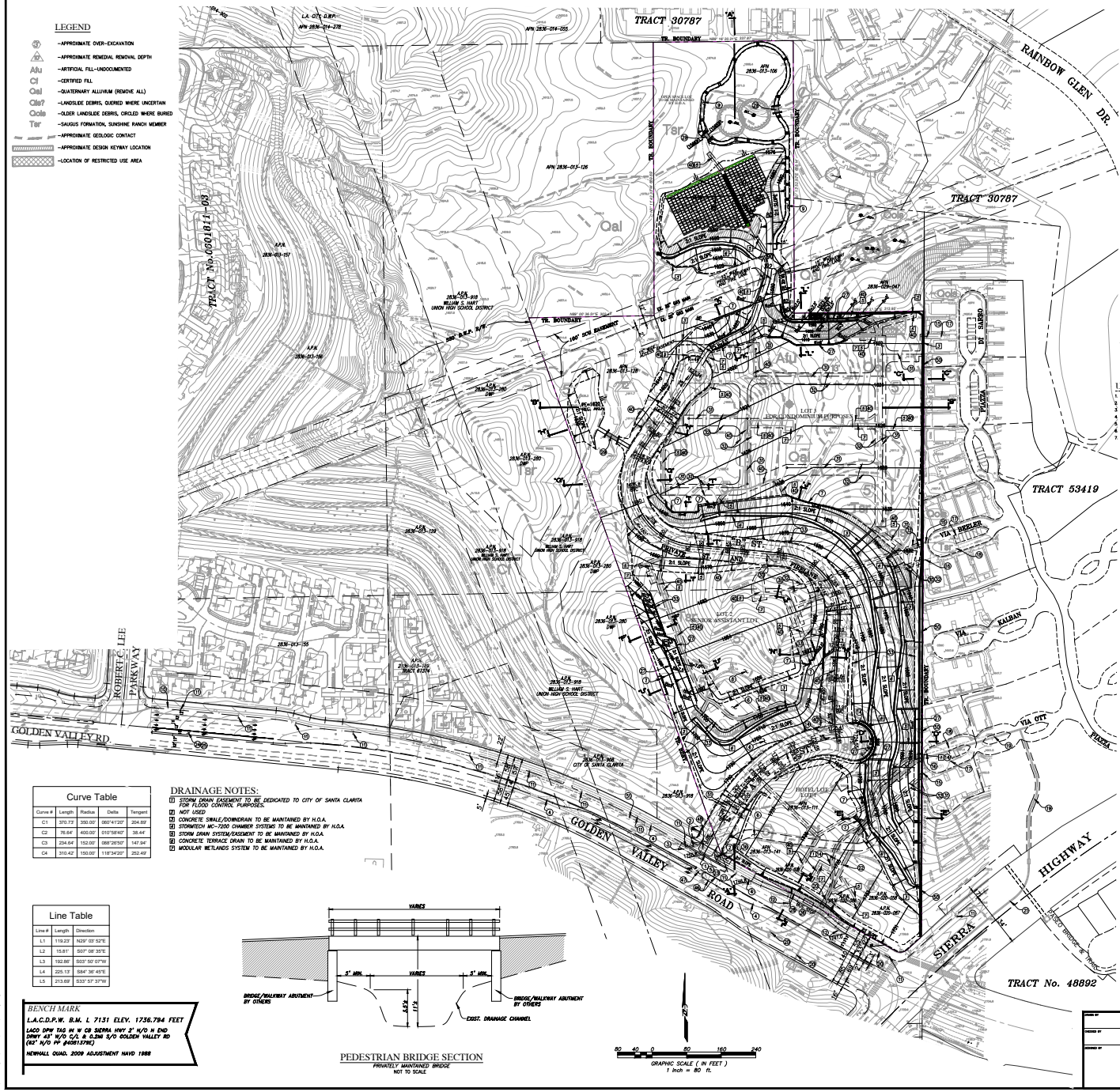
Appendix F:

DRAFT TENTATIVE TRACT MAP No. 68203 SITE PLAN

(FOR INFORMATION PURPOSES ONLY, NOT FOR APPROVAL)

TENTATIVE TRACT MAP No. 68203

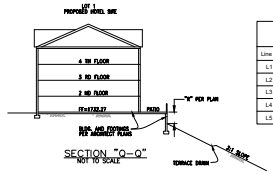
LOCATED IN THE CITY OF SANTA CLARITA
STATE OF CALIFORNIA



TENTATIVE TRACT MAP No. 68203

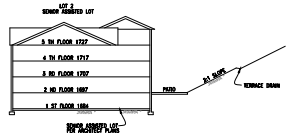
LOCATED IN THE CITY OF SANTA CLARITA
STATE OF CALIFORNIA

PARKING SUMMARY						
				PARKING		
CONDOMINIUM	REQUIRED	PROVIDED	STANDARD	REGULAR	HANDICAP VAN	HANDICAP
HOTEL LOT (50 ROOMS)	100	105	104	79	4	6
SENIOR ASSISTANT LOT (22 UNIT)	70	72	57	-	6	2
CONDOMINIUM LOT (29 UNITS)	58	58	50	6	1	-
TOTAL	228	235	211	79	11	8



SECTION "Q-Q"
NOT TO SCALE

Line Table		
Line #	Length	Direction
L1	119.23'	N29° 03' 52"E
L2	15.81'	S07° 08' 35"E
L3	192.86'	S03° 50' 07"W
L4	225.13'	S84° 36' 45"E
L5	213.69'	S33° 57' 37"W



SECTION "S-S"
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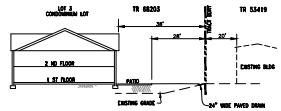
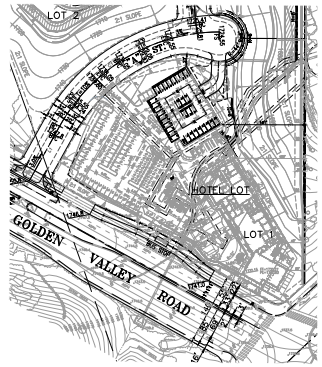
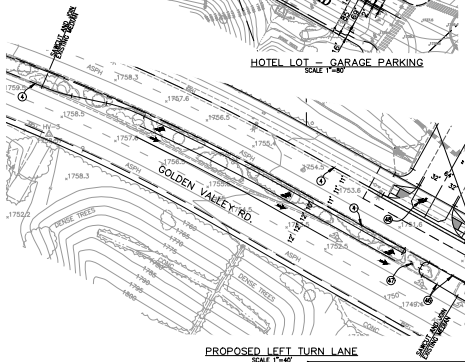


SECTION V-V
NOT TO SCALE



HOTEL LOT – GARAGE PARKING
SCALE 1"=80'



PROPOSED LEFT TURN LANE
SCALE 1"=40'

NOTES:

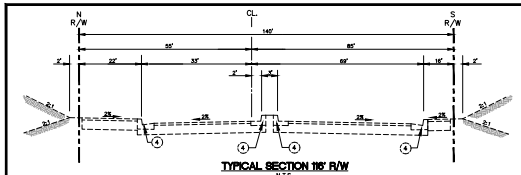
4. EXISTING CURB AND GUTTER TO REMAIN
7. PROPOSED RETAINING WALL (HEIGHT PER PLAN)
15. PROPOSED SEWER CONNECTION TO PC. 02-13
17. EXISTING 8" VCP SEWER PER PC. 02-13
18. PROPOSED BUS STOP WITH 10'x25" CONCRETE PASSENGER LOADING AND WAITING AREA, SHELTER, BENCH AND TRASH RECEPTACLE SHALL BE APPROVED BY CITY TRANSIT STAFF. (BUS STOP TURNOUT/PULLOUT DIMENSIONS TO BE DETERMINED BY THE DEPARTMENT OF PUBLIC WORKS AND THE CITY TRANSIT DIVISION)
21. PROPOSED KEYSTONE WALL WITH WALL DRAIN
24. PROPOSED STREET DEDICATION
28. PROPOSED PEDESTRIAN BRIDGE/WALKWAY
33. SLOPE TO BE MAINTAINED BY H.O.A.
34. PROPOSED PARKING STALLS (9'x18')
36. PROPOSED DELIVERY/LOADING STALLS (12'x20')
40. PROPOSED EV STATION
42. PROPOSED LONG TERM/SHORT TERM BICYCLE PARKING
43. PROPOSED EMPLOYEE BREAK AREA
44. PROPOSED TRASH ENCLOSURE
45. PROPOSED DROPOFF AREA
46. REMOVE EXISTING OPENING, CONST. CURB AND GUTTER
47. PROPOSED 20' WIDE LEFT TURN OPENING OR PER TRAFFIC ENGINEER RECOMMENDATION
48. RIGHT TURN ONLY
49. PROPOSED PUBLIC 6"x4"x2 1/2" FIRE HYDRANT PER AMERICAN WATERWORKS ASSOCIATION STANDARDS C503. FIRE FLOW REQUIREMENT 4000 GPM @ 20 PSI FOR 4 HOURS

GRAPHIC SCALE (IN FEET)
1 Inch = 80 ft.

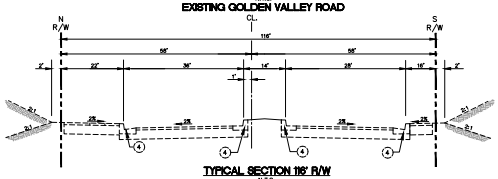
DESIGNED BY			
DRAWN BY			
CHECKED BY			
	DATE CHANGED	CHANGED BY	REVISIONS

TENTATIVE TRACT MAP No. 68203

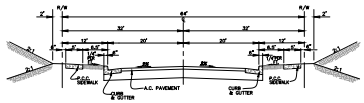
LOCATED IN THE CITY OF SANTA CLARITA
STATE OF CALIFORNIA



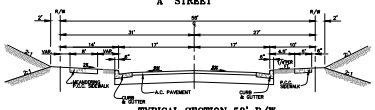
TYPICAL SECTION 116' R/W
NOT TO SCALE
EXISTING GOLDEN VALLEY ROAD



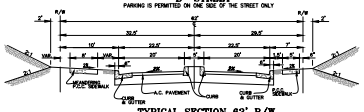
TYPICAL SECTION 116' R/W
NOT TO SCALE
EXISTING GOLDEN VALLEY ROAD



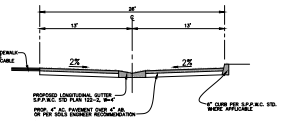
TYPICAL SECTION 64' R/W
NOT TO SCALE
"A" STREET



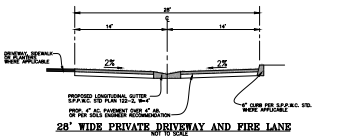
TYPICAL SECTION 56' R/W
PRIVATE DRIVEWAY & FIRE LANE
NOT TO SCALE
"B" STREET
PARKING IS PERMITTED ON ONE SIDE OF THE STREET ONLY



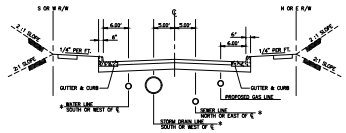
TYPICAL SECTION 62' R/W
PRIVATE DRIVEWAY & FIRE LANE
NOT TO SCALE
"B" STREET



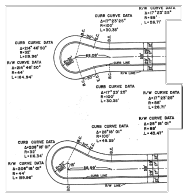
26' WIDE PRIVATE DRIVEWAY AND FIRE LANE
NOT TO SCALE



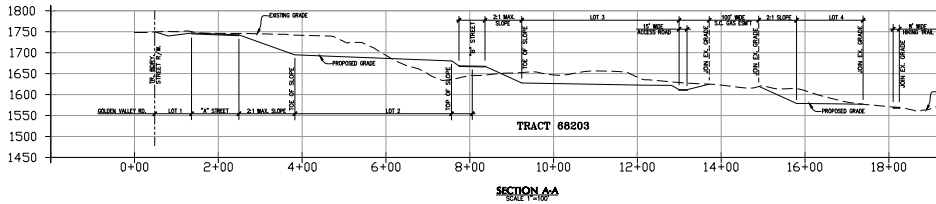
28' WIDE PRIVATE DRIVEWAY AND FIRE LANE
NOT TO SCALE



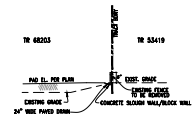
TYPICAL UTILITY LOCATION
NOT TO SCALE
* PIPE SIZE AND DEPTH PER ENGINEERING



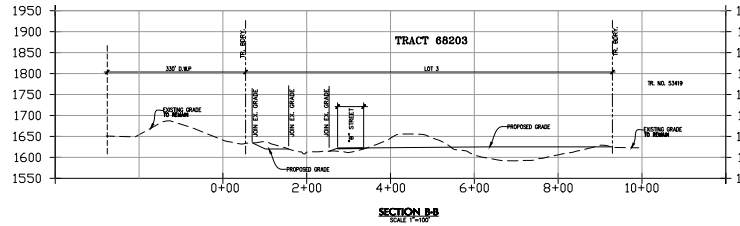
TYPICAL RESIDENTIAL CUL-DE-SAC DETAIL
NOT TO SCALE
PER L.A.C.D.P.W. LAND DEVELOPMENT DIVISION HANDBOOK, VOLUME 5, CHAPTER 44, PAGE 44-38



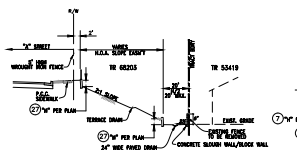
SECTION A-A
SCALE 1"=100'



SECTION C-C
NOT TO SCALE



SECTION B-B
SCALE 1"=100'



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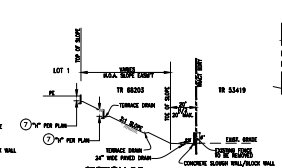

SECTION E-E
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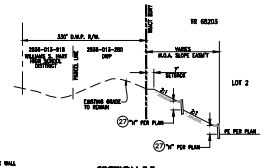

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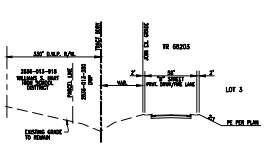
NOT TO SCALE



SECTION G-G
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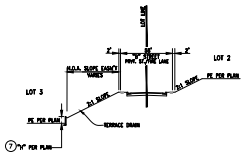

SECTION H
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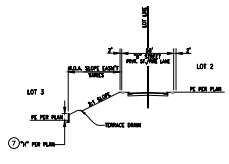
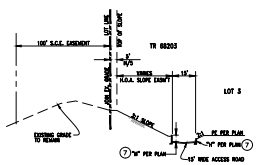
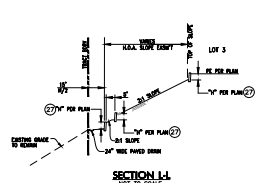


SECTION I-I
NOT TO SCALE



SECTION K-K
NOT TO SCALE



SECTION I-I
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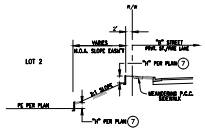

SECTION "N-N"
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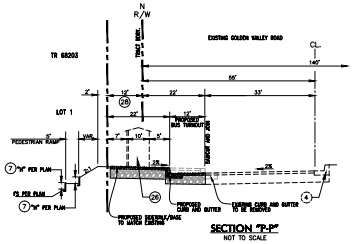

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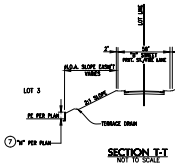
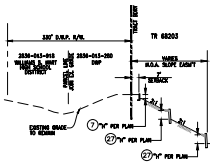


SECTION T-T
NOT TO SCALE



SECTION U-U
NOT TO SCALE

DATE CHANGED	CHANGED BY	REV

TENTATIVE TRACT MAP No. 68203
EASEMENTS AND LEASES

LOCATED IN THE CITY OF SANTA CLARITA
STATE OF CALIFORNIA

EASEMENT AND LEASE NOTES

(6) AN EASEMENT FOR WATER RIGHTS FOR MINING AGRICULTURAL, MANUFACTURING OR OTHER PURPOSES AND RIGHTS TO CANALS TO DITCHES AND RESERVOIRS USED IN CONNECTION WITH SUCH WATER RIGHTS AND INCIDENTAL PURPOSES, RECORDED NOVEMBER 26, 1923 AS BOOK 2873, PAGE 145 OF OFFICIAL RECORDS.
IN FAVOR OF: THE UNITED STATES OF AMERICA

(7) AN OIL AND GAS LEASE EXECUTED BY T. M. FREY, JR. A SINGLE MAN, AUGUSTA FERNIED AND MARY FERNIED, HIS WIFE AND ALBERT C. SMALL AND NOBEL S. SMALL, HIS WIFE AS LESSOR AND W. V. STABLER AS LESSEE, RECORDED JULY 26, 1926 AS INSTRUMENT NO. 767 IN BOOK 4646, PAGE 365 OF OFFICIAL RECORDS.

THE EFFECT OF A DOCUMENT ENTITLED 'INTERLOCUTORY JUDGMENT AND FINAL ORDER OF CONDEMNATION', RECORDED MAY 08, 2002 AS INSTRUMENT NOS. 02-1067607 AND 02-1067608 OF OFFICIAL RECORDS.

DEFECTS, LIENS, ENCUMBRANCES OR OTHER MATTERS AFFECTING THE LEASEHOLD ESTATE, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS ARE NOT SHOWN HEREIN.

(8) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED JUNE 23, 1930 AS INSTRUMENT NO. 711 IN BOOK 10081, PAGE 181 OF OFFICIAL RECORDS.
IN FAVOR OF: THE PACIFIC TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION
AFFECTS: AS DESCRIBED THEREIN

THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

(10) AN EASEMENT FOR PUBLIC HIGHWAY, EMBANKMENT SLOPES AND INCIDENTAL PURPOSES, RECORDED DECEMBER 30, 1937 AS INSTRUMENT NO. 614 OF OFFICIAL RECORDS.
IN FAVOR OF: STATE OF CALIFORNIA
AFFECTS: AS DESCRIBED THEREIN

THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

(11) A SUBSURFACE OIL AND GAS LEASE, EXECUTED BY THOMAS M. FREY AND CLARA G. FREY, HUSBAND AND WIFE AS LESSOR AND JAY LEE CROSS AS LESSEE, RECORDED MAY 27, 1941 AS INSTRUMENT NO. 1560 OF OFFICIAL RECORDS, AFFECTING THE LAND LYING BELOW A DEPTH OF 0NDT SHOWN0 FEET FROM THE SURFACE THEREOF, WITHOUT THE RIGHT OF SURFACE ENTRY.

DEFECTS, LIENS, ENCUMBRANCES OR OTHER MATTERS AFFECTING THE LEASEHOLD ESTATE, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS ARE NOT SHOWN HEREIN.

(12) A SUBSURFACE OIL AND GAS LEASE, EXECUTED BY HAROLD STUCKMAN, ETAL, AS LESSOR AND INDEPENDANT EXPLORATION COMPANY, A CALIFORNIA CORPORATION AS LESSEE, RECORDED JANUARY 11, 1949 AS INSTRUMENT NO. 296 IN BOOK 29039, PAGE 12; RECORDED FEBRUARY 19, 1949 AS INSTRUMENT NO. 2466 IN BOOK 29415, PAGE 401; RECORDED MARCH 10, 1949 AS BOOK 29536, PAGE 205 AND RECORDED APRIL 7, 1949 IN BOOK 29786 PAGE 389 RECORDED DECEMBER 28, 1949 AS INSTRUMENT NO. 2058 IN BOOK 31804, PAGE 245, ALL OF OFFICIAL RECORDS, AFFECTING THE LAND BELOW A DEPTH OF 0NDT SHOWN0 FEET FROM THE SURFACE THEREOF, WITHOUT THE RIGHT OF SURFACE ENTRY.

THE TERMS AND PROVISIONS CONTAINED IN THE DOCUMENT ENTITLED 'DECLARATION OF POOLING' RECORDED MAY 19, 1993 AS INSTRUMENT NO. 93-951901 OF OFFICIAL RECORDS.

THE EFFECT OF A DOCUMENT ENTITLED 'INTERLOCUTORY JUDGMENT AND FINAL ORDER OF CONDEMNATION', RECORDED MAY 8, 2002 AS INSTRUMENT NO. 02-1067609 OF OFFICIAL RECORDS.

THE EFFECT OF A DOCUMENT ENTITLED 'FINAL ORDER OF CONDEMNATION', RECORDED SEPTEMBER 18, 2003 AS INSTRUMENT NO. 03-2761989 OF OFFICIAL RECORDS.

THE LESSOR'S INTEREST UNDER THE LEASE HAS BEEN ASSIGNED TO PAUL RENAUD VELUZAT AND CAROL SUE VELUZAT, TRUSTEES OF THE VELUZAT TRUST DATED MAY 30, 2013, AS COMMUNITY PROPERTY BY ASSIGNMENT RECORDED AUGUST 2, 2013 AS INSTRUMENT NO. 2013199244 OF OFFICIAL RECORDS.

DEFECTS, LIENS, ENCUMBRANCES OR OTHER MATTERS AFFECTING THE LEASEHOLD ESTATE, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS ARE NOT SHOWN HEREIN.

(13) A SUBSURFACE OIL AND GAS LEASE, EXECUTED BY M.R. YANT AND GENEVA F. YANT, HIS WIFE AS LESSOR AND J. RAMON SOMAVIA AND JUANITA BE L. SOMAVIA, HIS WIFE AS LESSEE, RECORDED FEBRUARY 16, 1949 AS INSTRUMENT NO. 1486 BOOK 29381, PAGE 43 OF OFFICIAL RECORDS, AFFECTING THE LAND LYING BELOW A DEPTH OF 0NDT SHOWN0 FEET FROM THE SURFACE THEREOF.

DOCUMENT(S) DECLARING MODIFICATIONS THEREOF RECORDED MARCH 10, 1949 AS BOOK 29536, PAGE 205 AND RECORDED APRIL 7, 1949 IN BOOK 29786, PAGE 184, BOTH OF OFFICIAL RECORDS.

DEFECTS, LIENS, ENCUMBRANCES OR OTHER MATTERS AFFECTING THE LEASEHOLD ESTATE, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS ARE NOT SHOWN HEREIN.

(14) A SUBSURFACE OIL AND GAS LEASE, EXECUTED BY JULIUS R. SCHWARTZ, MARRIED MAN AND ANNA R. SCHWARTZ, HIS WIFE AS LESSOR AND HARRY S. ROTHSCHILD AND JOSEPHINE E. ROTHSCHILD, HUSBAND AND WIFE, DBA ROTHSCHILD OIL COMPANY AS LESSEE, RECORDED MARCH 30, 1949 AS BOOK 29716, PAGE 185 AS INSTRUMENT NO. 2702 OF OFFICIAL RECORDS, AFFECTING THE LAND LYING BELOW A DEPTH OF 0NDT SHOWN0 FEET FROM THE SURFACE THEREOF.

DEFECTS, LIENS, ENCUMBRANCES OR OTHER MATTERS AFFECTING THE LEASEHOLD ESTATE WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS ARE NOT SHOWN HEREIN.

(15) A SUBSURFACE OIL AND GAS LEASE, EXECUTED BY D. L. ASHLEY AS LESSOR AND C. D. HOWE AS LESSEE, RECORDED JUNE 1, 1949 AS INSTRUMENT NO. 2154 IN BOOK 30217, PAGE 9 OF OFFICIAL RECORDS, AFFECTING THE LAND LYING BELOW A DEPTH OF 0NDT SHOWN0 FEET FROM THE SURFACE THEREOF.

THE LESSOR'S INTEREST UNDER THE LEASE HAS BEEN ASSIGNED TO PAUL RENAUD VELUZAT AND CAROL SUE VELUZAT, TRUSTEES OF THE VELUZAT TRUST DATED MAY 30, 2013, AS COMMUNITY PROPERTY BY ASSIGNMENT RECORDED AUGUST 2, 2013 AS INSTRUMENT NO. 2013199244 OF OFFICIAL RECORDS.

DEFECTS, LIENS, ENCUMBRANCES OR OTHER MATTERS AFFECTING THE LEASEHOLD ESTATE, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS ARE NOT SHOWN HEREIN.

(16) THE EFFECT OF A RECITAL CONTAINED IN VARIOUS DEEDS OF RECORD EXECUTED BY M. R. YANT AS FOLLOWS

"TOGETHER WITH FULL RIGHTS OF INGRESS AND EGRESS GRANTED TO ALL ADJOINING LANDOWNER' ONE OF WHICH DEED WAS RECORDED JULY 25, 1949 AS INSTRUMENT NO. 1570 IN BOOK 30613, PAGE 137 OF OFFICIAL RECORDS.

AFFECTS: THE LAND AND OTHER PROPERTY.

(18) THE EFFECT OF AN AGREEMENT DATED NOVEMBER 28, 1949, EXECUTED BY DOUGLAS OIL CO. OF CALIFORNIA, AND M. R. YANT, ETAL, REGARDING MINERALS AND ROYALTIES DERIVED FROM THE PRODUCTION THEREOF, RECORDED MARCH 7, 1950 AS INSTRUMENT NO. 3085 IN BOOK 30497, PAGE 259 OF OFFICIAL RECORDS.

(20) AN EASEMENT FOR ROAD AND INCIDENTAL PURPOSES, RECORDED FEBRUARY 26, 1954 AS INSTRUMENT NO. 3116 IN BOOK 43945, PAGE 366 OF OFFICIAL RECORDS.
IN FAVOR OF: C. W. RODECKER
AFFECTS: AS DESCRIBED THEREIN

THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

(21) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED SEPTEMBER 14, 1956 AS INSTRUMENT NO. 5017 IN BOOK 52308, PAGE 76 OF OFFICIAL RECORDS.
IN FAVOR OF: SOUTHERN CALIFORNIA GAS COMPANY.
AFFECTS: AS DESCRIBED THEREIN

(22) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED OCTOBER 9, 1962 AS INSTRUMENT NO. 3394 IN BOOK D1783, PAGE 463 OF OFFICIAL RECORDS.
IN FAVOR OF: THE PACIFIC TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION
AFFECTS: AS DESCRIBED THEREIN

(23) AN EASEMENT FOR PUBLIC UTILITIES AND INCIDENTAL PURPOSES, RECORDED APRIL 27, 1965 AS INSTRUMENT NO. 4329 IN BOOK D-2893, PAGE 596 OF OFFICIAL RECORDS.
IN FAVOR OF: SOUTHERN CALIFORNIA EDISON COMPANY, A CORPORATION
AFFECTS: AS DESCRIBED THEREIN

(25) AN EASEMENT FOR INGRESS AND EGRESS AND INCIDENTAL PURPOSES, RECORDED SEPTEMBER 12, 1979 AS INSTRUMENT NO. 79-1016411 OF OFFICIAL RECORDS.
IN FAVOR OF: ELAINE L. MOFFATT AND ROBERT PRENTICE
AFFECTS: AS DESCRIBED THEREIN

THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

(26) AN EASEMENT FOR INGRESS AND EGRESS AND INCIDENTAL PURPOSES, RECORDED SEPTEMBER 12, 1979 AS INSTRUMENT NO. 79-1016412 OF OFFICIAL RECORDS.
IN FAVOR OF: ELAINE L. MOFFATT AND ROBERT PRENTICE
AFFECTS: AS DESCRIBED THEREIN

THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

(27) AN EASEMENT FOR INGRESS AND EGRESS AND INCIDENTAL PURPOSES, RECORDED SEPTEMBER 12, 1979 AS INSTRUMENT NO. 79-1016413 OF OFFICIAL RECORDS.
IN FAVOR OF: ELAINE L. MOFFATT AND ROBERT PRENTICE
AFFECTS: AS DESCRIBED THEREIN

THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

(29) A DEED OF TRUST TO SECURE AN ORIGINAL INDEBTEDNESS OF $75,000.00 RECORDED NOVEMBER 21, 1979 AS INSTRUMENT NO. 79-1313495 OF OFFICIAL RECORDS.
DATED: OCTOBER 30, 1979
TRUSTOR: TVA REAL ESTATE INVESTMENTS, INC.
TRUSTEE: MAJOR ASSURANCE CORP., A CALIFORNIA CORPORATION
BENEFICIARY: CLARA H. RIDER, A WIDOW

AFFECTS: THE LAND AND OTHER PROPERTY.

(30) AN EASEMENT FOR INGRESS AND EGRESS AND INCIDENTAL PURPOSES, RECORDED FEBRUARY 22, 1980 AS INSTRUMENT NO. 80-184203 OF OFFICIAL RECORDS.
IN FAVOR OF: TVA REAL ESTATE INVESTMENTS, INC.
AFFECTS: AS DESCRIBED THEREIN

(33) A DEED OF TRUST TO SECURE AN ORIGINAL INDEBTEDNESS OF $200,000.00 RECORDED NOVEMBER 2, 1984 AS INSTRUMENT NO. 84-1315389 OF OFFICIAL RECORDS.
DATED: OCTOBER 15, 1984
TRUSTOR: RENAUD VELUZAT AND SUE VELUZAT, HUSBAND AND WIFE AS JOINT TENANTS

TRUSTEE: NEWHALL FINANCIAL CORPORATION, A CALIFORNIA CORPORATION
BENEFICIARY: CLARA H. RIDER, A WIDOW

(AFFECTS PARCELS 3 AND 4)

(35) A DEED OF TRUST TO SECURE AN ORIGINAL INDEBTEDNESS OF $33,000.00 RECORDED FEBRUARY 10, 1988 AS INSTRUMENT NO. 88-211954 OF OFFICIAL RECORDS.
DATED: FEBRUARY 10, 1988
TRUSTOR: RENAULD VELUZAT AND SUE VELUZAT
TRUSTEE: TRUSTORS SECURITY SERVICE, A CALIFORNIA CORPORATION
BENEFICIARY: MOSHE PEMEG

AFFECTS: THE LAND AND OTHER PROPERTY.

(40) THE TERMS AND PROVISIONS CONTAINED IN THE DOCUMENT ENTITLED 'RESOLUTION NO. 91-127, A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SANTA CLARA CONFORMING THE BOUQUET CANYON AND ROUTE 126 BRIDGE AND MAJOR THOROUGHFARE CONSTRUCTION FEE DISTRICT FEE REVISIONS' RECORDED OCTOBER 8, 1991 AS INSTRUMENT NO. 91-1561844 OF OFFICIAL RECORDS.

(41) THE TERMS AND PROVISIONS CONTAINED IN THE DOCUMENT ENTITLED 'RESOLUTION NO. 91-106, A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SANTA CLARA CONFORMING THE BOUQUET CANYON AND ROUTE 126 BRIDGE AND MAJOR THOROUGHFARE CONSTRUCTION FEE DISTRICT FEE REVISIONS' RECORDED OCTOBER 8, 1991 AS INSTRUMENT NO. 91-1561845 OF OFFICIAL RECORDS.

(43) A SUBSURFACE OIL AND GAS LEASE, EXECUTED BY HERMAN RASSP AND BEVERLY A. RASSP, AS CO-TRUSTEES OF THE RASSP TRUST OF 1986 (AN UNDIVIDED ONE-THIRD INTEREST); HERMAN RASSP, AS TRUSTEE OF THE ADELA STANFORD TRUST UNDER THE ANNA R. SCHWARTZ TRUST OF 1984 (AN UNDIVIDED ONE-THIRD INTEREST); HERMAN RASSP, AS TRUSTEE OF THE LIA MILLARD TRUST UNDER THE ANNA R. SCHWARTZ TRUST OF 1984 (AN UNDIVIDED ONE-THIRD INTEREST) AS LESSOR AND CALTICO OIL CORPORATION AS LESSEE, RECORDED APRIL 20, 1993 AS INSTRUMENT NO. 93-734929 OF OFFICIAL RECORDS, AFFECTING THE LAND LYING BELOW A DEPTH OF 500 FEET FROM THE SURFACE THEREOF.

DEFECTS, LIENS, ENCUMBRANCES OR OTHER MATTERS AFFECTING THE LEASEHOLD ESTATE, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS ARE NOT SHOWN HEREIN.

(44) A SUBSURFACE OIL AND GAS LEASE, EXECUTED BY HERMAN RASSP AND BEVERLY A. RASSP, AS CO-TRUSTEES OF THE RASSP TRUST OF 1986 (AS) AS LESSOR AND CALTICO OIL CORPORATION AS LESSEE, RECORDED APRIL 20, 1993 AS INSTRUMENT NO. 93-734931 OF OFFICIAL RECORDS, AFFECTING THE LAND LYING BELOW A DEPTH OF 500 FEET FROM THE SURFACE THEREOF.

DEFECTS, LIENS, ENCUMBRANCES OR OTHER MATTERS AFFECTING THE LEASEHOLD ESTATE, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS ARE NOT SHOWN HEREIN.

(45) AN POWERLINE OIL AND GAS LEASE EXECUTED BY ROBERT K. CANFIELD AS LESSOR AND CALTICO OIL CORPORATION AS LESSEE, RECORDED AUGUST 26, 1993 AS INSTRUMENT NO. 93-1669339 OF OFFICIAL RECORDS.

DEFECTS, LIENS, ENCUMBRANCES OR OTHER MATTERS AFFECTING THE LEASEHOLD ESTATE, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS ARE NOT SHOWN HEREIN.

(46) AN OIL AND GAS LEASE EXECUTED BY SHIRLEY PHILLIPS, FORMERLY SHIRLY R. MOORE, A WIDOW AS LESSOR AND ATLANTIC RICHFIELD COMPANY, A DELAVARE CORPORATION AS LESSEE, RECORDED JULY 18, 1995 AS INSTRUMENT NO. 95-1160339 OF OFFICIAL RECORDS.

DOCUMENT(S) DECLARING MODIFICATIONS THEREOF RECORDED APRIL 29, 1999 AS INSTRUMENT NO. 990769383 OF OFFICIAL RECORDS.

DEFECTS, LIENS, ENCUMBRANCES OR OTHER MATTERS AFFECTING THE LEASEHOLD ESTATE, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS ARE NOT SHOWN HEREIN.

(47) AN OIL AND GAS LEASE EXECUTED BY ROGER MOORE, A MARRIED MAN DEALING WITH HIS SOLE AND SEPARATE PROPERTY AS LESSOR AND ATLANTIC RICHFIELD COMPANY, A DELAVARE CORPORATION AS LESSEE, RECORDED JULY 18, 1995 AS INSTRUMENT NO. 95-1160340 OF OFFICIAL RECORDS.

DOCUMENT(S) DECLARING MODIFICATIONS THEREOF RECORDED APRIL 29, 1999 AS INSTRUMENT NO. 990769382 OF OFFICIAL RECORDS.

DEFECTS, LIENS, ENCUMBRANCES OR OTHER MATTERS AFFECTING THE LEASEHOLD ESTATE, WHETHER OR NOT SHOWN BY THE PUBLIC RECORDS ARE NOT SHOWN HEREIN.

(48) A DEED OF TRUST TO SECURE AN ORIGINAL INDEBTEDNESS OF $140,000.00 RECORDED SEPTEMBER 2, 1999 AS INSTRUMENT NO. 99-1669990 OF OFFICIAL RECORDS.
DATED: AUGUST 17, 1999
TRUSTOR: RENAUD VELUZAT AND CAROL SUE VELUZAT, HUSBAND AND WIFE
TRUSTEE: FIRST AMERICAN TITLE COMPANY, A CALIFORNIA CORPORATION
BENEFICIARY: SHIRLEY PHILLIPS, TRUSTEE OF THE SHIRLEY PHILLIPS TRUST DATED 2/20/96 AS TO AN UNDIVIDED 50% INTEREST AND ROGER MOORE AND BOBBIE MOORE, TRUSTEE UNDER DECLARATION OF TRUST DATED DECEMBER 3, 1996, AS TO AN UNDIVIDED 50% INTEREST, TENANTS IN COMMON

(AFFECTS PARCEL 1)

(49) THE TERMS AND PROVISIONS CONTAINED IN THE DOCUMENT ENTITLED 'MEMORANDUM OF OFF-SITE GRADING AND DEVELOPMENT AGREEMENT' RECORDED OCTOBER 12, 2001 AS INSTRUMENT NO. 01-1937176 OF OFFICIAL RECORDS.

(50) AN EASEMENT FOR STORM DRAIN PURPOSES, RECORDED APRIL 22, 2002 AS INSTRUMENT NO. 02-0933501 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF SANTA CLARA, CALIFORNIA

(51) AN EASEMENT FOR COVERED STORM DRAIN AND APPURTENANT STRUCTURE PURPOSES, THE RIGHT FOR INGRESS/EGRESS, RECORDED APRIL 22, 2002 AS INSTRUMENT NO. 020933503 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF SANTA CLARA, CALIFORNIA
AFFECTS: AS DESCRIBED THEREIN

(52) AN EASEMENT FOR FUTURE PUBLIC ROAD PURPOSES, RECORDED NOVEMBER 19, 2002 AS INSTRUMENT NO. 02-2796053 OF OFFICIAL RECORDS.
IN FAVOR OF: THE CITY OF SANTA CLARITA
AFFECTS: AS DESCRIBED THEREIN

THE LOCATION OF THE EASEMENT CANNOT BE DETERMINED FROM RECORD INFORMATION.

(53) AN EASEMENT FOR STORM DRAIN PURPOSES, RECORDED JANUARY 29, 2004 AS INSTRUMENT NO. 04-0211428 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF SANTA CLARA, CALIFORNIA
AFFECTS: AS DESCRIBED THEREIN

(54) AN EASEMENT FOR STORM DRAIN PURPOSES, RECORDED NOVEMBER 15, 2005 AS INSTRUMENT NO. 05-2748964 OF OFFICIAL RECORDS.
IN FAVOR OF: CITY OF SANTA CLARA, A MUNICIPAL CORPORATION
AFFECTS: AS DESCRIBED THEREIN

DATA FROM FIRST AMERICAN TITLE INSURANCE COMPANY
ORDER NO: NCS-801358-ONT1
FEBRUARY 25, 2021

EASEMENT LEGEND

(6) NOVEMBER 26, 1923 — BOOK 2873 PAGE 145 OFFICIAL RECORDS — IN FAVOR OF: UNITED STATES OF AMERICA; DITCHES OR CANALS, AND TRANSMISSION LINES

(8) JUNE 23, 1930 — INSTRUMENT NO. 711, BOOK 10081 PAGE 181 OFFICIAL RECORDS — IN FAVOR OF: THE PACIFIC TELEPHONE AND TELEGRAPH COMPANY; PUBLIC UTILITIES AND INCIDENTAL PURPOSES

(10) DECEMBER 30, 1937 — INSTRUMENT NO. 614, BOOK 15526 PAGE 114 OFFICIAL RECORDS — IN FAVOR OF: STATE OF CALIFORNIA; PUBLIC HIGHWAY AND INCIDENTAL PUPOSES

(21) SEPTEMBER 14, 1956 — INSTRUMENT NO. 5017, BOOK 52308 PAGE 76 OFFICIAL RECORDS — IN FAVOR OF: SOUTHER CALIFORNIA GAS COMPANY; PIPELINE

(23) APRIL 27, 1965 — INSTRUMENT NO. 4329, BOOK D-2893 PAGE 596 OFFICIAL RECORDS — IN FAVOR OF: SOUTHERN CALIFORNIA EDISON; AERIAL AND UNDERGROUND ELECTRIC LINES AND COMMUNICATION LINES

(25) (26) (27) SEPTEMBER 12, 1979 — INSTRUMENT NO. 79-1016411; INSTRUMENT NO. 79-1016412; INSTRUMENT NO. 79-1016413 OFFICIAL RECORDS — IN FAVOR OF: ELAINE L. MOFFATT AND ROBERT PRENTICE; INGRESS AND EGRESS AND INCIDENTAL PURPOSE

(30) FEBRUARY 22, 1980 — INSTRUMENT NO. 80-184203 OFFICIAL RECORDS — IN FAVOR OF: TWA REAL ESTATES INVESTMENTS INC.; INGRESS AND EGRESS AND INCIDENTAL PURPOSES

(50) APRIL 22, 2002 — 02-0933501 OFFICIAL RECORDS — IN FAVOR OF: CITY OF SANTA CLARITA; STORM DRAIN AND INCIDENTAL PURPOSES

(51) APRIL 22, 2002 — 02-0933503 OFFICIAL RECORDS — IN FAVOR OF: CITY OF SANTA CLARITA; COVERED STORM DRAIN AND APPURTENANT STRUCTURE; INGRESS AND EGRESS

(52) NOVEMBER 19, 2002 — INSTRUMENT NO. 02-2796053 OFFICIAL RECORDS — IN FAVOR OF: CITY OF SANTA CLARITA; ROAD AND INCIDENTAL PURPOSES

(53) JANUARY 29, 2004 — INSTRUMENT NO. 04-0211428 OFFICIAL RECORDS — IN FAVOR OF: CITY OF SANTA CLARITA; STORM DRAIN AND INCIDENTAL PURPOSES

LEASE LEGEND

(7) JULY 26, 1926 — INSTRUMENT NO. 767, BOOK 4646 PAGE 365 OFFICIAL RECORDS

(11) MAY 27, 1941 — INSTRUMENT NO. 1560 OFFICIAL RECORDS

(13) FEBRUARY 16, 1949 — INSTRUMENT NO. 1486, BOOK 29381 PAGE 43 OFFICIAL RECORDS

(15) JUNE 1, 1949 — INSTRUMENT NO. 2154 OFFICIAL RECORDS

(43) APRIL 20, 1993 — INSTRUMENT NO. 93-734929 OFFICIAL RECORDS

(47) APRIL 29, 1999 — INSTRUMENT NO. 95-1160340 OFFICIAL RECORDS

(7) (11) (13) SUBSURFACES OIL AND GAS LEASES

(15) SUBSURFACES OIL AND GAS LEASE

(43) (47) OIL AND GAS LEASES

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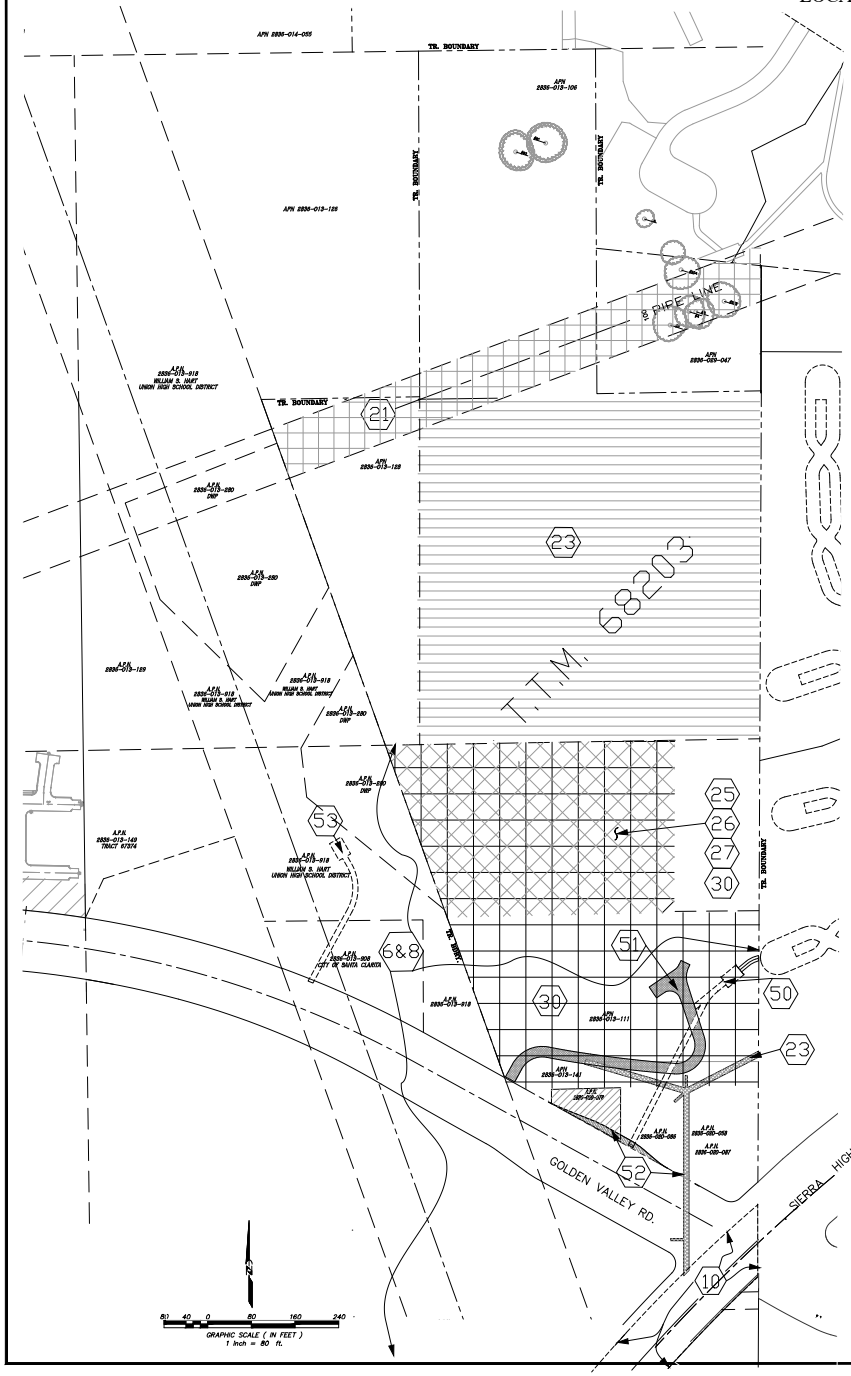
TENTATIVE TRACT MAP No. 68203
EASEMENTS

LOCATED IN THE CITY OF SANTA CLARITA
STATE OF CALIFORNIA



EASEMENT LEGEND

6	NOVEMBER 26, 1923 BOOK 2873 PAGE 145 OFFICIAL RECORDS	IN FAVOR OF: UNITED STATES OF AMERICA DITCHES OR CANALS, AND TRANSMISSION LINES
8	JUNE 23, 1930 INSTRUMENT NO. 711 BOOK 1008, PAGE 181 OFFICIAL RECORDS	IN FAVOR OF: THE PACIFIC TELEPHONE AND TELEGRAPH PUBLIC UTILITIES AND INCIDENTAL PURPOSES
10	DECEMBER 30, 1937 INSTRUMENT NO. 614 BOOK 15526, PAGE 114 OFFICIAL RECORDS	IN FAVOR OF: STATE OF CALIFORNIA PUBLIC HIGHWAY AND INCIDENTAL PURPOSES
21	SEPTEMBER 14, 1956 INSTRUMENT NO. 5017 BOOK 52308 PAGE 76 OFFICIAL RECORDS	IN FAVOR OF: SOUTHER CALIFORNIA GAS COMPANY PIPELINE
23	APRIL 27, 1965 INSTRUMENT NO. 4329 BOOK D-2883 PAGE 596 OFFICIAL RECORDS	IN FAVOR OF: SOUTHERN CALIFORNIA EDISON AERIAL AND UNDERGROUND ELECTRIC LINES AND COMMU
25 26 27	SEPTEMBER 12, 1979 INSTRUMENT NO. 79-1016411 INSTRUMENT NO. 79-1016412 INSTRUMENT NO. 79-1016413 OFFICIAL RECORDS	IN FAVOR OF: ELAINE L MOFFATT AND ROBERT PRENTIC INGRESS AND EGRESS AND INCIDENTAL PURPOSE
30	FEBRUARY 22, 1980 INSTRUMENT NO. 80-184203 OFFICIAL RECORDS	IN FAVOR OF: TWA REAL ESTATES INVESTMENTS INC. INGRESS AND EGRESS AND INCIDENTAL PURPOSES
50	APRIL 22, 2002 02-0933501 OFFICIAL RECORDS	IN FAVOR OF: CITY OF SANTA CLARITA STORM DRAIN AND INCIDENTAL PURPOSES
51	APRIL 22, 2002 02-0933503 OFFICIAL RECORDS	IN FAVOR OF: CITY OF SANTA CLARITA COVERED STORM DRAIN AND APPURTENANT STRUCTURE INGRESS AND EGRESS
52	NOVEMBER 19, 2002 INSTRUMENT NO. 02-2796053 OFFICIAL RECORDS	IN FAVOR OF: CITY OF SANTA CLARITA ROAD AND INCIDENTAL PURPOSES
53	JANUARY 29, 2004 INSTRUMENT NO. 04-0211428 OFFICIAL RECORDS	IN FAVOR OF: CITY OF SANTA CLARITA STORM DRAIN AND INCIDENTAL PURPOSES

DATA FROM FIRST AMERICAN TITLE INSURANCE COMPANY
ORDER NO: NCS-801358-ONT1
FEBRUARY 25, 2021

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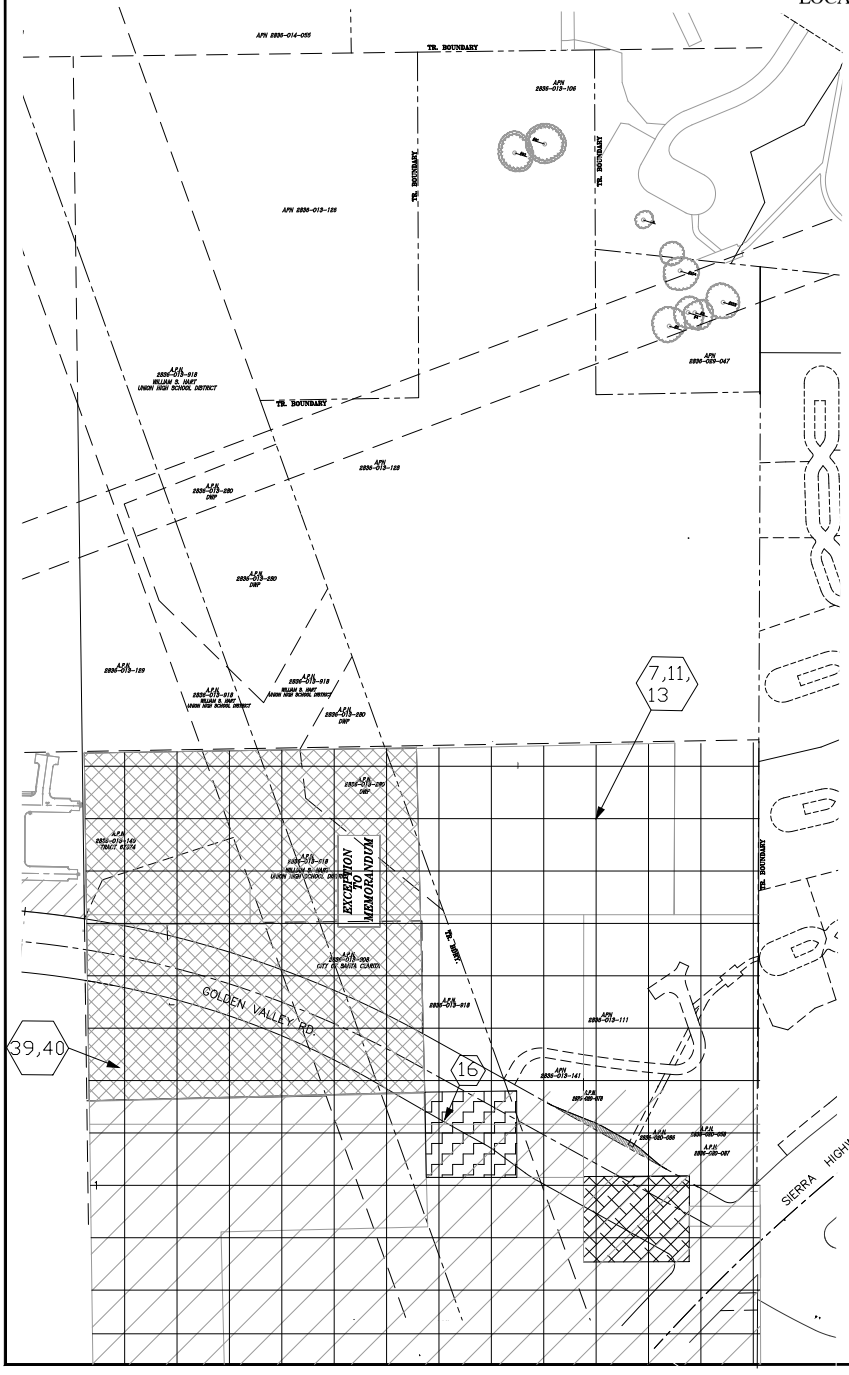
TENTATIVE TRACT MAP No. 68203
LEASES

LOCATED IN THE CITY OF SANTA CLARITA
STATE OF CALIFORNIA



LEASE LEGEND

7	JULY 26, 1926 INSTRUMENT NO. 767 BOOK 4646, PAGE 365 OFFICIAL RECORDS	7 11 13 — SUBSURFACES OIL AND GAS
11	MAY 27, 1941 INSTRUMENT NO. 1560 OFFICIAL RECORDS	
13	FEBRUARY 16, 1949 INSTRUMENT NO. 1486 BOOK 29381 PAGE 43 OFFICIAL RECORDS	
15	JUNE 1, 1949 INSTRUMENT NO. 2154 OFFICIAL RECORDS	15 — SUBSURFACES OIL AND GAS
43	APRIL 20, 1993 INSTRUMENT NO. 93-734929 OFFICIAL RECORDS	
47	APRIL 29, 1999 INSTRUMENT NO. 95-1160340 OFFICIAL RECORDS	43 47 — OIL AND GAS

DATA FROM FIRST AMERICAN TITLE INSURANCE COMPANY
ORDER NO: NCS-801358-ONT1
FEBRUARY 25, 2021

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APPENDIX G
Noise and Vibration Technical Report

Golden Valley-Sierra Highway Mixed-Use Project

Noise and Vibration Technical Report

July 2024

Prepared for:

Renaud and Sue Veluzat
Melody Ranch Studio
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Prepared by:

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A – Noise and Vibration Technical Appendix

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1.0 INTRODUCTION

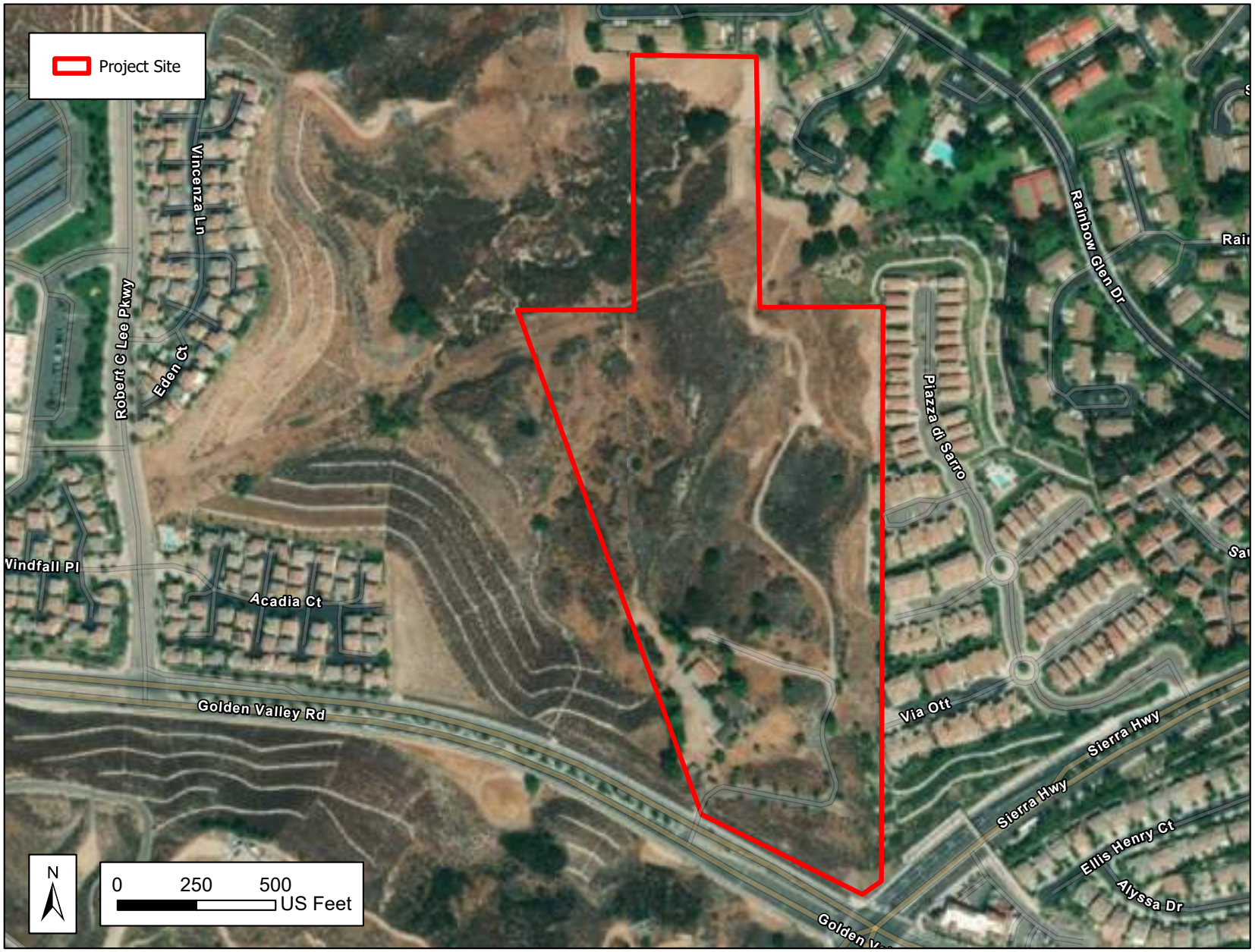
The purpose of this report is to evaluate the potential for noise and groundborne vibration impacts resulting from implementation of the proposed Golden Valley-Sierra Highway Mixed-Use Project (Project) in the City of Santa Clarita (City). This report includes an evaluation of potential impacts associated with substantial temporary and permanent increases in ambient noise levels in the vicinity of the Project Site; exposure of people in the vicinity of the Project Site to excessive noise or groundborne vibration levels; and whether exposure is in excess of standards established in the City's General Plan or Noise Ordinance. This report has been prepared by Impact Sciences, Inc., in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA).

1.1 PROJECT LOCATION

The 28.13-acre Project Site is located at the northwest corner of Golden Valley Road and Sierra Highway, in the City. Currently, the majority of the site is vacant except for the single-family residence and accessory structures that are located near the southerly portion of the property near Golden Valley Road. The Project Site is designated as Mixed-Use Neighborhood Planned Development Overlay Zone (MX-N (PD)). The proposed uses are consistent with the City General Plan, Unified Development Code, and Zoning designations. Adjacent uses include residential uses to the immediate north and east, vacant land to the south, and residential uses/Golden Valley High School to the west. The surrounding uses along Golden Valley Road and Sierra Highway consist of mostly established residential uses, schools, and neighborhood commercial retail centers. See **Figure 1, Aerial Photograph of the Project Site**.

1.2 PROJECT DESCRIPTION

The Project involves the demolition of the existing single-family residence and associated debris, and development of a mixed-use project consisting of 151 senior assisted living units, 73 residential units, a 60-room hotel (with 2,544 square feet (sf) of banquet space, 3,315 sf of retail space, and 2,360 sf of restaurant space), and 5.83 acres of open space. See **Figure 2, Project Site Plan.** The Project Site would be graded with a volume totaling 360,000 cubic yards of cut and fill to be balanced on site. No soil import or export is anticipated at this time.



SOURCE: Esri, 2022

FIGURE **1**

IMPACT SCIENCES

Aerial Photo of the Project Site

1415.001•02/22

SOURCE: Land Design Consultants Inc., 2024

FIGURE **2**

IMPACT SCIENCES

Project Site Plan

1415.001•07/24

2.0 ENVIRONMENTAL SETTING

2.1 FUNDAMENTALS OF NOISE & VIBRATION

Noise

Noise is usually defined as unwanted sound that is an undesirable byproduct of society's normal day-to-day activities. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm, and/or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). The human ear does not respond uniformly to sounds at all frequencies. For example, the human ear is less sensitive to low and high frequencies than medium frequencies, which more closely correspond with human speech. In response to the sensitivity of the human ear to different frequencies, the A-weighted noise level (or scale), which corresponds better with people's subjective judgment of sound levels, has been developed. This A-weighted sound level, referenced in units of dB(A), is measured on a logarithmic scale such that a doubling of sound energy results in a 3 dB(A) increase in noise level. Typically, changes in a community noise level of less than 3 dB(A) are not noticed by the human ear.[1] Changes from 3 to 5 dB(A) may be noticed by some individuals who are sensitive to changes in noise. A greater than 5 dB(A) increase is readily noticeable, while the human ear perceives a 10 dB(A) increase in sound level to be a doubling of sound.

On the A-weighted scale, the range of human hearing extends from approximately 3 to 140 dB(A). **Table 1, A-Weighted Decibel Scale**, provides examples of A-weighted noise levels from common sources. Noise sources occur in two forms: (1) point sources, such as stationary equipment or individual motor vehicles; and (2) line sources, such as a roadway with a large number of point sources (motor vehicles). Sound generated by a point source typically diminishes (attenuates) at a rate of 6 dB(A) for each doubling of distance from the source to the receptor at acoustically "hard" sites and 7.5 dB(A) at acoustically "soft" sites.[2] For example, if a noise source produces a noise level of 89 dB(A) at a reference distance of 50 feet, the noise level would be 83 dB(A) at a distance of 100 feet from the noise source, 77 dB(A) at a distance of 200 feet, and so on. Noise generated by a mobile source will decrease by approximately 3 dB(A) over hard surfaces and 4.5 dB(A) over soft surfaces for each doubling of distance.

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1 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.

2 Federal Highway Administration, *Highway Noise Fundamentals*, (1980) 97. Examples of "hard" or reflective sites include asphalt, concrete, and hard and sparsely vegetated soils. Examples of acoustically "soft" or absorptive sites include soft, sand, plowed farmland, grass, crops, heavy ground cover, etc.

Table 1
A-Weighted Decibel Scale

Typical A-Weighted Sound Levels	Sound Level (dB(A), Leq)
Threshold of Pain	140
Jet Takeoff at 100 Meters	125
Jackhammer at 15 Meters	95
Heavy Diesel Truck at 15 Meters	85
Conversation at 1 Meter	60
Soft Whisper at 2 Meters	35

Source: United States Occupational Safety & Health Administration, Noise and Hearing Conservation Technical Manual, 1999.

Sound levels also can be attenuated by man-made or natural barriers (e.g., sound walls, berms, ridges), as well as elevational differences. Noise is most audible when traveling by direct line-of-sight, an interrupted visual path between the noise source and noise receptor. Barriers, such as walls or buildings that break the line-of-sight between the source and the receiver, can greatly reduce noise levels from the source since sound can only reach the receiver by diffraction. However, if a barrier is not high or long enough to break the line-of-sight from the source to the receiver, its effectiveness is greatly reduced.

Solid walls and berms may reduce noise levels by 5 to 10 dB(A) depending on their height and distance relative to the noise source and the noise receptor.[3] Sound levels may also be attenuated 3 dB(A) by a first row of houses and 1.5 dB(A) for each additional row of houses.[4] The minimum noise attenuation provided by typical structures in California is provided in **Table 2, Building Noise Reduction Factors**.

3 Federal Highway Administration, *Highway Noise Mitigation*, (1980) 18.

4 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.

Table 2
Building Noise Reduction Factors

Building Type	Window Condition	Noise Reduction Due to Exterior of the Structure (dB(A))
All	Open	10
Light Frame	Ordinary Sash (closed)	20
	Storm Windows	25
Masonry	Single Glazed	25
	Double Glazed	35

Source: Federal Highway Administration, Highway Traffic Noise: Analysis and Abatement Guidance. December 2011.

Sound Rating Scales

Various rating scales approximate the human subjective assessment to the "loudness" or "noisiness" of a sound. Noise metrics have been developed to account for additional parameters, such as duration and cumulative effect of multiple events. Noise metrics are categorized as single event metrics and cumulative metrics, as summarized below.

In order to simplify the measurement and computation of sound loudness levels, frequency weighted networks have obtained wide acceptance. The A-weighted scale, discussed above, has become the most prominent of these scales and is widely used in community noise analysis. Its advantages are that it has shown good correlation with community response and is easily measured. The metrics used in this analysis are all based upon the dB(A) scale.

Equivalent Noise Level

Equivalent Noise Level (Leq) is the sound level corresponding to a steady-state A-weighted sound level containing the same total energy as several single event noise exposure level events during a given sample period. Leq is the "acoustic energy" average noise level during the period of the sample. It is based on the observation that the potential for noise annoyance is dependent on the total acoustical energy content of the noise. The equivalent noise level is expressed in units of dB(A). Leq can be measured for any period, but is typically measured for 15 minutes, 1 hour, or 24 hours. Leq for a 1-hour period is used by the Federal Highway Administration (FHWA) for assessing highway noise impacts. Leq for 1 hour is referred to as the Hourly Noise Level (HNL) in the California Airport Noise Regulations and is used to develop Community

Noise Equivalent Level values for aircraft operations. Construction noise levels and ambient noise measurements in this section use the Leq scale.

Community Noise Equivalent Level

Community Noise Equivalent Level (CNEL) is a 24-hour, time-weighted energy average noise level based on the A-weighted decibel. It is a measure of the overall noise experienced during an entire day. The term "time-weighted" refers to the penalties attached to noise events occurring during certain sensitive periods. In the CNEL scale, 5 dB are added to measured noise levels occurring between the hours of 7 P.M. and 10 P.M. For measured noise levels occurring between the hours of 10 P.M. and 7 A.M., 10 dB are added. These decibel adjustments are an attempt to account for the higher sensitivity to noise in the evening and nighttime hours and the expected lower ambient noise levels during these periods. Existing and projected future traffic noise levels in this section use the CNEL scale.

Day-Night Average Noise Level

The day-night average sound level (Ldn) is another average noise level over a 24-hour period. Noise levels occurring between the hours of 10 P.M. and 7 A.M. are increased by 10 decibels (dB). This noise is weighted to take into account the decrease in community background noise of 10 dB(A) during this period. Noise levels measured using the Ldn scale are typically similar to CNEL measurements.

Adverse Effects of Noise Exposure

Noise is known to have several adverse effects on humans, which has led to laws and standards being set to protect public health and safety, and to ensure compatibility between land uses and activities. Adverse effects of noise on people include hearing loss, communication interference, sleep interference, physiological responses, and annoyance. Each of these potential noise impacts on people is briefly discussed in the following narrative.

Hearing Loss

Hearing loss is generally not a community noise concern, even near a major airport or a major freeway. The potential for noise-induced hearing loss is more commonly associated with occupational noise exposures in heavy industry, very noisy work environments with long-term exposure, or certain very loud recreational activities (e.g., target shooting and motorcycle or car racing). The Occupational Safety and Health Administration (OSHA) identifies a noise exposure limit of 90 dB(A) for 8 hours per day to protect from hearing loss (higher limits are allowed for shorter duration exposures). Noise levels in neighborhoods, even in very noisy neighborhoods, are not sufficiently loud enough to cause hearing loss.

Communication Interference

Communication interference is one of the primary concerns in environmental noise. Communication interference includes speech disturbance and intrusion with activities such as watching television. Noise can also interfere with communications such as within school classrooms. Normal conversational speech is in the range of 60 to 65 dB(A) and any noise in this range or louder may interfere with speech.

Sleep Interference

Noise can make it difficult to fall asleep, create momentary disturbances of natural sleep patterns by causing shifts from deep to lighter stages, and cause awakening. Noise may even cause awakening that a person may or may not be able to recall.

Physiological Responses

Physiological responses are those measurable effects of noise on people that are realized as changes in pulse rate, blood pressure, and other physical changes. Studies to determine whether exposure to high noise levels can adversely affect human health have concluded that, while a relationship between noise and health effects seems plausible, there is no empirical evidence of the relationship.

Annoyance

Annoyance is an individual characteristic and can vary widely from person to person. Noise that one person considers tolerable can be unbearable to another of equal hearing capability. The level of annoyance depends both on the characteristics of the noise (including loudness, frequency, time, and duration), and how much activity interference (such as speech interference and sleep interference) results from the noise. However, the level of annoyance is also a function of the attitude of the receiver. Personal sensitivity to noise varies widely. It has been estimated that 2% to 10% of the population is highly susceptible to annoyance from any noise not of their own making, while approximately 20% are unaffected by noise.[5] Attitudes may also be affected by the relationship between the person affected and the source of noise, and whether attempts have been made to abate the noise.

Vibration

Vibration consists of waves transmitted through solid material. Groundborne vibration propagates from a source through the ground to adjacent buildings by surface waves. Vibration may comprise a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how

5 Wayne County Airport Authority. *Background information on noise & its measurement, 2009.*

rapidly it is oscillating and is measured in hertz (Hz). Most environmental vibrations consist of a composite, or "spectrum" of many frequencies, and are generally classified as broadband or random vibrations. The normal frequency range of most groundborne vibration that can be felt generally starts from a low frequency of less than one Hz to a high of about 200 Hz. Vibration is often measured in terms of the peak particle velocity (PPV) in inches per second (in/sec) when considering impacts on buildings or other structures, as PPV represents the maximum instantaneous peak of vibration that can stress buildings. Because it is a representation of acute vibration, PPV is often used to measure the temporary impacts of short-term construction activities that could instantaneously damage-built structures. Vibration is often also measured by the Root Mean Squared (RMS) because it best correlates with human perception and response. Specifically, RMS represents "smoothed" vibration levels over an extended period of time and is often used to gauge the long-term chronic impact of a Project's operation on the adjacent environment. RMS amplitude is the average of a signal's squared amplitude. It is most commonly measured in decibel notation (VdB).

Vibration energy attenuates as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. High frequency vibrations reduce much more rapidly than low frequencies, so that in the far-field from a source, the low frequencies tend to dominate. Soil properties also affect the propagation of vibration. When groundborne vibration interacts with a building, there is usually a ground-to-foundation coupling loss (i.e., the foundation of the structure does not move in sync with the ground vibration), but the vibration can also be amplified by the structural resonances of the walls and floors. Vibration in buildings is typically perceived as rattling of windows or items on shelves, or the motion of building surfaces. At high levels, vibration can result in damage to structures.

Manmade groundborne vibration is generally limited to areas within a few hundred feet of certain types of construction activities, especially pile driving. Road vehicles rarely create enough groundborne vibration to be perceptible to humans unless the road surface is poorly maintained and there are potholes or bumps. If traffic induces perceptible vibration in buildings, such as window rattling or shaking of small loose items (typically caused by heavy trucks in passing), then it is most likely an effect of low-frequency airborne noise or ground characteristics. Human annoyance by vibration is related to the number and duration of events. The more events or the greater the duration, the more annoying it will be to humans.

Construction vibration damage criteria are assessed based on structural category (e.g., reinforced-concrete, steel, or timber). The Federal Transit Administration (FTA) guidelines consider 0.2 inch/sec PPV to be the significant impact level for non-engineered timber and masonry buildings. Structures or buildings constructed of reinforced concrete, steel, or timber have a vibration damage criterion of 0.5 inch/sec PPV

pursuant to FTA Guidelines.[6] The FTA Guidelines include a table showing the vibration damage criteria based on structural category and is presented below in **Table 3, Construction Vibration Damage Criteria.**

Table 3
Construction Vibration Damage Criteria

Building/Structural Category	PPV, in/sec
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual. September 2018.

2.2 NOISE SENSITIVE RECEPTORS

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses. The closest noise-sensitive receptors to the Project Site include adjacent residences to the north, adjacent residences to the east, residences to the southeast (approximately 395 feet), residences to the west (approximately 700 feet), and Golden Valley High School to the west (approximately 1,000 feet). See **Figure 3, Noise Monitoring and Sensitive Receptor Location Map.**

2.3 EXISTING CONDITIONS

Measured Ambient Noise Levels

To establish baseline noise conditions, existing noise levels were monitored at four locations in the vicinity of the Project Site. The locations of where the noise measurements were taken are depicted in **Figure 3, Noise Monitoring and Sensitive Receptor Location Map**. The noise survey was conducted in January 2022 using the Larson Davis SoundTrack LxT (Type 1) sound level meter, which conforms to industry standards

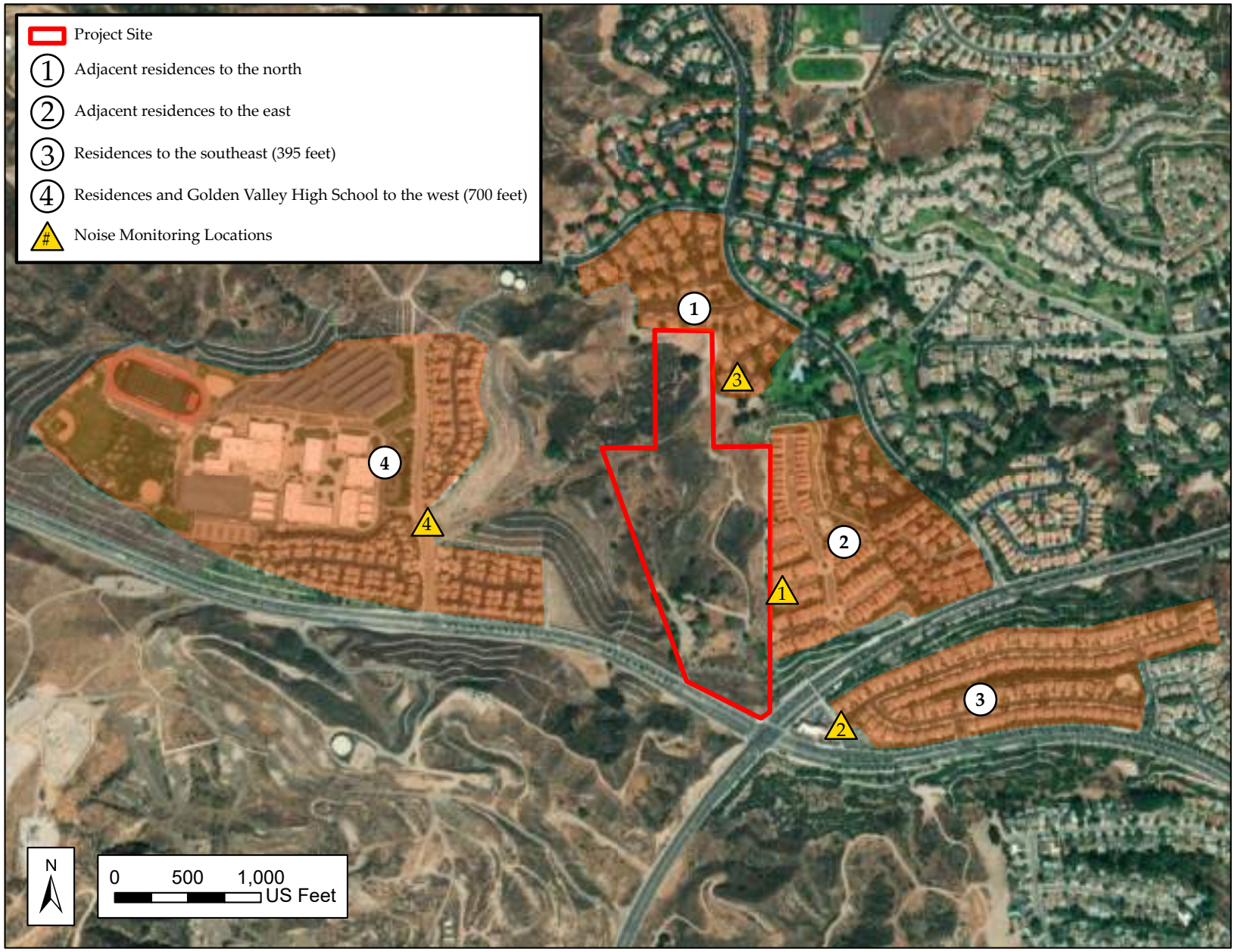
6 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual. September 2018.

set forth in ANSI S1.4-1983 (R2006) – Specification for Sound Level Meters/Type 1, and is consistent with the sound level meter definition established in the SCMC. This instrument was calibrated and operated according to the manufacturer's written specifications. At the measurement sites, the microphone was placed at a height of approximately five feet above grade. The results of the measurements are summarized in **Table 4, Existing Noise Levels in the Vicinity of the Project Site**. As shown in **Table 4**, the daytime ambient noise levels ranged from 42.5 dBA Leq to 56.1 dBA Leq in the vicinity the Project Site. Based on this data, the calculated CNEL for Location 1 is 45.7 dBA.

Table 4
Existing Noise Levels in the Vicinity of the Project Site

Noise Monitoring Locations	Primary Noise Sources	Noise Levels (dBA)		
		Leq	Lmin	Lmax
Daytime Measurements (between 7:00 a.m. and 7:00 p.m.)				
1. Eastern boundary of Project Site, near residences	Traffic, Parking, Neighborhood Activity	42.5	34.5	59.3
2. Residential area southeast of Project Site	Traffic & Commercial Uses Activity	54.2	41.4	64.0
3. Residential area northeast of Project Site	Traffic, Parking, Neighborhood Activity	49.4	35.8	58.9
4. Residential area west of Project Site	Traffic & Neighborhood Activity	56.1	37.8	69.9
Evening Measurement (between 7:00 p.m. and 10:00 p.m.)				
1. Eastern boundary of Project Site, near residences	Traffic, Parking, Neighborhood Activity	45.1	36.1	66.7
Nighttime Measurement (between 10:00 p.m. and 7:00 a.m.)				
1. Eastern boundary of Project Site, near residences	Traffic, Parking, Neighborhood Activity	36.1	33.1	47.0

Source: Impact Sciences, Inc., March 2022. See Appendix A – Noise and Vibration Technical Data.



SOURCE: Esri, 2022

FIGURE 3

IMPACT SCIENCES

Noise Monitoring and Sensitive Receptor Location Map

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Existing Modeled Roadway Noise Levels

Existing roadway noise levels were calculated for primary roadway segments located in proximity to the Project Site. The roadway segments selected for analysis are considered to be those that are expected to be most directly impacted by project-related traffic, which, for the purpose of this analysis, include the roadways that are nearest to the Project Site and had the most project-generated trips. These roadways, when compared to roadways located further away from the Project site, would experience the greatest percentage increase in traffic generated by the Project.

Calculation of the existing roadway noise levels was based on the Federal Highway Administration Highway Noise Prediction Model (FHWA-RD-77-108) and traffic volumes from the Project's traffic analysis.[7] The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (energy rates) utilized in the FHWA Model have been modified to reflect average vehicle noise rates identified for California by Caltrans. The Caltrans data show that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The average daily noise levels along study area roadway segments are presented in **Table 5, Existing Roadway Noise Levels**.

Table 5
Existing Roadway Noise Levels

Roadway	Roadway Segment	Predominant Existing Land Use Along Segment	dBA CNEL
Golden Valley Road	West of Sierra Highway	Residential	73.6
	East of Sierra Highway	Residential/Commercial	71.0
Sierra Highway	South of Golden Valley Road	Residential/Open Space	73.0
	North of Golden Valley Road	Residential/Commercial	71.6

Source
Traffic data: Traffic Impact Analysis, Santa Clarita Mixed-Use, City of Santa Clarita, TJW Engineering, Inc., December 2, 2021.
Calculations provided in Appendix A to this report.

Existing Groundborne Vibration Levels

The main sources of groundborne vibration near the Project Site are heavy-duty vehicular travel (e.g., refuse trucks, delivery trucks, and transit buses) on local roadways. Trucks and buses typically generate

7 Traffic Impact Analysis, Santa Clarita Mixed-Use, City of Santa Clarita, prepared by TJW Engineering, Inc., December 2, 2021.

groundborne vibration velocity levels of around 63 VdB at 50 feet, and these levels could reach 72 VdB where trucks and buses pass over bumps in the road.[8] In terms of PPV levels, a heavy-duty vehicle traveling at a distance of 50 feet can result in a vibration level of approximately 0.001 inch per second.

8 FTA, Transit Noise and Vibration Impact Assessment Manual, September 2018.

3.0 REGULATORY FRAMEWORK

3.1 STATE REGULATIONS

Title 24, California Code of Regulations

The California Noise Insulation Standards of 1988 (California Code of Regulations Title 24, Section 3501 et seq.) require that interior noise levels from the exterior sources not exceed 45 dBA Ldn/community noise equivalent level (CNEL)[9] in any habitable room of a multi-residential use facility (e.g., hotels, motels, dormitories, long-term care facilities, and apartment houses and other dwellings, except detached single-family dwellings) with doors and windows closed. Where exterior noise levels exceed 60 dBA CNEL/Ldn, an acoustical analysis is required to show that the building construction achieves an interior noise level of 45 dBA CNEL/Ldn or less.

3.2 LOCAL PLANS AND POLICIES

City of Santa Clarita General Plan Noise Element

The Noise Element of the General Plan is a comprehensive program for including noise management in the planning process, providing a tool for planners to use in achieving and maintaining land uses that are compatible with existing and future environmental noise levels. The Noise Element identifies current noise conditions within the planning area, and projects future noise impacts resulting from continued growth allowed by the Land Use Element. The element identifies noise-sensitive land uses and noise sources and defines areas of noise impact for the purpose of developing programs to ensure that residents in the Santa Clarita Valley will be protected from excessive noise intrusion. As development proposals are reviewed in the future, the City and County will evaluate each proposal with respect to the Noise Element to ensure that noise impacts are reduced through planning and project design. Through implementation of the policies and programs of the Noise Element, current and future adverse noise impacts will be reduced or avoided in order to protect the general health, safety, and welfare of the community.

The most basic planning strategy to minimize adverse impacts on new land uses due to noise is to avoid designating sensitive land uses in areas that are subject to high levels of noise. Uses such as schools, hospitals, child care, senior care, congregate care, churches, and all types of residential use should be located outside of any area anticipated to exceed acceptable noise levels as defined by the Noise and Land Use Compatibility Guidelines, or should be protected from noise through sound attenuation measures such as site and architectural design and sound walls. The City of Santa Clarita and the County of Los Angeles

9 Measurements are based on Ldn or CNEL.

have adopted the State's guidelines[10] in a modified form as a basis for planning decisions based on noise considerations. Modifications were made to eliminate overlap between categories in the table, in order to make the guidelines easier for applicants and decision makers to interpret and apply to planning decisions. These guidelines are shown in **Table 6, Noise and Land Use Compatibility Guidelines (City Noise Element)**. Additional considerations in the determination of noise compatible land uses include the following:

A. Noise Exposure Information Desired. Where sufficient data exists, evaluate land use suitability with respect to a worst-case value of CNEL. Usually, a future projection of noise levels represents the worst case. Existing and future noise contours for freeway, roadway, airport and railroads are provided in the Noise Element.

B. Noise Source Characteristics. The land use-noise compatibility recommendations should be viewed in relation to the specific source of the noise. For example, aircraft and railroad noise is normally made up of higher single noise events than auto traffic but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment. The State Aeronautics Act uses 65 dB CNEL as the criterion which airports must eventually meet to protect existing residential communities from unacceptable exposure to aircraft noise. In order to facilitate the purposes of the Act, one of which is to encourage land uses compatible with the 65 dB CNEL criterion wherever possible, and in order to facilitate the ability of airports to comply with the Act, residential uses located in areas with an aircraft noise level greater than 65 CNEL should be discouraged and considered located within normally unacceptable areas.

C. Suitable Interior Environments. One objective of locating residential units relative to a known noise source is to maintain a suitable interior noise environment at no greater than 45 dB CNEL. This requirement, coupled with the measured or calculated noise reduction performance of the type of structure under consideration, should govern the minimum acceptable distance to a noise source.

D. Acceptable Outdoor Environments. Another consideration, which in some communities is an overriding factor, is the desire for an acceptable outdoor noise environment. The acceptable outdoor noise level is 65 CNEL for rear yard areas, neighborhood parks, and pool recreation areas at multi-family developments.

10 California Office of Planning and Research, General Plan Guidelines 2003, Appendix C.

Table 6
Noise and Land Use Compatibility Guidelines (City Noise Element)

Land Use	Normally Acceptable[a]	Conditionally Acceptable[b]	Normally Unacceptable[c]	Clearly Unacceptable[d]
Residential – Low Density Single-Family, Duplex, Mobile Homes	50 – 60	60 – 70	70 – 75	above 75
Residential - Multi-Family Homes	50 – 60	60 – 70	70 – 75	above 75
Transient Lodging – Motels, Hotels	50 – 60	60 – 70	70 – 80	above 80
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 60	60 – 70	70 – 80	above 80
Auditoriums, Concert Halls, Amphitheaters	---	50 – 65	---	above 65
Sports Arena, Outdoor Spectator Sports	---	50 – 75	---	above 75
Playgrounds, Neighborhood Parks	50 – 65	---	65 – 75	above 75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 75	---	70 – 80	above 80
Office Buildings, Business and Professional Commercial	50 – 70	70-75	above 75	---
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	75 – 80	above 80	---

Notes:
[a] Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
[b] Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
[c] Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Sound walls, window upgrades, and site design modifications may be needed in order to achieve City standards.
[d] Clearly Unacceptable: New construction or development should generally not be undertaken.
Source: City of Santa Clarita General Plan Noise Element, Exhibit N-8: Noise and Land Use Compatibility Guidelines, June 2010.

Applicable goals and policies from the General Plan Noise Element are listed below.

Goal N 1: A healthy and safe noise environment for Santa Clarita Valley residents, employees, and visitors.

Objective N 1.1: Protect the health and safety of the residents of the Santa Clarita Valley by the elimination, mitigation, and prevention of significant existing and future noise levels.

Policy N 1.1.1: Use the Noise and Land Use Compatibility Guidelines contained on Exhibit N-8, which are consistent with State guidelines, as a policy basis for decisions on land use and development proposals related to noise.

Policy N 1.1.2: Continue to implement the adopted Noise Ordinance and other applicable code provisions, consistent with state and federal standards, which establish noise impact thresholds for noise abatement and attenuation, in order to reduce potential health hazards associated with high noise levels.

Policy N 1.1.3: Include consideration of potential noise impacts in land use planning and development review decisions.

Policy N 1.1.4: Control noise sources adjacent to residential, recreational, and community facilities, and those land uses classified as noise sensitive.

Goal N 2: Protect residents and sensitive receptors from traffic-generated noise.

Objective N 2.1: Prevent and mitigate adverse effects of noise generated from traffic on arterial streets and highways through implementing noise reduction standards and programs.

Policy N 2.1.1: Encourage owners of existing noise-sensitive uses, and require owners of proposed noise sensitive land uses, to construct sound barriers to protect users from significant noise levels, where feasible and appropriate.

Policy N 2.1.2: Encourage the use of noise absorbing barriers, where appropriate.

Goal N 3: Protect residential neighborhoods from excessive noise.

Objective N 3.1: Prevent and mitigate significant noise levels in residential neighborhoods.

Policy N 3.1.1: Require that developers of new single-family and multi-family residential neighborhoods in areas where the ambient noise levels exceed 60 CNEL provide mitigation measures for the new residences to reduce interior noise levels to 45 CNEL, based on future traffic and railroad noise levels.

Policy N 3.1.2: Require that developers of new single-family and multi-family residential neighborhoods in areas where the projected noise levels exceed 65 CNEL provide mitigation measures (which may include noise barriers, setbacks, and site design) for new residences to reduce outdoor noise levels to 65 CNEL, based on future traffic conditions. This requirement would apply to rear yard areas for single-family developments, and to private open space and common recreational and open space areas for multifamily developments.

Policy N 3.1.3: Through enforcement of the applicable Noise Ordinance, protect residential neighborhoods from noise generated by machinery or activities that produce significant discernable noise exceeding recommended levels for residential uses.

Policy N 3.1.4: Require that those responsible for construction activities develop techniques to mitigate or minimize the noise impacts on residences, and adopt standards that regulate noise from construction activities that occur in or near residential neighborhoods.

Policy N 3.1.5: Require that developers of private schools, childcare centers, senior housing, and other noise sensitive uses in areas where the ambient noise level exceeds 65 dBA (day), provide mitigation measures for these uses to reduce interior noise to acceptable levels.

Policy N 3.1.7: Ensure that design of parks, recreational facilities, and schools minimize noise impacts to residential neighborhoods.

Policy N 3.1.9: Implement a buyer and renter notification program for new residential developments where appropriate, to educate and inform potential buyers and renters of the sources of noise in the area and/or new sources of noise that may occur in the future. As determined by the reviewing authority, notification may be appropriate in the following areas:

c. Within 200 feet of commercial uses in mixed-use developments, potential buyers and renters should receive notice that the commercial uses within the mixed use developments may generate noise in excess of levels typically found in residential areas, that the commercial uses may change over time, and the associated noise levels and frequency of noise events may change along with the use.

City of Santa Clarita Municipal Code

The City of Santa Clarita Municipal Code (SCMC) Noise Ordinance provides exterior noise standards within the City, which are applicable to the Project:

11.44.040 Noise Limits

A. It shall be unlawful for any person within the City to produce or cause or allow to be produced noise which is received on property occupied by another person within the designated region, in excess of the following levels, except as expressly provided otherwise herein:

Region	Time	Sound Level dB
Residential Zone	Day	65
Residential Zone	Night	55
Commercial and Manufacturing	Day	80
Commercial and Manufacturing	Night	70

At the boundary line between a residential property and a commercial and manufacturing property, the noise level of the quieter zone shall be used.

B. Corrections to Noise Limits. The numerical limits given in subsection (A) of this section shall be adjusted by the following corrections, where the following noise conditions exist:

Noise Condition	Correction (in dB)
(1) Repetitive impulsive noise	-5
(2) Steady whine, screech or hum	-5
(3) Noise occurring more than 5 but less than 15 minutes per hour	+5
(4) Noise occurring more than 1 but less than 5 minutes per hour	+10
(5) Noise occurring less than 1 minute per hour	+20

11.44.060 Special Noise Sources – Radios, Television Sets and Similar Devices

A. Use Restricted. It shall be unlawful for any person within the City to use or operate any radio receiving set, musical instrument, phonograph, television set, or other machine or device for the producing or reproducing of sound at anytime in such a manner as to produce noise levels on residential land which would disturb the peace, quiet and comfort of neighboring residents or any reasonable person of normal sensitivity residing in the area.

B. Prima Facie Violation. Any noise exceeding the ambient noise limits as set forth in Section 11.44.040 at the property line of any residential land (or if a condominium or apartment house, within any adjoining apartment) by more than five (5) decibels shall be deemed to be prima facie evidence of a violation of the provisions of this section.

11.44.070 Special Noise Sources – Machinery, Fans, and Other Mechanical Devices

Any noise level from the use or operation of any machinery, equipment, pump, fan, air conditioning apparatus, refrigerating equipment, motor vehicle, or other mechanical or electrical device, or in repairing or rebuilding any motor vehicle, which exceeds the noise limits as set forth in SCMC Section 11.44.040 at any property line, or, if a condominium or rental units, within any condominium unit or rental unit within the complex, shall be a violation of this chapter.

11.44.080 Special Noise Sources – Construction and Building

No person shall engage in any construction work which requires a building permit from the City on sites within three hundred (300) feet of a residentially zoned property except between the hours of seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday. Further, no work shall be performed on the following public holidays: New Year's Day, Independence Day, Thanksgiving, Christmas, Memorial Day, and Labor Day.

Emergency work as defined in Section 11.44.020(D) is permitted at all times. The Department of Community Development may issue a permit for work to be done "after hours"; provided, that containment of construction noises is provided.

4.0 NOISE ANALYSIS

4.1 THRESHOLDS OF SIGNIFICANCE

The impacts of the proposed Project related to noise and vibration would be considered significant if they would exceed any of the following Standards of Significance, in accordance with Appendix G of the *California Environmental Quality Act (CEQA) Guidelines*:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project Site in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive ground-borne vibration or ground-borne noise levels; and
- 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 Project Site is not located within the vicinity of a private airstrip or an airport land use plan and is not located within 2 miles of a public airport or public-use airport. Therefore, no impacts with respect to airstrip or airport related noise would occur and no further analysis is required.

Construction Noise Threshold

The City does not have specific limitations on construction noise levels. Instead, construction noise is regulated by limiting construction activity to the less noise sensitive daytime hours. Specifically, as stated previously, Section 11.44.080 of the SCMC states no person shall engage in any construction work which requires a building permit from the City on sites within three hundred (300) feet of a residentially zoned property except between the hours of seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday. As the Project would comply with the daytime construction hours established in the SCMC, this analysis uses the FTA's general construction noise criteria of 90 dBA Leq (1-hour).[11] In addition to the FTA guidance, this approach is also consistent with many jurisdictions within the State including Beverly Hills, Fresno, Pasadena, and Caltrans which use absolute (fixed) construction noise thresholds.[12]

11 *FTA, Transit Noise and Vibration Impact Assessment Manual, Table 7-2 (General Assessment Construction Noise Criteria), September 2018.*

12 City of Beverly Hills Municipal Code Section 5-1-205; City of Fresno Municipal Code Section 10-109; City of Pasadena Municipal Code Chapter 9.36.07; Caltrans Traffic Noise Analysis Protocol Chapter 3.2.

Construction Vibration Thresholds

The *State CEQA Guidelines* do not define the levels at which groundborne vibration or groundborne noises are considered "excessive." Thus, in terms of construction-related vibration impacts on buildings, the adopted guidelines and recommendations by the FTA to limit groundborne vibration based on the age and/or condition of the structures that are located in close proximity to construction activity are used in this analysis to evaluate potential groundborne vibration impacts. Based on the FTA criteria, construction impacts relative to groundborne vibration would be considered significant if the following were to occur:

- Project construction activities would cause a PPV groundborne vibration level to exceed 0.5 inches per second at any building that is constructed with reinforced-concrete, steel, or timber;
- Project construction activities would cause a PPV groundborne vibration level to exceed 0.3 inches per second at any engineered concrete and masonry buildings;
- Project construction activities would cause a PPV groundborne vibration level to exceed 0.2 inches per second at any non-engineered timber and masonry buildings; or
- Project construction activities would cause a PPV ground-borne vibration level to exceed 0.12 inches per second at any historical building or building that is extremely susceptible to vibration damage.

In terms of groundborne vibration impacts associated with human annoyance, this analysis uses the FTA's vibration impact criteria for sensitive buildings, residences, and institutional land uses under conditions where there are a frequent number of events per day, which would provide for the most conservative vibration analysis. These criteria are 65 VdB at buildings where vibration would interfere with interior operations, 72 VdB at residences and buildings where people normally sleep, and 75 VdB at other institutional buildings.[13] The 65 VdB criterion applies to typical land uses where vibration would interfere with interior operations, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. The 72 VdB criterion applies to all residential land uses and any buildings where people sleep, such as hotels and hospitals. The 75 VdB criterion applies to institutional land uses such as schools, churches, and doctors' offices. Commercial or industrial locations including office buildings are not included in this category unless there is vibration-sensitive activity or equipment within the building.

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13 *FTA, Transit Noise and Vibration Impact Assessment Manual, September 2018.*

Operational Noise Threshold

The *State CEQA Guidelines* do not define the levels at which noise would be considered substantial increases. Thus, for purposes of this analysis, the Project would normally have a significant impact on noise levels from project operations if the project causes the ambient noise level measured at the property line of affected uses to increase by 3 dBA if the total ambient noise levels without the Project exceed the City's General Plan exterior noise standards, or any 5 dBA or greater noise increase when total ambient noise levels without the Project are within the City's General Plan exterior noise standards (see "conditionally acceptable" column in **Table 6** earlier in this report).

4.2 METHODOLOGY

Noise levels associated with project-related construction activities were calculated using the FHWA Roadway Construction Noise Model (RCNM). Noise levels were compared to the FTA's criteria in consideration with the City's noise ordinance which includes provisions regarding allowable construction hours.

An analysis of traffic noise was conducted to determine if the project would have a perceptible increase in traffic related noise. Studies have shown that a 3 dB(A) increase in sound level pressure is barely detectable by the human ear. A 3 dB(A) increase in roadway noise levels requires an approximate doubling of roadway traffic volume, assuming that travel speeds and fleet mix remain constant.[14]

The project's potential to result in significant noise impacts from on-site operational noise sources was assessed by identifying sources of on-site noise sources and considering the impact that they could produce given the nature of the source (i.e., loudness and whether noise would be produced during daytime or more-sensitive nighttime hours), distances to nearby sensitive receptors, surrounding ambient noise levels, the presence of similar noise sources in the vicinity, and maximum allowable noise levels permitted by the SCMC.

14 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Protocol.* September 2013.

4.3 IMPACT ANALYSIS

Impact NOI-1 **Would the proposed Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project Site in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? *(Less than Significant).***

Construction Impacts

Construction of the Project would require the use of heavy equipment for demolition, grading/site preparation, installation of utilities, building fabrication, and finishing. Construction activities would also involve the use of smaller power tools, generators, and other sources of noise. During each stage of construction, several types of equipment potentially could be operating concurrently and noise levels would vary based on the amount of equipment in operation and the location of the activity. The Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) has compiled data regarding the noise-generating characteristics of specific types of construction equipment and typical construction activities.

With the use of the RCNM, as detailed in Appendix A to this report,[15] the construction noise levels forecasted for the sensitive receptors are presented in **Table 7, Estimated Exterior Construction Noise at Sensitive Receptors.** Noise levels would diminish notably with distance from the construction site at a rate of 6 dBA per doubling of distance (noise from stationary or point sources is reduced by about 6 dBA for every doubling of distance at acoustically hard locations). For example, a noise level of 86 dBA L_{eq} measured at 50 feet from the noise source to the receptor would decline to 80 dBA L_{eq} at 100 feet from the source to the receptor and fall by another 6 dBA L_{eq} to 74 dBA L_{eq} at 200 feet from the source to the receptor. These noise attenuation rates assume a flat and unobstructed distance between the noise generator and the receptor. Intervening structures and vegetation would further attenuate (reduce) the noise. Furthermore, it should be noted that increases in noise levels at sensitive receptors during construction would be intermittent and temporary and would not generate continuously high noise levels. In addition, the construction noise experienced at sensitive receptors during the initial periods of construction (i.e., demolition and grading) typically would be reduced in the later construction periods (i.e., interior building construction). As the structures are built, the noise from interior construction work would be reduced at off-site locations because the proposed structures would break the line-of-sight noise transmission from the interior construction areas to the exterior areas of sensitive receptors.

15 Project construction noise levels were calculated based on the Project's anticipated mix of construction equipment with the FHWA RCNM Version 1.1.

Table 7
Estimated Exterior Construction Noise at Sensitive Receptors

Sensitive Land Uses[a]	Distance to Project Site (feet)	Estimated Peak Construction Noise Levels (dBA 1-Hour Leq)	Exceed FTA 90 dBA 1-Hour Leq Criteria?
1. Residential uses to north	Adjacent[b]	89.1	No
2. Residential uses to east	Adjacent[b]	89.1	No
3. Residential uses to southeast	395	65.9	No
3. Residential uses & Golden Valley High School to west	700	60.9	No

[a] *See Figure 3 (Noise Monitoring and Sensitive Receptor Location Map).*
[b] *See Appendix A to this report for details associated with equipment and distance assumptions for each phase of construction. This table summarizes the highest noise level at each receptor during any of the construction phases.*
Source: Impact Sciences, Inc., December 2022. See Appendix A to this report.

The City does not have specific limitation on construction noise levels. Instead, construction noise is regulated by limiting construction activity to the less noise sensitive daytime hours. Specifically, as stated previously, Section 11.44.080 of the SCMC states no person shall engage in any construction work which requires a building permit from the City on sites within three hundred (300) feet of a residentially zoned property except between the hours of seven a.m. to seven p.m., Monday through Friday, and eight a.m. to six p.m. on Saturday. Further, no work shall be performed on the following public holidays: New Year's Day, Independence Day, Thanksgiving, Christmas, Memorial Day and Labor Day. While construction activity would increase noise levels in the vicinity of the Project Site, the Project's construction activities would not exceed the FTA's general construction noise criteria of 90 dBA Leq (1-hour) at any of the sensitive receptors. Furthermore, Project construction would not occur during restricted periods, and thus, the Project would be consistent with the criteria set forth in the City's Noise Ordinance. As such, construction noise impacts would be less than significant and no mitigation is required. Although not required by CEQA, the Project would also include best management practices to reduce construction noise levels to the maximum extent feasible (see below).

Construction Best Management Practices

1. Noise and groundborne vibration construction activities whose specific location on the Project Site may be flexible (e.g., operation of compressors and generators, cement mixing, general truck idling) shall be conducted as far as possible from the nearest off-site land uses.

2. When possible, construction activities shall be scheduled so as to avoid operating several pieces of equipment simultaneously, which causes high noise levels.

3. Flexible sound control curtains shall be placed around all drilling apparatuses, drill rigs, and jackhammers when in use.

4. The Project contractor shall use power construction equipment with state-of-the-art noise shielding and muffling devices.

5. Barriers such as flexible sound control curtains shall be erected around heavy equipment to minimize the amount of noise on the surrounding land uses to the maximum extent feasible during construction.

6. All construction truck traffic shall be restricted to truck routes approved by the City, which shall avoid residential areas and other sensitive receptors to the extent feasible.

7. A construction notice shall be prepared and shall include the following information: job site address, permit number, name and phone number of the contractor and owner or owner's agent, hours of construction allowed by code or any discretionary approval for the site, and City telephone numbers where violations can be reported. The notice shall be posted and maintained at the construction site prior to the start of construction and displayed in a location that is readily visible to the public and approved by the City.

Operational Impacts

Permanent Operational Traffic Noise

The increase in traffic resulting from implementation of the Project would increase ambient noise levels at off-site locations in the Project vicinity. These concerns were addressed using the FHWA TNM model, which calculates the CNEL noise level for a particular reference set of input conditions, based on site-specific traffic volumes, distances, speeds and/or noise barriers. Based on the traffic analysis prepared for the Project in combination with an analysis of the surrounding land uses, roadway noise levels were forecasted to determine if the Project's vehicular traffic would result in a significant impact at off-site locations.

Off-site locations in the Project vicinity would experience an increase in noise resulting from the additional traffic generated by the Project. The Project-related increases in noise levels at the primary roadway segments located in proximity to the Project Site are identified in **Table 8, Project Roadway Noise Levels**. As shown in **Table 8**, the Project would increase local noise levels by a maximum of 0.2 dBA CNEL during project-level buildout scenarios and 0.4 dBA CNEL during cumulative buildout scenarios, which would be less than the 3 dBA and 5 dBA CNEL thresholds identified previously. As such, the Project's traffic-related

noise level increases would not exceed thresholds of significance, and off-site traffic noise levels associated with the Project would be less than significant.

Table 8
Project Roadway Noise Levels

		dBA CNEL						
Roadway	**Roadway Segment**	**Existing [1]**	**Existing Plus Project [2]**	**Project Net Increase [2] – [1]**	**Future Without Project [3]**	**Future With Project [4]**	**Project Net Increase [4] – [3]**	**Cumulative Net Increase [4] –[1]**
Golden Valley Road	West of Sierra Highway	73.6	73.7	***0.1***	73.8	73.9	***0.1***	***0.3***
	East of Sierra Highway	71.0	71.1	***0.1***	71.2	71.4	***0.2***	***0.4***
Sierra Highway	South of Golden Valley Road	73.0	73.1	***0.1***	73.2	73.2	***0.0***	***0.2***
	North of Golden Valley Road	71.6	71.6	***0.0***	71.8	71.9	***0.1***	***0.3***

Note:
Traffic data: Traffic Impact Analysis, Santa Clarita Mixed-Use, City of Santa Clarita, TJW Engineering, Inc., December 2, 2021. Noise levels calculated from the nearest receptor location to the roadway centerline.
Calculations provided in Appendix A to this report.

Parking Noise

Various noise events would occur periodically from the Project's parking uses. Such periodic events would include activation of car alarms, sounding of car horns, slamming of car doors, engine revs, and tire squeals. Automobile movements would comprise the most continuous noise source and would generate a noise level of approximately 65 dBA at a distance of 25 feet. Car alarm and horn noise events generate sound levels as high as 75 dBA at a reference distance of 25 feet, however these noise sources would be sporadic. It should also be noted that the existing urban environment of the Project Site currently generates noise levels associated with parking and vehicular noise sources identified above. Although the Project would increase the number of vehicles parking in the area, the types of noise would be similar to those currently occurring in the vicinity of the Project Site. While periodic noise levels from car alarms, horns, slamming of doors, etc., would increase as a result of the Project, these events would not occur consistently over a 24-hour period and thus would not have the potential to increase ambient noise levels at off-site locations by 5 dBA CNEL or more, nor exceed the City's exterior noise standards at off-site locations. As such, noise impacts from the parking areas would be considered less than significant.

Stationary Noise Sources

As part of the Project, new mechanical equipment, HVAC units, and exhaust fans could be installed on the roof or near the proposed new structures. Although the operation of this equipment would generate noise,

the design of these on-site HVAC units and exhaust fans would be required to comply with the regulations of the SCMC. Specifically, Section 11.44.070 of the SCMC states any noise level from the use or operation of any machinery, equipment, pump, fan, air conditioning apparatus, refrigerating equipment, motor vehicle, or other mechanical or electrical device, or in repairing or rebuilding any motor vehicle, which exceeds the noise limits as set forth in Section 11.44.040 at any property line, or, if a condominium or rental units, within any condominium unit or rental unit within the complex, shall be a violation of this chapter. Similarly, Section 11.44.060 of the SCMC states any noise level from the use or operation any radio receiving set, musical instrument, phonograph, television set, or other machine or device for the producing or reproducing of sound at any time in such a manner as to produce noise levels on residential land which would disturb the peace, quiet and comfort of neighboring residents or any reasonable person of normal sensitivity residing in the area shall be unlawful. In addition to these requirements, the Project will screen mechanical equipment as feasible and necessary to meet City noise standards. As such, compliance with Section 11.44.070 of the SCMC would ensure noise from stationary sources would be less than significant.

Land Use Compatibility

Exposure to Noise Levels

While agencies subject to CEQA are not required to analyze or mitigate the impact of existing environmental conditions on a project's future users or residents, the following discussion is included for informational purposes. With respect to the Project's placement of residential uses on the Project Site and exposure to noise levels, ambient measured noise levels on the Project Site are approximately 45.7 dBA CNEL.[16] As such, it is anticipated on-site residences would experience exterior noise levels that are consistent the City's exterior noise standard of 65 dBA CNEL. With respect to interior noise levels, consistent with State and City standards, all habitable spaces associated with the Project would be required to provide indoor noise levels of 45 dBA CNEL or less. As discussed previously, the exterior-to-interior noise reduction of newer residential buildings can reach more than 30 dBA depending on the type of building materials and methods used. This is based in part on mandatory compliance with CCR Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, which requires substantial building insulation, improving exterior-to-interior noise reductions. As exterior noise levels on the Project Site are approximately 45.7 dBA CNEL, exterior-to-interior noise reductions from current construction standards would ensure the Project is consistent with State and City interior noise level standards.

16 See **Appendix A** to this report for calculated CNEL at Noise Monitoring Location 1, which is representative of the location of the proposed placement of residential uses for the Project.

Mixed-Use Projects

As stated in the City's Noise Element, mixed-use developments may generate noise in excess of levels typically found in residential areas, that the commercial uses may change over time, and the associated noise levels and frequency of noise events may change along with the use. As such, and consistent with Policy N 3.1.9 of the City's Noise Element, the Project would implement a buyer and renter notification program for residences where appropriate, to educate and inform potential buyers and renters of the sources of noise in the area and/or new sources of noise that may occur in the future.

Impact NOI-2 **Would the proposed Project result in the generation of excessive groundborne vibration or groundborne noise levels? *(Less than Significant).***

The FTA provides ground-born vibration impact criteria with respect to building damage during construction activities. PPV, expressed in inches per second, is used to measure building vibration damage. Construction vibration damage criteria are assessed based on structural category (e.g., reinforced-concrete, steel, or timber). FTA guidelines consider 0.2 inch/sec PPV to be the significant impact level for non-engineered timber and masonry buildings. Structures or buildings constructed of reinforced concrete, steel, or timber have a vibration damage criterion of 0.5 inch/sec PPV pursuant to FTA guidelines.[17]

The City has not adopted any thresholds associated with human annoyance for groundborne vibration impacts. Therefore, this analysis uses the FTA's vibration impact criteria as thresholds for human annoyance. These criteria utilized the root mean square (RMS) velocity to describe human response is measured using vibration decibels (VdB). The FTA criteria include 72 VdB at residences and buildings where people normally sleep and 75 VdB at institutional buildings such as schools or churches. No criteria for human annoyance have been adopted or recommended for commercial and office uses.

The vibration levels at nearby sensitive receptors are shown below in **Table 9, Vibration Levels at Off-Site Sensitive Uses from Project Construction.**

17 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*. September 2018.

Table 9
Vibration Levels at Off-Site Sensitive Uses from Project Construction

Sensitive Uses Off-Site[a]	Distance to Project Site (ft.)	Receptor Significance Threshold PPV (in./sec)/RMS (VdB)	Estimated PPV (in/sec)/RMS (VdB)
1. Adjacent Residences to the north	Adjacent[b]	0.5/72	0.191/94
2. Adjacent Residences to the east	Adjacent[b]	0.5/72	0.191/94
3. Residences to the southeast	395	0.5/72	0.001/51
4. Residences & Golden Valley High School to the west	700	0.5/72	0.001/44

[a] *See **Figure 3** (Noise Monitoring and Sensitive Receptor Location Map).*
[b] *While the Project includes construction activity up to the property lines of adjacent receptors, this analysis assumes that not all equipment would operate closer than 15 feet from the residential uses during peak activities.*
Source: Impact Sciences, Inc., March 2022. See Appendix A to this report.

The vibration velocities predicted to occur at the nearest sensitive receptors adjacent to the Project Site would be 0.191 in/sec PPV. These nearby structures are considered to be a constructed of reinforced concrete, steel, or timber which have a vibration damage criterion of 0.5 inch/sec PPV pursuant to FTA guidelines. As shown in **Table 9**, Project construction vibration levels would not have the potential exceed this standard and this impact would be less than significant.

With regard to human annoyance, vibration levels at the adjacent residences could reach 94 VdB under a worst-case scenario. As such, the 72 VdB residential annoyance standard could be exceeded during a worst-case construction activity. However, it should be noted that vibration levels experienced in the Project vicinity would be temporary and intermittent and would be reduced when construction activities are located toward the center portion of the Project Site. The construction best management practices listed previously would also serve to reduce construction vibration levels to the maximum extent feasible. Furthermore, the Project would be consistent with Section 11.44.080 of the SCMC (Special Noise Sources—Construction and Building), which regulates construction activity in the City. While this section of the SCMC is applicable to construction noise, it would also ensure any annoyance impacts related to construction vibration would not occur during sensitive hours. Therefore, the Project would be constructed in accordance with all applicable provisions of the SCMC and vibration impacts with respect to human annoyance would be less than significant.

5.0 REFERENCES

California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.

California Office of Planning and Research. General Plan Guidelines and Technical Advisories. Appendix D: Noise Element Guidelines. Available at: https://opr.ca.gov/docs/OPR_Appendix_D_final.pdf

City of Santa Clarita. 2011. General Plan Noise Element. Available at: https://www.codepublishing.com/CA/SantaClarita/html/SantaClaritaGP/5%20-%20Noise%20Element.pdf

Federal Highway Administration, *Highway Noise Fundamentals*, (1980).

Federal Highway Administration, *Highway Noise Mitigation*, (1980).

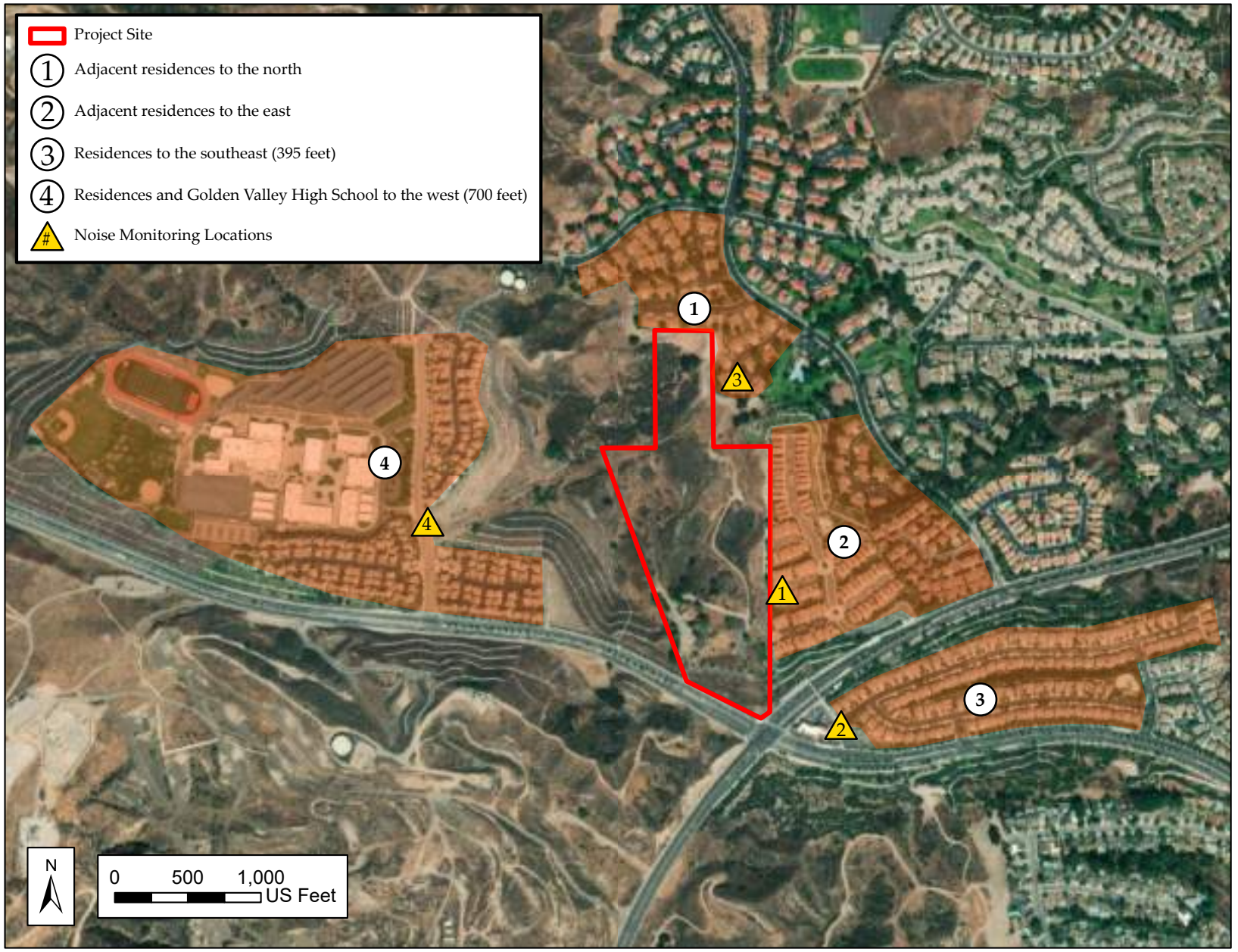
Federal Highway Administration, *Highway Traffic Noise: Analysis and Abatement Guidance*. December 2011.

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual. September* 2018

Wayne County Airport Authority. *Background information on noise & its measurement, 2009*

APPENDIX A

Noise and Vibration Technical Appendix



SOURCE: Esri, 2022

IMPACT SCIENCES

Noise Monitoring and Sensitive Receptor Location Map

1415.001•02/22

NOISE MONITORING FIELD REPORT

Site Map

Project Name: Golden Valley

Monitoring Location: 19877 Via Kalban

Date: 01/27/2022 Site Number: 1 (Daytime)

Measured By: Raul Castillo

Measurement Start Time: 6:36 p.m.

Measurement End Time: 6:51 p.m.

Total Measurement Time: 15 min.

Noise Meter Model: Larson Davis Soundtrack LxT Calibration: 94.0 (dBA)

Meter Setting: A-Weighted Sound Level (SLOW)

Session File Name: LxT_Data.138

Primary Noise Sources: Traffic, parking

Data Summary

Noise Scale	Noise Level (dBA)
L_{eq}	42.5
L_{max}	59.3
L_{min}	34.5

Other Noise Sources During Monitoring

1. _____ Time: _____
2. _____ Time: _____
3. _____ Time: _____
4. _____ Time: _____
5. _____ Time: _____

Additional Notes:

_____
_____
_____
_____
_____

IMPACT SCIENCES

Measurement Report

Report Summary

Meter's File Name	LxT_Data.138.s	Computer's File Name	LxT_0005667-20220127 183645-LxT_Data.138.ldbin
Meter	LxT1 0005667		
Firmware	2.302		
User		Location	
Job Description			
Note			
Start Time	2022-01-27 18:36:45	Duration	0:15:00.0
End Time	2022-01-27 18:51:45	Run Time	0:15:00.0
		Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	42.5 dB		
LAE	72.1 dB	SEA	--- dB
EA	1.8 μPa²h		
EA8	57.0 μPa²h		
EA40	285.2 μPa²h		
LA_{peak}	89.1 dB	2022-01-27 18:48:54	
LAS_{max}	59.3 dB	2022-01-27 18:40:16	
LAS_{min}	34.5 dB	2022-01-27 18:41:38	
LA_{eq}	42.5 dB		
LC_{eq}	57.7 dB	LC_{eq} - LA_{eq}	15.2 dB
LAI_{eq}	50.1 dB	LAI_{eq} - LA_{eq}	7.5 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	42.5 dB		57.7 dB		--- dB	
$L_{S(max)}$	59.3 dB	2022-01-27 18:40:16	--- dB		--- dB	
$L_{S(min)}$	34.5 dB	2022-01-27 18:41:38	--- dB		--- dB	
$L_{Peak(max)}$	89.1 dB	2022-01-27 18:48:54	--- dB		--- dB	

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 0.0	--- dB
LAS 0.0	--- dB
LAS 10.0	45.0 dB
LAS 33.3	40.3 dB
LAS 66.7	36.9 dB
LAS 90.0	35.7 dB

Time History

NOISE MONITORING FIELD REPORT

Site Map

Project Name: Golden Valley

Monitoring Location: 19877 Via Kalban

Date: 01/27/2022 Site Number: 1 (Evening)

Measured By: Raul Castillo

Measurement Start Time: 7:00 p.m.

Measurement End Time: 7:15 p.m.

Total Measurement Time: 15 min.

Noise Meter Model: Larson Davis Soundtrack LxT Calibration: 94.0 (dBA)

Meter Setting: A-Weighted Sound Level (SLOW)

Session File Name: LxT_Data.139

Primary Noise Sources: Traffic, parking

Data Summary

Noise Scale	Noise Level (dBA)
L_{eq}	45.1
L_{max}	66.7
L_{min}	36.1

Other Noise Sources During Monitoring

1. _____ Time: _____
2. _____ Time: _____
3. _____ Time: _____
4. _____ Time: _____
5. _____ Time: _____

Additional Notes:

_____
_____
_____
_____
_____

IMPACT SCIENCES

Measurement Report

Report Summary

Meter's File Name	LxT_Data.139.s	Computer's File Name	LxT_0005667-20220127 190038-LxT_Data.139.ldbin
Meter	LxT1 0005667		
Firmware	2.302		
User		Location	
Job Description			
Note			
Start Time	2022-01-27 19:00:38	Duration	0:15:00.0
End Time	2022-01-27 19:15:38	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	45.1 dB		
LAE	74.6 dB	SEA	--- dB
EA	3.2 μPa^2h		
EA8	102.7 μPa^2h		
EA40	513.5 μPa^2h		
LA_{peak}	86.6 dB	2022-01-27 19:06:39	
LAS_{max}	66.7 dB	2022-01-27 19:06:39	
LAS_{min}	36.1 dB	2022-01-27 19:01:18	
LA_{eq}	45.1 dB		
LC_{eq}	59.4 dB	LC_{eq} - LA_{eq}	14.3 dB
LAI_{eq}	51.2 dB	LAI_{eq} - LA_{eq}	6.1 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

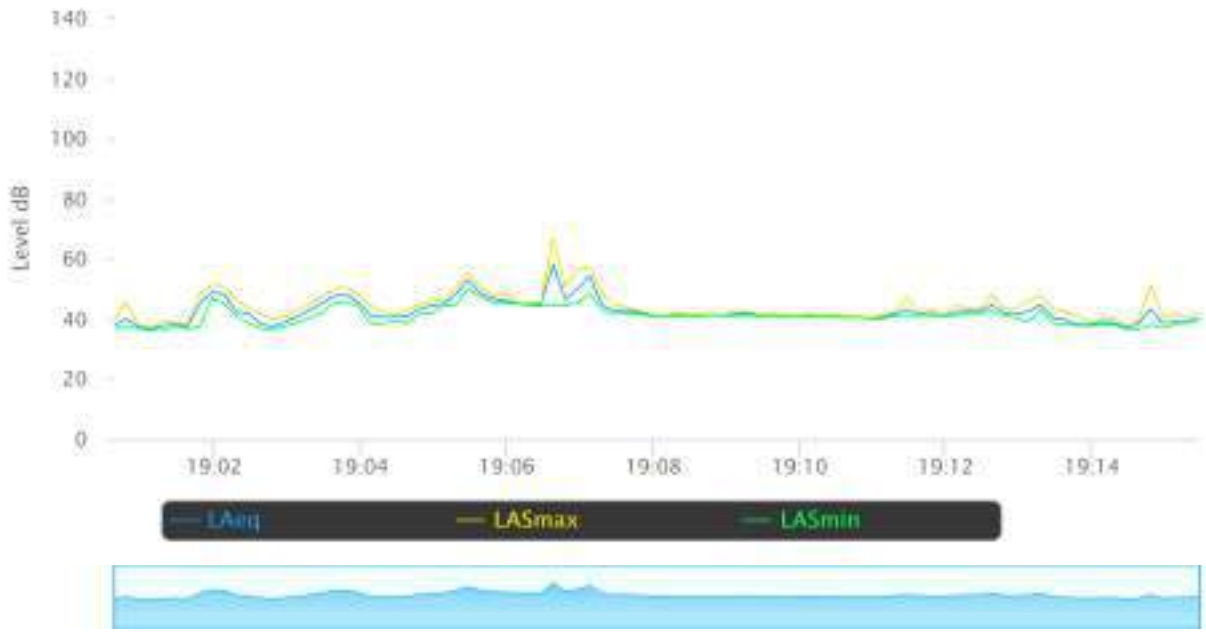
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	45.1 dB		59.4 dB		--- dB	
$Ls_{(max)}$	66.7 dB	2022-01-27 19:06:39	--- dB		--- dB	
$LS_{(min)}$	36.1 dB	2022-01-27 19:01:18	--- dB		--- dB	
$L_{Peak(max)}$	86.6 dB	2022-01-27 19:06:39	--- dB		--- dB	

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 0.0	--- dB
LAS 0.0	--- dB
LAS 10.0	47.0 dB
LAS 33.3	42.6 dB
LAS 66.7	40.8 dB
LAS 90.0	38.0 dB

Time History



NOISE MONITORING FIELD REPORT

Site Map

Project Name: Golden Valley

Monitoring Location: 19877 Via Kalban

Date: 01/27/2022 Site Number: 1 (Night)

Measured By: Raul Castillo

Measurement Start Time: 10:00 p.m.

Measurement End Time: 10:15 p.m.

Total Measurement Time: 15 min.

Noise Meter Model: Larson Davis Soundtrack LxT Calibration: 94.0 (dBA)

Meter Setting: A-Weighted Sound Level (SLOW)

Session File Name: LxT_Data.140

Primary Noise Sources: Traffic, parking

Data Summary

Noise Scale	Noise Level (dBA)
L_{eq}	36.1
L_{max}	47.0
L_{min}	33.1

Other Noise Sources During Monitoring

1. _____ Time: _____
2. _____ Time: _____
3. _____ Time: _____
4. _____ Time: _____
5. _____ Time: _____

Additional Notes:

_____
_____
_____
_____
_____

IMPACT SCIENCES

Measurement Report

Report Summary

Meter's File Name	LxT_Data.140.s	Computer's File Name	LxT_0005667-20220127 220047-LxT_Data.140.ldbin
Meter	LxT1 0005667		
Firmware	2.302		
User		Location	
Job Description			
Note			
Start Time	2022-01-27 22:00:47	Duration	0:15:00.0
End Time	2022-01-27 22:15:47	Run Time	0:15:00.0
		Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	36.1 dB		
LAE	65.7 dB	SEA	--- dB
EA	0.4 μPa²h		
EA8	13.2 μPa²h		
EA40	65.9 μPa²h		
LA_{peak}	82.3 dB	2022-01-27 22:15:40	
LAS_{max}	47.0 dB	2022-01-27 22:15:40	
LAS_{min}	33.1 dB	2022-01-27 22:07:19	
LA_{eq}	36.1 dB		
LC_{eq}	51.8 dB	LC_{eq} - LA_{eq}	15.6 dB
LAI_{eq}	39.6 dB	LAI_{eq} - LA_{eq}	3.4 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	36.1 dB		51.8 dB		--- dB	
$L_{S(max)}$	47.0 dB	2022-01-27 22:15:40	--- dB		--- dB	
$L_{S(min)}$	33.1 dB	2022-01-27 22:07:19	--- dB		--- dB	
$L_{Peak(max)}$	82.3 dB	2022-01-27 22:15:40	--- dB		--- dB	

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 0.0	--- dB
LAS 0.0	--- dB
LAS 10.0	37.9 dB
LAS 33.3	36.0 dB
LAS 66.7	34.9 dB
LAS 90.0	34.2 dB

Time History

NOISE MONITORING FIELD REPORT

Site Map

Project Name: Golden Valley

Monitoring Location: 19845 Ellis Henry Ave.

Date: 01/27/2022 Site Number: 2

Measured By: Raul Castillo

Measurement Start Time: 6:15 p.m.

Measurement End Time: 6:30 p.m.

Total Measurement Time: 15 min.

Noise Meter Model: Larson Davis Soundtrack LxT Calibration: 94.0 (dBA)

Meter Setting: A-Weighted Sound Level (SLOW)

Session File Name: LxT_Data.137

Primary Noise Sources: Traffic, commercial uses

Data Summary

Noise Scale	Noise Level (dBA)
L_{eq}	54.2
L_{max}	64.0
L_{min}	41.4

Other Noise Sources During Monitoring

1. _____ Time: _____
2. _____ Time: _____
3. _____ Time: _____
4. _____ Time: _____
5. _____ Time: _____

Additional Notes:

_____
_____
_____
_____
_____

IMPACT SCIENCES

Measurement Report

Report Summary

Meter's File Name	LxT_Data.137.s	Computer's File Name	LxT_0005667-20220127 181545-LxT_Data.137.ldbin
Meter	LxT1 0005667		
Firmware	2.302		
User		Location	
Job Description			
Note			
Start Time	2022-01-27 18:15:45	Duration	0:15:00.0
End Time	2022-01-27 18:30:45	Run Time	0:15:00.0
		Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	54.2 dB		
LAE	83.7 dB	SEA	--- dB
EA	26.2 μPa^2h		
EA8	839.8 μPa^2h		
EA40	4.2 mPa^2h		
LA_{peak}	80.0 dB	2022-01-27 18:29:52	
LAS_{max}	64.0 dB	2022-01-27 18:17:39	
LAS_{min}	41.4 dB	2022-01-27 18:22:30	
LA_{eq}	54.2 dB		
LC_{eq}	68.0 dB	LC_{eq} - LA_{eq}	13.8 dB
LAI_{eq}	55.6 dB	LAI_{eq} - LA_{eq}	1.4 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
--- dB	--- dB	0.0 dB

LDEN	LDay	LEve	LNight
--- dB	--- dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	54.2 dB		68.0 dB		--- dB	
$L_{S(max)}$	64.0 dB	2022-01-27 18:17:39	--- dB		--- dB	
$L_{S(min)}$	41.4 dB	2022-01-27 18:22:30	--- dB		--- dB	
$L_{Peak(max)}$	80.0 dB	2022-01-27 18:29:52	--- dB		--- dB	

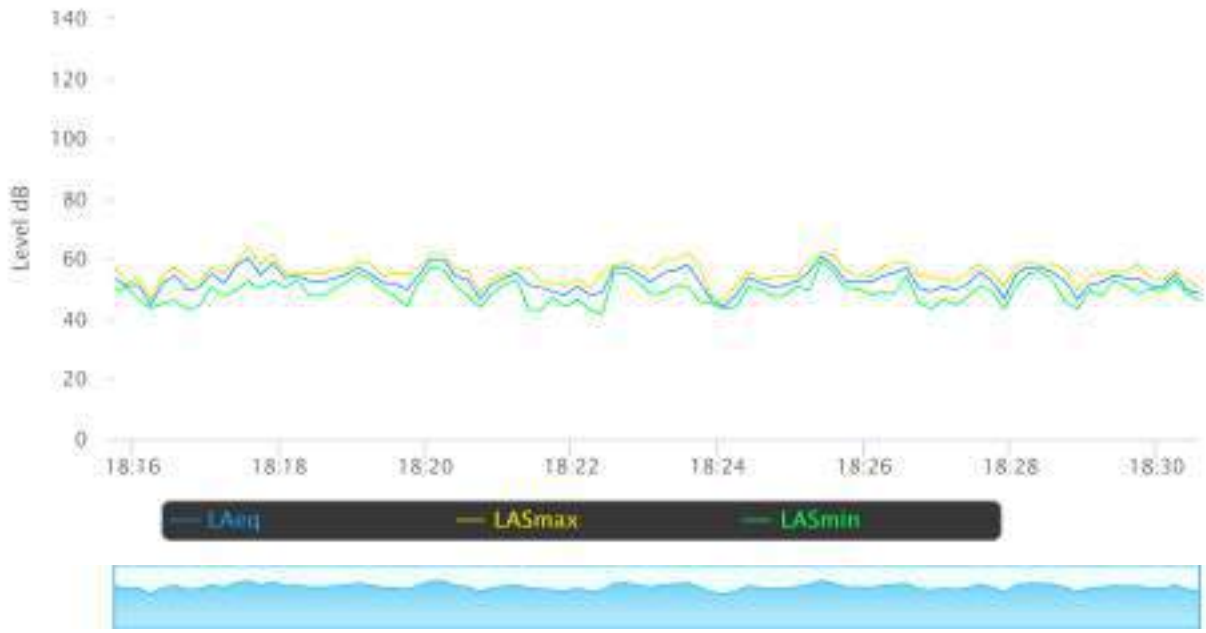
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 0.0	--- dB
LAS 0.0	--- dB
LAS 10.0	57.6 dB
LAS 33.3	54.3 dB
LAS 66.7	50.6 dB
LAS 90.0	46.2 dB

Time History



NOISE MONITORING FIELD REPORT

Site Map

Project Name: Golden Valley

Monitoring Location: 26271 Rainbow Glen Dr.

Date: 01/27/2022 Site Number: 3

Measured By: Raul Castillo

Measurement Start Time: 5:52 p.m.

Measurement End Time: 6:07 p.m.

Total Measurement Time: 15 min.

Noise Meter Model: Larson Davis Soundtrack LxT Calibration: 94.0 (dBA)

Meter Setting: A-Weighted Sound Level (SLOW)

Session File Name: LxT_Data.136

Primary Noise Sources: Traffic, parking noise

Data Summary

Noise Scale	Noise Level (dBA)
L_{eq}	49.4
L_{max}	58.9
L_{min}	35.8

Other Noise Sources During Monitoring

1. _____ Time: _____
2. _____ Time: _____
3. _____ Time: _____
4. _____ Time: _____
5. _____ Time: _____

Additional Notes:

_____
_____
_____
_____
_____

IMPACT SCIENCES

Measurement Report

Report Summary

Meter's File Name	LxT_Data.136.s	Computer's File Name	LxT_0005667-20220127 175235-LxT_Data.136.ldbin
Meter	LxT1 0005667		
Firmware	2.302		
User		Location	
Job Description			
Note			
Start Time	2022-01-27 17:52:35	Duration	0:15:00.0
End Time	2022-01-27 18:07:35	Run Time	0:15:00.0
		Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	49.4 dB		
LAE	78.9 dB	SEA	--- dB
EA	8.7 µPa²h		
EA8	277.7 µPa²h		
EA40	1.4 mPa²h		
LA_{peak}	85.1 dB	2022-01-27 17:55:26	
LAS_{max}	58.9 dB	2022-01-27 17:59:00	
LAS_{min}	35.8 dB	2022-01-27 18:05:36	
LA_{eq}	49.4 dB		
LC_{eq}	62.0 dB	LC_{eq} - LA_{eq}	12.6 dB
LAI_{eq}	51.9 dB	LAI_{eq} - LA_{eq}	2.5 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
--- dB	--- dB	0.0 dB

LDEN	LDay	LEve	LNight
--- dB	--- dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	49.4 dB		62.0 dB		--- dB	
$L_{S(max)}$	58.9 dB	2022-01-27 17:59:00	--- dB		--- dB	
$L_{S(min)}$	35.8 dB	2022-01-27 18:05:36	--- dB		--- dB	
$L_{Peak(max)}$	85.1 dB	2022-01-27 17:55:26	--- dB		--- dB	

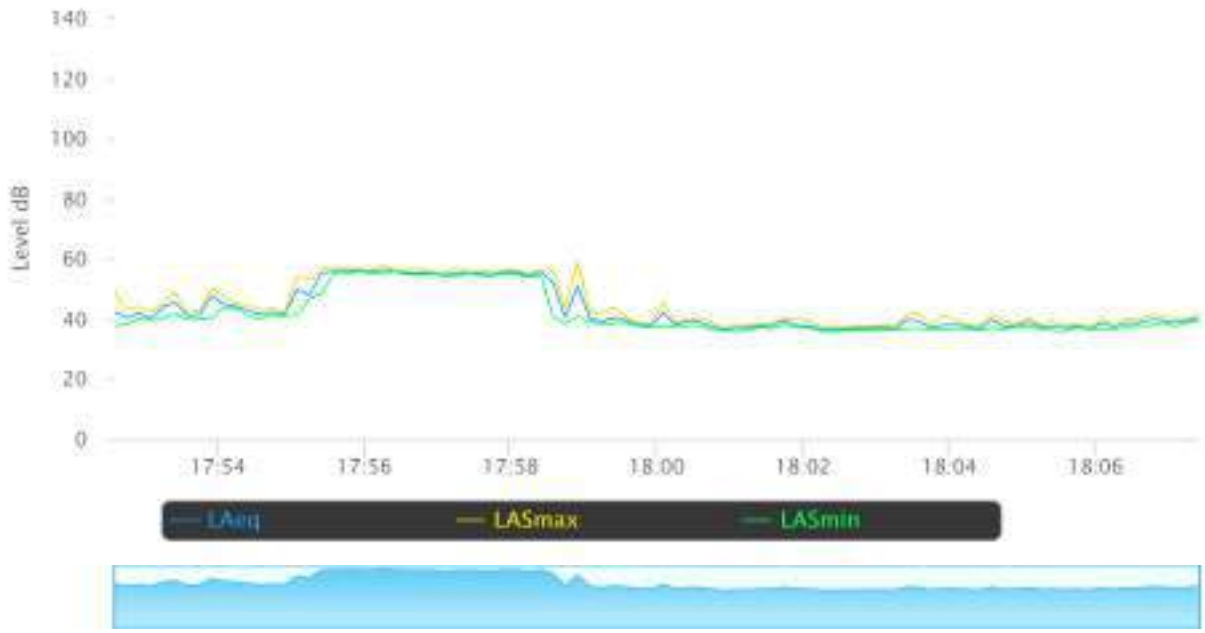
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 0.0	--- dB
LAS 0.0	--- dB
LAS 10.0	55.4 dB
LAS 33.3	42.3 dB
LAS 66.7	38.2 dB
LAS 90.0	36.8 dB

Time History



NOISE MONITORING FIELD REPORT

Site Map

Project Name: Golden Valley

Monitoring Location: Robert C. Lee Pkwy

Date: 01/27/2022 Site Number: 4

Measured By: Raul Castillo

Measurement Start Time: 5:25 p.m.

Measurement End Time: 5:40 p.m.

Total Measurement Time: 15 min.

Noise Meter Model: Larson Davis Soundtrack LxT Calibration: 94.0 (dBA)

Meter Setting: A-Weighted Sound Level (SLOW)

Session File Name: LxT_Data.135

Primary Noise Sources: Traffic

Data Summary

Noise Scale	Noise Level (dBA)
L_{eq}	56.1
L_{max}	69.9
L_{min}	37.8

Other Noise Sources During Monitoring

1. _____ Time: _____
2. _____ Time: _____
3. _____ Time: _____
4. _____ Time: _____
5. _____ Time: _____

Additional Notes:

_____
_____
_____
_____
_____

IMPACT SCIENCES

Measurement Report

Report Summary

Meter's File Name	LxT_Data.135.s	Computer's File Name	LxT_0005667-20220127 172508-LxT_Data.135.ldbin
Meter	LxT1 0005667		
Firmware	2.302		
User		Location	
Job Description			
Note			
Start Time	2022-01-27 17:25:08	Duration	0:15:00.0
End Time	2022-01-27 17:40:08	Run Time	0:15:00.0
Pause Time	0:00:00.0		

Results

Overall Metrics

LA_{eq}	56.1 dB		
LAE	85.7 dB	SEA	--- dB
EA	41.1 μPa²h		
EA8	1.3 mPa²h		
EA40	6.6 mPa²h		
LA_{peak}	89.4 dB	2022-01-27 17:33:30	
LAS_{max}	69.9 dB	2022-01-27 17:31:53	
LAS_{min}	37.8 dB	2022-01-27 17:33:51	
LA_{eq}	56.1 dB		
LC_{eq}	67.9 dB	LC_{eq} - LA_{eq}	11.7 dB
LAI_{eq}	59.0 dB	LAI_{eq} - LA_{eq}	2.8 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	--- dB	--- dB	0.0 dB

	LDEN	LDay	LEve	LNight
	--- dB	--- dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	56.1 dB		67.9 dB		--- dB	
$L_{S(max)}$	69.9 dB	2022-01-27 17:31:53	--- dB		--- dB	
$L_{S(min)}$	37.8 dB	2022-01-27 17:33:51	--- dB		--- dB	
$L_{Peak(max)}$	89.4 dB	2022-01-27 17:33:30	--- dB		--- dB	

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 0.0	--- dB
LAS 0.0	--- dB
LAS 10.0	59.1 dB
LAS 33.3	55.9 dB
LAS 66.7	49.9 dB
LAS 90.0	42.2 dB

Time History

Estimated Project Site Vicinity CNEL (Location 1)		
Hour of Day	**dBA Leq**	**With CNEL Penalty**
12:00 AM	36.1	46.1
1:00 AM	36.1	46.1
2:00 AM	36.1	46.1
3:00 AM	36.1	46.1
4:00 AM	36.1	46.1
5:00 AM	36.1	46.1
6:00 AM	36.1	46.1
7:00 AM	42.5	42.5
8:00 AM	42.5	42.5
9:00 AM	42.5	42.5
10:00 AM	42.5	42.5
11:00 AM	42.5	42.5
12:00 PM	42.5	42.5
1:00 PM	42.5	42.5
2:00 PM	42.5	42.5
3:00 PM	42.5	42.5
4:00 PM	42.5	42.5
5:00 PM	42.5	42.5
6:00 PM	42.5	42.5
7:00 PM	45.1	50.1
8:00 PM	45.1	50.1
9:00 PM	45.1	50.1
10:00 PM	36.1	46.1
11:00 PM	36.1	46.1
	Calculated CNEL:	**45.7**

Daytime Hours:	7:00 AM - 7:00 PM
Evening Hours:	7:00 PM - 10:00 PM
Nighttime Hours:	10:00 PM - 7:00 AM

Note: Calculation based on representative Leq measurements collected for daytime, evening and nighttime periods at Location 1. See noise monitoring data.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/8/2022
Case Description: Demoltion

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Adjacent residences to the north	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	1100	0
Dozer	No	40		81.7	1100	0

Note: Distance estimated from receptor to anticipated demolition areas of existing structures.

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		62.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		54.8	50.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	62.7	57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Adjacent residences to the east	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	380	0
Dozer	No	40		81.7	380	0

Note: Distance estimated from receptor to anticipated demolition areas of existing structures.

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		72	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	72	66.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences to the southeast	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	395	0
Dozer	No	40		81.7	395	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		71.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		63.7	59.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	71.6	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences and GVHS to west	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	700	0
Dozer	No	40		81.7	700	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		66.7	59.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		58.7	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	66.7	60.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/8/2022
Case Description: Grading

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Adjacent residences to the north	Residential	55	55	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Scraper	No	40		83.6	25	0
Dozer	No	40		81.7	25	0

Note: Given the dynamic nature of mobile grading equipment, distance estimate assumes grading equipment would not operate closer than an average of 25 feet during a one-hour period. Said another way, it is assumed equipment could operate within 25 feet for some part of 1 hour, but would also operate farther than 25 feet during a 1-hour period.

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper		89.6	85.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		87.7	83.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	89.6	87.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Adjacent residences to the east	Residential	55	55	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Scraper	No	40		83.6	25	0
Dozer	No	40		81.7	25	0

Note: Given the dynamic nature of mobile grading equipment, distance estimate assumes grading equipment would not operate closer than an average of 25 feet during a one-hour period. Said another way, it is assumed equipment could operate within 25 feet for some part of 1 hour, but would also operate farther than 25 feet during a 1-hour period.

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper		89.6	85.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		87.7	83.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	89.6	87.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences to the southeast	Residential	55	55	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Scraper	No	40		83.6	395	0
Dozer	No	40		81.7	395	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper		65.6	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		63.7	59.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	65.6	63.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences and GVHS to west	Residential	55	55	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Scraper	No	40		83.6	700	0
Dozer	No	40		81.7	700	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper		60.7	56.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		58.7	54.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	60.7	58.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/8/2022
Case Description: Building Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Adjacent residences to the north	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	25	0
Generator	No	50		80.6	25	0

Note: Based on the Project Site Plan, building construction equipment would not be required within 25 feet.

Results

		Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		86.6	78.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		86.7	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	86.7	84.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Adjacent residences to the east	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	25	0
Generator	No	50		80.6	25	0

Note: Based on the Project Site Plan, building construction equipment would not be required within 25 feet.

Results

		Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		86.6	78.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		86.7	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	86.7	84.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences to the southeast	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	395	0
Generator	No	50		80.6	395	0

Results

		Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		62.6	54.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		62.7	59.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	62.7	60.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences and GVHS to west	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	700	0
Generator	No	50		80.6	700	0

Results

		Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		57.6	49.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		57.7	54.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	57.7	55.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/8/2022
Case Description: Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Adjacent residences to the north	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	25	0
Pavement Scarafier	No	20		89.5	25	0

Note: Given the dynamic nature of mobile paving equipment, distance estimate assumes paving equipment would not operate closer than an average of 25 feet during a one-hour period. Said another way, it is assumed equipment could operate within 25 feet for some part of 1 hour, but would also operate farther than 25 feet during a 1-hour period.

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	83.2	80.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pavement Scarafier	95.5	88.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	95.5	89.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Adjacent residences to the east	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	25	0
Pavement Scarafier	No	20		89.5	25	0

Note: Given the dynamic nature of mobile paving equipment, distance estimate assumes paving equipment would not operate closer than an average of 25 feet during a one-hour period. Said another way, it is assumed equipment could operate within 25 feet for some part of 1 hour, but would also operate farther than 25 feet during a 1-hour period.

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	83.2	80.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pavement Scarafier	95.5	88.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	95.5	89.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences to the southeast	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	395	0
Pavement Scarafier	No	20		89.5	395	0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	59.3	56.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pavement Scarafier	71.5	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	71.5	65.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences and GVHS to west	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	700	0
Pavement Scarafier	No	20		89.5	700	0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	54.3	51.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pavement Scarafier	66.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.6	60.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Golden Valley Project — Adjacent residences to the north

Ref= Reference vibration level (PPV)

RefD= Reference distance for Reference vibration level (Feet)

Vibration PPV		
Ref=	0.089	Based on type of equipment
RefD=	25	
D=	15	Distance from equipment to sensitive receptor
Equip=	0.191	
Annoyance VdB		
Ref=	87	Based on type of equipment
RefD=	25	
D=	15	Distance from equipment to sensitive receptor
Equip=	94	

Peak demolition vibration based on utilizing a large bulldozer.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

Golden Valley Project — Adjacent residences to the east

Ref= Reference vibration level (PPV)

RefD= Reference distance for Reference vibration level (Feet)

Vibration PPV		
Ref=	0.089	Based on type of equipment
RefD=	25	
D=	15	Distance from equipment to sensitive receptor
Equip=	0.191	
Annoyance VdB		
Ref=	87	Based on type of equipment
RefD=	25	
D=	15	Distance from equipment to sensitive receptor
Equip=	94	

Peak demolition vibration based on utilizing a large bulldozer.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

Golden Valley Project — Residences to southeast

Ref= Reference vibration level (PPV)

RefD= Reference distance for Reference vibration level (Feet)

Vibration PPV		
Ref=	0.089	Based on type of equipment
RefD=	25	
D=	395	Distance from equipment to sensitive receptor
Equip=	0.001	
Annoyance VdB		
Ref=	87	Based on type of equipment
RefD=	25	
D=	395	Distance from equipment to sensitive receptor
Equip=	51	

Peak demolition vibration based on utilizing a large bulldozer.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

Golden Valley Project — Residences and GVHS to west

Ref= Reference vibration level (PPV)

RefD= Reference distance for Reference vibration level (Feet)

Vibration PPV		
Ref=	0.089	Based on type of equipment
RefD=	25	
D=	700	Distance from equipment to sensitive receptor
Equip=	0.001	
Annoyance VdB		
Ref=	87	Based on type of equipment
RefD=	25	
D=	700	Distance from equipment to sensitive receptor
Equip=	44	

Peak demolition vibration based on utilizing a large bulldozer.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

TRAFFIC NOISE LEVELS

Project Name: Golden Valley-Sierra Hwy Mixed-Use Project

Background Information

Model Description:	FHWA Highway Noise Prediction Model with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s):	Existing, Existing Plus Project, Future Without Project, Future With Project
Source of Traffic Volumes:	Traffic Impact Analysis, Santa Clarita Mixed-Use, City of Santa Clarita, TJW Engineering, Inc., December 2, 2021
Community Noise Descriptor:	X

Assumed 24-Hour Traffic Distribution:	(Ldn) Day	Evening	(CNEL) Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Traffic Noise Levels

Analysis Condition Roadway Name Roadway Segment	Lanes	Median Width	Peak Hour Volume	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor[1]	Alpha Factor	Barrier Attn. dB(A)	Vehicle Mix: Medium Trucks	Vehicle Mix: Heavy Trucks	Peak Hour dB(A) L_{eq}	24-Hour dB(A) CNEL
Existing Traffic Noise												
Golden Valley Rd.												
west of Sierra Hwy	4	10	3,455	27,636	50	50	0	0	1.8%	0.7%	75.3	73.6
east of Sierra Hwy	4	10	1,881	15,044	50	50	0	0	1.8%	0.7%	72.7	71.0
Sierra Hwy												
south of Golden Valley Rd.	4	10	3,035	24,280	50	50	0	0	1.8%	0.7%	74.8	73.0
north of Golden Valley Rd.	4	10	2,176	17,408	50	50	0	0	1.8%	0.7%	73.3	71.6
Existing Plus Project Traffic Noise												
Golden Valley Rd.												
west of Sierra Hwy	4	10	3,551	28,408	50	50	0	0	1.8%	0.7%	75.4	73.7
east of Sierra Hwy	4	10	1,941	15,528	50	50	0	0	1.8%	0.7%	72.8	71.1
Sierra Hwy												
south of Golden Valley Rd.	4	10	3,047	24,372	50	50	0	0	1.8%	0.7%	74.8	73.1
north of Golden Valley Rd.	4	10	2,201	17,604	50	50	0	0	1.8%	0.7%	73.4	71.6
Future Without Project Traffic Noise												
Golden Valley Rd.												
west of Sierra Hwy	4	10	3,632	29,052	50	50	0	0	1.8%	0.7%	75.5	73.8
east of Sierra Hwy	4	10	2,006	16,048	50	50	0	0	1.8%	0.7%	73.0	71.2
Sierra Hwy												
south of Golden Valley Rd.	4	10	3,164	25,308	50	50	0	0	1.8%	0.7%	74.9	73.2
north of Golden Valley Rd.	4	10	2,282	18,256	50	50	0	0	1.8%	0.7%	73.5	71.8
Future With Project Traffic Noise												
Golden Valley Rd.												
west of Sierra Hwy	4	10	3,728	29,824	50	50	0	0	1.8%	0.7%	75.7	73.9
east of Sierra Hwy	4	10	2,067	16,532	50	50	0	0	1.8%	0.7%	73.1	71.4
Sierra Hwy												
south of Golden Valley Rd.	4	10	3,175	25,400	50	50	0	0	1.8%	0.7%	75.0	73.2
north of Golden Valley Rd.	4	10	2,307	18,452	50	50	0	0	1.8%	0.7%	73.6	71.9

[1] Distance in feet from the roadway centerline to nearest receptor location.

APPENDIX H
Santa Clarita Mixed Use Traffic Impact Analysis

Santa Clarita Mixed Use Traffic Impact Analysis

City of Santa Clarita, California

December 2, 2021

Prepared by:

TJW ENGINEERING, INC.
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TJW ENGINEERING, INC.
TRAFFIC ENGINEERING & TRANSPORTATION PLANNING CONSULTANTS

December 2, 2021

Renaud and Sue Veluzat
VELUZAT PRODUCTIONS
24715 Oak Creek
Newhall, CA 91321

Subject: Traffic Impact Analysis - Santa Clarita Mixed Use, City of Santa Clarita

Dear Mr. and Mrs. Veluzat:

TJW ENGINEERING, INC. (TJW) is pleased to present you with this traffic impact analysis for the proposed Santa Clarita Mixed Use project located at the northwest corner of the intersection of Golden Valley Road and Sierra Highway in the City of Santa Clarita.

This traffic study has been prepared to meet the traffic study requirements for the City of Santa Clarita and assesses the forecast traffic operations associated with the proposed project and its impact on the local street network. This report is being submitted to you for review and forwarding to the City of Santa Clarita.

Please contact us at (949) 878-3509 if you have any questions regarding this analysis.

Sincerely,

Thomas Wheat, PE, TE
President

David Chew, PTP
Transportation Planner

Registered Civil Engineer *#69467*
Registered Traffic Engineer *#2565*

Jeffrey Chinchilla, PE
Project Engineer

Santa Clarita Mixed Use Traffic Impact Analysis

City of Santa Clarita, California

December 2, 2021

Prepared for:
Renaud and Sue Veluzat
VELUZAT PRODUCTIONS
24715 Oak Creek
Newhall, CA 91321

Prepared by:
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Appendix C: HCM Analysis Sheets

1.0 EXECUTIVE SUMMARY

This traffic impact analysis (TIA) analyzes the projected traffic operations associated with the proposed Santa Clarita Mixed Use project located at the northwest corner of the intersection of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The purpose of this TIA is to evaluate potential circulation system deficiencies that may result from development of the proposed project, and to recommend improvements to achieve acceptable operations, if applicable. This analysis has been prepared in coordination with the City of Santa Clarita via a scoping agreement (See **Appendix A**) and is pursuant to applicable City of Santa Clarita and Caltrans traffic impact analysis guidelines.

The proposed project consists of the following land uses:

- 151 Unit Senior Assisted Living Units
- 73 Multi-Family Condominium Units
- 60 Room Hotel with 3,315 sf of retail space and 2,360 sf of restaurant space.

Site access is planned via one left-in, right-in, right-out driveway on Golden Valley Road. The site is currently zoned as Mixed-Use Neighborhood (MX-N) and classified as Mixed-Use Neighborhood in the City of Santa Clarita General Plan Land Use Plan. The project site is currently vacant. The proposed project land use will not require a zone change or General Plan amendment.

The proposed project is anticipated to be built and generating trips in 2023. A growth rate of 2% was used to account for 2023 volumes.

The proposed project is projected to generate 1,787 daily trips, 104 AM peak hour trips, and 133 PM peak hour trips.

The following seven (7) intersections in the vicinity of the project site have been included in the intersection level of service (LOS) analysis:

1. Golden Valley Rd/Centre Pointe Pkwy;
2. Golden Valley Rd/Robert C Lee Pkwy;
3. Golden Valley Rd/Sierra Hwy;
4. Golden Valley Rd/SB-14 Ramp;
5. Golden Valley Rd/NB-14 Ramp;
6. Sierra Hwy/Friendly Valley Pkwy; and
7. Sierra Hwy/Via Princessa.

The study intersections are analyzed for the following study scenarios:

- Existing Conditions;
- Existing Plus Project;
- Project Opening Year (Cumulative); and
- Project Opening Year Plus Project.

1.1 SUMMARY OF LEVEL OF SERVICE ANALYSIS RESULTS

Table ES-1 summarizes the results of the intersection level of service analysis based on the City of Santa Clarita thresholds of significance for analyzing transportation deficiencies.

Table ES-1
Summary of Transportation Deficiencies at Study Intersections

Intersection			Opening Year Plus Project	Future Year Plus Project
1	Golden Valley	Centre Pointe	No Deficiencies	No Deficiencies
2	Golden Valley	Robert C Lee	No Deficiencies	No Deficiencies
3	Golden Valley	Sierra	No Deficiencies	No Deficiencies
4	Golden Valley	SB SR-14	No Deficiencies	No Deficiencies
5	Golden Valley	NB SR-14	No Deficiencies	No Deficiencies
6	Sierra	Friendly Valley	No Deficiencies	No Deficiencies
7	Sierra	Via Princessa	No Deficiencies	No Deficiencies

Existing Conditions

The study intersections are projected to operate at an acceptable LOS during the AM and PM peak hours for existing conditions with the exception of the following intersections:

- #1 – Golden Valley Rd/Centre Pointe (LOS E PM Peak Hour); and
- #3 – Golden Valley Rd/Sierra Hwy (LOS E AM Peak Hour).

Existing Plus Project Conditions

The study intersections are projected to operate at an acceptable LOS during the AM and PM peak hours for existing plus project (EP) conditions with the exception of the following intersections:

- #1 – Golden Valley Rd/Centre Pointe (LOS E PM Peak Hour); and
- #3 – Golden Valley Rd/Sierra Hwy (LOS E AM Peak Hour).

Per City of Santa Clarita Guidelines, the proposed project does not create a transportation deficiency.

Project Opening Year Cumulative Conditions

The study intersections are projected to operate at an acceptable LOS during the AM and PM peak hours for project opening year cumulative (OYC) conditions with the exception of the following intersections:

- #1 – Golden Valley Rd/Centre Pointe (LOS E PM Peak Hour); and
- #3 – Golden Valley Rd/Sierra Hwy (LOS E AM Peak Hour).

Project Opening Year Cumulative Plus Project Conditions

The study intersections are projected to operate at an acceptable LOS during the AM and PM peak hours for project opening year cumulative (OYC) conditions with the exception of the following intersections:

- #1 – Golden Valley Rd/Centre Pointe (LOS E PM Peak Hour); and
- #3 – Golden Valley Rd/Sierra Hwy (LOS E AM Peak Hour).

Per City of Santa Clarita Guidelines, the proposed project does not create a transportation deficiency.

1.2 ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

Wherever necessary, roadways adjacent to the proposed project site and site access points will be constructed in compliance with recommended roadway classifications and respective cross-sections in the City of Santa Clarita General Plan or as directed by the City Engineer.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City sight distance standards at the time of final grading, landscaping and street improvement plans.

Signing/striping should be implemented in conjunction with detailed construction plans for the project site.

1.3 SUMMARY OF DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

Based on City of Santa Clarita thresholds, no off-site improvements were identified since the proposed project is projected to result in no deficiencies at the study intersections for all analysis scenarios.

2.0 INTRODUCTION

This traffic impact analysis (TIA) analyzes the projected traffic operations associated with the proposed Santa Clarita Mixed Use project located at the northwest corner of the intersection of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The purpose of this TIA is to evaluate potential circulation system deficiencies that may result from development of the proposed project, and to recommend improvements to achieve acceptable operations, if applicable. This analysis has been prepared in coordination with the City of Santa Clarita via a scoping agreement (See **Appendix A**) and is pursuant to applicable City of Santa Clarita and Caltrans traffic impact analysis guidelines.

2.1 PROJECT DESCRIPTION

The proposed project consists of the following land uses:

- 151 Unit Senior Assisted Living Units
- 73 Multi-Family Condominium Units
- 60 Room Hotel with 3,315 sf of retail space and 2,360 sf of restaurant space.

Site access is planned via one left-in, right-in, right-out driveway on Golden Valley Road. The site is currently zoned as Mixed-Use Neighborhood (MX-N) and classified as Mixed-Use Neighborhood in the City of Santa Clarita General Plan Land Use Plan. The project site is currently vacant. The proposed project land use will not require a zone change or General Plan amendment. The proposed project is anticipated to be built and generating trips in 2023. A growth rate of 2% was used to account for 2023 volumes.

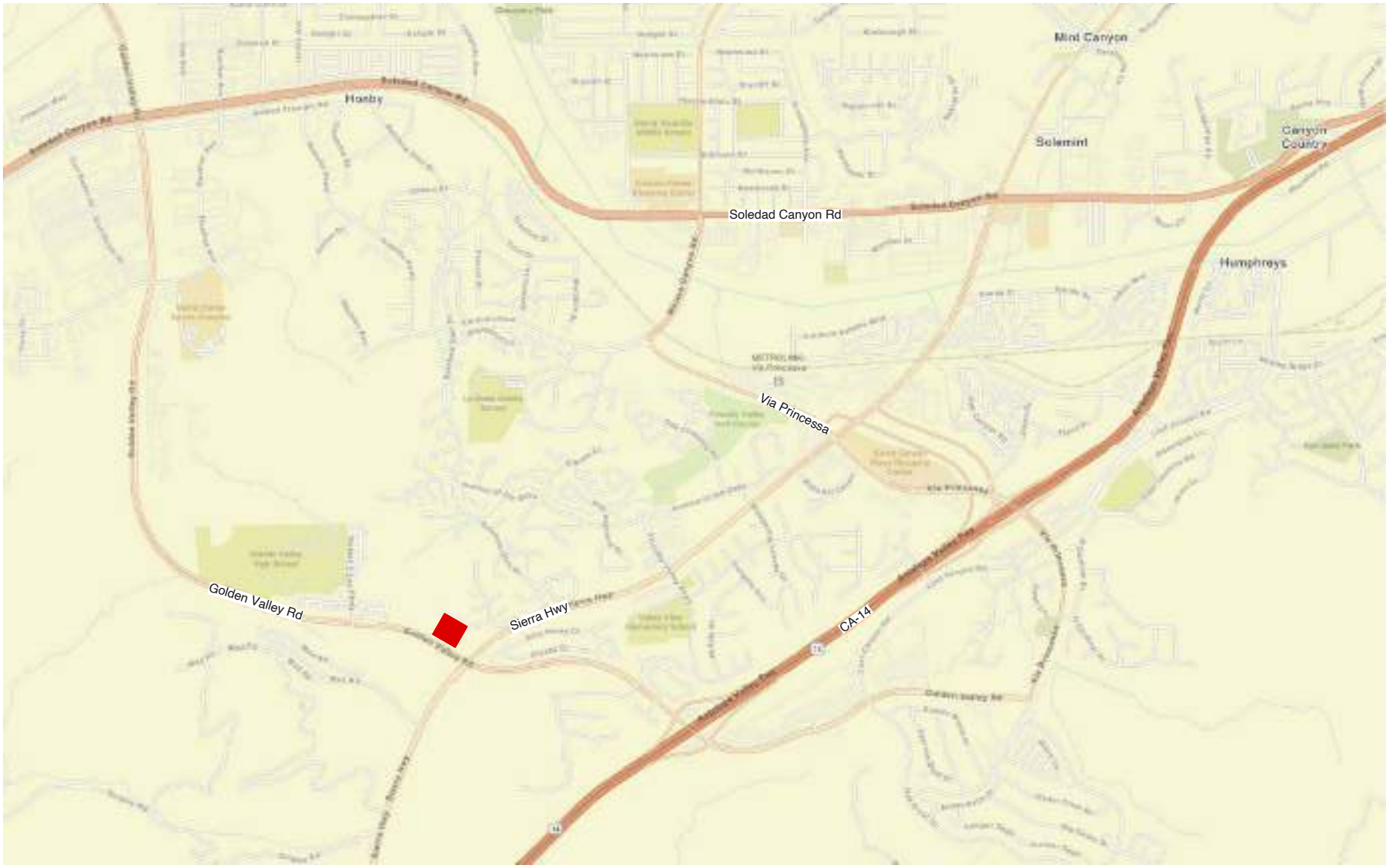
Exhibit 1 shows the project site location. **Exhibit 2** shows the proposed project site plan.

2.2 STUDY AREA

In addition to project driveways, the following seven (7) intersections in the vicinity of the project site have been included in the intersection level of service (LOS) analysis:

8. Golden Valley Rd/Centre Pointe Pkwy;
9. Golden Valley Rd/Robert C Lee Pkwy;
10. Golden Valley Rd/Sierra Hwy;
11. Golden Valley Rd/SB-14 Ramp;
12. Golden Valley Rd/NB-14 Ramp;
13. Sierra Hwy/Friendly Valley Pkwy; and
14. Sierra Hwy/Via Princessa.

The study intersections are all located within the City of Santa Clarita.



Legend:

Project Site

Not to Scale

Exhibit 1: Project Location

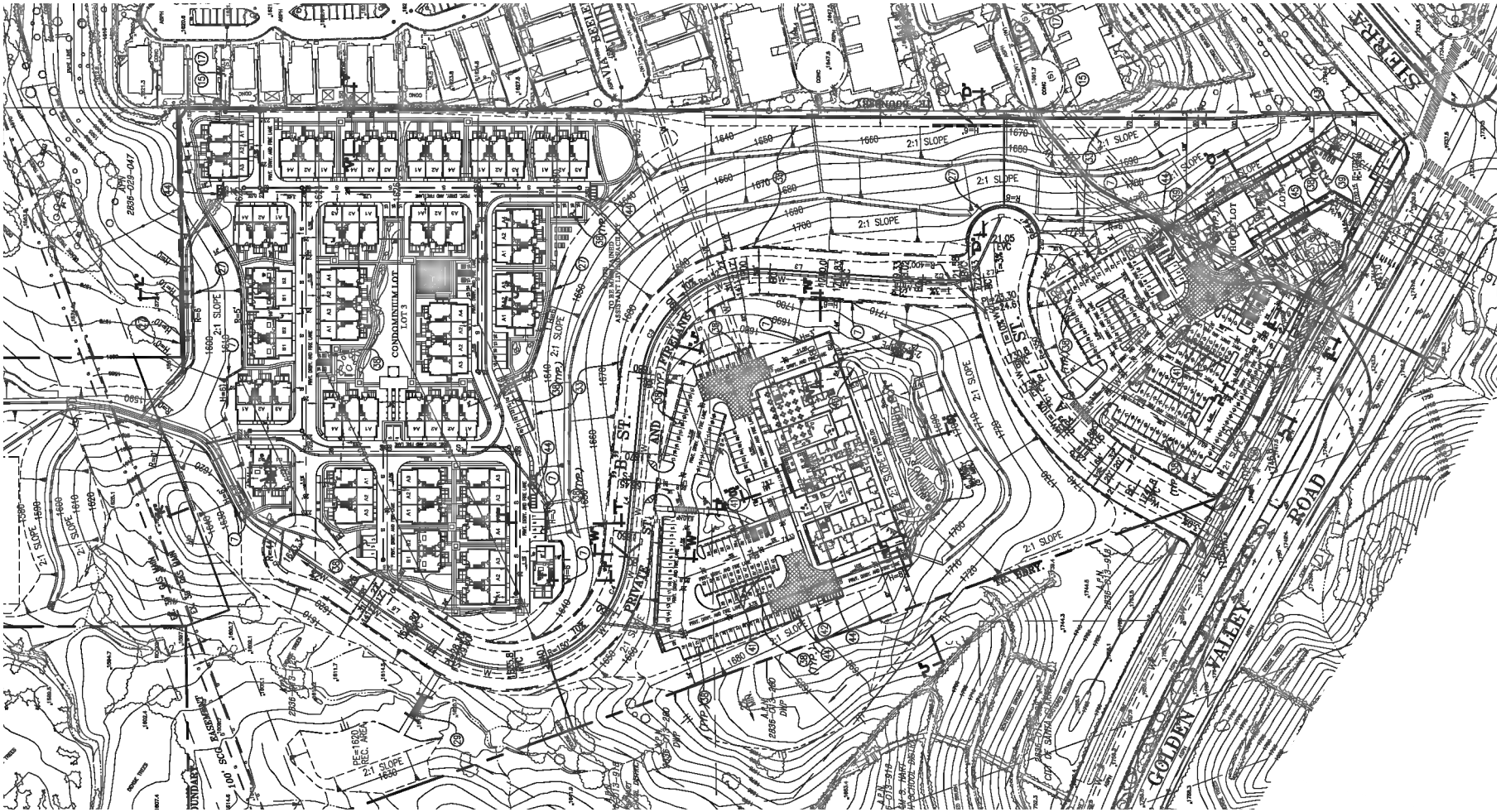


Exhibit 2: Proposed Project Site Plan

This traffic analysis follows the *Transportation Analysis Updates in Santa Clarita (May 2020)* and the *Caltrans Guidelines for the Preparation of Traffic Impact Studies (December, 2002)*.

Exhibit 3 shows the location of the study intersections which are analyzed for the following study scenarios:

- Existing Conditions;
- Existing Plus Project;
- Project Opening Year (Cumulative); and
- Project Opening Year Plus Project.

Traffic operations are evaluated for the following time periods:

- Weekday AM Peak Hour occurring within 7:00 AM to 9:00 AM; and
- Weekday PM Peak Hour occurring within 4:00 PM to 6:00 PM.

2.3 ANALYSIS METHODOLOGY

2.3.1 Intersection Analysis Methodology

Level of Service (LOS) is commonly used to describe the quality of flow on roadways and at intersections using a range of LOS from LOS A (free flow with little congestion) to LOS F (severely congested conditions). The definitions for LOS for interruption of traffic flow differ depending on the type of traffic control (traffic signal, unsignalized intersection with side street stops, unsignalized intersection with all-way stops). The *Highway Capacity Manual (HCM) 6* (Transportation Research Board, 2016) methodology expresses the LOS of an intersection in terms of delay time for the intersection approaches. The HCM methodology utilizes different procedures for different types of intersection control.

The City of Santa Clarita and Caltrans traffic impact study guidelines require signalized intersection operations be analyzed utilizing the HCM 6th Edition methodology. Intersection LOS for signalized intersections is based on the intersections average control delay for all movements at the intersection during the peak hour. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Table 1 describes the general characteristics of traffic flow and accompanying delay ranges at signalized intersections.

Legend:

Project Site

Study Intersection Location

Exhibit 3: Proposed TIA Study Area

Table 1

HCM – LOS & Delay Ranges – Signalized Intersections

Level of Service	Description	Delay (in seconds)
A	Very favorable progression; most vehicles arrive during green signal and do not stop. Short cycle lengths.	0 – 10.00
B	Good progression, short cycle lengths. More vehicles stop than for LOS A.	10.01 – 20.00
C	Fair progression; longer cycle lengths. Individual cycle failures may begin to appear. The number of vehicles stopping is significant, though many vehicles still pass through without stopping.	20.01 – 35.00
D	Progression less favorable, longer cycle length and high flow/capacity ratio. The proportion of vehicles that pass through without stopping diminishes. Individual cycle failures are obvious.	35.01 – 55.00
E	Severe congestion with some long-standing queues on critical approaches. Poor progression, long cycle lengths and high flow/capacity ratio. Individual cycle failures are frequent.	55.01 – 80.00
F	Very poor progression, long cycle lengths and many individual cycle failures. Arrival flow rates exceed capacity of intersection.	> 80.01

Source: Transportation Research Board, *Highway Capacity Manual*, HCM6 Edition (Washington D.C., 2016).

Collected peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. It is a common practice in LOS analysis to conservatively use a peak 15-minute flow rate applied to the entire hour to derive flow rates in vehicles per hour that are used in the LOS analysis. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume. PHF = [Hourly Volume]/ [4 * Peak 15-Minute Volume]. The use of a 15-minute PHF produces a more detailed and conservative analysis compared to analyzing vehicles per hour. Existing PHFs, obtained from the existing traffic counts have been used for all analysis scenarios in this study.

The City of Santa Clarita traffic study guidelines also require unsignalized intersection operations be analyzed utilizing the HCM 6th Edition methodology. Intersection operation for unsignalized intersections is based on the weighted average control delay expressed in seconds per vehicle.

At a two-way or side-street stop-controlled intersection, LOS is calculated for each stop-controlled minor street movement, for the left-turn movement(s) from the major street, and for the intersection as a whole. For approaches consisting of a single lane, the delay is calculated as the average of all movements in that lane. For all-way stop-controlled intersection, LOS is computed for the intersection as a whole.

Table 2 describes the general characteristics of traffic flow and accompanying delay ranges at unsignalized intersections.

Table 2

HCM – LOS & Delay Ranges – Unsignalized Intersections

Level of Service	Description	Delay (in seconds)
A	Little or no delays.	0 – 10.00
B	Short traffic delays.	10.01 – 15.00
C	Average traffic delays.	15.01 – 25.00
D	Long traffic delays. Multiple vehicles in queue.	25.01 – 35.00
E	Very long delays. Demand approaching capacity of intersection	35.01 – 50.00
F	Very constrained flow with extreme delays and intersection capacity exceeded.	> 50.01

Source: Transportation Research Board, *Highway Capacity Manual*, HCM6 Edition (Washington D.C., 2016).

This analysis utilizes *PTV Vistro 2022* analysis software for all signalized and unsignalized intersections. *Vistro* is a macroscopic traffic software program that is based on the signalized intersection capacity analysis specified in Chapter 16 of the HCM. The level of service and capacity analysis performed within *Vistro* takes the optimization and coordination of signalized intersections within a network into consideration.

2.4 PERFORMANCE CRITERIA

2.4.1 City of Santa Clarita

The City of Santa Clarita has established level of service "D" or better as acceptable LOS for all intersections along the designated street and highway system in the City's General Plan Circulation Element.

For the purposes of analyzing transportation deficiencies, the City of Santa Clarita identifies deficiencies through a comparison of "without project" and "with project" traffic conditions. An intersection is considered to be affected if the project would:

- Worsen and intersection maintained by the City of Santa Clarita from LOS D or better to LOS E or F
- Cause the following increase in delay at an intersection maintained by the City of Santa Clarita that operated (with the project) at LOS D or worse
    - LOS D with the project: more than 4-seond increase in delay is deficient
    - LOS E or F with the project: more than 2-second increase in delay is deficient

2.4.2 Caltrans

Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State Highway facilities, although Caltrans acknowledges that this may not always be feasible. If an existing State Highway facility is operating at less than this target LOS, the existing LOS should be maintained. In general, the region-wide goal for acceptable LOS on all freeways, roadway segments and intersections is LOS "D". Consistent with the City of Santa Clarita LOS threshold, LOS "D" will be used as the target LOS for state highway intersection in this analysis.

3.0 EXISTING CONDITIONS

3.1 EXISTING CIRCULATION NETWORK/STUDY AREA CONDITIONS

The characteristics of the roadway system in the vicinity of the proposed project site are described in **Table 3.**

Table 3
Roadway Characteristics within Study Area

Roadway	Classification[1]	Jurisdiction	Direction	Existing Travel Lanes	Median Type[2]	Speed Limit (mph)	On-Street Parking
Sierra Hwy	Major Highway	Santa Clarita	North-South	4	PM-RM	55	No
Via Princessa	Major Highway	Santa Clarita	East-West	6	PM-RM	55	No
Golden Valley	Major Highway	Santa Clarita	East-West	4	RM	55	No
Centre Pointe	Collector	Santa Clarita	East-West	2	TWLTL	35	Yes
Robert C Lee	Collector	Santa Clarita	North-South	4	TWLTL	35	Yes
Friendly Valley	Collector	Santa Clarita	East-West	2	NM	25	Yes

1: Sources: City of Santa Clarita General Plan (November, 2005)
2: TWLTL = Two-Way Left-Turn Lane, RM= Raised Median, PM = Painted Median, NM = No Median.

Exhibit 4 show existing conditions study area intersection and roadway geometry.

3.2 CITY OF SANTA CLARITA GENERAL PLAN CIRCULATION ELEMENT

The proposed project site is located within the City of Santa Clarita. **Appendix A** contains the current *City of Santa Clarita General Plan Circulation Plan* and an explanation of roadway cross sections.

3.3 EXISTING BICYCLE AND PEDESTRIAN FACILITIES

Within the study area, Class I bike lanes exist on Golden Valley Road between McKeon Way and Green Mountain Drive. Class II bike lanes exist on Robert C. Lee Parkway north of Golden Valley Road and on Centre Pointe Parkway West of Ruether Ave.

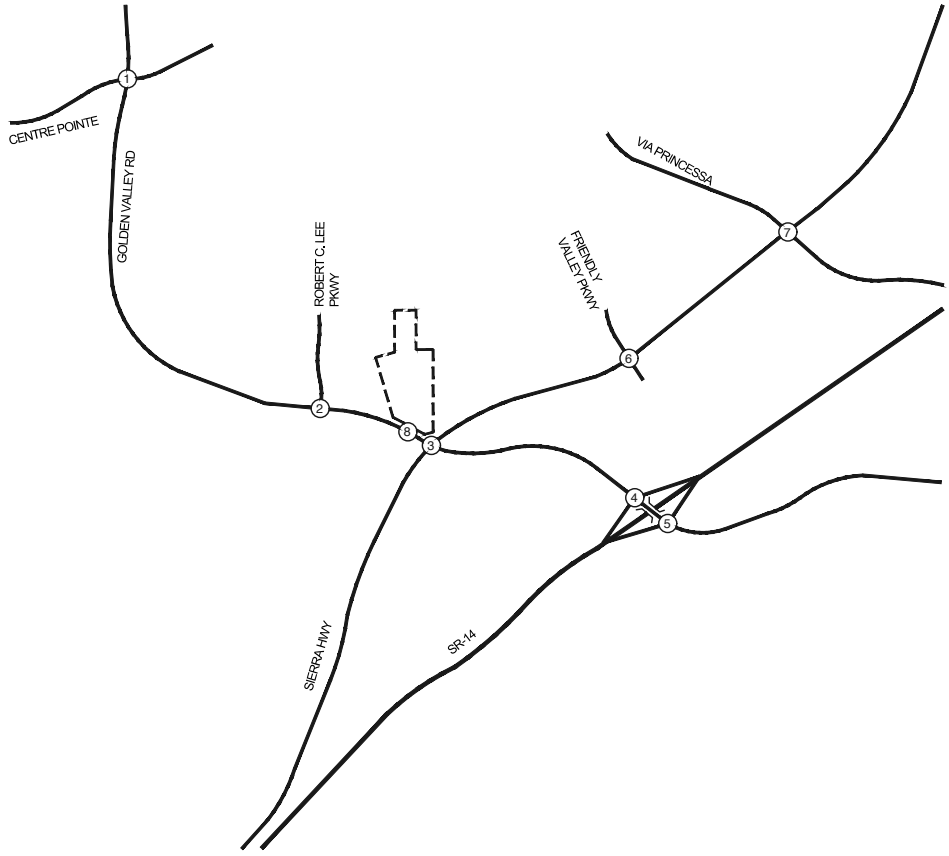


Exhibit 4: Existing Lane Geometry and Intersection Controls

According to the *City of Santa Clarita Bikeway Master Plan,* class II bike lanes and class III bike routes are planned along Sierra Highway.

Appendix A contains the *City of Santa Clarita Bikeway Master Plan*.

3.4 EXISTING PUBLIC TRANSIT SERVICES

The City of Santa Clarita is served by Santa Clarita Transit which provides bus service throughout the City of Santa Clarita. **Exhibit 5** shows the Santa Clarita Transit routes in the vicinity of the project site.

The nearest transit service is Santa Clarita Route 12 with stops at the intersections of Golden Valley Road and Sierra Highway. Route 12 runs between Whites Canyon and the McBean Regional Transit Center with headways of approximately 30 minutes.

3.5 EXISTING TRAFFIC VOLUMES

To determine the existing operation of the study intersections, AM and PM peak period traffic volumes were estimated based on new traffic counts collected on October 28, 2021. Detailed traffic count data is provided in **Appendix B**.

Exhibit 6 and **Exhibit 7** show existing AM and PM peak hour volumes at the study intersections.

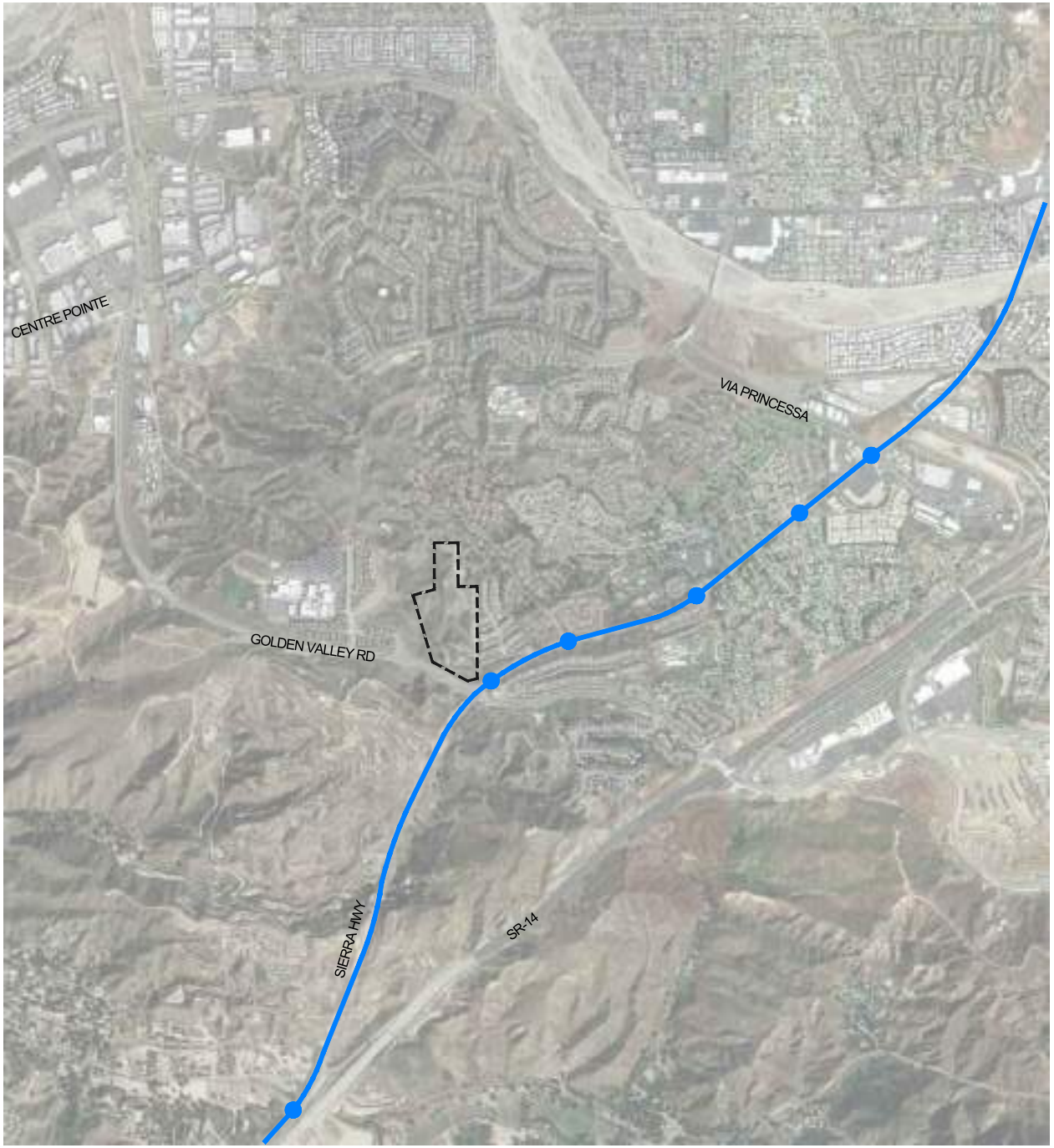
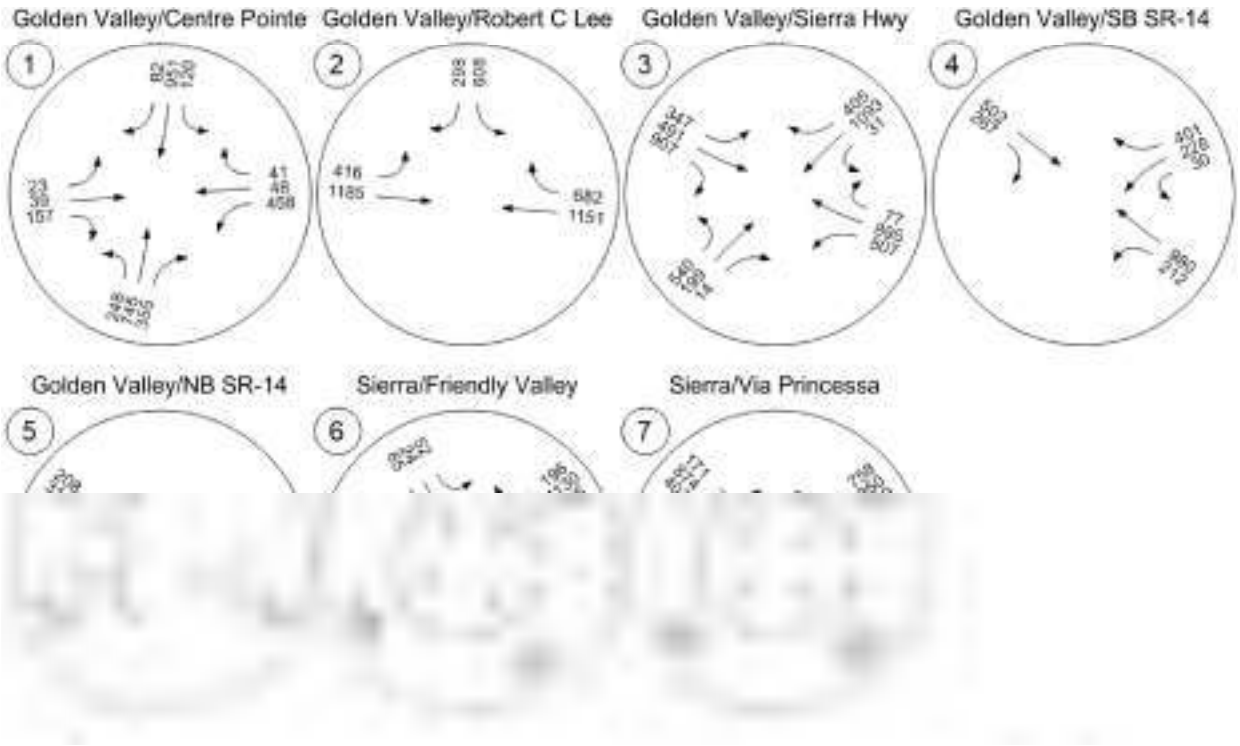


Exhibit 5: Existing Transit Services



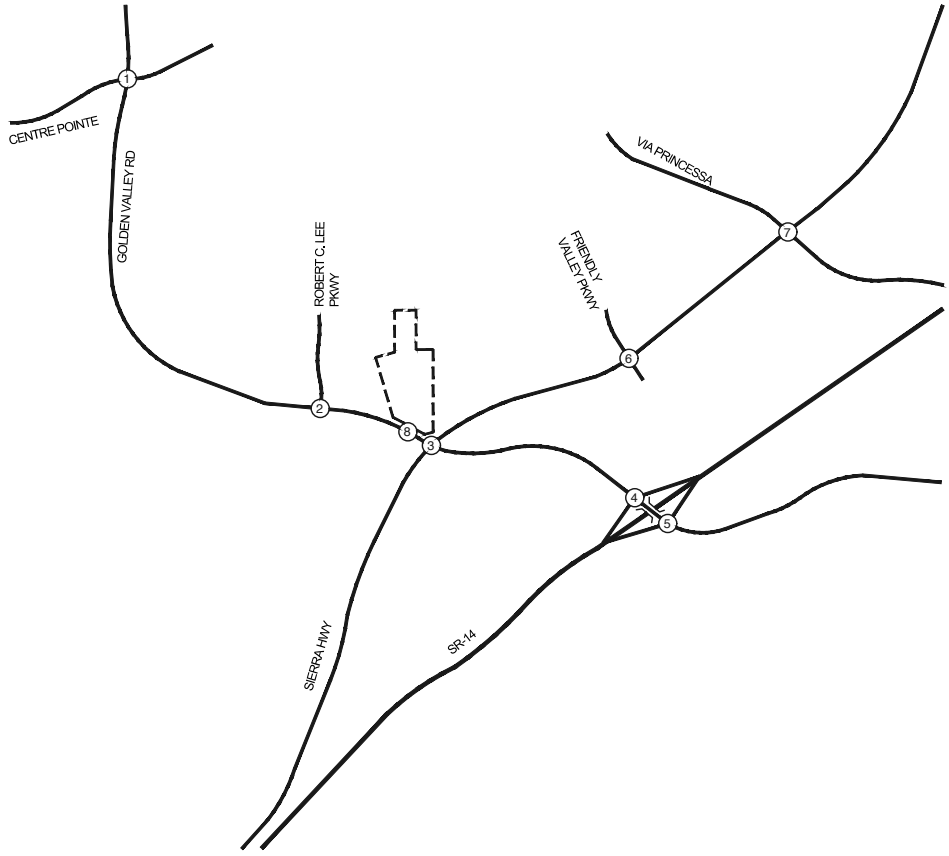
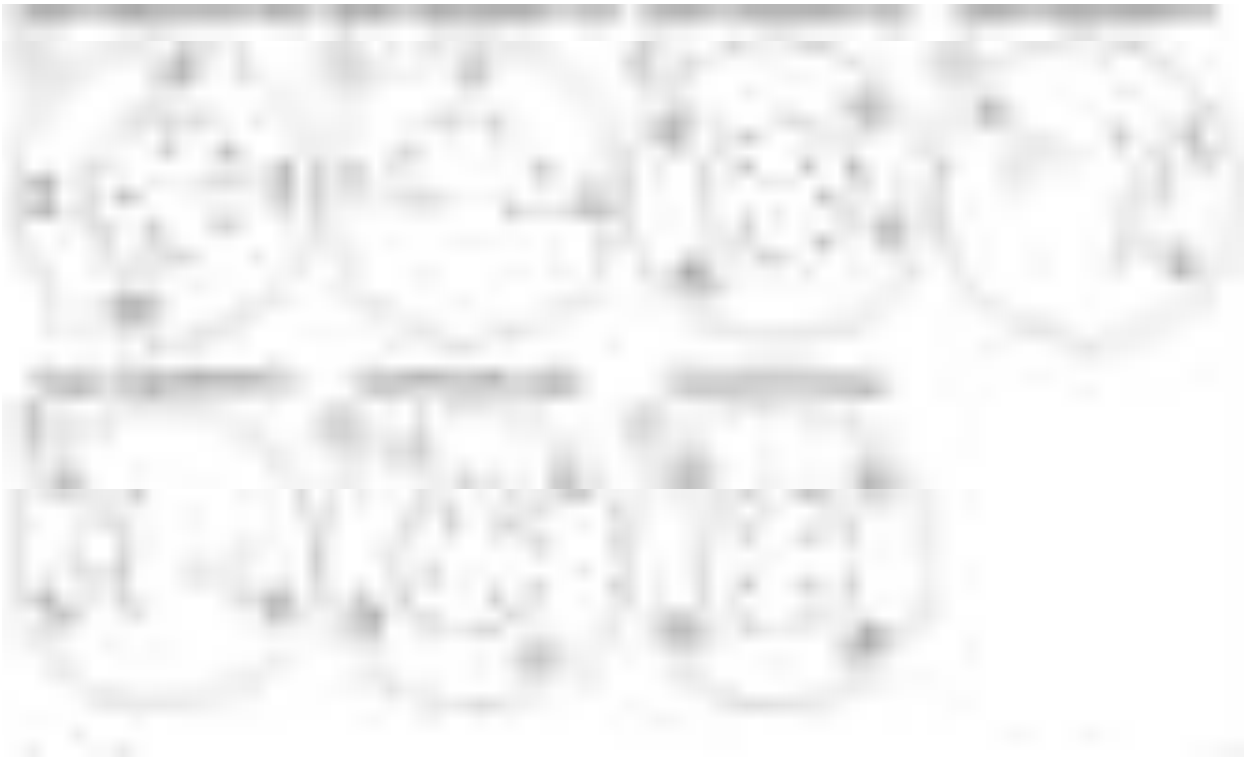


Exhibit 6: Existing AM Peak Hour Volumes



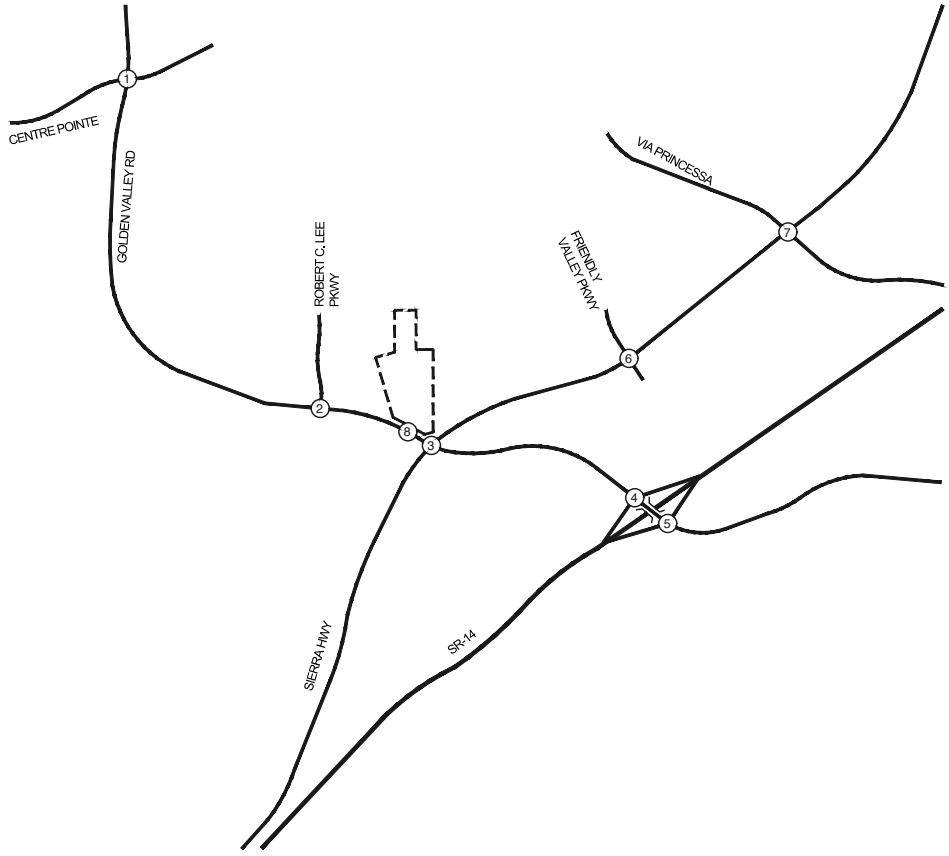


Exhibit 7: Existing PM Peak Hour Volumes

3.6 EXISTING CONDITIONS INTERSECTION LEVEL OF SERVICE ANALYSIS

Existing conditions AM and PM peak hour intersection analysis is shown in **Table 4**. Calculations are based on the existing geometrics at the study area intersections as shown in **Exhibit 4.** HCM analysis sheets are provided in **Appendix C**.

Table 4
Intersection Analysis – Existing Conditions

Intersection			Control Type	Peak Hour	Existing Conditions	
					Delay[1]	LOS
1	Golden Valley	Centre Pointe	Signal	AM	35.8	D
				PM	**55.6**	**E**
2	Golden Valley	Robert C Lee	Signal	AM	24.7	C
				PM	8.8	A
3	Golden Valley	Sierra	Signal	AM	**61.8**	**E**
				PM	44.1	D
4	Golden Valley	SB SR-14	Signal	AM	31.1	C
				PM	30.7	C
5	Golden Valley	NB SR-14	Signal	AM	21.5	C
				PM	27.0	C
6	Sierra	Friendly Valley	Signal	AM	25.1	C
				PM	22.5	C
7	Sierra	Via Princessa	Signal	AM	39.1	D
				PM	41.0	D

Note: Delay shown in seconds per vehicle.
1 = Per the Highway Capacity Manual 6th Edition, overall average delay and LOS are shown for signalized intersections.

As shown in **Table 4**, the study intersections are currently operating at an acceptable LOS during the AM and PM peak hours for existing conditions with the exception of the following intersections:

- #1 – Golden Valley Rd/Centre Pointe (LOS E PM Peak Hour); and
- #3 – Golden Valley Rd/Sierra Hwy (LOS E AM Peak Hour).

4.0 PROPOSED PROJECT

4.1 PROJECT DESCRIPTION

The proposed project consists of the following land uses:

- 151 Unit Senior Assisted Living Units
- 73 Multi-Family Condominium Units
- 60 Room Hotel with 3,315 sf of retail space and 2,360 sf of restaurant space.

Site access is planned via one left-in, right-in, right-out driveway on Golden Valley Road. The site is currently zoned as Mixed-Use Neighborhood (MX-N) and classified as Mixed-Use Neighborhood in the City of Santa Clarita General Plan Land Use Plan. The project site is currently vacant. The proposed project land use will not require a zone change or General Plan amendment.

Exhibit 2 previously showed the proposed project site plan.

4.2 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic, both inbound and outbound, produced by a development. Determining trip generation for a proposed project is based on projecting the amount of traffic that the specific land uses being proposed will produce. Industry standard *Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition, 2017)* trip generation rates were used to determine trip generation of for most of the proposed project land uses.

Table 5 summarizes the projected AM peak hour, PM peak hour and daily trip generation of the proposed project. The proposed project is projected to generate 1,787 daily trips, 104 AM peak hour trips, and 133 PM peak hour trips.

Table 5

Proposed Project Trip Generation

Proposed Land Use[1]	Qty	Unit[2]	Daily Trips (ADTs)		AM Peak Hour					PM Peak Hour				
			Rate	Volume	Rate	In:Out Split	Volume			Rate	In:Out Split	Volume		
							In	Out	Total			In	Out	Total
Multi-Family Residential (ITE 220)	73.00	DU	7.32	534	0.46	23:77	8	26	34	0.56	63:37	26	15	41
Assisted Senior Living (ITE 254)	151.00	Beds	2.60	393	0.19	63:37	18	11	29	0.26	38:62	15	24	39
Hotel (ITE 310)	60.00	Rooms	14.34	860	0.67	60:40	25	16	41	0.89	54:46	29	24	53
Total				1,787			51	53	104			70	63	133

1: Rates from ITE Trip Generation (10th Edition, 2017)

2: DU = Dwelling Units

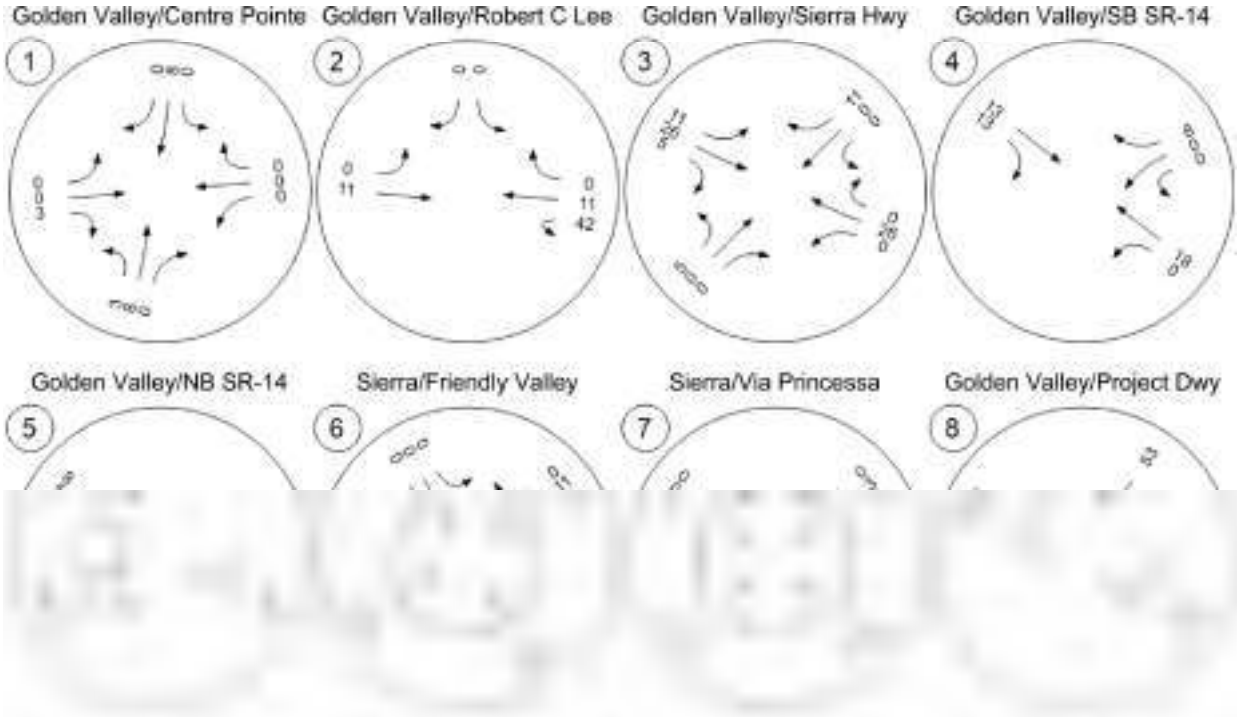
4.3 PROJECT TRIP DISTRIBUTION

Projecting trip distribution involves the process of identifying probable destinations and traffic routes that will be utilized by the proposed project's traffic. The potential interaction between the proposed land use and surrounding regional access routes are considered to identify the probable routes onto which project traffic would distribute. The projected trip distribution for the proposed project is based on anticipated travel patterns to and from the project site.

Exhibit 8 and **Exhibit 9** show the projected trip distribution of proposed project trips.

4.4 MODAL SPLIT

The traffic reducing potential of public transit, walking and bicycling have not been considered in this analysis since transit facilities in the study area are limited.



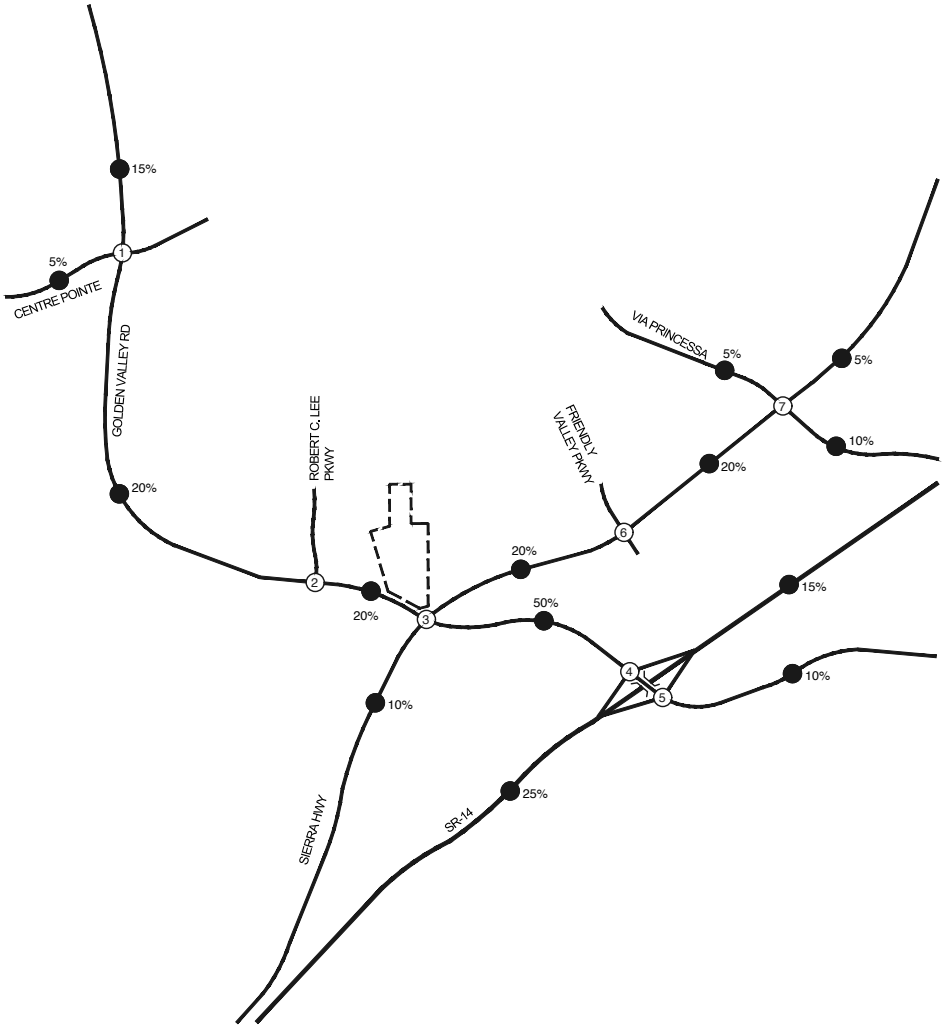
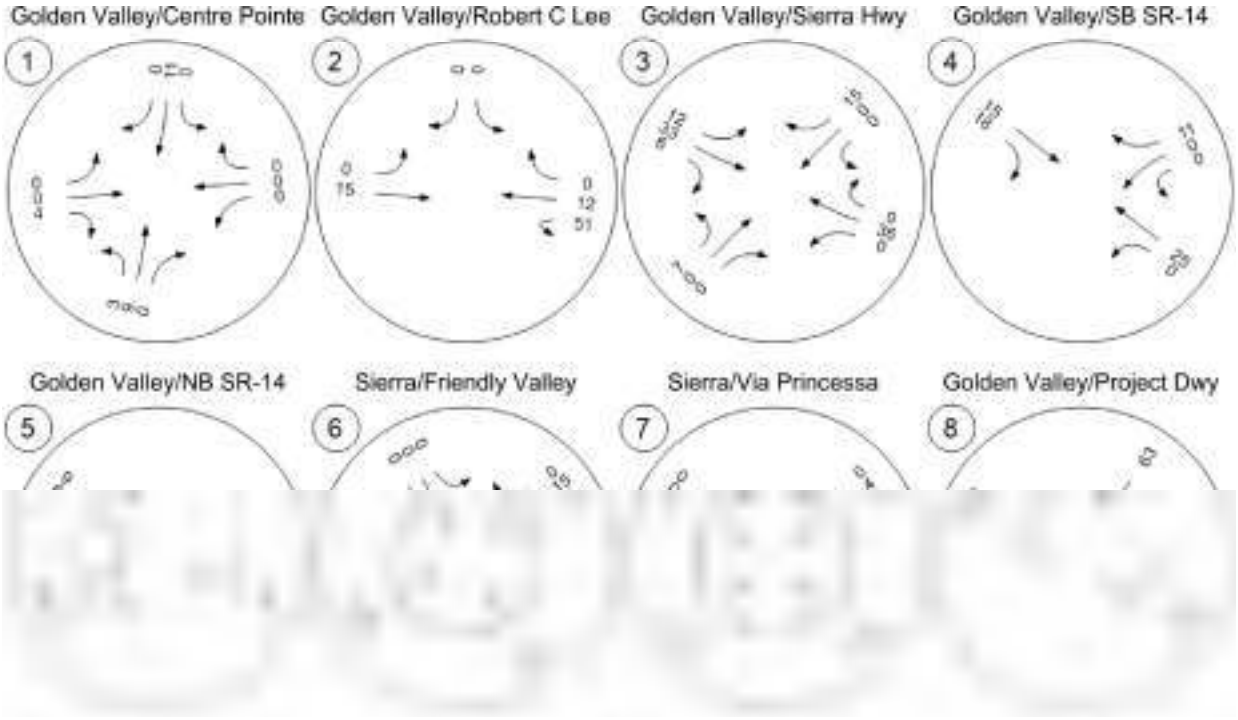


Exhibit 8: Trip Distribution of Proposed Project AM Trips at Study Intersections



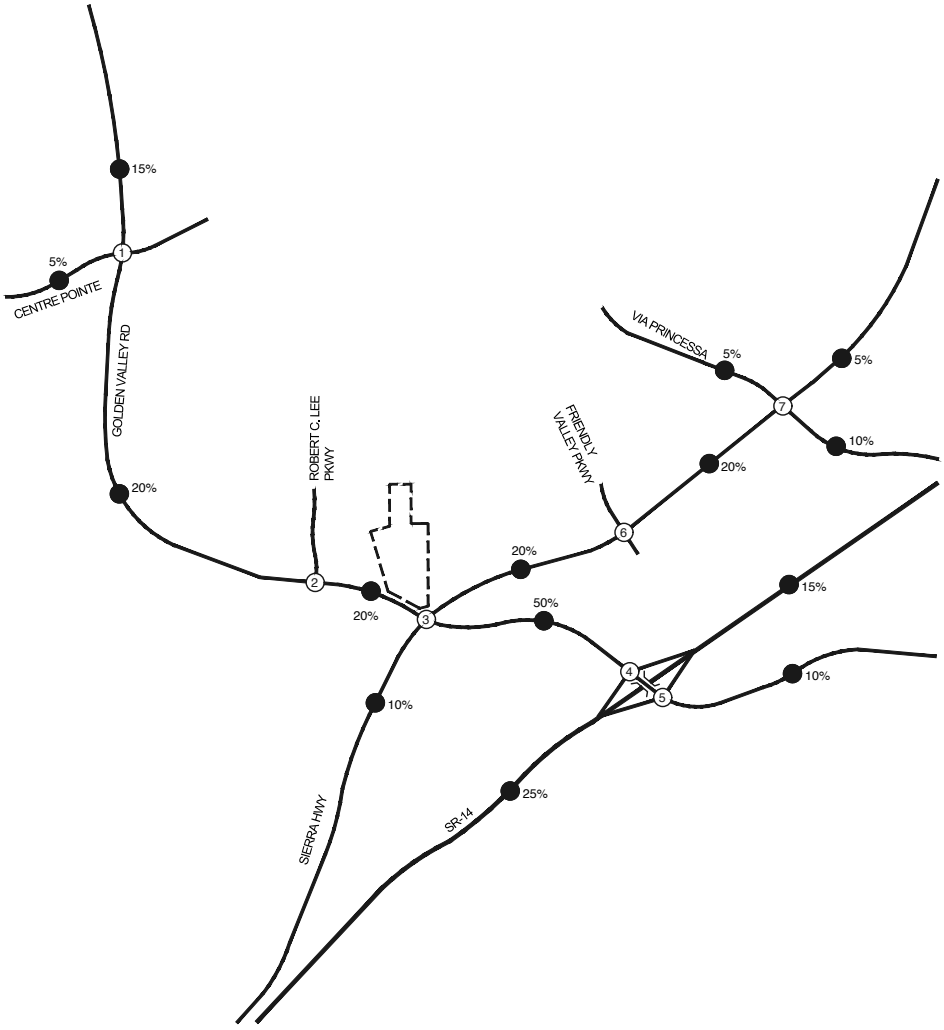


Exhibit 9: Trip Distribution of Proposed Project PM Trips at Study Intersections

5.0 EXISTING PLUS PROJECT CONDITIONS

Existing plus project (EP) traffic conditions analysis is intended to identify baseline conditions in the near-term with the proposed project.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for the existing plus project (EP) scenario are consistent with those previously shown in **Exhibit 4**. The proposed project will be adding a new left-in, right-in, right-out driveway along Golden Valley Road and will be modifying the intersection of Golden Valley Road and Robert C. Lee Parkway to include a designated westbound U-turn lane.

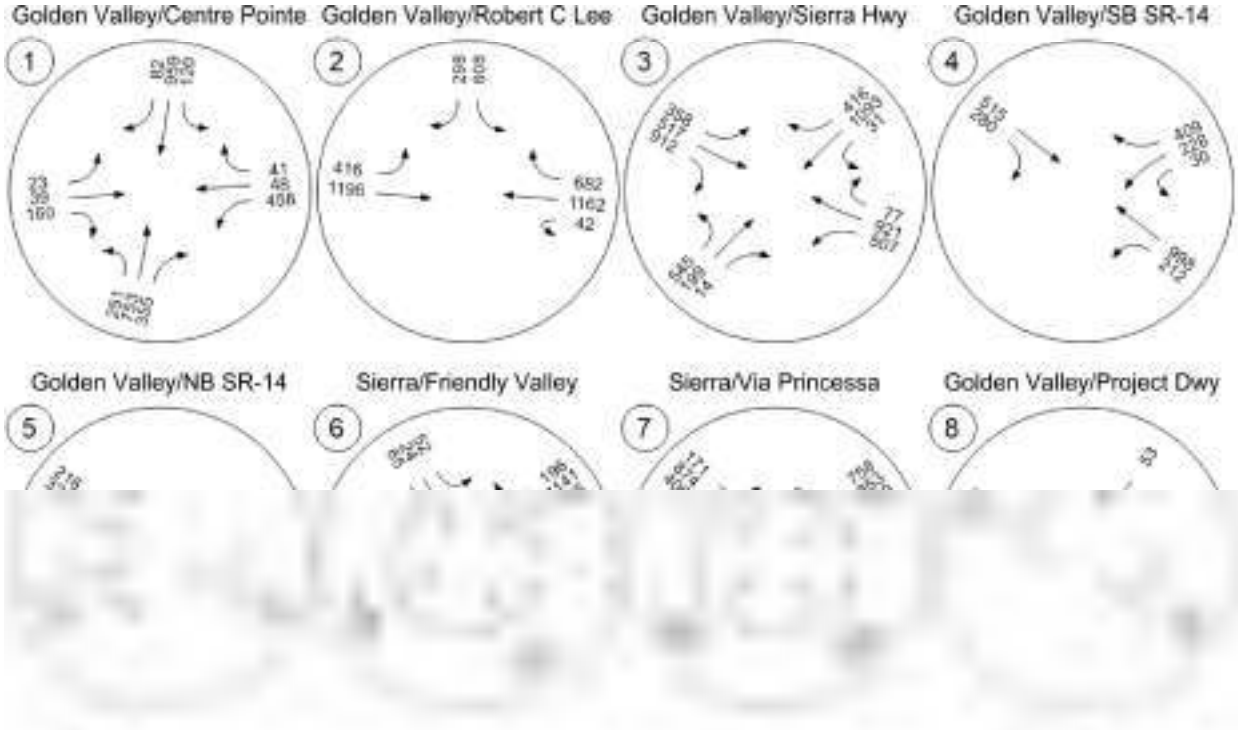
5.2 EXISTING PLUS PROJECT TRAFFIC VOLUMES

Existing plus project (EP) volumes include existing traffic volumes and the addition of project traffic volumes.

Exhibit 10 and **Exhibit 11**how existing plus project AM and PM peak hour volumes at the study intersections.

5.3 EXISTING PLUS PROJECT INTERSECTION LEVEL OF SERVICE ANALYSIS

Existing plus project (EP) AM and PM peak hour intersection analysis is shown in **Table 6**. Calculations are based on the existing geometrics at the study area intersections as shown in **Exhibit 3.** HCM analysis sheets are provided in **Appendix C**.



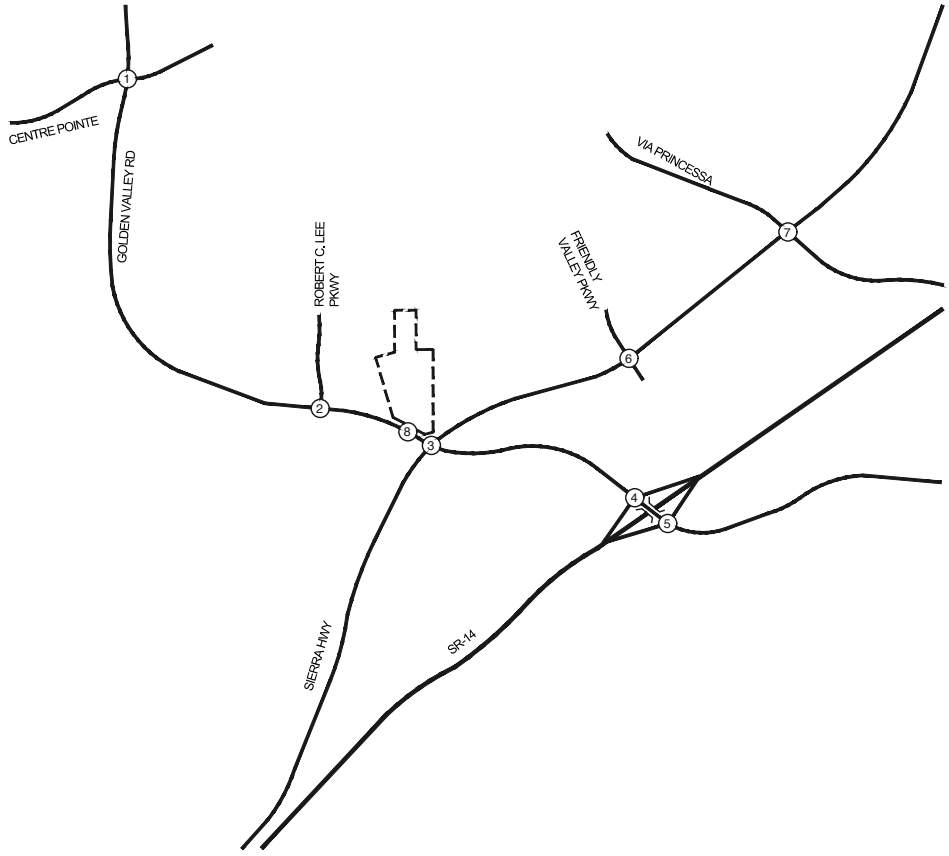
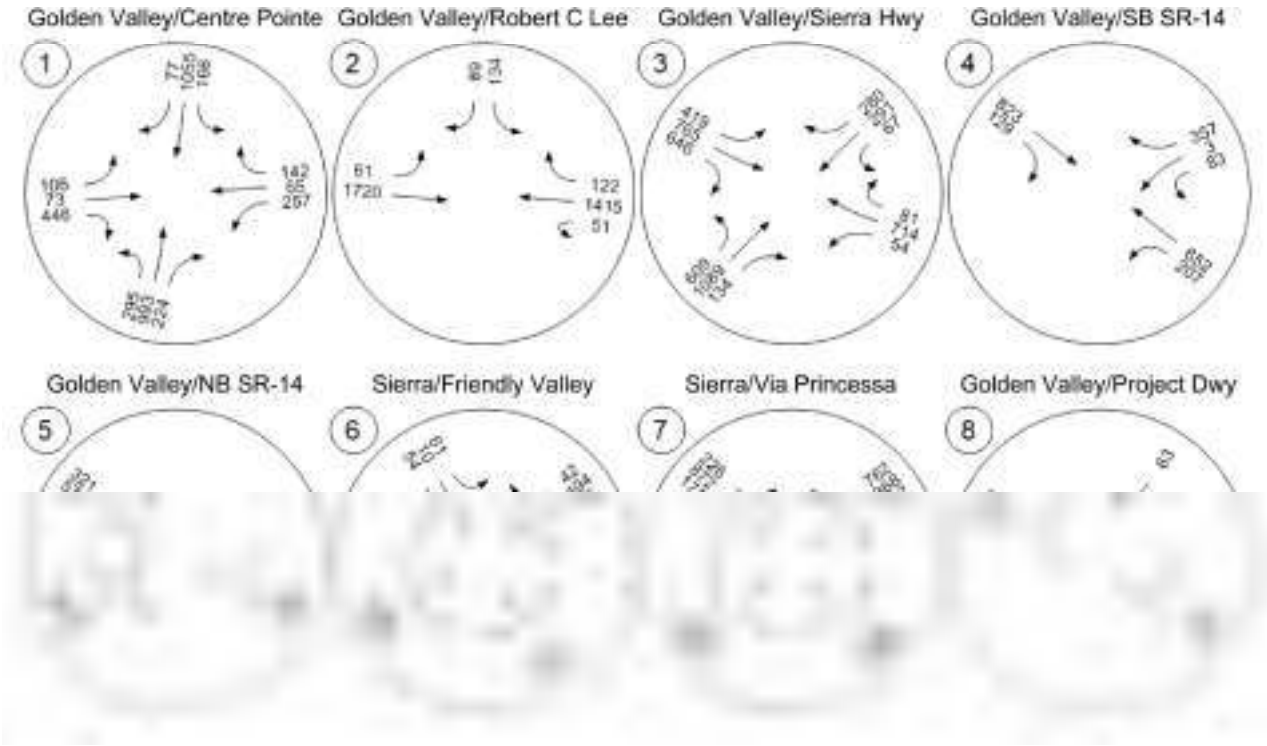


Exhibit 10: Existing Plus Project AM Peak Hour Volumes



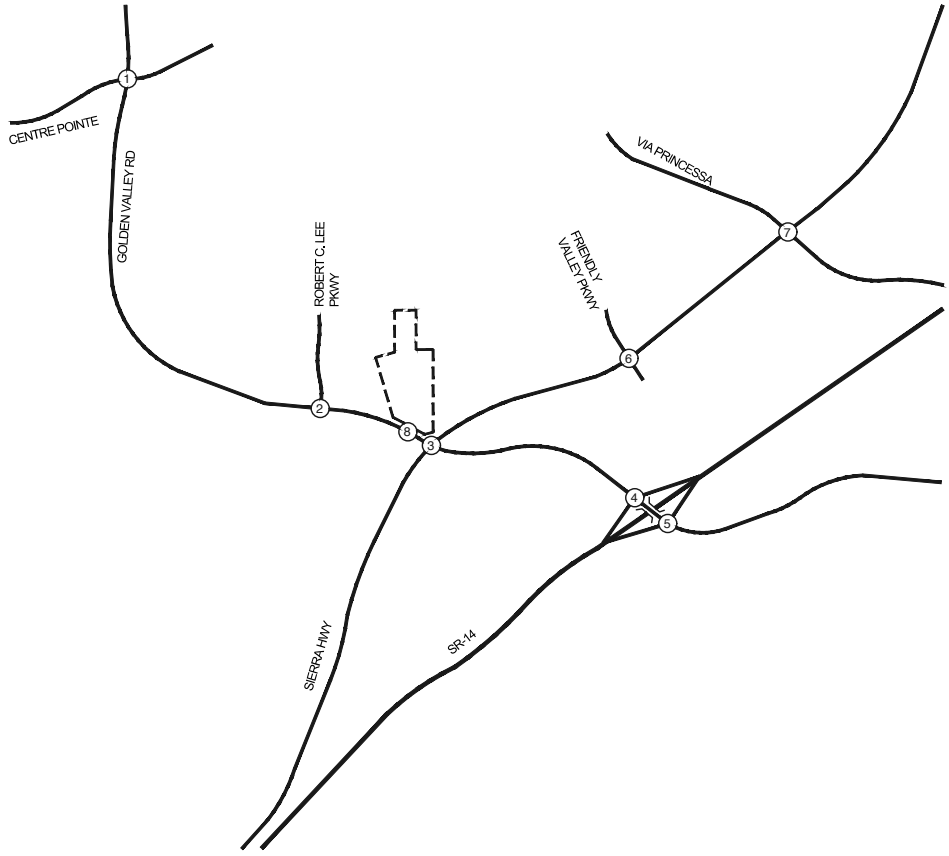


Exhibit 11: Existing Plus Project PM Peak Hour Volumes

Table 6

Intersection Analysis – Existing Plus Project (EP) Conditions

Intersection			Control Type	Peak Hour	Existing Conditions		EP Conditions		Change	Deficient?
					Delay[1]	LOS	Delay[1]	LOS		
1	Golden Valley	Centre Pointe	Signal	AM	35.8	D	36.2	D	0.4	No
				PM	**55.6**	**E**	**57.0**	**E**	1.4	No
2	Golden Valley	Robert C Lee	Signal	AM	24.7	C	27.1	C	2.4	No
				PM	8.8	A	12.1	B	3.3	No
3	Golden Valley	Sierra	Signal	AM	**61.8**	**E**	**63.3**	**E**	1.5	No
				PM	44.1	D	45.9	D	1.8	No
4	Golden Valley	SB SR-14	Signal	AM	31.1	C	31.2	C	0.1	No
				PM	30.7	C	30.8	C	0.1	No
5	Golden Valley	NB SR-14	Signal	AM	21.5	C	21.8	C	0.3	No
				PM	27.0	C	27.2	C	0.2	No
6	Sierra	Friendly Valley	Signal	AM	25.1	C	25.1	C	0.0	No
				PM	22.5	C	22.6	C	0.1	No
7	Sierra	Via Princessa	Signal	AM	39.1	D	39.2	D	0.1	No
				PM	41.0	D	42.3	D	1.3	No
8	Golden Valley	Dwy 1	OWSC	AM	-	-	25.5	D	-	No
				PM	-	-	21.2	C	-	No

Note: OWSC = One-Way Stop-Control; Delay shown in seconds per vehicle.

1 = Per the Highway Capacity Manual 6th Edition, overall average delay and LOS are shown for signalized intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual approach is shown.

As shown in **Table 6**, the study intersections are projected to continue to operate at an acceptable LOS during the AM and PM peak hours for existing plus project (EP) conditions with the exception of the following intersections:

- #1 – Golden Valley Rd/Centre Pointe (LOS E PM Peak Hour); and
- #3 – Golden Valley Rd/Sierra Hwy (LOS E AM Peak Hour).

Per City of Santa Clarita Guidelines, the proposed project does not create a transportation deficiency.

6.0 PROJECT OPENING YEAR CUMULATIVE CONDITIONS

Project opening year cumulative (OYC) traffic conditions analysis is intended identify baseline conditions in the near-term with cumulative projects and without the proposed project.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for the project opening year cumulative (OYC) scenario are consistent with those previously shown in **Exhibit 4**.

6.2 CUMULATIVE PROJECTS TRAFFIC

Coordination with the City of Santa Clarita was conducted to determine approved projects within the surrounding area. **Exhibit 12** shows the location of nearby cumulative developments. A summary of cumulative projects land uses is shown in **Table 7**.

6.3 PROJECT OPENING YEAR CUMULATIVE (OYC) TRAFFIC VOLUMES

Project opening year cumulative (OYC) volumes include background traffic plus the addition of traffic projected to be generated by nearby cumulative projects. Since the proposed project is expected to be built and generating trips in 2023, project opening year cumulative (OYC) volumes include a growth rate of 2% per year for two years, applied to existing volumes.

Project Opening Year Cumulative Volumes = (Existing (2021) Counts * 1.02^2) + Cumulative Traffic

Exhibit 13 and **Exhibit 14** show project opening year cumulative (OYC) AM and PM peak hour volumes at the study intersections.

6.4 PROJECT OPENING YEAR CUMULATIVE (OYC) INTERSECTION LEVEL OF SERVICE ANALYSIS

Project opening year cumulative (OYC) conditions AM and PM peak hour intersection analysis is shown in **Table 8** HCM analysis sheets are provided in **Appendix C.**

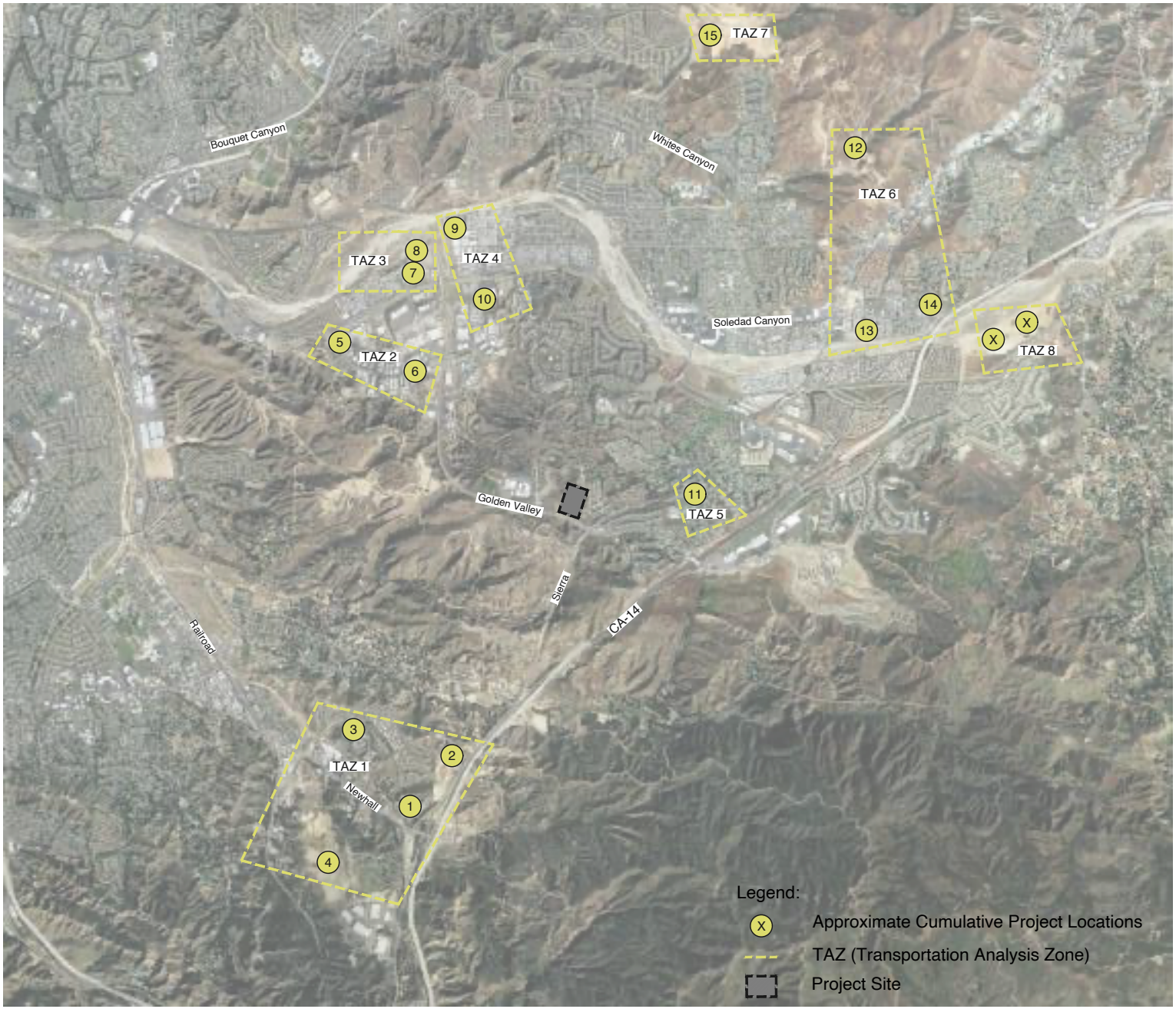
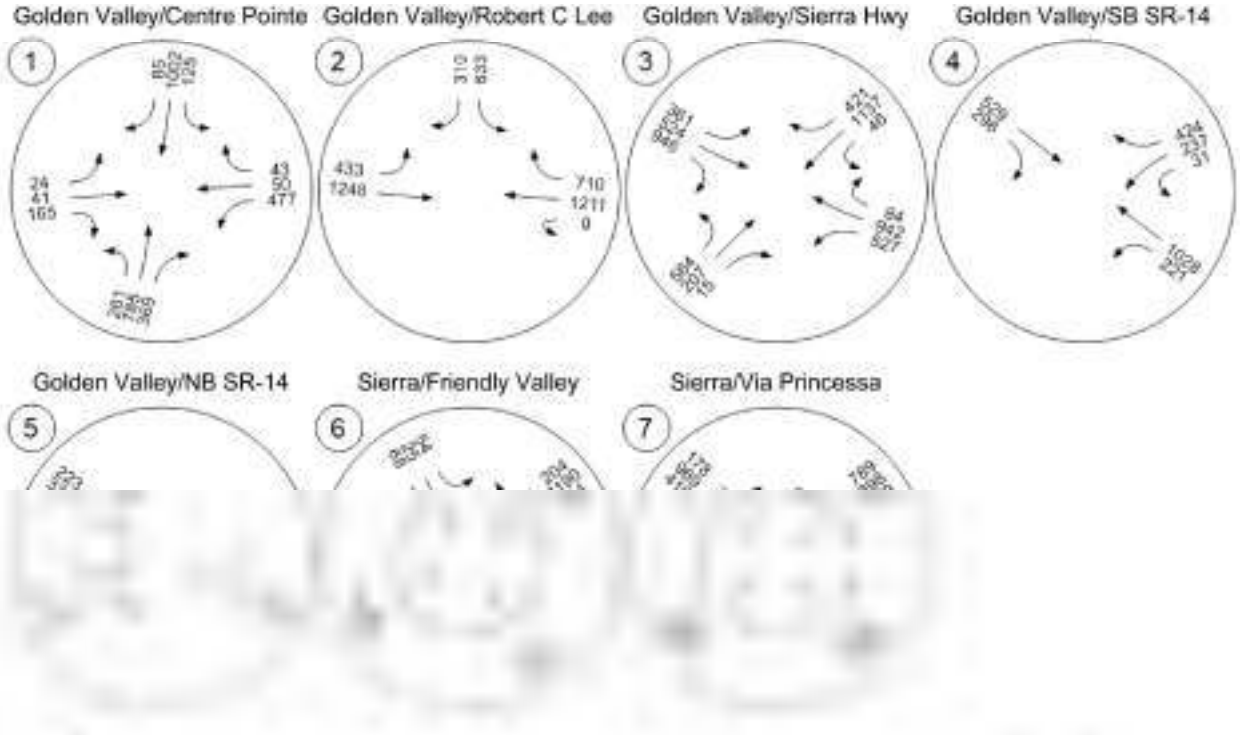


Exhibit 12: Proposed Study Area and Trip Distribution

Table 7
Cumulative Projects List

TAZ	Project	Land Use	Qty	Units	AM Peak Hour			PM Peak Hour			Daily
					In	Out	Total	In	Out	Total	
1	Sierra West Assisted Living	Assisted Living	61.74	TSF	18	6	23	9	20	30	259
	21046 Dockweiler Dr	Single Family Detached	93.00	DU	17	48	65	55	32	87	877
	21726 Placerita Canyon Rd	Single Family Detached	42.00	DU	8	22	29	25	15	39	396
	Needham Ranch Phase 2	Strip Retail (<40k TSF)	904.00	TSF	497	90	588	118	470	588	5,424
	Subtotal				540	166	705	207	537	744	6,956
2	Prima Way Commercial	Commercial	6.31	TSF	9	6	15	21	21	42	344
	Salazar Self Storage	Mini-Warehouse	111.76	TSF	6	4	10	8	9	17	162
	Subtotal				15	10	25	29	30	59	506
3	Valley Center Skilled Nursing	Nursing Home	51.00	TSF	22	6	28	12	18	30	344
	Valley Center Self Storage	Mini-Warehouse	156.06	TSF	8	6	14	11	12	23	226
	Subtotal				30	12	42	23	30	53	570
4	Rent A Bin Recycling	Mini-Warehouse	51.00	TSF	3	2	5	4	4	8	74
	20600 Golden Triangle	Multifamily Low Rise	164.00	DU	16	50	66	53	31	84	1,105
	Subtotal				19	52	71	57	35	92	1,179
5	Friendly Valley Gas Station	Convenience/Gas Station	3.00	TSF	85	85	170	82	82	164	2,101
6	Skyline Ranch	Single Family Detached	678.00	DU	123	351	475	402	236	637	6,394
	18300 Soledad Canyon	Multifamily Low Rise	136.00	DU	13	41	54	44	26	69	917
	Soledad Assisting Living	Assisted Living	100.00	TSF	29	10	38	15	33	48	419
	Subtotal				165	402	567	461	295	754	7,730
7	Sierra Victoria	Single Family Detached	48.00	DU	9	25	34	28	17	45	453
8	Vista Canyon	Multifamily Mid Rise	477.00	DU	41	136	176	113	73	186	2,166
	Metro Walk	Multifamily Mid Rise	498.00	DU	42	142	184	118	76	194	2,261
	Subtotal				83	278	360	231	149	380	4,427
				Total	**946**	**1,030**	**1,974**	**1,118**	**1,175**	**2,291**	**23,922**

1: Rates from ITE Trip Generation (10th Edition, 2017)
2: DU = Dwelling Units, TSF = Thousand Square Feet



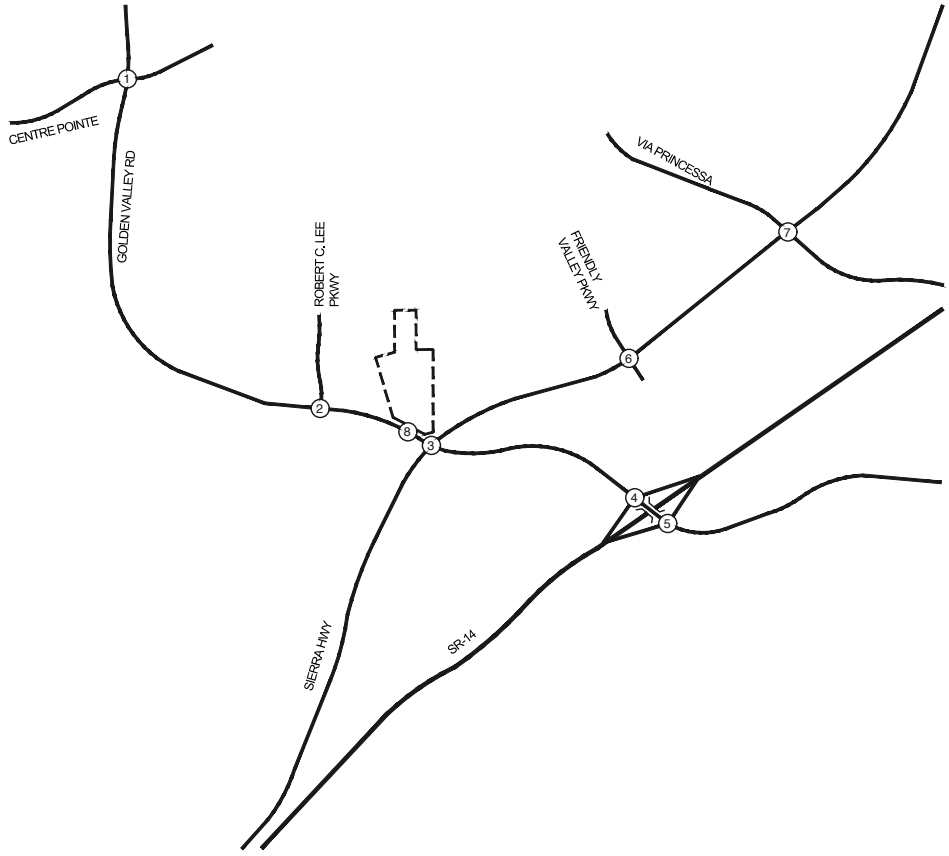
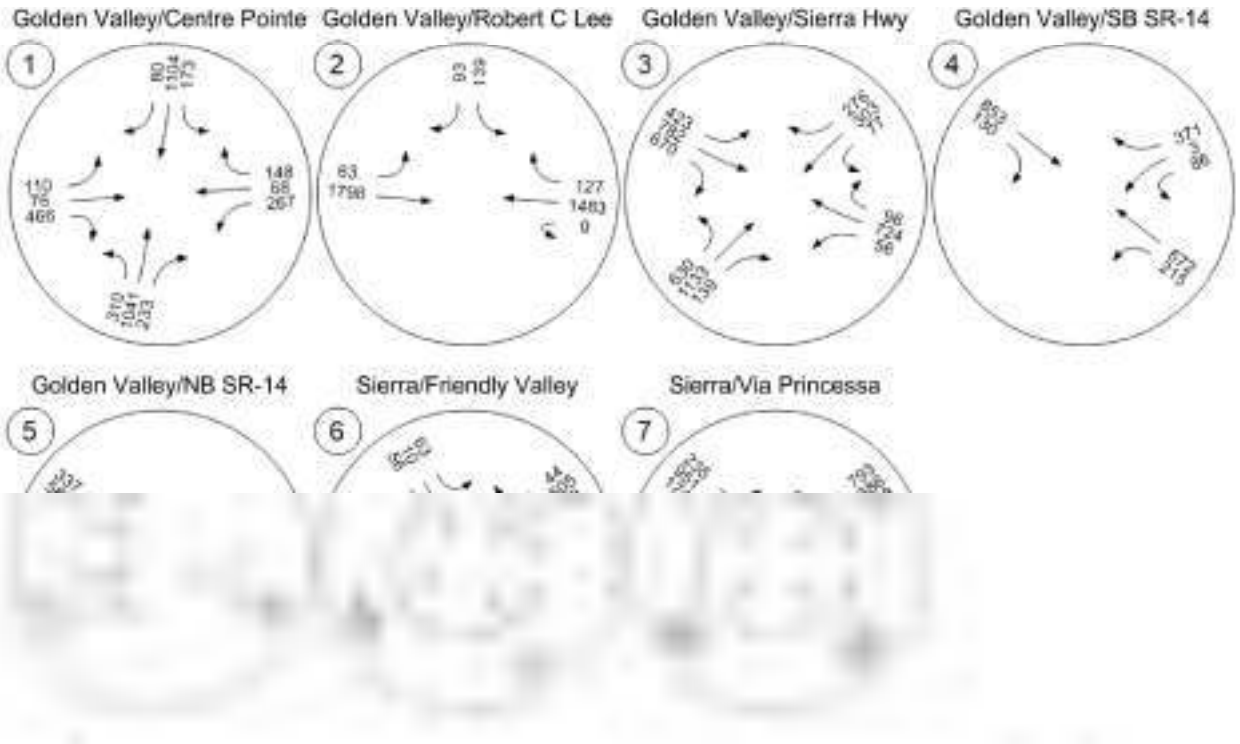


Exhibit 13: Project Opening Year Cumulative AM Peak Hour Volumes



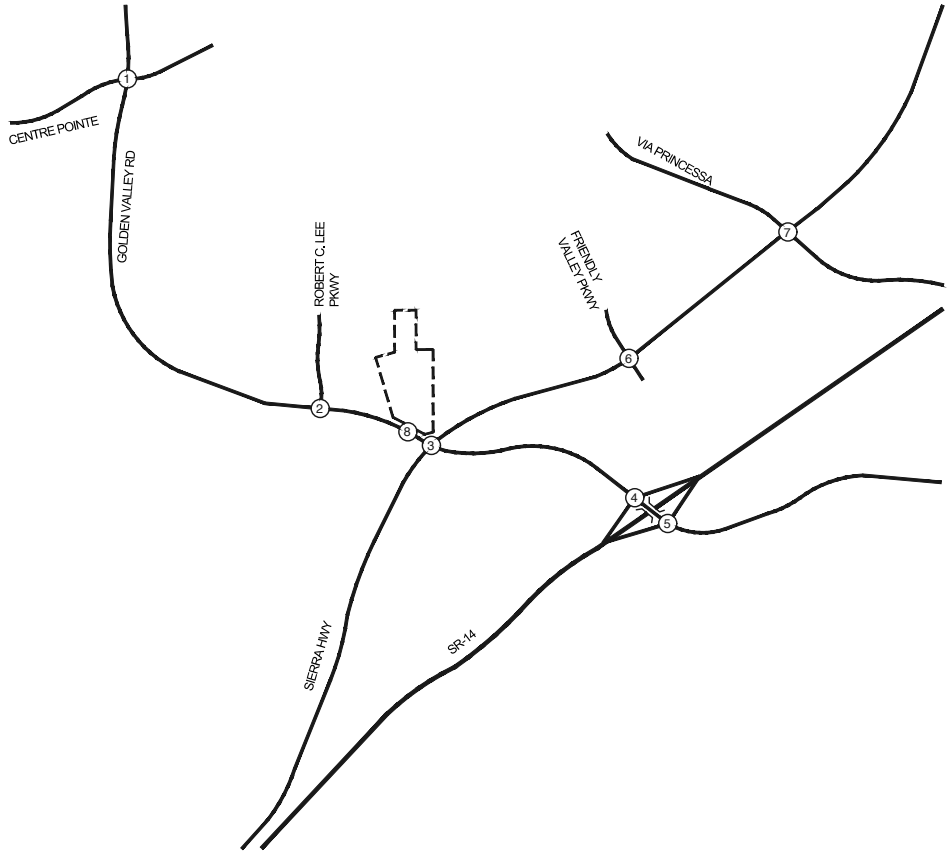


Exhibit 14: Project Opening Year Cumulative PM Peak Hour Volumes

Table 8
Intersection Analysis – Project Opening Year Cumulative (OYC) Conditions

Intersection			Control Type	Peak Hour	OYC Conditions	
					Delay[1]	LOS
1	Golden Valley	Centre Pointe	Signal	AM	39.6	D
				PM	**66.4**	**E**
2	Golden Valley	Robert C Lee	Signal	AM	26.9	C
				PM	10.5	B
3	Golden Valley	Sierra	Signal	AM	**73.9**	**E**
				PM	49.0	D
4	Golden Valley	SB SR-14	Signal	AM	31.5	C
				PM	31.1	C
5	Golden Valley	NB SR-14	Signal	AM	22.3	C
				PM	28.0	C
6	Sierra	Friendly Valley	Signal	AM	25.9	C
				PM	22.5	C
7	Sierra	Via Princessa	Signal	AM	40.3	D
				PM	43.2	D

Note: Delay shown in seconds per vehicle.
1 = Per the Highway Capacity Manual 6th Edition, overall average delay and LOS are shown for signalized intersections.

As shown in **Table 8**, the study intersections are projected to continue to operate at an acceptable LOS during the AM and PM peak hours for project opening year cumulative (OYC) conditions with the exception of the following intersections:

- #1 – Golden Valley Rd/Centre Pointe (LOS E PM Peak Hour); and
- #3 – Golden Valley Rd/Sierra Hwy (LOS E AM Peak Hour).

7.0 PROJECT OPENING YEAR CUMULATIVE PLUS PROJECT CONDITIONS

Project opening year cumulative plus project (OYCWP) conditions analysis is intended to identify the project-related impacts on both the existing and planned near-term circulation system.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for the project opening year cumulative plus project (OYCWP) scenario are consistent with those previously shown in **Exhibit 4.** The proposed project will be adding a new left-in, right-in, right-out driveway along Golden Valley Road and will be modifying the intersection of Golden Valley Road and Robert C. Lee Parkway to include a designated westbound U-turn lane.

7.2 PROJECT OPENING YEAR CUMULATIVE PLUS PROJECT (OYWCP) TRAFFIC VOLUMES

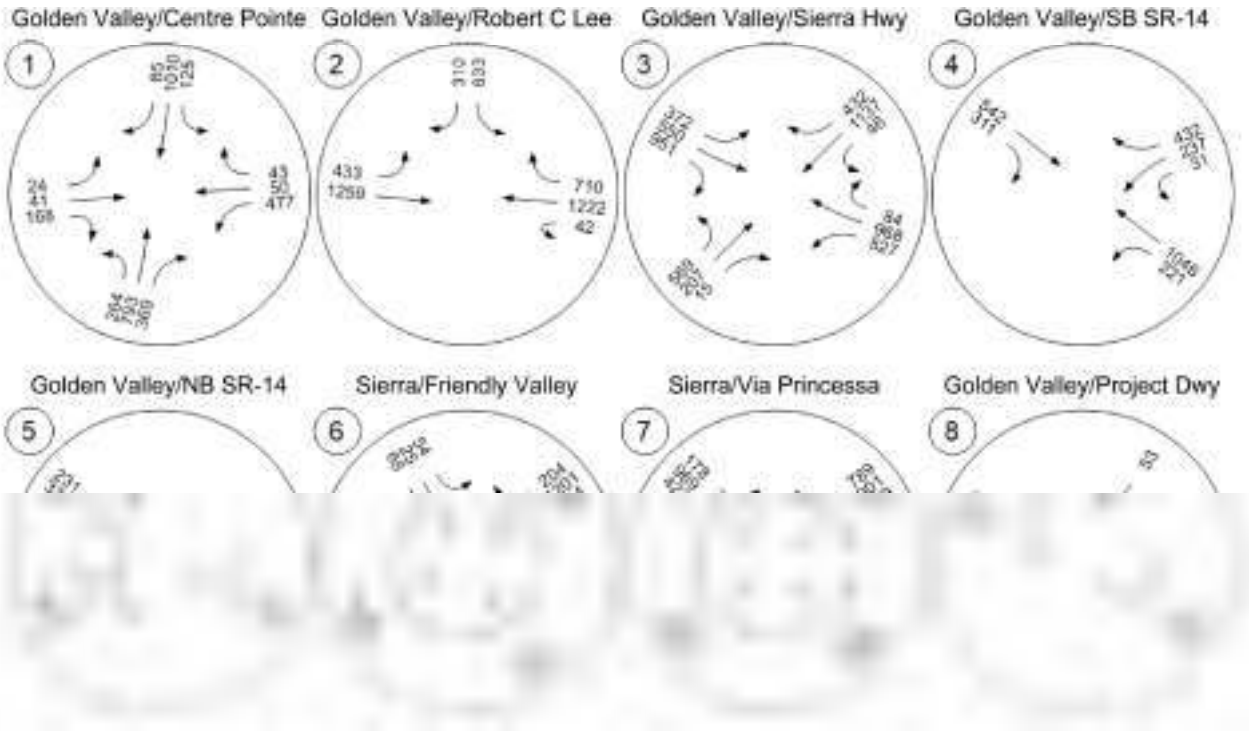
Project opening year cumulative plus project (OYCWP) volumes include background traffic plus the addition of traffic projected to be generated by nearby cumulative projects and the addition the traffic projected to be generated by the proposed project. Since the proposed project is expected to be built and generating trips in 2021, project opening year cumulative plus project (OYCWP) volumes include a growth rate of 2% per year for two year, applied to existing base volumes.

Project Opening Year Cumulative Plus Project (OYCWP) = (Existing (2021) Counts * 1.02^2) + Cumulative Project Volume + Project Volume

Exhibit 15 and **Exhibit 16** show project opening year cumulative plus project (OYCWP) AM and PM peak hour volumes at the study intersections.

7.3 PROJECT OPENING YEAR CUMULATIVE PLUS PROJECT (OYWCP) INTERSECTION LEVEL OF SERVICE ANALYSIS

Project opening year cumulative plus project (OYCWP) conditions AM and PM peak hour intersection analysis is shown in **Table 9**. HCM analysis sheets are provided in **Appendix C**.



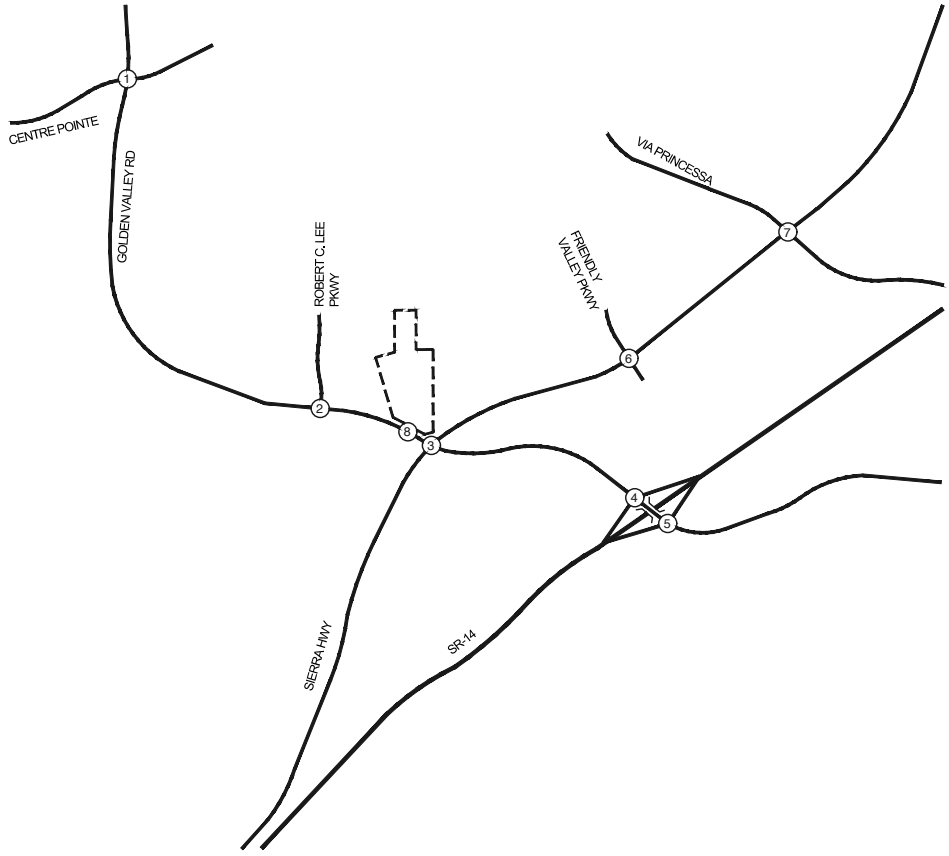
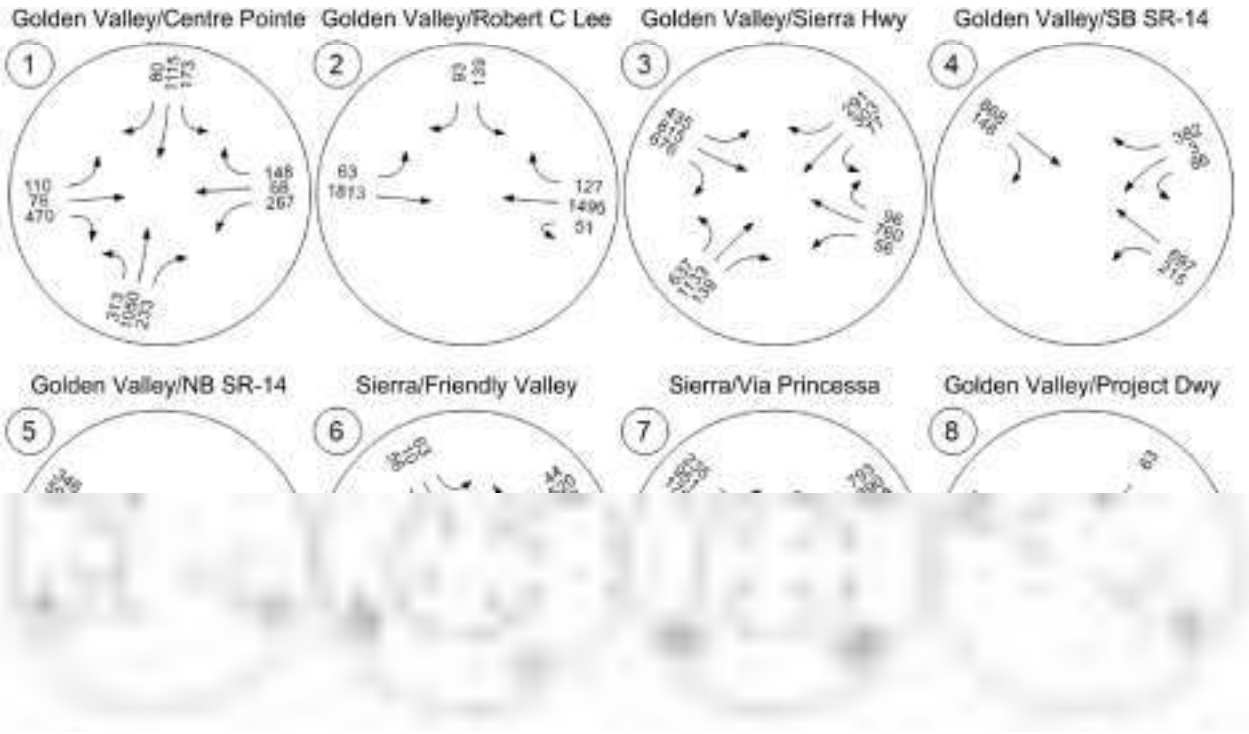


Exhibit 15: Project Opening Year Cumulative plus Project AM Peak Hour Volumes



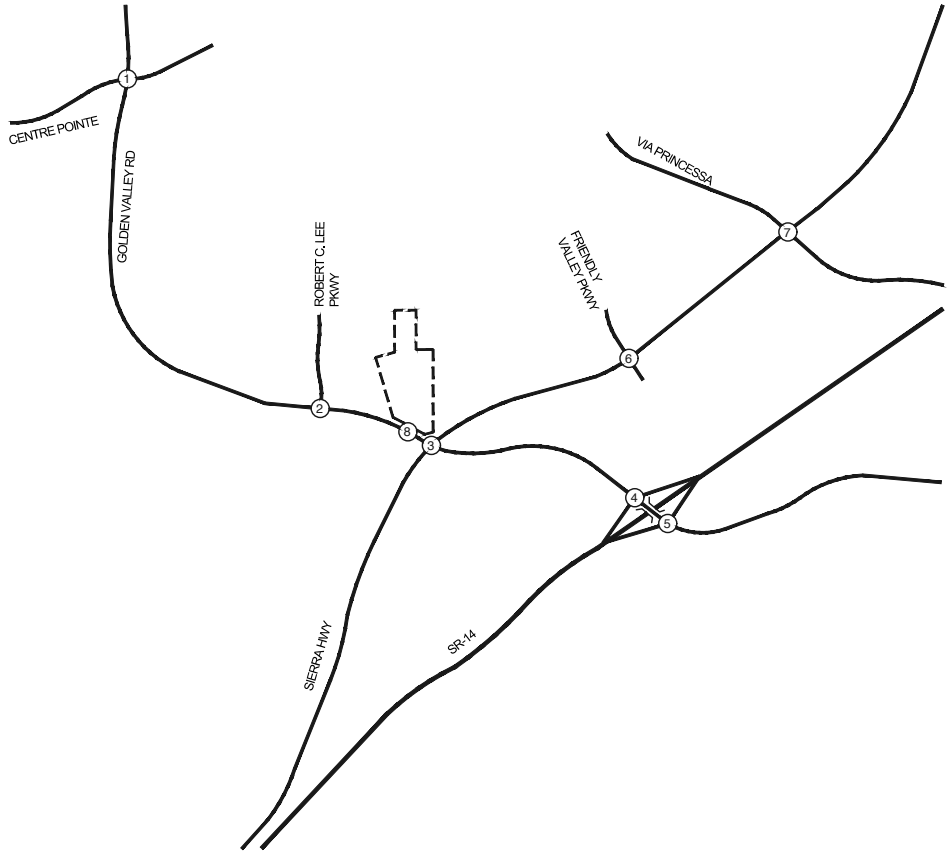


Exhibit 16: Project Opening Year Cumulative plus Project PM Peak Hour Volumes

Table 9

Intersection Analysis – Project Opening Year Cumulative Plus Project (OYCWP) Conditions

Intersection			Control Type	Peak Hour	OYC Conditions		OYCWP Conditions		Change	Deficient?
					Delay[1]	LOS	Delay[1]	LOS		
1	Golden Valley	Centre Pointe	Signal	AM	39.6	D	40.2	D	0.6	No
				PM	**66.4**	**E**	**68.2**	**E**	1.8	No
2	Golden Valley	Robert C Lee	Signal	AM	26.9	C	28.4	C	1.5	No
				PM	10.5	B	12.9	B	2.4	No
3	Golden Valley	Sierra	Signal	AM	**73.9**	**E**	**75.8**	**E**	1.9	No
				PM	49.0	D	50.6	D	1.6	No
4	Golden Valley	SB SR-14	Signal	AM	31.5	C	31.8	C	0.3	No
				PM	31.1	C	31.4	C	0.3	No
5	Golden Valley	NB SR-14	Signal	AM	22.3	C	22.6	C	0.3	No
				PM	28.0	C	28.2	C	0.2	No
6	Sierra	Friendly Valley	Signal	AM	25.9	C	26.0	C	0.1	No
				PM	22.5	C	22.6	C	0.1	No
7	Sierra	Via Princessa	Signal	AM	40.3	D	40.5	D	0.2	No
				PM	43.2	D	43.4	D	0.2	No
8	Golden Valley	Dwy 1	OWSC	AM	-	-	27.3	D	-	No
				PM	-	-	22.6	C	-	No

Note: OWSC = One-Way Stop-Control; Delay shown in seconds per vehicle.

1 = Per the Highway Capacity Manual 6th Edition, overall average delay and LOS are shown for signalized intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual approach is shown.

As shown in **Table 9** the study intersections are projected to continue to operate at an acceptable LOS during the AM and PM peak hours for project opening year cumulative (OYC) conditions with the exception of the following intersections:

- #1 – Golden Valley Rd/Centre Pointe (LOS E PM Peak Hour); and
- #3 – Golden Valley Rd/Sierra Hwy (LOS E AM Peak Hour).

Per City of Santa Clarita Guidelines, the proposed project does not create a transportation deficiency.

APPENDIX

APPENDIX A

SCOPING AGREEMENT
CITY OF SANTA CLARITA GENERAL PLAN CIRCULATION ELEMENT

Scoping Agreement for Traffic Impact Analysis

This form acknowledges the requirements for the traffic impact analysis of the following project. The analysis will follow the local jurisdiction's traffic impact analysis guidelines.

Project Name:	Santa Clarita Mixed-Use Development (TTM 68203)
Project Address:	Northwest Corner of Sierra Hwy/Golden Valley Road
Project Description:	151 Unit Senior Assistant Living, 73 Condominium Units, 60 Room Hotel with 3,3315 Square Feet of Retail, 2,360 SF of Restaurant (see attached site plan)

	Consultant	Developer
Name:	TJW Engineering	Jimmy Lee
Address:	9841 Irvine Center Dr, #200	800 Royal Oaks Dr, Suite 104
	Irvine, CA 92618	Monrovia, CA 91016
Telephone:	949-878-3509	626-578-7000 x2112
Email:	jeffrey@tjwengineering.com	jlee@ldcla.com

Trip Generation Source: ITE Trip Generation Manual, 10th Edition (2017)

Current GP Land Use:	Mixed Use Neighborhood	Proposed Land Use:	Mixed Use Neighborhood
Current Zoning:	MX-N	Proposed Zoning:	MX-N

Is the project screened from LOS analysis? [ ] Yes [X] No

Justification:	

Is the project screened from VMT analysis? [ ] Yes [X] No

Justification:	The project is not screened out per the Transportation Analysis Updates (May, 19 2020) - Project Size Screening – Exceeds daily trip limit of 110 trips - Low VMT Area Screening – Project location is between 15% below City baseline and City baseline - Transit Priority Screening – Project is not located within a transit priority area

	Existing Trip Generation			Proposed Trip Generation		
	In	Out	Total	In	Out	Total
AM Trips	-	-	-	51	53	104
PM Trips	-	-	-	70	63	133
Daily			-			1,787

Internal Trip Capture: [ ] Yes [X] No - % Trip Discount

Pass-By Allowance: [ ] Yes [X] No - % Trip Discount

Trip Distribution: See attached exhibit

Project Build-out Year: 2023 Annual Ambient Growth Rate: 2%

Study Intersections:

1.	Golden Valley Rd/ Centre Pointe Pkwy	6.	Sierra Hwy/Friendly Valley Pkwy
2.	Golden Valley Rd/Robert C Lee Pkwy	7.	Sierra Hwy/Via Princessa
3.	Golden Valley Rd/Sierra Hwy	8.	
4.	Golden Valley Rd/SB-14 Ramp	9.	
5.	Golden Valley Rd/NB-14 Ramp	10.	

Study Roadway Segments:

1.		3.	
2.		4.	

Analysis Scenarios:

1.	Existing	6.	
2.	Existing Plus Project	7.	
3.	Project Opening Year (Cumulative)	8.	
4.	Project Opening Year Plus Project	9.	
5.		10.	

Additional Notes:	TJW Engineering requests a list of recently approved projects within the vicinity of the proposed project. These projects will be included in the Background Conditions scenarios.

Signatures:

(Jeffrey Chinchilla)	
Consultant's Representative	City (Approved By)
October 7, 2021	
Date	Date

Table 1
Proposed Project Trip Generation

Proposed Land Use[1]	Qty	Unit[2]	Daily Trips (ADTs)		AM Peak Hour					PM Peak Hour				
			Rate	Volume	Rate	In:Out Split	Volume			Rate	In:Out Split	Volume		
							In	Out	Total			In	Out	Total
Multi-Family Residential (ITE 220)	73.00	DU	7.32	534	0.46	23:77	8	26	34	0.56	63:37	26	15	41
Assisted Senior Living (ITE 254)	151.00	Beds	2.60	393	0.19	63:37	18	11	29	0.26	38:62	15	24	39
Hotel (ITE 310)	60.00	Rooms	14.34	860	0.67	60:40	25	16	41	0.89	54:46	29	24	53
Total				1,787			51	53	104			70	63	133

1: Rates from ITE Trip Generation (10th Edition, 2017)

2: DU = Dwelling Units

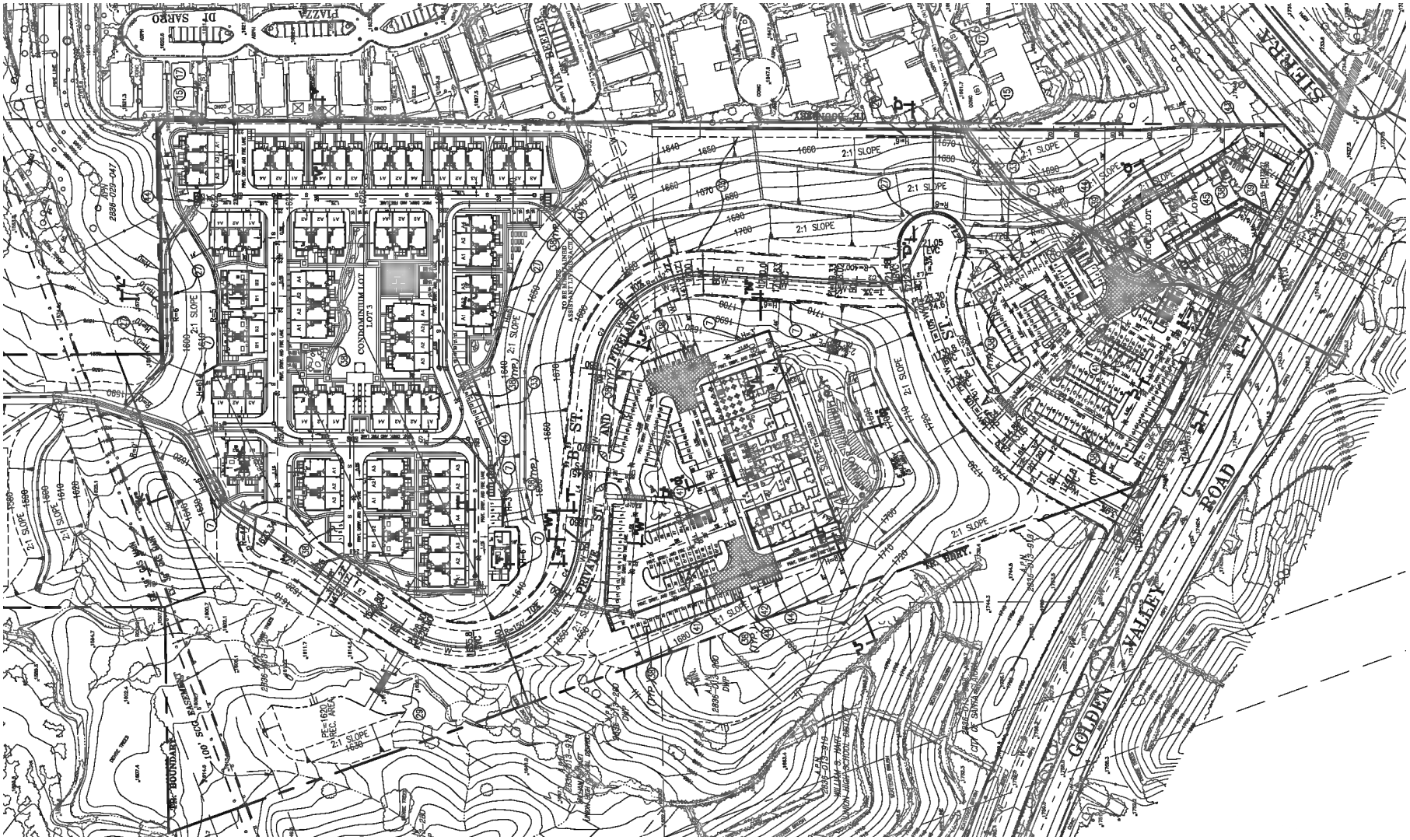
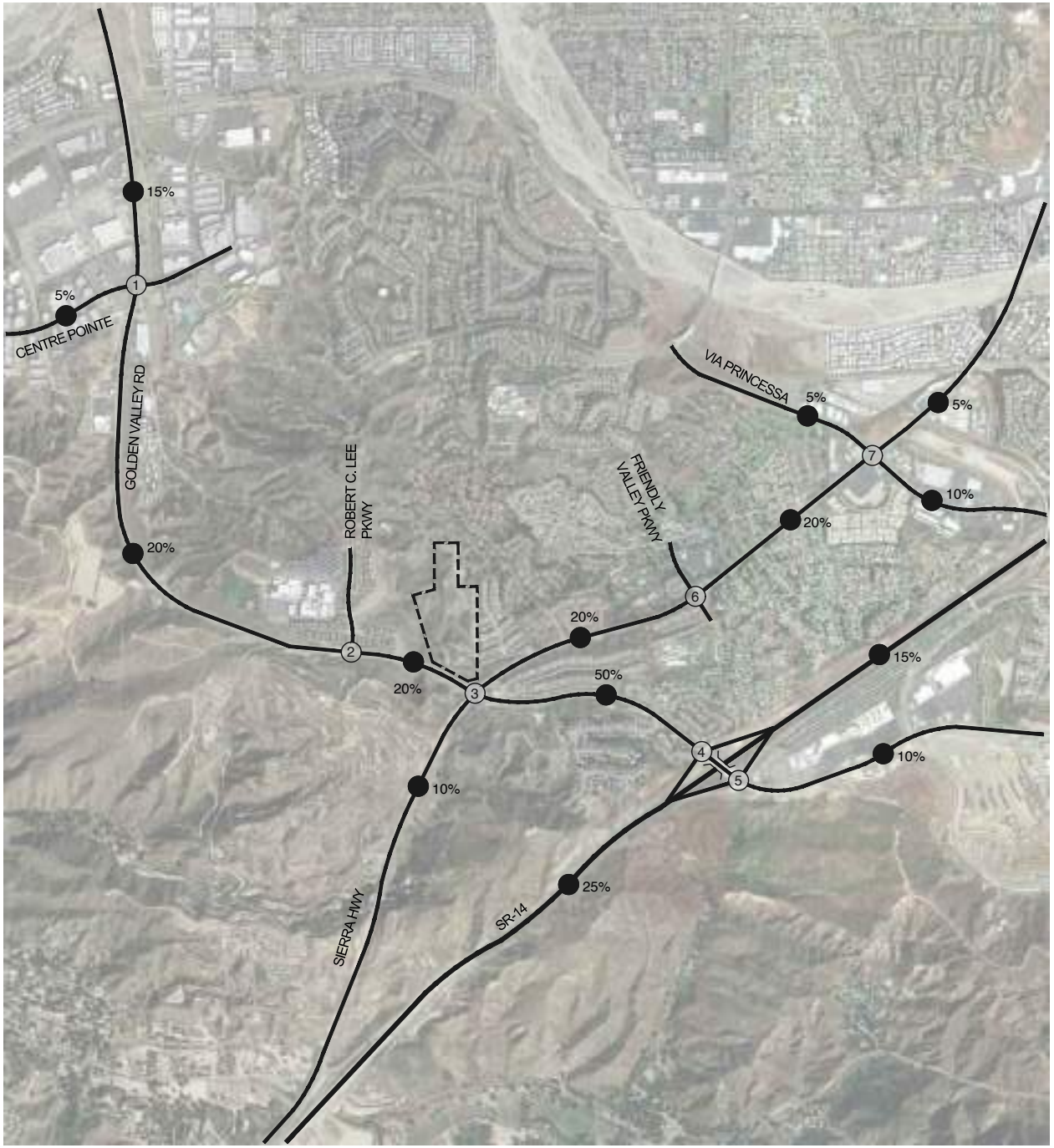


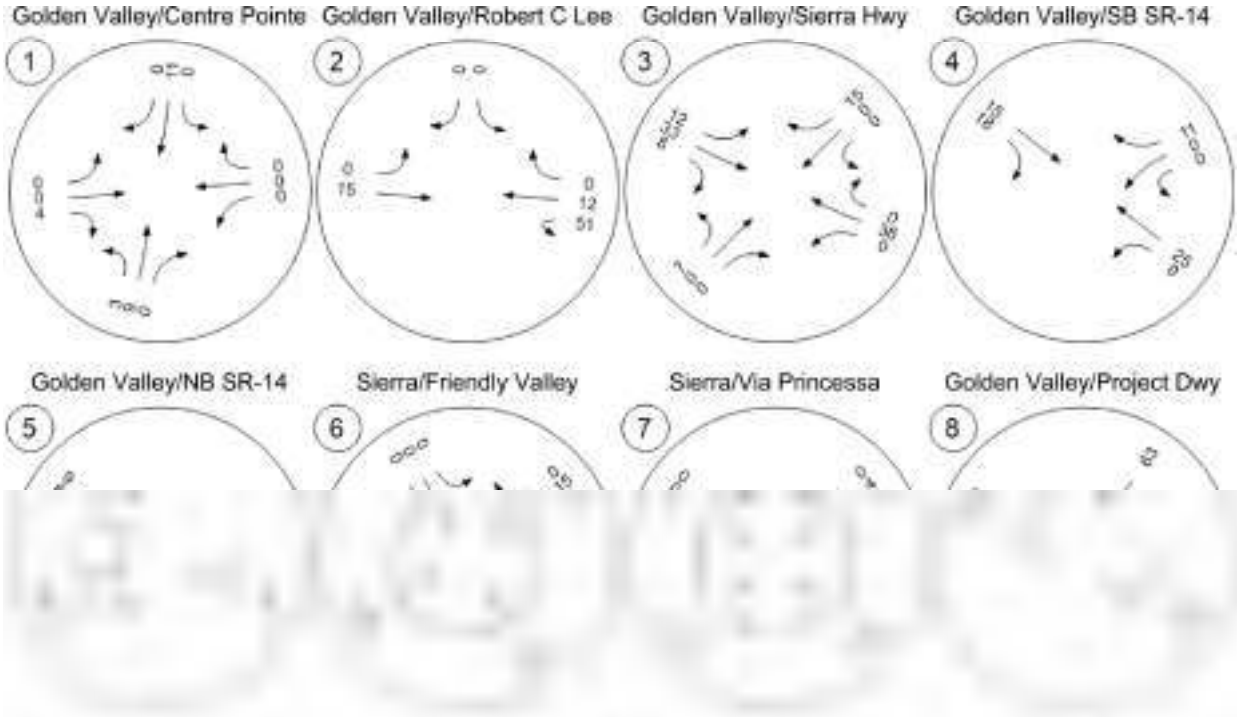
Exhibit 1: Proposed Project Site Plan



Legend:

- Project Site
- Study Intersection Location
- XX% Percent Trip Distribution

Exhibit 2: Proposed Study Area and Trip Distribution



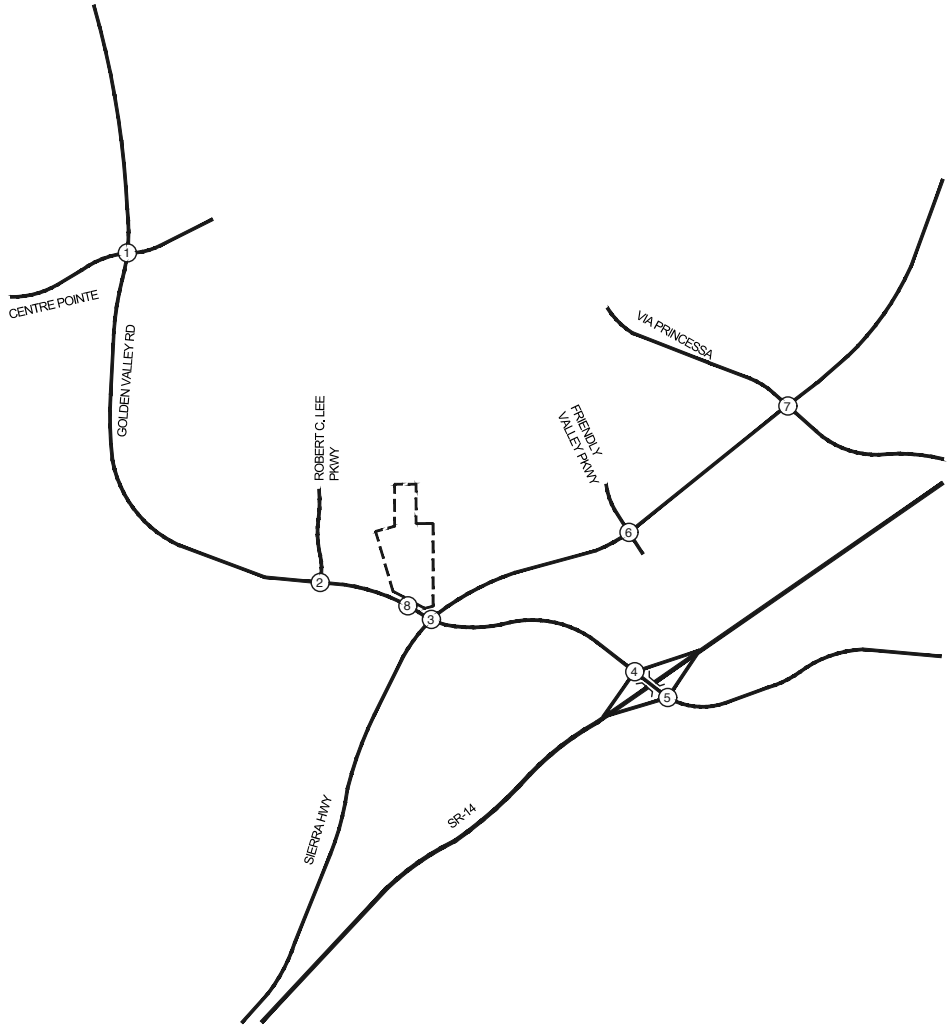
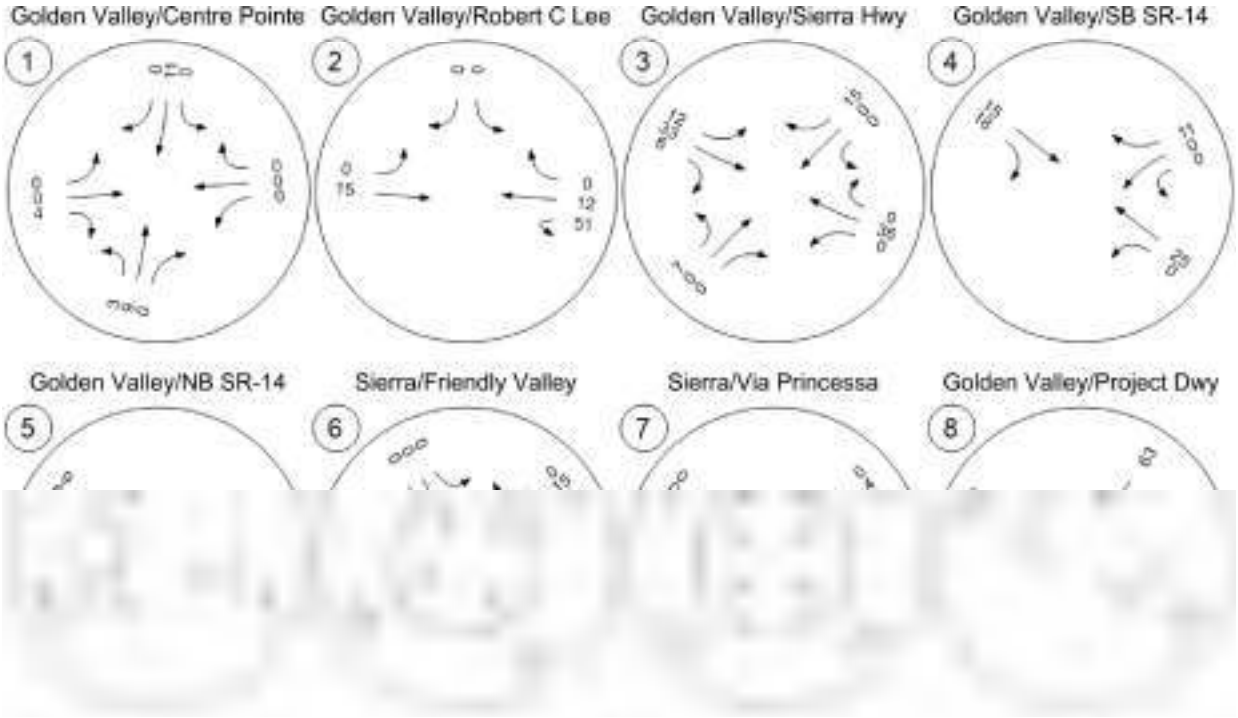


Exhibit 3: Trip Distribution of Proposed Project AM Trips at Study Intersections



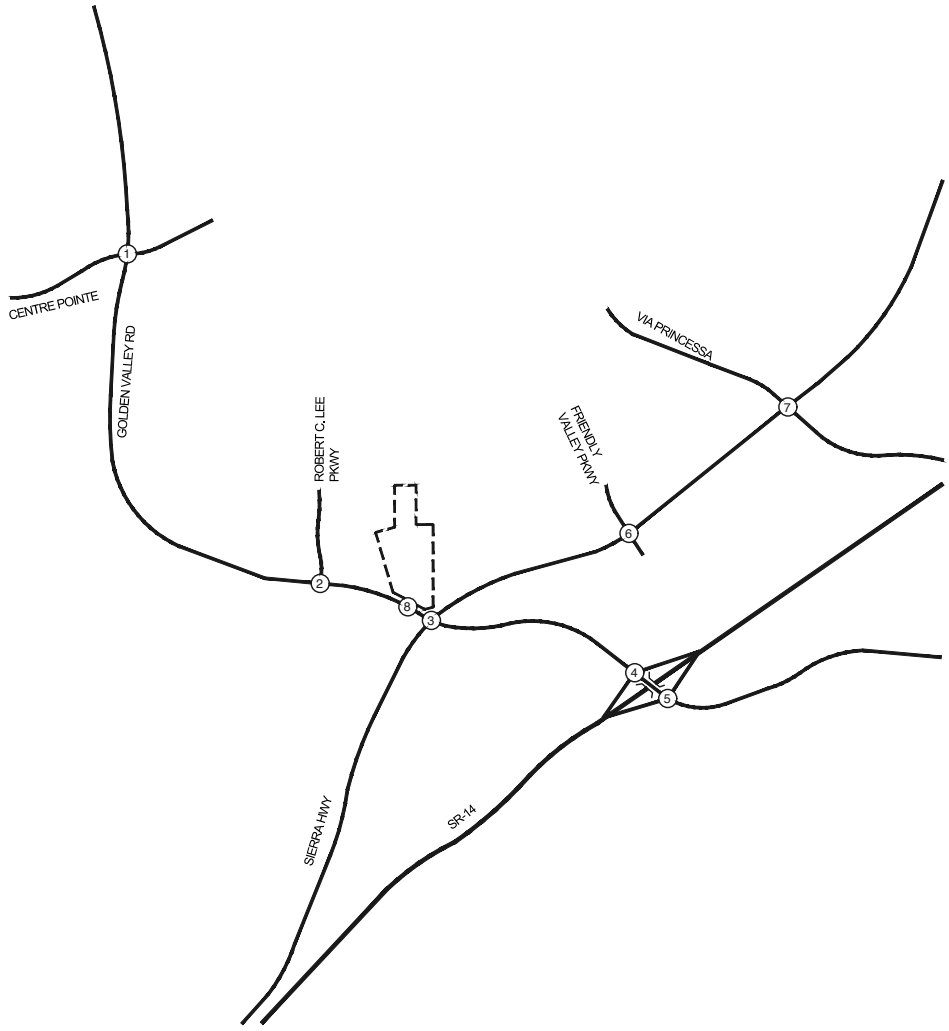


Exhibit 4: Trip Distribution of Proposed Project PM Trips at Study Intersections

Revised Tentative Tract Map 68203- Project Summary

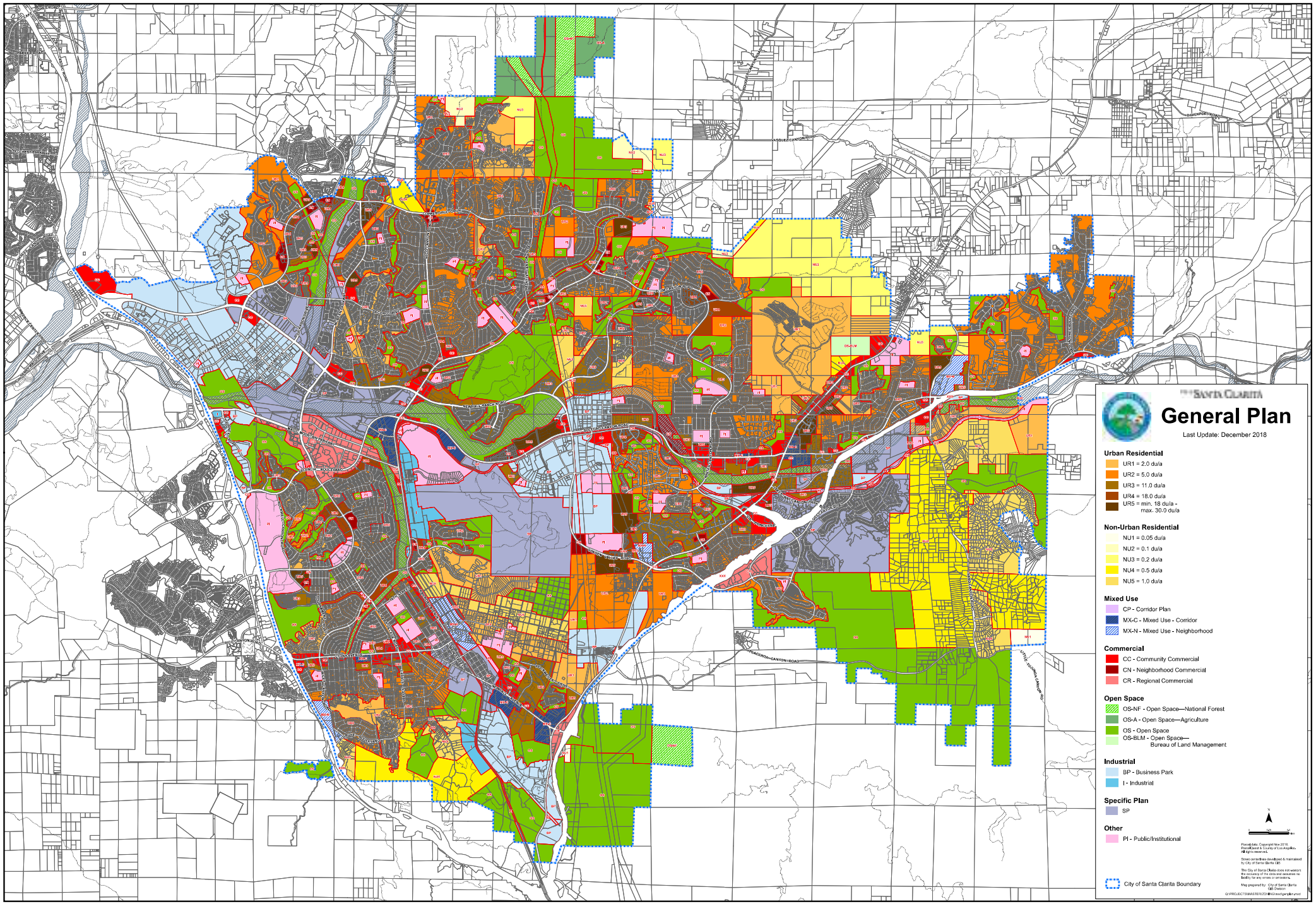
Entitlement of a Tentative Tract Map for the merger and re-subdivision of the existing 28.13-acre site for a mixed-use project in the City of Santa Clarita. The subject property is located at the northwest corner of Golden Valley Road and Sierra Highway, in the City of Santa Clarita. Currently, majority of the site is vacant except for the abandoned single-family residence and accessory structures that are located near the southerly portion of the property near Golden Valley Road.

The subject property is designated as Mixed-Use Neighborhood Planned Development Overlay Zone (MX-N (PD)). The proposed uses are consistent with both City General Plan, Unified Development Code, and Zoning designations. Adjacent uses include residential uses to the immediate north and east, vacant land to the south, and residential uses/Golden Valley High School to the west. The surrounding uses along Golden Valley Road and Sierra Highway consist of mostly established residential uses, schools, and neighborhood commercial retail centers.

Project Development Request-

The proposed project development will occur on a ±28.13-acre property consisting of 10 assessor parcels. The project development seeks to merge the 10 parcels and entitle a Vesting Tentative Tract Map 68203 for a four (4) lot subdivision consisting of the following:

- One (1) 5.43-acre lot for a four (4) story building consisting of 151-unit senior assisted living units and 95 parking spaces.
- One (1) 3.76-acre lot for a four (4) Story 60-room commercial hotel building with 2,544 sf. of banquet facility, ±3,315 sf. retail space, and ±2,360 sf. restaurant space. Total parking provided- 149 spaces.
    - Parking Breakdown:
        - Two (2) HC
        - Two (2) HC Van
        - Three (3) Loading
        - 142 Standard
- One (1) 13.09-acre lot for 73 residential Condominium units consisting of two, three, and four-plex buildings.
- One (1) 5.11-acre open space lot with a L.I.D. storm water treatment area.
- An 8' wide hiking trail (HOA maintained).
- 0.74 acre of public street
- Preliminary earthwork quantities: 360,000 cubic yards of cut and fill to be balanced onsite.


SANTA CLARITA
General Plan
Last Update: December 2018
Urban Residential
UR1 = 2.0 du/a
UR2 = 5.0 du/a
UR3 = 11.0 du/a
UR4 = 18.0 du/a
UR5 = min. 18 du/a - max. 30.0 du/a
Non-Urban Residential
NU1 = 0.05 du/a
NU2 = 0.1 du/a
NU3 = 0.2 du/a
NU4 = 0.5 du/a
NU5 = 1.0 du/a
Mixed Use
CP - Corridor Plan
MX-C - Mixed Use - Corridor
MX-N - Mixed Use - Neighborhood
Commercial
CC - Community Commercial
CN - Neighborhood Commercial
CR - Regional Commercial
Open Space
OS-NF - Open Space—National Forest
OS-A - Open Space—Agriculture
OS - Open Space
OS-BLM - Open Space—Bureau of Land Management
Industrial
BP - Business Park
I - Industrial
Specific Plan
SP
Other
PI - Public/Institutional
City of Santa Clarita Boundary

8. Cruzan Mesa Road from Whites Canyon Road to Sierra Highway – Remove planned limited secondary highway.

The following roadway alignments were recommended to be realigned as a result of the traffic analysis:

1. Sand Canyon Road from the Northern Santa Clarita City boundary to Sierra Highway – Realign planned secondary highway along the existing driven roadway.
2. Long Canyon Road/Potrero Canyon Road/Valencia Boulevard at planned intersection – Realign to make Long Canyon Road/Valencia Boulevard the continuous roadway.
3. Chiquito Canyon Road/Long Canyon Road at State Route 126 – Revise alignments to create a continuous north/south roadway.
4. Whites Canyon Road from Plum Canyon Road to Vasquez Canyon Road – Revise alignment to connect from Plum Canyon Road to Sierra Highway (as the proposed Skyline Ranch Road).

Table C-2 indicates the designation of all General Plan roadways within the planning area. It should be noted that local and collector streets are not included on the Highway Plan, which contains only major and secondary highways, expressways, and parkways.

Table C-2: Highway Plan Roadways in the Planning Area

Roadway Classification	Roadway Segments in Planning Area
Expressways	SR-126
Major Highways	Avenue Scott (from Rye Canyon to Avenue Tibbitts) Avenue Tibbitts Bouquet Canyon Road (from Plum Canyon Road to Magic Mountain Parkway) Castaic Road (from Lake Hughes Road to Parker Road) Commerce Center Drive Copper Hill Drive (from Newhall Ranch Road to Seco Canyon Road) Golden Valley Road (from Newhall Ranch Road to SR-14 freeway) Hasley Canyon Road (from Commerce Center Drive to I-5 freeway) Lake Hughes Road (from The Old Road to Ridge Route Road) Long Canyon Road (from SR-126 to Valencia Boulevard) Lost Canyon Road (from Jakes Way to Via Princessa) Lyons Avenue Magic Mountain Parkway (from Commerce Center Drive to Via Princessa) McBean Parkway (from I-5 freeway to Copper Hill Drive) Newhall Avenue (from Railroad Avenue to SR-14 freeway) Newhall Ranch Road Orchard Village Road Parker Road (from The Old Road to Castaic Road) Pico Canyon Road Plum Canyon Road Railroad Avenue (from Magic Mountain Parkway to Lyons Avenue) Rye Canyon Road Sand Canyon Road (from Soledad Canyon Road to Lost Canyon Road)

Roadway Classification	Roadway Segments in Planning Area
	Santa Clarita Parkway (from Bouquet Canyon Road to Sierra Highway) Sierra Highway Soledad Canyon Road Stevenson Ranch Parkway The Old Road (from Hasley Canyon Road to Lyons Avenue) The Old Road (from Calgrove Boulevard to Sierra Highway) Valencia Boulevard Via Princessa (from Wiley Canyon Road to Lost Canyon Road) Whites Canyon Road Wiley Canyon Road (from Lyons Avenue to Via Princessa)
Secondary Highways	16th Street (from Orchard Village Road to Newhall Avenue) Agua Dulce Canyon Road Avenue Scott (from Avenue Tibbitts to McBean Parkway) Bouquet Canyon Road (from Plum Canyon Road to Angeles National Forest boundary) Calgrove Boulevard Canyon Park Boulevard Copper Hill Drive (from Seco Canyon Road to Bouquet Canyon Road) Davenport Road Decoro Drive Dickason Drive Dockweiler Drive Escondido Canyon Road Golden Valley Road (from Newhall Ranch Road to Plum Canyon Road) Golden Valley Road (from SR-14 freeway to Via Princessa) Haskell Canyon Road (from Copper Hill Drive to Bouquet Canyon Road) Hasley Canyon Road (from Del Valle Road to Commerce Center Drive) Hillcrest Parkway Long Canyon Road (from Chiquito Canyon Road to SR-126) Lost Canyon Road (from Jakes Way to Sand Canyon Road) Magic Mountain Parkway (from Long Canyon Road to Commerce Center Drive) Newhall Avenue (from 16th Street to Railroad Avenue) Placerita Canyon Road (from Sierra Highway to Sand Canyon Road) Potrero Canyon Road Railroad Avenue (from Lyons Avenue to Newhall Avenue) Ridge Route Road (from approximately ¾ mile north of Northlake Hills elementary school to Castaic Road) Rockwell Canyon Road Sand Canyon Road (from Sierra Highway to Soledad Canyon Road) Seco Canyon (from Copper Hill Drive to Bouquet Canyon Road) Shadow Pines Boulevard Sloan Canyon Road (from The Old Road to Quail Valley Road) The Old Road (from Oak Valley Road to Hasley Canyon Road) The Old Road (from Pico Canyon Road to Calgrove Boulevard) Tourney Road Valley Street

Roadway Classification	Roadway Segments in Planning Area
	Via Princessa (from Lost Canyon Road to Golden Valley Road) Wiley Canyon Road (from Lyons Avenue to Calgrove Boulevard)
Limited Secondary Highways	Bouquet Canyon (from Angeles National Forest Boundary to Elizabeth Lake Road) Chiquito Canyon Road (from Del Valle Road to Long Canyon Road) Del Valle Road (from Chiquito Canyon Road to Hasley Canyon Road) Hasley Canyon Road (from Sloan Canyon Road to Del Valle Road) Jakes Way Lake Hughes Road (from Ridge Route Road to Pine Canyon Road) Lost Canyon Road (from Sand Canyon Road to Oak Springs Canyon Road) McBean Parkway (from San Francisquito Canyon Road to Copper Hill Drive) Ridge Route Road (from Templin Highway to approximately ¾ mile north of Northlake Hills elementary school) San Francisquito Canyon Road (from McBean Parkway to Elizabeth Lake Road) Sand Canyon Road (from Lost Canyon Road to Little Tujunga Canyon Road) Seco Canyon (from Discovery Ridge Drive to Copper Hill Drive) Skyline Ranch Road Sloan Canyon Road (from Hillcrest Parkway to Hasley Canyon Road) Sloan Canyon Road (from Quail Valley Road to Tract 46443) Tick Canyon Road Tournament Road Vasquez Canyon Road
Parkways	Henry Mayo Drive (from Commerce Center Drive to The Old Road)

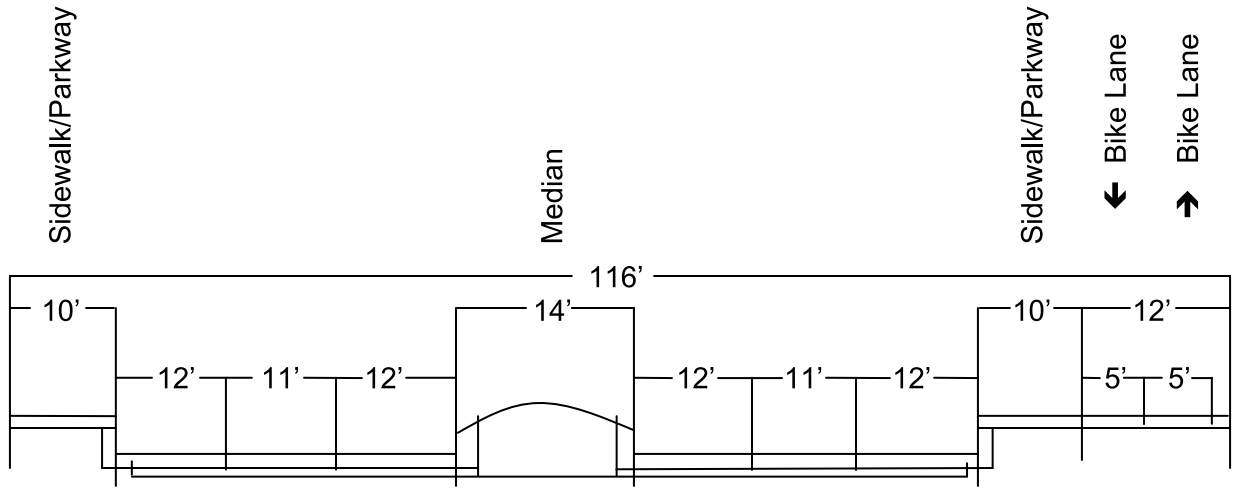
A complete listing of the future roadway improvements needed to implement the recommended Highway Plan is provided in Table C-3.

Table C-3: Roadway Improvements Needed For Build-Out of Highway Plan

Roadway/Segment	Improvement	Comments
Agua Dulce Canyon Road		
Between Sierra Highway and Escondido Canyon Road	Widen roadway from 2 lanes to a 4 lane Secondary Highway	
Between Escondido Canyon Road and Davenport Road	Construct new 4 lane Secondary Highway	Gap closure segment
Between Davenport Road and Soledad Canyon Road	Widen roadway from 2 lanes to a 4 lane Secondary Highway	
Avenue Scott		
Between Rye Canyon Road and Avenue Tibbitts	Re-stripe roadway from 4 lanes to 6 lanes	

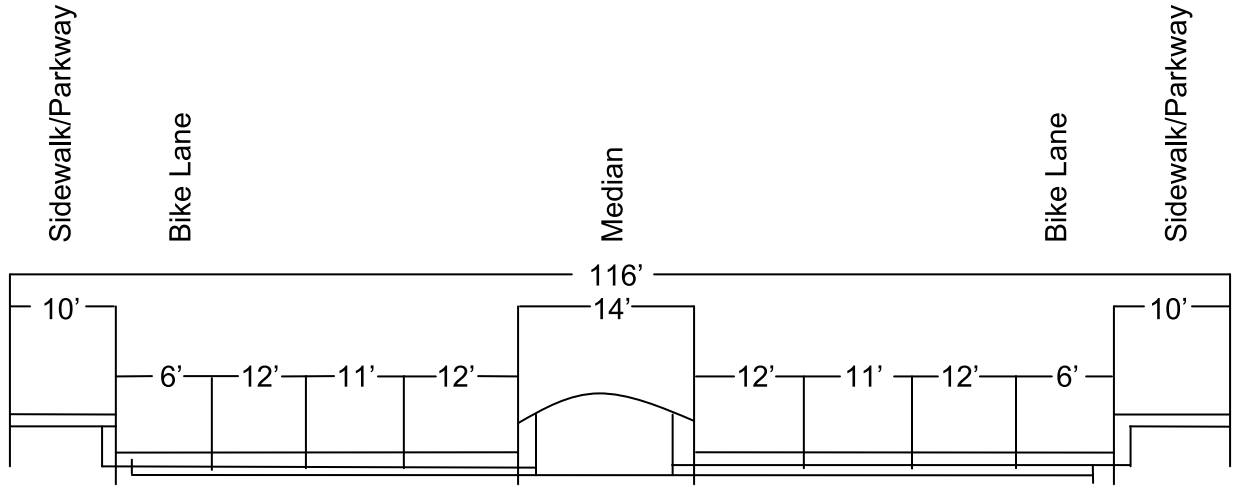
Exhibit C-3: Standard Roadway Cross Sections

Major Highway with Bike Trail Detail



Three Lanes in Each Direction With Raised Landscape Median, No On-Street Parking

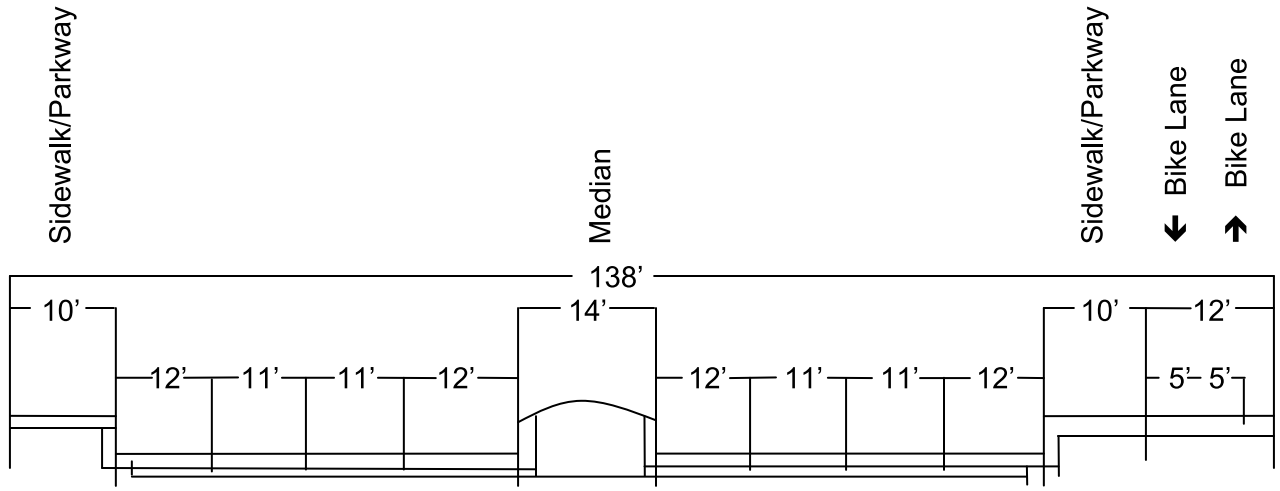
Major Highway with Bike Lane Detail



Three Lanes in Each Direction With Raised Landscape Median, No On-Street Parking

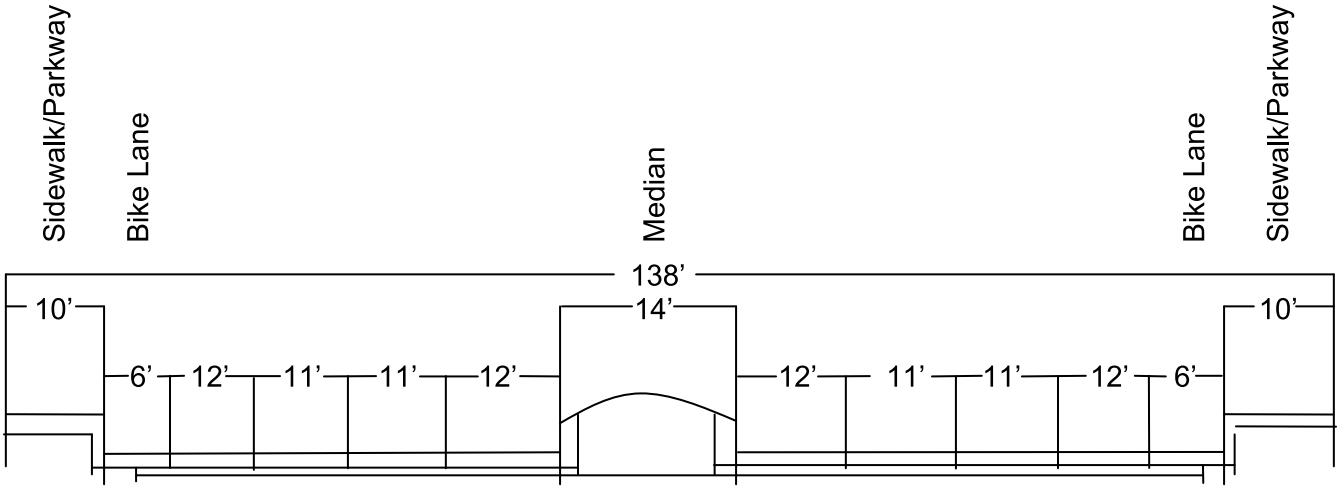
Exhibit C-3: Standard Roadway Cross Sections, Continued

Major Highway 8-Lane Alternative with Bike Trail Detail



Four Lanes in Each Direction With Raised Landscape Median, No On-Street Parking

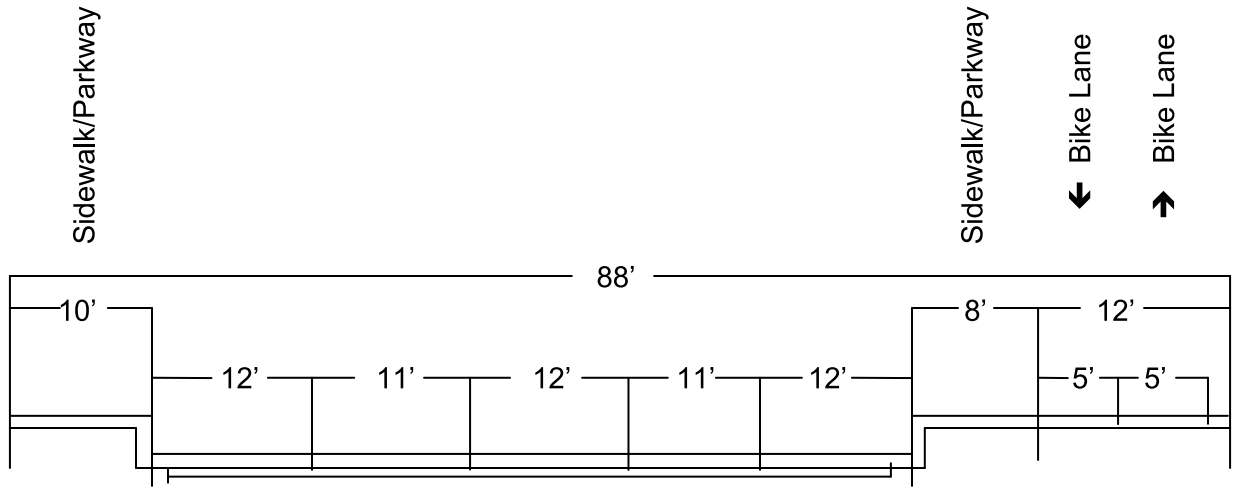
Major Highway 8-Lane Alternative with Bike Lane Detail



Four Lanes in Each Direction With Raised Landscape Median, No On-Street Parking

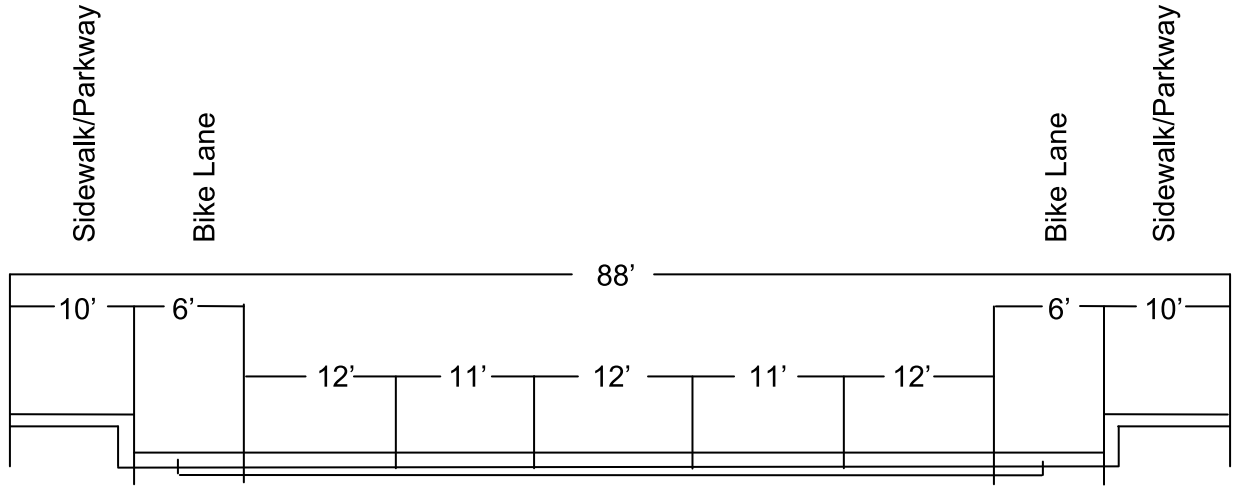
Exhibit C-3: Standard Roadway Cross Sections, Continued

Urban Secondary Highway with Bike Trail Detail



Two Lanes in Each Direction With Two Way Left Turn Lane, No On-Street Parking

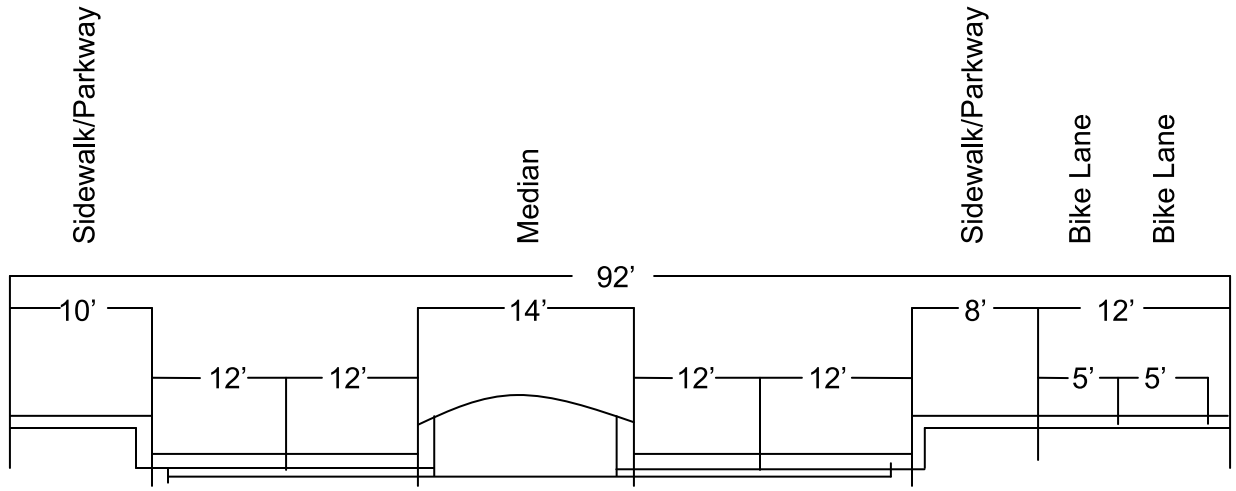
Urban Secondary Highway with Bike Lane Detail



Two Lanes in Each Direction With Two Way Left Turn Lane, No On-Street Parking

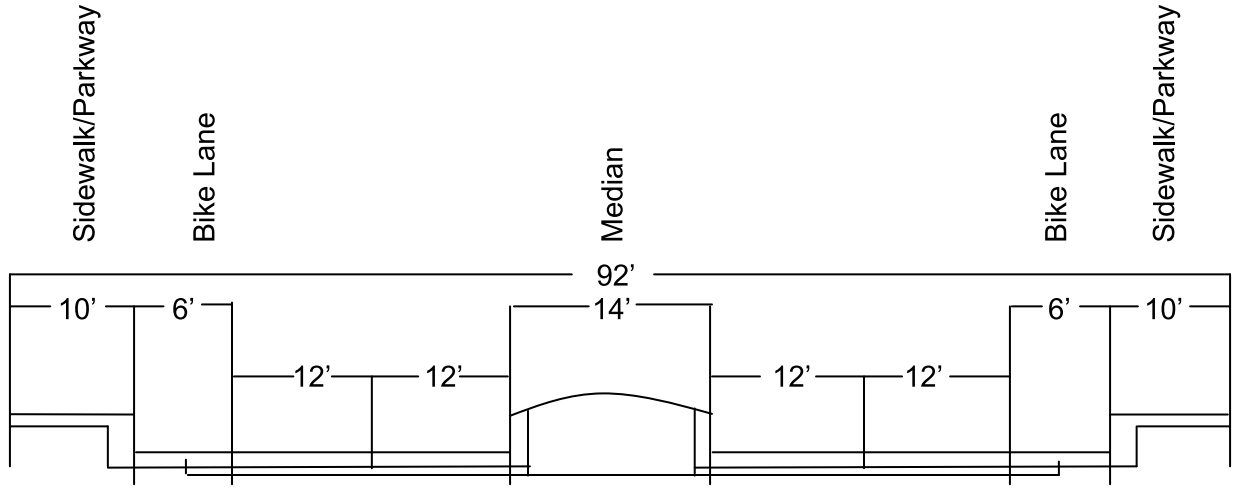
Exhibit C-3: Standard Roadway Cross Sections, Continued

Sub-Urban Secondary Highway with Bike Trail Detail



Two Lanes in Each Direction With Raised Landscape Median, No On-Street Parking

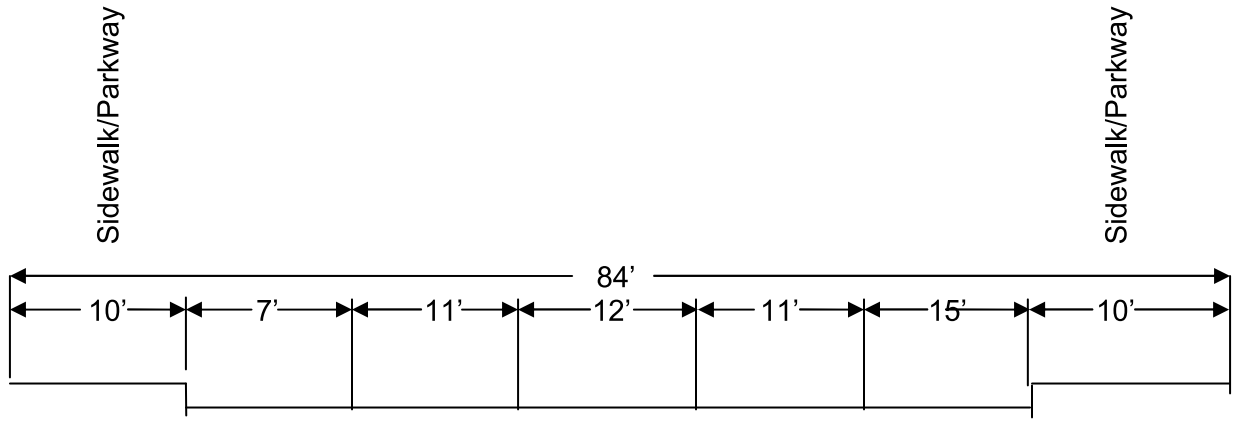
Sub-Urban Secondary Highway with Bike Lane Detail



Two Lanes in Each Direction With Raised Landscape Median

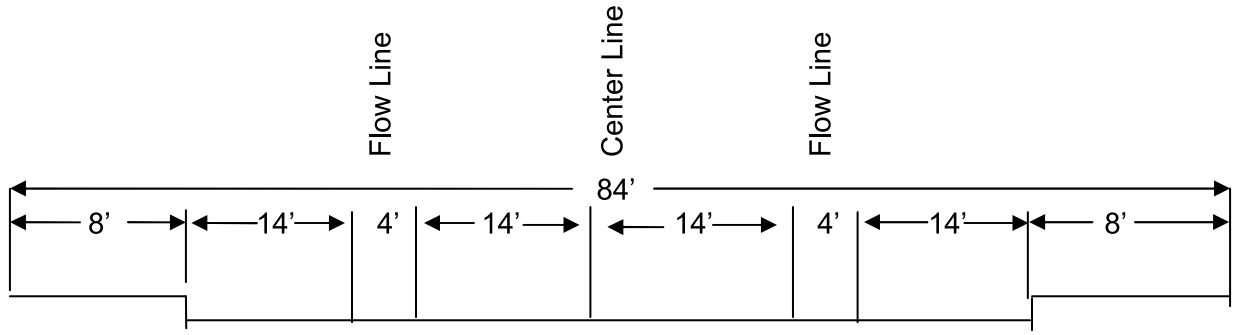
Exhibit C-3: Standard Roadway Cross Sections, Continued

Limited Secondary Arterial Highway- Two Lanes in Each Direction



Two lanes in each direction with no on-street parking.

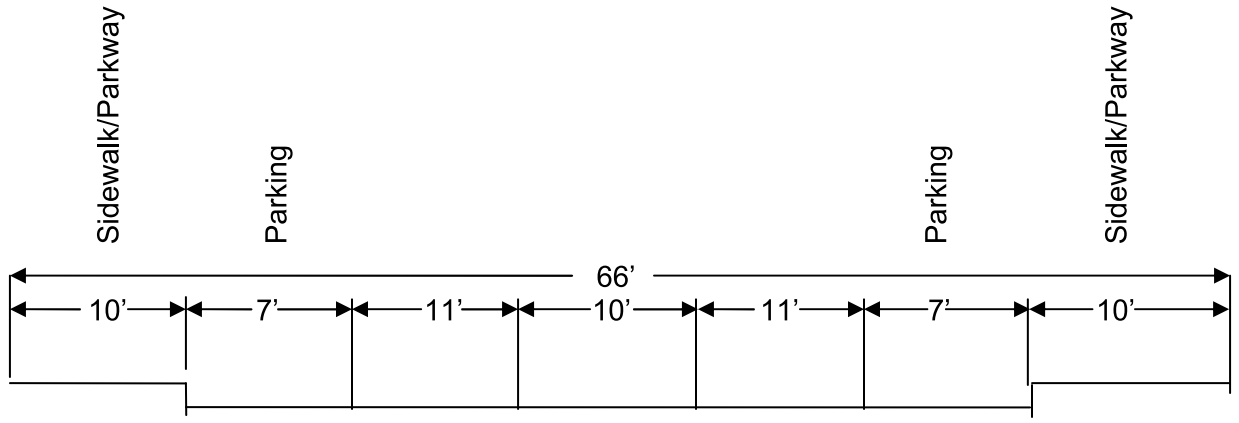
Limited Secondary Arterial Highway-One Lane in Each Direction



Two lanes in each direction with no on-street parking.

Exhibit C-3: Standard Roadway Cross Sections, Continued

Industrial/Commercial Cul-de-sac



Residential Collector

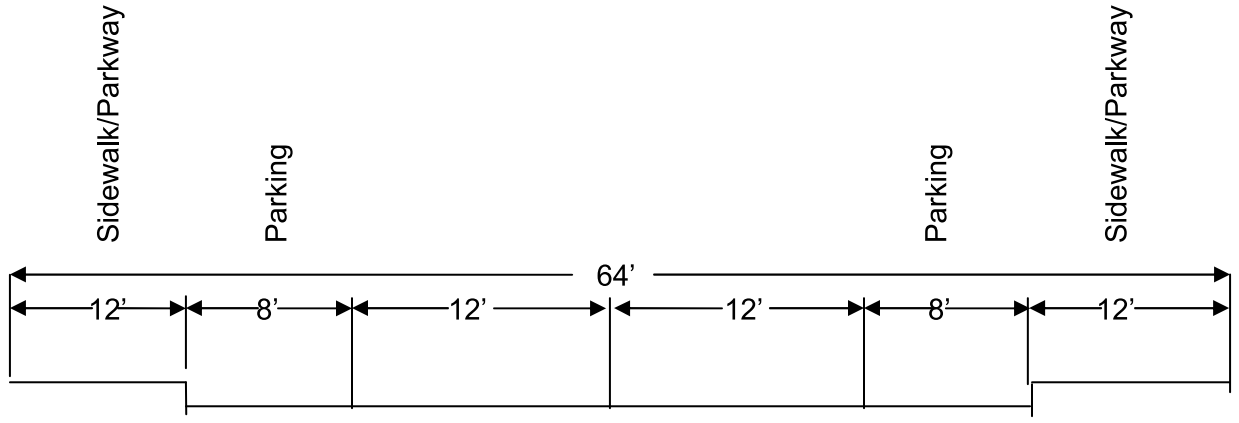
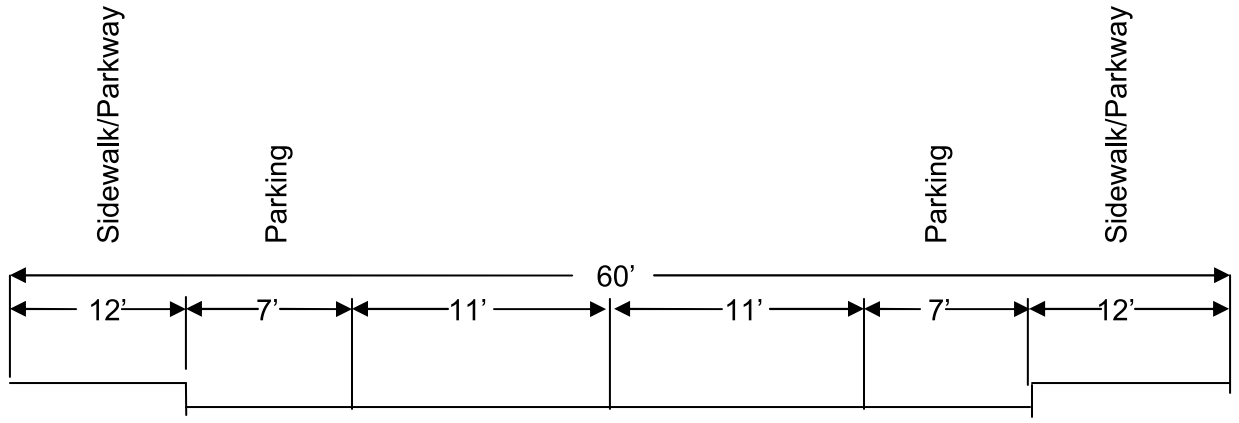


Exhibit C-3: Standard Roadway Cross Sections, Continued

Residential Through Street



Residential Cul-de-sac

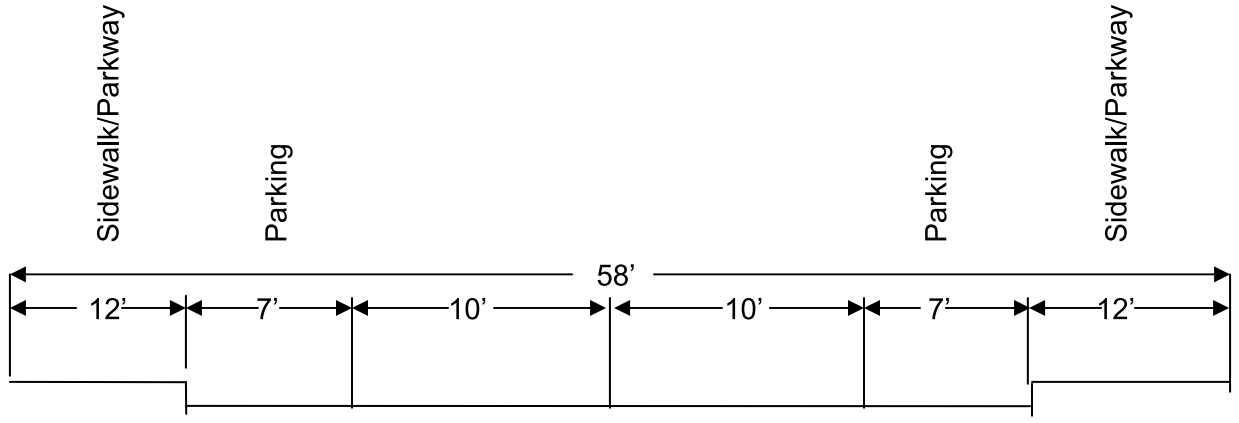
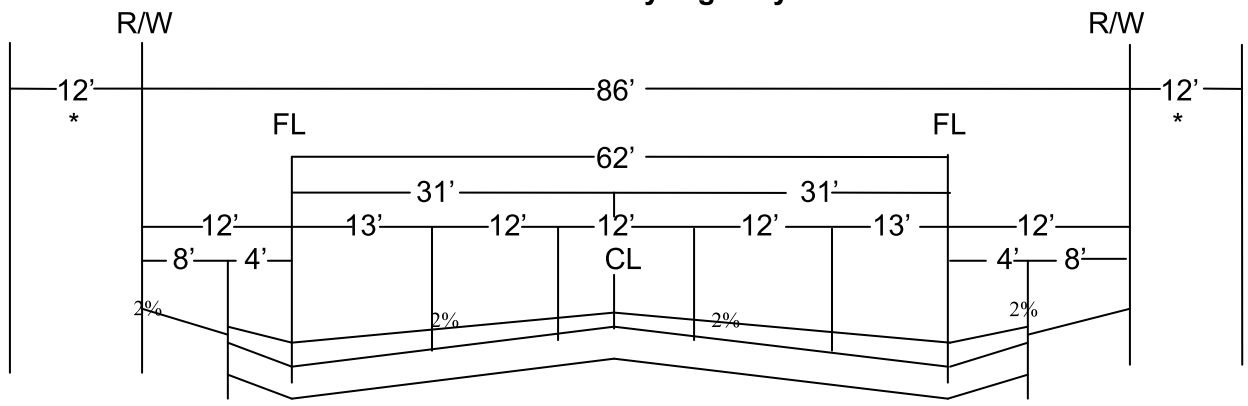
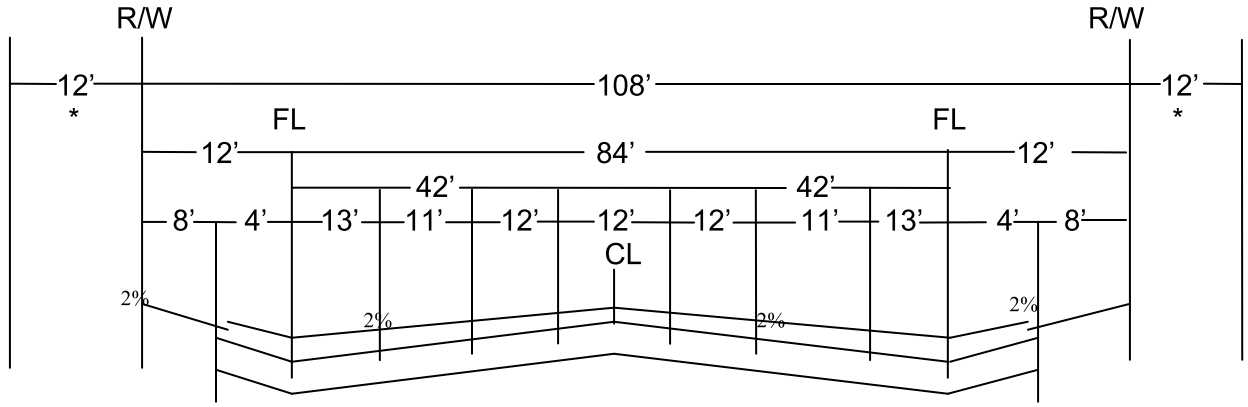


Exhibit C-3: Standard Roadway Cross Sections, Continued

Rural Secondary Highway



Rural Major Highway



* Master Plan Multi-Purpose Riding and Hiking Trail per Santa Clarita Area Plan.

Final design of rural highways to be approved by Los Angeles County Department of Public Works.

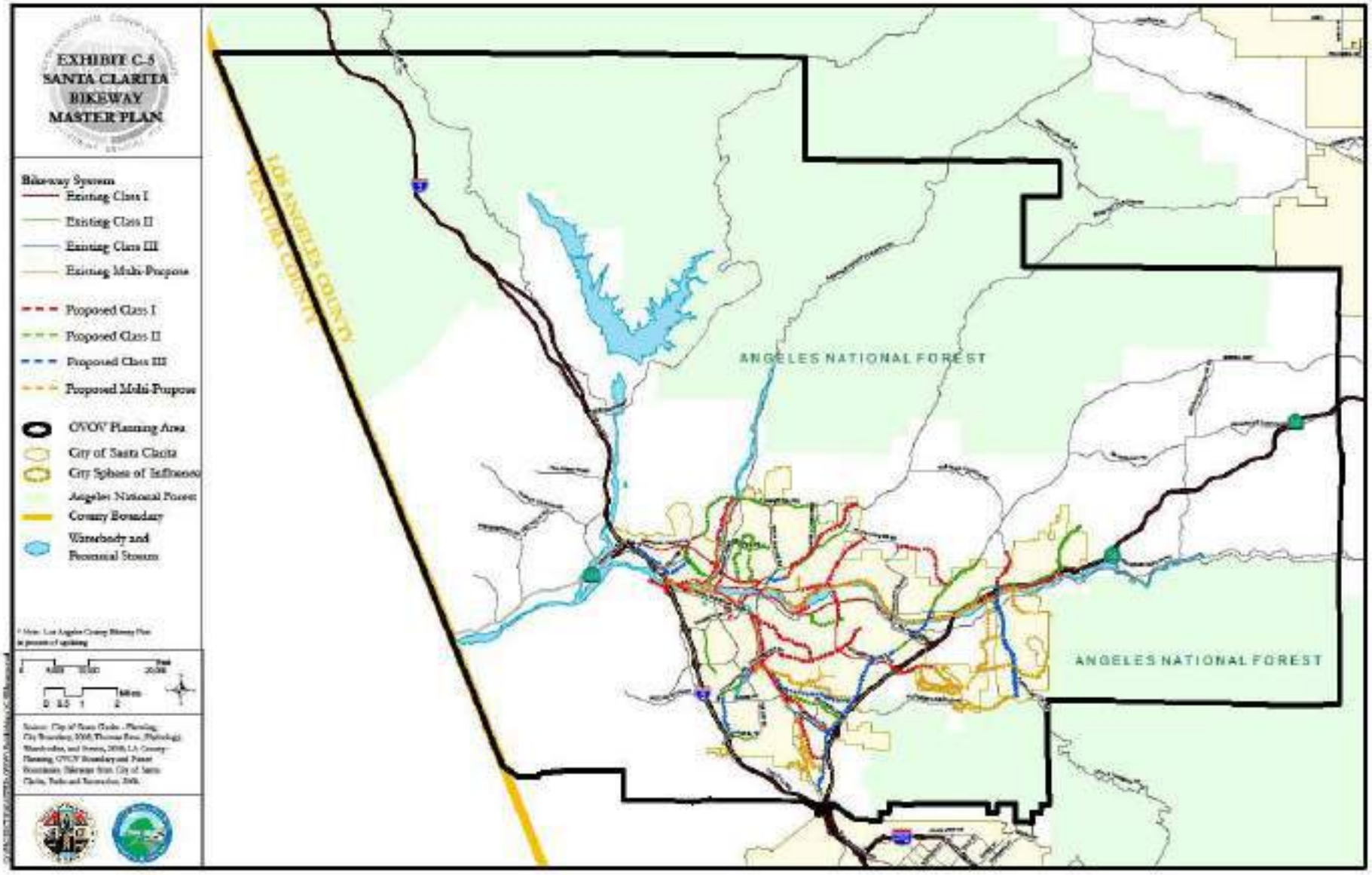


EXHIBIT C-5
SANTA CLARITA
BIKEWAY
MASTER PLAN
Bikeway System
Existing Class I
Existing Class II
Existing Class III
Existing Multi-Purpose
Proposed Class I
Proposed Class II
Proposed Class III
Proposed Multi-Purpose
OVOV Planning Area
City of Santa Clarita
City Sphere of Influence
Angeles National Forest
County Boundary
Waterbody and
Perennial Stream
LOS ANGELES COUNTY
VENTURA COUNTY
ANGELES NATIONAL FOREST
ANGELES NATIONAL FOREST

APPENDIX B

EXISTING TRAFFIC COUNTS

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Santa Clarita
N/S: Sierra Highway
E/W: Golden Valley Road
Weather: Clear

File Name : 03_SCL_Sierra_Golden AM
Site Code : 99921611
Start Date : 10/28/2021
Page No : 1

Groups Printed- Total Volume

	Sierra Highway Southbound				Golden Valley Road Westbound				Sierra Highway Northbound				Golden Valley Road 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	5	318	29	352	150	143	7	300	105	26	4	135	36	92	247	375	1162
07:15 AM	5	328	93	426	138	228	15	381	108	35	0	143	40	105	237	382	1332
07:30 AM	12	240	93	345	122	235	13	370	144	44	5	193	71	124	243	438	1346
07:45 AM	10	240	143	393	115	241	26	382	166	51	8	225	103	136	206	445	1445
Total	32	1126	358	1516	525	847	61	1433	523	156	17	696	250	457	933	1640	5285
08:00 AM	4	285	76	365	132	191	23	346	122	69	1	192	133	126	221	480	1383
08:15 AM	8	246	51	305	148	187	24	359	111	53	3	167	81	95	203	379	1210
08:30 AM	10	298	55	363	155	154	37	346	93	55	3	151	36	63	183	282	1142
08:45 AM	8	287	60	355	161	163	26	350	82	36	7	125	50	76	167	293	1123
Total	30	1116	242	1388	596	695	110	1401	408	213	14	635	300	360	774	1434	4858
Grand Total	62	2242	600	2904	1121	1542	171	2834	931	369	31	1331	550	817	1707	3074	10143
Apprch %	2.1	77.2	20.7		39.6	54.4	6		69.9	27.7	2.3		17.9	26.6	55.5		
Total %	0.6	22.1	5.9	28.6	11.1	15.2	1.7	27.9	9.2	3.6	0.3	13.1	5.4	8.1	16.8	30.3	

	Sierra Highway Southbound				Golden Valley Road Westbound				Sierra Highway Northbound				Golden Valley Road 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 07:15 AM																	
07:15 AM	5	**328**	93	**426**	**138**	228	15	381	108	35	0	143	40	105	237	382	1332
07:30 AM	**12**	240	93	345	122	235	13	370	144	44	5	193	71	124	**243**	438	1346
07:45 AM	10	240	**143**	393	115	**241**	**26**	**382**	**166**	51	**8**	**225**	103	**136**	206	445	**1445**
08:00 AM	4	285	76	365	132	191	23	346	122	**69**	1	192	**133**	126	221	**480**	1383
Total Volume	31	1093	405	1529	507	895	77	1479	540	199	14	753	347	491	907	1745	5506
% App. Total	2	71.5	26.5		34.3	60.5	5.2		71.7	26.4	1.9		19.9	28.1	52		
PHF	.646	.833	.708	.897	.918	.928	.740	.968	.813	.721	.438	.837	.652	.903	.933	.909	.953

Counts Unlimited, Inc.
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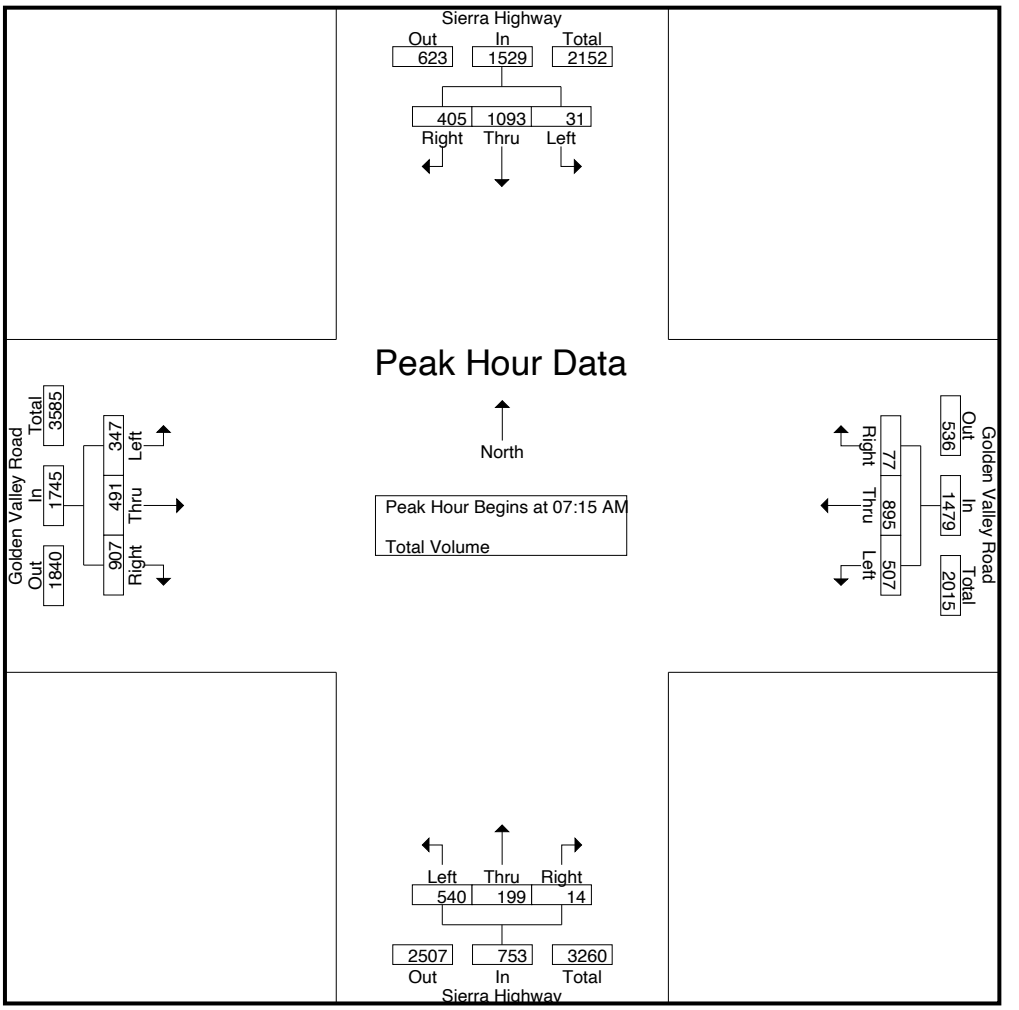
City of Santa Clarita
N/S: Sierra Highway
E/W: Golden Valley Road
Weather: Clear

File Name : 03_SCL_Sierra_Golden AM
Site Code : 99921611
Start Date : 10/28/2021
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				07:15 AM				07:30 AM				07:15 AM			
+0 mins.	5	**328**	93	**426**	**138**	228	15	381	144	44	5	193	40	105	237	382
+15 mins.	**12**	240	93	345	122	235	13	370	**166**	51	**8**	**225**	71	124	**243**	438
+30 mins.	10	240	**143**	393	115	**241**	**26**	**382**	122	**69**	1	192	103	**136**	206	445
+45 mins.	4	285	76	365	132	191	23	346	111	53	3	167	**133**	126	221	**480**
Total Volume	31	1093	405	1529	507	895	77	1479	543	217	17	777	347	491	907	1745
% App. Total	2	71.5	26.5		34.3	60.5	5.2		69.9	27.9	2.2		19.9	28.1	52	
PHF	.646	.833	.708	.897	.918	.928	.740	.968	.818	.786	.531	.863	.652	.903	.933	.909

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PO Box 1178
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City of Santa Clarita
N/S: Sierra Highway
E/W: Golden Valley Road
Weather: Clear

File Name : 03_SCL_Sierra_Golden PM
Site Code : 99921611
Start Date : 10/28/2021
Page No : 1

Groups Printed- Total Volume

	Sierra Highway Southbound				Golden Valley Road Westbound				Sierra Highway Northbound				Golden Valley Road 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	18	80	60	158	9	184	24	217	123	168	26	317	114	184	184	482	1174
04:15 PM	17	66	83	166	14	163	20	197	150	290	33	473	100	196	150	446	1282
04:30 PM	20	71	57	148	14	175	24	213	155	258	35	448	101	223	170	494	1303
04:45 PM	18	86	58	162	15	169	18	202	148	262	37	447	96	197	138	431	1242
Total	73	303	258	634	52	691	86	829	576	978	131	1685	411	800	642	1853	5001
05:00 PM	12	68	67	147	11	171	19	201	149	279	29	457	110	176	182	468	1273
05:15 PM	13	63	62	138	13	167	22	202	191	264	45	500	89	183	158	430	1270
05:30 PM	8	71	77	156	16	166	23	205	144	295	38	477	90	168	148	406	1244
05:45 PM	9	76	66	151	12	175	22	209	165	285	44	494	92	170	118	380	1234
Total	42	278	272	592	52	679	86	817	649	1123	156	1928	381	697	606	1684	5021
Grand Total	115	581	530	1226	104	1370	172	1646	1225	2101	287	3613	792	1497	1248	3537	10022
Apprch %	9.4	47.4	43.2		6.3	83.2	10.4		33.9	58.2	7.9		22.4	42.3	35.3		
Total %	1.1	5.8	5.3	12.2	1	13.7	1.7	16.4	12.2	21	2.9	36.1	7.9	14.9	12.5	35.3	

	Sierra Highway Southbound				Golden Valley Road Westbound				Sierra Highway Northbound				Golden Valley Road 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	17	66	**83**	**166**	14	163	20	197	150	**290**	33	**473**	100	196	150	446	1282
04:30 PM	**20**	71	57	148	14	**175**	**24**	**213**	**155**	258	35	448	101	**223**	170	**494**	**1303**
04:45 PM	18	**86**	58	162	**15**	169	18	202	148	262	**37**	447	96	197	138	431	1242
05:00 PM	12	68	67	147	11	171	19	201	149	279	29	457	**110**	176	**182**	468	1273
Total Volume	67	291	265	623	54	678	81	813	602	1089	134	1825	407	792	640	1839	5100
% App. Total	10.8	46.7	42.5		6.6	83.4	10		33	59.7	7.3		22.1	43.1	34.8		
PHF	.838	.846	.798	.938	.900	.969	.844	.954	.971	.939	.905	.965	.925	.888	.879	.931	.979

Counts Unlimited, Inc.
PO Box 1178
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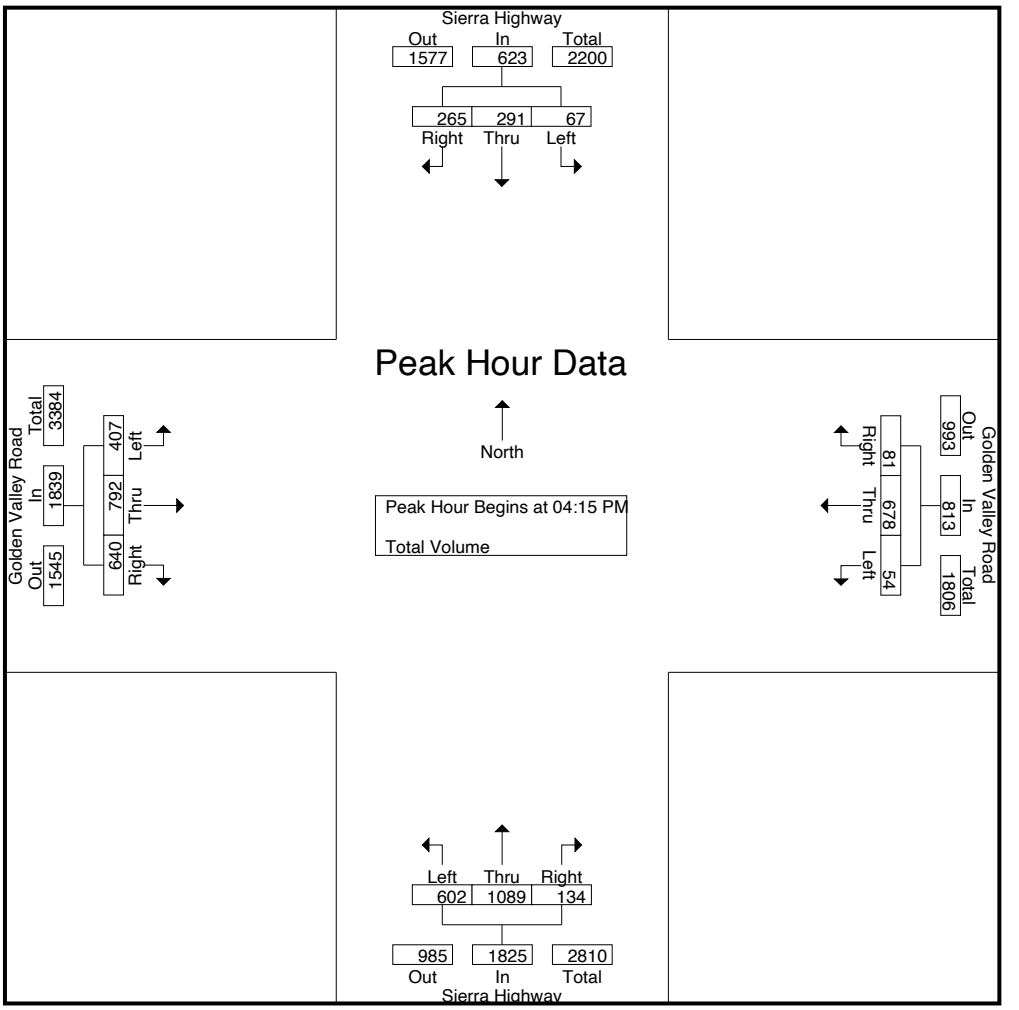
(951)268-6268

City of Santa Clarita
N/S: Sierra Highway
E/W: Golden Valley Road
Weather: Clear

File Name : 03_SCL_Sierra_Golden PM
Site Code : 99921611
Start Date : 10/28/2021
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				04:00 PM				05:00 PM				04:00 PM			
+0 mins.	18	80	60	158	9	**184**	**24**	**217**	149	279	29	457	**114**	184	**184**	482
+15 mins.	17	66	**83**	**166**	14	163	20	197	**191**	264	**45**	**500**	100	196	150	446
+30 mins.	**20**	71	57	148	14	175	24	213	144	**295**	38	477	101	**223**	170	**494**
+45 mins.	18	**86**	58	162	**15**	169	18	202	165	285	44	494	96	197	138	431
Total Volume	73	303	258	634	52	691	86	829	649	1123	156	1928	411	800	642	1853
% App. Total	11.5	47.8	40.7		6.3	83.4	10.4		33.7	58.2	8.1		22.2	43.2	34.6	
PHF	.913	.881	.777	.955	.867	.939	.896	.955	.849	.952	.867	.964	.901	.897	.872	.938

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951)268-6268

City of Santa Clarita
N/S: Golden Valley Road
E/W: SR-14 Southbound Ramps
Weather: Clear

File Name : 04_SCL_Golden_14S AM
Site Code : 99921611
Start Date : 10/28/2021
Page No : 1

Groups Printed- Total Volume

	Golden Valley Road Southbound				SR-14 Southbound Off Ramp Westbound				Golden Valley Road Northbound				SR-14 Southbound On Ramp 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	72	66	138	1	71	100	172	66	208	0	274	0	0	0	0	584
07:15 AM	0	80	76	156	11	54	82	147	54	288	0	342	0	0	0	0	645
07:30 AM	0	130	73	203	8	55	95	158	61	293	0	354	0	0	0	0	715
07:45 AM	0	155	77	232	4	57	99	160	52	182	0	234	0	0	0	0	626
Total	0	437	292	729	24	237	376	637	233	971	0	1204	0	0	0	0	2570
08:00 AM	0	137	41	178	7	62	125	194	45	217	0	262	0	0	0	0	634
08:15 AM	0	99	26	125	8	59	120	187	41	189	0	230	0	0	0	0	542
08:30 AM	0	75	33	108	10	49	118	177	38	184	0	222	0	0	0	0	507
08:45 AM	0	90	39	129	9	49	149	207	38	192	0	230	0	0	0	0	566
Total	0	401	139	540	34	219	512	765	162	782	0	944	0	0	0	0	2249
Grand Total	0	838	431	1269	58	456	888	1402	395	1753	0	2148	0	0	0	0	4819
Apprch %	0	66	34		4.1	32.5	63.3		18.4	81.6	0		0	0	0		
Total %	0	17.4	8.9	26.3	1.2	9.5	18.4	29.1	8.2	36.4	0	44.6	0	0	0	0	

	Golden Valley Road Southbound				SR-14 Southbound Off Ramp Westbound				Golden Valley Road Northbound				SR-14 Southbound On Ramp 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 07:15 AM																	
07:15 AM	0	80	76	156	**11**	54	82	147	54	288	0	342	0	0	0	0	645
07:30 AM	0	130	73	203	8	55	95	158	**61**	**293**	0	**354**	0	0	0	0	**715**
07:45 AM	0	**155**	**77**	**232**	4	57	99	160	52	182	0	234	0	0	0	0	626
08:00 AM	0	137	41	178	7	**62**	**125**	**194**	45	217	0	262	0	0	0	0	634
Total Volume	0	502	267	769	30	228	401	659	212	980	0	1192	0	0	0	0	2620
% App. Total	0	65.3	34.7		4.6	34.6	60.8		17.8	82.2	0		0	0	0		
PHF	.000	.810	.867	.829	.682	.919	.802	.849	.869	.836	.000	.842	.000	.000	.000	.000	.916

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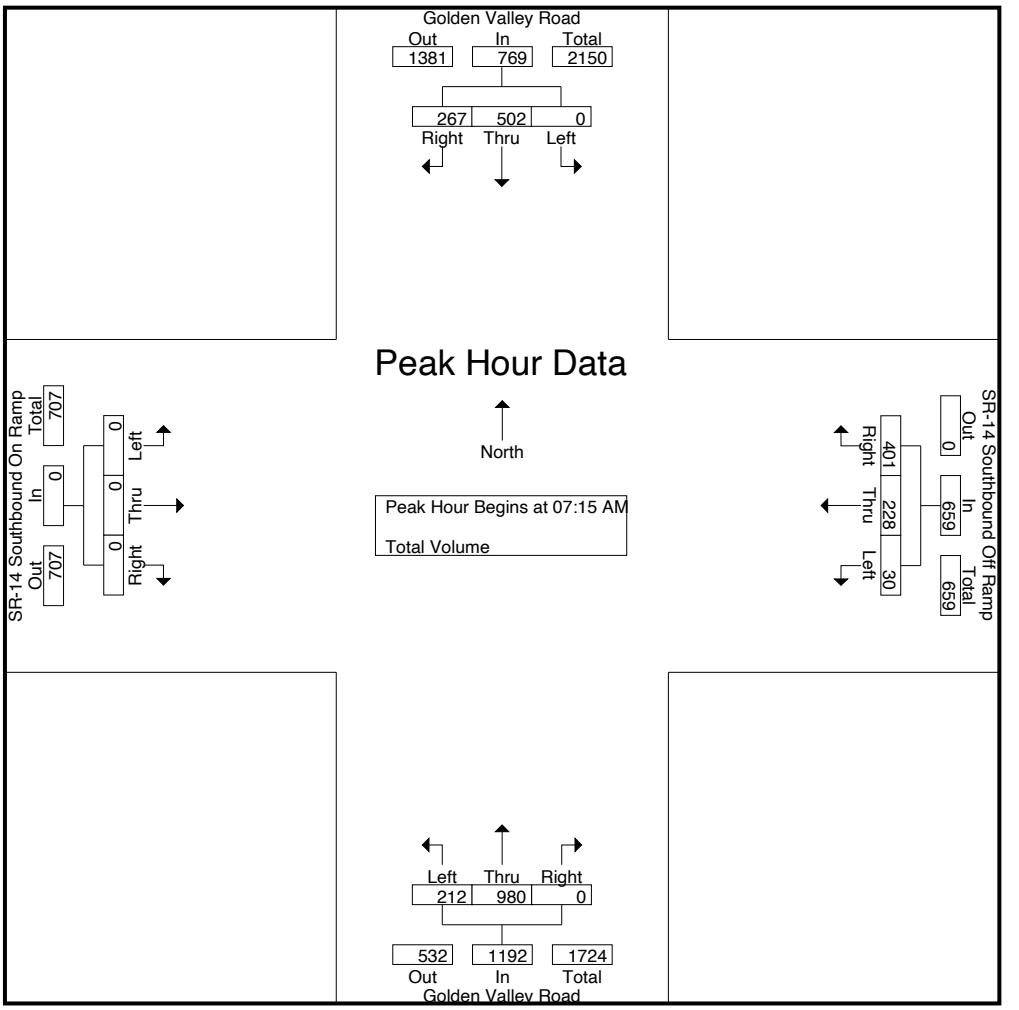
City of Santa Clarita
N/S: Golden Valley Road
E/W: SR-14 Southbound Ramps
Weather: Clear

File Name : 04_SCL_Golden_14S AM
Site Code : 99921611
Start Date : 10/28/2021
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				08:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	80	76	156	7	**62**	125	194	**66**	208	0	274	0	0	0	0
+15 mins.	0	130	73	203	8	59	120	187	54	288	0	342	0	0	0	0
+30 mins.	0	**155**	**77**	**232**	**10**	49	118	177	61	**293**	0	**354**	0	0	0	0
+45 mins.	0	137	41	178	9	49	**149**	**207**	52	182	0	234	0	0	0	0
Total Volume	0	502	267	769	34	219	512	765	233	971	0	1204	0	0	0	0
% App. Total	0	65.3	34.7		4.4	28.6	66.9		19.4	80.6	0		0	0	0	
PHF	.000	.810	.867	.829	.850	.883	.859	.924	.883	.828	.000	.850	.000	.000	.000	.000

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City of Santa Clarita
N/S: Golden Valley Road
E/W: SR-14 Southbound Ramps
Weather: Clear

File Name : 04_SCL_Golden_14S PM
Site Code : 99921611
Start Date : 10/28/2021
Page No : 1

Groups Printed- Total Volume

	Golden Valley Road Southbound				SR-14 Southbound Off Ramp Westbound				Golden Valley Road Northbound				SR-14 Southbound On Ramp 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	0	230	26	256	15	0	110	125	44	118	0	162	0	0	0	0	543
04:15 PM	0	218	29	247	17	1	99	117	54	128	0	182	0	0	0	0	546
04:30 PM	0	245	37	282	23	0	88	111	36	126	0	162	0	0	0	0	555
04:45 PM	0	192	34	226	15	1	92	108	46	132	0	178	0	0	0	0	512
Total	0	885	126	1011	70	2	389	461	180	504	0	684	0	0	0	0	2156
05:00 PM	0	197	30	227	19	2	78	99	56	157	0	213	0	0	0	0	539
05:15 PM	0	188	36	224	23	0	81	104	53	157	0	210	0	0	0	0	538
05:30 PM	0	218	24	242	23	0	89	112	58	158	0	216	0	0	0	0	570
05:45 PM	0	205	21	226	18	1	98	117	40	155	0	195	0	0	0	0	538
Total	0	808	111	919	83	3	346	432	207	627	0	834	0	0	0	0	2185
Grand Total	0	1693	237	1930	153	5	735	893	387	1131	0	1518	0	0	0	0	4341
Apprch %	0	87.7	12.3		17.1	0.6	82.3		25.5	74.5	0		0	0	0		
Total %	0	39	5.5	44.5	3.5	0.1	16.9	20.6	8.9	26.1	0	35	0	0	0	0	

	Golden Valley Road Southbound				SR-14 Southbound Off Ramp Westbound				Golden Valley Road Northbound				SR-14 Southbound On Ramp 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 05:00 PM																	
05:00 PM	0	197	30	227	19	**2**	78	99	56	157	0	213	0	0	0	0	539
05:15 PM	0	188	**36**	224	**23**	0	81	104	53	157	0	210	0	0	0	0	538
05:30 PM	0	**218**	24	**242**	23	0	89	112	**58**	**158**	0	**216**	0	0	0	0	**570**
05:45 PM	0	205	21	226	18	1	**98**	**117**	40	155	0	195	0	0	0	0	538
Total Volume	0	808	111	919	83	3	346	432	207	627	0	834	0	0	0	0	2185
% App. Total	0	87.9	12.1		19.2	0.7	80.1		24.8	75.2	0		0	0	0		
PHF	.000	.927	.771	.949	.902	.375	.883	.923	.892	.992	.000	.965	.000	.000	.000	.000	.958

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City of Santa Clarita
N/S: Golden Valley Road
E/W: SR-14 Southbound Ramps
Weather: Clear

File Name : 04_SCL_Golden_14S PM
Site Code : 99921611
Start Date : 10/28/2021
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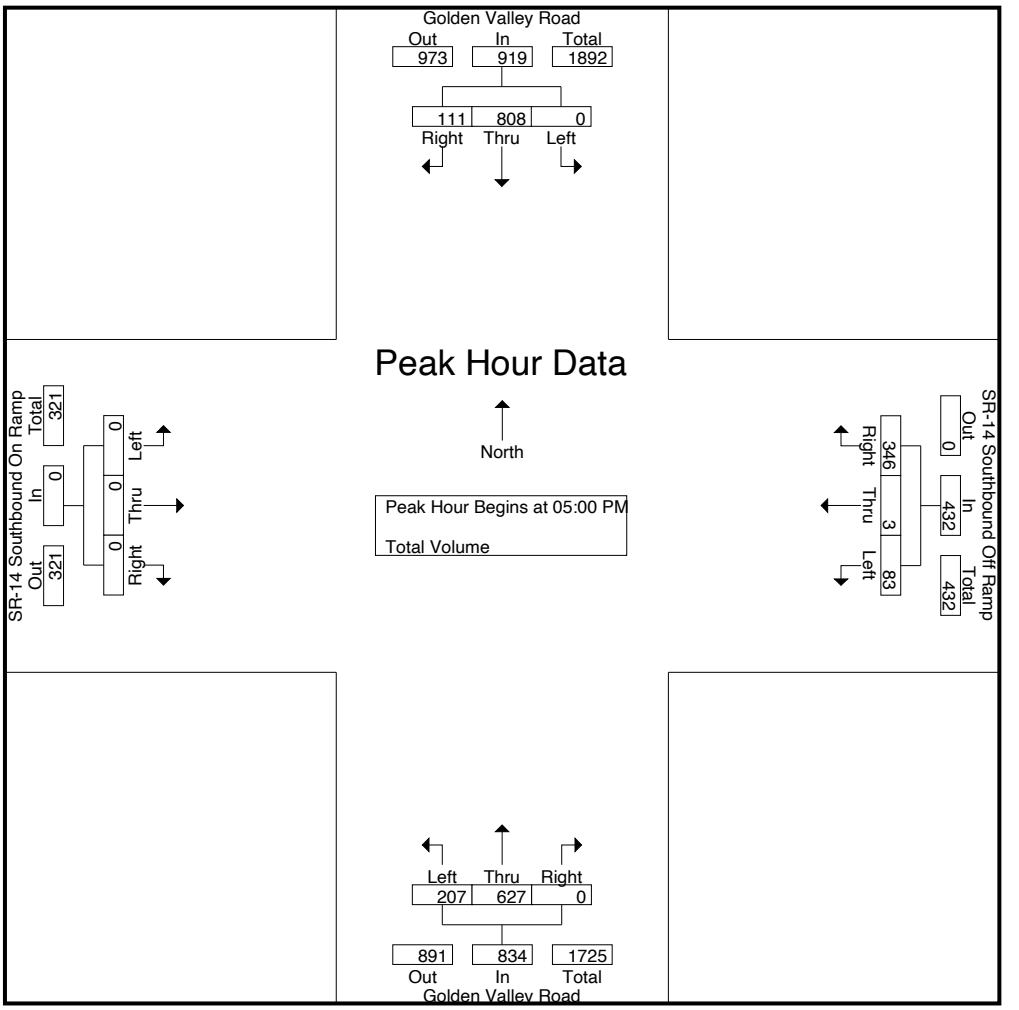

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				05:00 PM				04:00 PM			
+0 mins.	0	230	26	256	15	0	**110**	**125**	56	157	0	213	0	0	0	0
+15 mins.	0	218	29	247	17	**1**	99	117	53	157	0	210	0	0	0	0
+30 mins.	0	**245**	**37**	**282**	**23**	0	88	111	**58**	**158**	0	**216**	0	0	0	0
+45 mins.	0	192	34	226	15	1	92	108	40	155	0	195	0	0	0	0
Total Volume	0	885	126	1011	70	2	389	461	207	627	0	834	0	0	0	0
% App. Total	0	87.5	12.5		15.2	0.4	84.4		24.8	75.2	0		0	0	0	
PHF	.000	.903	.851	.896	.761	.500	.884	.922	.892	.992	.000	.965	.000	.000	.000	.000

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City of Santa Clarita
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Weather: Clear

File Name : 05_SCL_Golden_14N AM
Site Code : 99921611
Start Date : 10/28/2021
Page No : 1

Groups Printed- Total Volume

	Golden Valley Road Southbound				SR-14 Northbound On Ramp Westbound				Golden Valley Road Northbound				SR-14 Northbound Off Ramp 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	52	26	0	78	0	0	0	0	0	224	15	239	54	1	36	91	408
07:15 AM	39	40	0	79	0	0	0	0	0	315	12	327	31	0	25	56	462
07:30 AM	67	68	0	135	0	0	0	0	0	313	24	337	36	0	48	84	556
07:45 AM	54	107	0	161	0	0	0	0	0	193	19	212	43	1	57	101	474
Total	212	241	0	453	0	0	0	0	0	1045	70	1115	164	2	166	332	1900
08:00 AM	48	103	0	151	0	0	0	0	0	209	16	225	47	0	50	97	473
08:15 AM	46	61	0	107	0	0	0	0	0	180	19	199	49	0	31	80	386
08:30 AM	35	50	0	85	0	0	0	0	0	181	16	197	45	1	51	97	379
08:45 AM	39	60	0	99	0	0	0	0	0	187	20	207	43	0	44	87	393
Total	168	274	0	442	0	0	0	0	0	757	71	828	184	1	176	361	1631
Grand Total	380	515	0	895	0	0	0	0	0	1802	141	1943	348	3	342	693	3531
Apprch %	42.5	57.5	0		0	0	0		0	92.7	7.3		50.2	0.4	49.4		
Total %	10.8	14.6	0	25.3	0	0	0	0	0	51	4	55	9.9	0.1	9.7	19.6	

	Golden Valley Road Southbound				SR-14 Northbound On Ramp Westbound				Golden Valley Road Northbound				SR-14 Northbound Off Ramp 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 07:15 AM																	
07:15 AM	39	40	0	79	0	0	0	0	0	**315**	12	327	31	0	25	56	462
07:30 AM	**67**	68	0	135	0	0	0	0	0	313	**24**	**337**	36	0	48	84	**556**
07:45 AM	54	**107**	0	**161**	0	0	0	0	0	193	19	212	43	**1**	**57**	**101**	474
08:00 AM	48	103	0	151	0	0	0	0	0	209	16	225	**47**	0	50	97	473
Total Volume	208	318	0	526	0	0	0	0	0	1030	71	1101	157	1	180	338	1965
% App. Total	39.5	60.5	0		0	0	0		0	93.6	6.4		46.4	0.3	53.3		
PHF	.776	.743	.000	.817	.000	.000	.000	.000	.000	.817	.740	.817	.835	.250	.789	.837	.884

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City of Santa Clarita
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E/W: SR-14 Northbound Ramps
Weather: Clear

File Name : 05_SCL_Golden_14N AM
Site Code : 99921611
Start Date : 10/28/2021
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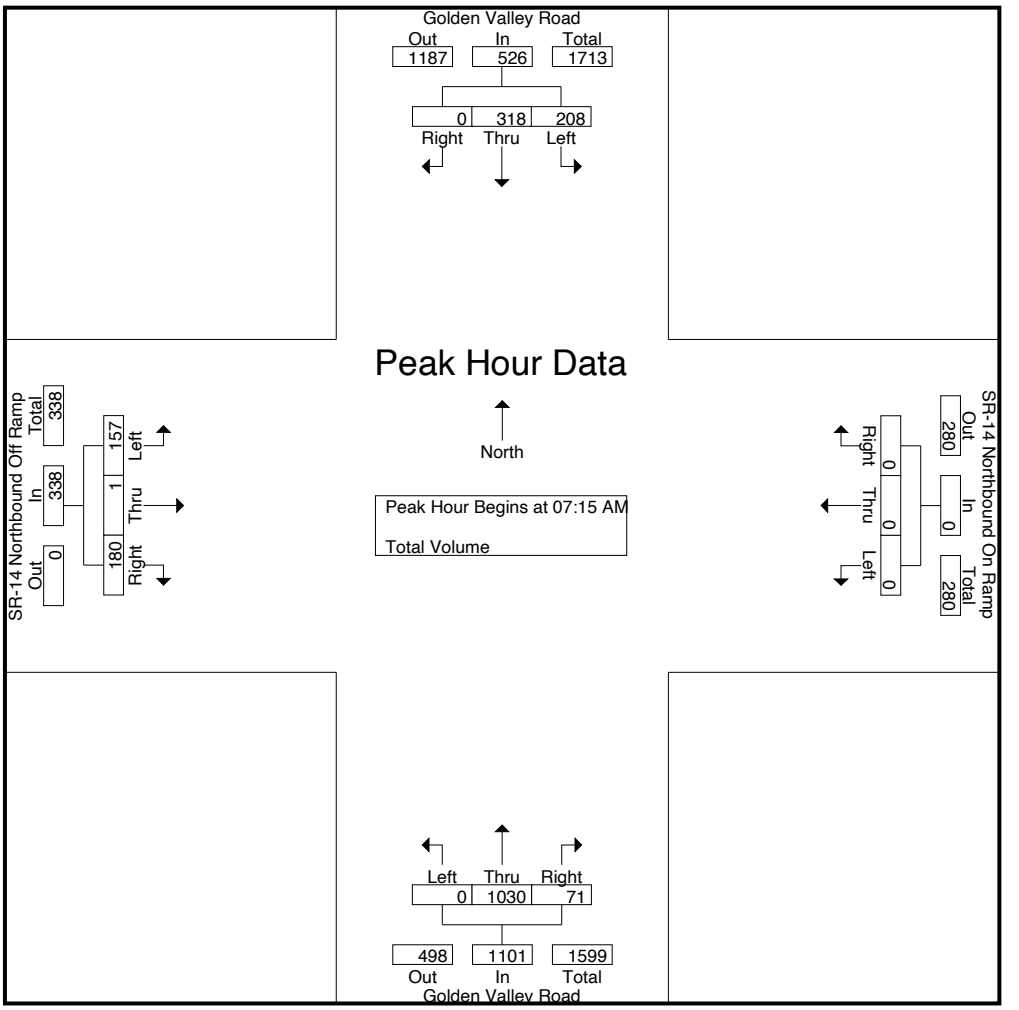

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:00 AM				07:00 AM				07:45 AM			
+0 mins.	**67**	68	0	135	0	0	0	0	0	224	15	239	43	**1**	**57**	**101**
+15 mins.	54	**107**	0	**161**	0	0	0	0	0	**315**	12	327	47	0	50	97
+30 mins.	48	103	0	151	0	0	0	0	0	313	**24**	**337**	**49**	0	31	80
+45 mins.	46	61	0	107	0	0	0	0	0	193	19	212	45	1	51	97
Total Volume	215	339	0	554	0	0	0	0	0	1045	70	1115	184	2	189	375
% App. Total	38.8	61.2	0		0	0	0		0	93.7	6.3		49.1	0.5	50.4	
PHF	.802	.792	.000	.860	.000	.000	.000	.000	.000	.829	.729	.827	.939	.500	.829	.928

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City of Santa Clarita
N/S: Golden Valley Road
E/W: SR-14 Northbound Ramps
Weather: Clear

File Name : 05_SCL_Golden_14N PM
Site Code : 99921611
Start Date : 10/28/2021
Page No : 1

Groups Printed- Total Volume

	Golden Valley Road Southbound				SR-14 Northbound On Ramp Westbound				Golden Valley Road Northbound				SR-14 Northbound Off Ramp 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	102	138	0	240	0	0	0	0	0	109	61	170	49	0	82	131	541
04:15 PM	112	123	0	235	0	0	0	0	0	127	57	184	51	0	73	124	543
04:30 PM	125	134	0	259	0	0	0	0	0	125	52	177	49	2	81	132	568
04:45 PM	86	137	0	223	0	0	0	0	0	116	51	167	46	0	90	136	526
Total	425	532	0	957	0	0	0	0	0	477	221	698	195	2	326	523	2178
05:00 PM	77	127	0	204	0	0	0	0	0	160	57	217	65	1	92	158	579
05:15 PM	70	145	0	215	0	0	0	0	0	139	45	184	60	2	102	164	563
05:30 PM	97	150	0	247	0	0	0	0	0	137	54	191	68	1	116	185	623
05:45 PM	68	142	0	210	0	0	0	0	0	144	49	193	55	1	85	141	544
Total	312	564	0	876	0	0	0	0	0	580	205	785	248	5	395	648	2309
Grand Total	737	1096	0	1833	0	0	0	0	0	1057	426	1483	443	7	721	1171	4487
Apprch %	40.2	59.8	0		0	0	0		0	71.3	28.7		37.8	0.6	61.6		
Total %	16.4	24.4	0	40.9	0	0	0	0	0	23.6	9.5	33.1	9.9	0.2	16.1	26.1	

	Golden Valley Road Southbound				SR-14 Northbound On Ramp Westbound				Golden Valley Road Northbound				SR-14 Northbound Off Ramp 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 05:00 PM																	
05:00 PM	77	127	0	204	0	0	0	0	0	**160**	**57**	**217**	65	1	92	158	579
05:15 PM	70	145	0	215	0	0	0	0	0	139	45	184	60	**2**	102	164	563
05:30 PM	**97**	**150**	0	**247**	0	0	0	0	0	137	54	191	**68**	1	**116**	**185**	**623**
05:45 PM	68	142	0	210	0	0	0	0	0	144	49	193	55	1	85	141	544
Total Volume	312	564	0	876	0	0	0	0	0	580	205	785	248	5	395	648	2309
% App. Total	35.6	64.4	0		0	0	0		0	73.9	26.1		38.3	0.8	61		
PHF	.804	.940	.000	.887	.000	.000	.000	.000	.000	.906	.899	.904	.912	.625	.851	.876	.927

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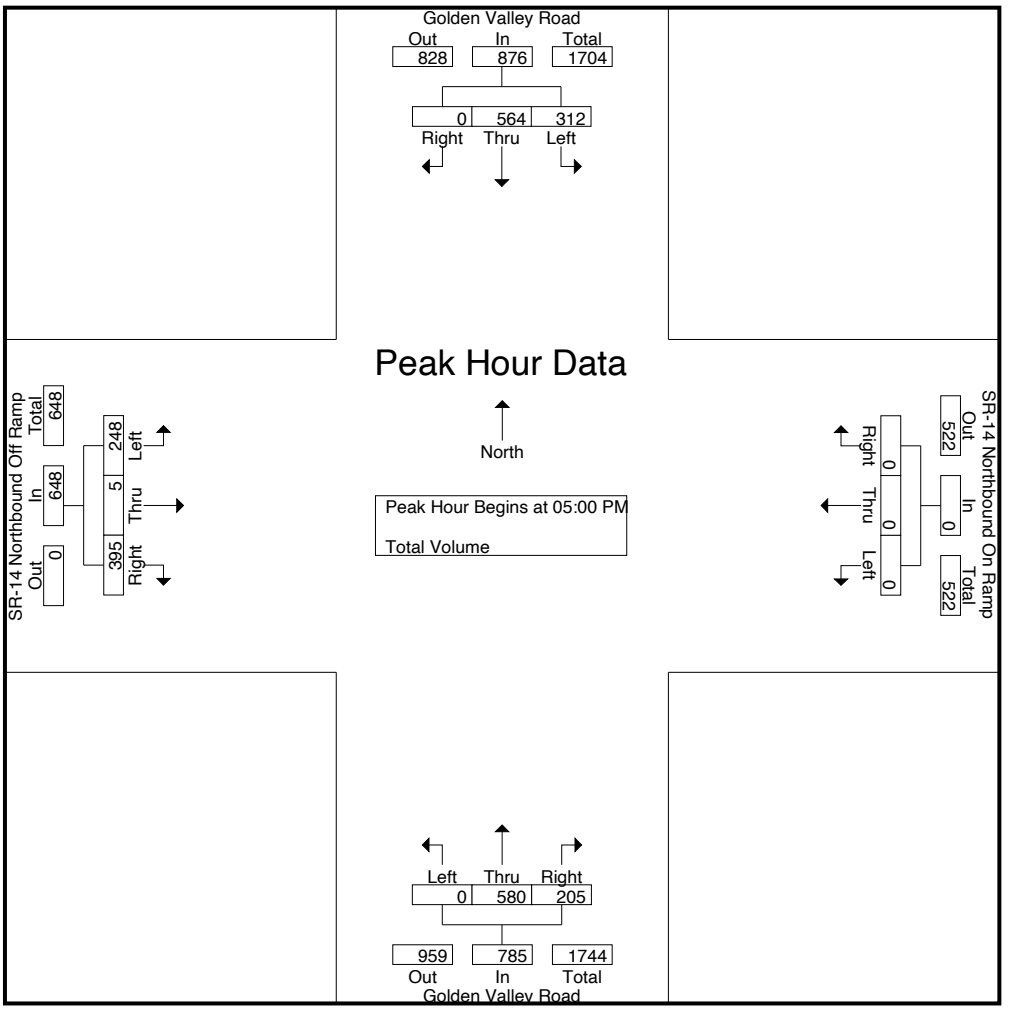
City of Santa Clarita
N/S: Golden Valley Road
E/W: SR-14 Northbound Ramps
Weather: Clear

File Name : 05_SCL_Golden_14N PM
Site Code : 99921611
Start Date : 10/28/2021
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				04:00 PM				05:00 PM				05:00 PM			
+0 mins.	102	**138**	0	240	0	0	0	0	0	**160**	**57**	**217**	65	1	92	158
+15 mins.	112	123	0	235	0	0	0	0	0	139	45	184	60	**2**	102	164
+30 mins.	**125**	134	0	**259**	0	0	0	0	0	137	54	191	**68**	1	**116**	**185**
+45 mins.	86	137	0	223	0	0	0	0	0	144	49	193	55	1	85	141
Total Volume	425	532	0	957	0	0	0	0	0	580	205	785	248	5	395	648
% App. Total	44.4	55.6	0		0	0	0		0	73.9	26.1		38.3	0.8	61	
PHF	.850	.964	.000	.924	.000	.000	.000	.000	.000	.906	.899	.904	.912	.625	.851	.876

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City of Santa Clarita
N/S: Friendly Valley Parkway
E/W: Sierra Highway
Weather: Clear

File Name : 06_SCL_Friendly_SierraAM
Site Code : 99921611
Start Date : 10/28/2021
Page No : 1

Groups Printed- Total Volume

	Friendly Valley Parkway Southbound				Sierra Highway Westbound				Friendly Valley Parkway Northbound				Sierra Highway 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	10	8	11	29	26	352	8	386	3	3	10	16	6	55	3	64	495
07:15 AM	4	9	21	34	33	334	16	383	10	3	9	22	6	58	0	64	503
07:30 AM	3	3	22	28	9	306	15	330	6	1	5	12	3	118	9	130	500
07:45 AM	8	1	17	26	16	321	9	346	4	2	7	13	9	120	14	143	528
Total	25	21	71	117	84	1313	48	1445	23	9	31	63	24	351	26	401	2026
08:00 AM	8	3	16	27	29	289	16	334	11	6	14	31	16	153	19	188	580
08:15 AM	14	8	18	40	58	268	14	340	9	3	30	42	16	96	29	141	563
08:30 AM	13	11	20	44	72	279	11	362	27	6	63	96	4	79	36	119	621
08:45 AM	17	2	11	30	37	294	13	344	22	3	60	85	8	70	3	81	540
Total	52	24	65	141	196	1130	54	1380	69	18	167	254	44	398	87	529	2304
Grand Total	77	45	136	258	280	2443	102	2825	92	27	198	317	68	749	113	930	4330
Apprch %	29.8	17.4	52.7		9.9	86.5	3.6		29	8.5	62.5		7.3	80.5	12.2		
Total %	1.8	1	3.1	6	6.5	56.4	2.4	65.2	2.1	0.6	4.6	7.3	1.6	17.3	2.6	21.5	

	Friendly Valley Parkway Southbound				Sierra Highway Westbound				Friendly Valley Parkway Northbound				Sierra Highway 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 08:00 AM																	
08:00 AM	8	3	16	27	29	289	**16**	334	11	**6**	14	31	**16**	**153**	19	**188**	580
08:15 AM	14	8	18	40	58	268	14	340	9	3	30	42	16	96	29	141	563
08:30 AM	13	**11**	**20**	**44**	**72**	279	11	**362**	**27**	6	**63**	**96**	4	79	**36**	119	**621**
08:45 AM	**17**	2	11	30	37	**294**	13	344	22	3	60	85	8	70	3	81	540
Total Volume	52	24	65	141	196	1130	54	1380	69	18	167	254	44	398	87	529	2304
% App. Total	36.9	17	46.1		14.2	81.9	3.9		27.2	7.1	65.7		8.3	75.2	16.4		
PHF	.765	.545	.813	.801	.681	.961	.844	.953	.639	.750	.663	.661	.688	.650	.604	.703	.928

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City of Santa Clarita
N/S: Friendly Valley Parkway
E/W: Sierra Highway
Weather: Clear

File Name : 06_SCL_Friendly_SierraAM
Site Code : 99921611
Start Date : 10/28/2021
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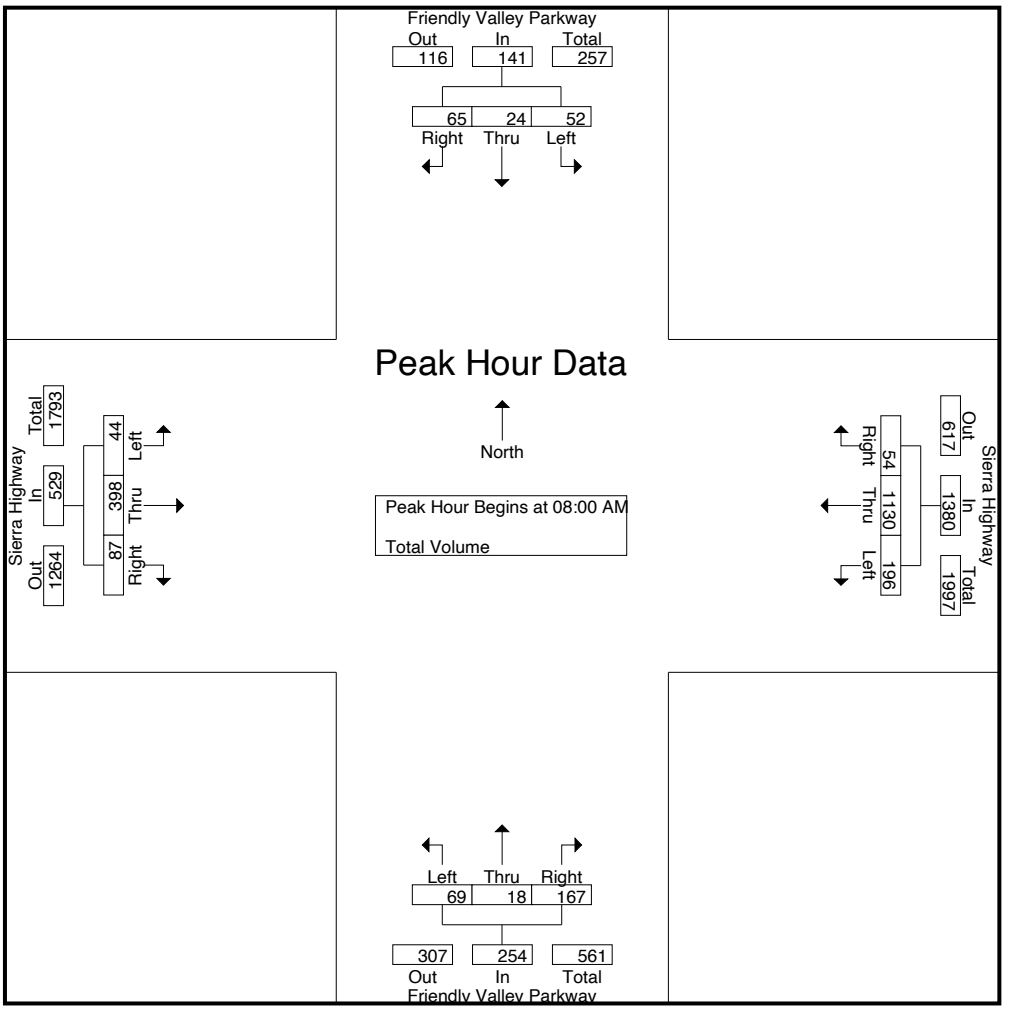

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				07:00 AM				08:00 AM				07:30 AM			
+0 mins.	8	3	16	27	26	**352**	8	**386**	11	**6**	14	31	3	118	9	130
+15 mins.	14	8	18	40	**33**	334	**16**	383	9	3	30	42	9	120	14	143
+30 mins.	13	**11**	**20**	**44**	9	306	15	330	**27**	6	**63**	**96**	**16**	**153**	19	**188**
+45 mins.	**17**	2	11	30	16	321	9	346	22	3	60	85	16	96	**29**	141
Total Volume	52	24	65	141	84	1313	48	1445	69	18	167	254	44	487	71	602
% App. Total	36.9	17	46.1		5.8	90.9	3.3		27.2	7.1	65.7		7.3	80.9	11.8	
PHF	.765	.545	.813	.801	.636	.933	.750	.936	.639	.750	.663	.661	.688	.796	.612	.801

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City of Santa Clarita
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File Name : 06_SCL_Friendly_Sierra PM
Site Code : 99921611
Start Date : 10/28/2021
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Groups Printed- Total Volume

	Friendly Valley Parkway Southbound				Sierra Highway Westbound				Friendly Valley Parkway Northbound				Sierra Highway 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	12	6	19	37	11	127	7	145	9	7	11	27	23	283	17	323	532
04:15 PM	6	5	15	26	16	107	12	135	5	5	12	22	28	314	11	353	536
04:30 PM	7	3	5	15	15	110	10	135	5	5	17	27	31	303	12	346	523
04:45 PM	22	4	13	39	20	132	10	162	12	8	17	37	30	315	13	358	596
Total	47	18	52	117	62	476	39	577	31	25	57	113	112	1215	53	1380	2187
05:00 PM	16	2	13	31	13	129	11	153	11	4	17	32	22	330	10	362	578
05:15 PM	11	0	12	23	21	106	7	134	9	3	11	23	24	312	13	349	529
05:30 PM	12	4	16	32	22	112	14	148	10	5	23	38	22	323	14	359	577
05:45 PM	12	1	12	25	22	119	13	154	7	9	15	31	13	350	6	369	579
Total	51	7	53	111	78	466	45	589	37	21	66	124	81	1315	43	1439	2263
Grand Total	98	25	105	228	140	942	84	1166	68	46	123	237	193	2530	96	2819	4450
Apprch %	43	11	46.1		12	80.8	7.2		28.7	19.4	51.9		6.8	89.7	3.4		
Total %	2.2	0.6	2.4	5.1	3.1	21.2	1.9	26.2	1.5	1	2.8	5.3	4.3	56.9	2.2	63.3	

	Friendly Valley Parkway Southbound				Sierra Highway Westbound				Friendly Valley Parkway Northbound				Sierra Highway 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 04:45 PM																	
04:45 PM	**22**	**4**	13	**39**	20	**132**	10	**162**	**12**	**8**	17	37	**30**	315	13	358	**596**
05:00 PM	16	2	13	31	13	129	11	153	11	4	17	32	22	**330**	10	**362**	578
05:15 PM	11	0	12	23	21	106	7	134	9	3	11	23	24	312	13	349	529
05:30 PM	12	4	**16**	32	**22**	112	**14**	148	10	5	**23**	**38**	22	323	**14**	359	577
Total Volume	61	10	54	125	76	479	42	597	42	20	68	130	98	1280	50	1428	2280
% App. Total	48.8	8	43.2		12.7	80.2	7		32.3	15.4	52.3		6.9	89.6	3.5		
PHF	.693	.625	.844	.801	.864	.907	.750	.921	.875	.625	.739	.855	.817	.970	.893	.986	.956

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File Name : 06_SCL_Friendly_Sierra PM
Site Code : 99921611
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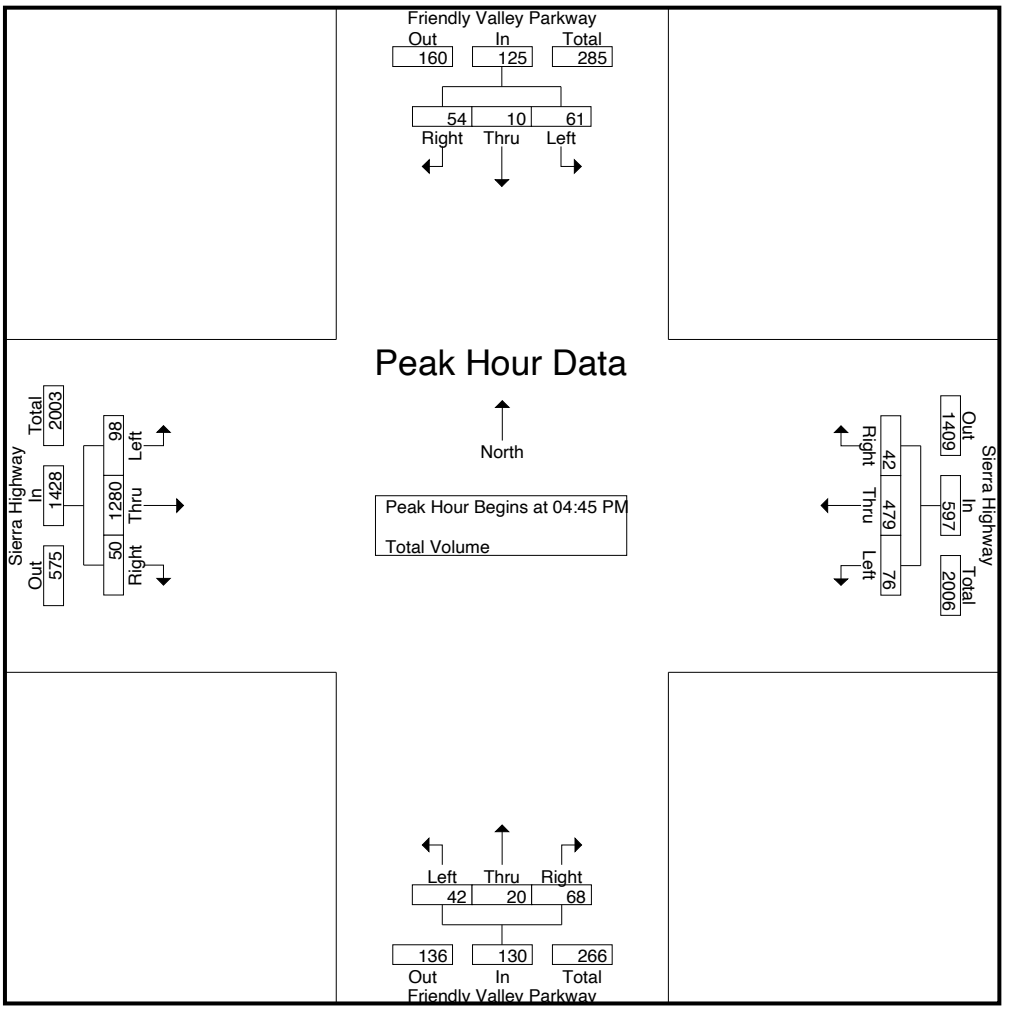

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				05:00 PM			
+0 mins.	**22**	**4**	13	**39**	20	**132**	10	**162**	**12**	**8**	17	37	22	330	10	362
+15 mins.	16	2	13	31	13	129	11	153	11	4	17	32	**24**	312	13	349
+30 mins.	11	0	12	23	21	106	7	134	9	3	11	23	22	323	**14**	359
+45 mins.	12	4	**16**	32	**22**	112	**14**	148	10	5	**23**	**38**	13	**350**	6	**369**
Total Volume	61	10	54	125	76	479	42	597	42	20	68	130	81	1315	43	1439
% App. Total	48.8	8	43.2		12.7	80.2	7		32.3	15.4	52.3		5.6	91.4	3	
PHF	.693	.625	.844	.801	.864	.907	.750	.921	.875	.625	.739	.855	.844	.939	.768	.975

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City of Santa Clarita
N/S: Via Princessa
E/W: Sierra Highway
Weather: Clear

File Name : 07_SCL_Via P_SierraAM
Site Code : 99921611
Start Date : 10/28/2021
Page No : 1

Groups Printed- Total Volume

	Via Princessa Southbound				Sierra Highway Westbound				Via Princessa Northbound				Sierra Highway 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	8	132	96	236	28	330	175	533	56	105	16	177	50	28	10	88	1034
07:15 AM	16	148	84	248	33	312	229	574	53	182	13	248	39	29	20	88	1158
07:30 AM	15	138	92	245	27	248	242	517	71	233	12	316	89	50	33	172	1250
07:45 AM	31	160	96	287	44	200	215	459	58	236	14	308	92	79	28	199	1253
Total	70	578	368	1016	132	1090	861	2083	238	756	55	1049	270	186	91	547	4695
08:00 AM	41	251	98	390	33	204	193	430	76	267	24	367	78	101	24	203	1390
08:15 AM	48	245	105	398	52	241	189	482	81	211	21	313	105	76	33	214	1407
08:30 AM	51	218	104	373	40	205	161	406	80	220	19	319	76	75	42	193	1291
08:45 AM	38	173	75	286	42	184	124	350	85	173	27	285	53	98	29	180	1101
Total	178	887	382	1447	167	834	667	1668	322	871	91	1284	312	350	128	790	5189
Grand Total	248	1465	750	2463	299	1924	1528	3751	560	1627	146	2333	582	536	219	1337	9884
Apprch %	10.1	59.5	30.5		8	51.3	40.7		24	69.7	6.3		43.5	40.1	16.4		
Total %	2.5	14.8	7.6	24.9	3	19.5	15.5	38	5.7	16.5	1.5	23.6	5.9	5.4	2.2	13.5	

	Via Princessa Southbound				Sierra Highway Westbound				Via Princessa Northbound				Sierra Highway 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 07:45 AM																	
07:45 AM	31	160	96	287	44	200	**215**	459	58	236	14	308	92	79	28	199	1253
08:00 AM	41	**251**	98	390	33	204	193	430	76	**267**	**24**	**367**	78	**101**	24	203	1390
08:15 AM	48	245	**105**	**398**	**52**	**241**	189	**482**	**81**	211	21	313	**105**	76	33	**214**	**1407**
08:30 AM	**51**	218	104	373	40	205	161	406	80	220	19	319	76	75	**42**	193	1291
Total Volume	171	874	403	1448	169	850	758	1777	295	934	78	1307	351	331	127	809	5341
% App. Total	11.8	60.4	27.8		9.5	47.8	42.7		22.6	71.5	6		43.4	40.9	15.7		
PHF	.838	.871	.960	.910	.813	.882	.881	.922	.910	.875	.813	.890	.836	.819	.756	.945	.949

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Site Code : 99921611
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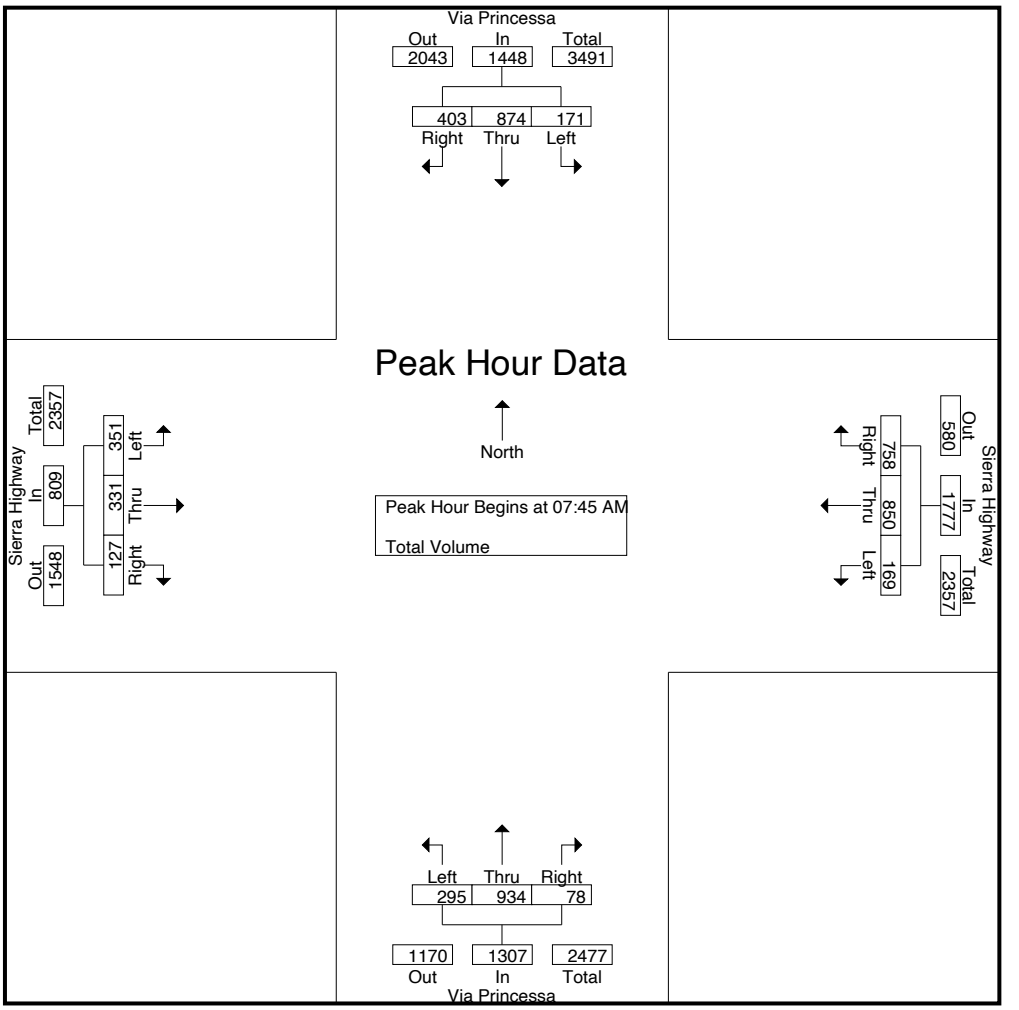

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:00 AM				07:45 AM				07:45 AM			
+0 mins.	31	160	96	287	28	**330**	175	533	58	236	14	308	92	79	28	199
+15 mins.	41	**251**	98	390	33	312	229	**574**	76	**267**	**24**	**367**	78	**101**	24	203
+30 mins.	48	245	**105**	**398**	27	248	**242**	517	**81**	211	21	313	**105**	76	33	**214**
+45 mins.	**51**	218	104	373	**44**	200	215	459	80	220	19	319	76	75	**42**	193
Total Volume	171	874	403	1448	132	1090	861	2083	295	934	78	1307	351	331	127	809
% App. Total	11.8	60.4	27.8		6.3	52.3	41.3		22.6	71.5	6		43.4	40.9	15.7	
PHF	.838	.871	.960	.910	.750	.826	.889	.907	.910	.875	.813	.890	.836	.819	.756	.945

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City of Santa Clarita
N/S: Via Princessa
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File Name : 07_SCL_Via P_Sierra PM
Site Code : 99921611
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Groups Printed- Total Volume

	Via Princessa Southbound				Sierra Highway Westbound				Via Princessa Northbound				Sierra Highway 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	62	198	51	311	59	93	156	308	65	199	52	316	110	187	57	354	1289
04:15 PM	44	182	32	258	54	85	154	293	46	167	53	266	124	226	59	409	1226
04:30 PM	46	194	38	278	66	94	190	350	38	189	50	277	103	216	57	376	1281
04:45 PM	39	204	48	291	56	101	129	286	43	196	49	288	123	207	69	399	1264
Total	191	778	169	1138	235	373	629	1237	192	751	204	1147	460	836	242	1538	5060
05:00 PM	50	216	45	311	54	87	205	346	51	201	58	310	105	225	49	379	1346
05:15 PM	63	231	27	321	45	79	169	293	52	198	66	316	102	209	53	364	1294
05:30 PM	56	214	47	317	68	97	186	351	39	191	46	276	107	244	56	407	1351
05:45 PM	57	211	48	316	50	101	202	353	48	179	38	265	126	252	56	434	1368
Total	226	872	167	1265	217	364	762	1343	190	769	208	1167	440	930	214	1584	5359
Grand Total	417	1650	336	2403	452	737	1391	2580	382	1520	412	2314	900	1766	456	3122	10419
Apprch %	17.4	68.7	14		17.5	28.6	53.9		16.5	65.7	17.8		28.8	56.6	14.6		
Total %	4	15.8	3.2	23.1	4.3	7.1	13.4	24.8	3.7	14.6	4	22.2	8.6	16.9	4.4	30	

	Via Princessa Southbound				Sierra Highway Westbound				Via Princessa Northbound				Sierra Highway 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 05:00 PM																	
05:00 PM	50	216	45	311	54	87	**205**	346	51	**201**	58	310	105	225	49	379	1346
05:15 PM	**63**	**231**	27	**321**	45	79	169	293	**52**	198	**66**	**316**	102	209	53	364	1294
05:30 PM	56	214	47	317	**68**	97	186	351	39	191	46	276	107	244	**56**	407	1351
05:45 PM	57	211	**48**	316	50	**101**	202	**353**	48	179	38	265	**126**	**252**	56	**434**	**1368**
Total Volume	226	872	167	1265	217	364	762	1343	190	769	208	1167	440	930	214	1584	5359
% App. Total	17.9	68.9	13.2		16.2	27.1	56.7		16.3	65.9	17.8		27.8	58.7	13.5		
PHF	.897	.944	.870	.985	.798	.901	.929	.951	.913	.956	.788	.923	.873	.923	.955	.912	.979

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City of Santa Clarita
N/S: Via Princessa
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File Name : 07_SCL_Via P_Sierra PM
Site Code : 99921611
Start Date : 10/28/2021
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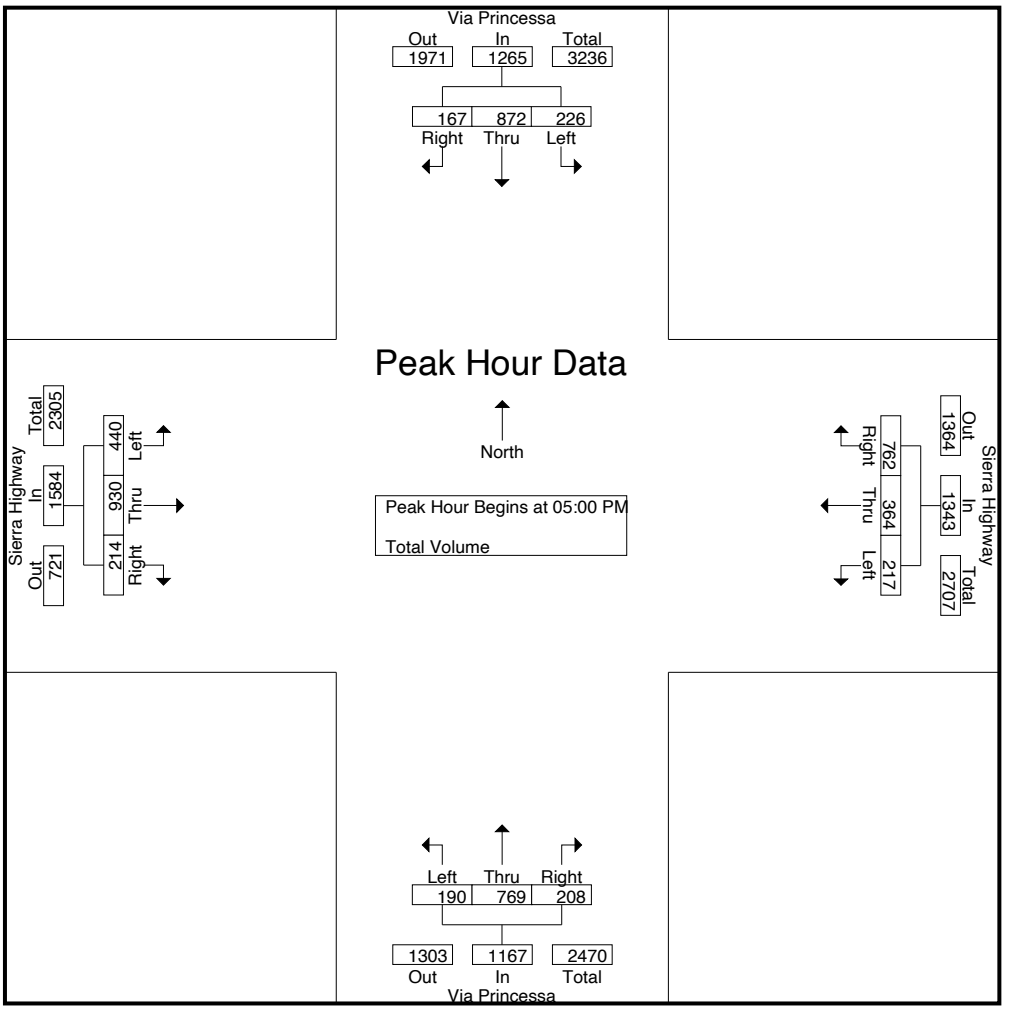

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				04:30 PM				05:00 PM			
+0 mins.	50	216	45	311	54	87	**205**	346	38	189	50	277	105	225	49	379
+15 mins.	**63**	**231**	27	**321**	45	79	169	293	43	196	49	288	102	209	53	364
+30 mins.	56	214	47	317	**68**	97	186	351	51	**201**	58	310	107	244	**56**	407
+45 mins.	57	211	**48**	316	50	**101**	202	**353**	**52**	198	**66**	**316**	**126**	**252**	56	**434**
Total Volume	226	872	167	1265	217	364	762	1343	184	784	223	1191	440	930	214	1584
% App. Total	17.9	68.9	13.2		16.2	27.1	56.7		15.4	65.8	18.7		27.8	58.7	13.5	
PHF	.897	.944	.870	.985	.798	.901	.929	.951	.885	.975	.845	.942	.873	.923	.955	.912

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City of Santa Clarita
N/S: Golden Valley Road
E/W: Centre Pointe Parkway
Weather: Clear

File Name : 01_SCL_Golden_Centre AM
Site Code : 99921611
Start Date : 10/28/2021
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Groups Printed- Total Volume

	Golden Valley Road Southbound				Centre Pointe Parkway Westbound				Golden Valley Road Northbound				Centre Pointe Parkway 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	9	162	16	187	105	11	17	133	44	123	63	230	7	4	31	42	592
07:15 AM	14	277	20	311	131	8	5	144	41	160	56	257	4	5	36	45	757
07:30 AM	27	263	11	301	156	8	9	173	40	184	84	308	5	9	56	70	852
07:45 AM	41	217	21	279	108	14	16	138	62	209	110	381	4	8	30	42	840
Total	91	919	68	1078	500	41	47	588	187	676	313	1176	20	26	153	199	3041
08:00 AM	38	194	30	262	63	18	11	92	105	192	105	402	10	17	35	62	818
08:15 AM	28	178	28	234	78	18	11	107	69	193	62	324	7	6	38	51	716
08:30 AM	19	171	17	207	54	12	13	79	58	159	48	265	4	7	29	40	591
08:45 AM	29	198	23	250	51	17	13	81	55	169	43	267	6	6	49	61	659
Total	114	741	98	953	246	65	48	359	287	713	258	1258	27	36	151	214	2784
Grand Total	205	1660	166	2031	746	106	95	947	474	1389	571	2434	47	62	304	413	5825
Apprch %	10.1	81.7	8.2		78.8	11.2	10		19.5	57.1	23.5		11.4	15	73.6		
Total %	3.5	28.5	2.8	34.9	12.8	1.8	1.6	16.3	8.1	23.8	9.8	41.8	0.8	1.1	5.2	7.1	

	Golden Valley Road Southbound				Centre Pointe Parkway Westbound				Golden Valley Road Northbound				Centre Pointe Parkway 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 07:15 AM																	
07:15 AM	14	**277**	20	**311**	131	8	5	144	41	160	56	257	4	5	36	45	757
07:30 AM	27	263	11	301	**156**	8	9	**173**	40	184	84	308	5	9	**56**	**70**	**852**
07:45 AM	**41**	217	21	279	108	14	**16**	138	62	**209**	**110**	381	4	8	30	42	840
08:00 AM	38	194	**30**	262	63	**18**	11	92	**105**	192	105	**402**	**10**	**17**	35	62	818
Total Volume	120	951	82	1153	458	48	41	547	248	745	355	1348	23	39	157	219	3267
% App. Total	10.4	82.5	7.1		83.7	8.8	7.5		18.4	55.3	26.3		10.5	17.8	71.7		
PHF	.732	.858	.683	.927	.734	.667	.641	.790	.590	.891	.807	.838	.575	.574	.701	.782	.959

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City of Santa Clarita
N/S: Golden Valley Road
E/W: Centre Pointe Parkway
Weather: Clear

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Start Date : 10/28/2021
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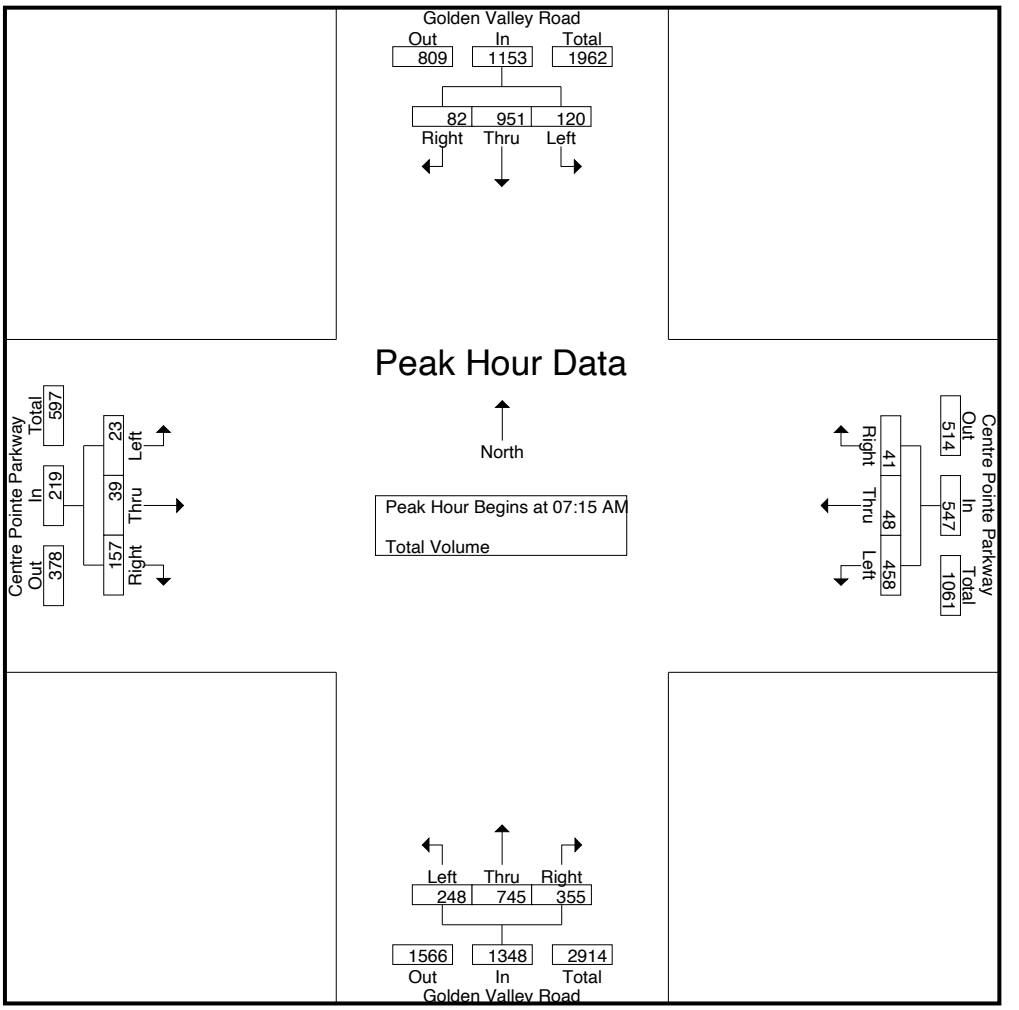

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:00 AM				07:30 AM				07:30 AM			
+0 mins.	14	**277**	20	**311**	105	11	**17**	133	40	184	84	308	5	9	**56**	**70**
+15 mins.	27	263	11	301	131	8	5	144	62	**209**	**110**	381	4	8	30	42
+30 mins.	**41**	217	21	279	**156**	8	9	**173**	**105**	192	105	**402**	**10**	**17**	35	62
+45 mins.	38	194	**30**	262	108	**14**	16	138	69	193	62	324	7	6	38	51
Total Volume	120	951	82	1153	500	41	47	588	276	778	361	1415	26	40	159	225
% App. Total	10.4	82.5	7.1		85	7	8		19.5	55	25.5		11.6	17.8	70.7	
PHF	.732	.858	.683	.927	.801	.732	.691	.850	.657	.931	.820	.880	.650	.588	.710	.804

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Corona, CA 92878
(951)268-6268

City of Santa Clarita
N/S: Golden Valley Road
E/W: Centre Pointe Parkway
Weather: Clear

File Name : 01_SCL_Golden_Centre PM
Site Code : 99921611
Start Date : 10/28/2021
Page No : 1

Groups Printed- Total Volume

	Golden Valley Road Southbound				Centre Pointe Parkway Westbound				Golden Valley Road Northbound				Centre Pointe Parkway 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	37	279	28	344	69	21	73	163	68	255	47	370	41	25	117	183	1060
04:15 PM	33	273	13	319	47	18	31	96	83	262	67	412	19	8	106	133	960
04:30 PM	46	240	11	297	84	11	21	116	76	226	62	364	20	22	116	158	935
04:45 PM	50	252	25	327	57	15	17	89	65	241	48	354	26	18	103	147	917
Total	166	1044	77	1287	257	65	142	464	292	984	224	1500	106	73	442	621	3872
05:00 PM	32	245	21	298	77	13	34	124	71	227	64	362	39	21	122	182	966
05:15 PM	43	300	10	353	47	12	35	94	74	314	47	435	19	14	92	125	1007
05:30 PM	48	272	14	334	52	15	28	95	63	244	47	354	19	12	96	127	910
05:45 PM	41	243	17	301	45	11	28	84	81	274	78	433	17	14	92	123	941
Total	164	1060	62	1286	221	51	125	397	289	1059	236	1584	94	61	402	557	3824
Grand Total	330	2104	139	2573	478	116	267	861	581	2043	460	3084	200	134	844	1178	7696
Apprch %	12.8	81.8	5.4		55.5	13.5	31		18.8	66.2	14.9		17	11.4	71.6		
Total %	4.3	27.3	1.8	33.4	6.2	1.5	3.5	11.2	7.5	26.5	6	40.1	2.6	1.7	11	15.3	

	Golden Valley Road Southbound				Centre Pointe Parkway Westbound				Golden Valley Road Northbound				Centre Pointe Parkway 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 04:00 PM																	
04:00 PM	37	**279**	**28**	**344**	69	**21**	**73**	**163**	68	255	47	370	**41**	**25**	**117**	**183**	**1060**
04:15 PM	33	273	13	319	47	18	31	96	**83**	**262**	**67**	**412**	19	8	106	133	960
04:30 PM	46	240	11	297	**84**	11	21	116	76	226	62	364	20	22	116	158	935
04:45 PM	**50**	252	25	327	57	15	17	89	65	241	48	354	26	18	103	147	917
Total Volume	166	1044	77	1287	257	65	142	464	292	984	224	1500	106	73	442	621	3872
% App. Total	12.9	81.1	6		55.4	14	30.6		19.5	65.6	14.9		17.1	11.8	71.2		
PHF	.830	.935	.688	.935	.765	.774	.486	.712	.880	.939	.836	.910	.646	.730	.944	.848	.913

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File Name : 01_SCL_Golden_Centre PM
Site Code : 99921611
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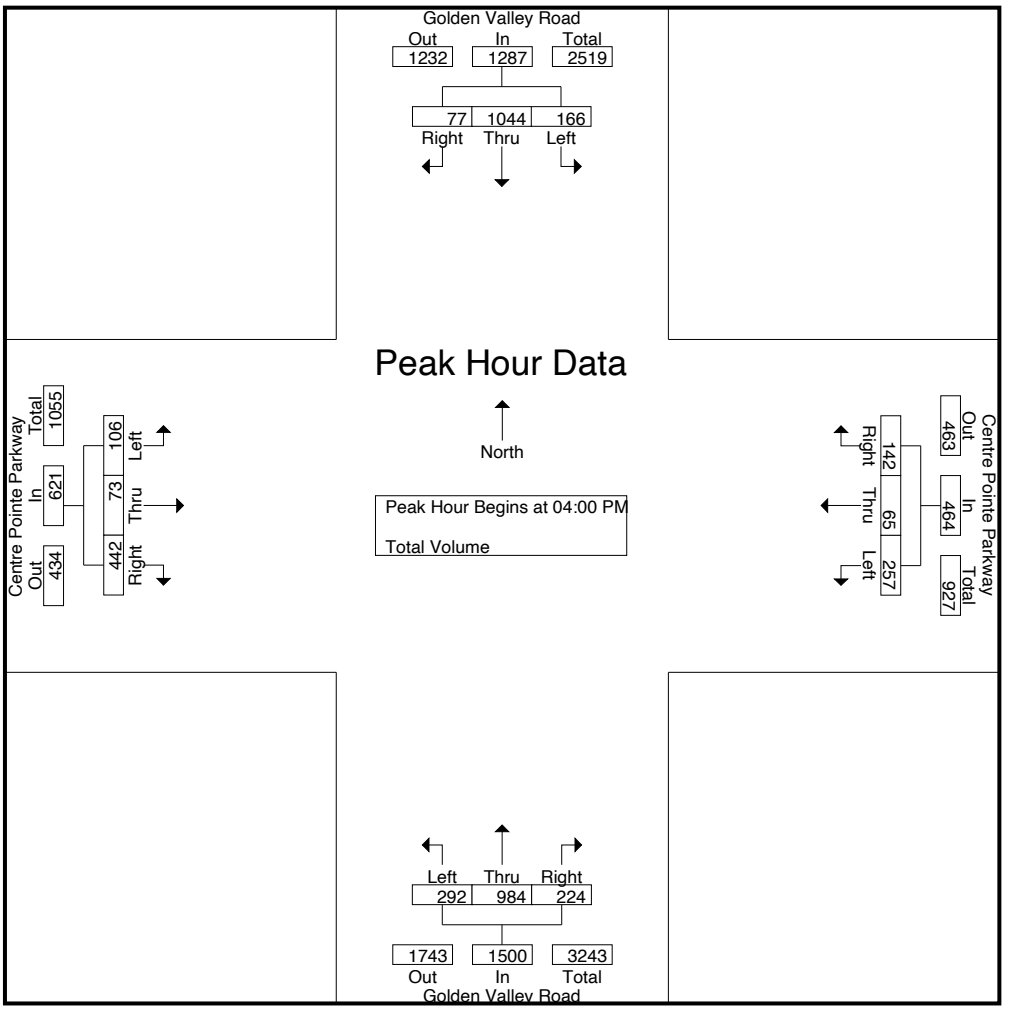

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:00 PM				05:00 PM				04:00 PM			
+0 mins.	**50**	252	**25**	327	69	**21**	**73**	**163**	71	227	64	362	**41**	**25**	**117**	**183**
+15 mins.	32	245	21	298	47	18	31	96	74	**314**	47	**435**	19	8	106	133
+30 mins.	43	**300**	10	**353**	**84**	11	21	116	63	244	47	354	20	22	116	158
+45 mins.	48	272	14	334	57	15	17	89	**81**	274	**78**	433	26	18	103	147
Total Volume	173	1069	70	1312	257	65	142	464	289	1059	236	1584	106	73	442	621
% App. Total	13.2	81.5	5.3		55.4	14	30.6		18.2	66.9	14.9		17.1	11.8	71.2	
PHF	.865	.891	.700	.929	.765	.774	.486	.712	.892	.843	.756	.910	.646	.730	.944	.848

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City of Santa Clarita
N/S: Robert C. Lee Parkway
E/W: Golden Valley Road
Weather: Clear

File Name : 02_SCL_Robert_Golden AM
Site Code : 99921611
Start Date : 10/28/2021
Page No : 1

Groups Printed- Total Volume

	Robert C. Lee Parkway Southbound			Golden Valley Road Westbound			Golden Valley Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
07:00 AM	54	30	84	199	70	269	37	297	334	687
07:15 AM	102	48	150	242	168	410	101	307	408	968
07:30 AM	146	85	231	265	208	473	154	297	451	1155
07:45 AM	154	87	241	347	203	550	124	287	411	1202
Total	456	250	706	1053	649	1702	416	1188	1604	4012
08:00 AM	206	78	284	297	103	400	37	294	331	1015
08:15 AM	42	14	56	314	45	359	11	313	324	739
08:30 AM	26	9	35	258	33	291	13	260	273	599
08:45 AM	33	4	37	283	33	316	8	274	282	635
Total	307	105	412	1152	214	1366	69	1141	1210	2988
Grand Total	763	355	1118	2205	863	3068	485	2329	2814	7000
Apprch %	68.2	31.8		71.9	28.1		17.2	82.8		
Total %	10.9	5.1	16	31.5	12.3	43.8	6.9	33.3	40.2	

	Robert C. Lee Parkway Southbound			Golden Valley Road Westbound			Golden Valley Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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	102	48	150	242	168	410	101	**307**	408	968
07:30 AM	146	85	231	265	**208**	473	**154**	297	**451**	1155
07:45 AM	154	**87**	241	**347**	203	**550**	124	287	411	**1202**
08:00 AM	**206**	78	**284**	297	103	400	37	294	331	1015
Total Volume	608	298	906	1151	682	1833	416	1185	1601	4340
% App. Total	67.1	32.9		62.8	37.2		26	74		
PHF	.738	.856	.798	.829	.820	.833	.675	.965	.887	.903

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File Name : 02_SCL_Robert_Golden AM
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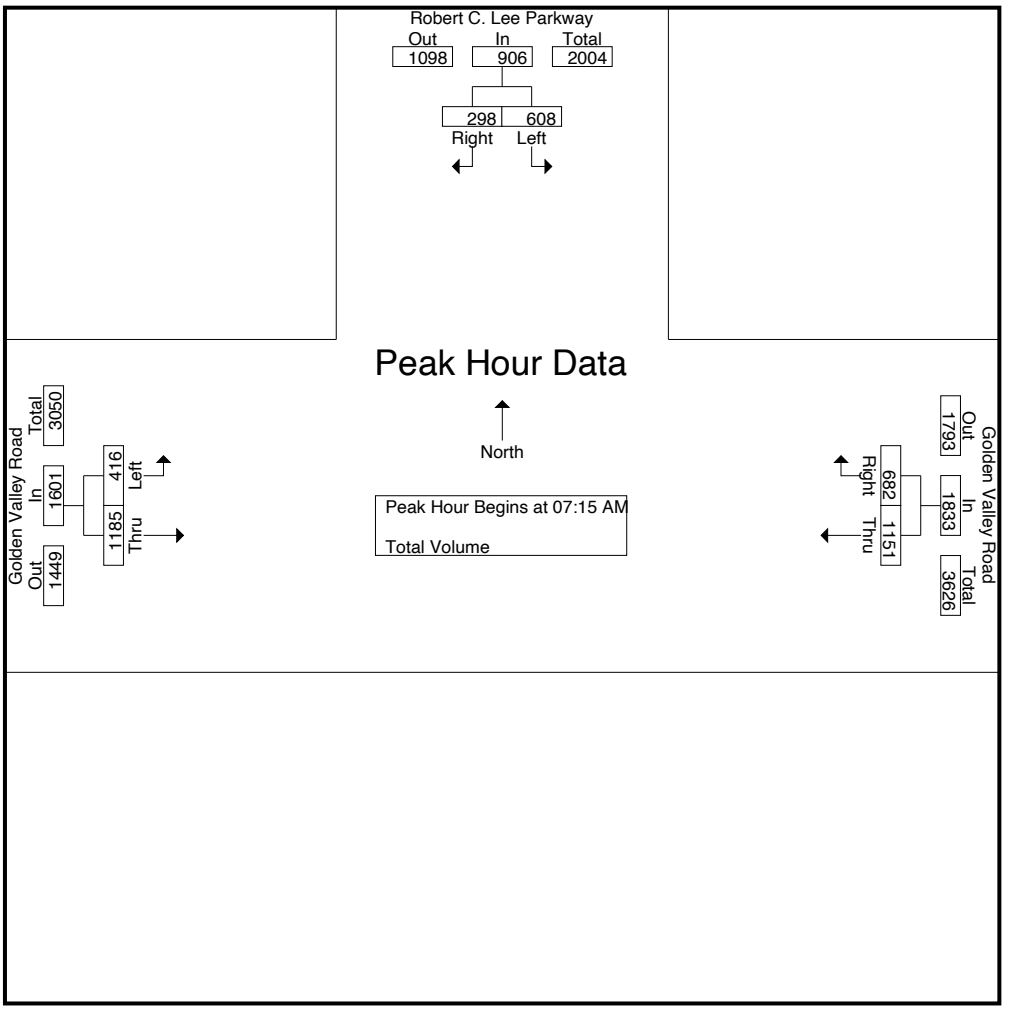

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM			07:15 AM			07:00 AM		
+0 mins.	102	48	150	242	168	410	37	297	334
+15 mins.	146	85	231	265	**208**	473	101	**307**	408
+30 mins.	154	**87**	241	**347**	203	**550**	**154**	297	**451**
+45 mins.	**206**	78	**284**	297	103	400	124	287	411
Total Volume	608	298	906	1151	682	1833	416	1188	1604
% App. Total	67.1	32.9		62.8	37.2		25.9	74.1	
PHF	.738	.856	.798	.829	.820	.833	.675	.967	.889

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Weather: Clear

File Name : 02_SCL_Robert_Golden PM
Site Code : 99921611
Start Date : 10/28/2021
Page No : 1

Groups Printed- Total Volume

	Robert C. Lee Parkway Southbound			Golden Valley Road Westbound			Golden Valley Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
04:00 PM	32	29	61	329	36	365	30	443	473	899
04:15 PM	36	26	62	364	28	392	7	423	430	884
04:30 PM	38	16	54	357	30	387	10	442	452	893
04:45 PM	28	18	46	353	28	381	14	397	411	838
Total	134	89	223	1403	122	1525	61	1705	1766	3514
05:00 PM	26	15	41	363	31	394	12	440	452	887
05:15 PM	17	12	29	390	26	416	11	429	440	885
05:30 PM	30	9	39	357	29	386	23	383	406	831
05:45 PM	21	17	38	377	44	421	19	361	380	839
Total	94	53	147	1487	130	1617	65	1613	1678	3442
Grand Total	228	142	370	2890	252	3142	126	3318	3444	6956
Apprch %	61.6	38.4		92	8		3.7	96.3		
Total %	3.3	2	5.3	41.5	3.6	45.2	1.8	47.7	49.5	

	Robert C. Lee Parkway Southbound			Golden Valley Road Westbound			Golden Valley Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	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 04:00 PM										
04:00 PM	32	**29**	61	329	**36**	365	**30**	**443**	**473**	**899**
04:15 PM	36	26	**62**	**364**	28	**392**	7	423	430	884
04:30 PM	**38**	16	54	357	30	387	10	442	452	893
04:45 PM	28	18	46	353	28	381	14	397	411	838
Total Volume	134	89	223	1403	122	1525	61	1705	1766	3514
% App. Total	60.1	39.9		92	8		3.5	96.5		
PHF	.882	.767	.899	.964	.847	.973	.508	.962	.933	.977

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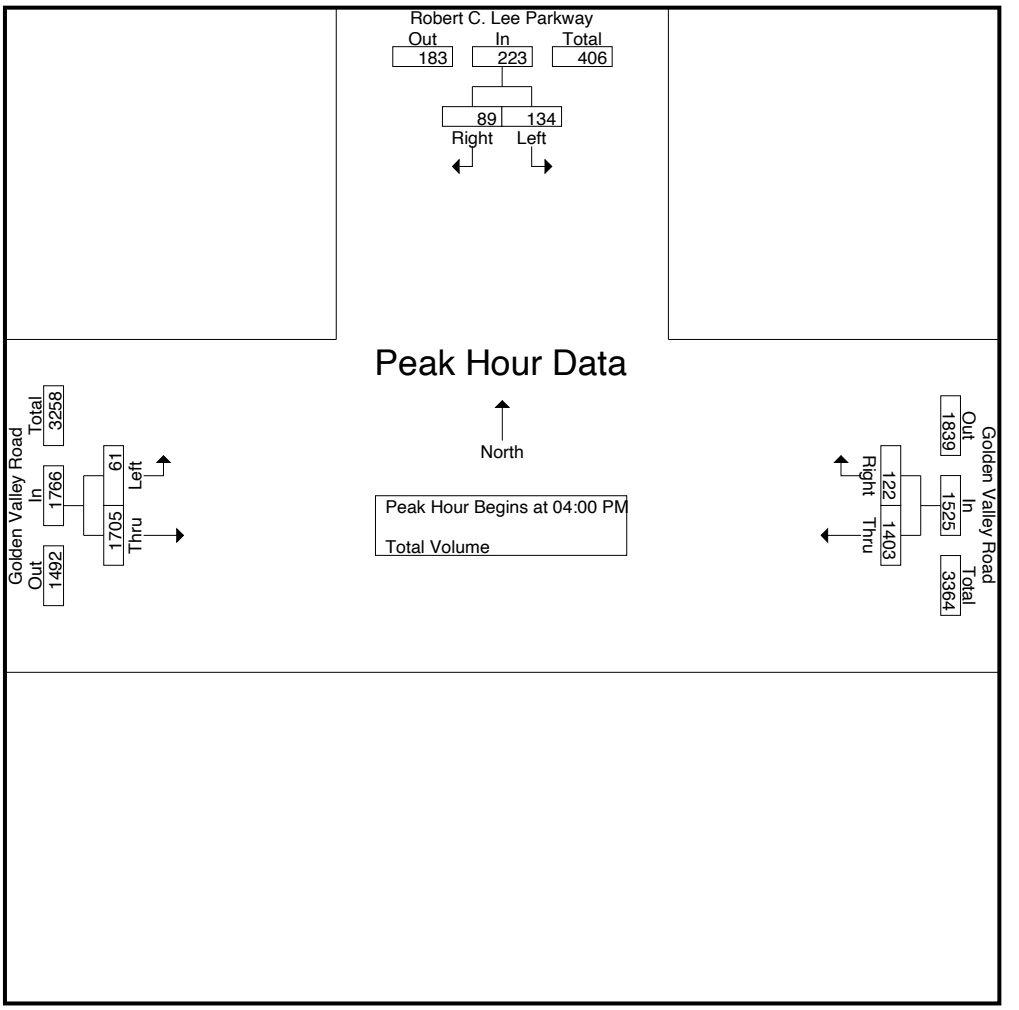


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			05:00 PM			04:00 PM		
+0 mins.	32	**29**	61	363	31	394	**30**	**443**	**473**
+15 mins.	36	26	**62**	**390**	26	416	7	423	430
+30 mins.	**38**	16	54	357	29	386	10	442	452
+45 mins.	28	18	46	377	**44**	**421**	14	397	411
Total Volume	134	89	223	1487	130	1617	61	1705	1766
% App. Total	60.1	39.9		92	8		3.5	96.5	
PHF	.882	.767	.899	.953	.739	.960	.508	.962	.933

APPENDIX C

HCM ANALYSIS WORKSHEETS

EXISTING CONDITIONS

Intersection Level Of Service Report
Intersection 1: Golden Valley/Centre Pointe

Control Type:	Signalized	Delay (sec / veh):	35.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.718

Intersection Setup

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	400.00	100.00	350.00	700.00	100.00	100.00	260.00	100.00	260.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Base Volume Input [veh/h]	248	745	355	120	951	82	23	39	157	458	48	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	248	745	355	120	951	82	23	39	157	458	48	41
Peak Hour Factor	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	65	194	93	31	248	21	6	10	41	119	13	11
Total Analysis Volume [veh/h]	259	777	370	125	992	86	24	41	164	478	50	43
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Split	Split	Overlap	Split	Split	Split
Signal Group	1	6	6	5	2	0	0	8	8	0	4	0
Auxiliary Signal Groups			6						1,8			
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	10	5	10	0	0	10	10	0	10	0
Maximum Green [s]	30	30	30	30	30	0	0	30	30	0	30	0
Amber [s]	3.2	4.7	4.7	3.2	4.7	0.0	0.0	3.9	3.9	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	21	39	39	14	32	0	0	15	15	0	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	5	5	0	7	0
Pedestrian Clearance [s]	0	17	17	0	17	0	0	10	10	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.2	3.7	3.7	2.2	3.7	0.0	0.0	2.9	2.9	0.0	2.6	0.0
Minimum Recall	No	No	No	No	No			No	No		No	
Maximum Recall	No	No	No	No	No			No	No		No	
Pedestrian Recall	No	No	No	No	No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	5.70	5.70	4.20	5.70	5.70	4.90	4.90	4.20	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	3.70	3.70	2.20	3.70	3.70	2.90	2.90	0.00	2.60	2.60
g_i, Effective Green Time [s]	17	43	43	9	36	36	10	10	32	18	18
g / C, Green / Cycle	0.17	0.43	0.43	0.09	0.36	0.36	0.10	0.10	0.32	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.16	0.24	0.26	0.08	0.31	0.06	0.01	0.02	0.11	0.15	0.06
s, saturation flow rate [veh/h]	1603	3204	1431	1603	3204	1431	1603	1683	1431	3113	1556
c, Capacity [veh/h]	270	1374	613	152	1138	508	161	169	454	568	284
d1, Uniform Delay [s]	41.32	21.58	22.05	44.51	30.16	22.15	41.15	41.54	26.34	39.54	35.59
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.81	1.69	4.36	10.53	9.26	0.72	0.42	0.74	0.48	3.46	0.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.96	0.57	0.60	0.82	0.87	0.17	0.15	0.24	0.36	0.84	0.33
d, Delay for Lane Group [s/veh]	59.13	23.27	26.41	55.04	39.42	22.87	41.57	42.28	26.83	43.00	36.26
Lane Group LOS	E	C	C	E	D	C	D	D	C	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	7.31	6.51	6.76	3.34	11.60	1.39	0.55	0.95	2.96	5.82	1.99
50th-Percentile Queue Length [ft/ln]	182.66	162.69	169.03	83.60	290.06	34.83	13.68	23.64	73.97	145.38	49.85
95th-Percentile Queue Length [veh/ln]	11.74	10.69	11.03	6.02	17.19	2.51	0.98	1.70	5.33	9.77	3.59
95th-Percentile Queue Length [ft/ln]	293.49	267.28	275.63	150.47	429.71	62.69	24.62	42.55	133.14	244.25	89.72

Movement, Approach, & Intersection Results

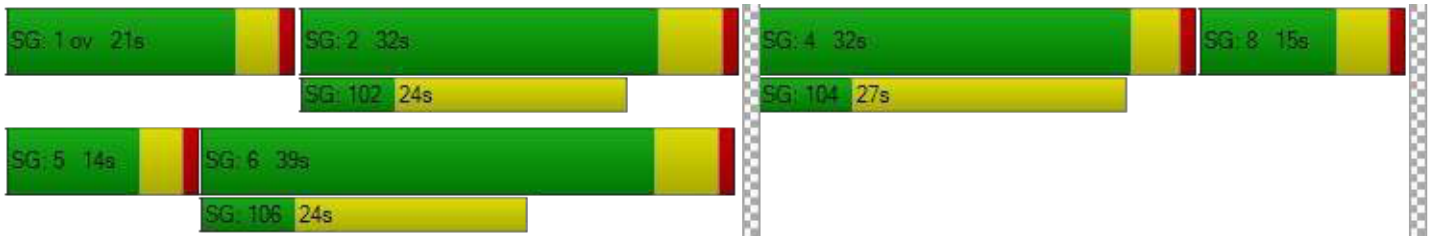
d_M, Delay for Movement [s/veh]	59.13	23.27	26.41	55.04	39.42	22.87	41.57	42.28	26.83	43.00	36.26	36.26
Movement LOS	E	C	C	E	D	C	D	D	C	D	D	D
d_A, Approach Delay [s/veh]	30.70			39.86			31.14			41.90		
Approach LOS	C			D			C			D		
d_I, Intersection Delay [s/veh]	35.84											
Intersection LOS	D											
Intersection V/C	0.718											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	39.64	39.64	39.64
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.012	2.339	2.451
Crosswalk LOS	F	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	665	526	202	548
d_b, Bicycle Delay [s]	22.28	27.19	40.45	26.39
l_b,int, Bicycle LOS Score for Intersection	2.720	2.552	1.937	2.502
Bicycle LOS	B	B	A	B

Sequence

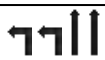
Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Golden Valley/Robert C Lee

Control Type:	Signalized	Delay (sec / veh):	24.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.749

Intersection Setup

Name	Robert C Lee		Golden Valley		Golden Valley	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1
Entry Pocket Length [ft]	170.00	100.00	450.00	100.00	100.00	275.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	800.00	0.00	0.00
Speed [mph]	35.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		No	

Volumes

Name	Robert C Lee		Golden Valley		Golden Valley	
Base Volume Input [veh/h]	608	298	416	1185	1151	682
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	608	298	416	1185	1151	682
Peak Hour Factor	0.9030	0.9030	0.9030	0.9030	0.9030	0.9030
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	168	83	115	328	319	189
Total Analysis Volume [veh/h]	673	330	461	1312	1275	755
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Overlap
Signal Group	7	0	5	2	6	6
Auxiliary Signal Groups						6,7
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	0	5	10	10	10
Maximum Green [s]	30	0	30	30	30	30
Amber [s]	3.2	0.0	3.2	4.7	4.7	4.7
All red [s]	1.0	0.0	1.0	1.0	1.0	1.0
Split [s]	32	0	38	68	30	30
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	3.0
Walk [s]	7	0	0	5	7	7
Pedestrian Clearance [s]	20	0	0	10	17	17
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	0.0	2.2	3.7	3.7	3.7
Minimum Recall	No		No	No	No	No
Maximum Recall	No		No	No	No	No
Pedestrian Recall	No		No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
C, Cycle Length [s]	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	5.70	5.70	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	3.70	3.70	0.00
g_i, Effective Green Time [s]	28	28	18	62	41	74
g / C, Green / Cycle	0.28	0.28	0.18	0.62	0.41	0.74
(v / s)_i Volume / Saturation Flow Rate	0.22	0.23	0.15	0.41	0.28	0.53
s, saturation flow rate [veh/h]	3113	1431	3113	3204	4584	1431
c, Capacity [veh/h]	865	398	547	1996	1858	1059
d1, Uniform Delay [s]	33.26	33.88	39.88	12.04	24.51	7.14
k, delay calibration	0.11	0.28	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.55	10.74	3.62	1.71	2.09	4.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.78	0.83	0.84	0.66	0.69	0.71
d, Delay for Lane Group [s/veh]	34.80	44.62	43.51	13.75	26.59	11.24
Lane Group LOS	C	D	D	B	C	B
Critical Lane Group	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.46	8.46	5.45	7.89	7.85	6.67
50th-Percentile Queue Length [ft/ln]	186.53	211.39	136.14	197.37	196.30	166.79
95th-Percentile Queue Length [veh/ln]	11.94	13.22	9.27	12.50	12.45	10.91
95th-Percentile Queue Length [ft/ln]	298.52	330.61	231.81	312.58	311.19	272.68

Movement, Approach, & Intersection Results

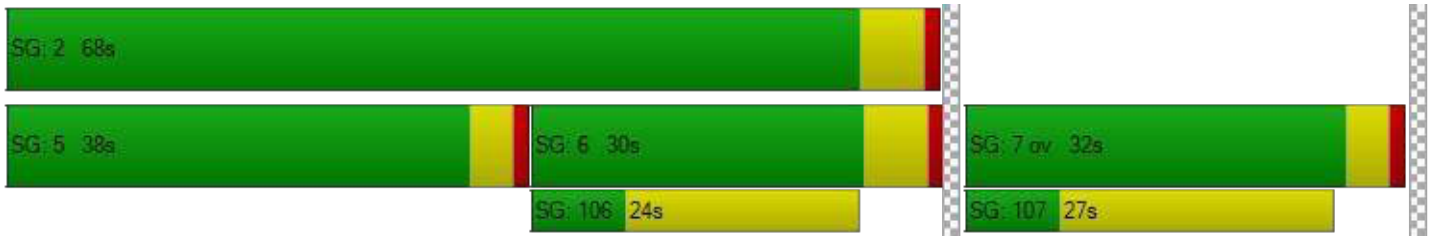
d_M, Delay for Movement [s/veh]	34.80	44.62	43.51	13.75	26.59	11.24
Movement LOS	C	D	D	B	C	B
d_A, Approach Delay [s/veh]	38.03		21.48		20.88	
Approach LOS	D		C		C	
d_I, Intersection Delay [s/veh]	24.68					
Intersection LOS	C					
Intersection V/C	0.749					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.810	3.383	0.000
Crosswalk LOS	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	556	1246	486
d_b, Bicycle Delay [s]	26.07	7.11	28.66
l_b,int, Bicycle LOS Score for Intersection	1.560	3.022	2.676
Bicycle LOS	A	C	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Golden Valley/Sierra Hwy

Control Type:	Signalized	Delay (sec / veh):	61.8
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.945

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	2	0	2	1	0	1
Entry Pocket Length [ft]	430.00	100.00	100.00	415.00	100.00	500.00	285.00	100.00	325.00	285.00	100.00	295.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	540	199	14	31	1093	405	347	491	907	507	895	77
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	540	199	14	31	1093	405	347	491	907	507	895	77
Peak Hour Factor	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	142	52	4	8	287	106	91	129	238	133	235	20
Total Analysis Volume [veh/h]	567	209	15	33	1147	425	364	515	952	532	939	81
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	2	3	8	8	7	4	0
Auxiliary Signal Groups						2,3			1,8			
Lead / Lag	Lead	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	24	55	0	9	40	40	18	34	34	22	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	5	5	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	25	0	10	10	0	27	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	57	57	3	40	58	14	24	48	20	30	30
g / C, Green / Cycle	0.17	0.48	0.48	0.03	0.34	0.49	0.12	0.20	0.40	0.16	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.18	0.07	0.07	0.02	0.36	0.30	0.12	0.16	0.38	0.17	0.20	0.06
s, saturation flow rate [veh/h]	3113	1683	1644	1603	3204	1431	3113	3204	2532	3113	4584	1431
c, Capacity [veh/h]	519	800	781	45	1079	696	363	643	1015	506	1131	353
d1, Uniform Delay [s]	50.00	17.70	17.70	57.90	39.80	22.50	53.00	45.67	34.53	50.24	42.82	36.09
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.27	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	49.26	0.37	0.38	20.94	45.92	3.96	22.45	2.36	10.50	33.73	1.65	0.33
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.09	0.14	0.14	0.74	1.06	0.61	1.00	0.80	0.94	1.05	0.83	0.23
d, Delay for Lane Group [s/veh]	99.26	18.07	18.08	78.84	85.72	26.46	75.45	48.03	45.02	83.97	44.47	36.42
Lane Group LOS	F	B	B	E	F	C	F	D	D	F	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	11.02	1.75	1.71	1.22	21.78	8.82	6.41	7.23	13.83	9.66	8.56	1.86
50th-Percentile Queue Length [ft/ln]	275.41	43.65	42.72	30.60	544.46	220.61	160.17	180.63	345.81	241.38	214.02	46.55
95th-Percentile Queue Length [veh/ln]	17.16	3.14	3.08	2.20	30.66	13.70	10.57	11.63	19.93	15.10	13.36	3.35
95th-Percentile Queue Length [ft/ln]	428.95	78.58	76.90	55.07	766.38	342.40	264.17	290.84	498.30	377.48	333.98	83.79

Movement, Approach, & Intersection Results

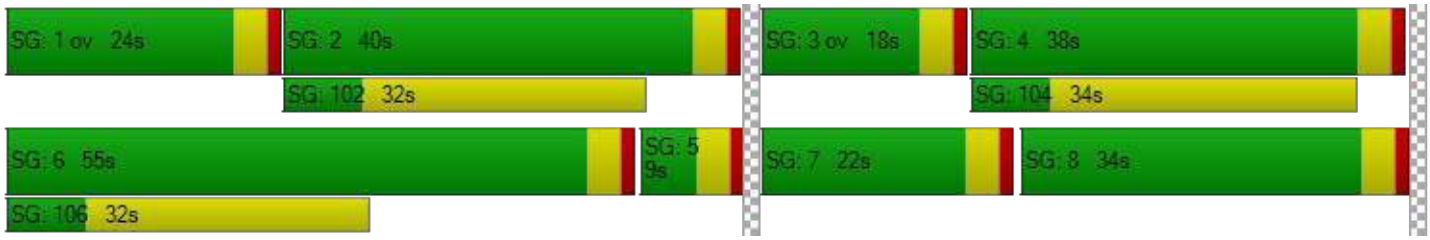
d_M, Delay for Movement [s/veh]	99.26	18.08	18.08	78.84	85.72	26.46	75.45	48.03	45.02	83.97	44.47	36.42
Movement LOS	F	B	B	E	F	C	F	D	D	F	D	D
d_A, Approach Delay [s/veh]	76.27			69.89			51.92			57.59		
Approach LOS	E			E			D			E		
d_I, Intersection Delay [s/veh]	61.77											
Intersection LOS	E											
Intersection V/C	0.945											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.078	3.542	3.245
Crosswalk LOS	F	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	850	600	500	567
d_b, Bicycle Delay [s]	19.84	29.40	33.75	30.82
l_b,int, Bicycle LOS Score for Intersection	2.212	2.884	3.070	2.413
Bicycle LOS	B	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Golden Valley/SB SR-14

Control Type:	Signalized	Delay (sec / veh):	31.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.654

Intersection Setup

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	300.00	100.00	100.00	100.00	100.00	270.00	200.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	0	0	0	30	228	401	0	502	267	212	980	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	30	228	401	0	502	267	212	980	0
Peak Hour Factor	1.0000	1.0000	1.0000	0.9160	0.9160	0.9160	1.0000	0.9160	0.9160	0.9160	0.9160	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	8	62	109	0	137	73	58	267	0
Total Analysis Volume [veh/h]	0	0	0	33	249	438	0	548	291	231	1070	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	0	10	0	0	10	0	5	10	0
Maximum Green [s]	0	0	0	0	30	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	0.0	3.6	0.0	0.0	4.7	0.0	3.2	4.7	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	0	55	0	0	26	0	19	45	0
Vehicle Extension [s]	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	7	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk					No			No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	2.6	0.0	0.0	3.7	0.0	2.2	3.7	0.0
Minimum Recall					No			No		No	No	
Maximum Recall					No			No		No	No	
Pedestrian Recall					No			No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	R	L	C
C, Cycle Length [s]		100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]		4.60	4.60	4.60	5.70	5.70	4.20	5.70
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.60	2.60	2.60	3.70	3.70	2.20	3.70
g_i, Effective Green Time [s]		46	46	46	23	23	16	44
g / C, Green / Cycle		0.46	0.46	0.46	0.23	0.23	0.16	0.44
(v / s)_i Volume / Saturation Flow Rate		0.02	0.15	0.31	0.17	0.20	0.14	0.33
s, saturation flow rate [veh/h]		1603	1683	1431	3204	1431	1603	3204
c, Capacity [veh/h]		734	771	655	743	332	265	1407
d1, Uniform Delay [s]		15.00	17.24	21.17	35.60	37.04	40.74	23.63
k, delay calibration		0.50	0.50	0.50	0.11	0.19	0.11	0.11
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.12	1.11	5.35	1.45	12.05	8.75	0.87
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.04	0.32	0.67	0.74	0.88	0.87	0.76
d, Delay for Lane Group [s/veh]		15.12	18.35	26.52	37.05	49.09	49.49	24.50
Lane Group LOS		B	B	C	D	D	D	C
Critical Lane Group		No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]		0.41	3.59	8.22	5.95	7.52	5.88	9.65
50th-Percentile Queue Length [ft/ln]		10.26	89.82	205.51	148.77	188.05	147.06	241.31
95th-Percentile Queue Length [veh/ln]		0.74	6.47	12.92	9.95	12.02	9.86	14.75
95th-Percentile Queue Length [ft/ln]		18.47	161.67	323.07	248.79	300.50	246.50	368.70

Movement, Approach, & Intersection Results

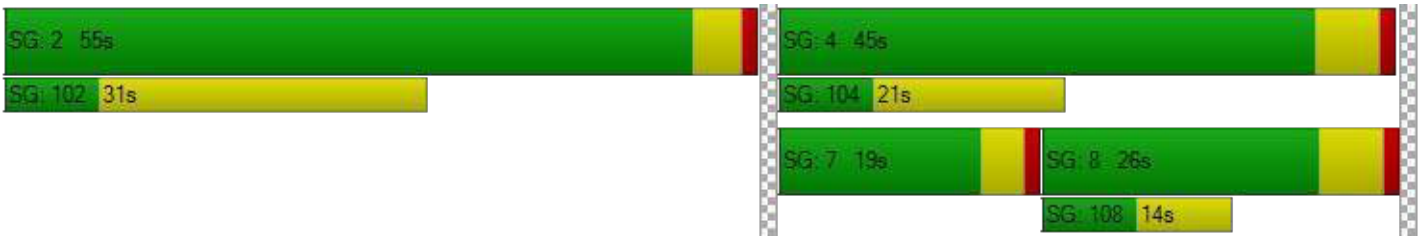
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	15.12	18.35	26.52	0.00	37.05	49.09	49.49	24.50	0.00
Movement LOS				B	B	C		D	D	D	C	
d_A, Approach Delay [s/veh]	0.00			23.17			41.23			28.94		
Approach LOS	A			C			D			C		
d_I, Intersection Delay [s/veh]	31.09											
Intersection LOS	C											
Intersection V/C	0.654											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.096	2.399	3.144	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1008	406	786
d_b, Bicycle Delay [s]	50.01	12.31	31.77	18.43
l_b,int, Bicycle LOS Score for Intersection	4.132	2.748	2.252	2.633
Bicycle LOS	D	B	B	B

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Golden Valley/NB SR-14

Control Type:	Signalized	Delay (sec / veh):	21.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.582

Intersection Setup

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	185.00	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	360.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	157	1	180	0	0	0	208	318	0	0	1030	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	157	1	180	0	0	0	208	318	0	0	1030	71
Peak Hour Factor	0.8840	0.8840	0.8840	1.0000	1.0000	1.0000	0.8840	0.8840	1.0000	1.0000	0.8840	0.8840
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	44	0	51	0	0	0	59	90	0	0	291	20
Total Analysis Volume [veh/h]	178	1	204	0	0	0	235	360	0	0	1165	80
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	10	0	0	0	0	5	10	0	0	10	0
Maximum Green [s]	0	30	0	0	0	0	30	30	0	0	30	0
Amber [s]	0.0	3.6	0.0	0.0	0.0	0.0	3.6	4.7	0.0	0.0	4.7	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	45	0	0	0	0	15	55	0	0	40	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	0	0	0	14	0	0	7	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No						No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.6	0.0	0.0	0.0	0.0	2.6	3.7	0.0	0.0	3.7	0.0
Minimum Recall		No					No	No			No	
Maximum Recall		No					No	No			No	
Pedestrian Recall		No					No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R		L	C	C	R
C, Cycle Length [s]	100	100	100		100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60		4.60	5.70	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60		2.60	3.70	3.70	3.70
g_i, Effective Green Time [s]	17	17	17		9	73	59	59
g / C, Green / Cycle	0.17	0.17	0.17		0.09	0.73	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.06	0.06	0.14		0.08	0.11	0.36	0.06
s, saturation flow rate [veh/h]	1603	1604	1431		3113	3204	3204	1431
c, Capacity [veh/h]	269	269	240		296	2337	1885	841
d1, Uniform Delay [s]	36.68	36.68	40.40		44.30	4.13	13.32	8.98
k, delay calibration	0.11	0.11	0.11		0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.72	0.72	8.19		4.83	0.14	1.53	0.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.33	0.33	0.85		0.79	0.15	0.62	0.10
d, Delay for Lane Group [s/veh]	37.40	37.40	48.59		49.14	4.27	14.85	9.21
Lane Group LOS	D	D	D		D	A	B	A
Critical Lane Group	No	No	Yes		Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.91	1.91	5.20		2.91	0.80	7.39	0.70
50th-Percentile Queue Length [ft/ln]	47.68	47.70	129.98		72.82	20.03	184.74	17.49
95th-Percentile Queue Length [veh/ln]	3.43	3.43	8.94		5.24	1.44	11.85	1.26
95th-Percentile Queue Length [ft/ln]	85.82	85.86	223.47		131.07	36.05	296.20	31.48

Movement, Approach, & Intersection Results

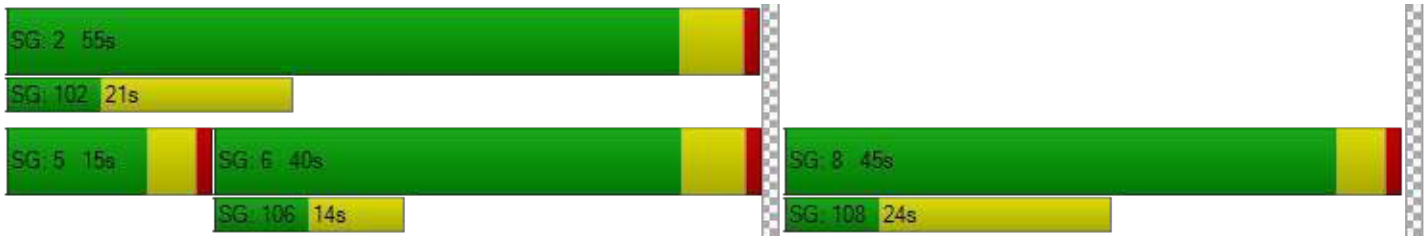
d_M, Delay for Movement [s/veh]	37.40	37.40	48.59	0.00	0.00	0.00	49.14	4.27	0.00	0.00	14.85	9.21
Movement LOS	D	D	D				D	A			B	A
d_A, Approach Delay [s/veh]	43.36			0.00			21.99			14.49		
Approach LOS	D			A			C			B		
d_I, Intersection Delay [s/veh]	21.47											
Intersection LOS	C											
Intersection V/C	0.582											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.276	1.874	0.000	2.893
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	808	0	986	686
d_b, Bicycle Delay [s]	17.76	50.00	12.86	21.59
l_b,int, Bicycle LOS Score for Intersection	2.192	4.132	2.050	2.587
Bicycle LOS	B	D	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Sierra/Friendly Valley

Control Type:	Signalized	Delay (sec / veh):	25.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.547

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	125.00	100.00	100.00	135.00	100.00	400.00	100.00	100.00	100.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Base Volume Input [veh/h]	44	398	87	196	1130	196	52	24	65	69	18	167
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	44	398	87	196	1130	196	52	24	65	69	18	167
Peak Hour Factor	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	107	23	53	304	53	14	6	18	19	5	45
Total Analysis Volume [veh/h]	47	429	94	211	1218	211	56	26	70	74	19	180
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	0	10	0	0	10	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	22	23	0	45	46	0	0	32	0	0	32	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	14	0	0	17	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	5.70	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	3.70	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	43	43	15	54	54	28	28	28	28
g / C, Green / Cycle	0.04	0.43	0.43	0.15	0.54	0.54	0.28	0.28	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.03	0.16	0.16	0.13	0.38	0.15	0.12	0.05	0.06	0.14
s, saturation flow rate [veh/h]	1603	1683	1580	1603	3204	1431	657	1431	1169	1451
c, Capacity [veh/h]	59	717	673	245	1737	776	243	398	142	404
d1, Uniform Delay [s]	47.81	19.60	19.64	41.33	16.91	12.30	36.16	27.38	47.19	30.18
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	21.58	1.49	1.62	8.69	2.39	0.87	0.81	0.21	2.95	0.93
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.37	0.38	0.86	0.70	0.27	0.34	0.18	0.52	0.49
d, Delay for Lane Group [s/veh]	69.39	21.10	21.26	50.03	19.30	13.16	36.97	27.59	50.14	31.11
Lane Group LOS	E	C	C	D	B	B	D	C	D	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.52	4.55	4.34	5.66	10.48	2.68	1.87	1.28	1.95	4.06
50th-Percentile Queue Length [ft/ln]	37.97	113.69	108.58	141.60	262.05	67.05	46.81	32.11	48.75	101.43
95th-Percentile Queue Length [veh/ln]	2.73	8.05	7.76	9.57	15.79	4.83	3.37	2.31	3.51	7.30
95th-Percentile Queue Length [ft/ln]	68.34	201.13	194.02	239.18	394.79	120.69	84.25	57.80	87.76	182.57

Movement, Approach, & Intersection Results

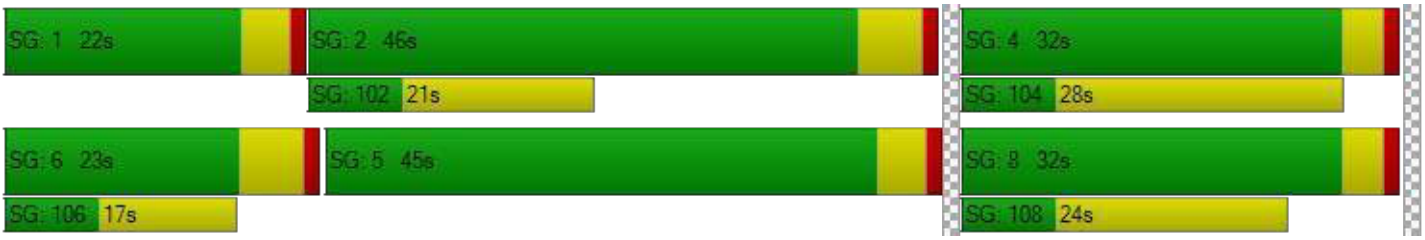
d_M, Delay for Movement [s/veh]	69.39	21.16	21.26	50.03	19.30	13.16	36.97	36.97	27.59	50.14	31.11	31.11
Movement LOS	E	C	C	D	B	B	D	D	C	D	C	C
d_A, Approach Delay [s/veh]	25.15			22.46			32.65			36.27		
Approach LOS	C			C			C			D		
d_I, Intersection Delay [s/veh]	25.06											
Intersection LOS	C											
Intersection V/C	0.547											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.724	2.849	2.240	2.141
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	346	806	560	560
d_b, Bicycle Delay [s]	34.20	17.82	25.92	25.92
l_b,int, Bicycle LOS Score for Intersection	2.030	2.913	1.810	2.010
Bicycle LOS	B	C	A	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sierra/Via Princessa

Control Type:	Signalized	Delay (sec / veh):	39.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.748

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	200.00	100.00	100.00	200.00	100.00	250.00	360.00	100.00	630.00	200.00	100.00	300.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Base Volume Input [veh/h]	351	331	127	169	850	758	171	874	403	295	934	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	351	331	127	169	850	758	171	874	403	295	934	78
Peak Hour Factor	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	92	87	33	45	224	200	45	230	106	78	246	21
Total Analysis Volume [veh/h]	370	349	134	178	896	799	180	921	425	311	984	82
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	4	5	2	2	1	6	0
Auxiliary Signal Groups						4,5			2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	4.7	3.6	4.7	4.7	3.6	4.7	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	20	46	0	15	41	41	18	41	41	18	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	28	0	28	28	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	3.7	2.6	3.7	3.7	2.6	3.7	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	4.60	4.60	5.70	4.60	4.60	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	0.00	2.60	3.70	0.00	2.60	3.70	3.70
g_i, Effective Green Time [s]	15	35	35	9	29	48	13	42	63	13	42	42
g / C, Green / Cycle	0.13	0.29	0.29	0.07	0.24	0.40	0.11	0.35	0.52	0.11	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.12	0.08	0.09	0.06	0.20	0.32	0.06	0.20	0.30	0.10	0.21	0.06
s, saturation flow rate [veh/h]	3113	4584	1431	3113	4584	2532	3113	4584	1431	3113	4584	1431
c, Capacity [veh/h]	402	1346	420	232	1096	1010	350	1595	750	350	1595	498
d1, Uniform Delay [s]	51.72	32.45	33.08	54.58	43.25	31.70	50.22	31.98	19.33	52.56	32.54	27.11
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.97	0.10	0.43	5.25	1.56	1.43	1.17	1.53	3.09	7.60	1.80	0.71
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.26	0.32	0.77	0.82	0.79	0.51	0.58	0.57	0.89	0.62	0.16
d, Delay for Lane Group [s/veh]	60.69	32.56	33.52	59.83	44.81	33.14	51.38	33.51	22.42	60.17	34.34	27.82
Lane Group LOS	E	C	C	E	D	C	D	C	C	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.81	2.50	2.97	2.73	8.17	9.69	2.52	7.12	7.94	4.83	7.76	1.66
50th-Percentile Queue Length [ft/ln]	145.16	62.50	74.28	68.18	204.26	242.28	63.09	177.99	198.48	120.78	194.00	41.48
95th-Percentile Queue Length [veh/ln]	9.76	4.50	5.35	4.91	12.86	14.80	4.54	11.50	12.56	8.44	12.33	2.99
95th-Percentile Queue Length [ft/ln]	243.95	112.50	133.71	122.73	321.45	369.92	113.55	287.39	314.00	210.90	308.21	74.67

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.69	32.56	33.52	59.83	44.81	33.14	51.38	33.51	22.42	60.17	34.34	27.82
Movement LOS	E	C	C	E	D	C	D	C	C	E	C	C
d_A, Approach Delay [s/veh]	44.91			41.26			32.53			39.78		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	39.08											
Intersection LOS	D											
Intersection V/C	0.748											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.54	49.54	49.54	49.54
l_p,int, Pedestrian LOS Score for Intersection	3.312	3.384	3.527	3.334
Crosswalk LOS	C	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	671	588	588	588
d_b, Bicycle Delay [s]	26.50	29.93	29.93	29.93
l_b,int, Bicycle LOS Score for Intersection	2.029	2.590	2.399	2.317
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 1: Golden Valley/Centre Pointe

Control Type:	Signalized	Delay (sec / veh):	55.6
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.864

Intersection Setup

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	400.00	100.00	350.00	700.00	100.00	100.00	260.00	100.00	260.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Base Volume Input [veh/h]	292	984	224	166	1044	77	106	73	442	257	65	142
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	292	984	224	166	1044	77	106	73	442	257	65	142
Peak Hour Factor	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	80	269	61	45	286	21	29	20	121	70	18	39
Total Analysis Volume [veh/h]	320	1078	245	182	1143	84	116	80	484	281	71	156
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Split	Split	Overlap	Split	Split	Split
Signal Group	1	6	6	5	2	0	0	8	8	0	4	0
Auxiliary Signal Groups			6						1,8			
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	10	5	10	0	0	10	10	0	10	0
Maximum Green [s]	30	30	30	30	30	0	0	30	30	0	30	0
Amber [s]	3.2	4.7	4.7	3.2	4.7	0.0	0.0	3.9	3.9	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	29	57	57	19	47	0	0	15	15	0	29	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	5	5	0	7	0
Pedestrian Clearance [s]	0	15	15	0	15	0	0	10	10	0	17	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.2	3.7	3.7	2.2	3.7	0.0	0.0	2.9	2.9	0.0	2.6	0.0
Minimum Recall	No	No	No	No	No			No	No		No	
Maximum Recall	No	No	No	No	No			No	No		No	
Pedestrian Recall	No	No	No	No	No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.20	5.70	5.70	4.20	5.70	5.70	4.90	4.90	4.20	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	3.70	3.70	2.20	3.70	3.70	2.90	2.90	0.00	2.60	2.60
g_i, Effective Green Time [s]	25	51	51	15	41	41	14	14	44	20	20
g / C, Green / Cycle	0.21	0.43	0.43	0.12	0.35	0.35	0.12	0.12	0.36	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.20	0.34	0.17	0.11	0.36	0.06	0.07	0.05	0.34	0.09	0.15
s, saturation flow rate [veh/h]	1603	3204	1431	1603	3204	1431	1603	1683	1431	3113	1501
c, Capacity [veh/h]	331	1374	613	198	1108	494	185	194	519	531	256
d1, Uniform Delay [s]	47.20	29.51	23.63	52.01	39.27	27.30	50.61	49.29	36.80	45.39	48.66
k, delay calibration	0.30	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.50	0.11	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	30.72	4.56	1.94	15.62	35.60	0.74	3.45	1.39	25.76	0.82	13.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.97	0.78	0.40	0.92	1.03	0.17	0.63	0.41	0.93	0.53	0.89
d, Delay for Lane Group [s/veh]	77.92	34.07	25.57	67.63	74.88	28.05	54.06	50.68	62.56	46.22	62.00
Lane Group LOS	E	C	C	E	F	C	D	D	E	D	E
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	11.89	13.27	4.84	6.08	20.75	1.71	3.44	2.27	16.79	3.85	7.51
50th-Percentile Queue Length [ft/ln]	297.13	331.77	121.10	152.01	518.65	42.81	86.11	56.74	419.78	96.29	187.85
95th-Percentile Queue Length [veh/ln]	17.54	19.25	8.45	10.12	28.83	3.08	6.20	4.08	23.51	6.93	12.01
95th-Percentile Queue Length [ft/ln]	438.48	481.13	211.33	253.10	720.69	77.05	155.00	102.12	587.79	173.32	300.23

Movement, Approach, & Intersection Results

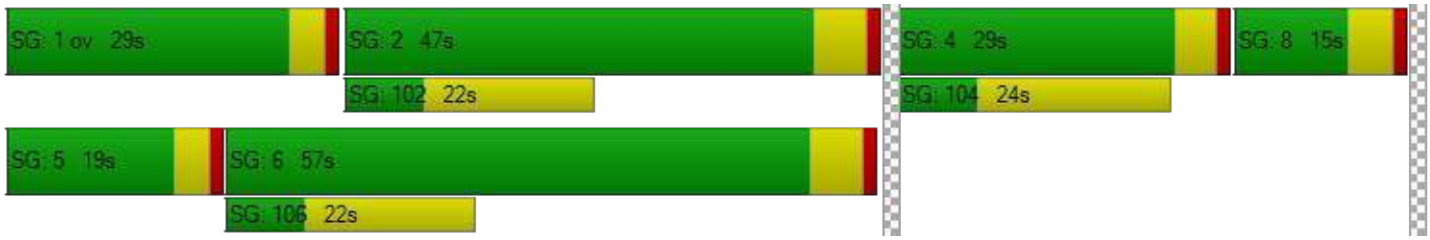
d_M, Delay for Movement [s/veh]	77.92	34.07	25.57	67.63	74.88	28.05	54.06	50.68	62.56	46.22	62.00	62.00
Movement LOS	E	C	C	E	F	C	D	D	E	D	E	E
d_A, Approach Delay [s/veh]	41.34			71.15			59.71			53.27		
Approach LOS	D			E			E			D		
d_I, Intersection Delay [s/veh]	55.62											
Intersection LOS	E											
Intersection V/C	0.864											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.214	2.520	2.434
Crosswalk LOS	F	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	855	688	168	407
d_b, Bicycle Delay [s]	19.67	25.82	50.33	38.09
l_b,int, Bicycle LOS Score for Intersection	2.915	2.722	2.682	2.398
Bicycle LOS	C	B	B	B

Sequence

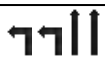
Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Golden Valley/Robert C Lee

Control Type:	Signalized	Delay (sec / veh):	8.8
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.608

Intersection Setup

Name	Robert C Lee		Golden Valley		Golden Valley	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1
Entry Pocket Length [ft]	170.00	100.00	450.00	100.00	100.00	275.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	800.00	0.00	0.00
Speed [mph]	35.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	Yes		Yes		No	

Volumes

Name	Robert C Lee		Golden Valley		Golden Valley	
Base Volume Input [veh/h]	134	89	61	1705	1403	122
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	134	89	61	1705	1403	122
Peak Hour Factor	0.9770	0.9770	0.9770	0.9770	0.9770	0.9770
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	23	16	436	359	31
Total Analysis Volume [veh/h]	137	91	62	1745	1436	125
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Permissive	Overlap
Signal Group	7	0	5	2	6	6
Auxiliary Signal Groups						6,7
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	0	5	10	10	10
Maximum Green [s]	30	0	30	30	30	30
Amber [s]	3.2	0.0	3.2	4.7	4.7	4.7
All red [s]	1.0	0.0	1.0	1.0	1.0	1.0
Split [s]	60	0	10	40	30	30
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	3.0
Walk [s]	7	0	0	5	7	7
Pedestrian Clearance [s]	20	0	0	10	17	17
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No	No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	0.0	2.2	3.7	3.7	3.7
Minimum Recall	No		No	No	No	No
Maximum Recall	No		No	No	No	No
Pedestrian Recall	No		No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
C, Cycle Length [s]	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	5.70	5.70	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	3.70	3.70	0.00
g_i, Effective Green Time [s]	9	9	4	81	73	87
g / C, Green / Cycle	0.09	0.09	0.04	0.81	0.73	0.87
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.02	0.54	0.31	0.09
s, saturation flow rate [veh/h]	3113	1431	3113	3204	4584	1431
c, Capacity [veh/h]	286	131	131	2593	3324	1250
d1, Uniform Delay [s]	43.15	44.05	46.82	4.00	5.50	0.87
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.25	6.40	2.64	1.41	0.41	0.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.48	0.69	0.47	0.67	0.43	0.10
d, Delay for Lane Group [s/veh]	44.40	50.45	49.46	5.41	5.91	1.03
Lane Group LOS	D	D	D	A	A	A
Critical Lane Group	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.63	2.38	0.77	3.38	2.79	0.06
50th-Percentile Queue Length [ft/ln]	40.87	59.59	19.25	84.56	69.75	1.39
95th-Percentile Queue Length [veh/ln]	2.94	4.29	1.39	6.09	5.02	0.10
95th-Percentile Queue Length [ft/ln]	73.57	107.26	34.66	152.21	125.55	2.50

Movement, Approach, & Intersection Results

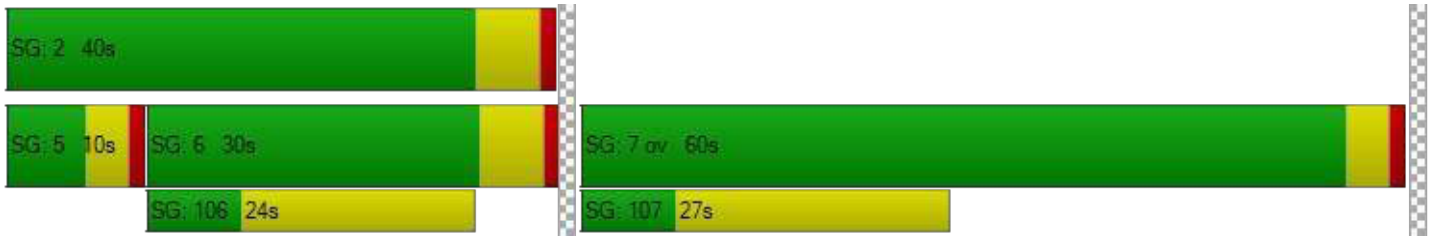
d_M, Delay for Movement [s/veh]	44.40	50.45	49.46	5.41	5.91	1.03
Movement LOS	D	D	D	A	A	A
d_A, Approach Delay [s/veh]	46.81		6.92		5.52	
Approach LOS	D		A		A	
d_I, Intersection Delay [s/veh]	8.84					
Intersection LOS	A					
Intersection V/C	0.608					

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00
I_p,int, Pedestrian LOS Score for Intersection	2.399	3.373	0.000
Crosswalk LOS	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1116	686	486
d_b, Bicycle Delay [s]	9.77	21.59	28.66
I_b,int, Bicycle LOS Score for Intersection	1.560	3.050	2.418
Bicycle LOS	A	C	B

Sequence

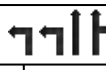
Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Golden Valley/Sierra Hwy

Control Type:	Signalized	Delay (sec / veh):	44.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.712

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	2	0	2	1	0	1
Entry Pocket Length [ft]	430.00	100.00	100.00	415.00	100.00	500.00	285.00	100.00	325.00	285.00	100.00	295.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	602	1089	134	67	291	265	407	732	640	54	678	81
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	602	1089	134	67	291	265	407	732	640	54	678	81
Peak Hour Factor	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	154	278	34	17	74	68	104	187	163	14	173	21
Total Analysis Volume [veh/h]	615	1112	137	68	297	271	416	748	654	55	693	83
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	2	3	8	8	7	4	0
Auxiliary Signal Groups						2,3			1,8			
Lead / Lag	Lead	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	27	53	0	10	36	36	19	48	48	9	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	5	5	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	25	0	10	10	0	27	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	61	61	6	44	63	15	32	60	4	22	22
g / C, Green / Cycle	0.19	0.51	0.51	0.05	0.37	0.53	0.13	0.27	0.50	0.03	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.20	0.37	0.38	0.04	0.09	0.19	0.13	0.23	0.26	0.02	0.15	0.06
s, saturation flow rate [veh/h]	3113	1683	1620	1603	3204	1431	3113	3204	2532	3113	4584	1431
c, Capacity [veh/h]	597	860	827	81	1185	756	390	869	1257	106	824	257
d1, Uniform Delay [s]	48.52	22.89	23.34	56.49	26.29	16.47	52.50	41.58	20.52	57.03	47.57	42.87
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	25.44	5.39	6.26	19.30	0.51	1.32	41.12	2.65	0.34	3.92	2.41	0.72
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.03	0.73	0.75	0.84	0.25	0.36	1.07	0.86	0.52	0.52	0.84	0.32
d, Delay for Lane Group [s/veh]	73.96	28.28	29.60	75.79	26.79	17.80	93.62	44.23	20.86	60.95	49.98	43.59
Lane Group LOS	F	C	C	E	C	B	F	D	C	E	D	D
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	10.66	13.77	14.08	2.42	2.90	4.27	7.89	10.33	5.80	0.85	6.59	2.13
50th-Percentile Queue Length [ft/ln]	266.55	344.21	352.12	60.38	72.55	106.71	197.33	258.30	144.95	21.32	164.80	53.15
95th-Percentile Queue Length [veh/ln]	16.26	19.85	20.24	4.35	5.22	7.66	12.83	15.60	9.75	1.53	10.80	3.83
95th-Percentile Queue Length [ft/ln]	406.53	496.34	506.00	108.69	130.59	191.41	320.77	390.09	243.68	38.37	270.06	95.68

Movement, Approach, & Intersection Results

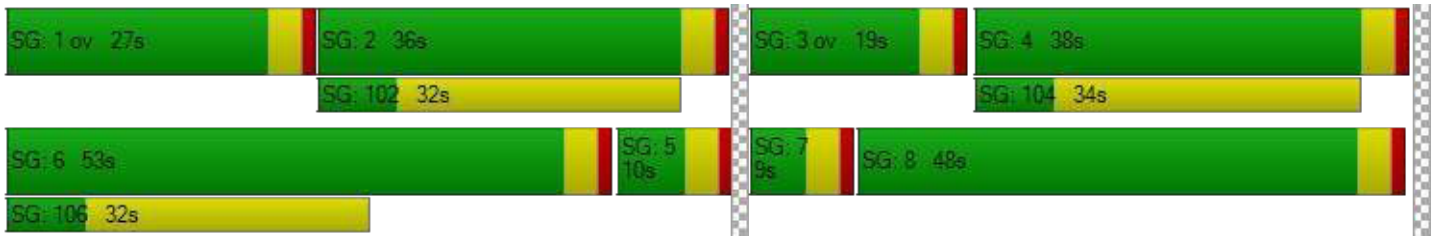
d_M, Delay for Movement [s/veh]	73.96	28.86	29.60	75.79	26.79	17.80	93.62	44.23	20.86	60.95	49.98	43.59
Movement LOS	F	C	C	E	C	B	F	D	C	E	D	D
d_A, Approach Delay [s/veh]	43.79			28.20			47.12			50.07		
Approach LOS	D			C			D			D		
d_I, Intersection Delay [s/veh]	44.05											
Intersection LOS	D											
Intersection V/C	0.712											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.52	49.52	49.52
I_p,int, Pedestrian LOS Score for Intersection	0.000	3.075	3.476	3.185
Crosswalk LOS	F	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	816	533	733	567
d_b, Bicycle Delay [s]	21.02	32.28	24.08	30.83
I_b,int, Bicycle LOS Score for Intersection	3.097	2.084	3.059	2.017
Bicycle LOS	C	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Golden Valley/SB SR-14

Control Type:	Signalized	Delay (sec / veh):	30.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.650

Intersection Setup

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	300.00	100.00	100.00	100.00	100.00	270.00	200.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	0	0	0	83	3	346	0	808	111	207	627	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	83	3	346	0	808	111	207	627	0
Peak Hour Factor	1.0000	1.0000	1.0000	0.9580	0.9580	0.9580	1.0000	0.9580	0.9580	0.9580	0.9580	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	22	1	90	0	211	29	54	164	0
Total Analysis Volume [veh/h]	0	0	0	87	3	361	0	843	116	216	654	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	0	10	0	0	10	0	5	10	0
Maximum Green [s]	0	0	0	0	30	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	0.0	3.6	0.0	0.0	4.7	0.0	3.2	4.7	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	0	45	0	0	32	0	23	55	0
Vehicle Extension [s]	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	7	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk					No			No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	2.6	0.0	0.0	3.7	0.0	2.2	3.7	0.0
Minimum Recall					No			No		No	No	
Maximum Recall					No			No		No	No	
Pedestrian Recall					No			No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	R	L	C
C, Cycle Length [s]		100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]		4.60	4.60	4.60	5.70	5.70	4.20	5.70
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.60	2.60	2.60	3.70	3.70	2.20	3.70
g_i, Effective Green Time [s]		42	42	42	28	28	16	48
g / C, Green / Cycle		0.42	0.42	0.42	0.28	0.28	0.16	0.48
(v / s)_i Volume / Saturation Flow Rate		0.03	0.03	0.25	0.26	0.08	0.13	0.20
s, saturation flow rate [veh/h]		1603	1608	1431	3204	1431	1603	3204
c, Capacity [veh/h]		666	668	594	910	406	250	1544
d1, Uniform Delay [s]		17.60	17.60	22.88	34.78	27.90	41.21	16.88
k, delay calibration		0.50	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.20	0.20	4.58	4.68	0.38	8.76	0.19
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.07	0.07	0.61	0.93	0.29	0.87	0.42
d, Delay for Lane Group [s/veh]		17.79	17.79	27.45	39.47	28.28	49.97	17.06
Lane Group LOS		B	B	C	D	C	D	B
Critical Lane Group		No	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		0.62	0.62	6.87	9.80	2.08	5.52	4.40
50th-Percentile Queue Length [ft/ln]		15.55	15.59	171.82	245.02	51.89	137.97	110.03
95th-Percentile Queue Length [veh/ln]		1.12	1.12	11.17	14.93	3.74	9.37	7.84
95th-Percentile Queue Length [ft/ln]		27.98	28.07	279.31	373.37	93.39	234.28	196.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	17.79	17.79	27.45	0.00	39.47	28.28	49.97	17.06	0.00
Movement LOS				B	B	C		D	C	D	B	
d_A, Approach Delay [s/veh]	0.00			25.52			38.12			25.23		
Approach LOS	A			C			D			C		
d_I, Intersection Delay [s/veh]	30.71											
Intersection LOS	C											
Intersection V/C	0.650											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	1.883	2.301	3.057	0.000
Crosswalk LOS	A	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	808	526	986
d_b, Bicycle Delay [s]	50.01	17.77	27.17	12.86
l_b,int, Bicycle LOS Score for Intersection	4.132	2.304	2.351	2.277
Bicycle LOS	D	B	B	B

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: Golden Valley/NB SR-14

Control Type:	Signalized	Delay (sec / veh):	27.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.601

Intersection Setup

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	185.00	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	360.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	248	5	395	0	0	0	312	564	0	0	580	205
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	248	5	395	0	0	0	312	564	0	0	580	205
Peak Hour Factor	0.9270	0.9270	0.9270	1.0000	1.0000	1.0000	0.9270	0.9270	1.0000	1.0000	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	1	107	0	0	0	84	152	0	0	156	55
Total Analysis Volume [veh/h]	268	5	426	0	0	0	337	608	0	0	626	221
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	10	0	0	0	0	5	10	0	0	10	0
Maximum Green [s]	0	30	0	0	0	0	30	30	0	0	30	0
Amber [s]	0.0	3.6	0.0	0.0	0.0	0.0	3.6	4.7	0.0	0.0	4.7	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	62	0	0	0	0	18	38	0	0	20	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	0	0	0	14	0	0	7	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No						No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.6	0.0	0.0	0.0	0.0	2.6	3.7	0.0	0.0	3.7	0.0
Minimum Recall		No					No	No			No	
Maximum Recall		No					No	No			No	
Pedestrian Recall		No					No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R		L	C	C	R
C, Cycle Length [s]	100	100	100		100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60		4.60	5.70	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60		2.60	3.70	3.70	3.70
g_i, Effective Green Time [s]	32	32	32		13	57	40	40
g / C, Green / Cycle	0.32	0.32	0.32		0.13	0.57	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.09	0.09	0.30		0.11	0.19	0.20	0.15
s, saturation flow rate [veh/h]	1603	1606	1431		3113	3204	3204	1431
c, Capacity [veh/h]	521	522	465		396	1833	1278	571
d1, Uniform Delay [s]	24.91	24.91	32.46		42.71	11.30	22.46	21.37
k, delay calibration	0.11	0.11	0.11		0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.26	0.26	7.64		5.18	0.49	1.34	1.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.26	0.26	0.92		0.85	0.33	0.49	0.39
d, Delay for Lane Group [s/veh]	25.18	25.18	40.11		47.90	11.78	23.80	23.35
Lane Group LOS	C	C	D		D	B	C	C
Critical Lane Group	No	No	Yes		Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.30	2.31	10.20		4.15	3.16	5.26	3.69
50th-Percentile Queue Length [ft/ln]	57.58	57.66	255.06		103.77	79.01	131.43	92.15
95th-Percentile Queue Length [veh/ln]	4.15	4.15	15.44		7.47	5.69	9.02	6.63
95th-Percentile Queue Length [ft/ln]	103.64	103.78	386.02		186.79	142.21	225.44	165.87

Movement, Approach, & Intersection Results

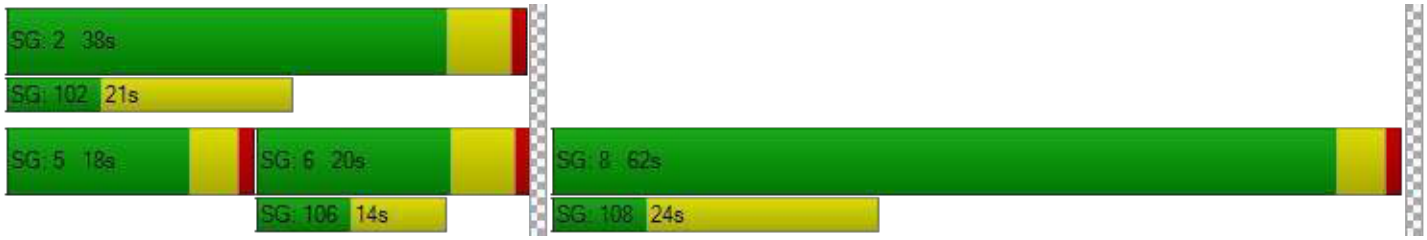
d_M, Delay for Movement [s/veh]	25.18	25.18	40.11	0.00	0.00	0.00	47.90	11.78	0.00	0.00	23.80	23.35
Movement LOS	C	C	D				D	B			C	C
d_A, Approach Delay [s/veh]	34.28			0.00			24.66			23.69		
Approach LOS	C			A			C			C		
d_I, Intersection Delay [s/veh]	27.03											
Intersection LOS	C											
Intersection V/C	0.601											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.391	1.994	0.000	2.916
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1148	0	646	286
d_b, Bicycle Delay [s]	9.08	50.00	22.92	36.73
l_b,int, Bicycle LOS Score for Intersection	2.713	4.132	2.339	2.258
Bicycle LOS	B	D	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Sierra/Friendly Valley

Control Type:	Signalized	Delay (sec / veh):	22.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.559

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	125.00	100.00	100.00	135.00	100.00	400.00	100.00	100.00	100.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Base Volume Input [veh/h]	98	1280	50	76	479	42	61	10	54	42	20	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	98	1280	50	76	479	42	61	10	54	42	20	68
Peak Hour Factor	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	335	13	20	125	11	16	3	14	11	5	18
Total Analysis Volume [veh/h]	103	1339	52	79	501	44	64	10	56	44	21	71
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	0	10	0	0	10	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	41	48	0	20	27	0	0	32	0	0	32	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	14	0	0	17	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	5.70	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	3.70	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	58	58	6	56	56	21	21	21	21
g / C, Green / Cycle	0.08	0.58	0.58	0.06	0.56	0.56	0.21	0.21	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.06	0.42	0.42	0.05	0.16	0.03	0.09	0.04	0.04	0.06
s, saturation flow rate [veh/h]	1603	1683	1661	1603	3204	1431	797	1431	1202	1481
c, Capacity [veh/h]	129	980	967	99	1806	806	237	305	136	315
d1, Uniform Delay [s]	45.19	14.91	14.95	46.31	11.28	9.82	38.95	32.23	46.54	33.02
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.77	4.41	4.52	13.62	0.38	0.13	0.74	0.29	1.37	0.51
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.71	0.72	0.80	0.28	0.05	0.31	0.18	0.32	0.29
d, Delay for Lane Group [s/veh]	55.96	19.32	19.48	59.93	11.67	9.95	39.69	32.52	47.91	33.53
Lane Group LOS	E	B	B	E	B	A	D	C	D	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	2.90	11.88	11.82	2.32	2.90	0.46	1.71	1.13	1.12	1.91
50th-Percentile Queue Length [ft/ln]	72.62	296.96	295.53	57.97	72.58	11.45	42.67	28.27	28.04	47.67
95th-Percentile Queue Length [veh/ln]	5.23	17.53	17.46	4.17	5.23	0.82	3.07	2.04	2.02	3.43
95th-Percentile Queue Length [ft/ln]	130.71	438.27	436.50	104.35	130.65	20.61	76.80	50.88	50.47	85.80

Movement, Approach, & Intersection Results

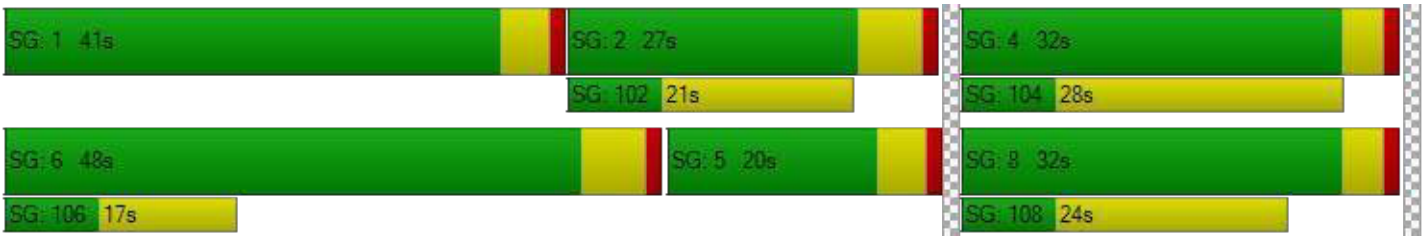
d_M, Delay for Movement [s/veh]	55.96	19.40	19.48	59.93	11.67	9.95	39.69	39.69	32.52	47.91	33.53	33.53
Movement LOS	E	B	B	E	B	A	D	D	C	D	C	C
d_A, Approach Delay [s/veh]	21.92			17.65			36.60			38.18		
Approach LOS	C			B			D			D		
d_I, Intersection Delay [s/veh]	22.53											
Intersection LOS	C											
Intersection V/C	0.559											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.708	2.833	2.209	2.035
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	846	426	560	560
d_b, Bicycle Delay [s]	16.65	30.97	25.92	25.92
l_b,int, Bicycle LOS Score for Intersection	2.792	2.074	1.774	1.784
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sierra/Via Princessa

Control Type:	Signalized	Delay (sec / veh):	41.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.634

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	200.00	100.00	100.00	200.00	100.00	250.00	360.00	100.00	630.00	200.00	100.00	300.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Base Volume Input [veh/h]	440	930	214	217	364	762	226	872	167	190	769	208
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	440	930	214	217	364	762	226	872	167	190	769	208
Peak Hour Factor	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	112	237	55	55	93	195	58	223	43	49	196	53
Total Analysis Volume [veh/h]	449	950	219	222	372	778	231	891	171	194	785	212
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	4	5	2	2	1	6	0
Auxiliary Signal Groups						4,5			2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	4.7	3.6	4.7	4.7	3.6	4.7	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	22	48	0	15	41	41	16	41	41	16	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	28	0	28	28	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	3.7	2.6	3.7	3.7	2.6	3.7	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	4.60	4.60	5.70	4.60	4.60	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	0.00	2.60	3.70	0.00	2.60	3.70	3.70
g_i, Effective Green Time [s]	17	29	29	10	22	39	11	50	73	9	48	48
g / C, Green / Cycle	0.15	0.24	0.24	0.09	0.19	0.33	0.10	0.42	0.61	0.08	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.14	0.21	0.15	0.07	0.08	0.31	0.07	0.19	0.12	0.06	0.17	0.15
s, saturation flow rate [veh/h]	3113	4584	1431	3113	4584	2532	3113	4584	1431	3113	4584	1431
c, Capacity [veh/h]	452	1116	348	272	850	832	297	1918	874	247	1844	575
d1, Uniform Delay [s]	51.25	43.34	40.57	53.86	43.36	39.09	53.05	25.20	10.31	54.29	25.89	25.19
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	18.02	1.93	1.87	5.98	0.36	5.67	4.36	0.81	0.50	5.50	0.72	1.81
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.99	0.85	0.63	0.82	0.44	0.94	0.78	0.46	0.20	0.79	0.43	0.37
d, Delay for Lane Group [s/veh]	69.27	45.28	42.44	59.84	43.71	44.76	57.41	26.01	10.81	59.78	26.61	27.01
Lane Group LOS	E	D	D	E	D	D	E	C	B	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	7.61	8.76	5.72	3.41	3.18	11.11	3.47	5.89	1.90	2.97	5.21	4.30
50th-Percentile Queue Length [ft/ln]	190.37	219.05	143.10	85.28	79.57	277.73	86.77	147.16	47.48	74.33	130.33	107.56
95th-Percentile Queue Length [veh/ln]	12.14	13.62	9.65	6.14	5.73	16.58	6.25	9.87	3.42	5.35	8.96	7.70
95th-Percentile Queue Length [ft/ln]	303.51	340.42	241.19	153.50	143.22	414.38	156.18	246.63	85.46	133.79	223.95	192.60

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	69.27	45.28	42.44	59.84	43.71	44.76	57.41	26.01	10.81	59.78	26.61	27.01
Movement LOS	E	D	D	E	D	D	E	C	B	E	C	C
d_A, Approach Delay [s/veh]	51.55			46.92			29.61			32.09		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	40.97											
Intersection LOS	D											
Intersection V/C	0.634											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	3.288	3.430	3.460	3.319
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	705	588	588	588
d_b, Bicycle Delay [s]	25.17	29.91	29.91	29.91
l_b,int, Bicycle LOS Score for Intersection	2.450	2.314	2.271	2.215
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

EXISTING PLUS PROJECT CONDITIONS

Intersection Level Of Service Report
Intersection 1: Golden Valley/Centre Pointe

Control Type:	Signalized	Delay (sec / veh):	36.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.724

Intersection Setup

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	400.00	100.00	350.00	700.00	100.00	100.00	260.00	100.00	260.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Base Volume Input [veh/h]	248	745	355	120	951	82	23	39	157	458	48	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	8	0	0	8	0	0	0	3	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	251	753	355	120	959	82	23	39	160	458	48	41
Peak Hour Factor	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	65	196	93	31	250	21	6	10	42	119	13	11
Total Analysis Volume [veh/h]	262	785	370	125	1000	86	24	41	167	478	50	43
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Split	Split	Overlap	Split	Split	Split
Signal Group	1	6	6	5	2	0	0	8	8	0	4	0
Auxiliary Signal Groups			6						1,8			
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	10	5	10	0	0	10	10	0	10	0
Maximum Green [s]	30	30	30	30	30	0	0	30	30	0	30	0
Amber [s]	3.2	4.7	4.7	3.2	4.7	0.0	0.0	3.9	3.9	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	21	39	39	14	32	0	0	15	15	0	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	5	5	0	7	0
Pedestrian Clearance [s]	0	17	17	0	17	0	0	10	10	0	20	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.2	3.7	3.7	2.2	3.7	0.0	0.0	2.9	2.9	0.0	2.6	0.0
Minimum Recall	No	No	No	No	No			No	No		No	
Maximum Recall	No	No	No	No	No			No	No		No	
Pedestrian Recall	No	No	No	No	No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	5.70	5.70	4.20	5.70	5.70	4.90	4.90	4.20	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	3.70	3.70	2.20	3.70	3.70	2.90	2.90	0.00	2.60	2.60
g_i, Effective Green Time [s]	17	43	43	9	36	36	10	10	32	18	18
g / C, Green / Cycle	0.17	0.43	0.43	0.09	0.36	0.36	0.10	0.10	0.32	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.16	0.24	0.26	0.08	0.31	0.06	0.01	0.02	0.12	0.15	0.06
s, saturation flow rate [veh/h]	1603	3204	1431	1603	3204	1431	1603	1683	1431	3113	1556
c, Capacity [veh/h]	270	1374	613	152	1138	508	161	169	454	568	284
d1, Uniform Delay [s]	41.41	21.65	22.05	44.51	30.27	22.16	41.14	41.54	26.40	39.54	35.59
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	20.23	1.73	4.36	10.53	9.72	0.72	0.42	0.74	0.50	3.46	0.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.97	0.57	0.60	0.82	0.88	0.17	0.15	0.24	0.37	0.84	0.33
d, Delay for Lane Group [s/veh]	61.65	23.38	26.41	55.04	39.99	22.88	41.57	42.28	26.90	43.00	36.26
Lane Group LOS	E	C	C	E	D	C	D	D	C	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	7.57	6.60	6.76	3.34	11.80	1.39	0.55	0.95	3.02	5.82	1.99
50th-Percentile Queue Length [ft/ln]	189.26	164.99	169.03	83.60	294.89	34.83	13.68	23.64	75.51	145.38	49.85
95th-Percentile Queue Length [veh/ln]	12.08	10.81	11.03	6.02	17.43	2.51	0.98	1.70	5.44	9.77	3.59
95th-Percentile Queue Length [ft/ln]	302.07	270.32	275.64	150.47	435.70	62.69	24.62	42.55	135.92	244.25	89.72

Movement, Approach, & Intersection Results

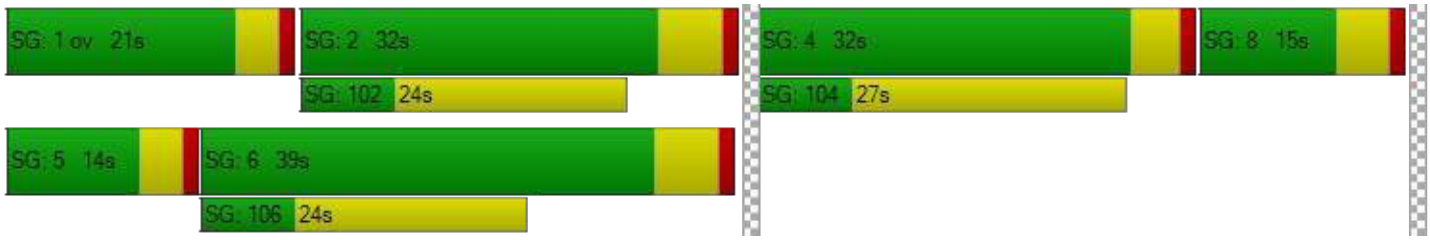
d_M, Delay for Movement [s/veh]	61.65	23.38	26.41	55.04	39.99	22.88	41.57	42.28	26.90	43.00	36.26	36.26
Movement LOS	E	C	C	E	D	C	D	D	C	D	D	D
d_A, Approach Delay [s/veh]	31.25			40.33			31.14			41.90		
Approach LOS	C			D			C			D		
d_I, Intersection Delay [s/veh]	36.22											
Intersection LOS	D											
Intersection V/C	0.724											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	39.64	39.64	39.64
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.016	2.341	2.451
Crosswalk LOS	F	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	665	526	202	548
d_b, Bicycle Delay [s]	22.28	27.19	40.45	26.39
l_b,int, Bicycle LOS Score for Intersection	2.729	2.559	1.942	2.502
Bicycle LOS	B	B	A	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Golden Valley/Robert C Lee

Control Type:	Signalized	Delay (sec / veh):	27.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.749

Intersection Setup

Name	Robert C Lee		Golden Valley		Golden Valley		
Approach	Southbound		Eastbound		Westbound		
Lane Configuration							
Turning Movement	Left	Right	Left	Thru	U-turn	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0	1
Entry Pocket Length [ft]	170.00	100.00	450.00	100.00	150.00	100.00	275.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	800.00	0.00	0.00	0.00
Speed [mph]	35.00		50.00		50.00		
Grade [%]	0.00		0.00		0.00		
Curb Present	No		No		No		
Crosswalk	Yes		Yes		No		

Volumes

Name	Robert C Lee		Golden Valley		Golden Valley		
Base Volume Input [veh/h]	608	298	416	1185	0	1151	682
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	11	42	11	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	608	298	416	1196	42	1162	682
Peak Hour Factor	0.9030	0.9030	0.9030	0.9030	0.9030	0.9030	0.9030
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	168	83	115	331	12	322	189
Total Analysis Volume [veh/h]	673	330	461	1324	47	1287	755
Presence of On-Street Parking	No	No	No	No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0		
v_di, Inbound Pedestrian Volume crossing m	0		0		0		
v_co, Outbound Pedestrian Volume crossing	0		0		0		
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0		
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0		
Bicycle Volume [bicycles/h]	0		0		0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive	Overlap
Signal Group	7	0	5	2	1	6	6
Auxiliary Signal Groups							6,7
Lead / Lag	Lead	-	Lead	-	Lead	-	-
Minimum Green [s]	5	0	5	10	5	10	10
Maximum Green [s]	30	0	30	30	30	30	30
Amber [s]	3.2	0.0	3.2	4.7	3.2	4.7	4.7
All red [s]	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	32	0	38	42	26	30	30
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	0	0	5	0	7	7
Pedestrian Clearance [s]	20	0	0	10	0	17	17
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No		No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	0.0	2.2	3.7	2.2	3.7	3.7
Minimum Recall	No		No	No	No	No	No
Maximum Recall	No		No	No	No	No	No
Pedestrian Recall	No		No	No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	L	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	5.70	4.20	5.70	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	3.70	2.20	3.70	0.00
g_i, Effective Green Time [s]	28	28	18	54	4	41	74
g / C, Green / Cycle	0.28	0.28	0.18	0.54	0.04	0.41	0.74
(v / s)_i Volume / Saturation Flow Rate	0.22	0.23	0.15	0.41	0.03	0.28	0.53
s, saturation flow rate [veh/h]	3113	1431	3113	3204	1603	4584	1431
c, Capacity [veh/h]	865	398	547	1742	60	1858	1059
d1, Uniform Delay [s]	33.26	33.88	39.88	17.76	47.73	24.59	7.14
k, delay calibration	0.11	0.28	0.11	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.55	10.74	3.62	3.18	19.39	2.15	4.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.78	0.83	0.84	0.76	0.78	0.69	0.71
d, Delay for Lane Group [s/veh]	34.80	44.62	43.51	20.94	67.12	26.75	11.24
Lane Group LOS	C	D	D	C	E	C	B
Critical Lane Group	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.46	8.46	5.45	10.78	1.44	7.96	6.67
50th-Percentile Queue Length [ft/ln]	186.53	211.39	136.14	269.53	35.89	199.02	166.79
95th-Percentile Queue Length [veh/ln]	11.94	13.22	9.27	16.17	2.58	12.59	10.91
95th-Percentile Queue Length [ft/ln]	298.52	330.61	231.81	404.16	64.60	314.70	272.68

Movement, Approach, & Intersection Results

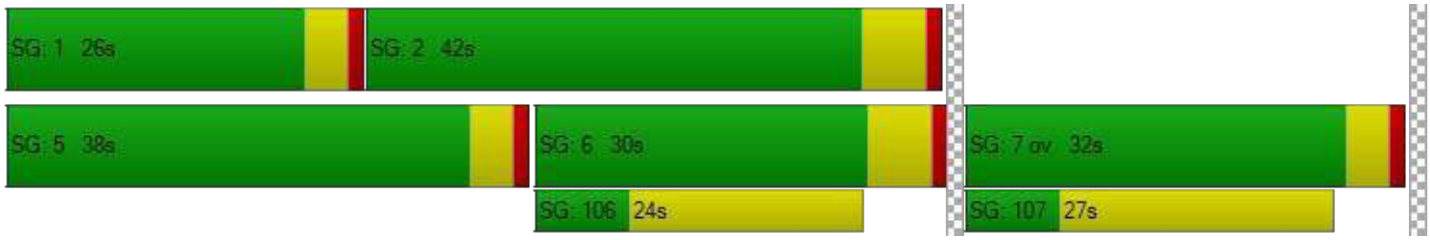
d_M, Delay for Movement [s/veh]	34.80	44.62	43.51	20.94	67.12	26.75	11.24
Movement LOS	C	D	D	C	E	C	B
d_A, Approach Delay [s/veh]	38.03		26.77		22.05		
Approach LOS	D		C		C		
d_I, Intersection Delay [s/veh]	27.06						
Intersection LOS	C						
Intersection V/C	0.749						

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.810	3.388	0.000
Crosswalk LOS	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	556	726	486
d_b, Bicycle Delay [s]	26.07	20.29	28.66
l_b,int, Bicycle LOS Score for Intersection	1.560	3.032	2.709
Bicycle LOS	A	C	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Golden Valley/Sierra Hwy

Control Type:	Signalized	Delay (sec / veh):	63.3
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.957

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	2	0	2	1	0	1
Entry Pocket Length [ft]	430.00	100.00	100.00	415.00	100.00	500.00	285.00	100.00	325.00	285.00	100.00	295.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	540	199	14	31	1093	405	347	491	907	507	895	77
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	0	0	0	0	11	11	26	5	0	26	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	545	199	14	31	1093	416	358	517	912	507	921	77
Peak Hour Factor	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	143	52	4	8	287	109	94	136	239	133	242	20
Total Analysis Volume [veh/h]	572	209	15	33	1147	437	376	542	957	532	966	81
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	2	3	8	8	7	4	0
Auxiliary Signal Groups						2,3			1,8			
Lead / Lag	Lead	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	25	54	0	9	38	38	19	36	36	21	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	5	5	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	25	0	10	10	0	27	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	57	57	3	39	58	15	25	50	19	29	29
g / C, Green / Cycle	0.18	0.47	0.47	0.03	0.33	0.48	0.13	0.21	0.42	0.15	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.18	0.07	0.07	0.02	0.36	0.31	0.12	0.17	0.38	0.17	0.21	0.06
s, saturation flow rate [veh/h]	3113	1683	1644	1603	3204	1431	3113	3204	2532	3113	4584	1431
c, Capacity [veh/h]	545	797	778	45	1046	694	389	676	1061	481	1101	344
d1, Uniform Delay [s]	49.50	17.83	17.83	57.90	40.42	22.93	52.25	44.98	32.54	50.74	43.89	36.72
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.27	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	32.79	0.37	0.38	20.94	58.07	4.31	14.58	2.28	7.26	55.39	2.42	0.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.05	0.14	0.14	0.74	1.10	0.63	0.97	0.80	0.90	1.11	0.88	0.24
d, Delay for Lane Group [s/veh]	82.29	18.20	18.21	78.84	98.48	27.24	66.82	47.25	39.80	106.13	46.30	37.07
Lane Group LOS	F	B	B	E	F	C	E	D	D	F	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	10.31	1.75	1.72	1.22	22.93	9.25	6.21	7.56	13.06	10.62	9.03	1.88
50th-Percentile Queue Length [ft/ln]	257.70	43.84	42.90	30.60	573.19	231.31	155.34	189.04	326.42	265.62	225.75	47.05
95th-Percentile Queue Length [veh/ln]	15.95	3.16	3.09	2.20	32.66	14.24	10.30	12.07	18.98	16.72	13.96	3.39
95th-Percentile Queue Length [ft/ln]	398.66	78.91	77.22	55.07	816.50	356.02	257.54	301.78	474.58	417.94	348.96	84.69

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	82.29	18.21	18.21	78.84	98.48	27.24	66.82	47.25	39.80	106.13	46.30	37.07
Movement LOS	F	B	B	E	F	C	E	D	D	F	D	D
d_A, Approach Delay [s/veh]	64.25			78.83			47.37			65.99		
Approach LOS	E			E			D			E		
d_I, Intersection Delay [s/veh]	63.34											
Intersection LOS	E											
Intersection V/C	0.957											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.085	3.558	3.255
Crosswalk LOS	F	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	833	567	533	567
d_b, Bicycle Delay [s]	20.42	30.82	32.27	30.82
l_b,int, Bicycle LOS Score for Intersection	2.216	2.894	3.106	2.428
Bicycle LOS	B	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 4: Golden Valley/SB SR-14

Control Type:	Signalized	Delay (sec / veh):	31.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.670

Intersection Setup

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	300.00	100.00	100.00	100.00	100.00	270.00	200.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	0	0	0	30	228	401	0	502	267	212	980	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	8	0	13	13	0	18	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	30	228	409	0	515	280	212	998	0
Peak Hour Factor	1.0000	1.0000	1.0000	0.9160	0.9160	0.9160	1.0000	0.9160	0.9160	0.9160	0.9160	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	8	62	112	0	141	76	58	272	0
Total Analysis Volume [veh/h]	0	0	0	33	249	447	0	562	306	231	1090	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	0	10	0	0	10	0	5	10	0
Maximum Green [s]	0	0	0	0	30	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	0.0	3.6	0.0	0.0	4.7	0.0	3.2	4.7	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	0	55	0	0	26	0	19	45	0
Vehicle Extension [s]	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	7	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk					No			No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	2.6	0.0	0.0	3.7	0.0	2.2	3.7	0.0
Minimum Recall					No			No		No	No	
Maximum Recall					No			No		No	No	
Pedestrian Recall					No			No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	R	L	C
C, Cycle Length [s]		100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]		4.60	4.60	4.60	5.70	5.70	4.20	5.70
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.60	2.60	2.60	3.70	3.70	2.20	3.70
g_i, Effective Green Time [s]		45	45	45	24	24	16	45
g / C, Green / Cycle		0.45	0.45	0.45	0.24	0.24	0.16	0.45
(v / s)_i Volume / Saturation Flow Rate		0.02	0.15	0.31	0.18	0.21	0.14	0.34
s, saturation flow rate [veh/h]		1603	1683	1431	3204	1431	1603	3204
c, Capacity [veh/h]		718	754	641	775	346	265	1438
d1, Uniform Delay [s]		15.55	17.87	22.15	34.87	36.58	40.74	23.03
k, delay calibration		0.50	0.50	0.50	0.11	0.21	0.11	0.11
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.12	1.17	6.18	1.31	13.56	8.75	0.84
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.05	0.33	0.70	0.73	0.88	0.87	0.76
d, Delay for Lane Group [s/veh]		15.67	19.05	28.33	36.19	50.14	49.49	23.87
Lane Group LOS		B	B	C	D	D	D	C
Critical Lane Group		No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]		0.42	3.68	8.74	6.03	8.03	5.88	9.69
50th-Percentile Queue Length [ft/ln]		10.50	92.01	218.58	150.72	200.70	147.06	242.32
95th-Percentile Queue Length [veh/ln]		0.76	6.62	13.59	10.06	12.67	9.86	14.80
95th-Percentile Queue Length [ft/ln]		18.90	165.62	339.81	251.39	316.87	246.50	369.96

Movement, Approach, & Intersection Results

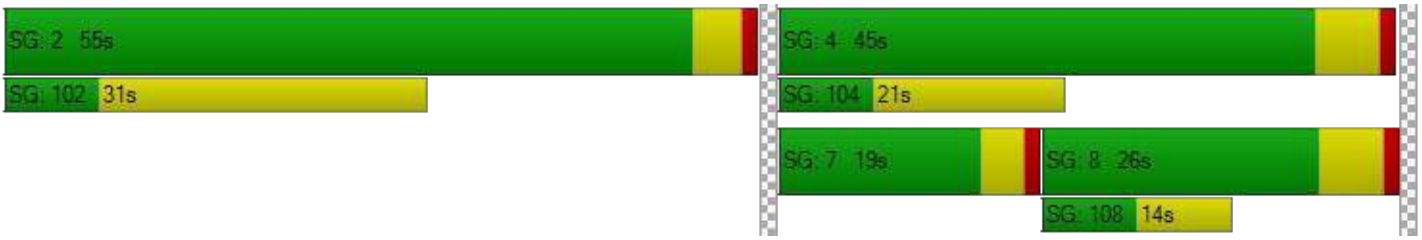
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	15.67	19.05	28.33	0.00	36.19	50.14	49.49	23.87	0.00
Movement LOS				B	B	C		D	D	D	C	
d_A, Approach Delay [s/veh]	0.00			24.59			41.11			28.35		
Approach LOS	A			C			D			C		
d_I, Intersection Delay [s/veh]	31.20											
Intersection LOS	C											
Intersection V/C	0.670											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.103	2.402	3.157	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1008	406	786
d_b, Bicycle Delay [s]	50.01	12.31	31.77	18.43
l_b,int, Bicycle LOS Score for Intersection	4.132	2.762	2.276	2.649
Bicycle LOS	D	C	B	B

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Golden Valley/NB SR-14

Control Type:	Signalized	Delay (sec / veh):	21.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.586

Intersection Setup

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	185.00	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	360.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	157	1	180	0	0	0	208	318	0	0	1030	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	0	0	0	0	0	8	5	0	0	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	170	1	180	0	0	0	216	323	0	0	1035	71
Peak Hour Factor	0.8840	0.8840	0.8840	1.0000	1.0000	1.0000	0.8840	0.8840	1.0000	1.0000	0.8840	0.8840
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	48	0	51	0	0	0	61	91	0	0	293	20
Total Analysis Volume [veh/h]	192	1	204	0	0	0	244	365	0	0	1171	80
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	10	0	0	0	0	5	10	0	0	10	0
Maximum Green [s]	0	30	0	0	0	0	30	30	0	0	30	0
Amber [s]	0.0	3.6	0.0	0.0	0.0	0.0	3.6	4.7	0.0	0.0	4.7	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	45	0	0	0	0	15	55	0	0	40	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	0	0	0	14	0	0	7	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No						No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.6	0.0	0.0	0.0	0.0	2.6	3.7	0.0	0.0	3.7	0.0
Minimum Recall		No					No	No			No	
Maximum Recall		No					No	No			No	
Pedestrian Recall		No					No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R		L	C	C	R
C, Cycle Length [s]	100	100	100		100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60		4.60	5.70	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60		2.60	3.70	3.70	3.70
g_i, Effective Green Time [s]	17	17	17		10	73	59	59
g / C, Green / Cycle	0.17	0.17	0.17		0.10	0.73	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.06	0.06	0.14		0.08	0.11	0.37	0.06
s, saturation flow rate [veh/h]	1603	1604	1431		3113	3204	3204	1431
c, Capacity [veh/h]	269	269	240		304	2336	1875	837
d1, Uniform Delay [s]	36.83	36.83	40.37		44.18	4.15	13.56	9.11
k, delay calibration	0.11	0.11	0.11		0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.80	0.80	8.10		4.92	0.14	1.58	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.36	0.36	0.85		0.80	0.16	0.62	0.10
d, Delay for Lane Group [s/veh]	37.63	37.63	48.47		49.09	4.29	15.14	9.34
Lane Group LOS	D	D	D		D	A	B	A
Critical Lane Group	No	No	Yes		Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.07	2.07	5.19		3.02	0.82	7.53	0.71
50th-Percentile Queue Length [ft/ln]	51.68	51.70	129.81		75.62	20.38	188.34	17.67
95th-Percentile Queue Length [veh/ln]	3.72	3.72	8.93		5.44	1.47	12.04	1.27
95th-Percentile Queue Length [ft/ln]	93.02	93.06	223.24		136.11	36.69	300.88	31.81

Movement, Approach, & Intersection Results

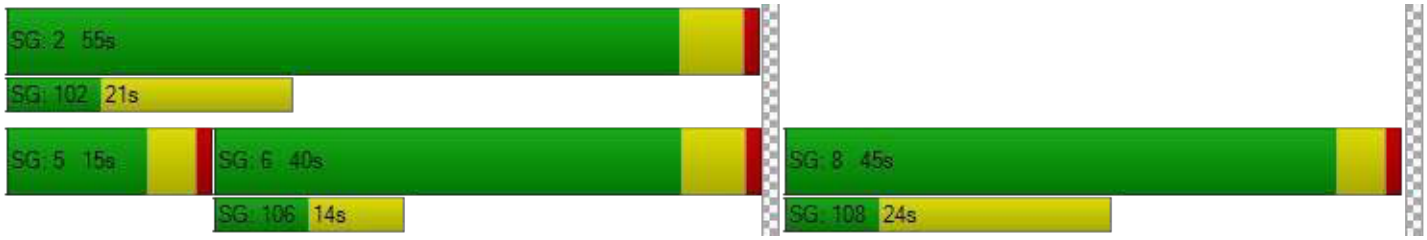
d_M, Delay for Movement [s/veh]	37.63	37.63	48.47	0.00	0.00	0.00	49.09	4.29	0.00	0.00	15.14	9.34
Movement LOS	D	D	D				D	A			B	A
d_A, Approach Delay [s/veh]	43.20			0.00			22.24			14.77		
Approach LOS	D			A			C			B		
d_I, Intersection Delay [s/veh]	21.78											
Intersection LOS	C											
Intersection V/C	0.586											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.281	1.878	0.000	2.896
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	808	0	986	686
d_b, Bicycle Delay [s]	17.76	50.00	12.86	21.59
l_b,int, Bicycle LOS Score for Intersection	2.215	4.132	2.062	2.592
Bicycle LOS	B	D	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Sierra/Friendly Valley

Control Type:	Signalized	Delay (sec / veh):	25.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.550

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	125.00	100.00	100.00	135.00	100.00	400.00	100.00	100.00	100.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Base Volume Input [veh/h]	44	398	87	196	1130	196	52	24	65	69	18	167
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	11	0	0	11	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	44	409	87	196	1141	196	52	24	65	69	18	167
Peak Hour Factor	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	110	23	53	307	53	14	6	18	19	5	45
Total Analysis Volume [veh/h]	47	441	94	211	1230	211	56	26	70	74	19	180
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	0	10	0	0	10	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	22	23	0	45	46	0	0	32	0	0	32	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	14	0	0	17	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	5.70	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	3.70	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	43	43	15	54	54	28	28	28	28
g / C, Green / Cycle	0.04	0.43	0.43	0.15	0.54	0.54	0.28	0.28	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.03	0.16	0.16	0.13	0.38	0.15	0.12	0.05	0.06	0.14
s, saturation flow rate [veh/h]	1603	1683	1582	1603	3204	1431	657	1431	1169	1451
c, Capacity [veh/h]	59	717	674	245	1737	776	243	398	142	404
d1, Uniform Delay [s]	47.81	19.69	19.73	41.33	17.01	12.30	36.16	27.38	47.19	30.18
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	21.58	1.55	1.67	8.69	2.47	0.87	0.81	0.21	2.95	0.93
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.38	0.39	0.86	0.71	0.27	0.34	0.18	0.52	0.49
d, Delay for Lane Group [s/veh]	69.39	21.24	21.40	50.03	19.48	13.16	36.97	27.59	50.14	31.11
Lane Group LOS	E	C	C	D	B	B	D	C	D	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.52	4.67	4.47	5.66	10.66	2.68	1.87	1.28	1.95	4.06
50th-Percentile Queue Length [ft/ln]	37.97	116.84	111.63	141.60	266.48	67.05	46.81	32.11	48.75	101.43
95th-Percentile Queue Length [veh/ln]	2.73	8.22	7.93	9.57	16.01	4.83	3.37	2.31	3.51	7.30
95th-Percentile Queue Length [ft/ln]	68.34	205.48	198.26	239.18	400.34	120.69	84.25	57.80	87.76	182.57

Movement, Approach, & Intersection Results

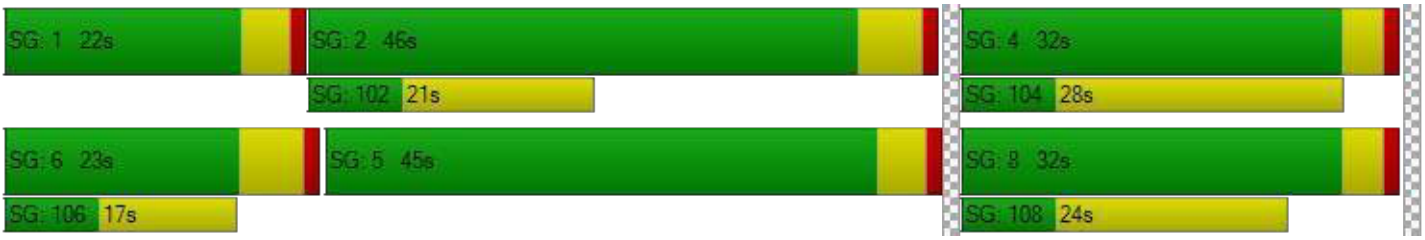
d_M, Delay for Movement [s/veh]	69.39	21.30	21.40	50.03	19.48	13.16	36.97	36.97	27.59	50.14	31.11	31.11
Movement LOS	E	C	C	D	B	B	D	D	C	D	C	C
d_A, Approach Delay [s/veh]	25.20			22.58			32.65			36.27		
Approach LOS	C			C			C			D		
d_I, Intersection Delay [s/veh]	25.13											
Intersection LOS	C											
Intersection V/C	0.550											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.728	2.853	2.240	2.141
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	346	806	560	560
d_b, Bicycle Delay [s]	34.20	17.82	25.92	25.92
l_b,int, Bicycle LOS Score for Intersection	2.040	2.923	1.810	2.010
Bicycle LOS	B	C	A	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sierra/Via Princessa

Control Type:	Signalized	Delay (sec / veh):	39.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.752

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	200.00	100.00	100.00	200.00	100.00	250.00	360.00	100.00	630.00	200.00	100.00	300.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Base Volume Input [veh/h]	351	331	127	169	850	758	171	874	403	295	934	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	3	5	0	3	0	0	0	3	5	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	354	334	132	169	853	758	171	874	406	300	934	78
Peak Hour Factor	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	93	88	35	45	225	200	45	230	107	79	246	21
Total Analysis Volume [veh/h]	373	352	139	178	899	799	180	921	428	316	984	82
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	4	5	2	2	1	6	0
Auxiliary Signal Groups						4,5			2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	4.7	3.6	4.7	4.7	3.6	4.7	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	20	42	0	19	41	41	18	41	41	18	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	28	0	28	28	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	3.7	2.6	3.7	3.7	2.6	3.7	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	4.60	4.60	5.70	4.60	4.60	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	0.00	2.60	3.70	0.00	2.60	3.70	3.70
g_i, Effective Green Time [s]	15	35	35	9	29	48	13	42	63	13	42	42
g / C, Green / Cycle	0.13	0.29	0.29	0.07	0.24	0.40	0.11	0.35	0.52	0.11	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.12	0.08	0.10	0.06	0.20	0.32	0.06	0.20	0.30	0.10	0.21	0.06
s, saturation flow rate [veh/h]	3113	4584	1431	3113	4584	2532	3113	4584	1431	3113	4584	1431
c, Capacity [veh/h]	402	1344	419	235	1098	1012	350	1592	749	350	1592	497
d1, Uniform Delay [s]	51.77	32.52	33.25	54.46	43.22	31.64	50.22	32.03	19.44	52.66	32.59	27.15
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.63	0.10	0.46	4.92	1.57	1.42	1.17	1.54	3.15	8.53	1.81	0.71
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.93	0.26	0.33	0.76	0.82	0.79	0.51	0.58	0.57	0.90	0.62	0.17
d, Delay for Lane Group [s/veh]	61.40	32.62	33.71	59.37	44.78	33.06	51.38	33.57	22.59	61.19	34.40	27.87
Lane Group LOS	E	C	C	E	D	C	D	C	C	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.89	2.53	3.10	2.72	8.20	9.68	2.52	7.13	8.04	4.96	7.77	1.66
50th-Percentile Queue Length [ft/ln]	147.30	63.13	77.43	67.88	204.94	241.97	63.09	178.20	200.91	123.90	194.22	41.53
95th-Percentile Queue Length [veh/ln]	9.87	4.55	5.58	4.89	12.89	14.78	4.54	11.51	12.69	8.61	12.34	2.99
95th-Percentile Queue Length [ft/ln]	246.82	113.64	139.38	122.19	322.33	369.52	113.55	287.66	317.13	215.18	308.50	74.75

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	61.40	32.62	33.71	59.37	44.78	33.06	51.38	33.57	22.59	61.19	34.40	27.87
Movement LOS	E	C	C	E	D	C	D	C	C	E	C	C
d_A, Approach Delay [s/veh]	45.22			41.18			32.59			40.14		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	39.22											
Intersection LOS	D											
Intersection V/C	0.752											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.54	49.54	49.54	49.54
l_p,int, Pedestrian LOS Score for Intersection	3.316	3.385	3.528	3.336
Crosswalk LOS	C	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	605	588	588	588
d_b, Bicycle Delay [s]	29.23	29.93	29.93	29.93
l_b,int, Bicycle LOS Score for Intersection	2.035	2.591	2.401	2.320
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 8: Golden Valley/Project Dwy

Control Type:	Two-way stop	Delay (sec / veh):	31.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.076

Intersection Setup

Name	Project Dwy		Golden Valley		Golden Valley	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	49.21	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		No	

Volumes

Name	Project Dwy		Golden Valley		Golden Valley	
Base Volume Input [veh/h]	0	0	0	1185	1833	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	53	11	42	0	42
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	53	11	1227	1833	42
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	13	3	307	458	11
Total Analysis Volume [veh/h]	0	53	11	1227	1833	42
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.23	0.08	0.01	0.02	0.00
d_M, Delay for Movement [s/veh]	0.00	25.47	31.92	0.00	0.00	0.00
Movement LOS		D	D	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.87	0.24	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	21.81	6.08	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	25.47		0.28		0.00	
Approach LOS	D		A		A	
d_I, Intersection Delay [s/veh]	0.54					
Intersection LOS	D					

Intersection Level Of Service Report
Intersection 1: Golden Valley/Centre Pointe

Control Type:	Signalized	Delay (sec / veh):	57.0
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.870

Intersection Setup

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	400.00	100.00	350.00	700.00	100.00	100.00	260.00	100.00	260.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Base Volume Input [veh/h]	292	984	224	166	1044	77	106	73	442	257	65	142
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	9	0	0	11	0	0	0	4	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	295	993	224	166	1055	77	106	73	446	257	65	142
Peak Hour Factor	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	81	272	61	45	289	21	29	20	122	70	18	39
Total Analysis Volume [veh/h]	323	1088	245	182	1156	84	116	80	488	281	71	156
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Split	Split	Overlap	Split	Split	Split
Signal Group	1	6	6	5	2	0	0	8	8	0	4	0
Auxiliary Signal Groups			6						1,8			
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	10	5	10	0	0	10	10	0	10	0
Maximum Green [s]	30	30	30	30	30	0	0	30	30	0	30	0
Amber [s]	3.2	4.7	4.7	3.2	4.7	0.0	0.0	3.9	3.9	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	29	57	57	19	47	0	0	15	15	0	29	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	5	5	0	7	0
Pedestrian Clearance [s]	0	15	15	0	15	0	0	10	10	0	17	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.2	3.7	3.7	2.2	3.7	0.0	0.0	2.9	2.9	0.0	2.6	0.0
Minimum Recall	No	No	No	No	No			No	No		No	
Maximum Recall	No	No	No	No	No			No	No		No	
Pedestrian Recall	No	No	No	No	No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.20	5.70	5.70	4.20	5.70	5.70	4.90	4.90	4.20	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	3.70	3.70	2.20	3.70	3.70	2.90	2.90	0.00	2.60	2.60
g_i, Effective Green Time [s]	25	51	51	15	41	41	14	14	44	20	20
g / C, Green / Cycle	0.21	0.43	0.43	0.12	0.35	0.35	0.12	0.12	0.36	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.20	0.34	0.17	0.11	0.36	0.06	0.07	0.05	0.34	0.09	0.15
s, saturation flow rate [veh/h]	1603	3204	1431	1603	3204	1431	1603	1683	1431	3113	1501
c, Capacity [veh/h]	331	1374	613	198	1108	494	185	194	519	531	256
d1, Uniform Delay [s]	47.31	29.65	23.63	52.01	39.27	27.30	50.61	49.29	36.96	45.39	48.66
k, delay calibration	0.30	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.50	0.11	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	32.92	4.74	1.94	15.62	39.17	0.74	3.45	1.39	27.03	0.82	13.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.97	0.79	0.40	0.92	1.04	0.17	0.63	0.41	0.94	0.53	0.89
d, Delay for Lane Group [s/veh]	80.22	34.40	25.57	67.63	78.45	28.05	54.06	50.68	63.98	46.22	62.00
Lane Group LOS	F	C	C	E	F	C	D	D	E	D	E
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	12.19	13.48	4.84	6.08	21.29	1.71	3.44	2.27	17.14	3.85	7.51
50th-Percentile Queue Length [ft/ln]	304.85	337.02	121.10	152.01	532.37	42.81	86.11	56.74	428.45	96.29	187.85
95th-Percentile Queue Length [veh/ln]	17.92	19.50	8.45	10.12	29.71	3.08	6.20	4.08	23.93	6.93	12.01
95th-Percentile Queue Length [ft/ln]	448.02	487.55	211.33	253.10	742.78	77.05	155.00	102.12	598.18	173.32	300.23

Movement, Approach, & Intersection Results

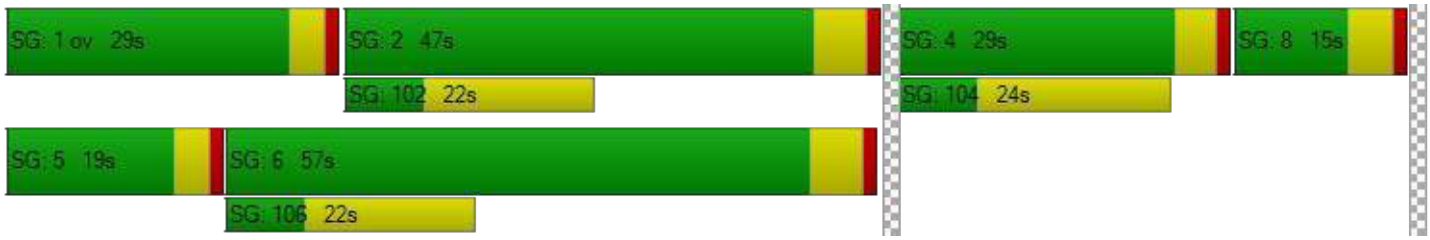
d_M, Delay for Movement [s/veh]	80.22	34.40	25.57	67.63	78.45	28.05	54.06	50.68	63.98	46.22	62.00	62.00
Movement LOS	F	C	C	E	F	C	D	D	E	D	E	E
d_A, Approach Delay [s/veh]	42.03			74.08			60.75			53.27		
Approach LOS	D			E			E			D		
d_I, Intersection Delay [s/veh]	57.04											
Intersection LOS	E											
Intersection V/C	0.870											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.220	2.523	2.434
Crosswalk LOS	F	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	855	688	168	407
d_b, Bicycle Delay [s]	19.67	25.82	50.33	38.09
l_b,int, Bicycle LOS Score for Intersection	2.926	2.733	2.688	2.398
Bicycle LOS	C	B	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Golden Valley/Robert C Lee

Control Type:	Signalized	Delay (sec / veh):	12.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.645

Intersection Setup

Name	Robert C Lee		Golden Valley		Golden Valley		
Approach	Southbound		Eastbound		Westbound		
Lane Configuration							
Turning Movement	Left	Right	Left	Thru	U-turn	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0	1
Entry Pocket Length [ft]	170.00	100.00	450.00	100.00	100.00	100.00	275.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	800.00	0.00	0.00	0.00
Speed [mph]	35.00		50.00		50.00		
Grade [%]	0.00		0.00		0.00		
Curb Present	No		No		No		
Crosswalk	Yes		Yes		No		

Volumes

Name	Robert C Lee		Golden Valley		Golden Valley		
Base Volume Input [veh/h]	134	89	61	1705	0	1403	122
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	15	51	12	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	134	89	61	1720	51	1415	122
Peak Hour Factor	0.9770	0.9770	0.9770	0.9770	0.9770	0.9770	0.9770
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	23	16	440	13	362	31
Total Analysis Volume [veh/h]	137	91	62	1760	52	1448	125
Presence of On-Street Parking	No	No	No	No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0		
v_di, Inbound Pedestrian Volume crossing m	0		0		0		
v_co, Outbound Pedestrian Volume crossing	0		0		0		
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0		
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0		
Bicycle Volume [bicycles/h]	0		0		0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive	Overlap
Signal Group	7	0	5	2	1	6	6
Auxiliary Signal Groups							6,7
Lead / Lag	Lead	-	Lead	-	Lead	-	-
Minimum Green [s]	5	0	5	10	5	10	10
Maximum Green [s]	30	0	30	30	30	30	30
Amber [s]	3.2	0.0	3.2	4.7	3.2	4.7	4.7
All red [s]	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	32	0	10	42	26	58	58
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	0	0	5	0	7	7
Pedestrian Clearance [s]	20	0	0	10	0	17	17
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No		No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	0.0	2.2	3.7	2.2	3.7	3.7
Minimum Recall	No		No	No	No	No	No
Maximum Recall	No		No	No	No	No	No
Pedestrian Recall	No		No	No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	L	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	5.70	4.20	5.70	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	3.70	2.20	3.70	0.00
g_i, Effective Green Time [s]	9	9	4	73	4	73	87
g / C, Green / Cycle	0.09	0.09	0.04	0.73	0.04	0.73	0.87
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.02	0.55	0.03	0.32	0.09
s, saturation flow rate [veh/h]	3113	1431	3113	3204	1603	4584	1431
c, Capacity [veh/h]	283	130	131	2329	66	3328	1250
d1, Uniform Delay [s]	43.23	44.13	46.82	8.28	47.51	5.49	0.87
k, delay calibration	0.11	0.11	0.11	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.28	6.63	2.64	2.34	18.29	0.42	0.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.48	0.70	0.47	0.76	0.79	0.44	0.10
d, Delay for Lane Group [s/veh]	44.51	50.77	49.46	10.62	65.80	5.90	1.03
Lane Group LOS	D	D	D	B	E	A	A
Critical Lane Group	No	Yes	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.64	2.39	0.77	8.13	1.56	2.81	0.06
50th-Percentile Queue Length [ft/ln]	40.94	59.81	19.25	203.17	39.10	70.19	1.39
95th-Percentile Queue Length [veh/ln]	2.95	4.31	1.39	12.80	2.81	5.05	0.10
95th-Percentile Queue Length [ft/ln]	73.69	107.66	34.66	320.05	70.37	126.33	2.50

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	44.51	50.77	49.46	10.62	65.80	5.90	1.03
Movement LOS	D	D	D	B	E	A	A
d_A, Approach Delay [s/veh]	47.01		11.94		7.45		
Approach LOS	D		B		A		
d_I, Intersection Delay [s/veh]	12.13						
Intersection LOS	B						
Intersection V/C	0.645						

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.399	3.379	0.000
Crosswalk LOS	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	556	726	1046
d_b, Bicycle Delay [s]	26.07	20.29	11.38
l_b,int, Bicycle LOS Score for Intersection	1.560	3.063	2.453
Bicycle LOS	A	C	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Golden Valley/Sierra Hwy

Control Type:	Signalized	Delay (sec / veh):	45.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.723

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	2	0	2	1	0	1
Entry Pocket Length [ft]	430.00	100.00	100.00	415.00	100.00	500.00	285.00	100.00	325.00	285.00	100.00	295.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	602	1089	134	67	291	265	407	732	640	54	678	81
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	7	0	0	0	0	15	12	33	6	0	36	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	609	1089	134	67	291	280	419	765	646	54	714	81
Peak Hour Factor	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	156	278	34	17	74	72	107	195	165	14	182	21
Total Analysis Volume [veh/h]	622	1112	137	68	297	286	428	781	660	55	729	83
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	2	3	8	8	7	4	0
Auxiliary Signal Groups						2,3			1,8			
Lead / Lag	Lead	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	26	52	0	10	36	36	20	48	48	10	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	5	5	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	25	0	10	10	0	27	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	59	59	6	43	63	16	34	60	4	23	23
g / C, Green / Cycle	0.18	0.50	0.50	0.05	0.36	0.53	0.13	0.29	0.50	0.03	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.20	0.37	0.38	0.04	0.09	0.20	0.14	0.24	0.26	0.02	0.16	0.06
s, saturation flow rate [veh/h]	3113	1683	1620	1603	3204	1431	3113	3204	2532	3113	4584	1431
c, Capacity [veh/h]	571	832	801	81	1159	756	416	919	1275	108	861	269
d1, Uniform Delay [s]	49.02	24.43	24.92	56.49	26.95	16.66	52.00	40.37	20.00	56.96	47.09	42.04
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	47.12	6.23	7.31	19.30	0.53	1.44	28.11	2.31	0.33	3.71	2.42	0.65
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.09	0.75	0.78	0.84	0.26	0.38	1.03	0.85	0.52	0.51	0.85	0.31
d, Delay for Lane Group [s/veh]	96.14	30.66	32.22	75.79	27.49	18.10	80.11	42.68	20.33	60.67	49.51	42.69
Lane Group LOS	F	C	C	E	C	B	F	D	C	E	D	D
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	11.93	14.45	14.82	2.42	2.95	4.56	7.65	10.62	5.76	0.85	6.92	2.10
50th-Percentile Queue Length [ft/ln]	298.36	361.18	370.41	60.38	73.66	114.02	191.35	265.56	143.99	21.26	173.07	52.51
95th-Percentile Queue Length [veh/ln]	18.35	20.68	21.13	4.35	5.30	8.06	12.34	15.97	9.70	1.53	11.24	3.78
95th-Percentile Queue Length [ft/ln]	458.78	517.02	528.22	108.69	132.58	201.58	308.44	399.18	242.38	38.26	280.95	94.53

Movement, Approach, & Intersection Results

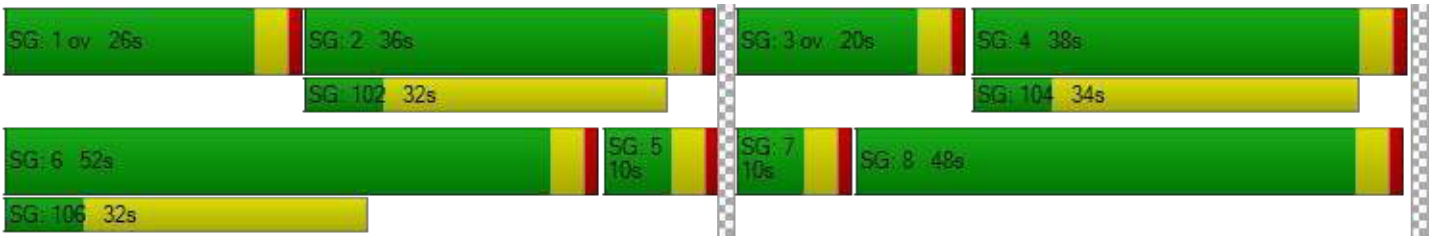
d_M, Delay for Movement [s/veh]	96.14	31.34	32.22	75.79	27.49	18.10	80.11	42.68	20.33	60.67	49.51	42.69
Movement LOS	F	C	C	E	C	B	F	D	C	E	D	D
d_A, Approach Delay [s/veh]	52.95			28.41			43.36			49.56		
Approach LOS	D			C			D			D		
d_I, Intersection Delay [s/veh]	45.94											
Intersection LOS	D											
Intersection V/C	0.723											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.083	3.496	3.198
Crosswalk LOS	F	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	533	733	567
d_b, Bicycle Delay [s]	21.61	32.28	24.08	30.83
l_b,int, Bicycle LOS Score for Intersection	3.103	2.097	3.102	2.036
Bicycle LOS	C	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Golden Valley/SB SR-14

Control Type:	Signalized	Delay (sec / veh):	30.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.664

Intersection Setup

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	300.00	100.00	100.00	100.00	100.00	270.00	200.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	0	0	0	83	3	346	0	808	111	207	627	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	11	0	15	18	0	25	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	83	3	357	0	823	129	207	652	0
Peak Hour Factor	1.0000	1.0000	1.0000	0.9580	0.9580	0.9580	1.0000	0.9580	0.9580	0.9580	0.9580	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	22	1	93	0	215	34	54	170	0
Total Analysis Volume [veh/h]	0	0	0	87	3	373	0	859	135	216	681	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	0	10	0	0	10	0	5	10	0
Maximum Green [s]	0	0	0	0	30	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	0.0	3.6	0.0	0.0	4.7	0.0	3.2	4.7	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	0	45	0	0	32	0	23	55	0
Vehicle Extension [s]	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	7	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk					No			No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	2.6	0.0	0.0	3.7	0.0	2.2	3.7	0.0
Minimum Recall					No			No		No	No	
Maximum Recall					No			No		No	No	
Pedestrian Recall					No			No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	R	L	C
C, Cycle Length [s]		100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]		4.60	4.60	4.60	5.70	5.70	4.20	5.70
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.60	2.60	2.60	3.70	3.70	2.20	3.70
g_i, Effective Green Time [s]		41	41	41	29	29	16	49
g / C, Green / Cycle		0.41	0.41	0.41	0.29	0.29	0.16	0.49
(v / s)_i Volume / Saturation Flow Rate		0.03	0.03	0.26	0.27	0.09	0.13	0.21
s, saturation flow rate [veh/h]		1603	1608	1431	3204	1431	1603	3204
c, Capacity [veh/h]		659	661	588	923	412	250	1557
d1, Uniform Delay [s]		17.83	17.83	23.45	34.64	27.99	41.21	16.80
k, delay calibration		0.50	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.20	0.20	5.14	4.88	0.46	8.76	0.19
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.07	0.07	0.63	0.93	0.33	0.87	0.44
d, Delay for Lane Group [s/veh]		18.03	18.03	28.59	39.52	28.45	49.97	16.99
Lane Group LOS		B	B	C	D	C	D	B
Critical Lane Group		No	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		0.63	0.63	7.29	10.01	2.44	5.52	4.58
50th-Percentile Queue Length [ft/ln]		15.68	15.73	182.20	250.22	60.90	137.97	114.61
95th-Percentile Queue Length [veh/ln]		1.13	1.13	11.72	15.20	4.38	9.37	8.10
95th-Percentile Queue Length [ft/ln]		28.23	28.31	292.89	379.93	109.62	234.28	202.40

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	18.03	18.03	28.59	0.00	39.52	28.45	49.97	16.99	0.00
Movement LOS				B	B	C		D	C	D	B	
d_A, Approach Delay [s/veh]	0.00			26.54			38.02			24.93		
Approach LOS	A			C			D			C		
d_I, Intersection Delay [s/veh]	30.77											
Intersection LOS	C											
Intersection V/C	0.664											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	1.892	2.305	3.074	0.000
Crosswalk LOS	A	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	808	526	986
d_b, Bicycle Delay [s]	50.01	17.77	27.17	12.86
l_b,int, Bicycle LOS Score for Intersection	4.132	2.324	2.380	2.300
Bicycle LOS	D	B	B	B

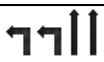
Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: Golden Valley/NB SR-14

Control Type:	Signalized	Delay (sec / veh):	27.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.606

Intersection Setup

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	185.00	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	360.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	248	5	395	0	0	0	312	564	0	0	580	205
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	18	0	0	0	0	0	9	6	0	0	7	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	266	5	395	0	0	0	321	570	0	0	587	205
Peak Hour Factor	0.9270	0.9270	0.9270	1.0000	1.0000	1.0000	0.9270	0.9270	1.0000	1.0000	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	72	1	107	0	0	0	87	154	0	0	158	55
Total Analysis Volume [veh/h]	287	5	426	0	0	0	346	615	0	0	633	221
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	10	0	0	0	0	5	10	0	0	10	0
Maximum Green [s]	0	30	0	0	0	0	30	30	0	0	30	0
Amber [s]	0.0	3.6	0.0	0.0	0.0	0.0	3.6	4.7	0.0	0.0	4.7	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	62	0	0	0	0	18	38	0	0	20	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	0	0	0	14	0	0	7	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No						No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.6	0.0	0.0	0.0	0.0	2.6	3.7	0.0	0.0	3.7	0.0
Minimum Recall		No					No	No			No	
Maximum Recall		No					No	No			No	
Pedestrian Recall		No					No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R		L	C	C	R
C, Cycle Length [s]	100	100	100		100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60		4.60	5.70	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60		2.60	3.70	3.70	3.70
g_i, Effective Green Time [s]	33	33	33		13	57	40	40
g / C, Green / Cycle	0.33	0.33	0.33		0.13	0.57	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.09	0.09	0.30		0.11	0.19	0.20	0.15
s, saturation flow rate [veh/h]	1603	1605	1431		3113	3204	3204	1431
c, Capacity [veh/h]	521	522	465		404	1832	1269	566
d1, Uniform Delay [s]	25.05	25.05	32.43		42.60	11.35	22.74	21.58
k, delay calibration	0.11	0.11	0.11		0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.29	0.29	7.57		5.29	0.50	1.40	2.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.28	0.28	0.92		0.86	0.34	0.50	0.39
d, Delay for Lane Group [s/veh]	25.34	25.34	40.00		47.89	11.84	24.14	23.60
Lane Group LOS	C	C	D		D	B	C	C
Critical Lane Group	No	No	Yes		Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.48	2.48	10.19		4.26	3.21	5.37	3.71
50th-Percentile Queue Length [ft/ln]	61.97	62.05	254.70		106.62	80.23	134.19	92.77
95th-Percentile Queue Length [veh/ln]	4.46	4.47	15.42		7.65	5.78	9.17	6.68
95th-Percentile Queue Length [ft/ln]	111.55	111.68	385.57		191.28	144.42	229.18	166.99

Movement, Approach, & Intersection Results

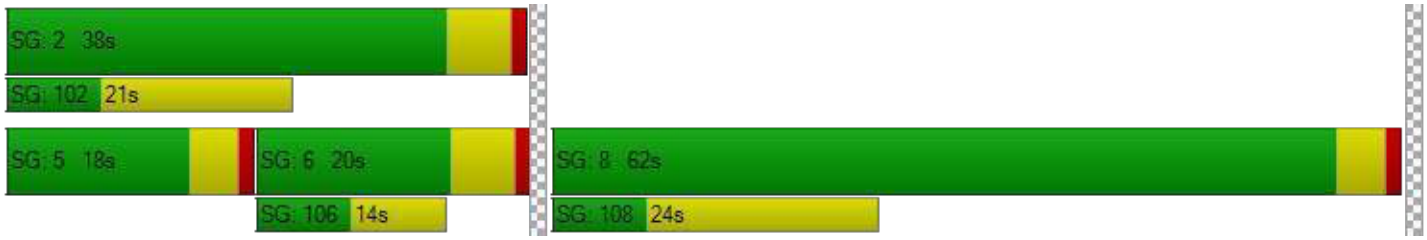
d_M, Delay for Movement [s/veh]	25.34	25.34	40.00	0.00	0.00	0.00	47.89	11.84	0.00	0.00	24.14	23.60
Movement LOS	C	C	D				D	B			C	C
d_A, Approach Delay [s/veh]	34.04			0.00			24.82			24.00		
Approach LOS	C			A			C			C		
d_I, Intersection Delay [s/veh]	27.16											
Intersection LOS	C											
Intersection V/C	0.606											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.398	1.999	0.000	2.921
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1148	0	646	286
d_b, Bicycle Delay [s]	9.08	50.00	22.92	36.73
l_b,int, Bicycle LOS Score for Intersection	2.744	4.132	2.352	2.264
Bicycle LOS	B	D	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Sierra/Friendly Valley

Control Type:	Signalized	Delay (sec / veh):	22.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.563

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	125.00	100.00	100.00	135.00	100.00	400.00	100.00	100.00	100.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Base Volume Input [veh/h]	98	1280	50	76	479	42	61	10	54	42	20	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	12	0	0	15	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	98	1292	50	76	494	42	61	10	54	42	20	68
Peak Hour Factor	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	338	13	20	129	11	16	3	14	11	5	18
Total Analysis Volume [veh/h]	103	1351	52	79	517	44	64	10	56	44	21	71
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	0	10	0	0	10	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	41	48	0	20	27	0	0	32	0	0	32	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	14	0	0	17	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	5.70	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	3.70	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	58	58	6	56	56	21	21	21	21
g / C, Green / Cycle	0.08	0.58	0.58	0.06	0.56	0.56	0.21	0.21	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.06	0.42	0.42	0.05	0.16	0.03	0.09	0.04	0.04	0.06
s, saturation flow rate [veh/h]	1603	1683	1661	1603	3204	1431	797	1431	1202	1481
c, Capacity [veh/h]	129	980	967	99	1806	806	237	305	136	315
d1, Uniform Delay [s]	45.19	15.00	15.05	46.31	11.35	9.82	38.95	32.23	46.54	33.02
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.77	4.54	4.66	13.62	0.40	0.13	0.74	0.29	1.37	0.51
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.72	0.72	0.80	0.29	0.05	0.31	0.18	0.32	0.29
d, Delay for Lane Group [s/veh]	55.96	19.54	19.70	59.93	11.75	9.95	39.69	32.52	47.91	33.53
Lane Group LOS	E	B	B	E	B	A	D	C	D	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	2.90	12.07	12.02	2.32	3.01	0.46	1.71	1.13	1.12	1.91
50th-Percentile Queue Length [ft/ln]	72.62	301.72	300.40	57.97	75.36	11.45	42.67	28.27	28.04	47.67
95th-Percentile Queue Length [veh/ln]	5.23	17.77	17.70	4.17	5.43	0.82	3.07	2.04	2.02	3.43
95th-Percentile Queue Length [ft/ln]	130.71	444.15	442.53	104.35	135.65	20.61	76.80	50.88	50.47	85.80

Movement, Approach, & Intersection Results

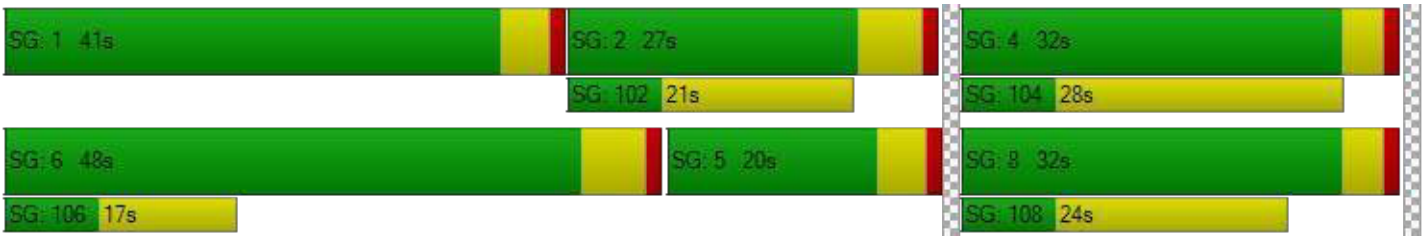
d_M, Delay for Movement [s/veh]	55.96	19.62	19.70	59.93	11.75	9.95	39.69	39.69	32.52	47.91	33.53	33.53
Movement LOS	E	B	B	E	B	A	D	D	C	D	C	C
d_A, Approach Delay [s/veh]	22.11			17.57			36.60			38.18		
Approach LOS	C			B			D			D		
d_I, Intersection Delay [s/veh]	22.59											
Intersection LOS	C											
Intersection V/C	0.563											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.712	2.837	2.209	2.035
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	846	426	560	560
d_b, Bicycle Delay [s]	16.65	30.97	25.92	25.92
l_b,int, Bicycle LOS Score for Intersection	2.802	2.088	1.774	1.784
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sierra/Via Princessa

Control Type:	Signalized	Delay (sec / veh):	42.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.642

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	200.00	100.00	100.00	200.00	100.00	250.00	360.00	100.00	630.00	200.00	100.00	300.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Base Volume Input [veh/h]	440	930	214	217	364	762	226	872	167	190	769	208
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	3	6	0	4	0	0	0	4	7	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	443	933	220	217	368	762	226	872	171	197	769	208
Peak Hour Factor	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	113	238	56	55	94	195	58	223	44	50	196	53
Total Analysis Volume [veh/h]	453	953	225	222	376	778	231	891	175	201	785	212
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	4	5	2	2	1	6	0
Auxiliary Signal Groups						4,5			2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	4.7	3.6	4.7	4.7	3.6	4.7	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	22	41	0	24	43	43	14	41	41	14	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	28	0	28	28	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	3.7	2.6	3.7	3.7	2.6	3.7	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	4.60	4.60	5.70	4.60	4.60	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	0.00	2.60	3.70	0.00	2.60	3.70	3.70
g_i, Effective Green Time [s]	17	29	29	11	23	38	9	50	73	9	50	50
g / C, Green / Cycle	0.15	0.24	0.24	0.09	0.19	0.32	0.08	0.41	0.61	0.08	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.15	0.21	0.16	0.07	0.08	0.31	0.07	0.19	0.12	0.06	0.17	0.15
s, saturation flow rate [veh/h]	3113	4584	1431	3113	4584	2532	3113	4584	1431	3113	4584	1431
c, Capacity [veh/h]	452	1123	350	281	870	801	246	1899	868	246	1899	593
d1, Uniform Delay [s]	51.32	43.22	40.62	53.51	42.93	40.51	55.02	25.56	10.56	54.45	24.85	24.18
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	20.03	1.89	1.97	4.95	0.34	9.50	15.68	0.83	0.52	6.58	0.67	1.68
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.00	0.85	0.64	0.79	0.43	0.97	0.94	0.47	0.20	0.82	0.41	0.36
d, Delay for Lane Group [s/veh]	71.34	45.11	42.59	58.45	43.26	50.01	70.70	26.40	11.08	61.03	25.52	25.86
Lane Group LOS	F	D	D	E	D	D	E	C	B	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	7.80	8.77	5.90	3.37	3.20	11.74	3.89	5.94	1.98	3.12	5.08	4.19
50th-Percentile Queue Length [ft/ln]	194.93	219.36	147.56	84.17	79.97	293.48	97.37	148.50	49.46	77.95	126.97	104.70
95th-Percentile Queue Length [veh/ln]	12.38	13.63	9.89	6.06	5.76	17.36	7.01	9.94	3.56	5.61	8.77	7.54
95th-Percentile Queue Length [ft/ln]	309.62	340.81	247.17	151.50	143.95	433.95	175.27	248.42	89.04	140.30	219.36	188.46

Movement, Approach, & Intersection Results

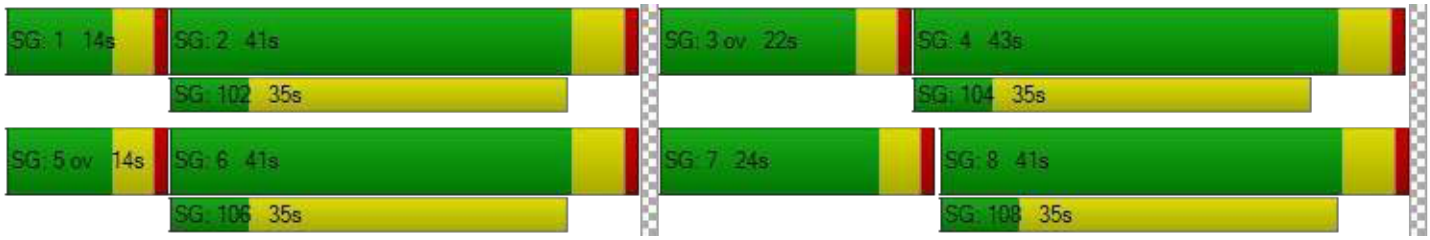
d_M, Delay for Movement [s/veh]	71.34	45.11	42.59	58.45	43.26	50.01	70.70	26.40	11.08	61.03	25.52	25.86
Movement LOS	F	D	D	E	D	D	E	C	B	E	C	C
d_A, Approach Delay [s/veh]	52.05			49.53			32.22			31.54		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	42.28											
Intersection LOS	D											
Intersection V/C	0.642											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	3.293	3.431	3.461	3.321
Crosswalk LOS	C	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	588	621	588	588
d_b, Bicycle Delay [s]	29.91	28.52	29.91	29.91
l_b,int, Bicycle LOS Score for Intersection	2.457	2.316	2.273	2.219
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Golden Valley/Project Dwy

Control Type:	Two-way stop	Delay (sec / veh):	24.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.074

Intersection Setup

Name	Project Dwy		Golden Valley		Golden Valley	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	49.21	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		No	

Volumes

Name	Project Dwy		Golden Valley		Golden Valley	
Base Volume Input [veh/h]	0	0	0	1705	1525	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	63	15	51	0	58
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	63	15	1756	1525	58
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	16	4	439	381	15
Total Analysis Volume [veh/h]	0	63	15	1756	1525	58
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.22	0.07	0.02	0.02	0.00
d_M, Delay for Movement [s/veh]	0.00	21.17	24.18	0.00	0.00	0.00
Movement LOS		C	C	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.83	0.24	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	20.66	5.94	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	21.17		0.20		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	0.50					
Intersection LOS	C					

PROJECT OPENING YEAR CUMULATIVE CONDITIONS

Intersection Level Of Service Report
Intersection 1: Golden Valley/Centre Pointe

Control Type:	Signalized	Delay (sec / veh):	39.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.752

Intersection Setup

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	400.00	100.00	350.00	700.00	100.00	100.00	260.00	100.00	260.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Base Volume Input [veh/h]	248	745	355	120	951	82	23	39	157	458	48	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	10	0	0	13	0	0	0	2	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	261	785	369	125	1002	85	24	41	165	477	50	43
Peak Hour Factor	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	68	205	96	33	261	22	6	11	43	124	13	11
Total Analysis Volume [veh/h]	272	819	385	130	1045	89	25	43	172	497	52	45
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Split	Split	Overlap	Split	Split	Split
Signal Group	1	6	6	5	2	0	0	8	8	0	4	0
Auxiliary Signal Groups			6						1,8			
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	10	5	10	0	0	10	10	0	10	0
Maximum Green [s]	30	30	30	30	30	0	0	30	30	0	30	0
Amber [s]	3.2	4.7	4.7	3.2	4.7	0.0	0.0	3.9	3.9	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	22	42	42	14	34	0	0	15	15	0	29	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	5	5	0	7	0
Pedestrian Clearance [s]	0	15	15	0	15	0	0	10	10	0	17	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.2	3.7	3.7	2.2	3.7	0.0	0.0	2.9	2.9	0.0	2.6	0.0
Minimum Recall	No	No	No	No	No			No	No		No	
Maximum Recall	No	No	No	No	No			No	No		No	
Pedestrian Recall	No	No	No	No	No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	5.70	5.70	4.20	5.70	5.70	4.90	4.90	4.20	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	3.70	3.70	2.20	3.70	3.70	2.90	2.90	0.00	2.60	2.60
g_i, Effective Green Time [s]	18	42	42	10	34	34	10	10	33	19	19
g / C, Green / Cycle	0.18	0.42	0.42	0.10	0.34	0.34	0.10	0.10	0.33	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.17	0.26	0.27	0.08	0.33	0.06	0.02	0.03	0.12	0.16	0.06
s, saturation flow rate [veh/h]	1603	3204	1431	1603	3204	1431	1603	1683	1431	3113	1556
c, Capacity [veh/h]	286	1350	603	157	1093	488	161	169	468	581	291
d1, Uniform Delay [s]	40.73	22.53	22.95	44.34	32.27	23.19	41.18	41.60	25.75	39.41	35.32
k, delay calibration	0.13	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.84	2.03	5.12	10.50	18.53	0.82	0.45	0.79	0.48	3.73	0.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.95	0.61	0.64	0.83	0.96	0.18	0.16	0.25	0.37	0.86	0.33
d, Delay for Lane Group [s/veh]	58.57	24.56	28.07	54.84	50.80	24.01	41.62	42.38	26.23	43.15	35.99
Lane Group LOS	E	C	C	D	D	C	D	D	C	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	7.66	7.13	7.32	3.47	14.06	1.49	0.57	0.99	3.07	6.07	2.07
50th-Percentile Queue Length [ft/ln]	191.44	178.24	182.99	86.77	351.54	37.21	14.26	24.84	76.67	151.76	51.81
95th-Percentile Queue Length [veh/ln]	12.20	11.51	11.76	6.25	20.21	2.68	1.03	1.79	5.52	10.11	3.73
95th-Percentile Queue Length [ft/ln]	304.90	287.72	293.92	156.18	505.29	66.97	25.67	44.71	138.01	252.78	93.25

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	58.57	24.56	28.07	54.84	50.80	24.01	41.62	42.38	26.23	43.15	35.99	35.99
Movement LOS	E	C	C	D	D	C	D	D	C	D	D	D
d_A, Approach Delay [s/veh]	31.74			49.33			30.73			41.98		
Approach LOS	C			D			C			D		
d_I, Intersection Delay [s/veh]	39.59											
Intersection LOS	D											
Intersection V/C	0.752											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	39.64	39.64	39.64
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.041	2.348	2.464
Crosswalk LOS	F	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	725	566	202	488
d_b, Bicycle Delay [s]	20.32	25.74	40.45	28.61
l_b,int, Bicycle LOS Score for Intersection	2.777	2.602	1.956	2.540
Bicycle LOS	C	B	A	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 2: Golden Valley/Robert C Lee

Control Type:	Signalized	Delay (sec / veh):	26.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.780

Intersection Setup

Name	Robert C Lee		Golden Valley		Golden Valley		
Approach	Southbound		Eastbound		Westbound		
Lane Configuration							
Turning Movement	Left	Right	Left	Thru	U-turn	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0	1
Entry Pocket Length [ft]	170.00	100.00	450.00	100.00	150.00	100.00	275.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	800.00	0.00	0.00	0.00
Speed [mph]	35.00		50.00		50.00		
Grade [%]	0.00		0.00		0.00		
Curb Present	No		No		No		
Crosswalk	Yes		Yes		No		

Volumes

Name	Robert C Lee		Golden Valley		Golden Valley		
Base Volume Input [veh/h]	608	298	416	1185	0	1151	682
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	15	0	13	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	633	310	433	1248	0	1211	710
Peak Hour Factor	0.9030	0.9030	0.9030	0.9030	0.9030	0.9030	0.9030
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	175	86	120	346	0	335	197
Total Analysis Volume [veh/h]	701	343	480	1382	0	1341	786
Presence of On-Street Parking	No	No	No	No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0		
v_di, Inbound Pedestrian Volume crossing m	0		0		0		
v_co, Outbound Pedestrian Volume crossing	0		0		0		
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0		
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0		
Bicycle Volume [bicycles/h]	0		0		0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive	Overlap
Signal Group	7	0	5	2	1	6	6
Auxiliary Signal Groups							6,7
Lead / Lag	Lead	-	Lead	-	Lead	-	-
Minimum Green [s]	5	0	5	10	5	10	10
Maximum Green [s]	30	0	30	30	30	30	30
Amber [s]	3.2	0.0	3.2	4.7	3.2	4.7	4.7
All red [s]	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	32	0	38	42	26	30	30
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	0	0	5	0	7	7
Pedestrian Clearance [s]	20	0	0	10	0	17	17
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No		No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	0.0	2.2	3.7	2.2	3.7	3.7
Minimum Recall	No		No	No	No	No	No
Maximum Recall	No		No	No	No	No	No
Pedestrian Recall	No		No	No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	L	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	5.70	4.20	5.70	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	3.70	2.20	3.70	0.00
g_i, Effective Green Time [s]	28	28	18	58	0	40	73
g / C, Green / Cycle	0.28	0.28	0.18	0.58	0.00	0.40	0.73
(v / s)_i Volume / Saturation Flow Rate	0.23	0.24	0.15	0.43	0.00	0.29	0.55
s, saturation flow rate [veh/h]	3113	1431	3113	3204	1603	4584	1431
c, Capacity [veh/h]	865	398	567	1858	2	1829	1050
d1, Uniform Delay [s]	33.64	34.29	39.56	15.53	0.00	25.54	7.86
k, delay calibration	0.11	0.30	0.11	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.87	13.89	3.61	2.75	0.00	2.65	4.89
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.86	0.85	0.74	0.00	0.73	0.75
d, Delay for Lane Group [s/veh]	35.52	48.18	43.17	18.27	0.00	28.18	12.75
Lane Group LOS	D	D	D	B	A	C	B
Critical Lane Group	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.89	9.18	5.66	10.26	0.00	8.60	7.70
50th-Percentile Queue Length [ft/ln]	197.28	229.51	141.41	256.58	0.00	214.99	192.47
95th-Percentile Queue Length [veh/ln]	12.50	14.15	9.56	15.52	0.00	13.41	12.25
95th-Percentile Queue Length [ft/ln]	312.46	353.73	238.93	387.93	0.00	335.23	306.23

Movement, Approach, & Intersection Results

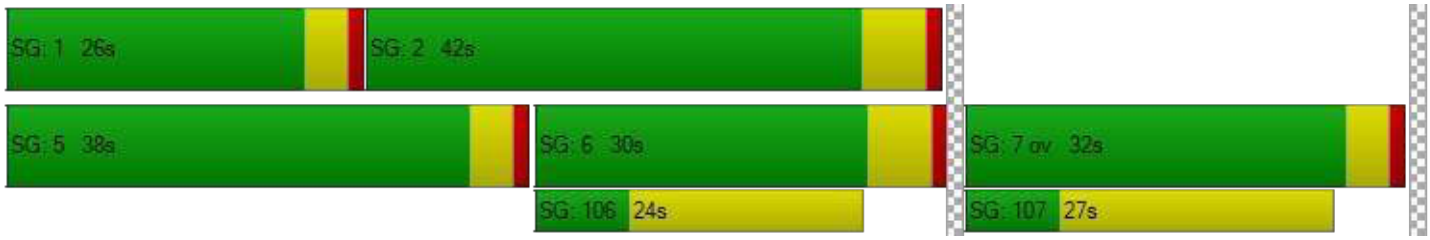
d_M, Delay for Movement [s/veh]	35.52	48.18	43.17	18.27	0.00	28.18	12.75
Movement LOS	D	D	D	B	A	C	B
d_A, Approach Delay [s/veh]	39.68		24.69		22.48		
Approach LOS	D		C		C		
d_I, Intersection Delay [s/veh]	26.86						
Intersection LOS	C						
Intersection V/C	0.780						

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.830	3.422	0.000
Crosswalk LOS	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	556	726	486
d_b, Bicycle Delay [s]	26.07	20.29	28.66
l_b,int, Bicycle LOS Score for Intersection	1.560	3.096	2.729
Bicycle LOS	A	C	B

Sequence

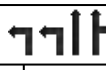
Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Golden Valley/Sierra Hwy

Control Type:	Signalized	Delay (sec / veh):	73.9
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.997

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	2	0	2	1	0	1
Entry Pocket Length [ft]	430.00	100.00	100.00	415.00	100.00	500.00	285.00	100.00	325.00	285.00	100.00	295.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	540	199	14	31	1093	405	347	491	907	507	895	77
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	14	0	0	0	13	2	0	11	4
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	564	207	15	46	1137	421	361	524	946	527	942	84
Peak Hour Factor	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	148	54	4	12	298	110	95	137	248	138	247	22
Total Analysis Volume [veh/h]	592	217	16	48	1193	442	379	550	993	553	988	88
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	2	3	8	8	7	4	0
Auxiliary Signal Groups						2,3			1,8			
Lead / Lag	Lead	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	25	54	0	9	38	38	19	36	36	21	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	5	5	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	25	0	10	10	0	27	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	55	55	4	39	58	15	27	52	17	29	29
g / C, Green / Cycle	0.18	0.46	0.46	0.04	0.32	0.48	0.13	0.22	0.43	0.15	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.19	0.07	0.07	0.03	0.37	0.31	0.12	0.17	0.39	0.18	0.22	0.06
s, saturation flow rate [veh/h]	3113	1683	1643	1603	3204	1431	3113	3204	2532	3113	4584	1431
c, Capacity [veh/h]	545	776	758	60	1036	689	389	717	1094	450	1115	348
d1, Uniform Delay [s]	49.50	18.73	18.73	57.35	40.60	23.32	52.30	43.66	31.85	51.33	43.80	36.62
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.29	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	46.49	0.41	0.43	21.79	79.43	4.54	15.82	1.76	7.95	107.20	2.58	0.38
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.09	0.15	0.15	0.81	1.15	0.64	0.97	0.77	0.91	1.23	0.89	0.25
d, Delay for Lane Group [s/veh]	95.99	19.14	19.15	79.14	120.03	27.86	68.12	45.42	39.80	158.52	46.39	36.99
Lane Group LOS	F	B	B	E	F	C	E	D	D	F	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	11.35	1.88	1.84	1.76	25.80	9.49	6.33	7.52	13.60	13.20	9.26	2.05
50th-Percentile Queue Length [ft/ln]	283.65	47.12	46.07	44.02	644.92	237.34	158.26	187.91	339.96	330.04	231.61	51.16
95th-Percentile Queue Length [veh/ln]	17.56	3.39	3.32	3.17	37.26	14.55	10.46	12.01	19.65	20.89	14.26	3.68
95th-Percentile Queue Length [ft/ln]	438.91	84.81	82.93	79.24	931.56	363.67	261.41	300.32	491.15	522.27	356.40	92.08

Movement, Approach, & Intersection Results

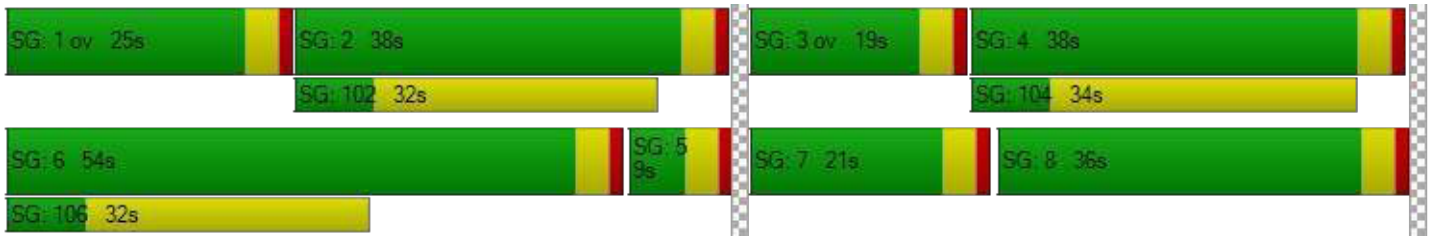
d_M, Delay for Movement [s/veh]	95.99	19.15	19.15	79.14	120.03	27.86	68.12	45.42	39.80	158.52	46.39	36.99
Movement LOS	F	B	B	E	F	C	E	D	D	F	D	D
d_A, Approach Delay [s/veh]	74.29			94.66			46.99			83.95		
Approach LOS	E			F			D			F		
d_I, Intersection Delay [s/veh]	73.89											
Intersection LOS	E											
Intersection V/C	0.997											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.108	3.575	3.268
Crosswalk LOS	F	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	833	567	533	567
d_b, Bicycle Delay [s]	20.42	30.82	32.27	30.82
l_b,int, Bicycle LOS Score for Intersection	2.240	2.948	3.145	2.456
Bicycle LOS	B	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Golden Valley/SB SR-14

Control Type:	Signalized	Delay (sec / veh):	31.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.701

Intersection Setup

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	300.00	100.00	100.00	100.00	100.00	270.00	200.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	0	0	0	30	228	401	0	502	267	212	980	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	7	0	7	20	0	8	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	31	237	424	0	529	298	221	1028	0
Peak Hour Factor	1.0000	1.0000	1.0000	0.9160	0.9160	0.9160	1.0000	0.9160	0.9160	0.9160	0.9160	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	8	65	116	0	144	81	60	281	0
Total Analysis Volume [veh/h]	0	0	0	34	259	463	0	578	325	241	1122	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	0	10	0	0	10	0	5	10	0
Maximum Green [s]	0	0	0	0	30	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	0.0	3.6	0.0	0.0	4.7	0.0	3.2	4.7	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	0	55	0	0	26	0	19	45	0
Vehicle Extension [s]	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	7	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk					No			No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	2.6	0.0	0.0	3.7	0.0	2.2	3.7	0.0
Minimum Recall					No			No		No	No	
Maximum Recall					No			No		No	No	
Pedestrian Recall					No			No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	R	L	C
C, Cycle Length [s]		100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]		4.60	4.60	4.60	5.70	5.70	4.20	5.70
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.60	2.60	2.60	3.70	3.70	2.20	3.70
g_i, Effective Green Time [s]		43	43	43	25	25	17	47
g / C, Green / Cycle		0.43	0.43	0.43	0.25	0.25	0.17	0.47
(v / s)_i Volume / Saturation Flow Rate		0.02	0.15	0.32	0.18	0.23	0.15	0.35
s, saturation flow rate [veh/h]		1603	1683	1431	3204	1431	1603	3204
c, Capacity [veh/h]		689	723	615	813	363	275	1497
d1, Uniform Delay [s]		16.61	19.22	24.04	33.97	36.03	40.42	21.85
k, delay calibration		0.50	0.50	0.50	0.11	0.24	0.11	0.11
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.14	1.38	8.30	1.16	15.55	8.76	0.77
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.05	0.36	0.75	0.71	0.89	0.88	0.75
d, Delay for Lane Group [s/veh]		16.75	20.60	32.34	35.14	51.58	49.18	22.62
Lane Group LOS		B	C	C	D	D	D	C
Critical Lane Group		No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]		0.45	4.03	9.81	6.10	8.69	6.12	9.67
50th-Percentile Queue Length [ft/ln]		11.30	100.80	245.36	152.61	217.31	153.12	241.86
95th-Percentile Queue Length [veh/ln]		0.81	7.26	14.95	10.16	13.53	10.18	14.78
95th-Percentile Queue Length [ft/ln]		20.34	181.44	373.80	253.91	338.19	254.59	369.38

Movement, Approach, & Intersection Results

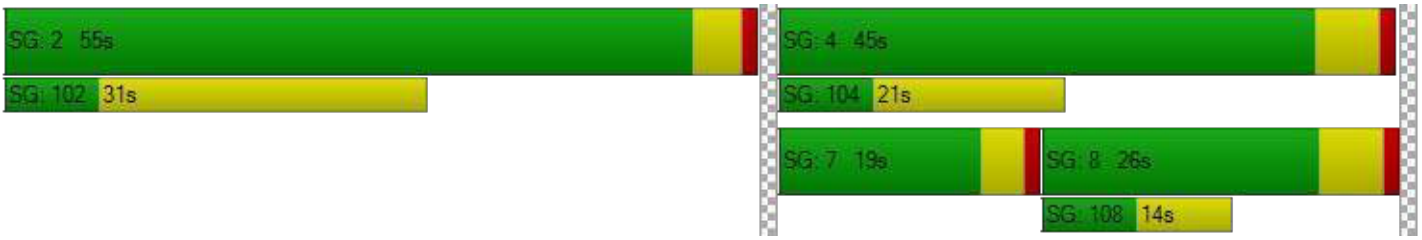
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	16.75	20.60	32.34	0.00	35.14	51.58	49.18	22.62	0.00
Movement LOS				B	C	C		D	D	D	C	
d_A, Approach Delay [s/veh]	0.00			27.62			41.05			27.32		
Approach LOS	A			C			D			C		
d_I, Intersection Delay [s/veh]	31.50											
Intersection LOS	C											
Intersection V/C	0.701											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.122	2.412	3.176	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1008	406	786
d_b, Bicycle Delay [s]	50.01	12.31	31.77	18.43
l_b,int, Bicycle LOS Score for Intersection	4.132	2.807	2.305	2.684
Bicycle LOS	D	C	B	B

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Golden Valley/NB SR-14

Control Type:	Signalized	Delay (sec / veh):	22.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.608

Intersection Setup

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	185.00	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	360.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	157	1	180	0	0	0	208	318	0	0	1030	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	8	0	0	0	0	0	7	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	171	1	187	0	0	0	223	331	0	0	1072	74
Peak Hour Factor	0.8840	0.8840	0.8840	1.0000	1.0000	1.0000	0.8840	0.8840	1.0000	1.0000	0.8840	0.8840
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	48	0	53	0	0	0	63	94	0	0	303	21
Total Analysis Volume [veh/h]	193	1	212	0	0	0	252	374	0	0	1213	84
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	10	0	0	0	0	5	10	0	0	10	0
Maximum Green [s]	0	30	0	0	0	0	30	30	0	0	30	0
Amber [s]	0.0	3.6	0.0	0.0	0.0	0.0	3.6	4.7	0.0	0.0	4.7	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	45	0	0	0	0	15	55	0	0	40	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	0	0	0	14	0	0	7	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No						No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.6	0.0	0.0	0.0	0.0	2.6	3.7	0.0	0.0	3.7	0.0
Minimum Recall		No					No	No			No	
Maximum Recall		No					No	No			No	
Pedestrian Recall		No					No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R		L	C	C	R
C, Cycle Length [s]	100	100	100		100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60		4.60	5.70	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60		2.60	3.70	3.70	3.70
g_i, Effective Green Time [s]	17	17	17		10	72	58	58
g / C, Green / Cycle	0.17	0.17	0.17		0.10	0.72	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.06	0.06	0.15		0.08	0.12	0.38	0.06
s, saturation flow rate [veh/h]	1603	1604	1431		3113	3204	3204	1431
c, Capacity [veh/h]	278	278	248		312	2318	1850	826
d1, Uniform Delay [s]	36.35	36.35	40.09		44.07	4.33	14.38	9.49
k, delay calibration	0.11	0.11	0.11		0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.75	0.74	8.11		4.99	0.15	1.83	0.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.35	0.35	0.85		0.81	0.16	0.66	0.10
d, Delay for Lane Group [s/veh]	37.09	37.09	48.20		49.06	4.48	16.21	9.74
Lane Group LOS	D	D	D		D	A	B	A
Critical Lane Group	No	No	Yes		Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.06	2.06	5.39		3.12	0.87	8.22	0.77
50th-Percentile Queue Length [ft/ln]	51.49	51.51	134.66		78.11	21.79	205.51	19.13
95th-Percentile Queue Length [veh/ln]	3.71	3.71	9.19		5.62	1.57	12.92	1.38
95th-Percentile Queue Length [ft/ln]	92.68	92.72	229.82		140.60	39.22	323.07	34.44

Movement, Approach, & Intersection Results

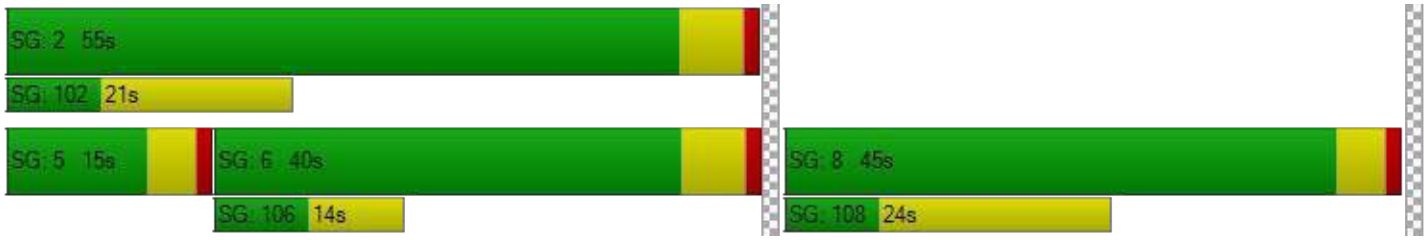
d_M, Delay for Movement [s/veh]	37.09	37.09	48.20	0.00	0.00	0.00	49.06	4.48	0.00	0.00	16.21	9.74
Movement LOS	D	D	D				D	A			B	A
d_A, Approach Delay [s/veh]	42.89			0.00			22.43			15.79		
Approach LOS	D			A			C			B		
d_I, Intersection Delay [s/veh]	22.30											
Intersection LOS	C											
Intersection V/C	0.608											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.284	1.884	0.000	2.917
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	808	0	986	686
d_b, Bicycle Delay [s]	17.76	50.00	12.86	21.59
l_b,int, Bicycle LOS Score for Intersection	2.230	4.132	2.076	2.630
Bicycle LOS	B	D	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Sierra/Friendly Valley

Control Type:	Signalized	Delay (sec / veh):	25.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.575

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	125.00	100.00	100.00	135.00	100.00	400.00	100.00	100.00	100.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Base Volume Input [veh/h]	44	398	87	196	1130	196	52	24	65	69	18	167
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	4	0	0	14	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	418	91	204	1190	204	54	25	68	72	19	174
Peak Hour Factor	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	113	25	55	321	55	15	7	18	19	5	47
Total Analysis Volume [veh/h]	50	450	98	220	1282	220	58	27	73	78	20	188
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	0	10	0	0	10	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	22	23	0	45	46	0	0	32	0	0	32	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	14	0	0	17	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	5.70	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	3.70	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	42	42	16	54	54	28	28	28	28
g / C, Green / Cycle	0.04	0.42	0.42	0.16	0.54	0.54	0.28	0.28	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.03	0.17	0.17	0.14	0.40	0.15	0.14	0.05	0.07	0.14
s, saturation flow rate [veh/h]	1603	1683	1580	1603	3204	1431	627	1431	1165	1451
c, Capacity [veh/h]	62	707	664	254	1730	772	235	398	131	404
d1, Uniform Delay [s]	47.68	20.18	20.22	41.04	17.64	12.51	36.81	27.45	48.08	30.40
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	20.68	1.67	1.81	8.65	2.90	0.93	0.94	0.22	4.26	1.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.40	0.40	0.87	0.74	0.28	0.36	0.18	0.59	0.51
d, Delay for Lane Group [s/veh]	68.36	21.85	22.02	49.69	20.55	13.43	37.74	27.67	52.34	31.42
Lane Group LOS	E	C	C	D	C	B	D	C	D	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.60	4.88	4.65	5.89	11.54	2.84	1.97	1.34	2.10	4.28
50th-Percentile Queue Length [ft/ln]	39.96	121.98	116.34	147.34	288.40	70.89	49.16	33.57	52.42	106.89
95th-Percentile Queue Length [veh/ln]	2.88	8.50	8.19	9.87	17.11	5.10	3.54	2.42	3.77	7.67
95th-Percentile Queue Length [ft/ln]	71.93	212.54	204.79	246.87	427.65	127.61	88.49	60.42	94.36	191.67

Movement, Approach, & Intersection Results

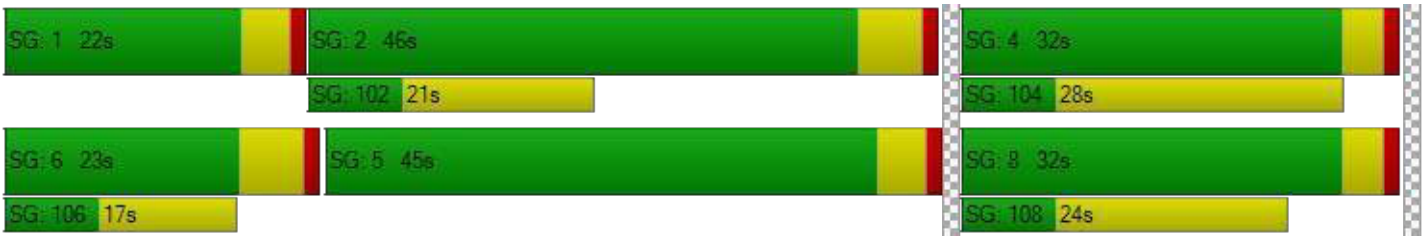
d_M, Delay for Movement [s/veh]	68.36	21.92	22.02	49.69	20.55	13.43	37.74	37.74	27.67	52.34	31.42	31.42
Movement LOS	E	C	C	D	C	B	D	D	C	D	C	C
d_A, Approach Delay [s/veh]	25.82			23.36			33.09			37.13		
Approach LOS	C			C			C			D		
d_I, Intersection Delay [s/veh]	25.87											
Intersection LOS	C											
Intersection V/C	0.575											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.746	2.868	2.245	2.150
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	346	806	560	560
d_b, Bicycle Delay [s]	34.20	17.82	25.92	25.92
l_b,int, Bicycle LOS Score for Intersection	2.053	2.980	1.820	2.032
Bicycle LOS	B	C	A	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sierra/Via Princessa

Control Type:	Signalized	Delay (sec / veh):	40.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.777

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	200.00	100.00	100.00	200.00	100.00	250.00	360.00	100.00	630.00	200.00	100.00	300.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Base Volume Input [veh/h]	351	331	127	169	850	758	171	874	403	295	934	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	4	0	3	14	0	0	60	0	0	25	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	365	348	132	179	898	789	178	969	419	307	997	82
Peak Hour Factor	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	96	92	35	47	237	208	47	255	110	81	263	22
Total Analysis Volume [veh/h]	385	367	139	189	946	831	188	1021	442	323	1051	86
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	4	5	2	2	1	6	0
Auxiliary Signal Groups						4,5			2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	4.7	3.6	4.7	4.7	3.6	4.7	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	20	42	0	19	41	41	18	41	41	18	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	28	0	28	28	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	3.7	2.6	3.7	3.7	2.6	3.7	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	4.60	4.60	5.70	4.60	4.60	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	0.00	2.60	3.70	0.00	2.60	3.70	3.70
g_i, Effective Green Time [s]	15	36	36	9	30	49	13	41	62	13	41	41
g / C, Green / Cycle	0.13	0.30	0.30	0.08	0.25	0.41	0.11	0.34	0.51	0.11	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.12	0.08	0.10	0.06	0.21	0.33	0.06	0.22	0.31	0.10	0.23	0.06
s, saturation flow rate [veh/h]	3113	4584	1431	3113	4584	2532	3113	4584	1431	3113	4584	1431
c, Capacity [veh/h]	402	1370	428	246	1141	1035	350	1549	736	350	1549	483
d1, Uniform Delay [s]	52.00	32.11	32.71	54.24	42.71	31.25	50.35	33.88	20.49	52.79	34.16	28.02
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.05	0.10	0.44	4.97	1.62	1.59	1.28	2.21	3.60	10.13	2.41	0.80
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.96	0.27	0.33	0.77	0.83	0.80	0.54	0.66	0.60	0.92	0.68	0.18
d, Delay for Lane Group [s/veh]	65.05	32.21	33.15	59.22	44.33	32.84	51.63	36.09	24.09	62.92	36.57	28.82
Lane Group LOS	E	C	C	E	D	C	D	D	C	E	D	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.28	2.62	3.07	2.88	8.61	10.08	2.65	8.32	8.67	5.15	8.65	1.78
50th-Percentile Queue Length [ft/ln]	156.99	65.40	76.63	72.02	215.33	251.95	66.14	208.02	216.73	128.66	216.35	44.51
95th-Percentile Queue Length [veh/ln]	10.39	4.71	5.52	5.19	13.43	15.28	4.76	13.05	13.50	8.87	13.48	3.20
95th-Percentile Queue Length [ft/ln]	259.73	117.72	137.94	129.64	335.66	382.10	119.05	326.28	337.45	221.67	336.96	80.12

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	65.05	32.21	33.15	59.22	44.33	32.84	51.63	36.09	24.09	62.92	36.57	28.82
Movement LOS	E	C	C	E	D	C	D	D	C	E	D	C
d_A, Approach Delay [s/veh]	46.55			40.90			34.65			41.95		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	40.27											
Intersection LOS	D											
Intersection V/C	0.777											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.54	49.54	49.54	49.54
l_p,int, Pedestrian LOS Score for Intersection	3.333	3.404	3.570	3.370
Crosswalk LOS	C	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	605	588	588	588
d_b, Bicycle Delay [s]	29.23	29.93	29.93	29.93
l_b,int, Bicycle LOS Score for Intersection	2.050	2.641	2.468	2.363
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 1: Golden Valley/Centre Pointe

Control Type:	Signalized	Delay (sec / veh):	66.4
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.898

Intersection Setup

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	400.00	100.00	350.00	700.00	100.00	100.00	260.00	100.00	260.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Base Volume Input [veh/h]	292	984	224	166	1044	77	106	73	442	257	65	142
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	17	0	0	18	0	0	0	6	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	310	1041	233	173	1104	80	110	76	466	267	68	148
Peak Hour Factor	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	85	285	64	47	302	22	30	21	128	73	19	41
Total Analysis Volume [veh/h]	340	1140	255	189	1209	88	120	83	510	292	74	162
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Split	Split	Overlap	Split	Split	Split
Signal Group	1	6	6	5	2	0	0	8	8	0	4	0
Auxiliary Signal Groups			6						1,8			
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	10	5	10	0	0	10	10	0	10	0
Maximum Green [s]	30	30	30	30	30	0	0	30	30	0	30	0
Amber [s]	3.2	4.7	4.7	3.2	4.7	0.0	0.0	3.9	3.9	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	30	57	57	19	46	0	0	15	15	0	29	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	5	5	0	7	0
Pedestrian Clearance [s]	0	15	15	0	15	0	0	10	10	0	17	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.2	3.7	3.7	2.2	3.7	0.0	0.0	2.9	2.9	0.0	2.6	0.0
Minimum Recall	No	No	No	No	No			No	No		No	
Maximum Recall	No	No	No	No	No			No	No		No	
Pedestrian Recall	No	No	No	No	No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.20	5.70	5.70	4.20	5.70	5.70	4.90	4.90	4.20	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	3.70	3.70	2.20	3.70	3.70	2.90	2.90	0.00	2.60	2.60
g_i, Effective Green Time [s]	26	51	51	15	40	40	13	13	44	21	21
g / C, Green / Cycle	0.22	0.43	0.43	0.12	0.34	0.34	0.11	0.11	0.37	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.21	0.36	0.18	0.12	0.38	0.06	0.07	0.05	0.36	0.09	0.16
s, saturation flow rate [veh/h]	1603	3204	1431	1603	3204	1431	1603	1683	1431	3113	1501
c, Capacity [veh/h]	345	1374	613	198	1081	482	176	185	523	548	264
d1, Uniform Delay [s]	46.94	30.40	23.84	52.27	39.78	28.09	51.38	50.00	37.50	44.97	48.35
k, delay calibration	0.34	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.50	0.11	0.17
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	36.58	5.93	2.07	20.55	66.09	0.83	4.54	1.69	33.47	0.81	14.80
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.99	0.83	0.42	0.95	1.12	0.18	0.68	0.45	0.97	0.53	0.89
d, Delay for Lane Group [s/veh]	83.52	36.33	25.91	72.82	105.87	28.92	55.91	51.69	70.97	45.78	63.15
Lane Group LOS	F	D	C	E	F	C	E	D	E	D	E
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	13.16	14.64	5.09	6.58	24.86	1.83	3.63	2.38	18.96	3.99	7.91
50th-Percentile Queue Length [ft/ln]	328.96	366.01	127.28	164.48	621.48	45.73	90.87	59.60	473.93	99.67	197.71
95th-Percentile Queue Length [veh/ln]	19.11	20.92	8.79	10.79	35.51	3.29	6.54	4.29	26.10	7.18	12.52
95th-Percentile Queue Length [ft/ln]	477.69	522.89	219.79	269.65	887.85	82.32	163.57	107.27	652.44	179.40	313.01

Movement, Approach, & Intersection Results

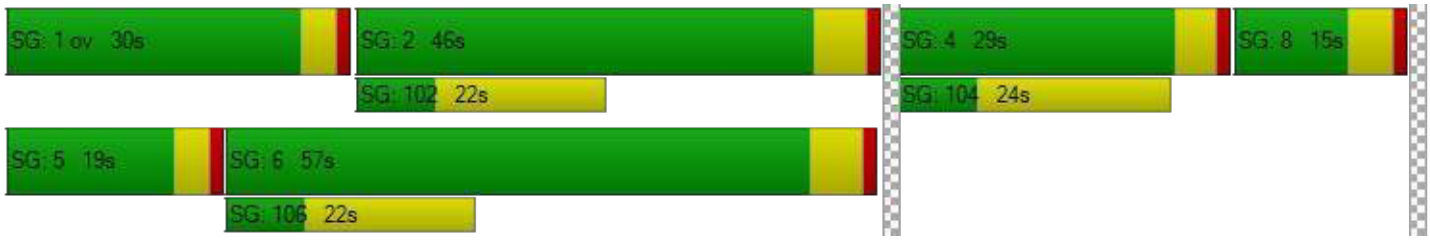
d_M, Delay for Movement [s/veh]	83.52	36.33	25.91	72.82	105.87	28.92	55.91	51.69	70.97	45.78	63.15	63.15
Movement LOS	F	D	C	E	F	C	E	D	E	D	E	E
d_A, Approach Delay [s/veh]	44.05			97.11			66.19			53.54		
Approach LOS	D			F			E			D		
d_I, Intersection Delay [s/veh]	66.38											
Intersection LOS	E											
Intersection V/C	0.898											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.254	2.540	2.445
Crosswalk LOS	F	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	855	672	168	407
d_b, Bicycle Delay [s]	19.67	26.48	50.33	38.09
l_b,int, Bicycle LOS Score for Intersection	2.991	2.786	2.736	2.431
Bicycle LOS	C	C	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Golden Valley/Robert C Lee

Control Type:	Signalized	Delay (sec / veh):	10.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.641

Intersection Setup

Name	Robert C Lee		Golden Valley		Golden Valley		
Approach	Southbound		Eastbound		Westbound		
Lane Configuration							
Turning Movement	Left	Right	Left	Thru	U-turn	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0	1
Entry Pocket Length [ft]	170.00	100.00	450.00	100.00	100.00	100.00	275.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	800.00	0.00	0.00	0.00
Speed [mph]	35.00		50.00		50.00		
Grade [%]	0.00		0.00		0.00		
Curb Present	No		No		No		
Crosswalk	Yes		Yes		No		

Volumes

Name	Robert C Lee		Golden Valley		Golden Valley		
Base Volume Input [veh/h]	134	89	61	1705	0	1403	122
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	24	0	23	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	139	93	63	1798	0	1483	127
Peak Hour Factor	0.9770	0.9770	0.9770	0.9770	0.9770	0.9770	0.9770
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	24	16	460	0	379	32
Total Analysis Volume [veh/h]	142	95	64	1840	0	1518	130
Presence of On-Street Parking	No	No	No	No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0		
v_di, Inbound Pedestrian Volume crossing m	0		0		0		
v_co, Outbound Pedestrian Volume crossing	0		0		0		
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0		
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0		
Bicycle Volume [bicycles/h]	0		0		0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive	Overlap
Signal Group	7	0	5	2	1	6	6
Auxiliary Signal Groups							6,7
Lead / Lag	Lead	-	Lead	-	Lead	-	-
Minimum Green [s]	5	0	5	10	5	10	10
Maximum Green [s]	30	0	30	30	30	30	30
Amber [s]	3.2	0.0	3.2	4.7	3.2	4.7	4.7
All red [s]	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	32	0	10	42	26	58	58
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	0	0	5	0	7	7
Pedestrian Clearance [s]	20	0	0	10	0	17	17
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No		No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	0.0	2.2	3.7	2.2	3.7	3.7
Minimum Recall	No		No	No	No	No	No
Maximum Recall	No		No	No	No	No	No
Pedestrian Recall	No		No	No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	L	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	5.70	4.20	5.70	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	3.70	2.20	3.70	0.00
g_i, Effective Green Time [s]	9	9	4	76	0	72	87
g / C, Green / Cycle	0.09	0.09	0.04	0.76	0.00	0.72	0.87
(v / s)_i Volume / Saturation Flow Rate	0.05	0.07	0.02	0.57	0.00	0.33	0.09
s, saturation flow rate [veh/h]	3113	1431	3113	3204	1603	4584	1431
c, Capacity [veh/h]	293	135	133	2448	2	3312	1249
d1, Uniform Delay [s]	43.01	43.97	46.80	6.55	0.00	5.76	0.88
k, delay calibration	0.11	0.11	0.11	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.25	6.62	2.71	2.18	0.00	0.46	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.49	0.71	0.48	0.75	0.00	0.46	0.10
d, Delay for Lane Group [s/veh]	44.25	50.59	49.51	8.74	0.00	6.22	1.05
Lane Group LOS	D	D	D	A	A	A	A
Critical Lane Group	No	Yes	No	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	1.69	2.49	0.80	6.67	0.00	3.09	0.06
50th-Percentile Queue Length [ft/ln]	42.30	62.32	19.89	166.83	0.00	77.22	1.45
95th-Percentile Queue Length [veh/ln]	3.05	4.49	1.43	10.91	0.00	5.56	0.10
95th-Percentile Queue Length [ft/ln]	76.15	112.17	35.79	272.74	0.00	138.99	2.61

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	44.25	50.59	49.51	8.74	0.00	6.22	1.05
Movement LOS	D	D	D	A	A	A	A
d_A, Approach Delay [s/veh]	46.79		10.11		5.81		
Approach LOS	D		B		A		
d_I, Intersection Delay [s/veh]	10.53						
Intersection LOS	B						
Intersection V/C	0.641						

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.403	3.415	0.000
Crosswalk LOS	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	556	726	1046
d_b, Bicycle Delay [s]	26.07	20.29	11.38
l_b,int, Bicycle LOS Score for Intersection	1.560	3.130	2.466
Bicycle LOS	A	C	B

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Golden Valley/Sierra Hwy

Control Type:	Signalized	Delay (sec / veh):	49.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.750

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	2	0	2	1	0	1
Entry Pocket Length [ft]	430.00	100.00	100.00	415.00	100.00	500.00	285.00	100.00	325.00	285.00	100.00	295.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	602	1089	134	67	291	265	407	732	640	54	678	81
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	4	0	0	7	0	0	0	20	4	0	19	12
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	630	1133	139	77	303	276	423	782	670	56	724	96
Peak Hour Factor	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	161	289	35	20	77	70	108	200	171	14	185	25
Total Analysis Volume [veh/h]	644	1157	142	79	309	282	432	799	684	57	740	98
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	2	3	8	8	7	4	0
Auxiliary Signal Groups						2,3			1,8			
Lead / Lag	Lead	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	26	52	0	10	36	36	20	48	48	10	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	5	5	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	25	0	10	10	0	27	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	59	59	6	43	63	16	35	61	4	23	23
g / C, Green / Cycle	0.18	0.49	0.49	0.05	0.36	0.53	0.13	0.29	0.51	0.04	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.21	0.39	0.40	0.05	0.10	0.20	0.14	0.25	0.27	0.02	0.16	0.07
s, saturation flow rate [veh/h]	3113	1683	1620	1603	3204	1431	3113	3204	2532	3113	4584	1431
c, Capacity [veh/h]	571	828	797	81	1150	753	416	927	1281	109	873	273
d1, Uniform Delay [s]	49.02	25.25	25.88	56.90	27.30	16.80	52.00	40.40	20.07	56.95	46.91	42.23
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	62.87	7.37	8.98	39.66	0.57	1.43	31.09	2.52	0.36	3.85	2.39	0.80
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.13	0.78	0.81	0.97	0.27	0.37	1.04	0.86	0.53	0.52	0.85	0.36
d, Delay for Lane Group [s/veh]	111.88	32.63	34.86	96.56	27.87	18.22	83.09	42.92	20.43	60.80	49.30	43.03
Lane Group LOS	F	C	C	F	C	B	F	D	C	E	D	D
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	13.18	15.59	16.22	3.21	3.10	4.51	7.83	10.93	6.01	0.88	7.02	2.50
50th-Percentile Queue Length [ft/ln]	329.59	389.67	405.48	80.30	77.39	112.86	195.66	273.19	150.35	22.05	175.44	62.53
95th-Percentile Queue Length [veh/ln]	20.28	22.06	22.82	5.78	5.57	8.00	12.61	16.35	10.04	1.59	11.36	4.50
95th-Percentile Queue Length [ft/ln]	507.10	551.54	570.60	144.54	139.30	199.98	315.33	408.72	250.90	39.69	284.05	112.56

Movement, Approach, & Intersection Results

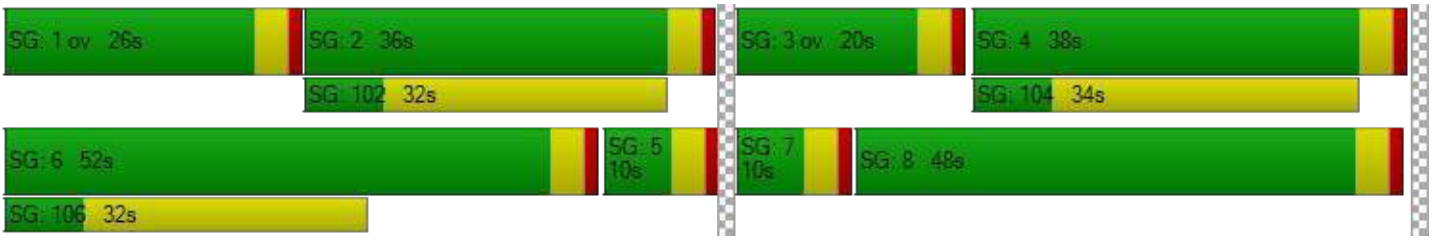
d_M, Delay for Movement [s/veh]	111.88	33.60	34.86	96.56	27.87	18.22	83.09	42.92	20.43	60.80	49.30	43.03
Movement LOS	F	C	C	F	C	B	F	D	C	E	D	D
d_A, Approach Delay [s/veh]	59.64			31.91			43.95			49.34		
Approach LOS	E			C			D			D		
d_I, Intersection Delay [s/veh]	48.97											
Intersection LOS	D											
Intersection V/C	0.750											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.105	3.510	3.209
Crosswalk LOS	F	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	533	733	567
d_b, Bicycle Delay [s]	21.61	32.28	24.08	30.83
l_b,int, Bicycle LOS Score for Intersection	3.163	2.112	3.139	2.052
Bicycle LOS	C	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Golden Valley/SB SR-14

Control Type:	Signalized	Delay (sec / veh):	31.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.688

Intersection Setup

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	300.00	100.00	100.00	100.00	100.00	270.00	200.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	0	0	0	83	3	346	0	808	111	207	627	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	11	0	12	15	0	20	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	86	3	371	0	853	130	215	672	0
Peak Hour Factor	1.0000	1.0000	1.0000	0.9580	0.9580	0.9580	1.0000	0.9580	0.9580	0.9580	0.9580	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	22	1	97	0	223	34	56	175	0
Total Analysis Volume [veh/h]	0	0	0	90	3	387	0	890	136	224	701	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	0	10	0	0	10	0	5	10	0
Maximum Green [s]	0	0	0	0	30	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	0.0	3.6	0.0	0.0	4.7	0.0	3.2	4.7	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	0	45	0	0	32	0	23	55	0
Vehicle Extension [s]	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	7	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk					No			No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	2.6	0.0	0.0	3.7	0.0	2.2	3.7	0.0
Minimum Recall					No			No		No	No	
Maximum Recall					No			No		No	No	
Pedestrian Recall					No			No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	R	L	C
C, Cycle Length [s]		100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]		4.60	4.60	4.60	5.70	5.70	4.20	5.70
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.60	2.60	2.60	3.70	3.70	2.20	3.70
g_i, Effective Green Time [s]		40	40	40	29	29	16	50
g / C, Green / Cycle		0.40	0.40	0.40	0.29	0.29	0.16	0.50
(v / s)_i Volume / Saturation Flow Rate		0.03	0.03	0.27	0.28	0.10	0.14	0.22
s, saturation flow rate [veh/h]		1603	1608	1431	3204	1431	1603	3204
c, Capacity [veh/h]		640	642	571	945	422	258	1595
d1, Uniform Delay [s]		18.58	18.58	24.74	34.42	27.47	40.96	16.15
k, delay calibration		0.50	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.22	0.22	6.34	5.48	0.44	8.76	0.19
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.07	0.07	0.68	0.94	0.32	0.87	0.44
d, Delay for Lane Group [s/veh]		18.80	18.80	31.08	39.90	27.91	49.72	16.35
Lane Group LOS		B	B	C	D	C	D	B
Critical Lane Group		No	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		0.67	0.67	7.96	10.45	2.43	5.71	4.61
50th-Percentile Queue Length [ft/ln]		16.65	16.70	199.07	261.30	60.63	142.82	115.16
95th-Percentile Queue Length [veh/ln]		1.20	1.20	12.59	15.75	4.37	9.63	8.13
95th-Percentile Queue Length [ft/ln]		29.97	30.06	314.77	393.86	109.14	240.82	203.15

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	18.80	18.80	31.08	0.00	39.90	27.91	49.72	16.35	0.00
Movement LOS				B	B	C		D	C	D	B	
d_A, Approach Delay [s/veh]	0.00			28.70			38.31			24.43		
Approach LOS	A			C			D			C		
d_I, Intersection Delay [s/veh]	31.13											
Intersection LOS	C											
Intersection V/C	0.688											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	1.897	2.311	3.090	0.000
Crosswalk LOS	A	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	808	526	986
d_b, Bicycle Delay [s]	50.01	17.77	27.17	12.86
l_b,int, Bicycle LOS Score for Intersection	4.132	2.352	2.406	2.323
Bicycle LOS	D	B	B	B

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: Golden Valley/NB SR-14

Control Type:	Signalized	Delay (sec / veh):	28.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.629

Intersection Setup

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	185.00	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	360.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	248	5	395	0	0	0	312	564	0	0	580	205
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	20	0	0	0	0	0	12	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	278	5	411	0	0	0	337	587	0	0	603	213
Peak Hour Factor	0.9270	0.9270	0.9270	1.0000	1.0000	1.0000	0.9270	0.9270	1.0000	1.0000	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	75	1	111	0	0	0	91	158	0	0	163	57
Total Analysis Volume [veh/h]	300	5	443	0	0	0	364	633	0	0	650	230
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	10	0	0	0	0	5	10	0	0	10	0
Maximum Green [s]	0	30	0	0	0	0	30	30	0	0	30	0
Amber [s]	0.0	3.6	0.0	0.0	0.0	0.0	3.6	4.7	0.0	0.0	4.7	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	62	0	0	0	0	18	38	0	0	20	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	0	0	0	14	0	0	7	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No						No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.6	0.0	0.0	0.0	0.0	2.6	3.7	0.0	0.0	3.7	0.0
Minimum Recall		No					No	No			No	
Maximum Recall		No					No	No			No	
Pedestrian Recall		No					No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R		L	C	C	R
C, Cycle Length [s]	100	100	100		100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60		4.60	5.70	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60		2.60	3.70	3.70	3.70
g_i, Effective Green Time [s]	34	34	34		13	56	38	38
g / C, Green / Cycle	0.34	0.34	0.34		0.13	0.56	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.10	0.10	0.31		0.12	0.20	0.20	0.16
s, saturation flow rate [veh/h]	1603	1605	1431		3113	3204	3204	1431
c, Capacity [veh/h]	540	541	482		419	1794	1215	543
d1, Uniform Delay [s]	24.28	24.28	31.82		42.42	12.08	24.17	22.96
k, delay calibration	0.11	0.11	0.12		0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.28	0.28	8.27		5.64	0.55	1.69	2.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.28	0.28	0.92		0.87	0.35	0.53	0.42
d, Delay for Lane Group [s/veh]	24.56	24.56	40.10		48.06	12.62	25.86	25.38
Lane Group LOS	C	C	D		D	B	C	C
Critical Lane Group	No	No	Yes		Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.54	2.55	10.64		4.50	3.46	5.77	4.05
50th-Percentile Queue Length [ft/ln]	63.58	63.65	265.91		112.58	86.58	144.15	101.22
95th-Percentile Queue Length [veh/ln]	4.58	4.58	15.99		7.98	6.23	9.70	7.29
95th-Percentile Queue Length [ft/ln]	114.44	114.56	399.63		199.59	155.85	242.60	182.20

Movement, Approach, & Intersection Results

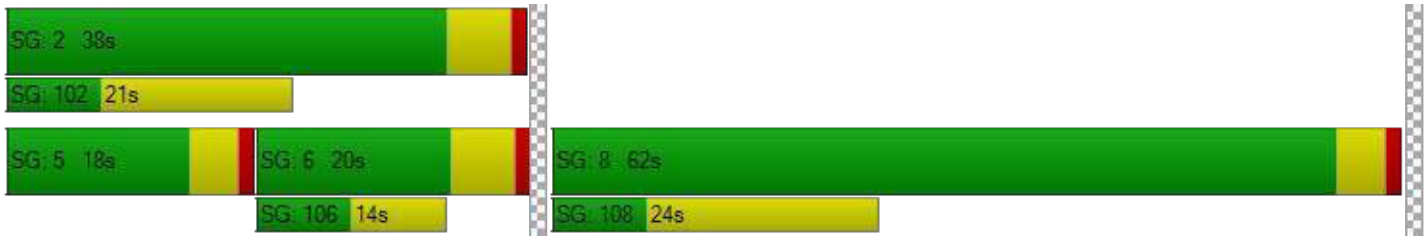
d_M, Delay for Movement [s/veh]	24.56	24.56	40.10	0.00	0.00	0.00	48.06	12.62	0.00	0.00	25.86	25.38
Movement LOS	C	C	D				D	B			C	C
d_A, Approach Delay [s/veh]	33.76			0.00			25.56			25.73		
Approach LOS	C			A			C			C		
d_I, Intersection Delay [s/veh]	27.95											
Intersection LOS	C											
Intersection V/C	0.629											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.409	2.012	0.000	2.940
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1148	0	646	286
d_b, Bicycle Delay [s]	9.08	50.00	22.92	36.73
l_b,int, Bicycle LOS Score for Intersection	2.794	4.132	2.382	2.286
Bicycle LOS	C	D	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Sierra/Friendly Valley

Control Type:	Signalized	Delay (sec / veh):	22.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.585

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	125.00	100.00	100.00	135.00	100.00	400.00	100.00	100.00	100.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Base Volume Input [veh/h]	98	1280	50	76	479	42	61	10	54	42	20	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	12	0	0	7	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	102	1344	52	79	505	44	63	10	56	44	21	71
Peak Hour Factor	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	351	14	21	132	12	16	3	15	12	5	19
Total Analysis Volume [veh/h]	107	1406	54	83	528	46	66	10	59	46	22	74
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	0	10	0	0	10	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	41	48	0	20	27	0	0	32	0	0	32	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	14	0	0	17	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	5.70	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	3.70	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	59	59	6	58	58	20	20	20	20
g / C, Green / Cycle	0.08	0.59	0.59	0.06	0.58	0.58	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.07	0.44	0.44	0.05	0.16	0.03	0.10	0.04	0.04	0.06
s, saturation flow rate [veh/h]	1603	1683	1661	1603	3204	1431	795	1431	1198	1481
c, Capacity [veh/h]	133	999	986	104	1843	823	225	284	138	294
d1, Uniform Delay [s]	45.03	14.62	14.67	46.13	10.80	9.32	39.94	33.50	46.39	34.34
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.55	4.77	4.91	13.13	0.39	0.13	0.88	0.36	1.39	0.64
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.73	0.74	0.80	0.29	0.06	0.34	0.21	0.33	0.33
d, Delay for Lane Group [s/veh]	55.58	19.39	19.59	59.25	11.19	9.45	40.81	33.86	47.79	34.98
Lane Group LOS	E	B	B	E	B	A	D	C	D	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	3.01	12.53	12.50	2.42	2.99	0.46	1.78	1.22	1.17	2.04
50th-Percentile Queue Length [ft/ln]	75.15	313.25	312.56	60.49	74.77	11.61	44.52	30.51	29.26	51.03
95th-Percentile Queue Length [veh/ln]	5.41	18.34	18.30	4.36	5.38	0.84	3.21	2.20	2.11	3.67
95th-Percentile Queue Length [ft/ln]	135.27	458.38	457.53	108.88	134.59	20.89	80.13	54.93	52.68	91.85

Movement, Approach, & Intersection Results

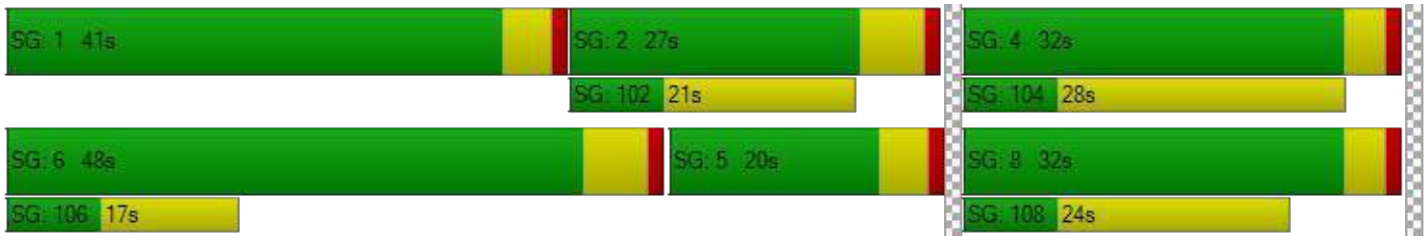
d_M, Delay for Movement [s/veh]	55.58	19.48	19.59	59.25	11.19	9.45	40.81	40.81	33.86	47.79	34.98	34.98
Movement LOS	E	B	B	E	B	A	D	D	C	D	C	C
d_A, Approach Delay [s/veh]	21.95			17.14			37.77			39.13		
Approach LOS	C			B			D			D		
d_I, Intersection Delay [s/veh]	22.52											
Intersection LOS	C											
Intersection V/C	0.585											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.728	2.850	2.211	2.039
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	846	426	560	560
d_b, Bicycle Delay [s]	16.65	30.97	25.92	25.92
l_b,int, Bicycle LOS Score for Intersection	2.852	2.102	1.782	1.794
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sierra/Via Princessa

Control Type:	Signalized	Delay (sec / veh):	43.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.679

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	200.00	100.00	100.00	200.00	100.00	250.00	360.00	100.00	630.00	200.00	100.00	300.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Base Volume Input [veh/h]	440	930	214	217	364	762	226	872	167	190	769	208
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	12	0	2	7	0	0	44	0	0	69	3
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	458	980	223	228	386	793	235	951	174	198	869	219
Peak Hour Factor	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	117	250	57	58	99	203	60	243	44	51	222	56
Total Analysis Volume [veh/h]	468	1001	228	233	394	810	240	971	178	202	888	224
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	4	5	2	2	1	6	0
Auxiliary Signal Groups						4,5			2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	4.7	3.6	4.7	4.7	3.6	4.7	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	22	41	0	24	43	43	14	41	41	14	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	28	0	28	28	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	3.7	2.6	3.7	3.7	2.6	3.7	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	4.60	4.60	5.70	4.60	4.60	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	0.00	2.60	3.70	0.00	2.60	3.70	3.70
g_i, Effective Green Time [s]	17	31	31	11	25	40	9	48	71	9	48	48
g / C, Green / Cycle	0.15	0.26	0.26	0.09	0.20	0.33	0.08	0.40	0.59	0.08	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.15	0.22	0.16	0.07	0.09	0.32	0.08	0.21	0.12	0.06	0.19	0.16
s, saturation flow rate [veh/h]	3113	4584	1431	3113	4584	2532	3113	4584	1431	3113	4584	1431
c, Capacity [veh/h]	452	1173	366	292	937	838	246	1833	848	246	1833	572
d1, Uniform Delay [s]	51.32	42.54	39.55	53.29	41.58	39.53	55.19	27.44	11.38	54.47	26.82	25.64
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	29.28	1.88	1.74	4.98	0.30	8.62	21.63	1.10	0.56	6.74	0.92	2.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.03	0.85	0.62	0.80	0.42	0.97	0.98	0.53	0.21	0.82	0.48	0.39
d, Delay for Lane Group [s/veh]	80.59	44.41	41.29	58.26	41.88	48.15	76.82	28.54	11.95	61.21	27.74	27.66
Lane Group LOS	F	D	D	E	D	D	E	C	B	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	8.38	9.18	5.88	3.53	3.29	12.04	4.24	6.84	2.12	3.14	6.10	4.62
50th-Percentile Queue Length [ft/ln]	209.45	229.46	146.97	88.26	82.35	301.06	105.99	170.97	53.00	78.47	152.57	115.55
95th-Percentile Queue Length [veh/ln]	13.33	14.15	9.86	6.35	5.93	17.73	7.62	11.13	3.82	5.65	10.15	8.15
95th-Percentile Queue Length [ft/ln]	333.14	353.67	246.39	158.86	148.23	443.33	190.41	278.20	95.40	141.24	253.86	203.69

Movement, Approach, & Intersection Results

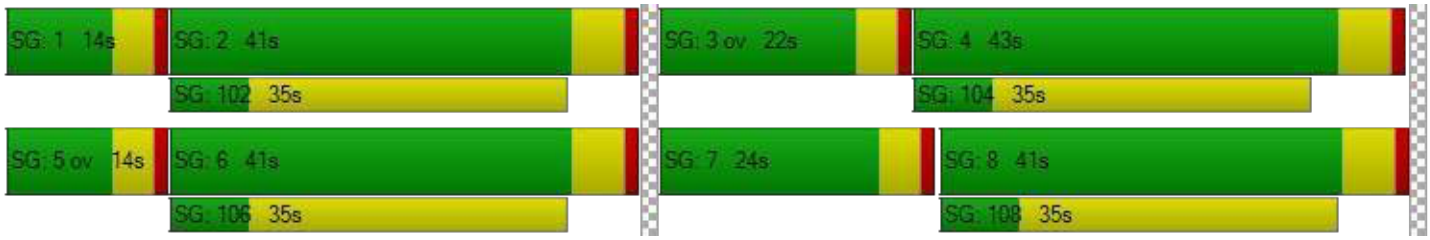
d_M, Delay for Movement [s/veh]	80.59	44.41	41.29	58.26	41.88	48.15	76.82	28.54	11.95	61.21	27.74	27.66
Movement LOS	F	D	D	E	D	D	E	C	B	E	C	C
d_A, Approach Delay [s/veh]	53.97			48.07			34.76			32.87		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	43.20											
Intersection LOS	D											
Intersection V/C	0.679											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	3.309	3.452	3.505	3.359
Crosswalk LOS	C	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	588	621	588	588
d_b, Bicycle Delay [s]	29.91	28.52	29.91	29.91
l_b,int, Bicycle LOS Score for Intersection	2.493	2.350	2.324	2.282
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



PROJECT OPENING YEAR CUMULAITVE PLUS PROJECT CONDITIONS

Intersection Level Of Service Report
Intersection 1: Golden Valley/Centre Pointe

Control Type:	Signalized	Delay (sec / veh):	40.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.758

Intersection Setup

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	400.00	100.00	350.00	700.00	100.00	100.00	260.00	100.00	260.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Base Volume Input [veh/h]	248	745	355	120	951	82	23	39	157	458	48	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	18	0	0	21	0	0	0	5	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	264	793	369	125	1010	85	24	41	168	477	50	43
Peak Hour Factor	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590	0.9590
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	69	207	96	33	263	22	6	11	44	124	13	11
Total Analysis Volume [veh/h]	275	827	385	130	1053	89	25	43	175	497	52	45
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Split	Split	Overlap	Split	Split	Split
Signal Group	1	6	6	5	2	0	0	8	8	0	4	0
Auxiliary Signal Groups			6						1,8			
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	10	5	10	0	0	10	10	0	10	0
Maximum Green [s]	30	30	30	30	30	0	0	30	30	0	30	0
Amber [s]	3.2	4.7	4.7	3.2	4.7	0.0	0.0	3.9	3.9	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	22	42	42	14	34	0	0	15	15	0	29	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	5	5	0	7	0
Pedestrian Clearance [s]	0	15	15	0	15	0	0	10	10	0	17	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.2	3.7	3.7	2.2	3.7	0.0	0.0	2.9	2.9	0.0	2.6	0.0
Minimum Recall	No	No	No	No	No			No	No		No	
Maximum Recall	No	No	No	No	No			No	No		No	
Pedestrian Recall	No	No	No	No	No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	5.70	5.70	4.20	5.70	5.70	4.90	4.90	4.20	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	3.70	3.70	2.20	3.70	3.70	2.90	2.90	0.00	2.60	2.60
g_i, Effective Green Time [s]	18	42	42	10	34	34	10	10	33	19	19
g / C, Green / Cycle	0.18	0.42	0.42	0.10	0.34	0.34	0.10	0.10	0.33	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.17	0.26	0.27	0.08	0.33	0.06	0.02	0.03	0.12	0.16	0.06
s, saturation flow rate [veh/h]	1603	3204	1431	1603	3204	1431	1603	1683	1431	3113	1556
c, Capacity [veh/h]	286	1350	603	157	1093	488	161	169	468	581	291
d1, Uniform Delay [s]	40.82	22.60	22.95	44.34	32.39	23.19	41.18	41.60	25.81	39.41	35.32
k, delay calibration	0.13	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	19.98	2.08	5.12	10.50	19.75	0.82	0.44	0.79	0.49	3.73	0.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.96	0.61	0.64	0.83	0.96	0.18	0.16	0.25	0.37	0.86	0.33
d, Delay for Lane Group [s/veh]	60.81	24.69	28.07	54.84	52.14	24.01	41.62	42.38	26.30	43.15	35.99
Lane Group LOS	E	C	C	D	D	C	D	D	C	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]	7.91	7.23	7.32	3.47	14.38	1.49	0.57	0.99	3.13	6.07	2.07
50th-Percentile Queue Length [ft/ln]	197.77	180.70	183.00	86.77	359.38	37.21	14.26	24.84	78.21	151.76	51.81
95th-Percentile Queue Length [veh/ln]	12.52	11.64	11.76	6.25	20.59	2.68	1.03	1.79	5.63	10.11	3.73
95th-Percentile Queue Length [ft/ln]	313.09	290.93	293.92	156.18	514.83	66.97	25.67	44.71	140.77	252.78	93.25

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.81	24.69	28.07	54.84	52.14	24.01	41.62	42.38	26.30	43.15	35.99	35.99
Movement LOS	E	C	C	D	D	C	D	D	C	D	D	D
d_A, Approach Delay [s/veh]	32.24			50.44			30.73			41.98		
Approach LOS	C			D			C			D		
d_I, Intersection Delay [s/veh]	40.19											
Intersection LOS	D											
Intersection V/C	0.758											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	39.64	39.64	39.64
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.045	2.350	2.464
Crosswalk LOS	F	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	725	566	202	488
d_b, Bicycle Delay [s]	20.32	25.74	40.45	28.61
l_b,int, Bicycle LOS Score for Intersection	2.786	2.609	1.961	2.540
Bicycle LOS	C	B	A	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 2: Golden Valley/Robert C Lee

Control Type:	Signalized	Delay (sec / veh):	28.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.780

Intersection Setup

Name	Robert C Lee		Golden Valley		Golden Valley		
Approach	Southbound		Eastbound		Westbound		
Lane Configuration							
Turning Movement	Left	Right	Left	Thru	U-turn	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0	1
Entry Pocket Length [ft]	170.00	100.00	450.00	100.00	150.00	100.00	275.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	800.00	0.00	0.00	0.00
Speed [mph]	35.00		50.00		50.00		
Grade [%]	0.00		0.00		0.00		
Curb Present	No		No		No		
Crosswalk	Yes		Yes		No		

Volumes

Name	Robert C Lee		Golden Valley		Golden Valley		
Base Volume Input [veh/h]	608	298	416	1185	0	1151	682
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	26	42	24	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	633	310	433	1259	42	1222	710
Peak Hour Factor	0.9030	0.9030	0.9030	0.9030	0.9030	0.9030	0.9030
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	175	86	120	349	12	338	197
Total Analysis Volume [veh/h]	701	343	480	1394	47	1353	786
Presence of On-Street Parking	No	No	No	No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0		
v_di, Inbound Pedestrian Volume crossing m	0		0		0		
v_co, Outbound Pedestrian Volume crossing	0		0		0		
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0		
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0		
Bicycle Volume [bicycles/h]	0		0		0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive	Overlap
Signal Group	7	0	5	2	1	6	6
Auxiliary Signal Groups							6,7
Lead / Lag	Lead	-	Lead	-	Lead	-	-
Minimum Green [s]	5	0	5	10	5	10	10
Maximum Green [s]	30	0	30	30	30	30	30
Amber [s]	3.2	0.0	3.2	4.7	3.2	4.7	4.7
All red [s]	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	32	0	38	42	26	30	30
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	0	0	5	0	7	7
Pedestrian Clearance [s]	20	0	0	10	0	17	17
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No		No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	0.0	2.2	3.7	2.2	3.7	3.7
Minimum Recall	No		No	No	No	No	No
Maximum Recall	No		No	No	No	No	No
Pedestrian Recall	No		No	No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	L	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	5.70	4.20	5.70	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	3.70	2.20	3.70	0.00
g_i, Effective Green Time [s]	28	28	18	54	4	40	73
g / C, Green / Cycle	0.28	0.28	0.18	0.54	0.04	0.40	0.73
(v / s)_i Volume / Saturation Flow Rate	0.23	0.24	0.15	0.44	0.03	0.30	0.55
s, saturation flow rate [veh/h]	3113	1431	3113	3204	1603	4584	1431
c, Capacity [veh/h]	865	398	567	1742	60	1829	1050
d1, Uniform Delay [s]	33.64	34.29	39.56	18.45	47.73	25.63	7.86
k, delay calibration	0.11	0.30	0.11	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.87	13.89	3.61	3.97	19.39	2.73	4.89
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.86	0.85	0.80	0.78	0.74	0.75
d, Delay for Lane Group [s/veh]	35.52	48.18	43.17	22.42	67.12	28.37	12.75
Lane Group LOS	D	D	D	C	E	C	B
Critical Lane Group	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	7.89	9.18	5.66	11.91	1.44	8.72	7.70
50th-Percentile Queue Length [ft/ln]	197.28	229.51	141.41	297.71	35.89	217.95	192.47
95th-Percentile Queue Length [veh/ln]	12.50	14.15	9.56	17.57	2.58	13.56	12.25
95th-Percentile Queue Length [ft/ln]	312.46	353.73	238.93	439.20	64.60	339.01	306.23

Movement, Approach, & Intersection Results

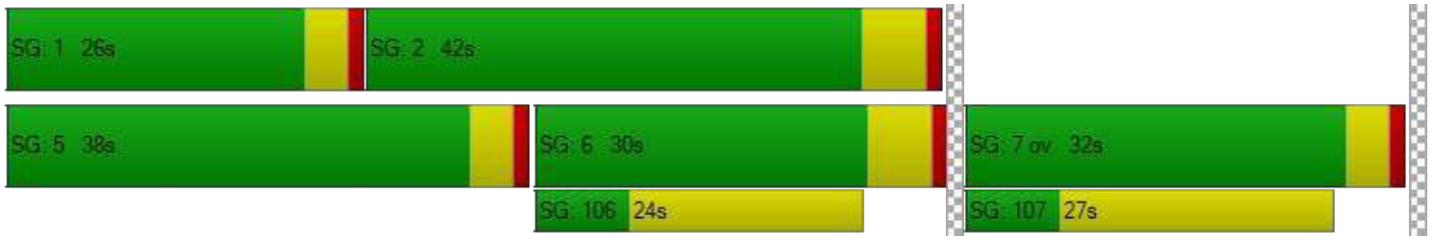
d_M, Delay for Movement [s/veh]	35.52	48.18	43.17	22.42	67.12	28.37	12.75
Movement LOS	D	D	D	C	E	C	B
d_A, Approach Delay [s/veh]	39.68		27.73		23.58		
Approach LOS	D		C		C		
d_I, Intersection Delay [s/veh]	28.40						
Intersection LOS	C						
Intersection V/C	0.780						

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.830	3.427	0.000
Crosswalk LOS	C	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	556	726	486
d_b, Bicycle Delay [s]	26.07	20.29	28.66
l_b,int, Bicycle LOS Score for Intersection	1.560	3.106	2.762
Bicycle LOS	A	C	C

Sequence

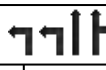
Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Golden Valley/Sierra Hwy

Control Type:	Signalized	Delay (sec / veh):	75.8
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.004

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	2	0	2	1	0	1
Entry Pocket Length [ft]	430.00	100.00	100.00	415.00	100.00	500.00	285.00	100.00	325.00	285.00	100.00	295.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	540	199	14	31	1093	405	347	491	907	507	895	77
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	7	0	0	14	0	11	11	39	7	0	37	4
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	569	207	15	46	1137	432	372	550	951	527	968	84
Peak Hour Factor	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530	0.9530
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	149	54	4	12	298	113	98	144	249	138	254	22
Total Analysis Volume [veh/h]	597	217	16	48	1193	453	390	577	998	553	1016	88
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	2	3	8	8	7	4	0
Auxiliary Signal Groups						2,3			1,8			
Lead / Lag	Lead	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	25	54	0	9	38	38	19	36	36	21	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	5	5	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	25	0	10	10	0	27	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	55	55	4	38	57	15	27	52	17	30	30
g / C, Green / Cycle	0.18	0.46	0.46	0.04	0.32	0.48	0.13	0.23	0.44	0.15	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.19	0.07	0.07	0.03	0.37	0.32	0.13	0.18	0.39	0.18	0.22	0.06
s, saturation flow rate [veh/h]	3113	1683	1643	1603	3204	1431	3113	3204	2532	3113	4584	1431
c, Capacity [veh/h]	545	767	749	60	1019	681	389	734	1108	450	1140	356
d1, Uniform Delay [s]	49.50	19.11	19.11	57.35	40.93	24.08	52.50	43.49	31.34	51.33	43.52	36.09
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.30	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	50.13	0.43	0.44	21.79	87.58	5.07	21.66	1.91	7.49	107.20	2.65	0.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.10	0.15	0.15	0.81	1.17	0.66	1.00	0.79	0.90	1.23	0.89	0.25
d, Delay for Lane Group [s/veh]	99.64	19.53	19.54	79.14	128.51	29.15	74.16	45.40	38.83	158.52	46.17	36.45
Lane Group LOS	F	B	B	E	F	C	F	D	D	F	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	11.62	1.91	1.87	1.76	26.54	10.02	6.82	7.91	13.50	13.20	9.53	2.03
50th-Percentile Queue Length [ft/ln]	290.54	47.73	46.66	44.02	663.49	250.44	170.38	197.79	337.38	330.04	238.16	50.71
95th-Percentile Queue Length [veh/ln]	17.98	3.44	3.36	3.17	38.55	15.21	11.11	12.52	19.52	20.89	14.59	3.65
95th-Percentile Queue Length [ft/ln]	449.57	85.91	83.99	79.24	963.67	380.21	277.64	313.11	488.00	522.27	364.71	91.27

Movement, Approach, & Intersection Results

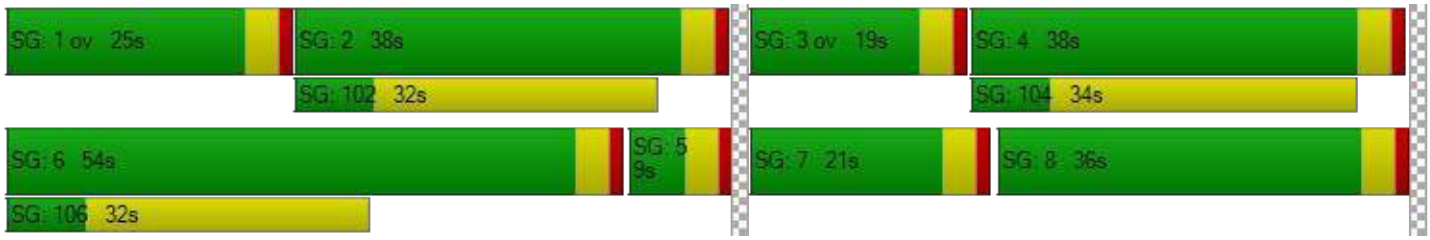
d_M, Delay for Movement [s/veh]	99.64	19.54	19.54	79.14	128.51	29.15	74.16	45.40	38.83	158.52	46.17	36.45
Movement LOS	F	B	B	E	F	C	F	D	D	F	D	D
d_A, Approach Delay [s/veh]	77.15			100.54			47.77			83.15		
Approach LOS	E			F			D			F		
d_I, Intersection Delay [s/veh]	75.82											
Intersection LOS	E											
Intersection V/C	1.004											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.114	3.591	3.278
Crosswalk LOS	F	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	833	567	533	567
d_b, Bicycle Delay [s]	20.42	30.82	32.27	30.82
l_b,int, Bicycle LOS Score for Intersection	2.244	2.957	3.181	2.471
Bicycle LOS	B	C	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Golden Valley/SB SR-14

Control Type:	Signalized	Delay (sec / veh):	31.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.718

Intersection Setup

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	300.00	100.00	100.00	100.00	100.00	270.00	200.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	0	0	0	30	228	401	0	502	267	212	980	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	15	0	20	33	0	26	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	31	237	432	0	542	311	221	1046	0
Peak Hour Factor	1.0000	1.0000	1.0000	0.9160	0.9160	0.9160	1.0000	0.9160	0.9160	0.9160	0.9160	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	8	65	118	0	148	85	60	285	0
Total Analysis Volume [veh/h]	0	0	0	34	259	472	0	592	340	241	1142	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	0	10	0	0	10	0	5	10	0
Maximum Green [s]	0	0	0	0	30	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	0.0	3.6	0.0	0.0	4.7	0.0	3.2	4.7	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	0	55	0	0	26	0	19	45	0
Vehicle Extension [s]	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	7	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk					No			No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	2.6	0.0	0.0	3.7	0.0	2.2	3.7	0.0
Minimum Recall					No			No		No	No	
Maximum Recall					No			No		No	No	
Pedestrian Recall					No			No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	R	L	C
C, Cycle Length [s]		100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]		4.60	4.60	4.60	5.70	5.70	4.20	5.70
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.60	2.60	2.60	3.70	3.70	2.20	3.70
g_i, Effective Green Time [s]		42	42	42	26	26	17	48
g / C, Green / Cycle		0.42	0.42	0.42	0.26	0.26	0.17	0.48
(v / s)_i Volume / Saturation Flow Rate		0.02	0.15	0.33	0.18	0.24	0.15	0.36
s, saturation flow rate [veh/h]		1603	1683	1431	3204	1431	1603	3204
c, Capacity [veh/h]		674	708	602	843	376	275	1527
d1, Uniform Delay [s]		17.16	19.85	25.06	33.31	35.62	40.42	21.30
k, delay calibration		0.50	0.50	0.50	0.11	0.27	0.11	0.11
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.14	1.46	9.89	1.08	17.20	8.76	0.75
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.05	0.37	0.78	0.70	0.90	0.88	0.75
d, Delay for Lane Group [s/veh]		17.30	21.31	34.95	34.39	52.83	49.18	22.05
Lane Group LOS		B	C	C	C	D	D	C
Critical Lane Group		No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh/ln]		0.46	4.12	10.47	6.18	9.24	6.12	9.71
50th-Percentile Queue Length [ft/ln]		11.54	103.02	261.86	154.57	230.98	153.12	242.67
95th-Percentile Queue Length [veh/ln]		0.83	7.42	15.78	10.26	14.22	10.18	14.82
95th-Percentile Queue Length [ft/ln]		20.77	185.43	394.56	256.52	355.60	254.59	370.41

Movement, Approach, & Intersection Results

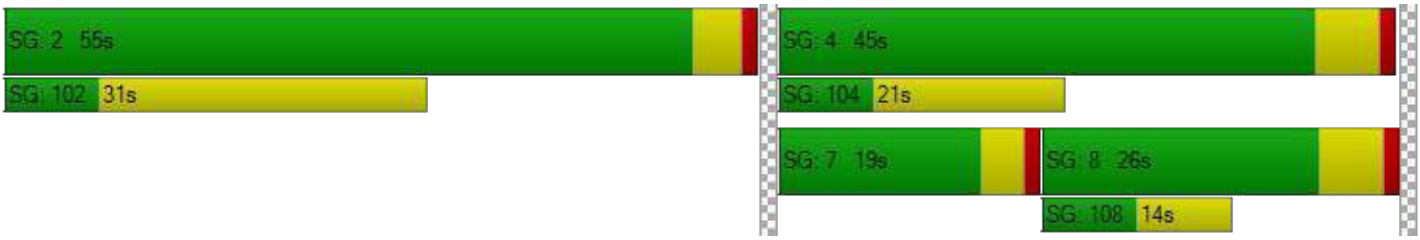
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	17.30	21.31	34.95	0.00	34.39	52.83	49.18	22.05	0.00
Movement LOS				B	C	C		C	D	D	C	
d_A, Approach Delay [s/veh]	0.00			29.55			41.11			26.78		
Approach LOS	A			C			D			C		
d_I, Intersection Delay [s/veh]	31.80											
Intersection LOS	C											
Intersection V/C	0.718											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.129	2.416	3.190	0.000
Crosswalk LOS	B	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	1008	406	786
d_b, Bicycle Delay [s]	50.01	12.31	31.77	18.43
l_b,int, Bicycle LOS Score for Intersection	4.132	2.822	2.329	2.701
Bicycle LOS	D	C	B	B

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Golden Valley/NB SR-14

Control Type:	Signalized	Delay (sec / veh):	22.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.612

Intersection Setup

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	185.00	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	360.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	157	1	180	0	0	0	208	318	0	0	1030	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	21	0	0	0	0	0	15	5	0	0	5	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	184	1	187	0	0	0	231	336	0	0	1077	74
Peak Hour Factor	0.8840	0.8840	0.8840	1.0000	1.0000	1.0000	0.8840	0.8840	1.0000	1.0000	0.8840	0.8840
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	52	0	53	0	0	0	65	95	0	0	305	21
Total Analysis Volume [veh/h]	208	1	212	0	0	0	261	380	0	0	1218	84
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	10	0	0	0	0	5	10	0	0	10	0
Maximum Green [s]	0	30	0	0	0	0	30	30	0	0	30	0
Amber [s]	0.0	3.6	0.0	0.0	0.0	0.0	3.6	4.7	0.0	0.0	4.7	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	45	0	0	0	0	15	55	0	0	40	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	0	0	0	14	0	0	7	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No						No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.6	0.0	0.0	0.0	0.0	2.6	3.7	0.0	0.0	3.7	0.0
Minimum Recall		No					No	No			No	
Maximum Recall		No					No	No			No	
Pedestrian Recall		No					No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R		L	C	C	R
C, Cycle Length [s]	100	100	100		100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60		4.60	5.70	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60		2.60	3.70	3.70	3.70
g_i, Effective Green Time [s]	17	17	17		10	72	57	57
g / C, Green / Cycle	0.17	0.17	0.17		0.10	0.72	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.07	0.07	0.15		0.08	0.12	0.38	0.06
s, saturation flow rate [veh/h]	1603	1604	1431		3113	3204	3204	1431
c, Capacity [veh/h]	279	279	249		320	2317	1840	822
d1, Uniform Delay [s]	36.50	36.50	40.06		43.95	4.35	14.62	9.63
k, delay calibration	0.11	0.11	0.11		0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.83	0.83	8.02		5.09	0.15	1.89	0.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.37	0.37	0.85		0.82	0.16	0.66	0.10
d, Delay for Lane Group [s/veh]	37.34	37.34	48.08		49.03	4.50	16.51	9.88
Lane Group LOS	D	D	D		D	A	B	A
Critical Lane Group	No	No	Yes		Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.23	2.23	5.38		3.24	0.89	8.37	0.77
50th-Percentile Queue Length [ft/ln]	55.78	55.80	134.48		80.93	22.23	209.13	19.32
95th-Percentile Queue Length [veh/ln]	4.02	4.02	9.18		5.83	1.60	13.11	1.39
95th-Percentile Queue Length [ft/ln]	100.40	100.44	229.57		145.68	40.02	327.71	34.78

Movement, Approach, & Intersection Results

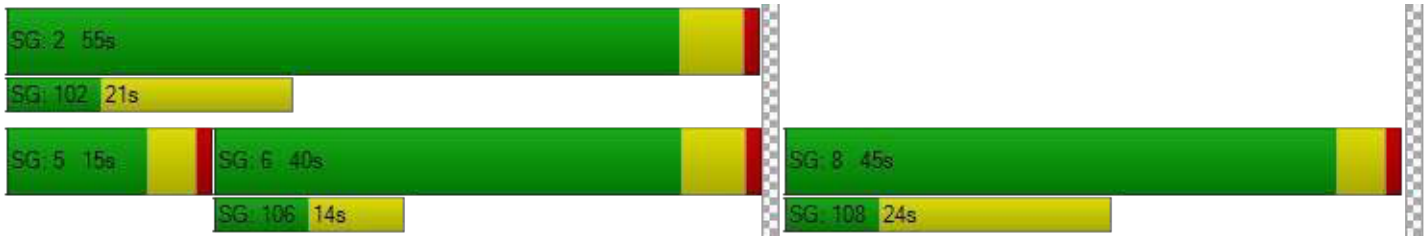
d_M, Delay for Movement [s/veh]	37.34	37.34	48.08	0.00	0.00	0.00	49.03	4.50	0.00	0.00	16.51	9.88
Movement LOS	D	D	D				D	A			B	A
d_A, Approach Delay [s/veh]	42.75			0.00			22.64			16.08		
Approach LOS	D			A			C			B		
d_I, Intersection Delay [s/veh]	22.61											
Intersection LOS	C											
Intersection V/C	0.612											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.290	1.888	0.000	2.920
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	808	0	986	686
d_b, Bicycle Delay [s]	17.76	50.00	12.86	21.59
l_b,int, Bicycle LOS Score for Intersection	2.254	4.132	2.088	2.634
Bicycle LOS	B	D	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Sierra/Friendly Valley

Control Type:	Signalized	Delay (sec / veh):	26.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.578

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	125.00	100.00	100.00	135.00	100.00	400.00	100.00	100.00	100.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Base Volume Input [veh/h]	44	398	87	196	1130	196	52	24	65	69	18	167
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	15	0	0	25	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	429	91	204	1201	204	54	25	68	72	19	174
Peak Hour Factor	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280	0.9280
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	116	25	55	324	55	15	7	18	19	5	47
Total Analysis Volume [veh/h]	50	462	98	220	1294	220	58	27	73	78	20	188
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	0	10	0	0	10	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	22	23	0	45	46	0	0	32	0	0	32	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	14	0	0	17	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	5.70	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	3.70	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	42	42	16	54	54	28	28	28	28
g / C, Green / Cycle	0.04	0.42	0.42	0.16	0.54	0.54	0.28	0.28	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.03	0.17	0.17	0.14	0.40	0.15	0.14	0.05	0.07	0.14
s, saturation flow rate [veh/h]	1603	1683	1583	1603	3204	1431	627	1431	1165	1451
c, Capacity [veh/h]	62	707	665	254	1730	772	235	398	131	404
d1, Uniform Delay [s]	47.68	20.27	20.30	41.04	17.75	12.51	36.81	27.45	48.08	30.40
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	20.68	1.73	1.87	8.65	3.01	0.93	0.94	0.22	4.26	1.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.41	0.41	0.87	0.75	0.28	0.36	0.18	0.59	0.51
d, Delay for Lane Group [s/veh]	68.36	22.00	22.17	49.69	20.76	13.43	37.74	27.67	52.34	31.42
Lane Group LOS	E	C	C	D	C	B	D	C	D	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.60	5.01	4.78	5.89	11.73	2.84	1.97	1.34	2.10	4.28
50th-Percentile Queue Length [ft/ln]	39.96	125.24	119.50	147.34	293.27	70.89	49.16	33.57	52.42	106.89
95th-Percentile Queue Length [veh/ln]	2.88	8.68	8.37	9.87	17.35	5.10	3.54	2.42	3.77	7.67
95th-Percentile Queue Length [ft/ln]	71.93	217.01	209.14	246.87	433.70	127.61	88.49	60.42	94.36	191.67

Movement, Approach, & Intersection Results

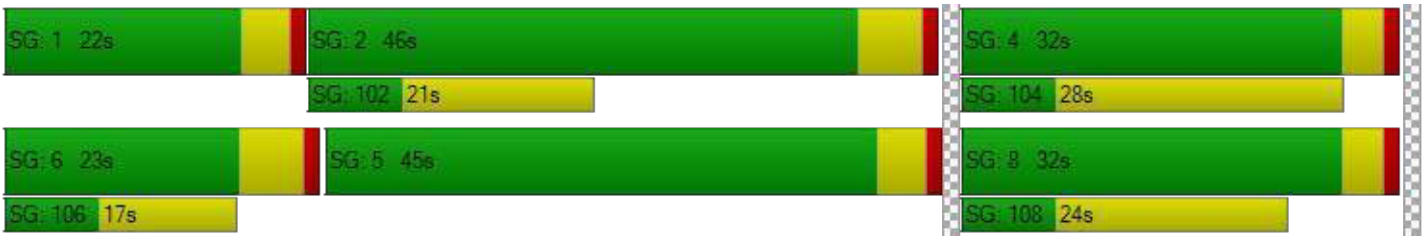
d_M, Delay for Movement [s/veh]	68.36	22.06	22.17	49.69	20.76	13.43	37.74	37.74	27.67	52.34	31.42	31.42
Movement LOS	E	C	C	D	C	B	D	D	C	D	C	C
d_A, Approach Delay [s/veh]	25.88			23.50			33.09			37.13		
Approach LOS	C			C			C			D		
d_I, Intersection Delay [s/veh]	25.96											
Intersection LOS	C											
Intersection V/C	0.578											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.750	2.871	2.245	2.150
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	346	806	560	560
d_b, Bicycle Delay [s]	34.20	17.82	25.92	25.92
l_b,int, Bicycle LOS Score for Intersection	2.063	2.990	1.820	2.032
Bicycle LOS	B	C	A	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sierra/Via Princessa

Control Type:	Signalized	Delay (sec / veh):	40.5
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.782

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	200.00	100.00	100.00	200.00	100.00	250.00	360.00	100.00	630.00	200.00	100.00	300.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Base Volume Input [veh/h]	351	331	127	169	850	758	171	874	403	295	934	78
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	7	5	3	17	0	0	60	3	5	25	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	368	351	137	179	901	789	178	969	422	312	997	82
Peak Hour Factor	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490	0.9490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	97	92	36	47	237	208	47	255	111	82	263	22
Total Analysis Volume [veh/h]	388	370	144	189	949	831	188	1021	445	329	1051	86
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	4	5	2	2	1	6	0
Auxiliary Signal Groups						4,5			2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	4.7	3.6	4.7	4.7	3.6	4.7	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	20	42	0	19	41	41	18	41	41	18	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	28	0	28	28	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	3.7	2.6	3.7	3.7	2.6	3.7	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	4.60	4.60	5.70	4.60	4.60	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	0.00	2.60	3.70	0.00	2.60	3.70	3.70
g_i, Effective Green Time [s]	15	36	36	9	30	49	13	41	62	13	41	41
g / C, Green / Cycle	0.13	0.30	0.30	0.08	0.25	0.41	0.11	0.34	0.51	0.11	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.12	0.08	0.10	0.06	0.21	0.33	0.06	0.22	0.31	0.11	0.23	0.06
s, saturation flow rate [veh/h]	3113	4584	1431	3113	4584	2532	3113	4584	1431	3113	4584	1431
c, Capacity [veh/h]	402	1373	428	246	1143	1037	350	1547	735	350	1547	483
d1, Uniform Delay [s]	52.06	32.08	32.79	54.24	42.69	31.19	50.35	33.93	20.60	52.90	34.22	28.06
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.15	0.10	0.46	4.97	1.63	1.58	1.28	2.23	3.68	11.88	2.42	0.81
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.97	0.27	0.34	0.77	0.83	0.80	0.54	0.66	0.61	0.94	0.68	0.18
d, Delay for Lane Group [s/veh]	66.21	32.18	33.25	59.22	44.31	32.77	51.63	36.16	24.27	64.78	36.64	28.87
Lane Group LOS	E	C	C	E	D	C	D	D	C	E	D	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.39	2.64	3.19	2.88	8.64	10.07	2.65	8.33	8.77	5.33	8.66	1.78
50th-Percentile Queue Length [ft/ln]	159.76	65.92	79.64	72.02	216.02	251.63	66.14	208.25	219.33	133.20	216.59	44.56
95th-Percentile Queue Length [veh/ln]	10.54	4.75	5.73	5.19	13.46	15.27	4.76	13.06	13.63	9.11	13.49	3.21
95th-Percentile Queue Length [ft/ln]	263.40	118.65	143.36	129.64	336.54	381.71	119.05	326.58	340.77	227.84	337.27	80.20

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	66.21	32.18	33.25	59.22	44.31	32.77	51.63	36.16	24.27	64.78	36.64	28.87
Movement LOS	E	C	C	E	D	C	D	D	C	E	D	C
d_A, Approach Delay [s/veh]	46.99			40.87			34.72			42.50		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	40.49											
Intersection LOS	D											
Intersection V/C	0.782											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.54	49.54	49.54	49.54
l_p,int, Pedestrian LOS Score for Intersection	3.337	3.405	3.572	3.372
Crosswalk LOS	C	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	605	588	588	588
d_b, Bicycle Delay [s]	29.23	29.93	29.93	29.93
l_b,int, Bicycle LOS Score for Intersection	2.056	2.643	2.469	2.366
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 8: Golden Valley/Project Dwy

Control Type:	Two-way stop	Delay (sec / veh):	35.1
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.084

Intersection Setup

Name	Project Dwy		Golden Valley		Golden Valley	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	49.21	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		No	

Volumes

Name	Project Dwy		Golden Valley		Golden Valley	
Base Volume Input [veh/h]	0	0	0	1185	1833	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	53	11	57	13	42
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	53	11	1290	1920	42
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	13	3	323	480	11
Total Analysis Volume [veh/h]	0	53	11	1290	1920	42
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.25	0.08	0.01	0.02	0.00
d_M, Delay for Movement [s/veh]	0.00	27.33	35.05	0.00	0.00	0.00
Movement LOS		D	E	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.95	0.27	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	23.64	6.77	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	27.33		0.30		0.00	
Approach LOS	D		A		A	
d_I, Intersection Delay [s/veh]	0.55					
Intersection LOS	E					

Intersection Level Of Service Report
Intersection 1: Golden Valley/Centre Pointe

Control Type:	Signalized	Delay (sec / veh):	68.2
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.903

Intersection Setup

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	400.00	100.00	350.00	700.00	100.00	100.00	260.00	100.00	260.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Golden Valley			Golden Valley			Centre Pointe			Centre Pointe		
Base Volume Input [veh/h]	292	984	224	166	1044	77	106	73	442	257	65	142
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	9	26	0	0	29	0	0	0	10	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	313	1050	233	173	1115	80	110	76	470	267	68	148
Peak Hour Factor	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130	0.9130
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	86	288	64	47	305	22	30	21	129	73	19	41
Total Analysis Volume [veh/h]	343	1150	255	189	1221	88	120	83	515	292	74	162
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Split	Split	Overlap	Split	Split	Split
Signal Group	1	6	6	5	2	0	0	8	8	0	4	0
Auxiliary Signal Groups			6						1,8			
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	10	5	10	0	0	10	10	0	10	0
Maximum Green [s]	30	30	30	30	30	0	0	30	30	0	30	0
Amber [s]	3.2	4.7	4.7	3.2	4.7	0.0	0.0	3.9	3.9	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	30	57	57	19	46	0	0	15	15	0	29	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	5	5	0	7	0
Pedestrian Clearance [s]	0	15	15	0	15	0	0	10	10	0	17	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.2	3.7	3.7	2.2	3.7	0.0	0.0	2.9	2.9	0.0	2.6	0.0
Minimum Recall	No	No	No	No	No			No	No		No	
Maximum Recall	No	No	No	No	No			No	No		No	
Pedestrian Recall	No	No	No	No	No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.20	5.70	5.70	4.20	5.70	5.70	4.90	4.90	4.20	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	3.70	3.70	2.20	3.70	3.70	2.90	2.90	0.00	2.60	2.60
g_i, Effective Green Time [s]	26	51	51	15	40	40	13	13	44	21	21
g / C, Green / Cycle	0.22	0.43	0.43	0.12	0.34	0.34	0.11	0.11	0.37	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.21	0.36	0.18	0.12	0.38	0.06	0.07	0.05	0.36	0.09	0.16
s, saturation flow rate [veh/h]	1603	3204	1431	1603	3204	1431	1603	1683	1431	3113	1501
c, Capacity [veh/h]	345	1374	613	198	1081	482	176	185	523	548	264
d1, Uniform Delay [s]	47.05	30.55	23.84	52.27	39.78	28.09	51.38	50.00	37.70	44.97	48.35
k, delay calibration	0.34	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.50	0.11	0.17
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	38.93	6.21	2.07	20.55	70.43	0.83	4.54	1.69	35.54	0.81	14.80
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.00	0.84	0.42	0.95	1.13	0.18	0.68	0.45	0.98	0.53	0.89
d, Delay for Lane Group [s/veh]	85.99	36.76	25.91	72.82	110.20	28.92	55.91	51.69	73.25	45.78	63.15
Lane Group LOS	F	D	C	E	F	C	E	D	E	D	E
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	13.49	14.88	5.09	6.58	25.51	1.83	3.63	2.38	19.48	3.99	7.91
50th-Percentile Queue Length [ft/ln]	337.30	371.96	127.28	164.48	637.74	45.73	90.87	59.60	486.88	99.67	197.71
95th-Percentile Queue Length [veh/ln]	19.52	21.20	8.79	10.79	36.54	3.29	6.54	4.29	26.71	7.18	12.52
95th-Percentile Queue Length [ft/ln]	487.90	530.11	219.79	269.65	913.60	82.32	163.57	107.27	667.82	179.40	313.01

Movement, Approach, & Intersection Results

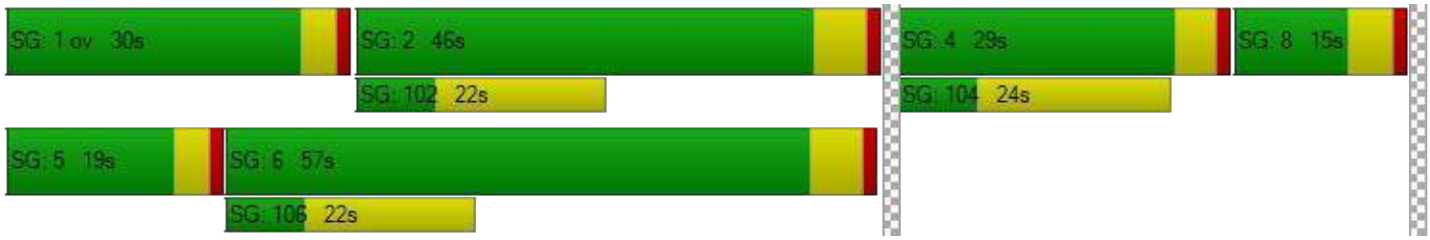
d_M, Delay for Movement [s/veh]	85.99	36.76	25.91	72.82	110.20	28.92	55.91	51.69	73.25	45.78	63.15	63.15
Movement LOS	F	D	C	E	F	C	E	D	E	D	E	E
d_A, Approach Delay [s/veh]	44.84			100.71			67.86			53.54		
Approach LOS	D			F			E			D		
d_I, Intersection Delay [s/veh]	68.17											
Intersection LOS	E											
Intersection V/C	0.903											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.51	49.51	49.51
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.260	2.542	2.445
Crosswalk LOS	F	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	855	672	168	407
d_b, Bicycle Delay [s]	19.67	26.48	50.33	38.09
l_b,int, Bicycle LOS Score for Intersection	3.002	2.795	2.744	2.431
Bicycle LOS	C	C	B	B

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Golden Valley/Robert C Lee

Control Type:	Signalized	Delay (sec / veh):	12.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.678

Intersection Setup

Name	Robert C Lee		Golden Valley		Golden Valley		
Approach	Southbound		Eastbound		Westbound		
Lane Configuration							
Turning Movement	Left	Right	Left	Thru	U-turn	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	1	0	1
Entry Pocket Length [ft]	170.00	100.00	450.00	100.00	100.00	100.00	275.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	800.00	0.00	0.00	0.00
Speed [mph]	35.00		50.00		50.00		
Grade [%]	0.00		0.00		0.00		
Curb Present	No		No		No		
Crosswalk	Yes		Yes		No		

Volumes

Name	Robert C Lee		Golden Valley		Golden Valley		
Base Volume Input [veh/h]	134	89	61	1705	0	1403	122
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	39	51	35	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	139	93	63	1813	51	1495	127
Peak Hour Factor	0.9770	0.9770	0.9770	0.9770	0.9770	0.9770	0.9770
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	24	16	464	13	383	32
Total Analysis Volume [veh/h]	142	95	64	1856	52	1530	130
Presence of On-Street Parking	No	No	No	No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0		
v_di, Inbound Pedestrian Volume crossing m	0		0		0		
v_co, Outbound Pedestrian Volume crossing	0		0		0		
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0		
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0		
Bicycle Volume [bicycles/h]	0		0		0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive	Overlap
Signal Group	7	0	5	2	1	6	6
Auxiliary Signal Groups							6,7
Lead / Lag	Lead	-	Lead	-	Lead	-	-
Minimum Green [s]	5	0	5	10	5	10	10
Maximum Green [s]	30	0	30	30	30	30	30
Amber [s]	3.2	0.0	3.2	4.7	3.2	4.7	4.7
All red [s]	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	32	0	10	42	26	58	58
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	0	0	5	0	7	7
Pedestrian Clearance [s]	20	0	0	10	0	17	17
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk	No			No		No	
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	0.0	2.2	3.7	2.2	3.7	3.7
Minimum Recall	No		No	No	No	No	No
Maximum Recall	No		No	No	No	No	No
Pedestrian Recall	No		No	No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	L	C	R
C, Cycle Length [s]	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	5.70	4.20	5.70	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	3.70	2.20	3.70	0.00
g_i, Effective Green Time [s]	9	9	4	72	4	72	87
g / C, Green / Cycle	0.09	0.09	0.04	0.72	0.04	0.72	0.87
(v / s)_i Volume / Saturation Flow Rate	0.05	0.07	0.02	0.58	0.03	0.33	0.09
s, saturation flow rate [veh/h]	3113	1431	3113	3204	1603	4584	1431
c, Capacity [veh/h]	293	135	133	2319	66	3312	1249
d1, Uniform Delay [s]	43.01	43.97	46.80	9.07	47.51	5.78	0.88
k, delay calibration	0.11	0.11	0.11	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.25	6.62	2.71	3.01	18.29	0.47	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.49	0.71	0.48	0.80	0.79	0.46	0.10
d, Delay for Lane Group [s/veh]	44.25	50.59	49.51	12.07	65.80	6.25	1.05
Lane Group LOS	D	D	D	B	E	A	A
Critical Lane Group	No	Yes	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.69	2.49	0.80	9.48	1.56	3.13	0.06
50th-Percentile Queue Length [ft/ln]	42.30	62.32	19.89	237.09	39.10	78.14	1.45
95th-Percentile Queue Length [veh/ln]	3.05	4.49	1.43	14.53	2.81	5.63	0.10
95th-Percentile Queue Length [ft/ln]	76.15	112.17	35.79	363.35	70.37	140.66	2.61

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	44.25	50.59	49.51	12.07	65.80	6.25	1.05
Movement LOS	D	D	D	B	E	A	A
d_A, Approach Delay [s/veh]	46.79		13.32		7.66		
Approach LOS	D		B		A		
d_I, Intersection Delay [s/veh]	12.87						
Intersection LOS	B						
Intersection V/C	0.678						

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	2.403	3.422	0.000
Crosswalk LOS	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	556	726	1046
d_b, Bicycle Delay [s]	26.07	20.29	11.38
l_b,int, Bicycle LOS Score for Intersection	1.560	3.144	2.501
Bicycle LOS	A	C	B

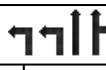
Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Golden Valley/Sierra Hwy

Control Type:	Signalized	Delay (sec / veh):	50.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.762

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	2	0	2	1	0	1
Entry Pocket Length [ft]	430.00	100.00	100.00	415.00	100.00	500.00	285.00	100.00	325.00	285.00	100.00	295.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	602	1089	134	67	291	265	407	732	640	54	678	81
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	11	0	0	7	0	15	12	53	10	0	55	12
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	637	1133	139	77	303	291	435	815	676	56	760	96
Peak Hour Factor	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	163	289	35	20	77	74	111	208	173	14	194	25
Total Analysis Volume [veh/h]	651	1157	142	79	309	297	444	832	691	57	776	98
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	2	3	8	8	7	4	0
Auxiliary Signal Groups						2,3			1,8			
Lead / Lag	Lead	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	26	52	0	10	36	36	20	48	48	10	38	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	5	5	0	7	0
Pedestrian Clearance [s]	0	25	0	0	25	25	0	10	10	0	27	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	58	58	6	42	62	16	36	62	4	24	24
g / C, Green / Cycle	0.18	0.48	0.48	0.05	0.35	0.52	0.13	0.30	0.51	0.04	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.21	0.39	0.40	0.05	0.10	0.21	0.14	0.26	0.27	0.02	0.17	0.07
s, saturation flow rate [veh/h]	3113	1683	1620	1603	3204	1431	3113	3204	2532	3113	4584	1431
c, Capacity [veh/h]	571	813	783	81	1123	740	416	954	1303	109	912	285
d1, Uniform Delay [s]	49.02	26.10	26.75	56.90	28.03	17.63	52.00	39.99	19.46	56.95	46.36	41.35
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.12	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	68.02	8.06	9.90	39.66	0.61	1.62	40.97	2.66	0.37	3.85	2.34	0.72
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.14	0.80	0.83	0.97	0.28	0.40	1.07	0.87	0.53	0.52	0.85	0.34
d, Delay for Lane Group [s/veh]	117.04	34.16	36.65	96.56	28.63	19.25	92.97	42.64	19.82	60.80	48.71	42.06
Lane Group LOS	F	C	D	F	C	B	F	D	B	E	D	D
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	13.59	16.02	16.70	3.21	3.15	4.94	8.40	11.38	5.96	0.88	7.33	2.47
50th-Percentile Queue Length [ft/ln]	339.82	400.46	417.60	80.30	78.71	123.54	209.95	284.56	149.01	22.05	183.28	61.67
95th-Percentile Queue Length [veh/ln]	20.92	22.58	23.41	5.78	5.67	8.59	13.52	16.92	9.96	1.59	11.77	4.44
95th-Percentile Queue Length [ft/ln]	522.96	564.56	585.17	144.54	141.68	214.69	337.88	422.89	249.11	39.69	294.30	111.00

Movement, Approach, & Intersection Results

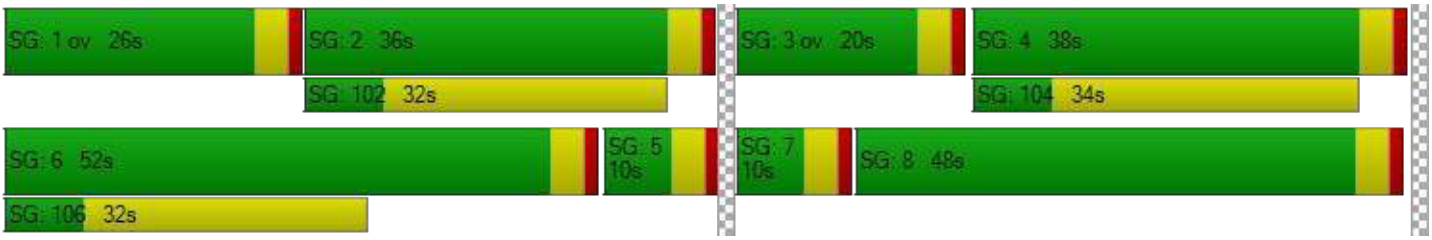
d_M, Delay for Movement [s/veh]	117.04	35.25	36.65	96.56	28.63	19.25	92.97	42.64	19.82	60.80	48.71	42.06
Movement LOS	F	D	D	F	C	B	F	D	B	E	D	D
d_A, Approach Delay [s/veh]	62.66			32.40			45.99			48.75		
Approach LOS	E			C			D			D		
d_I, Intersection Delay [s/veh]	50.65											
Intersection LOS	D											
Intersection V/C	0.762											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	0.000	3.112	3.529	3.221
Crosswalk LOS	F	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	533	733	567
d_b, Bicycle Delay [s]	21.61	32.28	24.08	30.83
l_b,int, Bicycle LOS Score for Intersection	3.168	2.125	3.182	2.072
Bicycle LOS	C	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Golden Valley/SB SR-14

Control Type:	Signalized	Delay (sec / veh):	31.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.701

Intersection Setup

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0	0	0	1	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	300.00	100.00	100.00	100.00	100.00	270.00	200.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			45.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present				No			No			No		
Crosswalk	Yes			Yes			Yes			No		

Volumes

Name	SR14 SB Ramp			SR14 SB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	0	0	0	83	3	346	0	808	111	207	627	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	22	0	27	33	0	45	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	86	3	382	0	868	148	215	697	0
Peak Hour Factor	1.0000	1.0000	1.0000	0.9580	0.9580	0.9580	1.0000	0.9580	0.9580	0.9580	0.9580	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	22	1	100	0	227	39	56	182	0
Total Analysis Volume [veh/h]	0	0	0	90	3	399	0	906	154	224	728	0
Presence of On-Street Parking				No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	0	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	0	0	0	10	0	0	10	0	5	10	0
Maximum Green [s]	0	0	0	0	30	0	0	30	0	30	30	0
Amber [s]	0.0	0.0	0.0	0.0	3.6	0.0	0.0	4.7	0.0	3.2	4.7	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	0	45	0	0	32	0	23	55	0
Vehicle Extension [s]	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	24	0	0	7	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk					No			No			No	
I1, Start-Up Lost Time [s]	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	2.6	0.0	0.0	3.7	0.0	2.2	3.7	0.0
Minimum Recall					No			No		No	No	
Maximum Recall					No			No		No	No	
Pedestrian Recall					No			No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group		L	C	R	C	R	L	C
C, Cycle Length [s]		100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]		4.60	4.60	4.60	5.70	5.70	4.20	5.70
l1_p, Permitted Start-Up Lost Time [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]		2.60	2.60	2.60	3.70	3.70	2.20	3.70
g_i, Effective Green Time [s]		40	40	40	30	30	16	50
g / C, Green / Cycle		0.40	0.40	0.40	0.30	0.30	0.16	0.50
(v / s)_i Volume / Saturation Flow Rate		0.03	0.03	0.28	0.28	0.11	0.14	0.23
s, saturation flow rate [veh/h]		1603	1608	1431	3204	1431	1603	3204
c, Capacity [veh/h]		635	637	567	956	427	258	1605
d1, Uniform Delay [s]		18.79	18.79	25.30	34.34	27.60	40.96	16.12
k, delay calibration		0.50	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]		0.22	0.22	7.18	5.91	0.51	8.76	0.20
d3, Initial Queue Delay [s]		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity		0.07	0.07	0.70	0.95	0.36	0.87	0.45
d, Delay for Lane Group [s/veh]		19.01	19.01	32.48	40.25	28.11	49.72	16.32
Lane Group LOS		B	B	C	D	C	D	B
Critical Lane Group		No	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]		0.67	0.67	8.44	10.70	2.77	5.71	4.79
50th-Percentile Queue Length [ft/ln]		16.77	16.82	210.91	267.57	69.28	142.82	119.82
95th-Percentile Queue Length [veh/ln]		1.21	1.21	13.20	16.07	4.99	9.63	8.38
95th-Percentile Queue Length [ft/ln]		30.19	30.27	330.00	401.71	124.70	240.82	209.58

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	19.01	19.01	32.48	0.00	40.25	28.11	49.72	16.32	0.00
Movement LOS				B	B	C		D	C	D	B	
d_A, Approach Delay [s/veh]	0.00			29.93			38.49			24.18		
Approach LOS	A			C			D			C		
d_I, Intersection Delay [s/veh]	31.36											
Intersection LOS	C											
Intersection V/C	0.701											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	0.00
l_p,int, Pedestrian LOS Score for Intersection	1.905	2.316	3.106	0.000
Crosswalk LOS	A	B	C	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	0	808	526	986
d_b, Bicycle Delay [s]	50.01	17.77	27.17	12.86
l_b,int, Bicycle LOS Score for Intersection	4.132	2.371	2.434	2.345
Bicycle LOS	D	B	B	B

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: Golden Valley/NB SR-14

Control Type:	Signalized	Delay (sec / veh):	28.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.635

Intersection Setup

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	185.00	100.00	100.00	100.00	250.00	100.00	100.00	100.00	100.00	360.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No						No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	SR14 NB Ramp			SR14 NB Ramp			Golden Valley			Golden Valley		
Base Volume Input [veh/h]	248	5	395	0	0	0	312	564	0	0	580	205
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	38	0	0	0	0	0	21	6	0	0	7	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	296	5	411	0	0	0	346	593	0	0	610	213
Peak Hour Factor	0.9270	0.9270	0.9270	1.0000	1.0000	1.0000	0.9270	0.9270	1.0000	1.0000	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	80	1	111	0	0	0	93	160	0	0	165	57
Total Analysis Volume [veh/h]	319	5	443	0	0	0	373	640	0	0	658	230
Presence of On-Street Parking	No		No				No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	0	0	5	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	10	0	0	0	0	5	10	0	0	10	0
Maximum Green [s]	0	30	0	0	0	0	30	30	0	0	30	0
Amber [s]	0.0	3.6	0.0	0.0	0.0	0.0	3.6	4.7	0.0	0.0	4.7	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	62	0	0	0	0	18	38	0	0	20	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	0	0	0	14	0	0	7	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No						No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.6	0.0	0.0	0.0	0.0	2.6	3.7	0.0	0.0	3.7	0.0
Minimum Recall		No					No	No			No	
Maximum Recall		No					No	No			No	
Pedestrian Recall		No					No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R		L	C	C	R
C, Cycle Length [s]	100	100	100		100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60		4.60	5.70	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60		2.60	3.70	3.70	3.70
g_i, Effective Green Time [s]	34	34	34		13	56	38	38
g / C, Green / Cycle	0.34	0.34	0.34		0.13	0.56	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.10	0.10	0.31		0.12	0.20	0.21	0.16
s, saturation flow rate [veh/h]	1603	1605	1431		3113	3204	3204	1431
c, Capacity [veh/h]	541	542	483		419	1793	1214	542
d1, Uniform Delay [s]	24.41	24.41	31.79		42.55	12.13	24.28	22.99
k, delay calibration	0.11	0.11	0.12		0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.31	0.31	8.19		6.64	0.56	1.74	2.43
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.30	0.30	0.92		0.89	0.36	0.54	0.42
d, Delay for Lane Group [s/veh]	24.72	24.72	39.99		49.19	12.68	26.02	25.41
Lane Group LOS	C	C	D		D	B	C	C
Critical Lane Group	No	No	Yes		Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	2.72	2.72	10.62		4.68	3.52	5.86	4.05
50th-Percentile Queue Length [ft/ln]	67.97	68.03	265.53		116.97	87.89	146.59	101.31
95th-Percentile Queue Length [veh/ln]	4.89	4.90	15.97		8.23	6.33	9.83	7.29
95th-Percentile Queue Length [ft/ln]	122.34	122.45	399.15		205.65	158.20	245.87	182.36

Movement, Approach, & Intersection Results

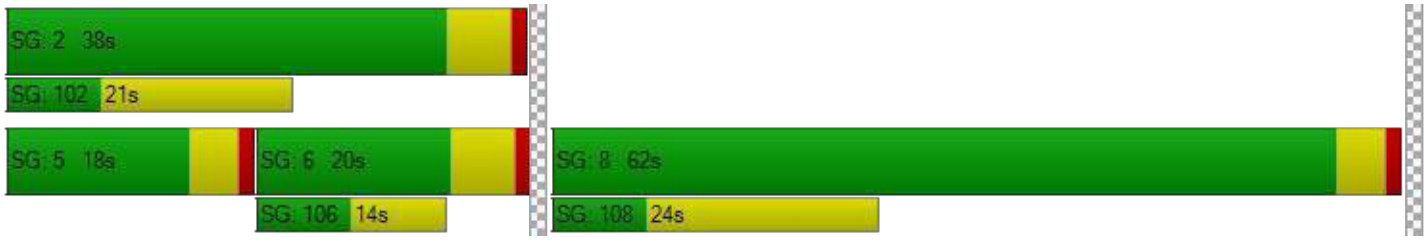
d_M, Delay for Movement [s/veh]	24.72	24.72	39.99	0.00	0.00	0.00	49.19	12.68	0.00	0.00	26.02	25.41
Movement LOS	C	C	D				D	B			C	C
d_A, Approach Delay [s/veh]	33.54			0.00			26.13			25.86		
Approach LOS	C			A			C			C		
d_I, Intersection Delay [s/veh]	28.17											
Intersection LOS	C											
Intersection V/C	0.635											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.416	2.016	0.000	2.945
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1148	0	646	286
d_b, Bicycle Delay [s]	9.08	50.00	22.92	36.73
l_b,int, Bicycle LOS Score for Intersection	2.825	4.132	2.395	2.292
Bicycle LOS	C	D	B	B

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 6: Sierra/Friendly Valley

Control Type:	Signalized	Delay (sec / veh):	22.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.589

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	125.00	100.00	100.00	135.00	100.00	400.00	100.00	100.00	100.00	150.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Friendly Valley Pkwy			Friendly Valley Pkwy		
Base Volume Input [veh/h]	98	1280	50	76	479	42	61	10	54	42	20	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	24	0	0	22	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	102	1356	52	79	520	44	63	10	56	44	21	71
Peak Hour Factor	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560	0.9560
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	355	14	21	136	12	16	3	15	12	5	19
Total Analysis Volume [veh/h]	107	1418	54	83	544	46	66	10	59	46	22	74
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	5	10	0	0	10	0	0	10	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	41	48	0	20	27	0	0	32	0	0	32	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	14	0	0	17	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
C, Cycle Length [s]	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	5.70	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	3.70	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	59	59	6	58	58	20	20	20	20
g / C, Green / Cycle	0.08	0.59	0.59	0.06	0.58	0.58	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.07	0.44	0.44	0.05	0.17	0.03	0.10	0.04	0.04	0.06
s, saturation flow rate [veh/h]	1603	1683	1661	1603	3204	1431	795	1431	1198	1481
c, Capacity [veh/h]	133	999	986	104	1843	823	225	284	138	294
d1, Uniform Delay [s]	45.03	14.71	14.77	46.13	10.87	9.32	39.94	33.50	46.39	34.34
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.55	4.91	5.06	13.13	0.41	0.13	0.88	0.36	1.39	0.64
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.74	0.74	0.80	0.30	0.06	0.34	0.21	0.33	0.33
d, Delay for Lane Group [s/veh]	55.58	19.62	19.83	59.25	11.28	9.45	40.81	33.86	47.79	34.98
Lane Group LOS	E	B	B	E	B	A	D	C	D	C
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh/ln]	3.01	12.73	12.71	2.42	3.10	0.46	1.78	1.22	1.17	2.04
50th-Percentile Queue Length [ft/ln]	75.15	318.24	317.71	60.49	77.52	11.61	44.52	30.51	29.26	51.03
95th-Percentile Queue Length [veh/ln]	5.41	18.58	18.55	4.36	5.58	0.84	3.21	2.20	2.11	3.67
95th-Percentile Queue Length [ft/ln]	135.27	464.53	463.87	108.88	139.53	20.89	80.13	54.93	52.68	91.85

Movement, Approach, & Intersection Results

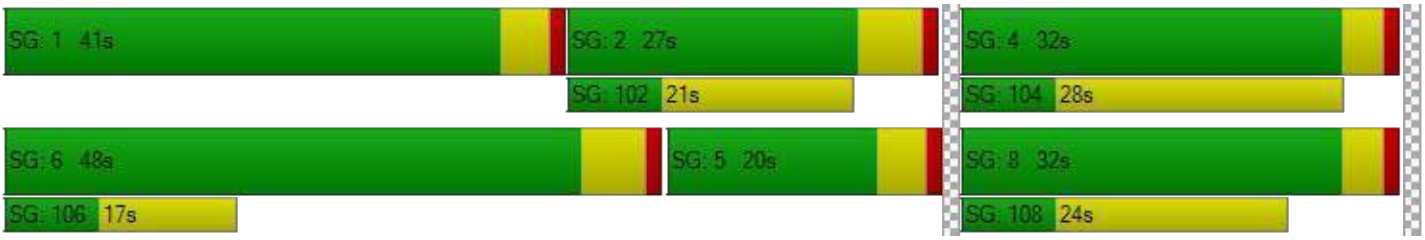
d_M, Delay for Movement [s/veh]	55.58	19.72	19.83	59.25	11.28	9.45	40.81	40.81	33.86	47.79	34.98	34.98
Movement LOS	E	B	B	E	B	A	D	D	C	D	C	C
d_A, Approach Delay [s/veh]	22.15			17.07			37.77			39.13		
Approach LOS	C			B			D			D		
d_I, Intersection Delay [s/veh]	22.59											
Intersection LOS	C											
Intersection V/C	0.589											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
l_p,int, Pedestrian LOS Score for Intersection	2.732	2.854	2.211	2.039
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	846	426	560	560
d_b, Bicycle Delay [s]	16.65	30.97	25.92	25.92
l_b,int, Bicycle LOS Score for Intersection	2.862	2.115	1.782	1.794
Bicycle LOS	C	B	A	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Sierra/Via Princessa

Control Type:	Signalized	Delay (sec / veh):	43.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.683

Intersection Setup

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	200.00	100.00	100.00	200.00	100.00	250.00	360.00	100.00	630.00	200.00	100.00	300.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Sierra Hwy			Sierra Hwy			Via Princessa			Via Princessa		
Base Volume Input [veh/h]	440	930	214	217	364	762	226	872	167	190	769	208
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	15	6	2	11	0	0	44	4	7	69	3
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	461	983	229	228	390	793	235	951	178	205	869	219
Peak Hour Factor	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790	0.9790
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	118	251	58	58	100	203	60	243	45	52	222	56
Total Analysis Volume [veh/h]	471	1004	234	233	398	810	240	971	182	209	888	224
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	3	8	0	7	4	4	5	2	2	1	6	0
Auxiliary Signal Groups						4,5			2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	30	30	30	0
Amber [s]	3.6	4.7	0.0	3.6	4.7	4.7	3.6	4.7	4.7	3.6	4.7	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	22	41	0	24	43	43	14	41	41	14	41	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	28	0	28	28	0	28	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	3.7	0.0	2.6	3.7	3.7	2.6	3.7	3.7	2.6	3.7	0.0
Minimum Recall	No	No		No	No	No	No	No	No	No	No	
Maximum Recall	No	No		No	No	No	No	No	No	No	No	
Pedestrian Recall	No	No		No	No	No	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.60	5.70	5.70	4.60	5.70	4.60	4.60	5.70	4.60	4.60	5.70	5.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	3.70	3.70	2.60	3.70	0.00	2.60	3.70	0.00	2.60	3.70	3.70
g_i, Effective Green Time [s]	17	31	31	11	25	40	9	48	71	9	48	48
g / C, Green / Cycle	0.15	0.26	0.26	0.09	0.20	0.33	0.08	0.40	0.59	0.08	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.15	0.22	0.16	0.07	0.09	0.32	0.08	0.21	0.13	0.07	0.19	0.16
s, saturation flow rate [veh/h]	3113	4584	1431	3113	4584	2532	3113	4584	1431	3113	4584	1431
c, Capacity [veh/h]	452	1177	367	292	941	840	246	1829	847	246	1829	571
d1, Uniform Delay [s]	51.32	42.48	39.66	53.29	41.53	39.44	55.19	27.51	11.46	54.60	26.90	25.71
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	31.41	1.87	1.84	4.98	0.30	8.31	21.63	1.11	0.58	8.04	0.92	2.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, 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
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.04	0.85	0.64	0.80	0.42	0.96	0.98	0.53	0.21	0.85	0.49	0.39
d, Delay for Lane Group [s/veh]	82.73	44.35	41.50	58.26	41.84	47.75	76.82	28.62	12.05	62.64	27.82	27.74
Lane Group LOS	F	D	D	E	D	D	E	C	B	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	8.51	9.20	6.06	3.53	3.33	11.99	4.24	6.85	2.18	3.29	6.11	4.63
50th-Percentile Queue Length [ft/ln]	212.81	230.03	151.55	88.26	83.17	299.82	105.99	171.27	54.52	82.28	152.84	115.75
95th-Percentile Queue Length [veh/ln]	13.54	14.18	10.10	6.35	5.99	17.67	7.62	11.14	3.93	5.92	10.17	8.16
95th-Percentile Queue Length [ft/ln]	338.46	354.39	252.49	158.86	149.70	441.80	190.41	278.59	98.14	148.10	254.21	203.98

Movement, Approach, & Intersection Results

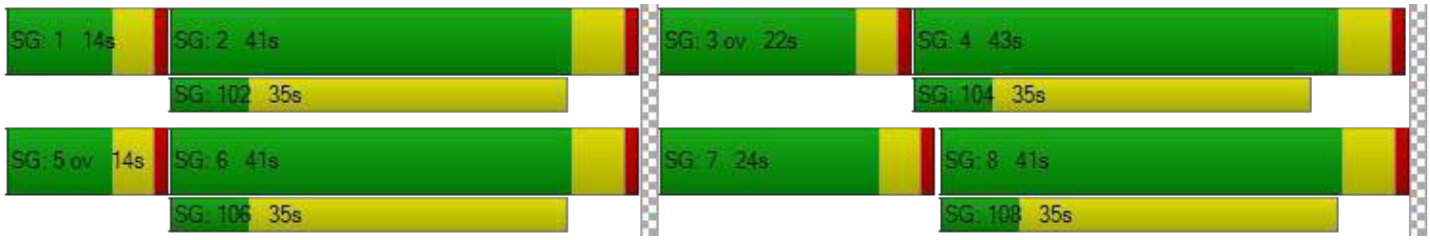
d_M, Delay for Movement [s/veh]	82.73	44.35	41.50	58.26	41.84	47.75	76.82	28.62	12.05	62.64	27.82	27.74
Movement LOS	F	D	D	E	D	D	E	C	B	E	C	C
d_A, Approach Delay [s/veh]	54.54			47.82			34.76			33.32		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	43.41											
Intersection LOS	D											
Intersection V/C	0.683											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.52	49.52	49.52	49.52
l_p,int, Pedestrian LOS Score for Intersection	3.314	3.453	3.506	3.361
Crosswalk LOS	C	C	D	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	588	621	588	588
d_b, Bicycle Delay [s]	29.91	28.52	29.91	29.91
l_b,int, Bicycle LOS Score for Intersection	2.500	2.352	2.326	2.286
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Golden Valley/Project Dwy

Control Type:	Two-way stop	Delay (sec / veh):	26.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.082

Intersection Setup

Name	Project Dwy		Golden Valley		Golden Valley	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	1	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	49.21	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		No	

Volumes

Name	Project Dwy		Golden Valley		Golden Valley	
Base Volume Input [veh/h]	0	0	0	1705	1525	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0404	1.0404	1.0404	1.0404	1.0404	1.0404
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	63	15	75	23	58
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	63	15	1849	1610	58
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	16	4	462	403	15
Total Analysis Volume [veh/h]	0	63	15	1849	1610	58
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.24	0.08	0.02	0.02	0.00
d_M, Delay for Movement [s/veh]	0.00	22.57	26.32	0.00	0.00	0.00
Movement LOS		C	D	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.89	0.26	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	22.34	6.58	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	22.57		0.21		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	0.51					
Intersection LOS	D					

APPENDIX I
Golden Valley Road Mixed-Use Vehicle Miles Traveled Analysis

November 14, 2023

TJW ENGINEERING, INC.
TRAFFIC ENGINEERING &
TRANSPORTATION PLANNING
CONSULTANTS

Mr. Ian Pari, Senior Traffic Engineer
CITY OF SANTA CLARITA
23920 Valencia Boulevard, Suite 300
Santa Clarita, CA 91355

SUBJECT: Golden Valley Road Mixed-Use Vehicle Miles Traveled (VMT) Analysis

Dear Mr. Pari,

*TJW Engineering, Inc. (*TJW*)* is pleased to submit this Vehicle Miles Traveled (VMT) Analysis for the proposed mixed-use project located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The purpose of this memorandum is to satisfy the requirements for disclosure of potential impacts and mitigation measures per the California Environmental Quality Act (CEQA). This analysis has been conducted using guidance from the City of Santa Clarita presented in *Transportation Analysis Updates in Santa Clarita* (May 2020).

PROJECT DESCRIPTION

The proposed project is located at the northwest corner of Golden Valley Road and Sierra Highway in the City of Santa Clarita. The proposed project will include the following uses:

- 151 senior assisted living dwelling units
- Hotel with 60 rooms, a 2,544 square foot banquet facility, 3,315 square feet of retail, and 2,360 square feet of restaurant space
- 73 condominiums

Project access will be provided via Golden Valley Road. Based on information provided by the project owner and discussion with the City, the hotel is anticipated to have 24 employees and the assisted living facility is anticipated to have 42 employees. The project is anticipated to have 308 residents based on the characteristics of the project zone. The assisted living portion of the proposed project will have 151 residents and the condominiums will have 157 residents.

BACKGROUND

Senate Bill 743 (SB-743), which was codified in Public Resources Code section 21099, was signed by the Governor in 2013 and directed the Governor's OPR to identify alternative metrics for evaluating transportation impacts under CEQA. Based on this, delay-based analysis (level of service) has been replaced by VMT. Pursuant to Section 21099, the criteria for determining the significance of transportation impacts must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." Recently adopted changes to the CEQA Guidelines in response to Section 21099 include a new section (15064.3) that specifies that VMT is the most appropriate measure of transportation impacts. A separate Technical Advisory issued by OPR provides additional technical details on calculating VMT and assessing transportation impacts for various types of projects.

THRESHOLDS

If a project within the City of Santa Clarita does not screen out and a VMT analysis is required, the Guidelines require that VMT be estimated using the Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Travel Demand Forecast Model. VMT is required to be reported as Home-Based VMT per Capita for residential projects and Home-Based Work VMT per Employee for office projects. Total VMT or VMT per Service Population can be reported for area plans, large-scale retail projects, or other project types, such as special event venues. Transportation demand management strategies to be included as project design features should be considered in the estimation of a project's daily vehicle trips and VMT. A project has a potentially significant VMT impact if it meets one or more of the criteria listed below:

- **Residential Projects.** Project exceeds 15% below citywide Baseline VMT for Home-Based VMT per Capita**.**
- **Employment (Commercial or Industrial) Projects.** Project exceeds 15% below citywide Baseline VMT for Home-Based Work VMT per Employee.
- **Regional Retail Projects.** Project results in a net increase in total VMT in comparison to the citywide Baseline VMT.
- **Mixed-Use Projects.** Evaluate each project land use component separately using the criteria above.
- **Land Use Plans.** Plan exceeds 15% below citywide Baseline VMT for Total VMT per service population.
- **Other land use types.** Project exceeds 15% below citywide Baseline VMT. For land use types not listed above, the City can determine the appropriate VMT metric depending on the project characteristics. For projects that are generally producing job-related travel, the employment generating VMT (Home-Based Work VMT per Employee) can be compared to the Baseline. For

other projects, the total VMT per service population can be compared to the citywide Baseline, or the net change in Total VMT can be estimated.

- **Transportation Projects.** Project results in an increase in VMT in the study area in comparison to Baseline conditions.

ANALYSIS METHODOLOGY & FINDINGS

This analysis was conducted based on the City's Guidelines and in discussion with City staff. The analysis was conducted using the SCAG Regional Transportation Plan Model. Since the project is a mixed-use project, each land use (residential and employment) was analyzed separately as directed by City staff.

Although the thresholds in the Guidelines are based on interpolation between the 2016 and 2040 models to obtain 2020 VMT, the model was run using the 2020 socio-economic dataset (SED) released by SCAG. To present an apples-to-apples comparison, the VMT comparison was conducted for the no-project and with project conditions using the same version of the model and SED. The proposed project is located in traffic analysis zone (TAZ, Tier 2) 20255100. The project was coded into the model with the condominiums in TAZ 20255000, assisted senior living in TAZ 20255000, and the hotel in TAZ 20255000. The existing SED from the zone was moved to the adjacent TAZ 20257100.

Model Outputs

Table A summarizes the findings of the model runs for the proposed project and the City of Santa Clarita.

Table A: Model VMT Summary

	Proposed Project	City of Santa Clarita[1]
Total Households	224	80,297
Total Population	308	236,531
Total Employment	66	84,969
Total Service Population	374	321,500
Total Homebased VMT (HB) VMT	4,409	5,286,676
Total Homebased Work (HBW) VMT	1,131	1,692,308
Total PA VMT	12,297	10,561,501
VMT per Capita	14.3	22.4
VMT per Employee	17.1	19.9
Total PA VMT per Service Population	32.8	32.9
VMT per Capita Threshold (15% Lower)		**19.0**
VMT per Employee Threshold (15% Lower)		**16.9**

Source: *Golden Valley Road – VMT Analysis* (Translutions, November 2023).
1: Estimated from 2020 No Project model run by Translutions.

As seen in **Table A**, the project would have a less than significant impact for the residential portion of the project, however, there is a significant impact for the employment portion of the project based on the VMT/employee metric. However, based on prior discussion with City staff, since the project is an employment generating use whereas a majority of the City residents have to leave the City for work, the metric of net change in work VMT was applied to the project. The baseline home-based work (HBW) VMT for the City was calculated to be 1,692,308 miles under without project conditions, which would decrease to 1,584,617 miles when the project is constructed. In addition, the total home-based VMT for the City under without project conditions was calculated to be 6,978,984 miles under without project conditions, which is anticipated to decrease to 6,929,836 miles after the project is in operation. The analysis shows that the project reduces both the home-based work VMT as well as the overall home-based VMT for the City. **Table B** summarizes this finding of the analysis.

Table B: Project VMT Summary

	City of Santa Clarita (With Project)	City of Santa Clarita (Without Project)
Total Employment	83,035	84,969
Total Home-Based Work VMT	1,584,617	1,692,308
VMT Per Employee	18.63	19.92
Total Employee + Population (SP)	320,334	319,960
Total Home-Based VMT	6,929,836	6,978,984
Home-Based VMT/SP	21.63	21.81

Source: *Golden Valley Road – VMT Analysis* (Translutions, November 2023).

As seen in Table B, the project reduces VMT for employment and residential uses within the City, and therefore, the employment portion of the project also has a less than significant impact.

The City's Guidelines indicate if a less than significant impact is determined under baseline conditions, a less than significant impact would occur under cumulative conditions as well. Therefore, the project's impacts under cumulative conditions are also anticipated to be less than significant.

CONCLUSION

The residential and employment portion of the project would have a less than significant impact. Therefore, the project's impacts are considered less than significant.

Please contact us at (949) 878-3509 if you have any questions regarding this analysis.

Sincerely,

Thomas Wheat, PE, TE
President

David Chew, PTP
Transportation Planner

Registered Civil Engineer *#69467*
Registered Traffic Engineer *#2565*

2020

TTM 68203 (Condos)			**TTM 68203 (SeniorHH)**		
TAZ	1	20255100	TAZ	1	20255200
TAZ_TIER1	1	20255000	TAZ_TIER1	1	20255000
TAZ_ID	1	20255100	TAZ_ID	1	20255200
POP	1	157	POP	1	151
RES	1	157	RES	1	151
HH	1	73	HH	1	151
GN	1	-	GN	1	-
K12	1	-	K12	1	-
COLLEGE	1	-	COLLEGE	1	-
MEDIAN	1	42,553	MEDIAN	1	52,179
TOT_EMP	1	-	TOT_EMP	1	-
Internal_Sequence_	1	775	Internal_Se	1	776
HBW_A_VMT	1	-	HBW_A_VM	1	-
HB_P_VMT	1	1,534	HB_P_VMT	1	1,609
TOT_P_VMT	1	1,703	TOT_P_VM	1	1,958
TOT_A_VMT	1	375	TOT_A_VM	1	861
Tot HBP_VMT		1,534	Tot HBP_VMT		1,609
TotHBWA_VMT		-	TotHBWA_VMT		-
TotPA_VMT		2,078	TotPA_VMT		2,819
TotOD_VMT			TotOD_VMT		
Tot_SerPop		157	Tot_SerPop		151
VMT/Cap		9.7	VMT/Cap		10.7
VMT/Emp		#DIV/0!	VMT/Emp		#DIV/0!
PAVMT/Serpop		13.2	PAVMT/Serpop		18.7

2020

TTM 68203 (Hotel+Assited Living Employe			TTM 68203 (Total Proj)		
TAZ	1	20255300	TAZ	1	
TAZ_TIER1	1	20255000	TAZ_TIER1	1	
TAZ_ID	1	20255300	TAZ_ID	1	
POP	1	-	POP	1	308
RES	1	-	RES	1	308
HH	1	-	HH	1	224
GN	1	-	GN	1	-
K12	1	-	K12	1	-
COLLEGE	1	-	COLLEGE	1	-
MEDIAN	1	54,650	MEDIAN	1	149,382
TOT_EMP	1	66	TOT_EMP	1	66
Internal_Se	1	777	Internal_Se	1	2,328
HBW_A_VI	1	1,131	HBW_A_VI	1	1,131
HB_P_VMT	1	-	HB_P_VMT	1	4,409
TOT_P_VM	1	858	TOT_P_VM	1	5,924
TOT_A_VM	1	4,828	TOT_A_VM	1	6,373
Tot HBP_VMT		-	Tot HBP_VMT		4,409
TotHBWA_VMT		1,131	TotHBWA_VMT		1,131
TotPA_VMT		5,686	TotPA_VMT		12,297
TotOD_VMT			TotOD_VMT		
Tot_SerPop		66	Tot_SerPop		374
VMT/Cap		#DIV/0!	VMT/Cap		14.3
VMT/Emp		17.1	VMT/Emp		17.1
PAVMT/Serpop		86.2	PAVMT/Serpop		32.8

2020

City of SantaClarita (No Project)		
TAZ	101	2045157400
TAZ_TIER1	101	2045137000
TAZ_ID	101	2045157400
POP	101	240,935
RES	101	239,246
HH	101	82,282
GN	101	1,156
K12	101	43,926
COLLEGE	101	21,488
TOT_EMP	101	85,458
Internal_Seque	101	76,688
HBW_A_VMT	101	1,701,590
HB_P_VMT	101	5,410,498
TOT_P_VMT	101	6,415,746
TOT_A_VMT	101	4,312,912
Tot HBP_VMT		5,410,498
TotHBWA_VMT		1,701,590
TotPA_VMT		10,728,658
TotOD_VMT		
Tot_SerPop		324,704
VMT/Cap		22.6
VMT/Emp		19.9
PAVMT/Serpop		33.0

City of SantaClarita (With Project)		
TAZ	101	2045157400
TAZ_TIER1	101	2045137000
TAZ_ID	101	2045157400
POP	101	241,243
RES	101	239,554
HH	101	82,506
GN	101	1,156
K12	101	43,926
COLLEGE	101	21,488
MEDIAN	101	6756536
TOT_EMP	101	85,491
Internal_Se	101	76,688
HBW_A_VI	101	1,592,178
HB_P_VMT	101	5,472,151
TOT_P_VM	101	6,160,984
TOT_A_VM	101	4,127,078
Tot HBP_VMT		5,472,151
TotHBWA_VMT		1,592,178
TotPA_VMT		10,288,062
TotOD_VMT		
Tot_SerPop		325,046
VMT/Cap		22.8
VMT/Emp		18.6
PAVMT/Serpop		31.7

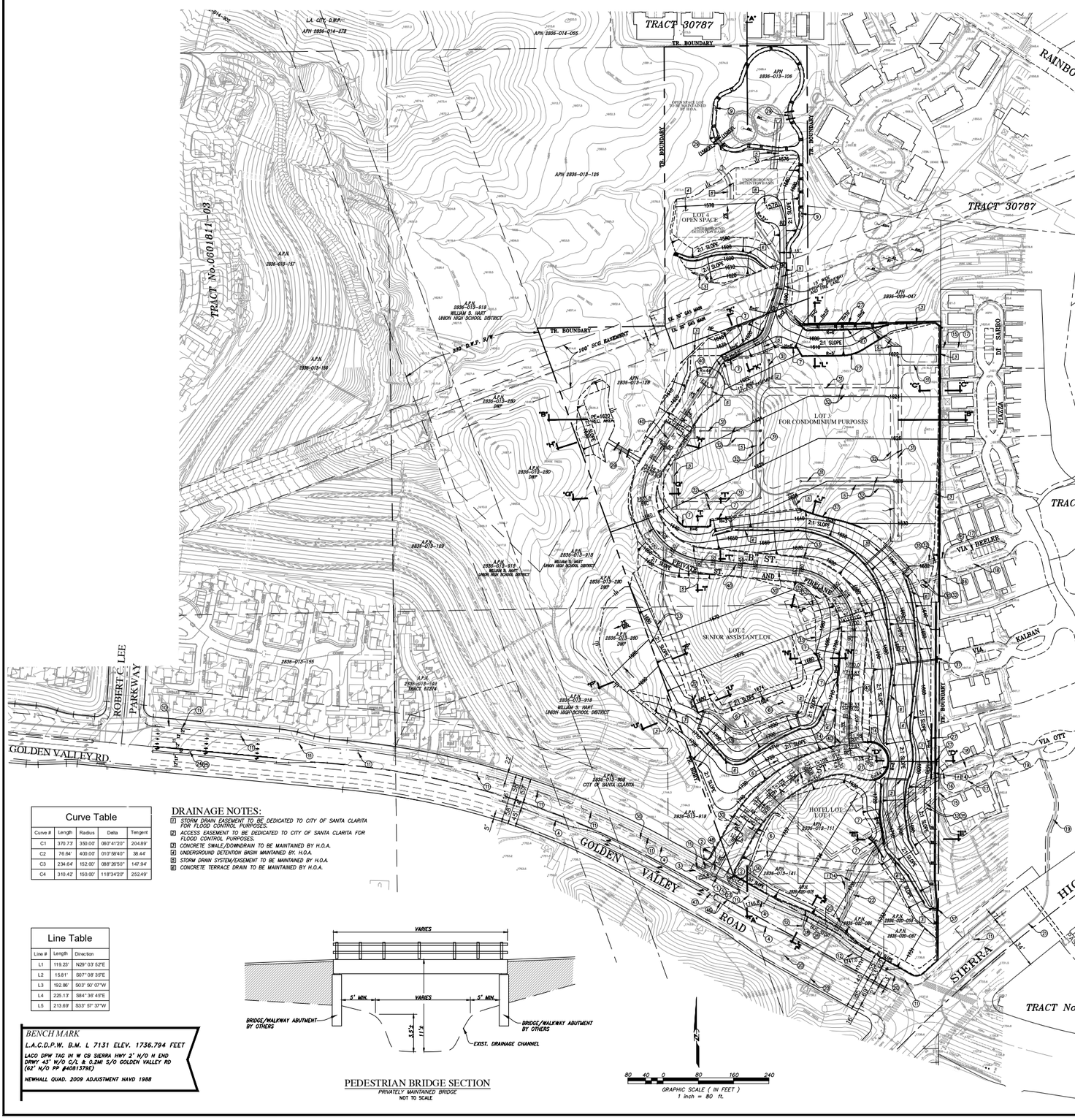
2020

City of SantaClarita (No Project)		
TAZ	100	2024891400
TAZ_TIER1	100	2024871000
TAZ_ID	100	2024891400
POP	100	236,531
RES	100	234,991
HH	100	80,927
GN	100	1,156
K12	100	43,628
COLLEGE	100	21,488
TOT_EMP	100	84,969
Internal_Se	100	75,892
HBW_A_VM	100	1,692,308
HB_P_VMT	100	5,286,676
TOT_P_VM	100	6,277,682
TOT_A_VM	100	4,283,819
Tot HBP_VMT		5,286,676
TotHBWA_VMT		1,692,308
TotPA_VMT		10,561,501
TotOD_VMT		
Tot_SerPop		319,960
VMT/Cap		22.5
VMT/Emp		19.9
PAVMT/Serpop		33.0

City of SantaClarita (With Project)		
TAZ	100	2024891400
TAZ_TIER1	100	2024871000
TAZ_ID	100	2024891400
POP	100	236,839
RES	100	235,299
HH	100	81,151
GN	100	1,156
K12	100	43,628
COLLEGE	100	21,488
MEDIAN	100	6642784
TOT_EMP	100	85,035
Internal_Se	100	75,892
HBW_A_VM	100	1,584,617
HB_P_VMT	100	5,345,219
TOT_P_VM	100	6,027,779
TOT_A_VM	100	4,102,504
Tot HBP_VMT		5,345,219
TotHBWA_VMT		1,584,617
TotPA_VMT		10,130,283
TotOD_VMT		
Tot_SerPop		320,334
VMT/Cap		22.7
VMT/Emp		18.6
PAVMT/Serpop		31.6

TENTATIVE TRACT MAP No. 68

LOCATED IN THE CITY OF SANTA CLARITA
STATE OF CALIFORNIA



Curve Table				
Curve #	Length	Radius	Delta	Tangent
C1	370.73'	350.00'	060°41'20"	204.89'
C2	76.64'	400.00'	010°58'40"	38.44'
C3	234.64'	152.00'	088°26'50"	147.94'
C4	310.42'	150.00'	118°34'20"	252.49'

Line Table		
Line #	Length	Direction
L1	119.23'	N29° 03' 52"E
L2	15.81'	S07° 08' 35"E
L3	192.86'	S03° 50' 07"W
L4	225.13'	S84° 36' 45"E
L5	213.69'	S33° 57' 37"W

DRAINAGE NOTES:

1. STORM DRAIN EASEMENT TO BE DEDICATED TO CITY OF SANTA CLARITA FOR FLOOD CONTROL PURPOSES.
2. ACCESS EASEMENT TO BE DEDICATED TO CITY OF SANTA CLARITA FOR FLOOD CONTROL PURPOSES.
3. CONCRETE SWALE/DOWNDRAIN TO BE MAINTAINED BY H.O.A.
4. UNDERGROUND DETENTION BASIN MAINTAINED BY, H.O.A.
5. STORM DRAIN SYSTEM/EASEMENT TO BE MAINTAINED BY H.O.A.
6. CONCRETE TERRACE DRAIN TO BE MAINTAINED BY H.O.A.

BENCH MARK

L.A.C.D.P.W. B.M. L 7131 ELEV. 1736.794 FEET

LACO DPW TAG IN W CB SIERRA HWY 2' N/O N END DPWY 45' W/O C/L & 0.2MI S/O GOLDEN VALLEY RD (62' N/O PP #40813790)

NEWHALL QUAD. 2009 ADJUSTMENT NAVD 1988

PEDESTRIAN BRIDGE SECTION
PRIVATELY MAINTAINED BRIDGE
NOT TO SCALE

GRAPHIC SCALE (IN FEET)
1 inch = 80 ft.

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