Sanders Ranch Wireless Facility

Initial Study – Mitigated Negative Declaration

prepared by

Town of Moraga
Planning Department
329 Rheem Boulevard
Moraga, California 94556
Contact: Brian Horn, Senior Planner

prepared with the assistance of

Rincon Consultants, Inc.
449 15th Street, Suite 303
Oakland, California 94612

August 2023

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
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Initial Study – Mitigated Negative Declaration

The Town of Moraga, as the Lead Agency, prepared this Initial Study – Mitigated Negative Declaration for the Sanders Ranch Wireless Facility Project in compliance with the California Environmental Quality Act (CEQA), the CEQA Guidelines (California Code of Regulations [CCR] Section 15000 et. seq.), and the regulations and policies of the Town of Moraga, California. The Sanders Ranch Wireless Facility Project (hereinafter referred to as “proposed project” or “project”) would involve the installation of six panel antennas on a 12-foot high “top hat” extension located on top of an existing PG&E transmission tower with associated infrastructure including an emergency generator, transformer and 3,000-gallon water tank. The project would require the construction of a new approximately 1,330-foot-long graded access road from Sanders Ranch Road to the existing tower as well as in-road utilities improvements beginning at Camino Pablo and running along Sanders Ranch Road.

1. Project Title

Sanders Ranch Wireless Facility Project

2. Lead Agency Name and Address

Town of Moraga
329 Rheem Boulevard
Moraga, California 94556

3. Contact Person and Phone Number

Brian Horn, Senior Planner
Office: (925) 888-7044
Email: bhorn@moraga.ca.us

4. Project Sponsor’s Name and Address

Verizon
2785 Mitchell Drive, Building 9
Walnut Creek, California 94598
Office: (925) 279-6000

5. Project Location

The project site is located on open space land within the Sanders Ranch Subdivision (Assessor’s Parcel Number 258-300-019) in the southeastern portion of the Town of Moraga, California. The site footprint totals approximately 0.75-acre within the common open space area of the Sanders Ranch Subdivision and east of a segment of the existing Old Moraga Ranch Trail. Regional access is available to the site from Interstate 580 (I-580), located approximately 5 miles west of the site; Interstate 680 (I-680), located approximately 5 miles east of the site; and State Route 24 (SR 24), located approximately 4.7 miles north of the site. Local access to the site is available from Sanders Ranch Road via Canyon Road and Camino Pablo. Figure 1 shows the regional location of the project site, and Figure 2 provides an aerial image of the project site in its neighborhood context.

6. General Plan Designation

The Town of Moraga 2002 General Plan designates the project site as Moraga Open Space Ordinance (MOSO) Open Space. The MOSO designation is intended to protect the remaining open space resources within the Town (Town of Moraga 1986).

7. Zoning

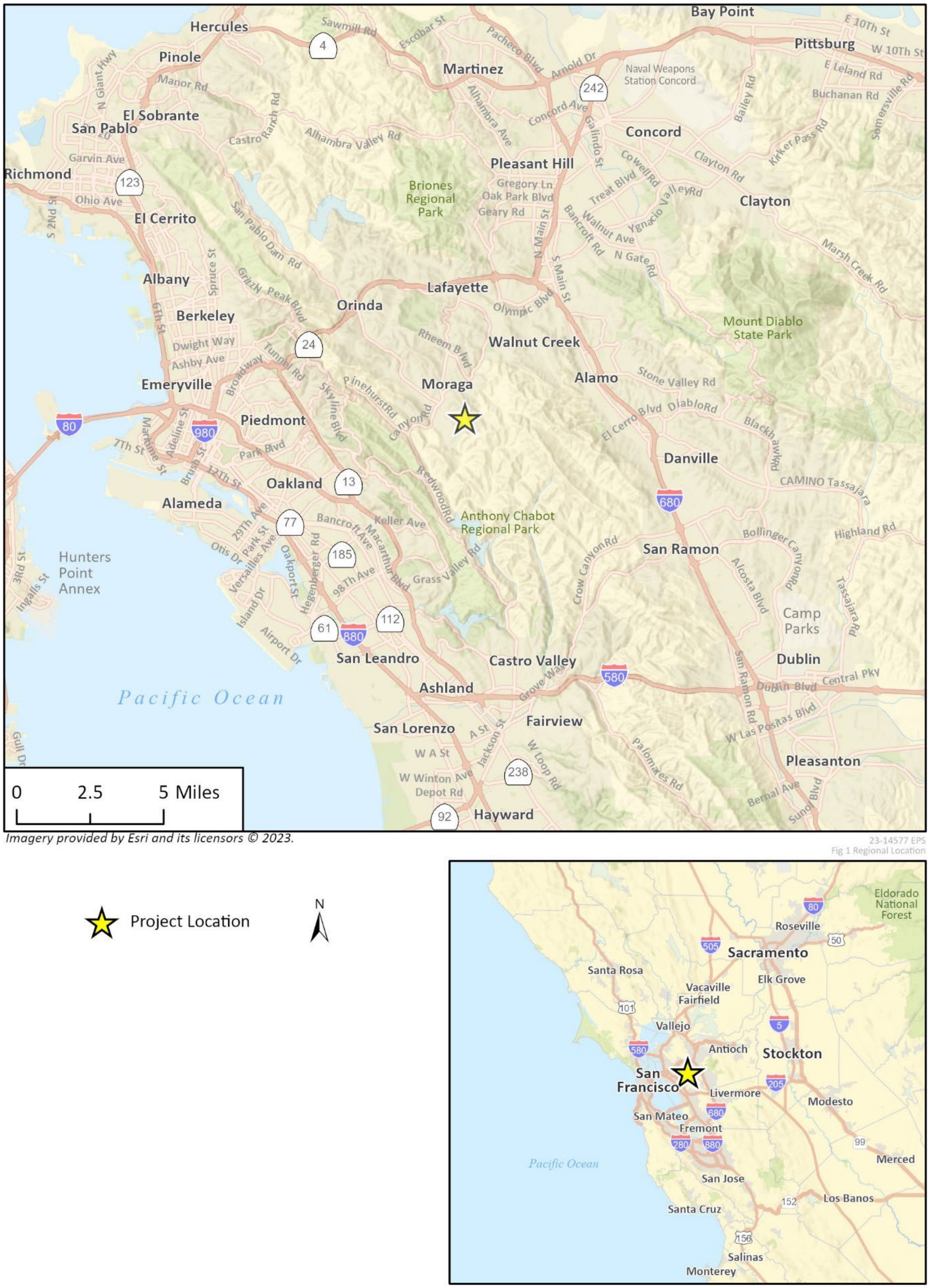
The project site is zoned as MOSO Open Space. Pursuant to Moraga Municipal Code (MMMC) Chapter 8.52 and according to the MOSO Guidelines, permitted uses include agriculture and accessory buildings. Conditional uses permitted within the MOSO area include single-family residential (including accessory buildings and structures), park and outdoor recreational facility, and schools. The project would also be subject to Chapter 8.144 of the MMC which would regulate the design of the structure in relation to its proximity to the MOSO minor ridgeline, and Chapter 8.128 of the MMC which would regulate the access road in relation to the MOSO minor ridgeline.

8. Surrounding Land Uses and Setting

The project site is located on common open space for the Sanders Ranch Subdivision. Surrounding land uses include open space to the north and south, single-family residences to the east, and open space to the west. The nearest residence to the site is located approximately 75 feet to the east of the proposed access road). A MOSO minor ridgeline runs through the project site. A portion of the ridgeline runs parallel to the proposed access road and cuts across it at two points northwest of the tower. An easement for the Old Moraga Ranch trail runs along the proposed alignment of the access road, north of the existing Pacific Gas and Electric (PG&E) transmission tower to be modified. However, during multiple site visits conducted by Rincon and the Town, it was determined that the natural trail has diverged from the trail easement shown and is physically located on a different property and runs roughly parallel to the alignment of the proposed new road on the project site, as shown in Figure 2.

The project site is currently undeveloped with the exception of an existing PG&E transmission tower. Existing overhead lines extend from the northern portion of the site through the proposed project area and continue further south of the site. The project site and immediate surroundings generally consist of native grassland with some shrubs and trees and are sloped, with some slope areas exceeding 20 percent. Photographs of existing conditions on the project site are shown in Figure 3.

Figure 1 Regional Location



Imagery provided by Esri and its licensors © 2023.

23-14577 EPS
Fig 1 Regional Location

Figure 2 Project Location

Imagery provided by Microsoft Bing and its licensors © 2023.
Additional data provided by East Bay Regional Parks District, 2023.

23-14577 EPS
Fig 2 Project Location 20230804

Figure 3 Existing Conditions of the Project Site

Photograph 1. Surrounding setting of the existing transmission tower to be modified

Photograph 2. Looking south along the first section of the proposed road alignment from the northern portion of the alignment

9. Description of Project

The proposed project would involve the installation of six panel antennas on a 12-foot high “top hat” extension that would be located on top of an existing PG&E transmission tower. The tower with the “top hat” extension would extend the existing 107.3-foot tower to reach a total height of approximately 116 feet. Also installed on the tower would be three 6449 antenna integrated radio (air) antennas with a centerline height of 45 feet along with six Verizon Wireless radios, two Verizon Wireless Raycap[1], a microwave antenna with a centerline height of 35 feet, and two hybrid wireless cables. An equipment enclosure consisting of a 19-foot by 19-foot concrete pad with 8-foot-tall composite fencing would enclose the facilities’ ground equipment, including an emergency generator, within the base of the PG&E transmission tower. A new transformer would be located on a 4-foot 2-inch by 4-foot 4-inch pad approximately 9 feet west of the equipment enclosure pad along with a 3,000-gallon water tank. The project would be supplied electricity by PG&E. The proposed diesel generator for the project would be rated below 50 brake-horsepower and would operate under two hours per day for occasional maintenance activities. The project would comply with applicable California Green Building Standards, including installation of energy-efficient equipment and lighting. Additionally, the proposed project would include the installation of new Verizon Wireless fiber vaults every 150 feet along Sanders Ranch Road and installation of a new fiber route for approximately 8,600 feet through existing in-road conduits. This work would replace existing Verizon Wireless fiber vaults and fiber routes beneath Sanders Ranch Road.

To provide access to the facility for construction and maintenance, a new 15-foot-wide access driveway constructed of Class II aggregate base would be graded and built approximately 155 feet northwest from near the end of Sanders Ranch Road to the existing PG&E transmission tower to be modified. The new road would be built on some portions of slopes exceeding 20 percent, roughly following the alignment of a portion of Old Moraga Ranch Trail for approximately 630 feet, and would also cross a Moraga Open Space Ordinance minor ridgeline.

Construction would occur over approximately four months. Grading activities would primarily occur along the proposed new road alignment and through a portion of a MOSO minor ridgeline. The total proposed grading for the project would be approximately 350 cubic yards of cut and 530 cubic yards of fill, totaling approximately 1,020 cubic yards of grading activities. The maximum cut depth would be approximately 3.6 feet and the maximum fill height would be approximately 4 feet. The total disturbed area of the site would be approximately 0.75 acres.

Figure 4 shows the proposed site plan.

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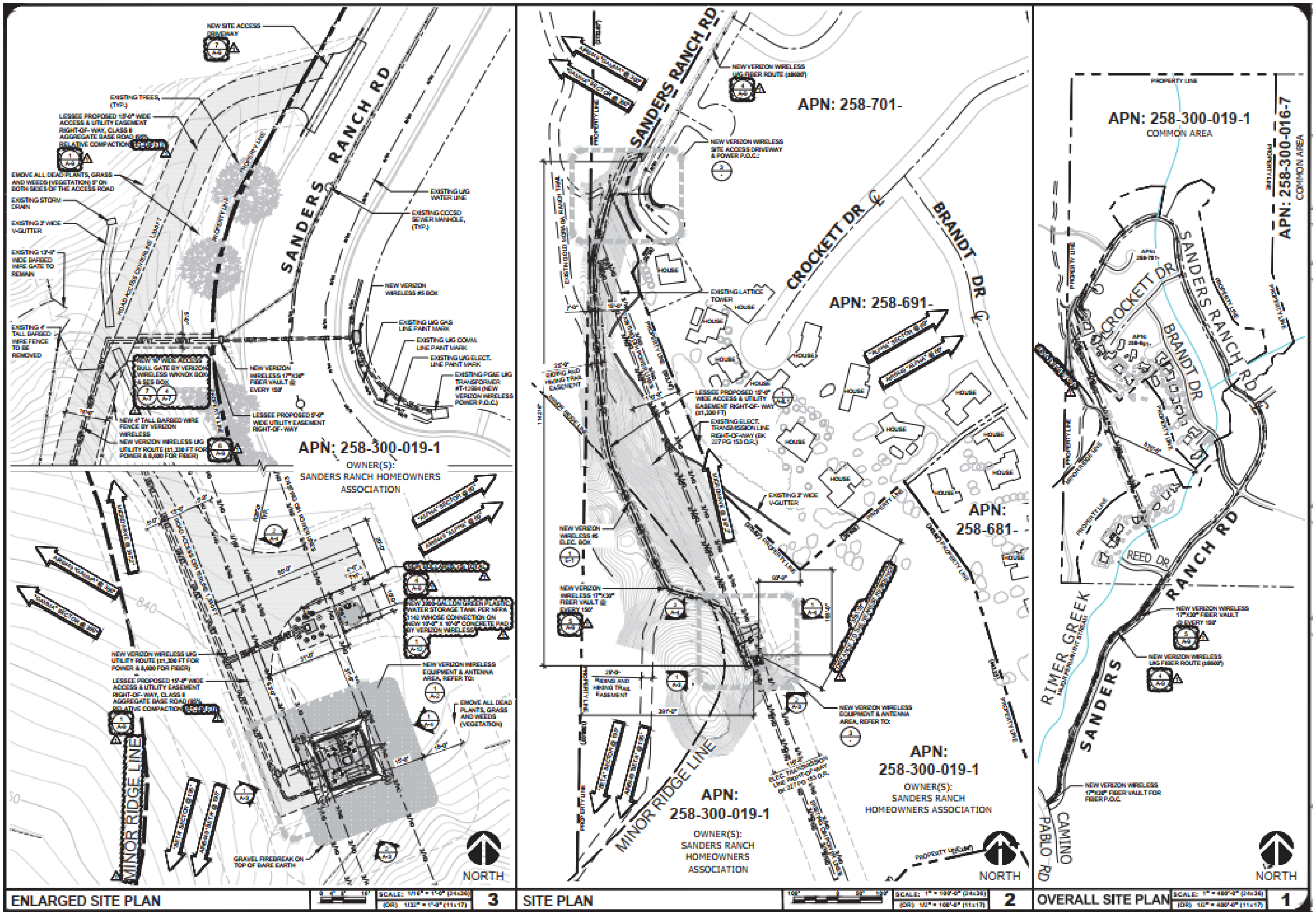
[1] “…Industrial surge protection, connectivity, and power management solutions for telecommunications…” (Raycap 2023)

Figure 4 Proposed Site Plan



10. Other Public Agencies Whose Approval is Required

The Town of Moraga is the lead agency with responsibility for approving the proposed project. Discretionary approval from the Federal Communications Commission would also be required.

11. Have California Native American Tribes Traditionally and Culturally Affiliated with the Project Area Requested Consultation Pursuant to Public Resources Code Section 21080.3.1?

On June 30, 2023, the Town of Moraga sent Assembly Bill (AB) 52 notification letters via certified mail to the following Native American tribes: the Guidiville Indian Rancheria, the Ohlone Indian Tribe, The confederated Villages of Lisjan, The Chicken Ranch Rancheria of MeWuk Indians, the Muwekma Ohlone Indian Tribe of the SF Bay Area, the North Valley Yokuts Tribe, the Tule river Indian Tribe, the Indian Canyon Mutsun Ban of Costanoan, Wilton Rancheria, Nashville Enterprise Miwok-Maidu Nishinam Tribe, Wuksache Indian Tribe/Eshom Valley Band, and the Amah Mutsun Tribal Band of Mission San Juan Bautista. The Town did not receive certified confirmation of delivery from the Indian Canyon Mutsun Band of Costanoan, Nashville Enterprise Miwok-Maidu-Nishinam Tribe, and the Wuksache Indian Tribe/Eshom Valley Bandand Tribes, and therefore, resent them an email notification on August 2, 2023.

Under AB 52, tribes have 30 days from receipt of the letter to respond and request consultation. On July 13, 2023, the Town received a request from the Confederated Villages of Lisjan Nation to receive a copy of the final CHRIS and environmental document for this project, along with the SLF from the Native American Heritage Commission and any additional archeological reports. They requested these items be sent to their physical address in Oakland, California. Copies of AB 52 correspondence for this project are included in Appendix B.

Environmental Factors Potentially Affected

This project would potentially affect the environmental factors checked below, involving at least one impact that is "Potentially Significant" or "Less than Significant with Mitigation Incorporated" 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

Based on 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 to 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 "less than significant with mitigation incorporated" 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 potential 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, nothing further is required.

Brian Horn
Signature

8/28/23
Date

Brian Horn
Printed Name

Senior Planner
Title

Environmental Checklist

1 Aesthetics

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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 within a state scenic highway?	☐	☐	☐	■
c. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	■	☐
d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	☐	☐	■	☐

Regulatory Setting

The following Moraga General Plan sections would be applicable to the project.

Moraga 2002 General Plan

Policy CD1.3 **View Protection.** Protect important elements of the natural setting to maintain the Town's semi-rural character. Give particular attention to viewsheds along the Town's scenic corridors, protecting ridgelines, hillside areas, mature native tree groupings, and other significant natural features. Consideration should be given to views both from within the Town and from adjacent jurisdictions. Likewise, the Town should work with adjacent jurisdictions to protect views from Moraga to adjacent areas.

Policy CD1.5 **Ridgelines and Hillside Areas.** Protect ridgelines from development. In hillside areas, require new developments to conform to the site's natural setting, retaining the character of existing landforms preserving significant native vegetation and with respect to ridgelines, encourage location of building sites so that visual impacts are minimized. When grading land with an average slope of 20% of more, require 'natural contour' grading to minimize soil displacement and use of retainer walls. Design buildings and other improvements in accordance with the natural setting, maintaining a low profile and providing dense native landscaping to blend hillside structures with the natural setting.

Policy CD1.7 **Wireless Communication Facilities.** Regulate the location and design of wireless communications facilities, satellite dishes and other miscellaneous antennas in accordance with the Town's Ordinance No. 176 and the Federal Communications Act.

Moraga Municipal Code

The following section of the Moraga Municipal Code (MMC) would be applicable to the project.

SECTION 8.144.060, OPEN SPACE AND OPEN SPACE MOSO DISTRICT DEVELOPMENT STANDARDS.

A. In addition to the general development standards provided in Section 8.144.030, facilities proposed to be located within the Town's open space and ridgeline areas as defined by Chapter 8.128 and the General Plan shall comply with the following development standards.

  1. No wireless communication facilities which do not as of the effective date of the ordinance codified in this chapter have a conditional or temporary use permit shall be located within five hundred (500) feet of a major ridgeline as defined in the Moraga open space ordinance (MOSO).
  2. No wireless communication facilities which do not as of the effective date of said ordinance have a conditional or temporary use permit shall be located on the crest of a minor ridge with an elevation of eight hundred (800) feet or greater as defined in the Moraga open space ordinance (MOSO), nor shall the silhouette of an antenna be visible above the ridge as viewed from a lower elevation perspective generally available to the public.
  3. No wireless communications facilities which do not as of the effective date of said ordinance have a conditional or temporary use permit shall be located on areas where the slope has a grade of twenty (20) percent or greater in MOSO open space.
  4. Special design considerations such as designing facilities to appear as natural features found in the immediate area, such as rocks or trees, shall be considered in approving facilities for such use.

B. The facilities shall comply with the above development standards unless the applicant establishes and it is determined by the planning commission that there is no other optimal location for the carrier to provide adequate coverage, and it is determined that compliance with these standards would violate federal law. The burden shall be on the applicant to prove to the satisfaction of the planning commission that there is no optimal locations where adequate coverage could be provided.

C. Notwithstanding the foregoing, any temporary use permits which are valid as of the effective date of said ordinance must receive approval by the planning commission of a conditional use permit in order to be in compliance with this chapter.

Impact Analysis

a. Would the project have a substantial adverse effect on a scenic vista?

A scenic vista is usually defined as a panoramic view from an elevated position or a long-range view from a public vantage point. This can include views of natural features or of the built environment, when architecture and landscaped boulevards offer high-value views of an area considered important to the sense of place.

The project site is located on open space adjacent to the Sanders Ranch Subdivision. Surrounding land uses include open space to the north and east, single-family residences to the south, and open space to the west. Additionally, a MOSO minor ridgeline is located south of the project site on which the existing Old Moraga Ranch Trail is located. As described above in the Project Description, a portion of the ridgeline runs parallel to the access road and cuts across it at two points northwest of the tower. Additionally, the mapped Old Moraga Ranch trail briefly runs along the proposed access road, north of the tower. However, during multiple site visits conducted by Rincon and the Town, it was determined that the natural trail has diverged from the mapped trail and is now located roughly parallel to the project site, as shown in Figure 2.

The proposed project would expand upon an existing PG&E transmission tower and would also involve construction of a new access road from Sanders Ranch Road to the tower and smaller structures within the base and adjacent to the transmission tower. The additional equipment added to the tower would incrementally increase the visible equipment and height, but this increase would not be substantial, nor would it or the new smaller structures intrude on scenic views from the trail or Sanders Ranch Road and subdivision substantially more than the existing equipment does under current conditions. The proposed access road and related adjustments to the trail surface and/or alignment would not obstruct or substantially alter the scenic vistas currently available from the trail. Installation of new fiber vaults and fiber route would be located underground on Sanders Ranch Road and would not obstruct or substantially alter the scenic vistas currently available in the area. Impacts to scenic vistas would be less than significant.

LESS THAN SIGNIFICANT IMPACT

b. Would the project substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

The nearest officially designated State Scenic Highways are Interstate 680 (I-680) located 5 miles east of the site and State Route (SR 24) located 4.5 miles north of the site. The nearest eligible designated State Scenic Highway is SR 13 located approximately 4 miles west of the site (California Department of Transportation [Caltrans] 2023). Due to intervening topography, development, trees and distance, the project site is not clearly visible from these highways. In addition, the project would not involve tree removal or damage to rock outcroppings or buildings. As discussed above under Criterion a and below under Criterion c, the contours or scenic qualities of the identified minor ridgeline would not be substantially changed. Therefore, implementation of the project would have no effect on scenic resources in view of a State Scenic Highway. There would be no impact.

NO IMPACT

c. *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 a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?*

The project site is currently developed with an existing PG&E transmission tower but is otherwise generally undeveloped, and, therefore, non-urbanized; in addition, the Town of Moraga as a whole is non-urbanized pursuant to CEQA Statute Section 21071 because its population, including in combination with adjacent cities, is under 100,000 residents. However, the analysis below reviews potential impacts for both non-urbanized and urbanized areas. Existing overhead lines extend from the northern portion of the site through the proposed project area and continue further south of the site. The surrounding area of the project site consists of native grassland with some shrubs and trees and is moderately to steeply sloped. Development of the proposed project would comply with Town zoning standards, including Chapter 8.52 of the MMC which permits the use of accessory buildings in MOSO areas. The project would also be required to comply with Chapter 8.144 of the MMC which regulates the design of the structure in relation to its proximity to the MOSO minor ridgeline.

The proposed tower improvements would extend the tower by approximately 8 feet to a total height of roughly 116 feet and would include new smaller structures for associated equipment adjacent to the tower. This incremental increase in height and addition of new small structures would not substantially change or degrade the existing visual character of this existing structure. The addition of a new access roadway and facility improvements would alter the character of the overall site as seen from the urbanized areas of Sanders Ranch Road, other locations within the Sanders Ranch Subdivision and the Old Moraga Ranch trail. Residents within the Sanders Ranch Subdivision would see the entrance to the 15-foot-wide aggregate access driveway approximately 155 feet northwest from the end of Sanders Ranch Road cul-de-sac, as well as portions of the road as it extends up the hillside. Old Moraga Ranch trail users would see minor alterations during a brief segment of the trail including views of a gravel roadway and, in the distance and partially obscured by topography and vegetation, the new small structures of the wireless facility. Consistent with MMC Section 8.144.0070.A and B which require that wireless communication facilities have a non-reflective finish, be painted to be compatible with the surrounding area and be compatible with the design, scale, materials, colors and landscaping of other existing structures on site, the proposed project would be required to use nonreflective materials and be similar in design to the existing transmission tower. Installation of new fiber vaults and fiber route would be located underground on Sanders Ranch Road and would not degrade the existing visual character of the area. The proposed site changes would incrementally alter the visual character for neighboring residents and trail users; however, the project would be generally consistent with existing development on the site and would not introduce new uses to the area. The proposed project would not substantially degrade the existing visual character of the site. Further, the project would not conflict with applicable zoning regulations. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

d. Would the project create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?

The immediate project vicinity contains limited sources of light and glare. Existing light and glare are from the existing utility tower, existing security lighting on the tower, and nearby residences. Temporary construction activities would not occur during evening hours and, as such, no construction light and glare impacts would be anticipated. Operation of the proposed project would continue to use the existing tower and security lighting. Coatings on the proposed panel additions would be non-reflective consistent with the existing tower design. Maintenance vehicles may also be sources of light and glare on the project site. Vehicle travel to the project site for maintenance activities would be limited to daytime hours and would not generate light. Glare from the maintenance vehicles would be temporary and would cease once maintenance activities are completed. Installation of new fiber vaults and fiber route would be located underground on Sanders Ranch Road and would not generate light or glare. The project would not substantially alter light or glare conditions in the vicinity. Impacts related to project light and glare would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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2 Agriculture and Forestry Resources

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

b. Would the project conflict with existing zoning for agricultural use or a Williamson Act contract?

c. Would the project 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. *Would the project result in the loss of forest land or conversion of forest land to non-forest use?*

e. *Would the project 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?*

The California Department of Conservation (DOC) manages the Farmland Mapping and Monitoring Program to assess and record suitability of land for agricultural purposes. The project site and adjacent properties do not contain Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) identified with the Farmland Mapping and Monitoring Program, are not enrolled in Williamson Act contracts, and do not support forest land or resources (DOC 2023). Vegetation on the site is generally characterized by non-native grasses and there are no trees on the site that would be impacted by the project. The site is not considered forest or timberland (California Department of Fish and Wildlife [CDFW] 2023). As such, the project would not convert forest or timberland uses, and no impact would occur.

For the above reasons, the proposed project would have no impact with respect to conversion of Farmland to non-agricultural use; conflict with existing agricultural zoning or Williamson Act contracts; and loss of forest land or conversion of forest land to non-forest use.

NO IMPACT

3 Air Quality

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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?	☐	☐	■	☐

Overview of Air Pollution

The federal and State Clean Air Acts (CAA) mandate the control and reduction of certain air pollutants. Under these laws, the U.S. Environmental Protection Agency (USEPA) and the California Air Resources Board (CARB) have established the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS) for “criteria pollutants” and other pollutants. Some pollutants are emitted directly from a source (e.g., vehicle tailpipe, an exhaust stack of a factory, etc.) into the atmosphere, including carbon monoxide, volatile organic compounds (VOC)/reactive organic gases (ROG),[2] nitrogen oxides (NO_X), particulate matter with diameters of ten microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$), sulfur dioxide, and lead. Other pollutants are created indirectly through chemical reactions in the atmosphere, such as ozone, which is created by atmospheric chemical and photochemical reactions primarily between ROG and NO_X. Secondary pollutants include oxidants, ozone, and sulfate and nitrate particulates (smog).

Air pollutant emissions are generated primarily by stationary and mobile sources. Stationary sources can be divided into two major subcategories:

- Point sources occur at a specific location and are often identified by an exhaust vent or stack. Examples include boilers or combustion equipment that produce electricity or generate heat.

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[2] CARB defines VOC and ROG similarly as, “any compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate,” with the exception that VOC are compounds that participate in atmospheric photochemical reactions. For the purposes of this analysis, ROG and VOC are considered comparable in terms of mass emissions, and the term ROG is used in this IS-MND.

- Area sources are widely distributed and include such sources as residential and commercial water heaters, painting operations, lawn mowers, agricultural fields, landfills, and some consumer products.

Mobile sources refer to emissions from motor vehicles, including tailpipe and evaporative emissions, and can also be divided into two major subcategories:

- On-road sources that may be legally operated on roadways and highways.
- Off-road sources include aircraft, ships, trains, and self-propelled construction equipment.

Air pollutants can also be generated by the natural environment, such as when high winds suspend fine dust particles.

Air Quality Standards and Attainment

The project site is located in the San Francisco Bay Area Air Basin (SFBAAB), which is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). BAAQMD has jurisdiction over much of the nine-county Bay Area, including Contra Costa County. As the local air quality management agency, BAAQMD is required to monitor air pollutant levels to ensure that the NAAQS and CAAQS are met and, if they are not met, to develop strategies to meet the standards. Depending on whether the standards are met or exceeded, the SFBAAB is classified as being in “attainment” or “nonattainment.” In areas designated as non-attainment for one or more air pollutants, a cumulative air quality impact exists for those air pollutants, and the human health impacts associated with these criteria pollutants, presented in Table 1 are already occurring in that area as part of the environmental baseline condition.

Table 1 Health Effects Associated with Non-Attainment Criteria Pollutants

Pollutant	Adverse Effects
Ozone	(1) Short-term exposures: (a) pulmonary function decrements and localized lung edema in humans and animals and (b) risk to public health implied by alterations in pulmonary morphology and host defense in animals; (2) long-term exposures: risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (3) vegetation damage; and (4) property damage.
Suspended particulate matter (PM_{10})	(1) Excess deaths from short-term and long-term exposures; (2) excess seasonal declines in pulmonary function, especially in children; (3) asthma exacerbation and possibly induction; (4) adverse birth outcomes including low birth weight; (5) increased infant mortality; (6) increased respiratory symptoms in children such as cough and bronchitis; and (7) increased hospitalization for both cardiovascular and respiratory disease (including asthma).[1]
Suspended particulate matter ($PM_{2.5}$)	(1) Excess deaths from short- and long-term exposures; (2) excess seasonal declines in pulmonary function, especially in children; (3) asthma exacerbation and possibly induction; (4) adverse birth outcomes, including low birth weight; (5) increased infant mortality; (6) increased respiratory symptoms in children, such as cough and bronchitis; and (7) increased hospitalization for both cardiovascular and respiratory disease, including asthma.

Source: United States Environmental Protection Agency 2022

Under state law, air districts are required to prepare a plan for air quality improvement for pollutants for which the district is in non-compliance. The SFBAAB is designated a nonattainment area for the federal 8-hour ozone standard, federal $PM_{2.5}$ 24-hour standard, state 8-hour and 1-hour ozone standards, state PM_{10} annual and 24-hour standards, and the state $PM_{2.5}$ 24-hour standard (BAAQMD 2017a). This nonattainment status is a result of several factors, such as mobile sources, wood burning, industrial combustion, and dust, in the SFBAAB.

Air Quality Management

Because the SFBAAB currently exceeds the federal ozone and $PM_{2.5}$ standards and the state ozone, PM_{10}, and $PM_{2.5}$ standards, BAAQMD is required to implement strategies to reduce pollutant levels to achieve attainment of the NAAQS and CAAQS. BAAQMD adopted the 2017 Clean Air Plan (2017 Plan) as an update to the 2010 Clean Air Plan. The 2017 Plan provides a regional strategy to protect public health and the climate. Consistent with the greenhouse gas (GHG) reduction targets adopted by the state, the 2017 Plan lays the groundwork for a long-term effort to reduce Bay Area GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. To fulfill state ozone planning requirements, the 2017 control strategy includes all feasible measures to reduce emissions of ozone precursors (ROG and NO_X) and reduce transport of ozone and its precursors to neighboring air basins. In addition, the 2017 Plan builds upon and enhances BAAQMD's efforts to reduce emissions of fine particulate matter and toxic air contaminants (TAC) (BAAQMD 2017a).

Air Pollutant Emission Thresholds

The BAAQMD has adopted guidelines for quantifying and determining the significance of air quality emissions in its *California Environmental Quality Act Air Quality Guidelines* (BAAQMD 2022). BAAQMD recommends that lead agencies determine appropriate air quality emissions thresholds of significance based on substantial evidence in the record. BAAQMD's significance thresholds in the updated guidelines for projects within the SFBAAB are the most appropriate thresholds for use in determining air quality impacts of the project.

Table 2 presents these significance thresholds for construction and operational-related criteria air pollutant and precursor emissions used for the purposes of this analysis. These represent the levels at which a project's individual emissions of criteria air pollutants or precursors would result in a cumulatively considerable contribution to the SFBAAB's existing air quality conditions. For the purposes of this analysis, the project would result in a significant impact if construction or operational emissions would exceed any of the thresholds shown in Table 2.

Table 2 Criteria Air Pollutant Significance Thresholds

	Construction Thresholds	Operational Thresholds	
Pollutant	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tons/year)
ROG	54	54	10
NO_X	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
Fugitive Dust	Best Management Practices	None	

Source: BAAQMD 2022

BAAQMD does not have quantitative thresholds for fugitive dust emissions during construction. Instead, BAAQMD states that the following Best Management Practices (BMPs) must be implemented to reduce fugitive dust emissions to a less than significant level:

BAAQMD Basic Best Management Practices for Construction-Related Fugitive Dust Emissions

The applicant shall require all construction contractors to implement the basic construction mitigation measures recommended by BAAQMD to reduce fugitive dust emissions. Emission reduction measures will include, at a minimum, the following measures:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt trackout onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
7. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
8. Unpaved roads providing access to sites located 100 feet or further from a paved road shall be treated with a 6- to 12-inch layer of compacted layer of wood chips, mulch, or gravel.
9. Publicly visible signs shall be posted with the telephone number and name of the person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District’s General Air Pollution Complaints number shall also be visible to ensure compliance with applicable regulations.

In the absence of a qualified Community Risk Reduction Plan, BAAQMD has established the following thresholds for local community risks and hazards associated with TACs and $PM_{2.5}$ for assessing individual source impacts at a local level. Impacts would be significant if:

- The project would result in an increased cancer risk of > 10 in one million
- The project would result in an increased non-cancer (i.e., Chronic or Acute) risk of > 1.0 Hazard Index
- The project would result in an ambient $PM_{2.5}$ concentration increase of > 0.3 $\mu g/m^3$ annual average

A project would be considered to have a cumulatively considerable impact if the aggregate total of current and proposed TAC sources within a 1,000 feet radius of the project fence-line in addition to the project would exceed the cumulative thresholds. Impacts would be significant if:

- The project would result in an increased cancer risk of > 100 in one million
- The project would result in an increased non-cancer (i.e., Chronic or Acute) risk of > 10 Hazard Index
- The project would result in an ambient $PM_{2.5}$ concentration increase of > 0.8 $\mu g/m^3$ annual average

Excess cancer risks are defined as those occurring in excess of or above and beyond those risks that would normally be associated with a location or activity if toxic pollutants were not present. Non-carcinogenic health effects are expressed as a hazard index, which is the ratio of expected exposure levels to an acceptable reference exposure level.

BAAQMD considers children, the elderly, and those with preexisting serious health problems to be sensitive receptors. Land uses where sensitive receptors are most likely to spend time include schools and schoolyards, parks and playgrounds, daycare centers and preschools, hospices, dormitories, prisons, nursing homes, hospitals, and residential communities (BAAQMD 2022).

BAAQMD establishes operational screening criteria for criteria air pollutants and precursors. If a project meets the screening criteria outlined in Table 3-1 of the BAAQMD CEQA Guidelines (BAAQMD 2017b), the project would not result in the generation of operational-related criteria air pollutants and/or precursors that exceed the emissions thresholds shown in Table 2 above.

Methodology

Air pollutant emissions generated by project construction and operation were estimated using the California Emissions Estimator Model (CalEEMod), version 2022.1. CalEEMod utilizes project-specific information, including the project's land use(s), square footage for different uses (e.g., parking lot, general office building, strip mall), and location, to model a project's construction and operational emissions. The analysis reflects the construction and operation of the project as described under Section 9, *Description of Project*.

Construction emissions modeled include emissions generated by construction equipment used on-site and emissions generated by vehicle trips associated with construction, such as worker, hauling, and vendor trips. CalEEMod estimates construction emissions by multiplying the amount of time equipment is in operation by emission factors. Construction of the project was analyzed based on the applicant-provided project characteristics, disturbance areas, and construction activities. Quantities and types of equipment used during construction were based on applicant-provided data. Emissions modeling assumes a proposed start date of January 2024 with project construction occurring over approximately four months. CalEEMod does not provide default land use subtypes that accurately represent the proposed project components. Therefore, the following assumptions were included in the model based on details described under Section 9, *Description of Project*:

- The equipment enclosure, transformer, water tank, and all associated concrete pads were modeled using the land use subtype "General Office Building." Given that components of the project include concrete foundations, electrical components, and other building-like features, "General Office Building" was the most reflective land use available among the CalEEMod options in terms of construction duration, construction equipment quantities, and onsite operational sources. This land use subtype also accounts for modifications and improvements on the existing electrical tower.
- The proposed gravel driveway was modeled using the land use subtype "Other Non-asphalt Surfaces."
- The total area of ground disturbance was assumed to be 0.75 acres.
- The proposed emergency standby generator was assumed to operate two hours per day as a maintenance and testing scenario.
- Project operation was assumed to generate 110 vehicle trips per day. This is based on the California Department of Transportation's screening threshold used for transportation significance of 110 trips per day. This is a conservative estimate that would allow for additional trips, if necessary, beyond the estimated monthly maintenance trips.

It is assumed that all construction equipment used would be diesel-powered. This analysis assumes that the project would comply with all applicable regulatory standards. In particular, the project would comply with BAAQMD Basic Construction Control Measures listed under *Air Pollutant Emissions Thresholds* above.

Operational emissions modeled include energy emissions, mobile source emissions, and area source emissions. Mobile source emissions are generated by vehicle trips to and from the project site. Emissions attributed to energy use include natural gas consumption for space and water heating. Area source emissions are generated by landscape maintenance equipment, consumer products and architectural coatings.

Impact Analysis

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

The California Clean Air Act requires that air districts create a Clean Air Plan that describes how the jurisdiction will meet air quality standards. The most recently adopted air quality plan is the 2017 Plan. The 2017 Plan focuses on two paramount goals, both consistent with the mission of BAAQMD:

- Protect air quality and health at the regional and local scale by attaining all national and state air quality standards and eliminating disparities among Bay Area communities in cancer health risk from TACs
- Protect the climate by reducing Bay Area GHG emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050
- Under BAAQMD's methodology, a determination of consistency with the 2017 Plan should demonstrate that a project:
- Supports the primary goals of the air quality plan

- Includes applicable control measures from the air quality plan
- Does not disrupt or hinder implementation of any air quality plan control measures

A project that would not support the 2017 Plan's goals would not be considered consistent with the 2017 Plan. On an individual project basis, consistency with BAAQMD quantitative thresholds is interpreted as demonstrating support with the 2017 Plan's goals. As discussed under Impact AQ-2 below, the project would not result in exceedances of BAAQMD thresholds for criteria air pollutants and thus would not conflict with the 2017 Plan's goal to attain air quality standards.

The 2017 Plan includes goals and measures to promote building decarbonization, conservation of water, use of on-site renewable energy, and energy efficiency. The project would be supplied electricity by PG&E, which is required to procure 100% of its energy supply from renewable sources by 2045. The proposed diesel generator would be rated below 50 brake-horsepower and would operate for occasional maintenance activities and during public outages, which on average would be under two hours per day for the life of the project. The project would comply with any applicable California Green Building Standards, including installation of energy-efficient equipment and lighting. Therefore, the project would not conflict with or obstruct the implementation of an applicable air quality plan, and impacts would be less than significant impact.

LESS THAN SIGNIFICANT IMPACT

b. 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?

The San Francisco Bay Area Air Basin is designated a nonattainment area for the federal 8-hour ozone standard, federal $PM_{2.5}$ 24-hour standard, state 8-hour and 1-hour ozone standards, state PM_{10} annual and 24-hour standards, and the state $PM_{2.5}$ 24-hour standard. The following subsections discuss emissions associated with construction and operation of the project.

Construction Emissions

Project construction would generate temporary air pollutant emissions associated with fugitive dust (PM_{10} and $PM_{2.5}$) and exhaust emissions from heavy construction equipment/vehicles. Table 3 summarizes the estimated maximum daily emissions of pollutants during project construction. As shown therein, construction-related emissions would not exceed applicable thresholds for construction impacts.

Table 3 Estimated Maximum Daily Construction Emissions

Construction Year	ROG	NO_x	CO	SO_2	PM_{10} (exhaust)	$PM_{2.5}$ (exhaust)
Maximum Daily Emissions	3	20	20	<1	1	1
Thresholds	54	54	None	None	82	54
Threshold Exceeded?	**No**	**No**	**N/A**	**N/A**	**No**	**No**

lbs/day = pounds per day; ROG = reactive organic gases, NO_X = nitrogen oxides, CO = carbon monoxide, SO_2 = sulfur dioxide, PM_{10} = particulate matter 10 microns in diameter or less, $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

Notes: See Appendix A for modeling results. Some numbers may not add up due to rounding. Emissions presented are the highest of the winter and summer modeled emissions.

In lieu of quantitative thresholds for fugitive dust, BAAQMD states that implementation of BMPs would ensure that impacts related to fugitive dust are less than significant. Without incorporation of BMPs, project construction would potentially 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. Mitigation Measure AQ-1 would ensure that construction related impacts would be less than significant.

Operational Emissions

Operational emissions are typically associated with area sources (e.g., architectural coatings, consumer products, and landscaping equipment), energy sources (e.g., mechanical equipment) and mobile sources (e.g., vehicle trips to and from the project site). The project would result in operational emissions from area, mobile, and energy sources.

Table 4 summarizes the project’s maximum daily operational emissions by emission source. As shown therein, operational emissions would not exceed the BAAQMD’s operational thresholds for criteria pollutants. Therefore, project operation would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment, and impacts would be less than significant.

Table 4 Estimated Maximum Daily and Annual Operational Emissions

Emissions Source	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions (lbs/day)	1	1	5	<1	1	<1
Thresholds	54	54	None	None	82	54
Threshold Exceeded?	**No**	**No**	**N/A**	**N/A**	**No**	**N/A**
Maximum Annual Emissions (tons/year)	<1	<1	1	<1	<1	<1
Thresholds	10	10	None	None	15	10
Threshold Exceeded?	**No**	**No**	**N/A**	**N/A**	**No**	**N/A**

lbs/day = pounds per day; ROG = reactive organic gases, NO_X = nitrogen oxides, CO = carbon monoxide, SO_2 = sulfur dioxide, PM_{10} = particulate matter 10 microns in diameter or less, $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

Notes: See Appendix A for modeling results. Some numbers may not add up due to rounding.

Mitigation Measure

AQ-1 BAAQMD Basic Best Management Practices for Construction-Related Fugitive Dust Emissions

The applicant shall require all construction contractors to implement the basic construction mitigation measures recommended by BAAQMD to reduce fugitive dust emissions. Emission reduction measures will include, at a minimum, the following measures:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt trackout onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
7. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
8. Unpaved roads providing access to sites located 100 feet or further from a paved road shall be treated with a 6- to 12-inch layer of compacted layer of wood chips, mulch, or gravel.
9. Publicly visible signs shall be posted with the telephone number and name of the person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District’s General Air Pollution Complaints number shall also be visible to ensure compliance with applicable regulations.

Significance After Mitigation

Implementation of Mitigation Measure AQ-1 would minimize fugitive dust emissions resulting from construction activities. Implementation of these BMPs would reduce project impacts from fugitive dust emissions to a less-than-significant level.

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED

c. Would the project expose sensitive receptors to substantial pollutant concentrations?

Certain population groups such as children, the elderly, and people with health issues are particularly sensitive to air pollution. The majority of sensitive receptor locations are schools, residences and hospitals. The closest sensitive receptors to the project site are the single-family residences near the eastern boundary of the project site, ranging from 75 to 200 feet east of the project site. The following subsections discuss the project’s potential to result in impacts related to TAC emissions during construction and operation.

Construction

Construction-related activities would result in temporary project-generated emissions of diesel particulate matter (DPM) exhaust emissions from off-road, heavy-duty diesel equipment for site preparation, grading, building construction, and other construction activities. DPM was identified as a TAC by CARB in 1998 (CARB 2021).

Generation of DPM from construction projects typically occurs in a single area for a short period. Construction of the proposed project would occur over approximately four months. The dose to which the receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the Maximally Exposed Individual. The risks estimated for a Maximally Exposed Individual are higher if a fixed exposure occurs over a longer period of time. According to the California Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project. Thus, the duration of proposed construction activities (i.e., 24 months) is approximately seven percent of the total exposure period used for 30-year health risk calculations. Current models and methodologies for conducting health-risk assessments are associated with longer-term exposure periods of 9, 30, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities, resulting in difficulties in producing accurate estimates of health risk (BAAQMD 2022).

The maximum PM_{10} and $PM_{2.5}$ emissions would occur during site preparation and grading activities. These activities would last for approximately 35 days. PM emissions would decrease for the remaining construction period because construction activities such as building construction and paving would require less intensive construction equipment. While the maximum DPM emissions associated with site preparation and grading activities would only occur for a portion of the overall construction period, these activities represent the worst-case condition for the total construction period. This would represent less than one percent of the total 30-year exposure period for health risk calculation. Given the aforementioned discussion, DPM generated by project construction would not create conditions where the probability is greater than one in one million of contracting cancer for the Maximally Exposed Individual or to generate ground-level concentrations of non-carcinogenic TACs that exceed a Hazard Index greater than one for the Maximally Exposed Individual.

In addition, as mentioned above, the project would be required to implement the BAAQMD *Basic Construction Mitigation Measures* during all phases of construction on the project site to reduce dust emissions. Therefore, project construction would not expose sensitive receptors to substantial TAC concentrations, and impacts would be less than significant.

Operation

Sources of operational TACs include, but are not limited to, land uses such as freeways and high-volume roadways, truck distribution centers, ports, rail yards, refineries, chrome plating facilities, dry cleaners using perchloroethylene, and gasoline dispensing facilities. The project does not include construction of new gas stations, dry cleaners, highways, roadways, or other sources that could be considered new permitted or non-permitted sources of TAC or $PM_{2.5}$ in proximity to sensitive receptors. In addition, mobile emissions generated from the project would be minimal and spread over a broad geographical area. Therefore, project operation would not expose sensitive receptors to substantial TAC concentrations, and impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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

BAAQMD's 2022 CEQA Air Quality Guidelines identifies land uses that have the potential to generate substantial odor complaints. The uses in the table include wastewater treatment plants, landfills or transfer stations, refineries, composting facilities, confined animal facilities, food manufacturing, smelting plants, and chemical plants (BAAQMD 2022). Odors are typically associated with industrial projects involving the use of chemicals, solvents, petroleum products, and other strong-smelling elements used in manufacturing processes, as well as sewage treatment facilities and landfills.

During construction activities, heavy equipment and vehicles would emit odors associated with vehicle and engine exhaust and during idling. However, these odors would be intermittent and temporary and would cease upon completion.

The project does not involve, nor would locate, new sensitive receptors in proximity to odor-emitting uses as identified in BAAQMD's 2022 CEQA Air Quality Guidelines. The proposed uses would not generate objectionable odors that would affect a substantial number of people. Furthermore, the project would be subject to BAAQMD Regulation 7, Odorous Substances, which requires abatement of any nuisance generating an odor complaint. Therefore, the project would not substantially cause new sources of odors and would not significantly expose sensitive receptors to existing or new odors, and impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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4 Biological Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	■	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	■	☐	☐
c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	■
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	■	☐	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	■	☐
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	■

The analysis in this section is based in part upon a biological resource assessment prepared by AJM Ecological Solutions, LLC in March 2021 (Appendix C to this Initial Study).

Regulatory Setting

Federal and State

Regulatory authority over biological resources is shared by federal, state, and local agencies under a variety of laws, ordinances, regulations, and statutes. Primary authority for biological resources lies with the land use control and planning authority of local jurisdictions (in this instance, the Town of Moraga).

The California Department of Fish and Wildlife (CDFW) is a trustee agency for biological resources throughout the state under CEQA and has direct jurisdiction under the California Fish and Game Code (CFGC). Under the California Endangered Species Act and the federal Endangered Species Act, the CDFW and the U.S. Fish and Wildlife Service (USFWS), respectively, have direct regulatory authority over species formally listed as threatened or endangered (and listed as rare for CDFW). Native and/or migratory bird species are protected under the CFGC Sections 3503, 3503.5, and 3511.

Statutes in the Clean Water Act (CWA), CFGC, and CCR protect wetlands and riparian habitat. The U.S. Army Corps of Engineers (USACE) has regulatory authority over wetlands and waters of the United States under Section 404 of the CWA. The State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs) ensure water quality protection in California pursuant to Section 401 of the CWA and Section 13263 of the Porter-Cologne Water Quality Control Act. The CDFW regulates waters of the State under the CFGC Section 1600 et seq.

Special-status species are those plants and animals: 1) listed, proposed for listing, or candidates for listing as Threatened or Endangered by the USFWS and the National Marine Fisheries Service (NMFS) under the federal Endangered Species Act; 2) listed or proposed for listing as Rare, Threatened, or Endangered by the CDFW under the California Endangered Species Act; 3) recognized as California Species of Special Concern by the CDFW; 4) afforded protection under CFGC; and 5) occurring on Lists 1 and 2 of the CDFW California Rare Plant Rank (CRPR) system.

Impact Analysis

a. *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 Wildlife or U.S. Fish and Wildlife Service?*

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

d. *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?*

The project site is undeveloped with the exception of an existing PG&E tower. The site does not contain riparian habitat and is not located within a known regional wildlife movement corridor or other sensitive biological area as indicated by the USFWS Critical Habitat portal (Appendix C). Based on the surroundings and lack of native or riparian habitat located on or adjacent to the site, no federal-or state-listed endangered, threatened, rare, or otherwise sensitive flora or fauna are anticipated to occur within the project site (Appendix C).

The site contains non-native vegetation and non-native invasive herbaceous lands with dense areas of coyote brush (Appendix C). Non-native grasslands provide suitable nesting habitat for passerine bird species protected under the Migratory Bird Treaty Act (MBTA). Protected birds include all common songbirds, waterfowl, shorebirds, hawks, owls, eagles, ravens, crows, native doves and pigeons, swifts, martins, swallows, and others, including their body parts (feathers, plumes etc.), nests, and eggs. Construction activities could disturb ground nesting and adjacent shrub nesting birds within and around the construction site. Potential impacts on special-status and migratory birds that could result from the construction and operation of the project include the destruction of eggs or occupied nests, mortality of young, and the abandonment of nests with eggs or young birds prior to fledging. If these species were found to be present, impacts to these species would be significant. Therefore, Mitigation Measure BIO-1 would be required to reduce impacts to a less-than-significant level.

Mitigation Measure

BIO-1 Nesting Bird Avoidance and Minimization Measures

The following avoidance and minimization measures shall be implemented during project construction activities:

- Initial site disturbance should occur outside the general avian nesting season (February 1 through September 15), if feasible.
- If initial site disturbance occurs in a work area within the general avian nesting season indicated above, a qualified biologist shall conduct a pre-construction nesting bird survey no more than 14 days prior to initial disturbances in the work area. The survey shall include the entire area of disturbance area plus a 50-foot buffer (relevant to non-raptor species) and 300-foot buffer (relevant to raptors) around the site. If active nests are located, all construction work shall be conducted outside a buffer zone from the nest to be determined by the qualified biologist. The buffer should be a minimum of 50 feet for non-raptor bird species and at least 300 feet for raptor species. Larger buffers may be required and/or smaller buffers may be established depending upon the species, status of the nest, and construction activities occurring in the vicinity of the nest. The buffer area(s) shall be closed to all construction personnel and equipment until the adults and young are no longer reliant on the nest site. A qualified biologist shall confirm that breeding/nesting is completed and young have fledged the nest prior to removal of the buffer.
- If construction activities in a given work area cease for more than 14 days, additional surveys shall be conducted for the work area. If active nests are located, the aforementioned buffer zone measures shall be implemented.

Significance After Mitigation

Implementation of Mitigation Measure BIO-1 would reduce the potential for project construction activities to result in the loss of active bird nests through a pre-construction nesting bird survey and establishment of avoidance buffers around active nests, if present. Implementation of these measures would reduce project impacts to special-status plant and wildlife species to a less-than-significant level.

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED

c. *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?*

AJM Ecological Solutions, LLC conducted an assessment of potentially jurisdictional features as part of the literature review and performed a reconnaissance-level survey of the project site. The project site does not contain wetlands or other areas designated as waters of the U.S. and no further studies or regulatory permitting would be required. Therefore, the project would not result in a significant impact to federally protected wetlands as defined by Section 404 of the Clean Water Act (Appendix C).

NO IMPACT

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

The project's area of disturbance does not contain trees but the surrounding areas contain oak woodland. The project would not involve tree removal for construction of the access road, utility work beneath Sanders Ranch Road, or tower improvements. Furthermore, the project would comply with Moraga General Plan Policy CD1.5 which requires development in MOSO areas to conform to the site's natural setting, retaining the character of existing landforms, preserving significant native vegetation and with respect to ridgelines. The project would not substantially modify the existing topography and would not require tree removal. Grading for the proposed access road would not substantially alter the MOSO minor ridgeline and would generally retain the character of the existing landforms. With required adherence to the aforementioned existing policies, impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

f. *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?*

There are no Habitat Conservation Plans, Natural Community Conservation Plans, or other approved local, regional, or state habitat conservation plans that govern activities on the project site (Appendix C). Therefore, the project would not conflict with such a plan and no impact would occur.

NO IMPACT

5 Cultural Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☐	☐	☐	■
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	■	☐	☐
c. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	■	☐

This section provides an analysis of the project's impacts on cultural resources, including historical and archaeological resources, as well as human remains. CEQA requires a lead agency to determine whether a project may have a significant effect on historical resources (Public Resources Code [PRC], Section 21084.1). A historical resource is a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR); a resource included in a local register of historical resources; or any object, building, structure, site, area, place, record, or manuscript a lead agency determines to be historically significant (CEQA Guidelines, Section 15064.5[a] [1-3]).

A resource is considered historically significant if it:

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; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

In addition, if it can be demonstrated that a project would 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 resources cannot be left undisturbed, mitigation measures are required (PRC, Section 21083.2[a], [b]).

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:

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; or

3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Methodology

Rincon completed background and archival research in support of this assessment in July 2023. A variety of primary and secondary source materials were consulted. Sources included, but were not limited to, historical maps, aerial photographs, and written histories of the area. The following sources were utilized to develop an understanding of the project site and its context:

- Contra Costa County Assessor's Office
- Historical aerial photographs accessed via NETR Online
- Historical aerial photographs accessed via University of California, Santa Barbara Library FrameFinder
- Historical USGS topographic maps
- Historical newspaper clippings obtained from Newspapers.com, ProQuest Historical Newspapers.com, and the California Digital Newspaper Collection

On July 14, 2023, Rincon received California Historical Resources Information System (CHRIS) records search results from the Northwest Information Center (NWIC) (Appendix D). The NWIC is the official state repository for cultural resources records and reports for the county in which the proposed project falls. The purpose of the records search was to identify previously recorded cultural resources, as well as previously conducted cultural resources studies within the project site and a 0.5-mile radius surrounding it. Rincon also reviewed the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), the California Historical Landmarks list, and the Built Environment Resources Directory (BERD). Additionally, Rincon reviewed the Archaeological Determination of Eligibility (ADOE) list.

Rincon contacted the Native American Heritage Commission (NAHC) on June 14, 2023, to request a search of the Sacred Lands File (SLF), as well as a contact list of Native Americans culturally affiliated with the project site vicinity (Appendix D). On June 30, 2023, the Town of Moraga sent letters to 12 Native American contacts in the area to request information on potential cultural resources in the project site vicinity that may be impacted by the proposed projects development (Appendix B).

Under contract to the Town, an archaeologist from Rincon Consultants conducted a pedestrian archaeological and built environment survey of the project site on July 20, 2023. The site was surveyed using transect intervals spaced 10-15 meters and oriented generally from north to south. Exposed ground surfaces were examined artifacts, ecofacts, soil discoloration that might indicate the presence of a cultural midden, soil depressions, and features indicative of the former presence of structures or buildings or historic debris. Ground disturbances such as burrows and drainages were also visually inspected. Additionally, under the direction of architectural historian JulieAnn Murphy, the Rincon Archaeologist visually inspected the built environment resources within the project site, including buildings, structures, and landscape elements. Pursuant to OHP Guidelines (California OHP 1995: 2), properties over 45 years of age were evaluated for inclusion in the NRHP, CRHR, and local listing and recorded on California Department of Parks (DPR) 523 series forms.

Impact Analysis

a. Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

The 0.4-mile segment of the Moraga Castro Valley Transmission Line, the alignment of which includes the project site, is recommended ineligible for listing in the NRHP, CRHR, or local listing because it lacks historical or architectural significance. As a result of the evaluation included in Appendix D, Rincon found no evidence suggesting the transmission line is associated with important events in the history of utility design and does not qualify as a historical resource as defined in Section 15064.5 of the CEQA Guidelines. It is therefore recommended ineligible for the NRHP, CRHR, or as a Town of Moraga Landmark.

The field survey and background research identified one built-environment historical resource on the project site, the transmission tower. However, the resource was determined ineligible for the NRHP, the CRHR, or as a Town of Moraga Landmark for lack of historical or architectural significance. The proposed project to modify the transmission tower for cell antennas and the installation of necessary associated equipment, and the construction of a new access road would not result in the substantial adverse change to the significance of a historical resource. The proposed project would result in no impact to historical resources.

NO IMPACT

b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Two field surveys conducted in 1981 and 1982 by Nancy Schluntz and Donna J. Little, respectively, discovered flank scrapers within portions of the project site. However, no archaeological resources were identified during the field survey, and neither of the two flaked scrapers identified in 1981 were relocated (Appendix D). The current field survey did not relocate the scraper identified in 1981 nor did it identify substantial prehistoric or historic-period archaeological remains within areas of the project site subject to ground disturbing activities or the immediate vicinity.

While the Town of Moraga is surrounded by a confluence of freshwater sources, the project site is not located near freshwater sources. Consistent with habitation patterns and isolated archaeological artifacts have been identified in the general vicinity, the undulating hillside topography, lack of historic period use or access depicted in maps and aerials, negative SLF results, and lack of specific archaeological resources recorded in the area suggest there is a low potential for encountering intact subsurface archaeological deposits. However, the lack of surface evidence of archaeological materials does not entirely preclude their subsurface existence. Therefore, implementation of Mitigation Measure CR-1 would be required.

Mitigation Measure

CR-1 Unanticipated Discovery of Cultural Resources

In the event that archaeological resources are unexpectedly encountered during ground-disturbing activities, work within 50 feet of the find shall halt and an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology (National Park Service 1983) shall be contacted immediately to evaluate the resource. If the resource is determined by the qualified archaeologist to be prehistoric, then a Native American representative shall also be contacted to participate in the evaluation of the resource. If the qualified archaeologist and/or Native American representative determines it to be appropriate, archaeological testing for CRHR eligibility shall be completed. If the resource proves to be eligible for the CRHR and significant impacts to the resource cannot be avoided via project redesign, a qualified archaeologist shall prepare a data recovery plan tailored to the physical nature and characteristics of the resource, per the requirements of CCR Guidelines Section 15126.4(b)(3)(C). The data recovery plan shall identify data recovery excavation methods, measurable objectives, and data thresholds to reduce any significant impacts to cultural resources related to the resource. Pursuant to the data recovery plan, the qualified archaeologist and Native American representative, as appropriate, shall recover and document the scientifically consequential information that justifies the resource's significance. The Town shall review and approve the treatment plan and archaeological testing as appropriate, and the resulting documentation shall be submitted to the regional repository of the California Historical Resources Information System, pursuant to CCR Guidelines Section 15126.4(b)(3)(C).

Significance After Mitigation

Impacts would be less than significant with implementation of Mitigation Measure CR-1.

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c. Would the project disturb any human remains, including those interred outside of formal cemeteries?

No human remains are known to be present within the project site or along Sanders Ranch Road. However, the discovery of human remains is always a possibility during ground disturbing activities. If human remains are found, the State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In the event of an unanticipated discovery of human remains, the County Coroner must be notified immediately. If the human remains are determined to be of Native American origin, the Coroner will notify the Native American Heritage Commission, which will determine and notify a most likely descendant (MLD). The MLD has 48 hours from being granted site access to make recommendations for the disposition of the remains. If the MLD does not make recommendations within 48 hours, the landowner shall reinter the remains in an area of the property secure from subsequent disturbance. With adherence to existing regulations, impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

6 Energy

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Result in a 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?	☐	☐	■	☐

Electricity is primarily consumed by the built environment for lighting, appliances, heating and cooling systems, and other uses such as industrial processes in addition to being consumed by alternative fuel vehicles. Most of California's electricity is generated in state, with approximately 30 percent imported from the northwest and southwest regions of the United States in 2020 (California Energy Commission [CEC] 2021). In addition, approximately 33 percent of California's electricity supply in 2020 came from renewable energy sources, such as wind, solar photovoltaic, geothermal, and biomass (CEC 2021). In 2018, Senate Bill 100 accelerated the state's Renewable Portfolio Standards Program, codified in the Public Utilities Act, by requiring electricity providers to increase procurement from eligible renewable energy and zero-carbon resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

The smallest scale at which energy consumption information is readily available is the county level. Therefore, energy consumption in Contra Costa County is used herein to characterize the town's existing consumption of electricity and natural gas. According to the California Energy Commission (CEC), Contra Costa County consumed approximately 8,287 GWh of electricity in 2021 from residential and non-residential uses (CEC 2023a). Moraga is served by Marin Clean Energy (MCE), which supplies electricity to all accounts (residential, business, and municipal) and is delivered through Pacific Gas and Electric (PG&E) infrastructure. MCE buys power mainly from clean sources like wind, solar, and hydropower (MCE 2023). In addition, property owners and businesses within Moraga can opt out of MCE to continue receiving electricity from PG&E directly. At the end of December 2022, Moraga had 6,440 electric accounts, 5,777 of which were with MCE for an enrollment rate of 89.7%. Of those 5,777 accounts, 2.7% are Deep Green (Town of Moraga 2023). Contra Costa County consumed approximately 971 millions of therms of natural gas in 2021 in both residential and non-residential uses (CEC 2023b).

Petroleum fuels are primarily consumed by on-road and off-road equipment in addition to some industrial processes, with California being one of the top petroleum-producing states in the nation (CEC 2023b). Gasoline, which is used by light-duty cars, pickup trucks, and sport utility vehicles, is the most used transportation fuel in California with 11.6 million gallons sold in 2021 (CEC 2023c). Diesel, which is used primarily by heavy duty-trucks, delivery vehicles, buses, trains, ships, boats and barges, farm equipment, and heavy-duty construction and military vehicles, is the second most used fuel in California with 1.6 million gallons sold in 2021 (CEC 2023c). Table 5 summarizes the petroleum fuel consumption for Contra Costa County, in which the project site would be located, as compared to statewide consumption.

Table 5 2021 Annual Gasoline and Diesel Consumption

Fuel Type	Contra Costa County (millions of gallons)	California (millions of gallons)	Proportion of Statewide Consumption[1]
Gasoline	374	13,818	2.7%
Diesel	28	1,883	1.5%

Source: CEC 2023c

Energy consumption is directly related to environmental quality in that the consumption of nonrenewable energy resources releases criteria air pollutant and GHG emissions into the atmosphere. The environmental impacts of air pollutant and GHG emissions associated with the project's energy consumption are discussed in detail in Section 3, *Air Quality*, and Section 8, *Greenhouse Gas Emissions*, respectively.

Impact Analysis

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

Construction Energy Demand

During project construction, energy would be consumed in the form of petroleum-based fuels used to power off-road construction vehicles and equipment on the project site, construction worker travel to and from the project site, and vehicles used to deliver materials to the site. The proposed project would require site preparation and grading, pavement installation, and equipment installation.

Energy use during project construction would be temporary in nature, and construction equipment used would be typical of similar-sized construction projects in the region. In addition, the project would utilize construction contractors who are in compliance with applicable CARB regulations that restrict the idling of heavy-duty diesel motor vehicles and govern the accelerated retrofitting, repowering, or replacement of heavy-duty diesel on- and off-road equipment. Electrical power would be consumed to construct the project, and the demand, to the extent required, would be supplied from existing electrical infrastructure in the area. Overall, construction activities would require minimal electricity consumption and would not have an adverse impact on available electricity supplies or infrastructure.

Construction activities would utilize fuel-efficient equipment consistent with state and federal regulations and would comply with state measures to reduce the inefficient, wasteful, or unnecessary consumption of energy. In addition, pursuant to applicable regulatory requirements such as CalGreen Code Section 4.408, the project would comply with construction waste management practices to divert a minimum of 50 percent of construction and demolition debris. These practices would result in efficient use of energy necessary to construct the project.

Furthermore, in the interest of cost efficiency, construction contractors would not utilize fuel in a manner that is wasteful or unnecessary. Therefore, project construction would not result in potentially significant environmental effects due to the wasteful, inefficient, or unnecessary consumption of energy. Project construction impacts would be less than significant.

Operational Energy Demand

Operational energy use of the proposed project would be similar to existing utilities on site or telecommunication facilities in the area. The additions to the existing PG&E tower would be constructed to current electrical codes and would be subject to energy efficiency regulations for the specific type of development. The project would be supplied electricity by PG&E, which is required to procure 100 percent of its energy supply from renewable sources by 2045. The proposed diesel generator would be rated below 50 brake-horsepower and would operate for an average of under two hours per day for occasional maintenance activities and power outages. The project would also comply with applicable California Green Building Standards, including installation of energy-efficient equipment and lighting. Therefore, operation of the proposed project would not result in the inefficient, wasteful, or unnecessary consumption of energy. The project would not result in a significant impact due to wasteful, inefficient, or unnecessary consumption of energy resources.

LESS THAN SIGNIFICANT IMPACT

b. Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The Town of Moraga's Climate Action Plan includes energy conservation and energy efficiency strategies for its transportation, residential, commercial, and municipal operations. The proposed project would result in a minimal increase in energy demand. As the proposed project is not related to transportation and is not a residential, commercial, or municipal use, it would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. As a result, impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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7 Geology and Soils

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
1. 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?	☐	☐	■	☐
2. Strong seismic ground shaking?	☐	☐	■	☐
3. Seismic-related ground failure, including liquefaction?	☐	■	☐	☐
4. Landslides?	☐	■	☐	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	■	☐
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	■	☐	☐
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	■	☐	☐
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	■
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	■	☐	☐

The analysis in this section is based in part on the geotechnical engineering investigation prepared for the project by Krazan & Associates, Inc. in February 2023. The geotechnical investigation is included as Appendix E to this Initial Study.

Regulatory Setting

Alquist-Priolo Earthquake Fault Zoning Act

Following the 1989 Loma Prieta earthquake, the Seismic Hazards Mapping Act (SHMA) was passed by the California legislature in 1990. The SHMA (PRC Chapter 7.8, Section 2690-2699.6) directs the Department of Conservation, California Geological Survey to identify and map areas prone to liquefaction, earthquake-induced landslides and amplified ground shaking. It also requires that agencies only approve projects in seismic hazard zones following site-specific geotechnical investigations to determine if the identified hazard is present and the inclusion of appropriate mitigation to reduce earthquake-related hazards.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 was enacted, in part, to address seismic hazards not included in the Alquist-Priolo Act, including strong ground shaking, landslides, and liquefaction. Under the Alquist-Priolo Act, the State Geologist is responsible for identifying and mapping seismic hazards. CGS Special Publication 117, adopted in 1997 by the State Mining and Geology Board, constitutes guidelines for evaluating seismic hazards other than surface faulting and for recommending mitigation measures as required by PRC Section 2695(a). In accordance with the mapping criteria, the CGS seismic hazard zone maps identifies areas with the potential for a ground shaking event that corresponds to 10 percent probability of exceedance in 50 years.

The purpose of the Seismic Hazards Mapping Act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards. Cities, counties, and state agencies are directed to use seismic hazard zone maps developed by CGS in their land-use planning and permitting processes. The Seismic Hazards Mapping Act requires site-specific geotechnical investigations prior to permitting most urban development projects in seismic hazard zones.

California Building Code (CBC)

The California Building Code (CBC), Title 24, Part 2, provides building codes and standards for the design and construction of structures in California. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, and general stability by controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of building and structures. The CBC contains specific requirements for seismic safety, excavation, foundations, retaining walls, soil conditions, and site demolition. It also regulates grading activities, including drainage and erosion control. Chapter 16 of the CBC contains definitions of seismic sources and the procedure used to calculate seismic forces on structures.

The CBC is updated every three years by order of the legislature, with supplements published in intervening years. State law mandates that local governments enforce the CBC. In addition, a city and/or county may establish more restrictive building standards reasonably necessary because of local climatic, geological, or topographical conditions. The 2022 CBC is based on the International Building Code.

Impact Analysis

a.1. 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?

Active faults are defined by the State of California to be a fault that has surface displacement within the Holocene time (approximately the last 10,000 years). Potentially active faults as defined by the State of California to be a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years). Any fault that is sufficiently active describes a fault that has some evidence of Holocene displacement on one or more of its segments or branches. Associated issues with earthquakes include liquefaction, which is the rapid transformation of sediment to a fluid-like state. It occurs when water-saturated, loose to medium dense, relatively clay-free sands and silts are subjected to earthquake ground motion.

The Bay Area contains both active and potentially active faults. Major active faults in the area are the Hayward and Calaveras faults located approximately 4.3 miles west of the site and 6.5 miles southeast of the site, respectively. The project site itself is not located within an Earthquake Fault Zone (California Geological Survey [CGS] 2021).

The project site is not within an Earthquake Fault Zone as defined by the Alquist-Priolo Earthquake Fault Zoning Act, and no known active or potentially active faults exist on the site (California Geological Survey [CGS] 2021). Direct ground rupture of a known earthquake fault would be unlikely, and impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.2. 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 nearest mapped active fault, the Hayward Fault, is located approximately 4 miles west of the project site (CGS 2021). The United States Geological Survey (USGS) has stated that there is a 72 percent chance of at least one magnitude 6.7 or greater earthquake striking the San Francisco Bay region between 2014 and 2043 (USGS 2016). Therefore, the site could be subjected to at least one moderate to severe earthquake that would cause strong ground shaking. However, the project does not include habitable structures, and project construction would be required to comply with the seismic safety requirements in the CBC and the California Public Utilities Commission (CPUC) energy requirements. Compliance with such requirements would reduce seismic ground shaking impacts to the maximum extent practicable with current engineering methods. Therefore, impacts related to strong seismic ground shaking would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.3. 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?

c. 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?

Soils that are most susceptible to liquefaction are clean, loose, uniformly graded, saturated, fine-grained sands that lie close to the ground surface. The surface soils of the site have been identified as firm to stiff silty clay and sandy clay or medium dense silty sand with trace clay. These soils are moderately strong, slightly compressible, and have a moderate expansion potential (Appendix E). The existing structure and proposed project would be required to be constructed in compliance with the California Building Code (CBC), which requires structures to be designed and constructed to resist liquefaction potential from seismic-related ground failure.

The geotechnical investigation prepared for the project (Appendix E) analyzed the potential for liquefaction induced settlements and provided recommendations for the design of the proposed structure's foundation. Pursuant to MMC Title 15, the Town of Moraga adopted the CBC; Section 1803.1.1.3 of the CBC states that the building department of each locality (in this case the Moraga Planning Department) must approve the soil investigation or geotechnical investigation (Appendix E) if it determines that the recommended action is likely to prevent structural damage. As a condition of the building permit, the approved recommended actions would be incorporated into project construction. Pursuant to the MMC and the CBC, the recommendations included in the geotechnical investigation (Appendix E) would be incorporated into the design of the project and verified by the Town prior to issuance of a building permit. Implementation of Mitigation Measure GEO-1 would ensure that all recommendations will be implemented.

The project would not increase the potential for unstable soils, on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. With incorporation of recommendations included in Appendix E during project construction, the cuts and fills needed for project grading would be formed to create stable slopes to limit the potential for soil slope failures. Furthermore, the grading would be designed such that it would not increase the potential for landslides on the existing slopes, either on or off site.

With adherence to MMC, the CBC, implementation of recommendations in the design-level geotechnical investigation, and implementation of Mitigation Measure GEO-1, impacts would be less than significant.

Mitigation Measure

GEO-1 Geotechnical Considerations

The project applicant shall implement all measures and recommendations set forth in the Geotechnical Investigation prepared by Krazan & Associates, Inc. in February 2023 (on file with the Town of Moraga and included as Appendix E). Recommendations include but are not limited to the following:

- Based on the existing moisture contents of the upper on-site soils, stabilization of the on-site subgrade may be required. Typical remedial measures include: discing and aerating the soils during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill materials; or mixing the soil with an approved lime or cement product.

- Ata minimum, the upper 18-inches of subgrade soil shall be moisture conditioned to a minimum of two percent above optimum moisture content and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557
- Concrete slab on-grade and exterior flatwork areas shall be supported by a minimum of 24-inches of non-expansive engineered fill or lime treated engineered fill.
- Reconstructed slopes shall be constructed at an inclination not exceeding 2:1 (horizontal to vertical) slopes or flatter. A geotechnical professional shall be retained to review all slope reconstruction plans and specifications prior to initiating the repair work.
- Where fills greater than eight feet are to be constructed on original ground that slopes at inclinations steeper than 6:1 (horizontal to vertical), benches shall be cut into the existing slope as the filling operations proceed.
- Site grading near slopes and the embankments, including retaining walls and wing walls, shall be accomplished such that excessive sheet run-off is prevented. The completed slopes shall be seeded or otherwise vegetated to protect from erosion. Within the side of embankments facing water flow, rock rip rap or concrete paving shall be used to prevent erosion.

Significance After Mitigation

Implementation of Mitigation Measure GEO-1 would reduce impacts related to liquefaction, landslide, lateral spreading, subsidence, or collapse.

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED

a.4. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?

The project site and its immediate vicinity are not mapped for landslide potential; however, unmapped landslides and areas of localized slope instability may be locally present (CGS 2021). Construction at the project site and for the access road would involve grading on moderate to steep slopes in soils and rocks of varying strength. According to the Geotechnical Investigation, construction on the project site's slopes would be feasible provided the recommendations in the Geotechnical Investigation are followed and as required pursuant to MMC Title 15. MMC Title 15 would require that the cuts and fills needed for project grading would be formed to create stable slopes to avoid susceptibility to land sliding and would not increase the potential for landslides on the existing slopes. Construction activities would be limited to the project footprint and geotechnical recommendations as listed in Appendix E and as summarized in Mitigation Measure GEO-1 would be implemented.

Mitigation Measure Implementation of Mitigation Measure GEO-1 would be required.

Significance After Mitigation

Implementation of Mitigation Measure GEO-1 would reduce impacts to slope instability and associated slope failure to less than significant levels.

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED

b. *Would the project result in substantial soil erosion or the loss of topsoil?*

Project construction, particularly grading and leveling, could result in erosion and loss of topsoil from the project site. Such grading could result in erosion induced sedimentation of downstream drainages, which may result in significant impacts. The project developer would be required to follow applicable CBC and MMC requirements to reduce soil erosion, including MMC Section 14.24.012, which requires erosion and sedimentation control measures and drainage plans to be prepared by a civil engineer and submitted to the Town for approval prior to issuance of a grading permit. Where appropriate, the control measures must include measures including, but not limited to, short-term erosion control planting, waterproof slope covers, stormwater retention basins, and devices to trap, store, and filter sediment during project construction and operation. Compliance with Town regulations would reduce impacts related to soil erosion and the loss of topsoil to less than significant levels.

LESS THAN SIGNIFICANT IMPACT

d. *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 are soils that swell in density and volume as they absorb water and contract as they lose water. Associated problems include cracking and deterioration of roadway surface, as they expand and contract during seasonal wet and dry cycles. The surface soils of the site have been identified as firm to stiff silty clay and sandy clay or medium dense silty sand with trace clay. These soils are moderately strong, slightly compressible, and have a moderate expansion potential (Appendix E)

Expansive soils are those that have a potential to undergo significant changes in volume, either shrinking or swelling, due to their composition and moisture content. Periodic shrinking and swelling of expansive soils can cause extensive damage to nearby roads or trails. The surface soils of the site have been identified as firm to stiff silty clay and sandy clay or medium dense silty sand with trace clay. These soils are moderately strong, slightly compressible, and have a moderate expansion potential (Appendix E). The proposed project would be constructed to comply with current CBC standards and with implementation of Mitigation Measure GEO-1, impacts would be less than significant.

Mitigation Measure

Implementation of Mitigation Measure GEO-1 would be required.

Significance After Mitigation

Implementation of Mitigation Measure GEO-1 would reduce impacts related to unstable soils to less than significant levels.

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED

e. *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 proposed project would not require subsurface infrastructure such as sewer or septic tanks. Therefore, no impacts from septic systems or alternative wastewater disposal systems would occur.

NO IMPACT

f. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Paleontological resources, or fossils, are the evidence of once-living organisms preserved in the rock record. They include both the fossilized remains of ancient plants and animals and the traces thereof (e.g., trackways, imprints, burrows, etc.). Paleontological resources are not found in “soil” but are contained within the geologic deposits or bedrock that underlies the soil layer. Typically, fossils are greater than 5,000 years old (i.e., older than middle Holocene in age) and are typically preserved in sedimentary rocks. Although rare, fossils can also be preserved in volcanic rocks and low-grade metamorphic rocks under certain conditions (Society of Vertebrate Paleontology [SVP] 2010). Fossils occur in a non-continuous and often unpredictable distribution within some sedimentary units, and the potential for fossils to occur within sedimentary units depends on several factors. It is possible to evaluate the potential for geologic units to contain scientifically important paleontological resources, and therefore evaluate the potential for impacts to those resources and provide mitigation for paleontological resources if they are discovered during construction of a development project.

Rincon evaluated the paleontological sensitivity of the geologic units that underlie the project site to assess the project’s potential for significant impacts to scientifically important paleontological resources. The analysis was based on a review of existing information in the scientific literature regarding known fossils within geologic units mapped at the project site. According to the SVP (2010) classification system, geologic units can be assigned a high, low, undetermined, or no potential for containing scientifically significant nonrenewable paleontological resources. Following the literature review, a paleontological sensitivity classification was assigned to each geologic unit mapped within the project site. This criterion is based on rock units within which vertebrate or significant invertebrate fossils have been determined by previous studies to be present or likely to be present. The potential for impacts to significant paleontological resources is based on the potential for ground disturbance to directly impact paleontologically sensitive geologic units.

The new access road and concrete pad are underlain by the Orinda Formation (Dibblee and Minch 2005). Due to its long history of producing scientifically significant fossils (Paleobiology Database 2023; University of California Museum of Paleontology 2023), the Orinda Formation has high paleontological sensitivity.

Ground disturbing activities within previously undisturbed sediments with high paleontological sensitivity could result in significant impacts to paleontological resources. Impacts would be significant if construction activities result in the destruction, damage, or loss of scientifically important paleontological resources and associated stratigraphic and paleontological data. The new access road and concrete pad will require grading that reaches up to 4 feet below the current grade, which will impact previously undisturbed sediments. Therefore, the project does have the potential for significant impacts to paleontological resources.

The following mitigation measure would address the potentially significant impacts if paleontological resources were damaged or destroyed during project implementation and ground-disturbing activities. This measure would apply to all phases of project construction and would ensure that any significant fossils present on-site are preserved. Implementation of Mitigation Measure GEO-2 would reduce potential impacts to paleontological resources to less than significant level and would effectively mitigate the project’s impacts to these resources through the recovery, identification, and curation of previously unrecovered fossils.

Mitigation Measure

GEO-2 Unanticipated Discovery of Paleontological Resources

If a potential fossil is discovered during project construction, construction activity within 50 feet of the find shall cease until the discovery is examined by a Qualified Professional Paleontologist. If the find is determined to be significant, the Qualified Professional Paleontologist shall direct all mitigation measures related to paleontological resources consistent with Society of Vertebrate Paleontology (2010) standards. The project applicant shall include a standard inadvertent discovery clause in every construction contract to inform contractors of this requirement.

Significance After Mitigation

Mitigation Measure GEO- 2 would avoid impacts to paleontological resources in the case of unanticipated fossil discoveries. This measure would apply to all phases of project construction and would reduce the potential for impacts to unanticipated fossils present on site by providing for the recovery, identification, and curation of paleontological resources. Impacts would be less than significant with mitigation.

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED

8 Greenhouse Gas Emissions

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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?	☐	☐	■	☐

Overview of Climate Change and Greenhouse Gases

Climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period of time. Climate change is the result of numerous, cumulative sources of GHG emissions contributing to the "greenhouse effect," a natural occurrence which takes place in Earth's atmosphere and helps regulate the temperature of the planet. The majority of radiation from the sun hits Earth's surface and warms it. The surface, in turn, radiates heat back towards the atmosphere in the form of infrared radiation. Gases and clouds in the atmosphere trap and prevent some of this heat from escaping into space and re-radiate it in all directions.

GHG emissions occur both naturally and as a result of human activities, such as fossil fuel burning, decomposition of landfill wastes, raising livestock, deforestation, and some agricultural practices. GHGs produced by human activities include carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Different types of GHGs have varying global warming potentials (GWP). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common reference gas (CO_2) is used to relate the amount of heat absorbed to the amount of the gas emitted, referred to as "carbon dioxide equivalent" (CO_2e), which is the amount of GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane has a GWP of 30, meaning its global warming effect is 30 times greater than CO_2 on a molecule per molecule basis (Intergovernmental Panel on Climate Change [IPCC] 2022).[3]

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[3] The Intergovernmental Panel on Climate Change's (2022) *Sixth Assessment Report* determined that methane has a GWP of 30. However, the 2017 Climate Change Scoping Plan published by the California Air Resources Board uses a GWP of 25 for methane, consistent with the Intergovernmental Panel on Climate Change's (2007) *Fourth Assessment Report*. Therefore, this analysis utilizes a GWP of 25.

Regulatory Setting

The “California Global Warming Solutions Act of 2006,” (Assembly Bill [AB] 32), outlines California’s major legislative initiative for reducing GHG emissions. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 and requires CARB to prepare a Scoping Plan that outlines the main state strategies for reducing GHG emissions to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. Based on this guidance, CARB approved a 1990 statewide GHG level and 2020 target of 431 million metric tons (MMT) of carbon dioxide equivalents (CO_2e), which was achieved in 2016. CARB approved the Scoping Plan on December 11, 2008, which included GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among others. Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted since the Scoping Plan’s approval.

The CARB approved the 2013 Scoping Plan update in May 2014 (CARB 2014). The update defined the CARB’s climate change priorities for the next five years, set the groundwork to reach post-2020 statewide goals, and highlighted California’s progress toward meeting the “near-term” 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluated how to align the state’s longer term GHG reduction strategies with other state policy priorities, including those for water, waste, natural resources, clean energy, transportation, and land use (CARB 2014).

On September 8, 2016, the governor signed Senate Bill (SB) 32 into law, extending the California Global Warming Solutions Act of 2006 by requiring the state to further reduce GHG emissions to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). On December 14, 2017, the CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, and implementation of recently adopted policies and legislation, such as SB 1383 and SB 100 (discussed later). The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with statewide per capita goals of six MT CO_2e by 2030 and two MT CO_2e by 2050 (CARB 2017). As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, sub-regional, or regional level), but not for specific individual projects because they include all emissions sectors in the state (CARB 2017).

AB 1279, “The California Climate Crisis Act,” was passed on September 16, 2022 and declares the State would achieve net zero GHG emissions as soon as possible, but no later than 2045, and to achieve and maintain net negative GHG emissions thereafter. In addition, the bill states that the State would reduce GHG emissions by 85 percent below 1990 levels no later than 2045. The 2022 Scoping Plan lays out a path to achieve AB 1279 targets (CARB 2022). The actions and outcomes in the 2022 Scoping Plan would achieve significant reductions in fossil fuel combustion by deploying clean technologies and fuels, further reductions in short-lived climate pollutants, support for sustainable development, increased action on natural and working lands to reduce emissions and sequester carbon, and the capture and storage of carbon.

Significance Thresholds

Individual projects do not generate sufficient GHG emissions to influence climate change directly. However, physical changes caused by a project can contribute incrementally to significant cumulative effects, even if individual changes resulting from a project are limited. The issue of climate change typically involves an analysis of whether a project's contribution towards an impact would be cumulatively considerable. "Cumulatively considerable" means 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 (CEQA Guidelines Section 15064[h][1]).

According to CEQA Guidelines Section 15183.5(b), projects can tier from a qualified GHG reduction plan, which allows for project-level evaluation of GHG emissions through the comparison of the project's consistency with the GHG reduction policies included in a qualified GHG reduction plan. This approach is considered by the Association of Environmental Professionals (2016) in its white paper, *Beyond Newhall and 2020*, to be the most defensible approach presently available under CEQA to determine the significance of a project's GHG emissions.

The 2022 BAAQMD *CEQA Guidelines* document contains two approaches for determining significance of GHGs (BAAQMD 2022). The two approaches are as follows:

1. Projects must include, at a minimum, the following project design elements:
    - **Buildings**
        - The project will not include natural gas appliances or natural gas plumbing (in both residential and nonresidential development).
        - The project will not result in any wasteful, inefficient, or unnecessary energy usage as determined by the analysis required under CEQA Section 21100(b)(3) and Section 15126.2(b) of the State CEQA Guidelines.
    - **Transportation**
        - Achieve a reduction in project-generated vehicle miles traveled (VMT) below the regional average consistent with the current version of the California Climate Change Scoping Plan (currently 15 percent) or meet a locally adopted Senate Bill 743 VMT target, reflecting the recommendations provided in the Governor's Office of Planning and Research's Technical Advisory on Evaluating Transportation Impacts in CEQA:
            - Residential projects: 15 percent below the existing VMT per capita
            - Office projects: 15 percent below the existing VMT per employee
            - Retail projects: no net increase in existing VMT
        - Achieve compliance with off-street electric vehicle requirements in the most recently adopted version of CALGreen Tier 2.
2. Projects must be consistent with a local GHG reduction strategy that meets the criteria under State CEQA Guidelines Section 15183.5(b).

According to the BAAQMD CEQA Thresholds for Evaluating the Significance of Climate Impacts From Land Use Projects and Plans, a qualified GHG reduction strategy must:

- Quantify GHG emissions, both existing and projected over a specified period, resulting from activities in a defined geographic area
- Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable
- Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated in the geographic area
- Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level
- Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels
- Be adopted in a public process following environmental review

This analysis will evaluate the project in terms of consistency with the project design elements listed under criterion 1 above.

Methodology

GHG emissions were modeled under the same assumptions and methodology outlined in Section 3, *Air Quality.* As discussed under *Significance Thresholds* above, projects consistent with a qualified climate action plan (CAP) are assumed to have less-than-significant impacts related to GHG emissions. Therefore, the proposed project's estimated GHG emissions during construction and operation are presented for informational purposes only.

Impact Analysis

a. Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

As described in Section 6, *Energy*, the project would be required to comply with the CARB In-Use Off-Road Diesel-Fueled Fleets Regulation during construction, which imposes limits on idling and restricts the use of older vehicles; this would reduce fuel consumption and lead to the use of fuel-efficient vehicles on the construction site. Construction equipment would also be maintained to applicable standards, and construction activity and associated fuel consumption and energy use would be temporary and typical for construction sites.

The proposed project would be consistent with BAAQMD criteria for buildings since it would not include natural gas appliances or natural gas plumbing. Additionally, the project would not include long-term parking, so EV parking requirements would not be applicable. The project would result in negligible VMT because only maintenance trips would be required for project operation. The additions to the existing PG&E tower would be constructed to current electrical codes and would be subject to energy efficiency regulations for the specific type of development and CPUC energy efficiency regulations. Therefore, the project would not result in wasteful or unnecessary energy consumption during construction and operation or conflict with existing energy standards and regulations, and would be consistent with the BAAQMD building thresholds.

Although BAAQMD does not have numeric thresholds for GHG emissions under the updated guidelines, the project's emissions inventory is presented for informational purposes. Table 6 shows the estimated construction emissions amortized over 30 years, the anticipated lifespan of the project. Table 7 shows the estimated combined annual GHG emissions associated with the project. As shown in the tables below, the proposed project would generate approximately 176 MT CO_2e per year.

Table 6 Estimated Construction GHG Emissions

Year	Project Emissions (MT/yr CO_2e)
Total	151
Total Amortized over 30 Years	5

See Appendix A for CalEEMod worksheets.

Table 7 Combined Annual Emissions of Greenhouse Gases

Emission Source	Annual Emissions (CO_2e in metric tons)
Construction	5
Operational	
Mobile	169
Area	<1
Energy	2
Water	0
Waste	<1
Stationary	<1
Total	**176**

See Appendix A for CalEEMod worksheets.

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

The Town of Moraga Climate Action Plan (Town of Moraga 2014) includes GHG emissions reductions strategies for the following sectors: land use and transportation, residential energy, commercial energy, solid waste, water and wastewater, and municipal operations. The proposed project would be a utility project and as such, none of the actions listed in the Climate Action Plan would be applicable to the proposed project, and the project would not conflict with the Town of Moraga Climate Action Plan.

In addition, the proposed project would not conflict with the 2022 BAAQMD *CEQA Guidelines* because it contains project design features that are consistent with BAAQMD significance criteria, as detailed under Impact a. Therefore, the proposed project would not conflict with applicable plans or regulations, and impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

9 Hazards and Hazardous Materials

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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 0.25 mile of an existing or proposed school?	☐	☐	☐	■
d. Be located on a site that is included on a list of hazardous material 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 in 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?	☐	☐	■	☐

Regulatory Setting

Department of Toxic Substances Control

As a department of CalEPA, the Department of Toxic Substances Control (DTSC) regulates hazardous waste, cleans up existing contamination, and looks for ways to reduce the hazardous waste produced in California. DTSC regulates hazardous waste in California primarily under the authority of the Resource Conservation and Recovery Act (RCRA) and the California Health and Safety Code.

DTSC also administers the California Hazardous Waste Control Law (HWCL) to regulate hazardous wastes. While the HWCL is generally more stringent than RCRA, until the USEPA approves the California program, both state and federal laws apply in California. The HWCL lists 791 chemicals and approximately 300 common materials that may be hazardous; establishes criteria for identifying, packaging, and labeling hazardous wastes; prescribes management controls; establishes permit requirements for treatment, storage, disposal, and transportation; and identifies some wastes that cannot be disposed of in landfills.

Government Code Section 65962.5 requires the DTSC, the State Department of Health Services, SWRCB, and the California Department of Resources Recycling and Recovery (CalRecycle) compile and annually update lists of hazardous waste sites and land designated as hazardous waste sites throughout the state. The Secretary for Environmental Protection consolidates the information submitted by these agencies and distributes it to each city and county where sites on the lists are located. Before the lead agency accepts an application for any development project as complete, the applicant must consult these lists to determine if the site at issue is included.

If any soil is excavated from a site containing hazardous materials, it is considered a hazardous waste if it exceeds specific criteria in Title 22 of the CCR. Remediation of hazardous wastes found at a site may be required if excavation of these materials is performed, or if certain other soil disturbing activities would occur. Even if soil or groundwater at a contaminated site does not have the characteristics required to be defined as hazardous waste, remediation of the site may be required by regulatory agencies subject to jurisdictional authority. Cleanup requirements are determined on a case-by-case basis by the agency taking jurisdiction.

Regional Water Quality Control Board

The Regional Water Quality Control Board (RWQCB) regulates discharges and releases to surface and groundwater in the project area. The RWQCB generally oversees cases involving groundwater contamination. The Contra Costa Health Services Hazardous Materials Programs handles most leaking underground storage tank cases, so the RWQCB may oversee cases involving other groundwater contaminants, i.e., Spills, Leaks, Incidents, and Clean-up cases. In the case of spills at a project site, the responsible party would notify the County of Contra Costa, RWQCB, or DTSC and a lead would be determined.

RWQCB has established guidelines used to evaluate the potential risk associated with chemicals found in soil or groundwater where a release of hazardous materials has occurred called Environmental Screening Levels (ESLs). ESLs were developed to expedite the identification and evaluation of potential environmental concerns at contaminated sites. ESLs address soil, groundwater, soil gas, and indoor air and cover a range of concerns (e.g., impacts to drinking water, aquatic habitat, and vapor intrusion).

Contra Costa Health Services Hazardous Materials Programs

The Contra Costa Health Services Hazardous Materials Programs is designated as the Town's Certified Unified Program Agency (CUPA), which is overseen by the California Environmental Protection Agency and coordinates the regulation of hazardous materials and hazardous wastes in the Town. CUPA ensures the consistent application of statewide standards during administrative, permitting, inspection, and enforcement activities associated with hazardous materials and hazardous wastes. If a business operated at the project site would use and store hazardous materials and generate hazardous wastes, CUPA would require the electronic submittal of chemical and facility information, a Hazardous Materials Business Plan, and hazardous waste generator permits to the California Environmental Reporting System online database. If operations at the project site would include the treatment, storage, and/or disposal of hazardous waste, the Contra Costa Health Services Hazardous Materials Programs would regulate these activities under a tiered permitting system.

CUPA, through the Hazardous Materials Office, regulates USTs containing hazardous materials, including installation, operation and maintenance, temporary closure, and removal and disposal of USTs. Additionally, CUPA holds the responsibility and authority to implement the Aboveground Petroleum Storage Act, which regulates aboveground petroleum storage tanks through administrative requirements, permitting, inspections, and enforcement. Any aboveground or underground storage tanks present at the project site would be managed by the Contra Costa Health Services Hazardous Materials Programs.

The Contra Costa Health Services Hazardous Materials Programs also administers the California Accidental Release Prevention (CalARP) Program, which aims to reduce the likelihood and impact of accidental releases of regulated toxic and flammable substances through administrative and operational procedures, and facility inspections. If the facility located on the project site would be regulated under the CalARP Program, the facility would file a written Risk Management Plan with the Contra Costa Health Services Hazardous Materials Programs.

Impact Analysis

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

b. *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?*

Construction

Project construction may include the temporary transport, storage, use, or disposal of potentially hazardous materials including fuels, lubricating fluids, cleaners, solvents, or contaminated soils. If spilled, these substances could pose a risk to the environment and to human health. However, the transport, storage, use, or disposal of hazardous materials is subject to various federal, state, and local regulations designed to reduce risks associated with hazardous materials, including potential risks associated with upset or accident conditions. Hazardous materials would be required to be transported under U.S. Department of Transportation (USDOT) regulations (USDOT Hazardous Materials Transport Act, 49 Code of Federal Regulations), which stipulate the types of containers, labeling, and other restrictions to be used in the movement of such material on interstate highways. In addition, the use, storage, and disposal of hazardous materials are regulated through the RCRA.

DTSC is responsible for implementing the RCRA program, as well as California's own hazardous waste laws. DTSC regulates hazardous waste, cleans up existing contamination, and looks for ways to control and reduce the hazardous waste produced in California. It does this primarily under the authority of RCRA and in accordance with the HWCL (California H&SC Division 20, Chapter 6.5) and the Hazardous Waste Control Regulations (Title 22, California Code of Regulations, Divisions 4 and 4.5). DTSC also oversees permitting, inspection, compliance, and corrective action programs to ensure that hazardous waste managers follow federal and state requirements and other laws that affect hazardous waste specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning. Compliance with existing regulations would reduce the risk of potential release of hazardous materials during construction. Impacts would be less than significant.

Operation

Wireless facilities and access roads typically do not use or store large quantities of hazardous materials other than those typically used for maintenance and landscaping. Therefore, project operation would not involve the use, storage, transportation, or disposal of substantial quantities of hazardous materials and would not result in the release of such materials into the environment. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?

The nearest school to the project site is Camino Pablo Elementary School, located approximately 0.4 miles southwest of the project site. There are no schools within 0.25 mile of the project site, and project operation would not involve the use or storage of hazardous materials. The project would not result in impacts on hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school.

NO IMPACT

d. Would the project be located on a site that is included on a list of hazardous material 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?

The following resources were reviewed to determine if hazardous materials may be present at the project site.

- **Department of Toxic Substances Control (DTSC)**
  - Online Cortese List of Hazardous Waste and Substances Sites (DTSC 2023)
- **California State Water Resources Control Board (SWRCB)**
  - Online GeoTracker database search for leaking underground storage tanks (LUST) and other cleanup sites (SWRCB 2023a)
  - Polyfluoroalkyl substances (PFAS) Investigation online Public Map Viewer (SWRCB 2022b)
- **California Department of Conservation Geologic Energy Management Division (CalGEM)**
  - Online Mapping System (CalGEM 2023)
- **U.S. Department of Transportation (USDOT)**
  - National Pipeline Mapping System (NPMS) online Public Map Viewer (USDOT 2023)

- **California Department of Resources Recycling and Recovery (CalRecycle)**
  - Solid Waste Information System (SWIS) (CalRecycle 2019)

DTSC Database Review

A review of the online Cortese List of Hazardous Waste and Substances Sites determined that the project site is not listed as a hazardous waste and substances site. Additionally, there are no listed hazardous waste and substance sites within 1,000 feet of the project site (DTSC 2023).

SWRCB GeoTracker Database Review

A review of the online GeoTracker database determined that the project site is not listed as a hazardous waste and substances site. Additionally, there are no sites listed in the GeoTracker Database within 1,000 feet of the project site (SWRCB 2023a).

PFAS Database Review

Beginning in 2019, the California SWRCB sent assessment requirements to property owners of sites that may be potential sources of PFAS. These sites currently include select landfills, airports, chrome plating facilities, publicly owned treatment works facilities, Department of Defense (DoD) sites, and bulk fuel storage terminals and refineries. According to the SWRCB, "PFAS are a large group of human-made substances that do not occur naturally in the environment and are resistant to heat, water, and oil" (SWRCB 2021). A review conducted on July 24, 2023 of the California Statewide PFAS Investigation online Public Map Viewer indicates that there are no current chrome plating, airport, landfill, publicly owned treatment works, DoD, or bulk fuel storage terminal or refinery PFAS orders at any facilities listed as located within one-half mile of the project site (SWRCB 2023b).

Well Finder Database Review

A review of the CalGEM Online Mapping System indicates that no oil wells are located on the project site, adjacent properties, or within 0.25 mile of the project site (CalGEM 2023).

Pipeline Database Review

The NPMS online Public Map Viewer indicates that one Pacific Gas and Electric Company-operated natural gas pipeline with an active status is located along St Mary's Road, approximately 1 mile north of the project site. Another Pacific Gas and Electric Company-operated natural gas pipeline with an active status is located along Moraga Way, approximately 1.5-mile northwest of the project site. The NPMS Viewer does not depict an accident or incident along either pipeline (USDOT 2023).

Landfill Database Review

The SWIS online database indicates that no landfills are located within one-half mile of the project site (CalRecycle 2019).

Review Summary

The project site is not specifically listed as a DTSC Cortese hazardous material site compiled pursuant to Government Code Section 65962.5. Based on the database research conducted, the project site is not within one-half mile of a facility that could be a potential source of PFAS or a well containing PFOA or PFOS. Additionally, there are no oil wells, landfills, or pipelines with reported instances within 0.25 mile of the site. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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?

The project site is approximately 9.5 miles northeast of Oakland International Airport. The project site would not be located within the noise or safety compatibility zones of Oakland International Airport (Alameda County Community Development Agency 2010). Therefore, the project would not result in a safety hazard or excessive noise for people working in the project area. Impacts would be less than significant.

NO IMPACT

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

Construction of the proposed project would occur within the boundary of the project site and would not lead to street closures which would interfere with emergency evacuations or response. Construction activities for the installation of the fiber vaults and fiber route would be limited to use of vehicles and equipment along Sanders Ranch Road. The proposed project does not involve the development of structures that could potentially impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, including the Contra Costa County Hazard Mitigation Plan (Contra Costa County 2018). The project would not result in physical changes to nearby roadways that would interfere or impair emergency response or evacuation. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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

Construction activities associated with the project may have the potential to result in activation of wildfires from sources such as welders, excavators, gasoline-powered equipment, and vehicles. The proposed project would be required to comply with the current California Fire Code during construction and operation of the proposed project to reduce potential impacts related to wildfire. In addition, the proposed water storage tank would serve as a safety feature intended to reduce potential impacts related to wildfire. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

10 Hydrology and Water Quality

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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 substantially 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 erosion or siltation on- or off-site;	☐	☐	■	☐
(ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;	☐	☐	■	☐
(iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	■	☐
(iv) Impede or redirect flood flows?	☐	☐	■	☐
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	■	☐
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	■	☐

Regulatory Setting

Clean Water Act

The Federal CWA, enacted by Congress in 1972 and amended several times since, is the primary federal law regulating water quality in the United States. The Act established the basic structure for regulating discharges of pollutants into the waters of the United States. The CWA gave the USEPA authority to implement federal pollution control programs, such as setting water quality standards for contaminants in surface water, establishing wastewater and effluent discharge limits for various contaminants in surface water, and imposing requirements for controlling nonpoint-source pollution. At the federal level, the Clean Water Act is administered by the USEPA and USACE. At the State and regional levels in California, the Act is administered and enforced by the SWRCB and the nine regional water quality control boards. The SFRWQCB is the CWA enforcement agency for Contra Costa County.

Town of Moraga Municipal Ordinances

Moraga Municipal Code Chapter 13.04 is related to stormwater management and discharge control, whereby the Town complies with provisions of the Porter-Cologne Water Quality Control Act and the Federal Clean Water Act, as well as conditions of the Town’s NPDES permit. Section 13.04.050 sets out the guidelines for preparation and implementation of a stormwater control plan for development projects that are subject to development runoff requirements. Section 13.04.060 lists prohibited discharge including non-stormwater discharges into the stormwater system and discharges that violate the NPDES permit. Section 13.04.090 lays out best management practices and standards such as proper maintenance of sidewalks, landscaped areas, parking lots, and paved areas. Construction activities are mandated to incorporate site-specific BMPs, which can be a combination of BMPs from the California BMP Handbook (January 2003), the Caltrans Stormwater Quality Handbooks, Construction Site Best Management Practices Manual (March 2003), the SFRWQCB Erosion and Sediment Control Field Manual (2002), and the Town's grading and erosion control ordinance (Moraga Municipal Code Chapter 14.04).

Impact Analysis

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

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

Construction

Project construction would involve ground-disturbing activities and use of heavy construction equipment. Grading and other construction activities associated with the project would have the potential to cause soil erosion and increase sediment loads in stormwater runoff resulting from exposed or disturbed soil. Additionally, spills, leakage, or improper handling and storage of substances such as oils, fuels, chemicals, metals, and other substances used during various construction phases could be collected in stormwater runoff and impact water quality of receiving water bodies. To minimize these impacts, the project would be required to comply with MMC Title 13, which details requirements for erosion and sediment control plans, and which regulates discharge of materials into curbside gutters, storm sewers, and storm drains. The project would be required to implement BMPs for drainage and erosion control during construction and meet requirements for stormwater and sewer discharge. Compliance with state and local requirements would reduce impacts to surface and ground water quality to less than significant levels.

Operation

The 361 square-foot concrete pad proposed to support ancillary facilities of the proposed project would increase impervious surfaces on the project site. However, the increase in runoff from increased impervious surfaces would be minimal and would likely percolate into the surrounding pervious area of the project site. Installation of new fiber vaults and fiber route would be located underground on Sanders Ranch Road would not introduce new impervious surfaces and would not result in additional runoff. Therefore, project operation would not substantially interfere with groundwater recharge, impact groundwater quality, or impede sustainable groundwater management. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

c.(i) 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 erosion or siltation on- or off-site?

c.(ii) 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 off-site?

c.(iii) 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 that 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?

c.(iv) 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 nearest creek to the project site is Moraga Creek, located approximately 0.3-mile southeast of the project site. There is existing residential development and roadways located between the project site and Moraga Creek. Project construction would not alter the course of these creeks or other nearby creeks, streams, or rivers.

Ground disturbing activities, such as grading, could temporarily affect the potential for erosion during construction. The project would result in a minimal increase in impervious surfaces on the project site. Implementation of BMPs, stormwater control measures, and NPDES permit requirements would reduce the amount of runoff that could enter the storm drain system compared to existing conditions and the project would not result in impeded flood flows. Furthermore, the proposed project would be subject to Chapter 14.48 of the MMC which requires compliance with recommendations for drainage and erosion control made within a Town-approved geotechnical report.

The addition of the proposed access road would require grading of the project site. However, the access road would be a dirt road layered with gravel and would not introduce new impervious surface areas. The gravel access road would continue to allow stormwater to percolate back into the ground and would not substantially increase the amount of runoff that could enter the storm drain system. The addition of the gravel access road would not result in impeded flood flows as it would generally maintain the existing flood flow pathways. Installation of new fiber vaults and fiber route would be located underground on Sanders Ranch Road would not introduce new impervious surfaces and would not result in impeded flood flows. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

d. In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map, the project site is located in Zone X, which is characterized as an area of minimal flood hazard and having a less than 0.2 percent annual chance to be inundated by flood waters as a result of a storm event (Map #06013C0428F, June 16, 2009) (FEMA 2023). According to the California Governor's Office of Emergency Services (Cal OES) MyHazards online database, the project site is not located in a 100-year floodplain (Cal OES 2015).

The project site is located approximately 10 miles east of the San Francisco Bay and is not located in a tsunami or seiche zone, as shown in the Alameda County Tsunami Hazard Areas maps produced by the California Department of Conservation (DOC) (DOC 2023). The nearest body of water that could experience seiche (water level oscillations in an enclosed or partially enclosed body of water) is the San Francisco Bay. No other large bodies of water with the potential to inundate the project site by a seiche are located near the site. Therefore, the proposed project would not result in the risk of release of pollutants due to inundation by a tsunami, seiche, or flooding. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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

The proposed project would not require or result in groundwater extraction activities. The addition of impervious surfaces to the project site would not be substantial and the minimal increase in runoff from these surfaces would percolate back into the soils surrounding the project site. As discussed above, operational water use would be limited to firefighting uses and would draw water from the proposed on-site water tank. Installation of new fiber vaults and fiber route would be located underground on Sanders Ranch Road would not require groundwater or impede recharge. Further, should the project require water from EBMUD resources, EBMUD does not rely on groundwater sources (EBMUD 2021). Therefore, project implementation would not conflict with a sustainable groundwater management plan. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

11 Land Use and Planning

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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. Would the project physically divide an established community?

The project would involve development of an existing site and additions to an existing PG&E tower. It would also include the construction of a new access road from Sanders Ranch Road. The access road circulation would be limited to the internal project site. The project site is and would continue to be accessible by Sanders Ranch Road. Installation of new fiber vaults and fiber route would be located underground on Sanders Ranch Road and would not physically divide an established community. The Old Moraga Ranch Trail would not be obstructed or substantially rerouted. No new roads, linear infrastructure, or other development features are proposed that would divide an established community or limit movement, travel, or social interaction between established land uses. Project construction would not physically divide an established community; there would be no impact to established communities. The proposed project would have no impact.

NO IMPACT

b. 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?

The Town's General Plan includes numerous policies, many of which do not pertain to environmental resources. The policies address a variety of topics, including biological resources, air quality and greenhouse gas reduction, open space, energy resources and efficiency, mineral resources, hydrology and water quality, water conservation, paleontological resources, and scenic resources. A discussion of the project's consistency with applicable General Plan policies is provided in Table 8.

Moraga General Plan

The Town's General Plan contains policies with the purpose of avoiding or mitigating an environmental effect. Table 8 shows applicable General Plan policies that aim to avoid or mitigate environmental effects and the project's consistency with those policies.

Table 8 Project Consistency with Moraga General Plan Policies

General Plan Policy	Project Consistency
Policy CD1.7. Wireless Communication Facilities. Regulate the location and design of wireless communications facilities, satellite dishes and other miscellaneous antennas in accordance with the Town's Ordinance No. 176 and the Federal Communications Act.	**Consistent.** The proposed project would be required to comply with Federal Communications Act regulations for the design and development of the proposed project. Additionally, the proposed project would build upon an already existing utility tower that has been previously approved by the Town and would not introduce a new feature to the area.
Policy CD8.9. Roads Crossing Ridgeline. The Town may allow roads to cross a designated Major MOSO Ridgeline, Minor MOSO Ridgeline, or Significant Non-MOSO Ridgeline only if the crossing is necessary for the orderly development of the Town and the crossing complies with all applicable requirements in Municipal Code Section 8.128.060.A (Crossing Ridgeline Allowed).	**Consistent.** The project would include the development of an access road to the project site within a minor MOSO ridgeline. The development of the access road is necessary to provide access to the wireless communication facility which would allow for safety access for the Moraga Orinda Fire District, and maintenance access to the project site, which would serve the goal of providing adequate cell service to residents in the area. The crossing would comply with Municipal Code Section 8.128.060.A as detailed below.
Policy OS1.5. Development on Slopes and Ridgelines in Open Space Lands. In MOSO Open Space, development shall be prohibited on slopes with grades of twenty percent (20%) or greater and on the crests of minor ridgelines. The Town Council shall reduce the allowable densities on slopes of less than twenty percent (20%) through appropriate means such as requiring proportionally larger lot sizes or other appropriate siting limitations. For the purposes of this paragraph the term 'minor ridgeline' means any ridgeline, including lateral ridges, with an elevation greater than 800 feet above mean sea level, other than a major ridgeline.	**Consistent.** No new lots are being created. The project would not result in additional density on an area with a slope of twenty percent or greater.
Policy OS2.1. **Protection of Wildlife Areas.** Prohibit development in locations where it will have a significantly adverse effect on wildlife areas. When development is permitted in the vicinity of wildlife areas, require implementation of appropriate mitigation measures to reduce any adverse impact upon the wildlife.	**Consistent.** As discussed in Section 4, *Biological Resources, t*he site does not contain riparian habitat and is not located within a known regional wildlife movement corridor or other sensitive biological area as indicated by the USFWS Critical Habitat portal (Appendix C).
Policy PS4.2. Development Review for Geologic Hazards. Require development proposals to address geologic hazards, including but not limited to landslide, surface instability, erosion, shrink-swell (expansiveness) and seismically active faults. Technical reports addressing the geologic hazards of the site shall be prepared by an independent licensed soil engineer, geologist and/or structural engineer, approved by the Town and at the expense of the developer. All technical reports shall be reviewed by the Town and found to be complete prior to approval of a development plan.	**Consistent.** The project applicant has contracted with Kranzan & Associates, Inc. to provide a Geotechnical Investigation of the project site. The Geotechnical Investigation is included as Appendix E to this document.

Source: Town of Moraga 2002

As shown above, the project would be consistent with applicable General Plan policies that aim to avoid or mitigate environmental effects.

Moraga Municipal Code

The MMC contains regulations that intend to avoid or mitigate environmental effects in the Town. Table 9 shows policies that aim to avoid or mitigate environmental effects and the project's consistency with those regulations.

Table 9 Project Consistency with the MMC

Moraga Municipal Code	Project Consistency
Section 8.128.060.A. Municipal Code Section 8.128.060.A contains standards and requirements for the development of roads that would cross a MOSO ridgelines: A. **Crossing Ridgeline Allowed.** 1. The planning commission may allow a road, together with attendant underground utilities, to cross a major MOSO ridgeline, a minor MOSO ridgeline, or a significant non-MOSO ridgeline upon finding that the crossing is necessary for the orderly development of the town, the road complies with all applicable requirements of Section 8.128.060, and it does not otherwise conflict with the Municipal Code. 2. For major MOSO ridgelines and significant non-MOSO ridgelines, a road may be located within the horizontal ridgeline buffer for only the minimum distance necessary to cross the ridgeline. 3. For minor MOSO ridgelines, a road may be located within two hundred (200) feet of the crest of the ridgeline for only the minimum distance necessary to cross the ridgeline. 4. Roads crossing a ridgeline, where allowed, shall comply with the following standards: a. Roads shall be located and designed to minimize visibility when viewed from a road or other public place; and b. On-street parking is prohibited on roads within the horizontal ridgeline buffer for major MOSO and significant non-MOSO ridgeline and within two hundred (200) feet of a minor MOSO ridgeline. The road shall be designed with the minimum width necessary to accommodate only through traffic without parking; and c. Streetlights shall not be permitted on ridgelines; and d. Road placement should minimize glare from vehicle lights visible from public places and nearby homes; and e. All utilities shall be undergrounded with cost to be borne by the project developer. 5. A "road" means any public or private thoroughfare constructed of any material approved by the town that provides permanent vehicle access to abutting property or a public right-of-way. Roads may include associated and parallel pedestrian pathways, bicycle lanes or paths, sidewalks, single-use or multi-use trails, and on-street parallel parking spaces, that are an integral part of or directly adjacent to a road approved by the town consistent with this section. 6. A road is considered to "cross a ridgeline" if it rises in elevation on one side of a ridgeline, extends over the ridgeline crest, and then descends down the hillside on the opposite side of the ridgeline.	**Consistent.** The proposed access road would be necessary for the orderly development of the town inasmuch as it would facilitate cell service in the area, which would contribute to public safety and convenience. The proposed access road would cross the minor MOSO ridgeline briefly, and travel along the ridgeline would be limited such that minimal disturbance to the ridgeline would occur consistent with the provisions of the MMC. At the ridgeline, the access road would be visible from some roads and properties within the Sanders Ranch Subdivisions and the Old Moraga Ranch Trail. The views from within the Sanders Ranch subdivision are anticipated to be substantially obscured by topography and vegetation, as the grasses and other vegetation grow high enough to obscure views of the road, and the road will be at a much higher elevation than where the subdivision homes and roads are located, The road is not a structure that would substantially alter the visual environment, and views of it from the Old Moraga Ranch Trail would be limited to the time that it would take a pedestrian to walk through the portion of trail and briefly view where it crosses the minor ridgeline. Surrounding hillsides and ridgelines would continue to obstruct views of the proposed access road from the rest of the trail. Parking along the access road would be prohibited. Parking at the project site would be temporary and would occur as part of maintenance activities. No streetlights would be installed. Access to the road would be restricted to maintenance and emergency vehicles. The project's access road would comply with the requirements of Section R4 (Roads and Sidewalks) in the town design guidelines, as applicable.

Moraga Municipal Code	Project Consistency
B. **Design Guidelines.** Any road crossing a ridgeline shall comply with the design guidelines for roads in Section R4 (Roads and Sidewalks) in the town design guidelines.	
Section 8.144.030. Section 8.144.030 contains general development standards for wireless communication facilities.	**Consistent.** The proposed project would build upon an existing utility tower.. The additions to the project site would be consistent with development standards as set forth by the MMC
Section 8.144.060. Section 8.144.060 contains development standards for wireless communication facilities within open space and open space MOSO district.	**Consistent.** The proposed project would build upon an existing utility tower.. The additions to the project site would be consistent with development standards as set forth by the MMC

Source: MMC 2023

As shown above, the project would be consistent with the MMC and applicable building codes that intend to avoid or mitigate environmental effects.

The project would not conflict with the Town's General Plan or Municipal Code and would be consistent with the applicable land use designation and zoning district and development standards. Therefore, with implementation of mitigation measures AQ-1, BIO-1, CR-1, GEO-1, GEO-2, and TCR-1 identified within this IS-MND, impacts would be less than significant.

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED

12 Mineral Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	■
b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	■

Regulatory Setting

Surface Mining and Reclamation Act of 1975

Pursuant to the mandate of the Surface Mining and Reclamation Act of 1975, the State Mining and Geology Board requires all cities to incorporate into their general plans mapped mineral resources designations approved by the State Mining and Geology Board.

Impact Analysis

a. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

b. Would the project 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?

According to mapping completed by the State of California for suitability of use as construction materials, it was determined that no minerals or aggregate resources of statewide importance are located within Moraga (California Department of Conservation 1996). In addition, there are no natural gas, oil, or geothermal resources identified in or adjacent to Moraga. The project site and surrounding properties are categorized as urban land or grazing land and do not have current oil or gas extraction. No mineral resource activities would be altered or displaced by the proposed project. There would be no impact.

NO IMPACT

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13 Noise

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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?	☐	☐	☐	■

Overview of Noise and Vibration

Noise

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (Caltrans 2020a).

HUMAN PERCEPTION OF SOUND

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response. Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; dividing the energy in half would result in a 3 dB decrease (Caltrans 2020a).

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not “sound twice as loud” as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease (i.e., twice the sound energy); that a change of 5 dBA is readily perceptible (8 times the sound energy); and that an increase (or decrease) of 10 dBA sounds twice (half) as loud (10.5 times the sound energy) (Caltrans 2020a).

SOUND PROPAGATION AND SHIELDING

Sound changes in both level and frequency spectrum as it travels from the source to the receiver. The most obvious change is the decrease in the noise level as the distance from the source increases. The manner by which noise reduces with distance depends on factors such as the type of sources (e.g., point or line), the path the sound will travel, site conditions, and obstructions.

Sound levels are described as either a “sound power level” or a “sound pressure level,” which are two distinct characteristics of sound. Both share the same unit of measurement, the dB. However, sound power (expressed as L_{pw}) is the energy converted into sound by the source. As sound energy travels through the air, it creates a sound wave that exerts pressure on receivers, such as an eardrum or microphone, which is the sound pressure level. Sound measurement instruments only measure sound pressure, and noise level limits are typically expressed as sound pressure levels.

Noise levels from a point source (e.g., construction, industrial machinery, air conditioning units) typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance. Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2020a). Noise levels may also be reduced by intervening structures; the amount of attenuation provided by this “shielding” depends on the size of the object and the frequencies of the noise levels. Natural terrain features, such as hills and dense woods, and man-made features, such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2011). Structures can substantially reduce exposure to noise as well. The FHWA’s guidance indicates that modern building construction generally provides an exterior-to-interior noise level reduction of 10 dBA with open windows and an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows (FHWA 2011).

DESCRIPTORS

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important factors of project noise impact. Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed. The noise descriptors used for this study are the equivalent noise level (L_{eq}), day-night average level (L_{dn}), and the community noise equivalent level (CNEL).

L_{eq} is one of the most frequently used noise metrics; it considers both duration and sound power level. The L_{eq} is defined as the single steady-state A-weighted sound level equal to the average sound energy over a time period. When no time period is specified, a one-hour period is assumed. The L_{max} is the highest noise level within the sampling period, and the L_{min} is the lowest noise level within the measuring period. Normal conversational levels are in the 60 to 65-dBA L_{eq} range; ambient noise levels greater than 65 dBA L_{eq} can interrupt conversations (Federal Transit Administration [FTA] 2018).

Groundborne Vibration

Groundborne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent buildings or structures and vibration energy may propagate through the buildings or structures. Vibration may be felt, may manifest as an audible low-frequency rumbling noise (referred to as groundborne noise), and may cause windows, items on shelves, and pictures on walls to rattle. Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern from vibration is that it can be intrusive and annoying to building occupants at vibration-sensitive land uses and may cause structural damage.

Typically, groundborne vibration generated by manmade activities attenuates rapidly as distance from the source of the vibration increases. Vibration amplitudes are usually expressed in peak particle velocity (PPV) or root mean squared (RMS) vibration velocity. The PPV and RMS velocity are normally described in inches per second (in/sec). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used as it corresponds to the stresses that are experienced by buildings (Caltrans 2020b).

The FTA's Transit Noise and Vibration Impact Assessment Manual (FTA 2018) has established standards for vibration impact assessments, which are summarized below in Table 10.

Table 10 Federal Transit Administration Construction Vibration Impact Criteria

Building Category	In./sec. ppv
Reinforced – Concrete, Steel, or Timber (no plaster)	0.5
Engineered Concrete and Masonry (no plaster)	0.3
Non-engineered Timber and Masonry Buildings	0.2
Buildings Extremely Susceptible to Vibration Damage	0.12

Source: FTA 2018

Project Noise Setting

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. Typically, the following land uses are considered noise-sensitive: schools, libraries, hospitals, parks, and residential neighborhoods. The project is located within 75 to 200 feet of the nearest single-family residences and is located 0.4-mile east of the nearest school (Camino Pablo Elementary School).

The existing noise environment of the project site represents a suburban noise environment, which is specified by Caltrans as having a typical noise level of 40 dBA during the nighttime (Caltrans 2013). Actual noise levels may be lower given the adjacent open space and the low-density character of the adjacent subdivision.

Regulatory Setting

Town of Moraga General Plan

The Town of Moraga 2002 General Plan Open Space Element includes policies to support the Goal of "a peaceful and tranquil community (Town of Moraga 2002)." Noise policies include:

Policy OS6.1: Acoustical Standards. Develop acoustical standards that properly reflect acceptable sound emission levels.

Policy OS6.2: Noise Levels. Ensure that noise from all sources is maintained at levels that will not adversely affect adjacent properties or the community, especially during evening and early morning hours. Reasonable exceptions may be made in the interest of public safety.

Policy OS6.3: Noise Sensitive Uses. Locate uses where they will be most acoustically compatible with elements of the man-made and natural environment.

Policy OS6.4: Noise Impacts of New Development. Ensure that new development will not raise noise levels above acceptable levels on the Town's arterials and major local streets.

Policy OS6.5: Acoustical Data with Development Applications. Require the submittal of acoustical data, when and where appropriate, as part of the development application process so that the noise impacts of proposed uses can be properly evaluated and mitigated.

Policy OS6.6: Temporary Noise Sources. Permit temporary noise-generating activities such as construction only for the shortest reasonable duration and in locations that will have the least possible adverse effect.

Policy OS6.7: Vehicle Noise. Require that vehicles, including those used for recreational purposes, be used in such a manner that they will not intrude on the peace and quiet of residential areas. Reasonable exceptions may be made in the interest of public safety.

Policy OS6.8: Public Information on Noise Pollution. Whenever appropriate, use public information programs to educate the public on the value of an environment that is free of noise pollution.

Town of Moraga Municipal Code

Chapter 7.12, Noise Control, of Moraga’s Municipal Code governs noise in the Town. Chapter 7.12.010 declares that it is the Town’s policy to prohibit unnecessary, excessive and annoying noises from all sources since certain noise levels are detrimental to the health and welfare of the Town’s citizens. Moraga Municipal Code Chapter 7.12.060 dictates that it is unlawful for a person to create noise that unreasonably interferes with the workings of or disturbs or unduly annoys a person within a school, hospital, or church. Chapter 7.12.080 states that it is unlawful for a person to operate machinery that disturbs the peace, quiet, and comfort of neighboring residents. Article 3, Chapter 7.12.090 mandates construction shall not occur within 500 feet of a residential zone during the hours of 5:00 p.m. and 8:00 a.m. in such a manner that a reasonable person residing in the area is discomforted or annoyed.

Chapter 7.12.130 establishes standards for determining a noise violation. Those standards include:

- The level of the noise;
- The intensity of the noise;
- Whether the nature of the noise is usual or unusual;
- Whether the origin of the noise is natural or unnatural;
- The level and intensity of the background noise, if any;
- The proximity of the noise to residential sleeping facilities;
- The nature and zoning of the area within which the noise emanates;
- The density of the inhabitation of the area within which the noise emanates;

- The time of the day or night the noise occurs;
- The duration of the noise;
- Whether the noise is recurrent, intermittent or constant; and
- Whether the noise is produced by a commercial or noncommercial activity.

FTA Transit and Noise Vibration Impact Assessment Manual

The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction in their Transit and Noise Vibration Impact Assessment Manual (FTA 2018). For residential, commercial, and industrial uses, the daytime noise threshold is 80 dBA Leq, 85 dBA Leq, and 90 dBA Leq for an 8-hour period, respectively. As the Town of Moraga does not have a quantitative construction noise threshold, the FTA standards are used for this analysis.

a. 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

Construction of the access road would approach as close as 75 feet to the nearest residences to the east and approximately 40 feet to the Old Moraga Ranch Trail to the west, while construction of the project equipment at the tower site would occur as close as 200 feet to the nearest residence to the east and 400 feet to the trail. While the construction near the trail would reach 40 feet at the closest point, the majority of the access road construction would be further than 75 feet, and often several hundred feet away; in addition, any one trail user in this location would be exposed to construction noise for a short duration as they would be walking the trail and as the construction equipment is mobile. Therefore, the 75-foot distance is also used to determine construction noise level exposure to the trail. The applicant indicated that equipment would include a backhoe, compactor, dozer, excavator, skid steer loader, water truck, and hauling truck. Construction noise was estimated using reference noise levels from the FHWA Roadway Construction Noise Model (RCNM). Due to the small size of the project site, all project equipment would not be anticipated to be working simultaneously; a conservative construction scenario was analyzed including simultaneous operation of a dozer, excavator, and a backhoe. At 75 feet, a dozer, excavator, and a backhoe would generate a noise level of 78 dBA L_{eq}. This would be below the FTA's 80 dBA L_{eq} threshold for residential uses. In addition, project construction would comply with the hours stated in Moraga Municipal Code Chapter 7.12.090. Therefore, impacts from construction equipment would be less than significant.

Onsite Operation Noise

A Noise Assessment Letter was completed by Waterford Consultants (Appendix F). The letter identified the project's operational noise sources as an emergency generator and a heat exchanger. The generator would result in a noise level of 65 dBA at 23 feet, and the heat exchanger would generate a noise level of 65 dBA at 5 feet. The distance from the generator and heat exchanger to the nearest residential property was analyzed at 226 feet and 230 feet, respectively. This is the distance where the project equipment is located; the 75-foot distance used for the construction analysis above is for construction of the access road. Outside of emergencies, the generator would only be used occasionally for testing and maintenance.

The letter identified the Town of Moraga's exterior noise limits as noise that is sustained over a five-minute period shall not exceed the 55 dBA during daytime hours and 50 dBA during nighttime hours (beginning one hour after sunset) inside of a residence with all windows and doors closed. The combined noise level of both sources operating simultaneously was determined to be 35.7 dBA at the nearest residence, which would not exceed the 55 dBA noise limit during daytime hours and 50 dBA noise limit during nighttime hours. Further, the 35.7 dBA noise level would only be met when both sources are operating, which will not be a standard occurrence as the emergency generator will not typically be operational. The project noise levels of 35.7 dBA would also be below the typical quiet suburban environment of approximately 40 dBA. In addition, the Old Moraga Ranch Trail is located 400 feet to the west of the proposed equipment and would be exposed to noise levels of approximately 31 dBA if both the generator and heat exchanger are running, which are also below Town noise limits and typical ambient levels. Installation of new fiber vaults and fiber route would be located underground on Sanders Ranch Road and would not introduce new sources of noise. Impacts would be less than significant.

Offsite Roadway Noise

Typically, a doubling of traffic would result in a 3 dBA increase, which is considered a barely perceptible noise increase. The project would require infrequent maintenance trips and would result in a negligible addition to traffic on nearby roadways that would not result in a doubling of traffic. Traffic noise increases from the project would be less than 3 dBA, and impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

b. *Would the project result in generation of excessive groundborne vibration or groundborne noise levels?*

Project construction would not involve activities typically associated with excessive groundborne vibration such as pile driving or blasting. The greatest anticipated source of vibration during general project construction activities would be from a dozer, which may be used within 75 feet of the nearest residential structure during construction of the access road. A dozer creates a vibration level of approximately 0.089 in/sec PPV at a distance of 25 feet. At the distance of 75 feet, vibration levels would attenuate to 0.027 in/sec PPV, which is lower than the FTA threshold of 0.2 in/sec PPV. Therefore, temporary impacts associated with construction would be less than significant. The project does not include any substantial vibration sources associated with operation. Operational vibration impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

c. *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*

The Oakland International Airport is the nearest public airport, located approximately nine miles to the southwest of the project site. Due to the distance from the airport, the project would not be exposed to excessive aircraft noise levels. No substantial noise exposure from airport noise would occur to construction workers or employees of the project, and no impacts would occur.

NO IMPACT

14 Population and Housing

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., 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. 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 project would involve additions to an existing utility structure, construction of associated facilities, construction of a new access road; and installation of fiber vaults and a fiber route; it would not involve the construction of new dwelling units or other active uses and would therefore not directly induce population growth in the Town. The project would improve communication coverage in the area; however, improved communication coverage would not result in substantial population growth. The project could facilitate the creation of temporary jobs during construction and operation; however, it can reasonably be assumed that workers on the project site would likely come from the existing workforce in the area and would not contribute to population growth. Since the proposed project would not result in substantial unplanned population growth, impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

b. Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

The project site is currently undeveloped with the exception of an existing PG&E tower and does not provide housing. The project would not displace existing people or housing and would not necessitate the construction of replacement housing elsewhere. There would be no impact.

NO IMPACT

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15 Public Services

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the 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:				
1 Fire protection?	☐	☐	■	☐
2 Police protection?	☐	☐	■	☐
3 Schools?	☐	☐	■	☐
4 Parks?	☐	☐	■	☐
5 Other public facilities?	☐	☐	■	☐

Impact Analysis

a.1. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities, or the need for new or physically altered fire protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives?

The Moraga-Orinda Fire District (MOFD) provides fire protection and emergency medical services in Moraga. This service area represents 42 square miles and approximately 38,500 residents (MOFD 2021a). The MOFD operates five fire stations including four paramedic engine companies, one paramedic truck company, three paramedic ambulances (two cross-staffed), and one Battalion Chief. MOFD is an “all-risk” fire service agency with 68 regular employees, 30 volunteers, and 5 Board of Directors members.

Fire Station 41 located at 1284 Moraga Way is located approximately 1.3 miles northwest of the project site. Fire Station 41 is staffed with five firefighters and equipment includes a fire engine, type 3 wildland fire engine and Leader ALS ambulance. The project would be required to comply with all applicable fire code standards. In addition, the project site is within the MOFD service area. The project would be required to meet all Office of Energy Infrastructure Safety requirements. While the project would introduce a generator to the project site, use of the generator would be temporary and would occur in the event that power is not available through PG&E. Installation of new fiber vaults and fiber route would be located underground on Sanders Ranch Road and would not generate the need for increased levels of fire department response. The project would not increase population in the area nor introduce structures or uses which could generate the need for substantially increased levels of fire department response or facilities. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.2. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered police protection facilities, or the need for new or physically altered police protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives?

The Moraga Police Department (MPD) provides police services to the Town of Moraga. Police headquarters are located at 329 Rheem Boulevard. The MPD is currently authorized for 13 sworn officers, additional volunteer reserve officers and police cadets, and two civilian positions (Town of Moraga 2022). Sworn personnel include a Chief of Police, Lieutenant, Detective, Corporals, and Patrol Officers. Civilian positions include a Support Services Coordinator and Police Services Technician.

The police headquarters are located at 329 Rheem Boulevard, located approximately 5 miles north of the project site. The project would not introduce a new population and no habitable structures would be constructed on the site. Therefore, the project would not increase population in the area nor introduce structures which could generate the need for increased levels of police response or facilities. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.3. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered schools, or the need for new or physically altered schools, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives?

The project would not involve construction of residences and would not increase population in the area. The number of school-aged children would not increase as a result of the project and as such, would not result in the need for new or physically altered school facilities. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.4. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered parks, or the need for new or physically altered parks, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives?

As discussed above within the *Project Description*, an easement for the Old Moraga Ranch Trail is located within the project site. The mapped easement for Old Moraga Ranch trail briefly runs along the proposed access road, north of the tower. However, during multiple site visits conducted by Rincon and the Town, it was determined that the actual trail has diverged from the original easement and is now located parallel to the project site, as shown in Figure 2. Furthermore, as discussed in Section 14, *Population and Housing*, the proposed project would not result in substantial population growth which would result in substantial new uses on existing parks and trails within Moraga. The proposed changes to the portions of the trail that would be affected by the project are analyzed throughout this Initial Study, as construction of the access road is part of the proposed project. Therefore, the proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered parks, or the need for new or physically altered parks, the construction of which could cause significant environmental impacts. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.5. Would the project result in substantial adverse physical impacts associated with the provision of other new or physically altered public facilities, or the need for other new or physically altered public facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives?

As discussed in Section 14, *Population and Housing*, the proposed project would not result in substantial population growth in Moraga or growth beyond that anticipated in the Town's General Plan as it would not increase the development on the site or induce of facilitate population growth. As discussed in Section 10, *Hydrology and Water Quality,* impacts related to stormwater facilities would be less than significant. As discussed in Section 19, *Utilities and Service Systems,* impacts related to water and wastewater water facilities would be less than significant. Therefore, demand for other public facilities, such as libraries, would not be substantial or require the modification or construction of libraries or other public facilities. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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16 Recreation

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

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?*

The Moraga Parks and Recreation Department administers recreation centers and maintains parks within town limits. The Town is responsible for the management of 307 acres of existing parkland, including 57.5 acres of developed parks and 250 acres of preserved natural areas (Town of Moraga 2007). The Town operates a number of recreational facilities including picnic areas, volleyball courts, basketball courts, playgrounds, an amphitheater, a skate park, and about two miles of pedestrian and multi-use trails. The East Bay Regional Park District administers the 7.65 mile Lafayette-Moraga Regional Trail which parallels St. Mary’s Road and is intended for hiking, bicycling, and equestrian use (EBRPD 2022). A portion of the Old Moraga Ranch Trail is located adjacent to the project site.

As described in Section 14, *Population and Housing,* the project would not directly result in an increase in population and would not result in increased demand for or use of parks, trails or recreational facilities. The proposed access road would be located along a portion of the mapped Old Moraga Ranch Trail, but not within the existing physical trail. Along this portion of the mapped trail, the access road would be graded to allow for vehicles to access the site and gravel would be added to the area. However, the natural trail has diverged from the original path and is now located approximately 30 feet or more from the road. Trail users would continue to use the existing, natural trail when hiking the area, or the new access road if it coincides with a brief segment of the trail. Trail users would continue to see the existing transmission tower located north of the trail and would also be able to view the associated structures of the tower. However, views would be brief as trail users travel past the project site. Vehicle travel along the trail section would be minimal and would be limited to maintenance activities for the project structure or road. Maintenance of the road would be required for continued project operation and would provide an additional maintained area for trail users. Therefore, development of the proposed project would not result in substantial physical deterioration of recreational facilities or require the need for new or expanded recreational facilities. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

17 Transportation

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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 due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)?	☐	☐	■	☐
d. Result in inadequate emergency access?	☐	☐	■	☐

Regulatory Setting

Senate Bill 743

On September 27, 2013, SB 743 was signed into law. The legislature found that with the adoption of the Sustainable Communities and Climate Protection Act of 2008 (SB 375), the State had signaled its commitment to encourage land use and transportation planning decisions and investments that reduce vehicle miles traveled and thereby contribute to the reduction of greenhouse gas emissions, as required by the California Global Warming Solutions Act of 2006 (AB 32). In December 2018, the Governor's Office of Planning and Research (OPR) finalized new CEQA guidelines (CEQA Guidelines section 15064.3), that identify VMT as the most appropriate criteria to evaluate a project's transportation impacts.

In November 2017, OPR released a technical advisory containing recommendations regarding the assessment of VMT, proposed thresholds of significance, and potential mitigation measures for lead agencies to use while implementing the required changes contained in Senate Bill 743 (SB 743). Also in November 2017, OPR released the proposed text for Section 15064.3, "Determining the Significance of Transportation Impacts," which summarized the criteria for analyzing transportation impacts for land use projects and transportation projects and directs lead agencies to "choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure." OPR recommends that for most instances a per service population threshold should be adopted and that a fifteen percent reduction below that of existing development would be a reasonable threshold.

Impact Analysis

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

Regional access is available to the site from Interstate 580 (I-580), located approximately 5 miles west of the site; Interstate 680 (I-680), located approximately 5 miles east of the site; and State Route 24 (SR 24), located approximately 4.7 miles north of the site. Local access to the site is available from Sanders Ranch Road via Canyon Road and Camino Pablo. The proposed project would generate an incremental number of vehicle trips. Vehicle trips for the proposed project would be limited to travel to and from the site during construction and for service calls and maintenance during operation. Installation of new fiber vaults and fiber route would require the temporary use of construction vehicles on Sanders Ranch Road and between each fiber vault. As vehicle trips due to the project would be negligible, impacts of the project related to consistency with a roadway plan, policy, or program would be less than significant.

There are existing sidewalks located along Sanders Ranch Road. The proposed project would not result in modifications to the existing sidewalks along Sanders Ranch Road. There are currently no bicycle lanes located along Sanders Ranch Road. Because the proposed project would not impact existing pedestrian and bicycle facilities, impacts of the project related to consistency with pedestrian and/or bicycle plans, policies, and programs would be less than significant. The project would not degrade local access to bus stops along Moraga Road/Canyon Road, which can be accessed via the local roadway and sidewalk network. There are no active bus stops near the project site and no bus stops near the entrance to the access road from Sanders Ranch Road. Therefore, implementation of the proposed project would not conflict with plans, programs, and policies regarding transit facilities, or decrease the performance and safety of such facilities. The proposed project would have no impact related to consistency with existing transit plans, policies, and programs.

LESS THAN SIGNIFICANT IMPACT

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

The proposed project would generate an incremental number of vehicle trips. Vehicle trips for the proposed project would be limited to travel to and from the site during construction and for service calls and maintenance during operation. Installation of new fiber vaults and fiber route would require the temporary use of construction vehicles to travel to Sanders Ranch Road and between each fiber vault. Vehicle trips related to construction would be temporary and would cease upon completion of the project's construction. Operation of the project may necessitate the maintenance of the structure which would increase vehicle trips to the site. However, vehicle trips for maintenance would be minimal and likely would not exceed the Small Project VMT screening threshold (i.e., projects that generate less than 110 daily vehicular trips are generally assumed to cause a less-than-significant transportation impact) used by the California Department of Transportation (Office of Planning and Research 2017). As no habitable structures would be constructed on the site, the project would not result in an increase in population that would affect the capacity of transit facilities to accommodate public demand. Therefore, the project would not conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b) and impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

c. Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)?

d. Would the project result in inadequate emergency access?

During construction and for maintenance, vehicles and equipment would access the site via Sanders Ranch Road. Project activities would be limited to the project site and the proposed access road alignment. Construction of the project would not alter or affect existing street and intersection networks or involve an incompatible use. Activities on nearby roadways including Sanders Ranch Road and Camino Pablo would be limited to installation of new underground fiber vaults and fiber route which would require the temporary use of construction vehicles to travel to Sanders Ranch Road and between each fiber vault. There would be no activities that would result in hazards due to the project or result in inadequate emergency access.

Operation of the proposed project would be limited to the project site and the proposed access road. Project implementation would occur within open space where hazards and emergency access are not a primary concern. Furthermore, emergency vehicles would have more direct access to the tower and adjacent open space in the event of an emergency or wildfire. Operation of the project would not alter or affect existing street and intersection networks or involve an incompatible use. There would be no new features that would substantially increase hazards due to a geometric design feature or result in inadequate emergency access. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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18 Tribal Cultural Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in a Public Resources Code Section 21074 as either a site, feature, place, or 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.	☐	■	☐	☐

As of July 1, 2015, California Assembly Bill 52 of 2014 (AB 52) was enacted and expands CEQA by defining a new resource category, “tribal cultural resources.” AB 52 establishes that “A project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment” (PRC Section 21084.2). It further states that the lead agency shall establish measures to avoid impacts that would alter the significant characteristics of a tribal cultural resource, when feasible (PRC Section 21084.3).

PRC Section 21074 (a)(1)(A) and (B) defines tribal cultural resources as “sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe” and is:

1. 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), or
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 Public Resources Code Section 5024.1. In applying these criteria, the lead agency shall consider the significance of the resource to a California Native American tribe.

AB 52 also establishes a formal consultation process for California tribes regarding those resources. The consultation process must be completed before a CEQA document can be certified. Under AB 52, lead agencies are required to "begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project." Native American tribes to be included in the process are those that have requested notice of projects proposed within the jurisdiction of the lead agency.

Impact Analysis

a. *Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code Section 21074 that is 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. *Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074 that is 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?*

Rincon contacted the Native American Heritage Commission (NAHC) on June 14, 2023, to request a search of the Sacred Lands File (SLF), as well as a contact list of Native Americans culturally affiliated with the project site vicinity The Town of Moraga mailed a notification letter on June 30, 2023 to the following Native American tribes: the Guidiville Indian Rancheria, the Ohlone Indian Tribe, The confederated Villages of Lisjan, The Chicken Ranch Rancheria of MeWuk Indians, the Muwekma Ohlone Indian Tribe of the SF Bay Area, the North Valley Yokuts Tribe, the Tule river Indian Tribe, the Indian Canyon Mutsun Ban of Costanoan, Wilton Rancheria, Nashville Enterprise Miwok-Maidu Nishinam Tribe, Wuksache Indian Tribe/Eshom Valley Band, and the Amah Mutsun Tribal Band of Mission San Juan Bautista.

Under AB 52, tribes have 30 days from receipt of the letter to respond and request consultation. On July 13, 2023, the Town received a request from the Confederated Villages of Lisjan Nation to receive a copy of the final CHRIS and environmental document for this project, along with the SLF from the Native American Heritage Commission and any additional archeological reports. They requested these items be sent to their physical address in Oakland, California. The Town will comply and send the aforementioned documents to the tribe after their completion. No other tribes responded and requested formal consultation under AB 52. However, during construction activities, especially those requiring earth disturbance in previously undeveloped portions of the site, there is potential to disturb unanticipated tribal cultural resources. Impacts would be less than significant with implementation of Mitigation Measure TCR-1. This measure would apply to all phases of project construction and would ensure that if tribal cultural resources are found on-site they would be preserved and evaluated for their significance as a cultural resource. Implementation of Mitigation Measure TCR-1 would reduce potential impacts to tribal cultural resources to less than significant level and would effectively mitigate the project’s impacts to these resources through the recovery, identification, and preservation of unanticipated tribal cultural resources.

Mitigation Measure

TCR-1 Unanticipated Discovery of Tribal Cultural Resources

In the event that cultural resources of Native American origin are identified during project construction, all earth-disturbing work within 50 feet of the find shall be temporarily suspended or redirected until an archaeologist has evaluated the nature and significance of the find as a cultural resource and an appropriate local Native American representative is consulted. If the Town, in consultation with local Native American tribes, determines that the resource is a tribal cultural resource and thus significant under CEQA, a mitigation plan shall be prepared and implemented in accordance with state guidelines and in consultation with local Native American group(s). The plan shall include avoidance of the resource or, if avoidance of the resource is infeasible, the plan shall outline the appropriate treatment of the resource in coordination with the appropriate local Native American tribal representative and, if applicable, a qualified archaeologist. The plan shall include measures to ensure the find is treated in a manner that respectfully retains, to the degree feasible, the qualities that render the resource of significance to the local Native American group(s). Examples of appropriate mitigation for tribal cultural resources include, but are not limited to, protecting the cultural character and integrity of the resource, protecting traditional use of the resource, protecting the confidentiality of the resource, or heritage recovery.

Significance After Mitigation

Implementation of Mitigation Measure TCR-1 would minimize impacts to tribal cultural resources encountered during project construction. Impacts would be less than significant with mitigation incorporated.

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED

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19 Utilities and Service Systems

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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. 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?

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

c. *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?*

Water

Water that would be used for construction activities would be trucked into the site. Operational water demands would be limited to fire-fighting needs. The proposed water tank on the project site would be constructed in compliance with the National Fire Protection Association Section 1142 which identifies a method of determining the minimum water supply necessary for structural firefighting purposed in areas where it has been determined there is no water or inadequate water for firefighting (National Fire Protection Association 2022). As such, the project would require new water facilities. However, the water facilities would be limited to the project area and would be constructed in accordance with existing regulations. Impacts to water facilities and water supplies would be less than significant.

Wastewater

Wastewater generation on site would be limited to the construction period and would be disposed of in portable toilets. A truck servicing the portable toilets would remove the wastewater generated and transfer it to Central San for treatment. Wastewater generation on the site would cease upon completion of the construction of the project. There would be no operational wastewater generators on the project site. As such, the project would not require new or expanded wastewater facilities and impacts to wastewater would be less than significant.

Stormwater

The project would be required to comply with MMC Title 13, which details requirements for erosion and sediment control plans, and which regulates discharge of materials into curbside gutters, storm sewers, and storm drains. The project would be required to implement BMPs for drainage and erosion control during construction and meet requirements for stormwater and sewer discharge. The 361 square-foot concrete pad proposed to support ancillary facilities of the proposed project would increase impervious surfaces on the project site. However, the increase in runoff from increased impervious surfaces would be minimal and would likely percolate into the surrounding pervious areas of the project site. Impacts related to stormwater on the project site would be less than significant.

Telecommunications, Electricity, and Natural Gas

Telecommunications services in Moraga are provided by private companies, including AT&T and Comcast/XFinity. The telecommunications provider used by residents and businesses in Moraga is subject to the user's discretion. Telecommunications facilities are generally available throughout the Town.

As discussed in Section 6, *Energy*, Marin Clean Energy (MCE) is the default electricity provider for the Town, and Pacific Gas and Electric Company (PG&E) is the primary natural gas provider for the Town. However, residents have the option to opt out of MCE and enroll in PG&E for electricity service. In conjunction with the utility companies, the California Public Utilities Commission (CPUC) regulates energy conservation programs. The proposed project likely would not require a substantial additional amount of power beyond what is already provided to the project site. Therefore, the project would not result in the need for new or expanded electric power facilities.

The proposed project would not use natural gas during construction or operation. The project itself would include the expansion of telecommunication facilities on the project site. However, as discussed throughout this document, impacts related to the expansion of the facility would either be less than significant with mitigation or less than significant. Therefore, impacts related to telecommunications, electricity, and natural gas would be less than significant.

LESS THAN SIGNIFICANT IMPACT

d. 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?

e. Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Construction of the proposed project would generate a limited amount of construction waste including oil, fuel, coolants, lubricants, and batteries. The project would be required to comply with Section 5.408, Construction Waste Reduction, Disposal, and Recycling, of the existing California Green Building Standards Code (CALGreen), which requires projects to recycle and/or salvage a minimum of 65 percent of nonhazardous construction and demolition waste; or, to meet a local construction and demolition waste management ordinance (whichever is more stringent). As such, the MMC Chapter 15.08, requires construction of the proposed project to divert 50 percent of the construction and demolition debris from landfill. The project would divert its construction debris consistent with the provisions of CALGreen and the MMC Chapter 15.08. Operation of the proposed project would not generate waste. As such, impacts related to solid waste would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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20 Wildfire

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
If located in or near state responsibility areas or lands 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 factors, exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	■
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	■
d. Expose people or structures to significant risks, including downslopes or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	■

Impact Analysis

a. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

b. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, 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?

c. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

d. *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project expose people or structures to significant risks, including downslopes or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?*

According to maps prepared by the California Department of Forestry and Fire Protection (CAL FIRE), most of Moraga is not located within a Very High Fire Hazard Severity Zone (VHFHSZ). The southwestern-most portion of the town is located within a Local Responsibility Area VHFHSZ. State Responsibility Areas are located outside of town limits (CAL FIRE 2023). The project site is not in a CAL FIRE designated Very High Fire Hazard Severity Zone and is located approximately 2.5 miles north of the nearest Very High Fire Hazard Severity Zone (CALFIRE 2023). The project site is located within a Moderate Fire Hazard Severity Zone and the adjacent Sanders Ranch Subdivision is mapped as a High Fire Hazard Severity Zone. Additionally, prevailing winds in Moraga are generally from the west off the ocean from February to November, and from the north from November to February (Weatherspark 2022); therefore, prevailing winds would likely blow wildfires away from the project site. Furthermore, in the event of an emergency, operation of the proposed project would allow for broader and more reliable cellular service for residents within the area.

Project implementation would not impair an adopted emergency response plan or emergency evacuation plan or exacerbate wildfire risks. While the project would introduce a generator to the project site, use of the generator would be temporary and would only occur in the event that power is not available through PG&E. The generator would be located within the proposed equipment enclosure and located atop a 19-foot by 19-foot concrete pad, away from brush or grassland that is subject to accidental ignition. Furthermore, the proposed project would include the construction of a water tank pursuant to the requirements of the National Fire Protection Association Section 1142 which would provide for water for firefighting purposes where there are limited water facilities. Further, the project would not require the installation or maintenance of associated infrastructure that may exacerbate fire risk or expose people or structures to significant risks, including downslopes or downstream flooding or landslides, as a result of runoff, post fire slope instability, or drainage changes in or near state responsibility areas or lands classified as very high fire severity zones. Installation of new fiber vaults and fiber route would on Sanders Ranch Road would not exacerbate fire risk as utilities would be undergrounded. Because the project is not located in a Very High Fire Severity Zone and includes water infrastructure which would serve to reduce potential impacts related to fire, no impact related to wildfire would occur.

NO IMPACT

21 Mandatory Findings of Significance

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Does the project:				
a. Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	■	☐	☐
b. Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	■	☐	☐
c. Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	■	☐	☐

a. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Based on the analysis provided throughout this IS-MND, implementation of the proposed project would not substantially degrade the quality of the environment and would not substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of rare or endangered plants or animals, or eliminate important examples of California history or prehistory. Biological resources are addressed in Section 4, *Biological Resources.* With implementation of Mitigation Measures BIO-1, related to nesting birds, the proposed project would not substantially reduce wildlife habitat or populations.

Mitigation measures CR-1, GEO-2, and TCR-1 have been designed to reduce potential impacts to unknown archaeological, paleontological, and tribal cultural resources. There are no historic resources on the site. Based on the ability of the identified mitigation measures to reduce potential impacts to prehistory resources to less than significant levels, the proposed project's impacts would be less than significant with implementation of the aforementioned mitigation measures.

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b. *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?*

Other projects are either approved or under consideration for approval in the project area, such as the residential projects, Hetfield Estates, MCSP Area 14, MCSP Area 15 and 17, 1600 School Street the Moraga Country Club Clubhouse Expansion Project. These other projects in the area are consistent with the envisioned land uses in the Town's General Plan. Cumulative projects are consistent with the growth planned for within the Town.

These other projects would impact some of the same resources as the proposed project, such as aesthetics, air quality, biological resources, cultural resources, geology and soils, noise, and water supply, given that they involve construction of residences and recreation facilities. Cumulative impacts of the proposed project associated with some of the resource areas are addressed in the individual resource sections above: Aesthetics, Air Quality, Cultural Resources, Greenhouse Gases, Geology and Soils, Noise, Water Supply, and Solid Waste (CEQA Guidelines Section 15064(h)(3)). Air Quality would be less than significant with implementation of BAAQMD BMPs required under Mitigation Measure AQ-1. Greenhouse Gas impacts would be less than significant. Water supply and solid waste impacts would be less than significant. Some of the other resource areas were determined to have no impact in comparison to existing conditions and therefore would not contribute to cumulative impacts, such as Mineral Resources and Agricultural Resources. As such, cumulative impacts in these issue areas would also be less than significant (not cumulatively considerable). The proposed project would not generate new VMT that exceeds regional average VMT per employee and therefore would not contribute to a cumulative increase in the average VMT per employee in the region. The proposed project would not result in a significant contribution to cumulatively considerable impacts, and impacts would be less than significant with implementation of the mitigation measures contained in this Initial Study.

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c. *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*

Effects to human beings are generally associated with air quality, noise, seismicity risks, GHG emissions, and hazards and hazardous materials. These resources are most closely related to impacts on humans because they can affect health and quality of life. As discussed in this IS-MND, implementation of the proposed project would result in less than significant environmental impacts with respect to these issue areas with mitigation incorporated. Impacts related to air quality would be reduced through Mitigation Measure AQ-1 which would minimize fugitive dust emissions resulting from construction activities to less than significant levels.. The geotechnical recommendations Mitigation Measure GEO-1 and GEO-2 discussed in Section 7, *Geology and Soils*, would ensure that soils and grounds are stable due to potential slope risk and reduce impacts to undiscovered paleontological resources. Impacts related with GHG emissions would be less than significant. Accordingly, with implementation of the mitigation measures provided in this IS-MND, the proposed project would not cause substantial adverse effects on human beings, either directly or indirectly. Impacts would be less than significant with mitigation.

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References

Bibliography

Alameda, County of. 2010. Oakland International Airport Land Use Compatibility Plan. https://www.acgov.org/cda/planning/generalplans/documents/OAK_ALUCP_122010_FULL.pdf (accessed July 2023).

Association of Bay Area Governments (ABAG)/Metropolitan Transportation Commission (MTC). 2021. Plan Bay Area 2050. October. https://www.planbayarea.org/sites/default/files/documents/Plan_Bay_Area_2050_October_2021.pdf (accessed July 2023).

Association of Environmental Professionals. 2016. Final White Paper Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California. October 18, 2016.

______. 2022. 2022 Scoping Plan for Achieving Carbon Neutrality. November 16, 2022. https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf (accessed July 2023).

______. 2023. "Overview Diesel Exhaust & Health" [webpage]. N.d. (accessed July 2023).

Bay Area Air Quality Management District (BAAQMD). 2017a. Air Quality Standards and Attainment Status. https://www.baaqmd.gov/about-air-quality/research-and-data/air-quality-standards-and-attainment-status (accessed November 2022).

______. 2017b. 2017 Clean Air Plan. https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en (accessed November 2022).

______. 2022. 2022 California Environmental Quality Act Guidelines. https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines (accessed August 2023).

California Air Resources Board (CARB). 2008. Climate Change Scoping Plan. December. https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/document/adopted_scoping_plan.pdf (accessed July 2023).

______. 2014. First Update to the Climate Change Scoping Plan. https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf (accessed August 2023).

______. 2017. California's 2017 Climate Change Scoping Plan. November 2017. https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf (accessed July 2023).

______. 2020. "Maps of State and Federal Area Designations." https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations (accessed August 2022).

______. 2021. Overview: Diesel Exhaust & Health. https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health (accessed November 2022).

______. 2022a.“Inhalable Particulate Matter and Health (PM2.5 and PM10). https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health#:~:text=Short%2Dterm%20exposures%20to%20PM10,to%20years)%20exposure%20 to%20PM2 (accessed July 2023).

______. 2022b. “Overview: Diesel Exhaust & Health.” https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health (accessed July 2023).

______. 2022c. Top 4 Summary. https://www.arb.ca.gov/adam/topfour/topfourdisplay.php (accessed July 2023).

______. 2022d. “National Ambient Air Quality Standards.” https://ww2.arb.ca.gov/resources/national-ambient-air-quality-standards (accessed August 2022).

______. 2022e. “California Ambient Air Quality Standards.” https://ww2.arb.ca.gov/resources/california-ambient-air-quality-standards (accessed August 2022).

California Department of Conservation (DOC). 2017. State of California Williamson Act Contract Land. https://www.conservation.ca.gov/dlrp/wa#:~:text=The%20Williamson%20Act%2C%20also%20known,or%20related%20open%20space%20use. (accessed July 2023)

______. 2021. EQ Zapp: California Earthquake Hazards Zone Application. https://maps.conservation.ca.gov/cgs/EQZApp/app/ (accessed July 2023)

______. 2022. DOC Maps: Agriculture – Data Viewer. [Geographic Information Systems map0. N.d. https://maps.conservation.ca.gov/agriculture/DataViewer/index.html (accessed July 2023).

______. 2023. Contra Costa County Tsunami Hazard Areas [map]. https://www.conservation.ca.gov/cgs/tsunami/maps/contra-costa (accessed July 2023)

California Department of Resources Recycling and Recovery (CalRecycle). 2019. SWIS Facility/Site Search. https://www2.calrecycle.ca.gov/SolidWaste/Site/Search (accessed July 2023)

California Department of Fish and Wildlife. 2023. Timberland Conservation and Fire Resiliency Program. https://wildlife.ca.gov/conservation/timber (accessed July 2023)

California Department of Forestry and Fire Protection (CAL FIRE). 2023. Fire Hazard Severity Zone Map Viewer [map]. https://calfire-forestry.maps.arcgis.com/apps/webappviewer/index.html?id=988d431a42b242b29d89597ab693d008 (accessed July 2023)

California Department of Toxic Substances. 2023. EnviroStor. https://www.envirostor.dtsc.ca.gov/public/map/?myaddress=120+Sanders+Ranch+Rd%2C+Moraga (accessed July 2023)

California Department of Transportation. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. September. https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf (accessed August 2023)

______. 2020a. Traffic Noise Analysis Protocol. https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/traffic-noise-protocol-april-2020-a11y.pdf (accessed June 2022).

______. 2020b. Transportation and Construction Vibration Guidance Manual. https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf

______. 2023. California State Scenic Highway System Map. https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways (accessed July 2023).

California Energy Commission. 2021. 2021 California Annual Retail Fuel Outlet Report Results. https://www.energy.ca.gov/media/3874 (accessed July 2023)

______. 2021a. Electricity Consumption by County. https://ecdms.energy.ca.gov/elecbycounty.aspx (accessed July 2023)

______. 2021b. Gas Consumption by County. https://ecdms.energy.ca.gov/gasbycounty.aspx (accessed July 2023)

California Geologic Energy Management Division. 2023. Well Finder [map]. https://maps.conservation.ca.gov/doggr/wellfinder/ (accessed July 2023)

California Office of Emergency Services. 2015. MyHazards. https://myhazards.caloes.ca.gov/ (accessed July 2023)

Contra Costa, County of. 2018. Local Hazard Mitigation Plan. https://www.contracosta.ca.gov/6842/Local-Hazard-Mitigation-Plan (accessed July 2023)

______. 2022. Hazardous Materials. https://www.contracosta.ca.gov/8310/Hazardous-Materials (accessed July 2023)

Contra Costa Health. 2023. California Environmental Reportion System. https://cchealth.org/hazmat/cers-instructions.php (accessed July 2023)

East Bay Municipal Utility District (EBMUD). 2021a. Urban Water Management Plan 2020. https://www.ebmud.com/water/about-your-water/water-supply/urban-water-management-plan/ (accessed July 2023).

______. 2021b. Water Shortage Contingency Plan 2020. https://www.ebmud.com/water/about-your-water/water-supply/urban-water-management-plan/ (accessed July 2023).

Federal Emergency Management Agency (FEMA). 2022. FEMA's National Flood Hazard Layer Viewer. https://msc.fema.gov/portal/search?AddressQuery=120%20Sanders%20Ranch%20Road%2C%20Moraga%2C%20CA (accessed July 2023).

Federal Highway Administration (FHWA). 2011. *Highway Traffic Noise: Analysis and Abatement Guidance.* December 2011. https://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf (accessed June 2022).

______. 2018. Transit Noise and Vibration Impact Assessment Manual. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf (accessed August 2023).

Intergovernmental Panel on Climate Change (IPCC). 2021. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)] Cambridge University Press.

Marin Clean Energy (MCE). 2023. Energy Suppliers. https://www.mcecleanenergy.org/energy-suppliers/ (accessed July 2023)

Moraga, Town of. 1986. Moraga Open Space Ordinance Guidelines. Available online: moraga.ca.us/DocumentCenter/View/305/Moraga-Open-Space-Ordinance-MOSO-Guidelines-PDF (accessed July 2023).

______. 2013. Bollinger Valley Project Draft Environmental Impact Report. SCH #2006112061. February 22, 2013.

______. 2014. Climate Action Plan. https://www.moraga.ca.us/DocumentCenter/View/406/Climate-Action-Plan-CAP-PDF (accessed July 2023)

______. 2002. Moraga General Plan. https://www.moraga.ca.us/DocumentCenter/View/5022/2002-General-Plan-PDF (accessed July 2023)

______. 2023. Town of Moraga Staff Report, March 8, 2023 [subsection: Moraga 2022 Annual General Plan Implementation Report]. https://www.moraga.ca.us/DocumentCenter/View/7788/Council-03-08-23-General-Plan-Annual-Report-PDF. (accessed August 2023).

National Pipeline Mapping System. 2023. Public Viewer [map]. https://pvnpms.phmsa.dot.gov/PublicViewer/ (accessed July 2023)

Raycap. 2023. Home. https://www.raycap.com/ (accessed July 2023)

State Water Resources Control Board. 2023. Geotracker. https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=120+Sanders+Ranch+rd%2C+moraga%2C+CA (accessed July 2023)

State of California. 2018. California's Fourth Climate Change Assessment Statewide Summary Report. August 27, 2018. http://www.climateassessment.ca.gov/state/ (accessed November 2022). (accessed August 2023).

United States Environmental Protection Agency (USEPA). 2014. Policy Assessment for the Review of the Lead National Ambient Air Quality Standards. https://www3.epa.gov/ttn/naaqs/standards/pb/data/140501_pa_pb_fin.pdf (accessed August 2022).

______. 2016. "NAAQS Table." https://www.epa.gov/criteria-air-pollutants/naaqs-table (accessed August 2022).

______. 2020. Health and Environmental Effects of Hazardous Air Pollutants. Last Modified: February 3, 2020. https://www.epa.gov/haps/health-and-environmental-effects-hazardous-air-pollutants (accessed August 2022).

______. 2022a. Health Effects of Ozone Pollution. Last Modified: June 14, 2022. https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution (accessed August 2022).

______. 2022b. Basic Information about Carbon Monoxide (CO) Outdoor Air Pollution. Last Modified: August 2, 2022. https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution#Effects (accessed August 2022).

______. 2022c. Basic Information about NO2. Last Modified: August 2, 2022. https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects (accessed August 2022).

______. 2022d. Sulfur Dioxide Basics. Last Modified: March 9, 2022. https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#effects (accessed August 2022).

______. 2022e. Basic Information about Lead Air Pollution. Last Modified: July 26, 2022. https://www.epa.gov/lead-air-pollution/basic-information-about-lead-air-pollution#health (accessed September 2022).

______. 2022f. “NAAQS Table.” Last Modified: April 5, 2022. https://www.epa.gov/criteria-air-pollutants/naaqs-table (accessed August 2022).

______. 2022g. Nonattainment Areas for Criteria Pollutants (Green Book). https://www.epa.gov/green-book (accessed August 2022).

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Appendix A

CalEEMod Modelling

Sanders Ranch Wireless Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Sanders Ranch Wireless
Construction Start Date	1/1/2024
Operational Year	2024
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.90
Precipitation (days)	7.20
Location	37.8248584190072, -122.11530209950925
County	Contra Costa
City	Moraga
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	1581
EDFZ	1
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.14

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

General Office Building	0.49	1000sqft	0.00	486	0.00	—	—	—
Other Non-Asphalt Surfaces	9.45	1000sqft	0.75	0.00	0.00	—	—	—

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.	2.79	2.35	19.7	19.6	0.04	0.80	0.14	0.94	0.73	0.03	0.77	—	4,870	4,870	0.19	0.04	0.66	4,889
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.81	2.36	19.9	19.8	0.04	0.80	2.70	3.50	0.74	1.35	2.09	—	4,893	4,893	0.20	0.05	0.02	4,911
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.51	0.43	3.62	3.58	0.01	0.15	0.22	0.37	0.13	0.11	0.24	—	907	907	0.04	0.01	0.04	910
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.09	0.08	0.66	0.65	< 0.005	0.03	0.04	0.07	0.02	0.02	0.04	—	150	150	0.01	< 0.005	0.01	151

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	2.79	2.35	19.7	19.6	0.04	0.80	0.14	0.94	0.73	0.03	0.77	—	4,870	4,870	0.19	0.04	0.66	4,889
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	2.81	2.36	19.9	19.8	0.04	0.80	2.70	3.50	0.74	1.35	2.09	—	4,893	4,893	0.20	0.05	0.02	4,911
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.51	0.43	3.62	3.58	0.01	0.15	0.22	0.37	0.13	0.11	0.24	—	907	907	0.04	0.01	0.04	910
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.09	0.08	0.66	0.65	< 0.005	0.03	0.04	0.07	0.02	0.02	0.04	—	150	150	0.01	< 0.005	0.01	151

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.	0.70	0.65	1.21	5.25	0.01	0.07	0.91	0.99	0.07	0.23	0.30	0.24	1,156	1,156	0.07	0.04	4.47	1,175
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.67	0.62	1.29	4.78	0.01	0.07	0.91	0.99	0.07	0.23	0.30	0.24	1,082	1,082	0.08	0.05	0.12	1,098
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.51	0.48	0.51	4.09	0.01	0.01	0.91	0.92	0.01	0.23	0.24	0.24	1,017	1,018	0.07	0.04	1.93	1,034

Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.09	0.09	0.09	0.75	< 0.005	< 0.005	0.17	0.17	< 0.005	0.04	0.04	0.04	168	168	0.01	0.01	0.32	171

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	0.53	0.49	0.44	4.63	0.01	0.01	0.91	0.92	0.01	0.23	0.24	—	1,071	1,071	0.04	0.04	4.47	1,089
Area	< 0.005	0.02	< 0.005	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.09	0.09	< 0.005	< 0.005	—	0.09
Energy	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.45	9.45	< 0.005	< 0.005	—	9.52
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.24	0.00	0.24	0.02	0.00	—	0.85
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Stationary	0.16	0.15	0.77	0.59	< 0.005	0.06	0.00	0.06	0.06	0.00	0.06	0.00	75.6	75.6	< 0.005	< 0.005	0.00	75.8
Total	0.70	0.65	1.21	5.25	0.01	0.07	0.91	0.99	0.07	0.23	0.30	0.24	1,156	1,156	0.07	0.04	4.47	1,175
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.51	0.46	0.52	4.18	0.01	0.01	0.91	0.92	0.01	0.23	0.24	—	997	997	0.05	0.05	0.12	1,011
Area	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.45	9.45	< 0.005	< 0.005	—	9.52
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.24	0.00	0.24	0.02	0.00	—	0.85
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Stationary	0.16	0.15	0.77	0.59	< 0.005	0.06	0.00	0.06	0.06	0.00	0.06	0.00	75.6	75.6	< 0.005	< 0.005	0.00	75.8

Total	0.67	0.62	1.29	4.78	0.01	0.07	0.91	0.99	0.07	0.23	0.30	0.24	1,082	1,082	0.08	0.05	0.12	1,098
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.50	0.45	0.48	4.05	0.01	0.01	0.91	0.92	0.01	0.23	0.24	—	1,005	1,005	0.04	0.04	1.93	1,021
Area	< 0.005	0.02	< 0.005	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.04	0.04	< 0.005	< 0.005	—	0.04
Energy	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.45	9.45	< 0.005	< 0.005	—	9.52
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.24	0.00	0.24	0.02	0.00	—	0.85
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Stationary	0.01	< 0.005	0.03	0.02	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	2.48	2.48	< 0.005	< 0.005	0.00	2.49
Total	0.51	0.48	0.51	4.09	0.01	0.01	0.91	0.92	0.01	0.23	0.24	0.24	1,017	1,018	0.07	0.04	1.93	1,034
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.09	0.08	0.09	0.74	< 0.005	< 0.005	0.17	0.17	< 0.005	0.04	0.04	—	166	166	0.01	0.01	0.32	169
Area	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.01	0.01	< 0.005	< 0.005	—	0.01
Energy	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.56	1.56	< 0.005	< 0.005	—	1.58
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.04	0.00	0.04	< 0.005	0.00	—	0.14
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Stationary	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	0.41	0.41	< 0.005	< 0.005	0.00	0.41
Total	0.09	0.09	0.09	0.75	< 0.005	< 0.005	0.17	0.17	< 0.005	0.04	0.04	0.04	168	168	0.01	0.01	0.32	171

3. Construction Emissions Details

3.1. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.74	2.30	19.8	19.1	0.04	0.80	—	0.80	0.74	—	0.74	—	4,749	4,749	0.19	0.04	—	4,766
Dust From Material Movemen	—	—	—	—	—	—	2.56	2.56	—	1.31	1.31	—	—	—	—	—	—	—
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	0.07	0.06	0.54	0.52	< 0.005	0.02	—	0.02	0.02	—	0.02	—	130	130	0.01	< 0.005	—	131
Dust From Material Movemen	—	—	—	—	—	—	0.07	0.07	—	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.10	0.10	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	21.5	21.5	< 0.005	< 0.005	—	21.6
Dust From Material Movemen	—	—	—	—	—	—	0.01	0.01	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	0.67	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	144	144	< 0.005	0.01	0.02	146
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.99	3.99	< 0.005	< 0.005	0.01	4.05
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.66	0.66	< 0.005	< 0.005	< 0.005	0.67
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Grading (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.40	2.02	17.1	16.7	0.04	0.68	—	0.68	0.63	—	0.63	—	4,368	4,368	0.18	0.04	—	4,383

Dust From Material Movement	—	—	—	—	—	—	1.92	1.92	—	0.99	0.99	—	—	—	—	—	—	—
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	0.16	0.14	1.17	1.15	< 0.005	0.05	—	0.05	0.04	—	0.04	—	299	299	0.01	< 0.005	—	300
Dust From Material Movement	—	—	—	—	—	—	0.13	0.13	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.21	0.21	< 0.005	0.01	—	0.01	0.01	—	0.01	—	49.5	49.5	< 0.005	< 0.005	—	49.7
Dust From Material Movement	—	—	—	—	—	—	0.02	0.02	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	0.67	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	144	144	< 0.005	0.01	0.02	146
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	0.01	< 0.005	0.10	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	72.9	72.9	0.01	0.01	< 0.005	76.6

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.96	9.96	< 0.005	< 0.005	0.02	10.1
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	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.99	4.99	< 0.005	< 0.005	< 0.005	5.25
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.65	1.65	< 0.005	< 0.005	< 0.005	1.67
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	—	0.83	0.83	< 0.005	< 0.005	< 0.005	0.87

3.5. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.74	2.30	19.8	19.1	0.04	0.80	—	0.80	0.74	—	0.74	—	4,749	4,749	0.19	0.04	—	4,766
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	0.19	0.16	1.36	1.31	< 0.005	0.06	—	0.06	0.05	—	0.05	—	325	325	0.01	< 0.005	—	326
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	0.25	0.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	53.9	53.9	< 0.005	< 0.005	—	54.0
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	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.28	1.28	< 0.005	< 0.005	< 0.005	1.30
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.18	2.18	< 0.005	< 0.005	< 0.005	2.28
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.09	0.09	< 0.005	< 0.005	< 0.005	0.09
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.15	0.15	< 0.005	< 0.005	< 0.005	0.16
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.01	0.01	< 0.005	< 0.005	< 0.005	0.01
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.02	0.02	< 0.005	< 0.005	< 0.005	0.03
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Paving (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.72	2.28	19.6	18.9	0.04	0.80	—	0.80	0.73	—	0.73	—	4,713	4,713	0.19	0.04	—	4,729
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.72	2.28	19.6	18.9	0.04	0.80	—	0.80	0.73	—	0.73	—	4,713	4,713	0.19	0.04	—	4,729
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.54	0.52	< 0.005	0.02	—	0.02	0.02	—	0.02	—	129	129	0.01	< 0.005	—	130
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.10	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	21.4	21.4	< 0.005	< 0.005	—	21.5
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.07	0.07	0.05	0.79	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	157	157	< 0.005	0.01	0.66	160
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	0.07	0.06	0.06	0.67	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	144	144	< 0.005	0.01	0.02	146
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.99	3.99	< 0.005	< 0.005	0.01	4.05
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.66	0.66	< 0.005	< 0.005	< 0.005	0.67
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

General Office Building	0.53	0.49	0.44	4.63	0.01	0.01	0.91	0.92	0.01	0.23	0.24	—	1,071	1,071	0.04	0.04	4.47	1,089
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.53	0.49	0.44	4.63	0.01	0.01	0.91	0.92	0.01	0.23	0.24	—	1,071	1,071	0.04	0.04	4.47	1,089
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	0.51	0.46	0.52	4.18	0.01	0.01	0.91	0.92	0.01	0.23	0.24	—	997	997	0.05	0.05	0.12	1,011
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.51	0.46	0.52	4.18	0.01	0.01	0.91	0.92	0.01	0.23	0.24	—	997	997	0.05	0.05	0.12	1,011
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	0.09	0.08	0.09	0.74	< 0.005	< 0.005	0.17	0.17	< 0.005	0.04	0.04	—	166	166	0.01	0.01	0.32	169
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.09	0.08	0.09	0.74	< 0.005	< 0.005	0.17	0.17	< 0.005	0.04	0.04	—	166	166	0.01	0.01	0.32	169

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)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	5.75	5.75	< 0.005	< 0.005	—	5.81
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	5.75	5.75	< 0.005	< 0.005	—	5.81
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	5.75	5.75	< 0.005	< 0.005	—	5.81
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	5.75	5.75	< 0.005	< 0.005	—	5.81
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	0.95	0.95	< 0.005	< 0.005	—	0.96
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.95	0.95	< 0.005	< 0.005	—	0.96

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)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.70	3.70	< 0.005	< 0.005	—	3.71
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.70	3.70	< 0.005	< 0.005	—	3.71
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.70	3.70	< 0.005	< 0.005	—	3.71
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.70	3.70	< 0.005	< 0.005	—	3.71
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.61	0.61	< 0.005	< 0.005	—	0.61
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.61	0.61	< 0.005	< 0.005	—	0.61

4.3. Area Emissions by Source

4.3.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	< 0.005	< 0.005	< 0.005	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.09	0.09	< 0.005	< 0.005	—	0.09
Total	< 0.005	0.02	< 0.005	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.09	0.09	< 0.005	< 0.005	—	0.09
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.01	0.01	< 0.005	< 0.005	—	0.01

Total	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.01	0.01	< 0.005	< 0.005	—	0.01

4.4. Water Emissions by Land Use

4.4.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.5. Waste Emissions by Land Use

4.5.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.24	0.00	0.24	0.02	0.00	—	0.85
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.24	0.00	0.24	0.02	0.00	—	0.85
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.24	0.00	0.24	0.02	0.00	—	0.85
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.24	0.00	0.24	0.02	0.00	—	0.85
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.04	0.00	0.04	< 0.005	0.00	—	0.14
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.04	0.00	0.04	< 0.005	0.00	—	0.14

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)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005

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)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.16	0.15	0.77	0.59	< 0.005	0.06	0.00	0.06	0.06	0.00	0.06	0.00	75.6	75.6	< 0.005	< 0.005	0.00	75.8

Total	0.16	0.15	0.77	0.59	< 0.005	0.06	0.00	0.06	0.06	0.00	0.06	0.00	75.6	75.6	< 0.005	< 0.005	0.00	75.8
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.16	0.15	0.77	0.59	< 0.005	0.06	0.00	0.06	0.06	0.00	0.06	0.00	75.6	75.6	< 0.005	< 0.005	0.00	75.8
Total	0.16	0.15	0.77	0.59	< 0.005	0.06	0.00	0.06	0.06	0.00	0.06	0.00	75.6	75.6	< 0.005	< 0.005	0.00	75.8
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	0.41	0.41	< 0.005	< 0.005	0.00	0.41
Total	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	0.41	0.41	< 0.005	< 0.005	0.00	0.41

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Sequest	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	1/1/2024	1/12/2024	5.00	10.0	—
Grading	Grading	1/15/2024	2/16/2024	5.00	25.0	—
Building Construction	Building Construction	2/19/2024	3/22/2024	5.00	25.0	—
Paving	Paving	3/25/2024	4/5/2024	5.00	10.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Site Preparation	Plate Compactors	Diesel	Average	1.00	8.00	8.00	0.43
Site Preparation	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Site Preparation	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Site Preparation	Skid Steer Loaders	Diesel	Average	1.00	8.00	71.0	0.37
Site Preparation	Off-Highway Trucks	Diesel	Average	2.00	8.00	376	0.38

Grading	Rubber Tired Dozers	Diesel	Average	1.00	6.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Average	1.00	7.00	84.0	0.37
Grading	Plate Compactors	Diesel	Average	1.00	8.00	8.00	0.43
Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Grading	Skid Steer Loaders	Diesel	Average	1.00	8.00	71.0	0.37
Grading	Off-Highway Trucks	Diesel	Average	2.00	8.00	376	0.38
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Building Construction	Plate Compactors	Diesel	Average	1.00	8.00	8.00	0.43
Building Construction	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Building Construction	Skid Steer Loaders	Diesel	Average	1.00	8.00	71.0	0.37
Building Construction	Off-Highway Trucks	Diesel	Average	2.00	8.00	376	0.38
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	7.00	84.0	0.37
Paving	Plate Compactors	Diesel	Average	1.00	8.00	8.00	0.43
Paving	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Paving	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Paving	Skid Steer Loaders	Diesel	Average	1.00	8.00	71.0	0.37
Paving	Off-Highway Trucks	Diesel	Average	2.00	8.00	376	0.38

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	11.7	LDA,LDT1,LDT2

Site Preparation	Vendor	—	8.40	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	17.5	11.7	LDA,LDT1,LDT2
Grading	Vendor	—	8.40	HHDT,MHDT
Grading	Hauling	1.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	0.16	11.7	LDA,LDT1,LDT2
Building Construction	Vendor	0.08	8.40	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	17.5	11.7	LDA,LDT1,LDT2
Paving	Vendor	—	8.40	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Water unpaved roads twice daily	55%	55%
Limit vehicle speeds on unpaved roads to 25 mph	44%	44%

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)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	—	—	5.00	0.00	—
Grading	—	200	9.38	0.00	—
Paving	0.00	0.00	0.00	0.00	0.75

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
General Office Building	0.00	0%
Other Non-Asphalt Surfaces	0.75	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	204	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
General Office Building	110	110	110	40,149	1,293	1,293	1,293	471,979
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

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)
0	0.00	729	243	1,960

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

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)

General Office Building	10,288	204	0.0330	0.0040	11,543
Other Non-Asphalt Surfaces	0.00	204	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
General Office Building	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
General Office Building	0.45	—
Other Non-Asphalt Surfaces	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0

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
Emergency Generator	Diesel	1.00	2.00	24.0	45.0	0.73

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type
—	—

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	13.4	annual days of extreme heat
Extreme Precipitation	11.3	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	21.1	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider different increments of sea level rise coupled with extreme storm events. Users may select from four model simulations to view the range in potential inundation depth for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 50 meters (m) by 50 m, or about 164 feet (ft) by 164 ft.
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A

Extreme Precipitation	3	0	0	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	3	1	1	3
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	7.60
AQ-PM	24.4
AQ-DPM	1.63
Drinking Water	4.36
Lead Risk Housing	18.0
Pesticides	11.9
Toxic Releases	49.4
Traffic	22.4
Effect Indicators	—
CleanUp Sites	0.00
Groundwater	35.0
Haz Waste Facilities/Generators	35.6
Impaired Water Bodies	12.5
Solid Waste	0.00
Sensitive Population	—
Asthma	4.27
Cardio-vascular	6.33
Low Birth Weights	1.85
Socioeconomic Factor Indicators	—
Education	0.42
Housing	6.89

Linguistic	36.5
Poverty	6.92
Unemployment	10.7

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	99.78185551
Employed	39.71512896
Median HI	98.74246118
Education	—
Bachelor's or higher	97.06146542
High school enrollment	100
Preschool enrollment	71.52572822
Transportation	—
Auto Access	95.6242782
Active commuting	89.69588092
Social	—
2-parent households	89.93968946
Voting	97.61324265
Neighborhood	—
Alcohol availability	97.0101373
Park access	16.95110997
Retail density	10.58642371
Supermarket access	32.9911459
Tree canopy	95.40613371

Housing	—
Homeownership	98.28050815
Housing habitability	99.9101758
Low-inc homeowner severe housing cost burden	95.08533299
Low-inc renter severe housing cost burden	99.08892596
Uncrowded housing	92.9038881
Health Outcomes	—
Insured adults	99.60220711
Arthritis	0.0
Asthma ER Admissions	97.5
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	95.8
Cognitively Disabled	85.7
Physically Disabled	69.8
Heart Attack ER Admissions	79.6
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	19.6
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—

Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	88.7
Elderly	25.4
English Speaking	80.0
Foreign-born	15.4
Outdoor Workers	94.4
Climate Change Adaptive Capacity	—
Impervious Surface Cover	90.2
Traffic Density	5.6
Traffic Access	23.0
Other Indices	—
Hardship	1.6
Other Decision Support	—
2016 Voting	88.8

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	0.00
Healthy Places Index Score for Project Location (b)	99.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	Equipment enclosure, transformer, water tank, and all associated concrete pads modeled as "General Office Building". Gravel driveway (630' x 15') modeled as non-asphalt surface. Total acreage adjusted to 0.75 AC based on project description.
Construction: Construction Phases	No demolition or architectural coating phases. Assumed start date of 1/1/2024. Phase lengths adjusted per applicant provided data.
Construction: Off-Road Equipment	Equipment types and quantities based on applicant provided data.
Operations: Vehicle Data	Conservatively assumes 110 trips per day as worst case scenario; based on California DOT screening threshold.
Operations: Water and Waste Water	no water consumption
Operations: Refrigerants	removed household refrigerators/appliances. Retained commercial A/C and heat pumps

Appendix B

AB 52 Consultation

TOWN OF MORAGA

PLANNING DEPARTMENT

June 30, 2023

Guidiville Indian Rancheria
Donald Duncan, Chairperson
P.O. Box 339
Talmage, California 95481
Via email: admin@guidiville.net

RE: Assembly Bill 52 Consultation, Sanders Ranch Subdivision New Wireless Facility, Town of Moraga, Contra Costa County, California

Dear Chairperson Duncan:

The Town of Moraga (Town) is preparing an Initial Study – Mitigated Negative Declaration (IS-MND) for a proposed new wireless facility within the Sanders Ranch Subdivision in the Town of Moraga (project). The proposed project must comply with California Public Resources Code § 21080.3.1 (Assembly Bill [AB] 52 of 2014), which requires local governments to conduct meaningful consultation with California Native American tribes that have requested to be notified by lead agencies of proposed projects in the geographic area with which the tribe is traditionally and culturally affiliated.

The proposed project would involve the installation of six panel antennas on a 12-foot-high “top hat” extension that would be located on top of an existing PG&E transmission tower. Also installed on the tower would be three air antennas with six Verizon Wireless radios, two Verizon Wireless Raycaps, a microwave antenna, and two hybrid wireless cables. An equipment enclosure would enclose the facility’s ground equipment and a new transformer would be located on a pad approximately 9 feet west of the equipment enclosure pad. To access the facility for construction and maintenance, a new 15-foot-wide access driveway would be graded and built from the end of Sanders Ranch Road to the existing PG&E transmission tower. The proposed project is subject to the California Environmental Quality Act (CEQA).

Your tribe’s input is important to the Town’s planning process. We request that you advise us as early as possible if you wish to consult on the proposed project. Under AB 52, you have 30 days from the date of receipt of this notice to advise the Town if you are interested in further consultation. If you require any additional information or have any questions, please contact me at 925-888-7044 or via e-mail at bhorn@moraga.ca.us. Thank you for your assistance.

Sincerely,

Brian Horn

Senior Planner

Enclosed: Project Location Map

TOWN OF MORAGA

PLANNING DEPARTMENT

June 30, 2023

The Ohlone Indian Tribe
Andrew Galvan
P.O. Box 3388
Fremont, California 94539
Via email: chochenyo@AOL.com

RE: Assembly Bill 52 Consultation, Sanders Ranch Subdivision New Wireless Facility, Town of Moraga, Contra Costa County, California

Dear Mr. Galvan:

The Town of Moraga (Town) is preparing an Initial Study – Mitigated Negative Declaration (IS-MND) for a proposed new wireless facility within the Sanders Ranch Subdivision in the Town of Moraga (project). The proposed project must comply with California Public Resources Code § 21080.3.1 (Assembly Bill [AB] 52 of 2014), which requires local governments to conduct meaningful consultation with California Native American tribes that have requested to be notified by lead agencies of proposed projects in the geographic area with which the tribe is traditionally and culturally affiliated.

The proposed project would involve the installation of six panel antennas on a 12-foot-high “top hat” extension that would be located on top of an existing PG&E transmission tower. Also installed on the tower would be three air antennas with six Verizon Wireless radios, two Verizon Wireless Raycaps, a microwave antenna, and two hybrid wireless cables. An equipment enclosure would enclose the facility’s ground equipment and a new transformer would be located on a pad approximately 9 feet west of the equipment enclosure pad. To access the facility for construction and maintenance, a new 15-foot-wide access driveway would be graded and built from the end of Sanders Ranch Road to the existing PG&E transmission tower. The proposed project is subject to the California Environmental Quality Act (CEQA).

Your tribe’s input is important to the Town’s planning process. We request that you advise us as early as possible if you wish to consult on the proposed project. Under AB 52, you have 30 days from the date of receipt of this notice to advise the Town if you are interested in further consultation. If you require any additional information or have any questions, please contact me at 925-888-7044 or via e-mail at bhorn@moraga.ca.us. Thank you for your assistance.

Sincerely,

Brian Horn

Senior Planner

Enclosed: Project Location Map

TOWN OF MORAGA

PLANNING DEPARTMENT

June 30, 2023

The Confederated Villages of Lisjan
Corrina Gould, Chairperson
10926 Edes Avenue
Oakland, California 94603
Via email: cvltribe@gmail.com

RE: Assembly Bill 52 Consultation, Sanders Ranch Subdivision New Wireless Facility, Town of Moraga, Contra Costa County, California

Dear Chairperson Gould:

The Town of Moraga (Town) is preparing an Initial Study – Mitigated Negative Declaration (IS-MND) for a proposed new wireless facility within the Sanders Ranch Subdivision in the Town of Moraga (project). The proposed project must comply with California Public Resources Code § 21080.3.1 (Assembly Bill [AB] 52 of 2014), which requires local governments to conduct meaningful consultation with California Native American tribes that have requested to be notified by lead agencies of proposed projects in the geographic area with which the tribe is traditionally and culturally affiliated.

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Sincerely,

Brian Horn

Senior Planner

Enclosed: Project Location Map

TOWN OF MORAGA

PLANNING DEPARTMENT

June 30, 2023

Chicken Ranch Rancheria of Me-Wuk Indians
Lloyd Mathiesen, Chairperson
P.O. Box 1159
Jamestown, California 95327
Via email: lmathiesen@crtribal.com

RE: Assembly Bill 52 Consultation, Sanders Ranch Subdivision New Wireless Facility, Town of Moraga, Contra Costa County, California

Dear Chairperson Mathiesen:

The Town of Moraga (Town) is preparing an Initial Study – Mitigated Negative Declaration (IS-MND) for a proposed new wireless facility within the Sanders Ranch Subdivision in the Town of Moraga (project). The proposed project must comply with California Public Resources Code § 21080.3.1 (Assembly Bill [AB] 52 of 2014), which requires local governments to conduct meaningful consultation with California Native American tribes that have requested to be notified by lead agencies of proposed projects in the geographic area with which the tribe is traditionally and culturally affiliated.

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Sincerely,

Brian Horn

Senior Planner

Enclosed: Project Location Map

TOWN OF MORAGA

PLANNING DEPARTMENT

June 30, 2023

Muwekma Ohlone Indian Tribe of the SF Bay Area
Charlene Nijmeh, Chairperson
20885 Redwood Road, Suite 232
Castro Valley, California 94546
Via email: cnijmeh@muwekma.org

RE: Assembly Bill 52 Consultation, Sanders Ranch Subdivision New Wireless Facility, Town of Moraga, Contra Costa County, California

Dear Chairperson Nijmeh:

The Town of Moraga (Town) is preparing an Initial Study – Mitigated Negative Declaration (IS-MND) for a proposed new wireless facility within the Sanders Ranch Subdivision in the Town of Moraga (project). The proposed project must comply with California Public Resources Code § 21080.3.1 (Assembly Bill [AB] 52 of 2014), which requires local governments to conduct meaningful consultation with California Native American tribes that have requested to be notified by lead agencies of proposed projects in the geographic area with which the tribe is traditionally and culturally affiliated.

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Sincerely,

Brian Horn

Senior Planner

Enclosed: Project Location Map

TOWN OF MORAGA

PLANNING DEPARTMENT

June 30, 2023

North Valley Yokuts Tribe
Katherine Erolinda Perez, Chairperson
P.O. Box 717
Linden, California 95236
Via email: canutes@verizon.net

RE: Assembly Bill 52 Consultation, Sanders Ranch Subdivision New Wireless Facility, Town of Moraga, Contra Costa County, California

Dear Chairperson Erolinda Perez:

The Town of Moraga (Town) is preparing an Initial Study – Mitigated Negative Declaration (IS-MND) for a proposed new wireless facility within the Sanders Ranch Subdivision in the Town of Moraga (project). The proposed project must comply with California Public Resources Code § 21080.3.1 (Assembly Bill [AB] 52 of 2014), which requires local governments to conduct meaningful consultation with California Native American tribes that have requested to be notified by lead agencies of proposed projects in the geographic area with which the tribe is traditionally and culturally affiliated.

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Sincerely,

Brian Horn

Senior Planner

Enclosed: Project Location Map

TOWN OF MORAGA

PLANNING DEPARTMENT

June 30, 2023

Tule River Indian Tribe
Neil Peyron, Chairperson
P.O. Box 589
Porterville, California 93258
Via email: neil.peyron@tulerivertribe-nsn.gov

RE: Assembly Bill 52 Consultation, Sanders Ranch Subdivision New Wireless Facility, Town of Moraga, Contra Costa County, California

Dear Chairperson Peyron:

The Town of Moraga (Town) is preparing an Initial Study – Mitigated Negative Declaration (IS-MND) for a proposed new wireless facility within the Sanders Ranch Subdivision in the Town of Moraga (project). The proposed project must comply with California Public Resources Code § 21080.3.1 (Assembly Bill [AB] 52 of 2014), which requires local governments to conduct meaningful consultation with California Native American tribes that have requested to be notified by lead agencies of proposed projects in the geographic area with which the tribe is traditionally and culturally affiliated.

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Sincerely,

Brian Horn

Senior Planner

Enclosed: Project Location Map

TOWN OF MORAGA

PLANNING DEPARTMENT

June 30, 2023

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister, California 95024
Via email: ams@indiancanyon.org

RE: Assembly Bill 52 Consultation, Sanders Ranch Subdivision New Wireless Facility, Town of Moraga, Contra Costa County, California

Dear Chairperson Sayers:

The Town of Moraga (Town) is preparing an Initial Study – Mitigated Negative Declaration (IS-MND) for a proposed new wireless facility within the Sanders Ranch Subdivision in the Town of Moraga (project). The proposed project must comply with California Public Resources Code § 21080.3.1 (Assembly Bill [AB] 52 of 2014), which requires local governments to conduct meaningful consultation with California Native American tribes that have requested to be notified by lead agencies of proposed projects in the geographic area with which the tribe is traditionally and culturally affiliated.

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Sincerely,

Brian Horn

Senior Planner

Enclosed: Project Location Map

TOWN OF MORAGA

PLANNING DEPARTMENT

June 30, 2023

Nashville Enterprise Miwok-Maidu-Nishinam Tribe
Cosme A. Valdez, Chairperson
P.O. Box 580986
Elk Grove, California 95758-001
Via email: valdezcome@comcast.net

RE: Assembly Bill 52 Consultation, Sanders Ranch Subdivision New Wireless Facility, Town of Moraga, Contra Costa County, California

Dear Chairperson Valdez:

The Town of Moraga (Town) is preparing an Initial Study – Mitigated Negative Declaration (IS-MND) for a proposed new wireless facility within the Sanders Ranch Subdivision in the Town of Moraga (project). The proposed project must comply with California Public Resources Code § 21080.3.1 (Assembly Bill [AB] 52 of 2014), which requires local governments to conduct meaningful consultation with California Native American tribes that have requested to be notified by lead agencies of proposed projects in the geographic area with which the tribe is traditionally and culturally affiliated.

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Sincerely,

Brian Horn

Senior Planner

Enclosed: Project Location Map

TOWN OF MORAGA

PLANNING DEPARTMENT

June 30, 2023

Wuksache Indian Tribe/Eshom Valley Band
Kenneth Woodrow, Chairperson
1179 Rock Haven Court
Salinas, California 93906
Via email: kwood8934@aol.com

RE: Assembly Bill 52 Consultation, Sanders Ranch Subdivision New Wireless Facility, Town of Moraga, Contra Costa County, California

Dear Chairperson Woodrow:

The Town of Moraga (Town) is preparing an Initial Study – Mitigated Negative Declaration (IS-MND) for a proposed new wireless facility within the Sanders Ranch Subdivision in the Town of Moraga (project). The proposed project must comply with California Public Resources Code § 21080.3.1 (Assembly Bill [AB] 52 of 2014), which requires local governments to conduct meaningful consultation with California Native American tribes that have requested to be notified by lead agencies of proposed projects in the geographic area with which the tribe is traditionally and culturally affiliated.

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Sincerely,

Brian Horn

Senior Planner

Enclosed: Project Location Map

NOVEMBER, 1974

TOWN OF MORAGA

PLANNING DEPARTMENT

June 30, 2023

Amah Mutsun Tribal Band of Mission San Juan Bautista
Irene Zwierlein, Chairperson
3030 Soda Bay Road
Lakeport, California 95453
Via email: amahmutsuntribal@gmail.com

RE: Assembly Bill 52 Consultation, Sanders Ranch Subdivision New Wireless Facility, Town of Moraga, Contra Costa County, California

Dear Chairperson Zwierlein:

The Town of Moraga (Town) is preparing an Initial Study – Mitigated Negative Declaration (IS-MND) for a proposed new wireless facility within the Sanders Ranch Subdivision in the Town of Moraga (project). The proposed project must comply with California Public Resources Code § 21080.3.1 (Assembly Bill [AB] 52 of 2014), which requires local governments to conduct meaningful consultation with California Native American tribes that have requested to be notified by lead agencies of proposed projects in the geographic area with which the tribe is traditionally and culturally affiliated.

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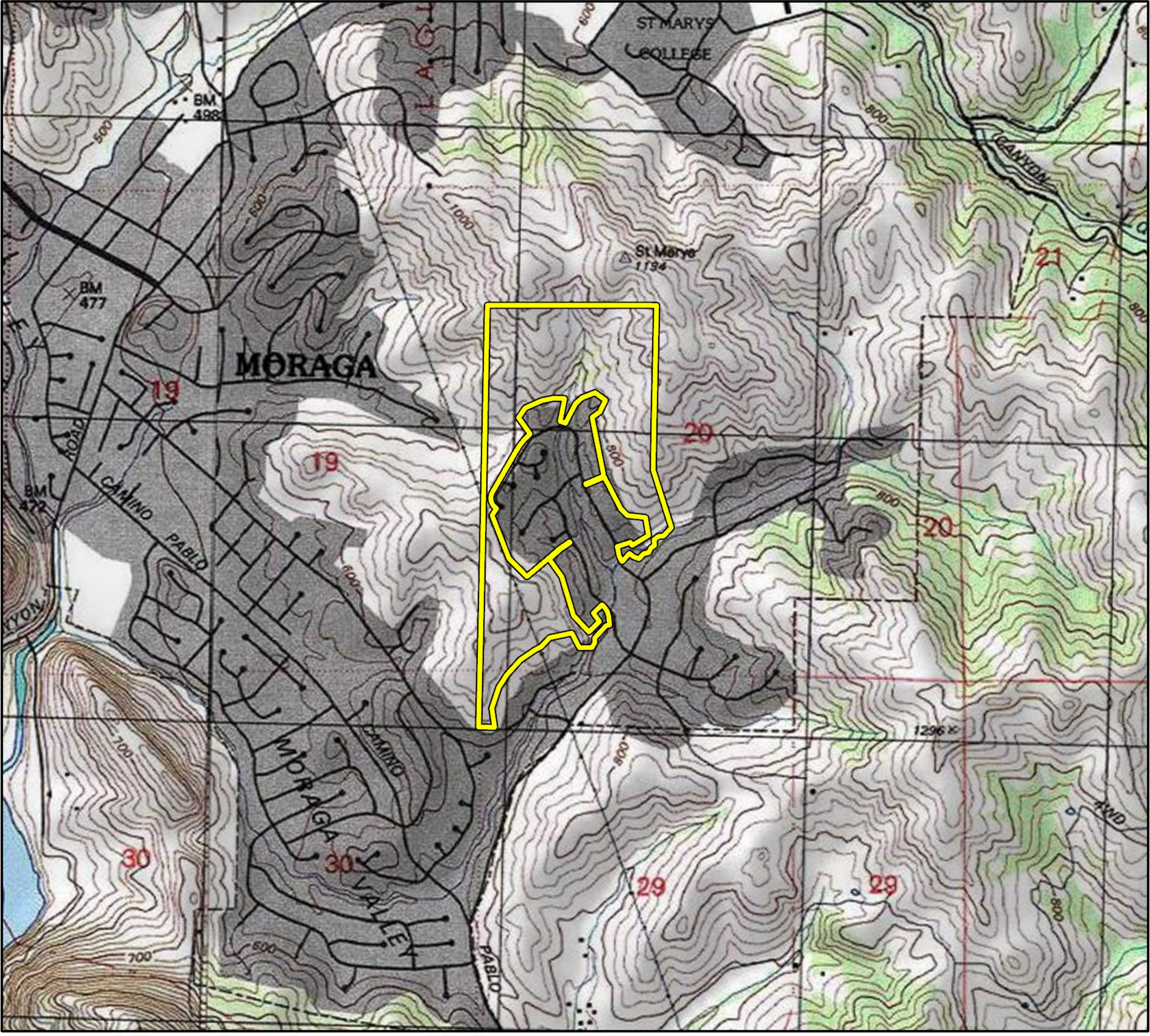
Sincerely,

Brian Horn

Senior Planner

Enclosed: Project Location Map



Basemap provided by National Geographic Society, Esri and their licensors © 2023. Las Trampas Ridge Quadrangle. T01S R02W S19,20,29,30. The topographic representation depicted in this map may not portray all of the features currently found in the vicinity today and/or features depicted in this map may have changed since the original topographic map was assembled.

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Project Location

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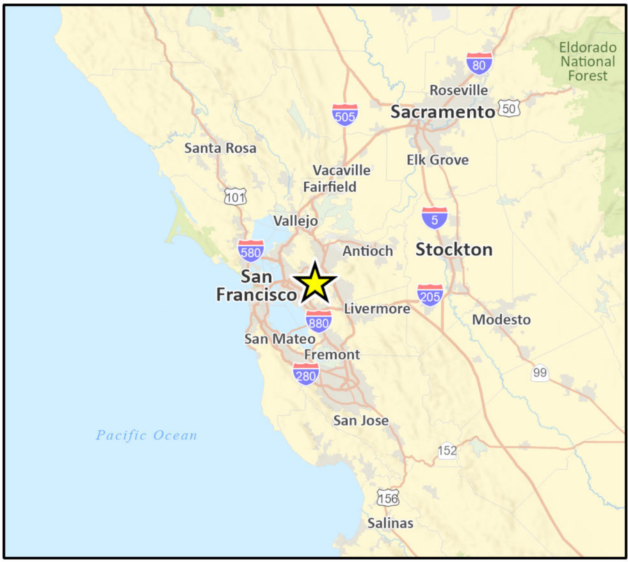

From: Corrina Gould <cvltribe@gmail.com>
Sent: Thursday, July 13, 2023 2:18 PM
To: Brian Horn <bhorn@moraga.ca.us>
Subject: AB52 Consultation Sanders Ranch Subdivision New Wireless Facility

Hello,

Thank you for your email. The Tribe is requesting a copy of the final CHRIS and EIR for this project, along with the SLF from Native American Heritage Commission and any additional archeological reports. Our physical address is: 10926 Edes Ave Oakland CA 94603 or if you would prefer to send them electronically, please send them to this email address.

'Uni (Respectfully),

Corrina Gould, Tribal Chair
Confederated Villages of Lisjan Nation

Appendix C

Biological Resources Assessment

Biological Resource Assessment

FUZE #616519836 / 304480 / Sanders Ranch - C

100 Sanders Ranch Road
Moraga, Contra Costa County, CA 94566

EBI Project Number:
6120009273

March 12, 2021

Prepared By:
AJM Ecological Solutions, LLC
c/o EBI Consulting
21 B Street
Burlington, MA 01803

TABLE OF CONTENTS

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A – FIGURES, MAPS & DRAWINGS

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D – PLANTS & WILDLIFE OBSERVED

E – QUALIFICATIONS

1.0 INTRODUCTION

On September 9, 2020, AJM Ecological Solutions, LLC (AJM) completed a biological resource assessment (BRA) at 100 Sanders Ranch Road Moraga, California 94566 (Attachment A; Figure 1). The approximately 3.2-acre Biological Study Area (BSA) is located approximately 1.2 miles southeast of the town of Moraga, CA. The survey was performed at the request of EBI Consulting to meet compliance with Federal, State, and local jurisdictions to determine if the project could potentially affect sensitive biological resources located on or adjacent to the property. This report analyzes potential effects on sensitive biological resources and jurisdictional areas associated from the proposed project as described below.

1.1 Project Site and History

The Subject Property is located at 100 Sanders Ranch Road in Moraga, Contra Costa County, California. Moraga is located in northern California, and the Subject Property is approximately 1.2 miles southeast of downtown Moraga. The current tenancy is for planned residential use.

The Subject Property and surrounding areas were mostly undeveloped circa 1949 and likely used for cattle grazing or other agricultural use. Circa 1958, electrical power lines and the existing limited residential development after1959. Circa 1963, residential development began in the immediate area with the neighborhood north of the proposed lease area developed circa 1982.

Currently, the land supports PG&E electrical transmissions lines and associated lattice stanchions. The Moraga Trail intersects the property north to south and is located immediately west and parallels the proposed access route. The parcel supports a variety of natural communities including non-native grassland, oak woodlands, and scrub. Note the scrub community consists largely of coyote brush (*Baccharis pilularis*).

1.2 Project Description

The proposed project involves the installation of a new communications facility. Specifically, the proposed installation will consist of outdoor support equipment on a concrete pad within a fenced compound on a 19-foot by 19-foot lease area directly beneath an existing PG&E self-support power stanchion. Antennas will be collocated at a centerline height of 112 feet on a proposed 12-foot extension on the existing power stanchion. Including new appurtenances, the overall height of the tower will increase approximately 9 feet to a total height of approximately 116 feet. Access would be gained via a proposed 15-foot wide by roughly 1,300-foot access/utility easement emanating from Sanders Ranch Road. Utilities will be placed underground within the proposed access route.

2.0 REGULATORY COMPLIANCE

The following sections explain the regulatory context of the biological assessment, including applicable laws and regulations that were applied to the field investigations and analysis of potential project impacts.

2.1 Special Status Species

Special status species include those plants and wildlife species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA). These acts afford protection to both listed and proposed species. In addition, California Department of Fish and Game (CDFW) Species of Special Concern, which are species that face extirpation in California if current population and habitat trends continue; U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern; and CDFW special status invertebrates are all considered special status species. Although CDFW Species of Special Concern generally have no special legal status, they are given special consideration under the California Environmental Quality Act (CEQA). In addition to regulations for special status species, most birds in the United States, including non-status species, are protected by the Migratory Bird Treaty Act of 1918. Under this legislation, destroying active nests, eggs, and young is illegal.

The California Rare Plant Ranking System (CRPR; formerly CNPS) identifies species ranked as 1A/1B and 2A/2B as special status plant species which must be considered under CEQA. Plants classified as Rank 3 under the CRPR, lack necessary information for ranking but must still be considered under CEQA. Rank 4 plants have little or no protection under CEQA.

Critical Habitat

Critical habitat is a term defined and used in the Federal ESA as a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. The ESA requires that federal agencies consult with the USFWS to conserve listed species and to ensure that any activities or projects they fund, authorize, or carry out will not jeopardize the survival of a threatened or endangered species, or adversely modify critical habitat to the point that it will no longer aid in the species' recovery. In many cases, this level of protection is similar to that already provided to species under the ESA "jeopardy standard." However, areas that are currently unoccupied by the species, but which are needed for the species' recovery, are protected by the prohibition against adverse modification of critical habitat.

2.2 Sensitive Biological Communities

Sensitive biological communities include habitats that fulfill special functions or have special values, such as wetlands, streams, and riparian habitat. These habitats are protected under federal regulations (such as the Clean Water Act), state regulations (such as the Porter-Cologne Act, the CDFW Streambed Alteration Program, and CEQA), or local ordinances or policies (City or County Tree Ordinances, Special Habitat Management Areas, and General Plan Elements).

Waters of the United States
The U.S. Army Corps of Engineers (Corps) regulates "Waters of the United States" under Section 404 of the Clean Water Act. "Waters of the U.S." are defined broadly as waters susceptible to use in commerce, including interstate waters and wetlands, all other waters (intrastate waterbodies, including wetlands), and their tributaries (33 CFR 328.3). Potential wetland areas, according to the three criteria used to delineate wetlands stated in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), are identified by the presence of (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology. Areas that are inundated for sufficient duration and depth to exclude growth of hydrophytic vegetation are subject to Section 404 jurisdiction as "other waters" and are often characterized by an ordinary high-water mark (OHWM). Other waters, for example, generally include lakes, rivers, and streams. The placement of fill material into "Waters of the U.S." (Including wetlands) generally requires an individual or nationwide permit from the Corps under Section 404 of the Clean Water Act.

Waters of the State
The term "Waters of the State" is defined by the Porter-Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." The Regional Water Quality Control Board (RWQCB) protects all waters in its regulatory scope, but has special responsibility for wetlands, riparian areas, and headwaters. These water bodies have high resource value, are vulnerable to filling, and are not systematically protected by other programs. The RWQCB's jurisdiction includes "isolated" wetlands and waters that may not be regulated by the Corps under Section 404. "Waters of the State" are regulated by the RWQCB under the State Water Quality Certification Program which regulates discharges of fill and dredged material under Section 401 of the Clean Water Act and the Porter-Cologne Water Quality Control Act. Projects that require a Corps permit, or fall under other federal jurisdiction, and have the potential to impact "Waters of the State," are required to comply with the terms of the Water Quality Certification determination. If a proposed project does not require a federal permit but does involve dredge or fill activities that may result in a discharge to "Waters of the State," the RWQCB has the option to regulate the dredge and fill activities under its state authority in the form of Waste Discharge Requirements.

Streams, Lakes, and Riparian Habitat
Streams and lakes, as habitat for fish and wildlife species, are subject to jurisdiction by CDFW under Sections 1600-1616 of California Fish and Game Code. Alterations to or work within or adjacent to streambeds or lakes generally require a 1602 Lake and Streambed Alteration Agreement. The term stream, which includes creeks and rivers, is defined in the California Code of Regulations (CCR) as follows: "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation" (14 CCR 1.72). In addition, the term stream can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife (CDFW ESD 1994). Riparian is defined as, "on, or pertaining to, the banks

of a stream;" therefore, riparian vegetation is defined as, "vegetation which occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself" (CDFW ESD 1994). Removal of riparian vegetation also requires a Section 1602 Lake and Streambed Alteration Agreement from CDFW.

Other Sensitive Biological Communities

Other sensitive biological communities not discussed above include habitats that fulfill special functions or have special values. Natural communities considered sensitive are those identified in local or regional plans, policies, regulations, or by the CDFW. CDFW ranks sensitive communities as "threatened" or "very threatened" and keeps records of their occurrences in its Natural Diversity Database (CNDDB; CDFW 2021). Sensitive plant communities are also identified by CDFW (2003, 2007) and, more recently, the List of Vegetation Alliances, December 28, 2009 (CDFW 2009). CNDDB vegetation alliances are ranked 1 through 5 based on NatureServe's (2010) methodology, with those alliances ranked globally (G) or statewide (S) as 1 through 3 considered sensitive. Impacts to sensitive natural communities identified in local or regional plans, policies, regulations or by the CDFW or USFWS must be considered and evaluated under CEQA (California Code of Regulations: Title 14, Div. 6, Chap. 3, Appendix G). Specific habitats may also be identified as sensitive in City or County General Plans or ordinances.

2.3 Habitat Conservation Plan

The project site does not fall within any Habitat Conservation Plan, regional or local, and will not have to follow any rules or regulations of any other Habitat Conservation Plan. The closest such plan is the East Contra Costa County Habitat Conservation Plan.

2.4 Regional and Local

The proposed project development will have to abide by all local and regional ordinances and regulations. Specifically, the following:

Contra Costa County General Plan

The purpose of the Contra Costa County General Plan is to express the broad goals and policies, and specific implementation measures, which will guide decisions on future growth, development, and the conservation of resources through the year 2020. The following are the applicable General Plan goals and policies most pertinent to the project with regard to protection and preservation of the natural resources in the area.

- **8-A.** To preserve and protect the ecological resources of the County.
- **8-B.** To conserve the natural resources of the County through control of the direction, extent and timing of urban growth.
- **8-D.** To protect ecologically significant lands, wetlands, plant, and wildlife habitats.
- **8-E**. To protect rare, threatened and endangered species of fish, wildlife, and plants, significant plant communities, and other resources which stand out as unique because of their scarcity, scientific value, aesthetic quality or cultural significance. Attempt to achieve a significant net increase in wetland values and functions within the County over the life of the General Plan. The definition of rare, threatened, and endangered includes those definitions provided by the Federal Endangered Species Act, the California Endangered Species Act, the California Native Plant Protection Act, and the California Environmental Quality Act.
- **8-1.** Resource utilization and development shall be planned within a framework of maintaining a healthy and attractive environment.
- **8-3.** Watersheds, natural waterways, and areas important for the maintenance of natural vegetation and wildlife populations shall be preserved and enhanced.
- **8-6.** Significant trees, natural vegetation, and wildlife populations generally shall be preserved.
- **8-7**. Important wildlife habitats which would be disturbed by major development shall be preserved, and corridors for wildlife migration between undeveloped lands shall be retained.
- **8-9.** Areas determined to contain significant ecological resources, particularly those containing endangered species, shall be maintained in their natural state and carefully regulated to the maximum legal extent. Acquisition of the most ecologically sensitive properties within the County by appropriate public agencies shall be encouraged.

- **8-10.** Any development located or proposed within significant ecological resource areas shall ensure that the resource is protected.
- **8-12**. Natural woodlands shall be preserved to the maximum extent possible in the course of land development.
- **8-13.** The critical ecological and scenic characteristics of rangelands, woodlands, and wildlands shall be recognized and protected.
- **8-14.** Development on hillsides shall be limited to maintain valuable natural vegetation, especially forests and open grasslands, and to control erosion. Development on open hillsides and significant ridgelines throughout the County shall be restricted, and hillsides with a grade of 26 percent or greater shall be protected through implementing zoning measures and other appropriate actions.
- **8-15.** Existing vegetation, both native and non-native, and wildlife habitat areas shall be retained in the major open space areas sufficient for the maintenance of a healthy balance of wildlife populations.
- **8-17.** The ecological value of wetland areas, especially the salt marshes and tidelands of the bay and delta, shall be recognized. Existing wetlands in the County shall be identified and regulated. Restoration of degraded wetland areas shall be encouraged and supported whenever possible.
- **8-21.** The planting of native trees and shrubs shall be encouraged in order to preserve the visual integrity of the landscape, provide habitat conditions suitable for native wildlife, and ensure that a maximum number and variety of well-adapted plants are sustained in urban areas.
- **8-22.** Applications of toxic pesticides and herbicides shall be kept at a minimum and applied in accordance with the strictest standards designed to conserve all the living resources of the County. The use of biological and other non-toxic controls shall be encouraged.
- **8-24.** The County shall strive to identify and conserve remaining upland habitat areas which are adjacent to wetlands and are critical to the survival and nesting of wetland species.
- **8-27.** Seasonal wetlands in grassland areas of the County shall be identified and protected.
- **8-28.** Efforts shall be made to identify and protect the County's mature native oak, bay, and buckeye trees.
- **9-A.** To preserve and protect the ecological, scenic, cultural/historic, and recreational resource lands of the county.
- **9-C.** To achieve a balance of open space and urban areas to meet the social, environmental, and economic needs of the county now and for the future.

Contra Costa County Municipal Code
- Chapter 82-1—65/35 Land Preservation Plan
  - Chapter 82-1 covers the implementation of the general plan and the various regulations regarding development in urban and undeveloped areas.

3.0 ASSESSMENT METHOD

Prior to the biological resources field survey, AJM Principal Ecologist, Mr. Tony Maguire, PWS, CWB® conducted a database records search to identify natural communities and previously recorded existence or potential occurrence of special-status biological resources (e.g., plant and animal species, and vegetation communities) within or in the vicinity of the BSA. Special-status species potentially relevant to the project are those that are federally and/or State-listed, proposed for listing, or candidate species for designation as threatened or endangered; species listed as species of concern by the California Department of Fish and Wildlife (CDFW, 2021), and/or plants with a California Rare Plant Ranking (CRPR) of 1B or 2B by the California Native Plant Society (CNPS).

AJM reviewed the following databases:

- The California Natural Diversity Data Base information (CNDDB) (Data download: February 2021). *AJM* reviewed species information within a 2-mile radius of the BSA.

- The CNPS Online Inventory of Rare and Endangered Plants of California (March 2021, CNPS Inventory 9 Quads).
- The United States Fish and Wildlife Service (USFWS) Information Planning and Consultation (IPaC) (Updated March 2021).
- The California Department of Fish and Wildlife (CDFW) Rarefind: USGS quad: Briones Valley (3712282), Clayton (3712188), Oakland East (3712272), Walnut Creek (3712281), Las Trampas Ridge (3712271), Diablo (3712178), San Leandro (3712262), Hayward (3712261), Dublin (3712168)
- National Wetland Inventory (NWI) (March 2021)
- Natural Resource Conservation Service – USDA - Web Soil Survey (March 2021)

3.1 Field Survey

AJM biologist surveyed the BSA on March 3, 2021 between the hours of 0800 – 1130 hrs. The survey occurred under partly cloudy skies, with west winds ranging from 0 -5 mph, and temperatures ranging between 59° – 65°.

Natural community boundaries were identified and noted on high-resolution aerial photograph. The following sections detail the methods utilized to define the Study Area.

3.2 Special Status Species

Potential occurrence of special-status species in the Study Area were evaluated by first determining which special-status species occur in the vicinity of the Study Area through a literature and database search. Database searches for known occurrences of special-status species focused 9 quadrants centered on Las Trampas Ridge (3712271). Data reviewed from the CDFW/CNDDB database, USFWS IPaC and the CNPS provided the survey baseline data.

3.2.1 Special Status Plant Species

Potential occurrence of special-status plants in the BSA were determined through a literature and database search (Attachment C).

The plant survey consisted of traversing the entire BSA and included an approximate 50-foot survey buffer. All observed plant species (Attachment B) were identified to the appropriate taxonomic level necessary to determine their rarity status. Plants were identified using the Jepson Manual (Hickam 1993), Jepson Manual, 2nd Edition (Baldwin et al. 2012), and Plants of the San Francisco Bay Region: Mendocino to Monterey (Beildleman, Linda H. (Revised, ed 2003). A Flora of Sonoma County (Best et al. 1996). Nomenclature follows Baldwin et al. (2012) unless otherwise noted.

Table 2 lists criteria for evaluating special-status plant and wildlife species potential for occurrence. Attachment C contains a table showing the special-status plant and wildlife species with the potential to occur in the BSA and/or the project vicinity (up to 2 miles).

Table 1: Criteria for evaluating special status plant and wildlife species potential for occurrence (PFO).

PFO	Criteria
Absent	Species is restricted to habitats or environmental conditions that do not occur in the study area.
Low	Historical records for this species do not exist in the study area, and/or habitats or environmental conditions needed to support the species are of poor quality.
Moderate	Either a historical record exists of the species in the study area and marginal habitat exists in the proposed work areas or the habitat requirements or environmental conditions associated with the species occur in the proposed work areas, but no historical records exist in the study area.
High	Both a historical record exists of the species and the habitat requirements and environmental conditions associated with the species occur in the study area.
Present	Species was detected in or near the study area during project surveys.

3.2.2 Special Status Wildlife Species

Potential occurrence of special-status wildlife in the BSA were determined through a literature and database search (Attachment C).

Records from the CNDDB (CDFW 2021), the California Department of Fish and Wildlife Rarefind (CDFW), and the USFWS IPaC (USFWS 2021) were reviewed to determine which special-status wildlife species have been documented within 2-miles of the BSA.

4.0 ENVIRONMENTAL SETTING

The following section is a review of the physical conditions and land-use history, as well as the existing vegetation types, within the BSA.

4.1 Land Use History

The Subject Property and surrounding areas were mostly undeveloped circa 1949 and likely used for cattle grazing or other agricultural use. Circa 1958, electrical power lines and the existing limited residential development after1959. Circa 1963, residential development began in the immediate area with the neighborhood north of the proposed lease area developed circa 1982.

Currently, the land supports PG&E electrical transmissions lines and associated lattice stanchions. The Moraga Trail intersects the property north to south and is located immediately west and parallels the proposed access route. The parcel supports a variety of natural communities including non-native grassland, oak woodlands, and scrub. Note the scrub community consists largely of coyote brush (*Baccharis pilularis*).

4.2 Soils

AJM reviewed the United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) Web Soil Survey (WSS) for the Project Site and immediate vicinity. According to EBI's review, soils at the Project Site consist of Los Osos clay, 30 to 50 percent slopes. This well drained soil supports a water table more than 80-inhces below the soil surface and a restrictive layer between 24-inches and 40-inches to paralithic rock. This soil is not listed as hydric by the NRCS (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/).

Native and naturalized vegetation associated with these soils include annual grasslands, with *Baccharis* scrub, and oak woodlands (USDA 2003).

4.3 Natural Communities

AJM mapped all vegetation communities within the BSA (Attachment A, Figure 2) and recorded all plant species observed (Attachment D). The status of these communities and plant species is discussed in Section 5.0. Vegetation communities and dominant plant species are described below.

Table 2: Biological Communities within the BSA.

Community Type	Survey Area	Impact Area
Non-native grasslands/herbaceous	2.86 acres	0.45 acre
Northern coyote brush scrub	0.23 acre	0.04 acre
Ornamental – Roadside planting	0.1 acre	NA
Total BSA	Approximately 3.19 acres	0.49 acre

[1] CNPS 2020
[2] MCV – Accessed 2020; Holland 1986
[3] Sawyer et al. 2009

Non-native grasslands: This vegetation community as described in the literature (Holland 1986, Sawyer et al. 2009) consists of dense to sparse cover of annual grasses with flowering culms. This community typically occurs on fine textured, usually clay soils that is waterlogged during the winter rainy season and very dry during the summer and fall. Within the BSA, non-native grasslands comprise the majority of the semi-natural community.

Plants observed included Italian ryegrass (*Festuca perennis*), foxtail barley (*Hordeum murinum*), ripgut brome (*Bromus diandrus*), western oat grass (*Avena occidentalis*), with the latter comprising the majority of the grasses. In addition, large areas of single species dominance occur throughout the BSA. These areas were predominantly occupied with fennel (*Foeniculum vulgare*), mustard (*Brassica nigra*), or bur chervil (*Anthriscus caucalis*). Intermixed within the non-native grasslands and herbaceous dominant areas included a poorly defined mixture of herbaceous vegetation includes pineapple weed (*Matricaria discoidea*), scarlet pimpernel (*Anagallis arvenis*), English plantain (*Plantago lanceolata*), bur clover (*Medicago polymorpha*), storksbill (*Erodium cicutarium*), Italian thistle (*Carduus pycnocephalus*), black mustard, carrot (*Daucus carota*), and California poppy (*Eschscholzia californica*).

Coyote brush scrub: This ecological system includes a variety of mixed and single-species-dominated shrublands that occur on windy exposed sites and typically represents the first stage of succession of scrub occupation of former grasslands sites. It is associated wtih northern coastal scrub but dominated by coyote brush.

Within the BSA, this community largely consisted of dense coyote bursh (*Baccharis pilularis*) and poison oak (*Toxicodendrun diversilobum)* largely lacking understory vegetation.

Ornamental: This vegetation community is not described in the literature (Holland 1986, Sawyer et al. 2009). However, as observed during the field visit, it consists of previously cleared and graded lands that have been planted with ornamental redwood trees (*Sequoia sempervirens*). The understory vegetation largely consists of managed ruderal herbaceous vegetation.

5.0 RESULTS

The following sections contain a description of BSA documented during *AJM's* assessments. Attachment A; Figure 2 shows the natural communities observed in the BSA. A list of all plant species observed within the Study Area is included in Attachment D. Representative photographs of the Study Area are included in Appendix B.

5.1 Environmental Setting

The 3.2-acre BSA primarily consists of non-native grassland and non-native invasive herbaceous lands with dense areas of coyote brush occurring along the edge of the BSA - outside the proposed project footprint. The proposed lease area is located within the PG&E power stanchion footprint and supports non-native grasses and forbs. The larger landscape is bound by residential developments west, south, east, and north of the Site with an approximate 800-foot wide wildlife corridor occurring northeast of the Site. This corridor leads to additional open space largely utilized for cattle grazing. No special status natural communities (e.g. – wetlands, seeps, streams, riparian, rock outcrops, serpentine soil, etc) were observed within the BSA.

5.2 Special Status Species

5.2.1 Special Status Plant Species

A total of 55 special-status plant species (Attachment C) have been documented within a nine-quad search of the BSA, of which no species have potential to occur within the BSA due to one or more of the following reasons:

- Hydrologic conditions (e.g. tidal, riverine) necessary to support the special-status plant species are not present in the BSA;
- Edaphic (soil) conditions (e.g. volcanic tuff, serpentine) necessary to support the special status plant species are not present in the BSA;
- Topographic conditions (e.g. north-facing slope, montane) necessary to support the special-status plant species are not present in the BSA;
- Unique pH conditions (e.g. alkali scalds) necessary to support the special-status plant species are not present in the BSA;
- Associated vegetation communities (e.g. interior chaparral, tidal marsh) necessary to support the special-status plant species are not present in the BSA;

- The Study Area is geographically isolated (e.g. below elevation, coastal environ) from the documented range of the special-status plant species.
- Prevalence of invasive non-native plant species.
- Land management practices (i.e. mowing, weeding, stockpiling)

5.2.2 Special Status Wildlife Species

A total of 44 special-status wildlife species have been documented within the greater vicinity of the BSA, of which three have the low potential to occur within the Study Area (Attachment C). Of the 44 special-status wildlife species that have been documented, 43 have no potential to occur within the BSA due to one or more of the following reasons:

- Aquatic habitats (e.g. rivers, ponds, estuaries) necessary to support the special-status wildlife species are not present in the BSA;
- Vegetation habitats (e.g. oak woodlands, old-growth Douglas fir-coast redwood) that provide nesting and/or foraging resources necessary support the special-status wildlife species are not present in the BSA;
- Structures or vegetation (e.g. old-growth trees) necessary to provide nesting or cover habitat to support the special-status wildlife species are not present in the BSA;
- Host plants (e.g. Harlequin lotus) necessary to provide larval and nectar resources for the special-status wildlife species are not present in the BSA;
- The Study Area is outside (e.g. north of, west of) of the special-status wildlife species documented nesting range.
- Prevalence of invasive non-native plant species.
- Land management practices (i.e. mowing, weeding)

5.2.3 Nesting Birds

Non-native grasslands provide suitable nesting habitat for passerine bird species protected under the MBTA.

Construction activities could disturb ground nesting and adjacent shrub nesting birds within and around the construction site. Potential impacts on special-status and migratory birds that could result from the construction and operation of the project include the destruction of eggs or occupied nests, mortality of young, and the abandonment of nests with eggs or young birds prior to fledging. If these species were found to be present, impacts to these species would be significant. The project would likely be required to conduct pre-construction nesting bird surveys to reduce impacts to nesting birds to a less than significant level.

5.3 Jurisdictional Waters and Wetlands

An assessment of potentially jurisdictional features was conducted as part of the literature review and reconnaissance-level survey for the project site. The project site does not contain any wetlands or other areas designated as waters of the US and no further studies or regulatory permitting would be required. Therefore, the project would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA.

5.4 Habitat Conservation Plan

The project site does not fall within the coverage area of a habitat conservation plan or natural community conservation plan. The East Contra Costa County Habitat Conservation Plan area is the nearest habitat conservation plan area. Therefore, there would be no construction impact related to consistency with a conservation plan.

6.0 IMPACT ANALYSIS AND RECOMMENDATIONS

The following discussion addresses potential impacts to special-status biological resources resulting from the proposed project and recommends mitigation measures, where appropriate, to minimize those impacts to a level of "less than significant" under CEQA.

6.1 Special Status Wildlife

The California horned lark is ground nesting bird that will utilize bare soil openings within grassland communities. Although this species was not observed during the biological survey, there is a low potential for this CDFW ‘watchlist’ species to occur within the BSA.

7.0 MITIGATION MEASURES

Potential Impact 1: Construction associated with the proposed installation has the potential to impact breeding birds during the nesting season. Impacts to breeding birds are prohibited by the Migratory Bird Treaty Act (MBTA).

Mitigation Measure 1-1: The bird breeding season typically extends from February to August. Ideally, the clearing of vegetation and the initiation of construction can be done in the non-breeding season between September and January. If these activities cannot be done in the non-breeding season, a qualified biologist shall perform pre-construction breeding bird surveys within 14 days of the onset of construction or clearing of vegetation. If active breeding bird nests are observed, no ground disturbance activities shall occur within a minimum 100-foot exclusion zone. These exclusion zones may vary depending on species, habitat, and level of disturbance. The exclusion zone shall remain in place around the active nest until all young are no longer dependent upon the nest. A biologist should monitor the nest site weekly during the breeding season to ensure the buffer is sufficient to protect the nest site from potential disturbances.

PREPARER

AJM Principal Ecologist Mr. Anthony Maguire, PWS, CWB® prepared this report.

Respectfully Submitted,

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Principal Ecologist
(650) 833-9592 / tmaguire@ajm-eco.com

8.0 References

American Ornithologists' Union. 1998. The *A.O.U. Checklist of North American Birds*, Seventh Edition, American Ornithologists' Union, Washington D.C.; and supplements; see http://www.aou.org/checklist/north/index.php.

Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012. The Jepson Manual: Vascular Plants of California, Second Edition. University of California Press, Berkeley.

Beildleman, Linda H. (Revised, ed 2003). Plants of the San Francisco Bay Region: Mendocino to Monterey. Rev. ed. Of: Plants of San Francisco Bay Region / Eugene N. Kozloff and Linda H. Beildleman. c1994

California Department of Fish and Wildlife (CDFW). 2020. *California Natural Diversity Data Base. California Natural Diversity Data Base (CNDDB), Commercial Version.* August, 2020. California Department of Fish and Game, Biogeographic Data Branch, Sacramento, California.

California Natural Diversity Database (CNDDB). 2020. Biogeographic Information and Observation System (BIOS). Retrieved September, 2020 from https://apps.wildlife.ca.gov/cnddb-subscriptions/downloads.

California Native Plant Society, Rare Plant Program. 2020. Inventory of Rare and Endangered Plants (online edition, v8-03 0.38). California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org. Accessed July 2020.

California Native Plant Society, 2020. Manual of California Vegetation. California Native Plant Society, Sacramento, CA. Website https://www.cnps.org/vegetation/manual-of-california-vegetation. Accessed September, 2020.

Calflora: Information on California plants for education, research and conservation, with data contributed by public and private institutions and individuals, including the Consortium of California Herbaria. [web application]. 2020. Berkeley, California: The Calflora Database [a non-profit organization]. Available: https://www.calflora.org/ (Accessed: September, 2020).

Crother, B.I. ed. 2012. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico. *Herpetological Circular* 39.

Hickman, J.C., ed. 1993. *The Jepson Manual: Higher Plants of California*. University of California Press, Berkeley and Los Angeles, CA. 1,400 pp.

Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. State of California, The Resources Agency, Department of Fish and Wildlife, Natural Heritage Division, Sacramento, California.

North American Butterfly Association. 2001. *NABA checklist and English Names of North American Butterflies*, Second Edition, North American Butterfly Association, Morristown, New Jersey; see http://www.naba.org/pubs/checklst.html.

Natureserve. 2020. NatureServe Web Service. Arlington, VA. U.S.A. Available http://services.natureserve.org.

Sawyer, J.O., T. Keeler-Wolf, and J. Evens. 2009. A Manual of California Vegetation, 2nd Edition. California Native Plant Society in collaboration with California Department of Fish and Game, Sacramento, CA.1300 pp.

Stebbins, R.C., and S.M. McGinnis. 2012. *Field Guide to Amphibians and Reptiles of California*, Revised Edition, University of California Press, Berkeley.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/.

U.S. Fish and Wildlife Service (USFWS). 2002 National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

U.S. Fish and Wildlife Service (USFWS). 2013. List of Federal Endangered and Threatened Species that Occur in Mendocino County, California. Available at: http://www.fws.gov/sacramento/es/. Accessed: September 2020.

UNITED STATES DEPARTMENT OF AGRICULTURE (USDA), SOIL SURVEY STAFF. 1973. *SOIL SURVEY OF SAN DIEGO COUNTY AREA*, CALIFORNIA. SOIL CONSERVATION SERVICE IN COOPERATION WITH THE UNIVERSITY OF CALIFORNIA, AGRICULTURAL EXPERIMENT STATION.

UNITED STATES GEOLOGICAL SURVEY (USGS). 2016. 7.5-MINUTE TOPOGRAPHIC QUADRANGLE MAPS FOR POWAY, CALIFORNIA, CALIFORNIA.

Western Regional Climate Center (WRCC). 2013. Western U.S. Climate Summaries – NOAA Cooperative Stations, Desert Research Institute. Available at: http://www.wrcc.dri.edu/. Accessed: December 2020.

WILSON, D.E., AND D.M. REEDER, EDS. 2005. *MAMMAL SPECIES OF THE WORLD*, THIRD EDITION, JOHNS HOPKINS UNIVERSITY PRESS, BALTIMORE,

ATTACHMENT A
FIGURES

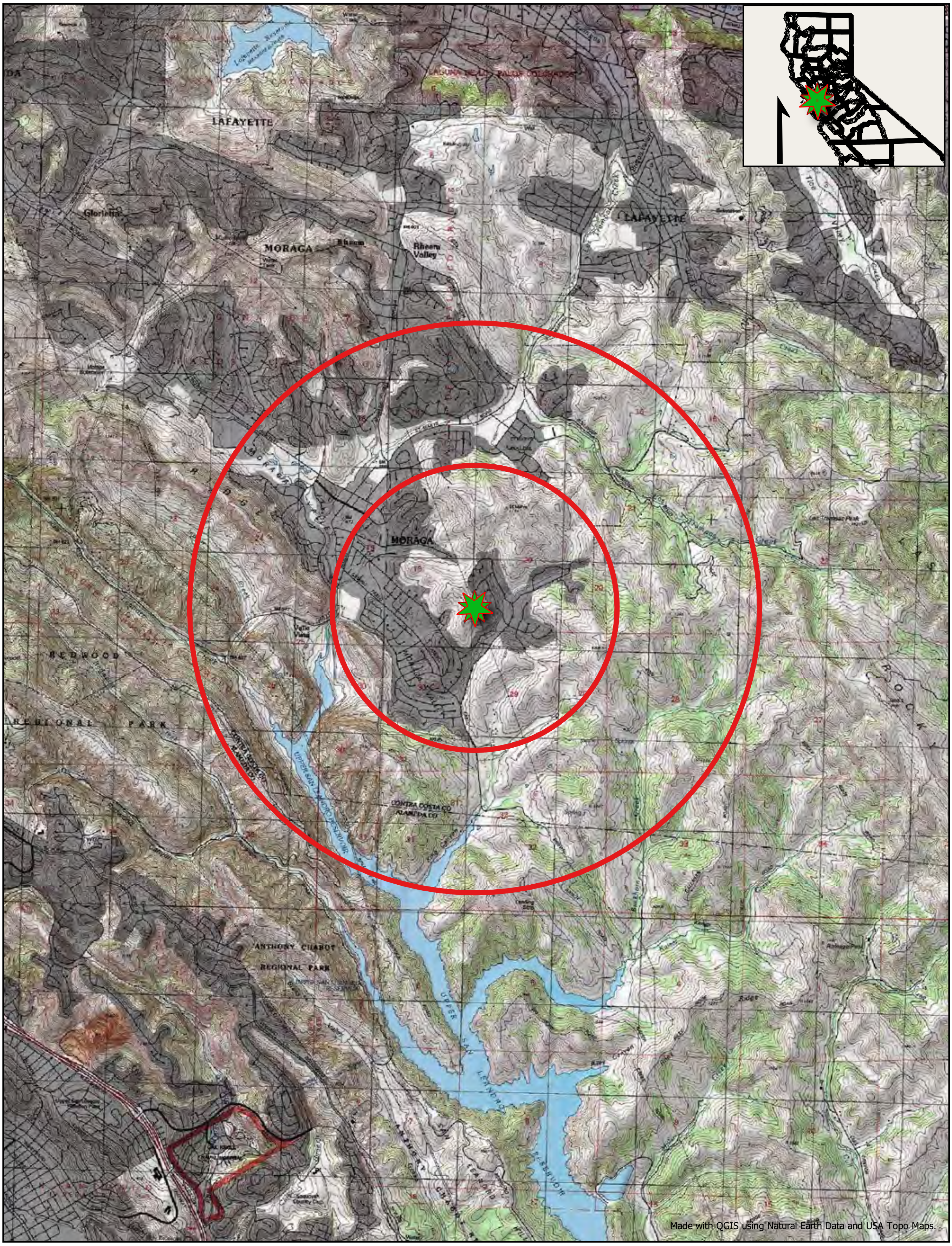


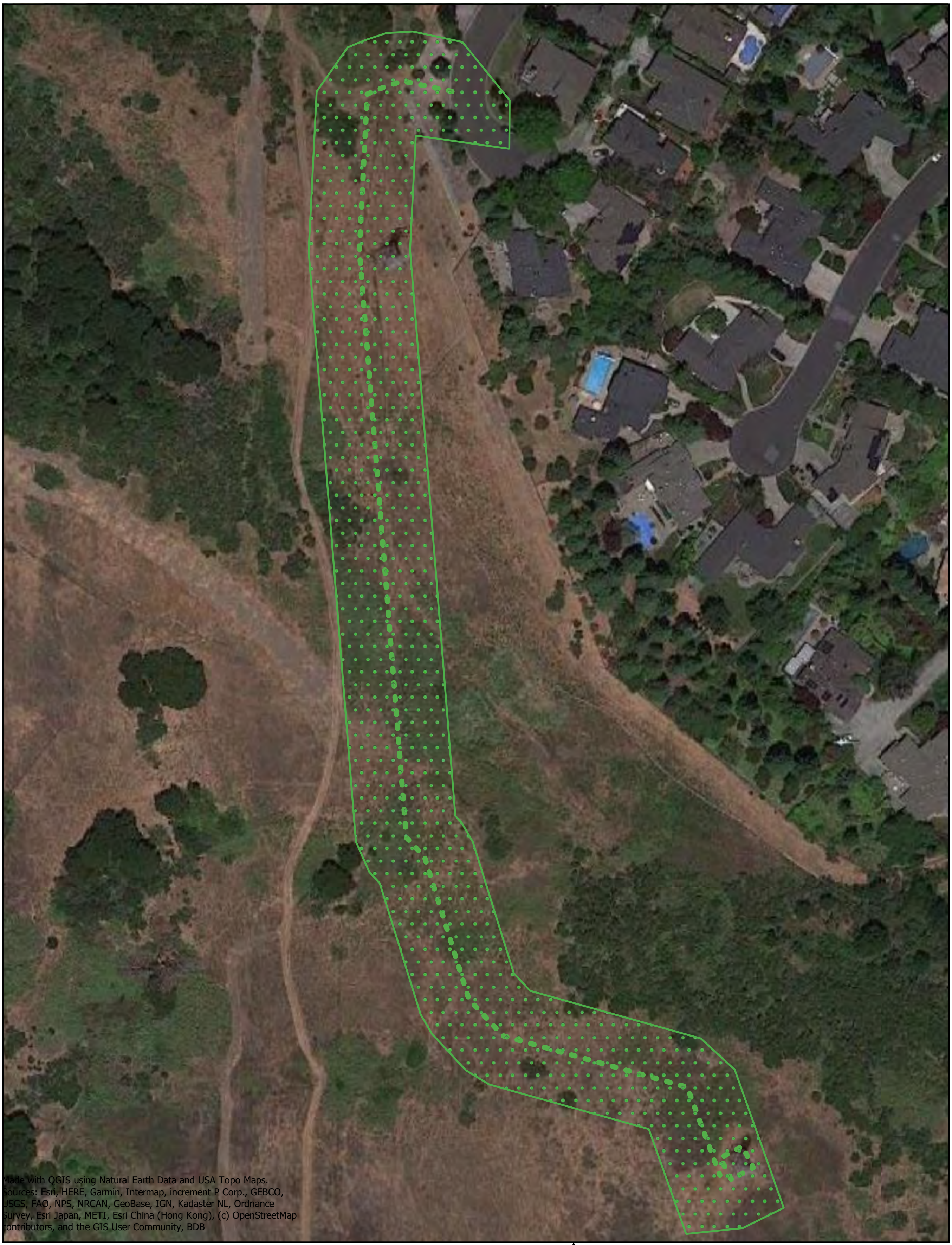
Figure 1. Location Map.
FUZE #616519836 / 304480 / Sanders Ranch - C
100 Sanders Ranch Road, Moraga, Contra Costa County, CA 94566
Lat: 37° 49' 25.7088" N
Long: 122° 06' 52.02" W

0 0.5 1 1.5 2 mi

□ 1-Mile & 2-Mile Radius

✸ Project Site

AJM Ecological Solutions, LLC



Made with QGIS using Natural Earth Data and USA Topo Maps.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, BDB

Figure 2. Biological Survey Area
FUZE #616519836 / 304480 / Sanders Ranch - C
100 Sanders Ranch Road, Moraga, Contra Costa County,
CA 94566

N

0 200 400 600

▨ 50-Foot Survey Area

╌ Access_Utility Route

AJM ECOLOGICAL SOLUTIONS, LLC

AJM Ecological Solutions, LLC

Made with QGIS using Natural Earth Data and USA Topo Maps.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, BDB

Figure 2.a Natural community map
FUZE #616519836 / 304480 / Sanders Ranch - C
100 Sanders Ranch Road, Moraga, Contra Costa County, CA 94566

N

0 200 400 600

🟩 Non-native grasslands (2.86 ac)

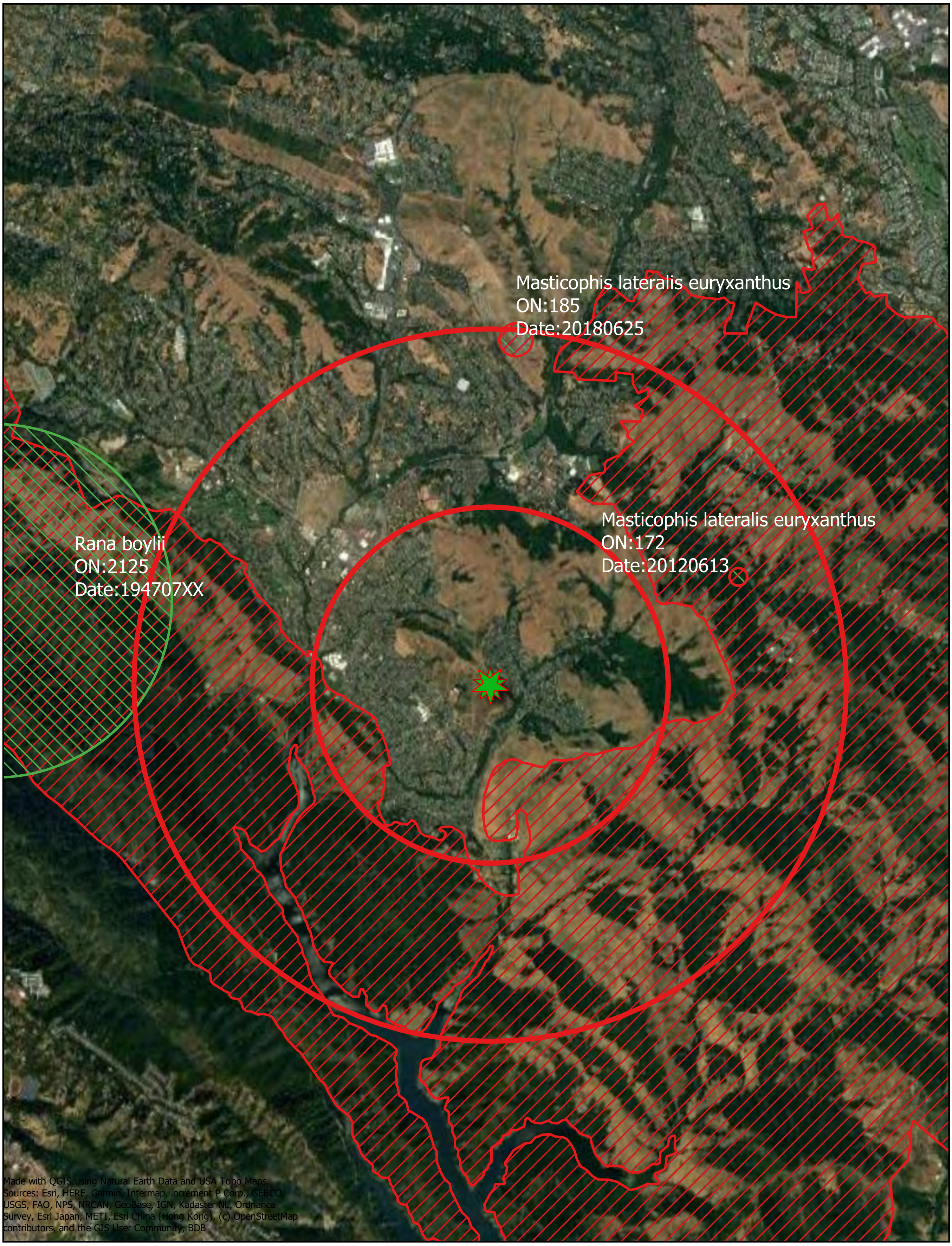
🟧 Baccharis Scrub (0.23 ac)

🟨 Ornamental (0.1 ac)

⬚ 50-Foot Survey Area

- - Access_Utility Route

AJM Ecological Solutions, LLC



Made with QGIS using Natural Earth Data and USA Topo Maps.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, BDB

Figure 3. CNDDB Occurrence Map
FUZE #616519836 / 304480 / Sanders Ranch - C
100 Sanders Ranch Road, Moraga, Contra Costa County, CA

- 🟥 1-Mile & 2-Mile Radius
- ▨ Federally Protected Species
- ▨ State Protected Species
- ✸ Project Site
- ▨ AWS Critical Habitat

AJM Ecological Solutions, LLC

Made with QGIS using Natural Earth Data and USA Topo Maps.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, BDB

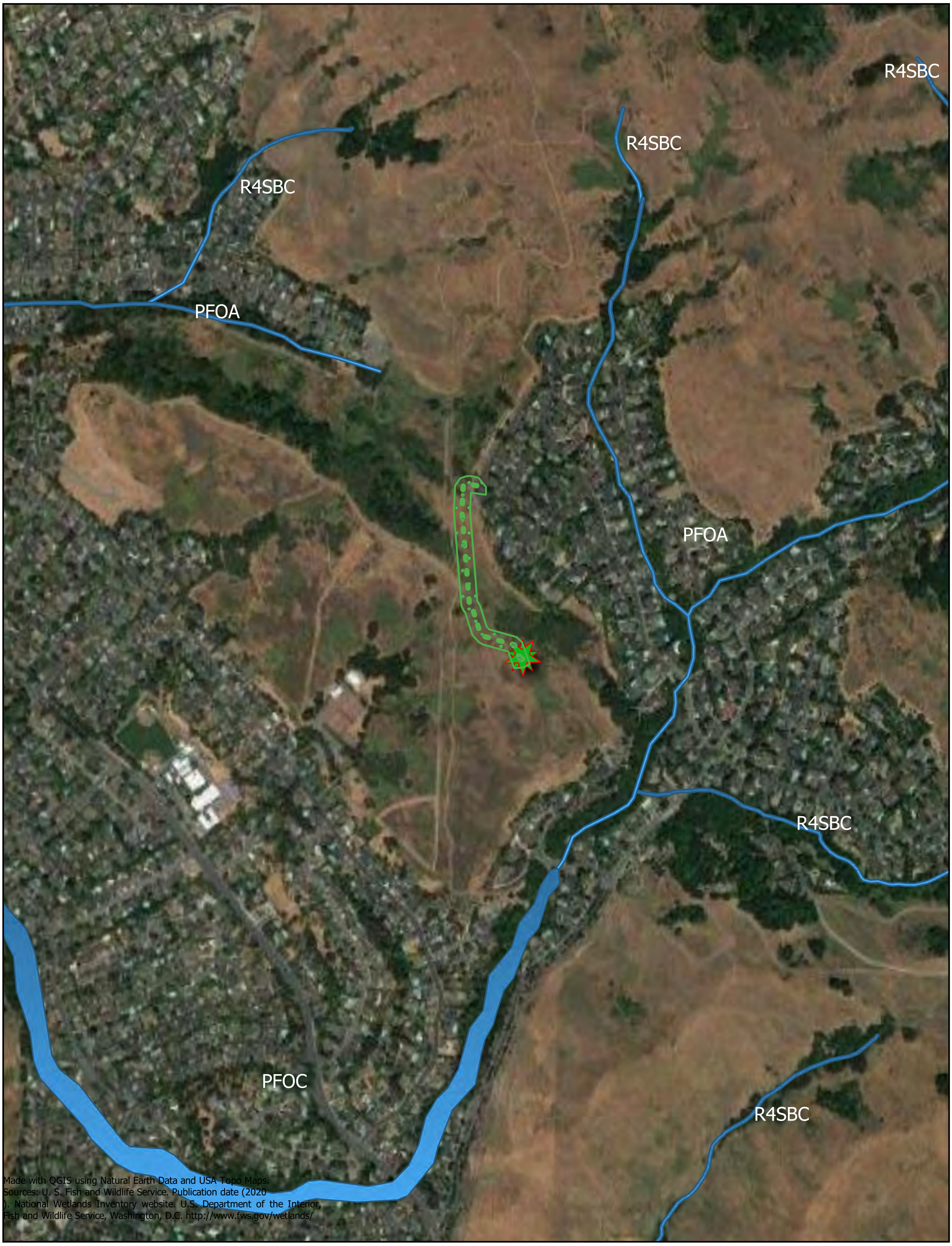
Figure 4. CNPS Rare Plant Occurrences
FUZE #616519836 / 304480 / Sanders Ranch - C
100 Sanders Ranch Road, Moraga, Contra Costa County, CA

0 0.5 1 1.5 2 mi

N

🟥 1-Mile & 2-Mile Radius
✷ Project Site
▨ CNPS Rare Plants

AJM Ecological Solutions, LLC



Made with QGIS using Natural Earth Data and USA Topo Maps.
Sources: U. S. Fish and Wildlife Service. Publication date (2020
). National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

Figure 5. NWI Wetland Map
FUZE #616519836 / 304480 / Sanders Ranch - C
100 Sanders Ranch Road, Moraga, Contra Costa County, CA 94566

N

0 500 1,000 1,500 ft

▭ 50-Foot Survey Area	🟦 NWI Wetlands
- - - Access_Utility Route	✸ Project Site

AJM Ecological Solutions, LLC

Attachment B
Photographs

Photo 1. Looking west toward Site entrance from Sanders Ranch Road.

Photo 2. Looking SW along proposed access route.

Photo 3. Looking south along proposed access route.

Photo 4. Looking NE along proposed access route (typical).

Photo 5. Looking SE along proposed access route toward lease area.

Photo 6. Looking south along proposed access toward lease area.

Photo 7. Looking east toward proposed lease area.

Photo 8. Looking north toward proposed lease area.

Photo 9. Looking south toward proposed lease area.

Attachment C

Special Status Species Summary Table & Occurrence Probability

Species	Habitat	Status	Activity Period	Occurrence Probability
Plants				
Amsinckia lunaris Bent-flowered fiddleneck	This annual herb occurs on gravelly slopes, often serpentine within Foothill Woodland, Valley Grasslands between 50 – 800 m	US:- CA:- CRPR: 1B.2	Blooms March - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Arctostaphylos auriculata Mt. Diablo manzanita	This shrub occurs in sandstone chaparral near coast between 150 – 650 m	US:- CA:- CRPR: 1B.3	Blooms January - March	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Arctostaphylos pallida Pallid manzanita	This shrub occurs on siliceous shale slopes and ridges in chaparral, mixed evergreen forest and foothill woodlands between 200 – 460 m	US: FT CA: SE CRPR: 1B.1	Blooms December - March	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Astragalus tener var. Tener alkali milk-vetch	This annual herb occurs in playas, vernal pools, valley grasslands, and alkali sinks < 60 m	US: - CA: - CRPR: 1B.2	Blooms March - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Balsamorhiza macrolepis big-scale balsamroot	This perennial herb occurs in open grassy and rocky slopes < 1400 m	US: - CA: - CRPR: 1B.2	Blooms March - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Blepharizonia plumosa big tarplant	This annual herb occurs on dry slopes in valley grasslands < 500 m	US: - CA: - CRPR: 1B.1	Blooms July - October	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Calochortus pulchellus Mt. Diablo fairy-lantern	This perennial herb occurs in foothill woodlands and valley grasslands between 200 – 800 m	US: - CA: - CRPR: 1B.1	Blooms April - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Campanula exigua chaparral harebell	This annual herb occurs on talus slopes, generally serpentine soils in chaparral between 300 – 1250 m	US: - CA: - CRPR: 1B.2	Blooms May - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Centromadia parryi ssp. congdonii Congdon's tarplant	This annual herb occurs on terraces, swales, floodplains, valley grassland, and disturbed areas usually within wetlands < 300 m	US: - CA: - CRPR: 1B.1	Blooms May - October	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	This annual herb occurs in salt marsh coastal wetlands < 10 m	US: - CA: - CRPR: 1B.2	Blooms June - October	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Chorizanthe robusta var. robusta robust spineflower	This annual herb occurs in coastal opening and dunes between 10 – 300 m	US: FE- CA: - CRPR: 1B.1	Blooms April - September	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Cicuta maculata var. bolanderi Bolander's water-hemlock	This perennial herb occurs in coastal wetlands < 200 m	US: - CA: - CRPR: 2B.1	Blooms July - September	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.

Species	Habitat	Status	Activity Period	Occurrence Probability
Cirsium andrewsii Franciscan thistle	This perennial herb occurs in seeps, bluffs, ravines associated with coastal scrub, mixed evergreen forest, and wetland-riparian < 100 m	US: - CA: - CRPR: 1B.2	Blooms March - July	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Clarkia franciscana Presidio clarkia	This annual herb occurs on serpentine soils within coastal scrub and valley grasslands around 50 m	US: FE CA: SE CRPR: 1B.1	Blooms May - July	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Cordylanthus nidularius Mt. Diablo bird's-beak	This annual herb occurs on serpentine soils within chaparral between 600 – 800 m	US: - CA: - CRPR: 1B.1	Blooms July - August	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Delphinium californicum ssp. interius Hospital Canyon larkspur	This perennial herb usually occurs in wetlands within foothill woodlands between 300 – 1000 m	US: - CA: - CRPR: 1B.2	Blooms April - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Dirca occidentalis western leatherwood	This shrub occurs in riparian corridors associated with north coastal forest, closed-cone forest, mixed evergreen forest, foothill woodlands, and chaparral between 50 – 400 m	US: - CA: - CRPR: 1B.2	Blooms January - March	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Eriastrum ertterae Lime Ridge eriastrum	This annual herb occurs in hard packed sand adjacent to chaparral communities < 300 m	US: - CA: - CRPR: 1B.1	Blooms June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Eriogonum luteolum var. caninum Tiburon buckwheat	This annual herb occurs in serpentine soils associated with chaparral, coastal prairie, and valley grasslands < 700 m	US: - CA: - CRPR: 1B.2	Blooms May - September	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Eriogonum truncatum Mt. Diablo buckwheat	This annual herb occurs in sandy soils associated with northern coastal scrub, chaparral, and valley grasslands between 200 – 400 m	US: - CA: - CRPR: 1B.1	Blooms April - September	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Eryngium jepsonii Jepson's coyote-thistle	This perennial herb occurs in moist clay soils typical of wetlands < 500 m	US: - CA: - CRPR: 1B.2	Blooms April - August	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Extriplex joaquinana San Joaquin spearscale	This annual herb occurs in alkaline soils within meadows associated shadscale scrub and valley grasslands < 350 m	US: - CA: - CRPR: 1B.2	Blooms April - September	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Fissidens pauperculus minute pocket moss	This bryophyte occurs on moist soil banks	US: - CA: - CRPR: 1B.2	Year round	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Fritillaria liliacea fragrant fritillary	This perennial herb occurs in heavy soils, open hills/field near coast in northern coastal scrub, coastal prairie, valley grasslands, and wetland-riparian < 200 m	US: - CA: - CRPR: 1B.2	Blooms February - August	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Gilia millefoliata dark-eyed gilia	This annual herb occurs in stable coastal strand < 10 m	US: - CA: - CRPR: 1B.2	Blooms April - July	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Grimmia torenii Toren's grimmia	This bryophyte occurs on rocky substrates	US: - CA: - CRPR: 1B.3	Year round	**Absent**. Suitable habitat was not present within the BSA and this species was not

Species	Habitat	Status	Activity Period	Occurrence Probability
				observed during the biological survey.
Holocarpha macradenia Santa cruz tarplant	This annual herb occurs on clay soils associated with coastal prairie and valley grasslands < 200 m	US: FT CA: SE CRPR: 1B.1	Blooms June - October	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Helianthella castanea Diablo helianthella	This perennial herb occurs in openings within northern coastal scrub, foothill woodlands, and valley grasslands between 200 – 1300 m	US: - CA: - CRPR: 1B.2	Blooms March - June	**Absent.** A 2014 record of this species is documented roughly 0.85 miles west of the Site and a 2009 record is documented roughly 1.5 miles northeast of the Site. Marginal habitat is present. This species was not observed within the BSA during the appropriate bloom period.
Hesperolinon breweri Brewer's western flax	This annual herb occurs in foothill woodlands, chaparral, and valley grasslands occasionally in serpentine soils between 30 – 700 m	US: - CA: - CRPR: 1B.2	Blooms May - July	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Hoita strobilina Loma Prieta hoita	This perennial herb occurs in oak woodlands and chaparral < 600 m	US: - CA: - CRPR: 1B.2	Blooms May - July	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Isocoma arguta Carquinez goldenbush	This shrub occurs within alkaline soils in wetlands associated with valley grasslands < 20 m	US: - CA: - CRPR: 1B.1	Blooms August - December	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Lasthenia conjugens Contra Costa goldfields	This annual herb occurs vernal pools and wet meadows < 100 m	US: FE CA: - CRPR: 1B.1	Blooms March - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Madia radiata showy golden madia	This annual herb occurs foothill woodlands and valley grasslands occasionally on serpentine soils between 20 -1200 m	US: - CA: - CRPR: 1B.1	Blooms March - May	**Absent.** Marginally suitable habitat was present within the BSA – However, this species was not observed during the biological survey nor are there any records of this species within 2-miles.
Malacothamnus hallii Hall's bush-mallow	This shrub occur in open chaparral at < 760 m	US: - CA: - CRPR: 1B.2	Blooms May - September	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Meconella oregana Oregon meconella	This annual herb occurs in shady canyons < 1000 m	US: - CA: - CRPR: 1B.1	Blooms March - April	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Monolopia gracilens woodland woollythreads	This annual herb occurs serpentine grasslands, open grasslands, and oak woodlands between 100 – 1200 m	US: - CA: - CRPR: 1B.2	Blooms March - July	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Navarretia gowenii Lime Ridge navarretia	This perennial herb occurs in clay and serpentine soils between 200 – 300 m	US: - CA: - CRPR: 1B.1	Blooms May - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Oenothera deltoides ssp. howellii	This perennial herb occurs in sand dunes, bluffs, and coastal strand < 100 m	US: FE CA: SE CRPR: 1B.1	Blooms March - September	**Absent**. Suitable habitat was not present within the BSA and this species was not

Species	Habitat	Status	Activity Period	Occurrence Probability
Antioch Dunes evening-primrose				observed during the biological survey.
Phacelia phacelioides Mt. Diablo phacelia	This annual herb occurs on open rocky slopes in foothill woodlands and chaparral between 500 – 1400 m	US: - CA: - CRPR: 1B.2	Blooms April - May	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Plagiobothrys diffusus San Francisco popcornflower	This annual herb occurs in moist soils/seeps within coastal prairie and valley grasslands between 30 – 150 m	US: - CA: SE CRPR: 1B.1	Blooms March - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Plagiobothrys glaber hairless popcornflower	This annual herb occurs in saline wetlands, meadows, salt marsh in coastal areas < 100 m	US: - CA: - CRPR: 1A	Blooms March - May	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Polemonium carneum Oregon polemonium	This perennial herb occurs moist to dry open areas associated with northern coastal scrub, yellow pine forest, and coastal prairie < 1800 m	US: - CA: - CRPR: 2B.2	Blooms April - September	**Absent.** Marginally suitable habitat was present within the BSA – However, this species was not observed during the biological survey nor are there any records of this species within 2-miles.
Polygonum marinense Marin knotweed	This annual herb occurs in coastal salt marsh, brackish marsh, and swamps < 10 m	US: - CA: - CRPR: 3.1	Blooms May - August	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Sanicula marítima adobe sanicle	This perennial herb occurs in coastal grassy and open wet areas associated with chaparral, valley grasslands, and wetland-riparian around 150 m	US: - CA: Rare CRPR: 1B.1	Blooms February - May	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Sanicula saxatilis rock sanicle	This perennial herb occurs on rocky ridges in chaparral and valley grasslands between 900 – 1100 m	US: - CA: - CRPR: 1B.2	Blooms April - May	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Senecio aphanactis chaparral ragwort	This annual herb occurs in alkaline flats, dry rocky open areas between 10 – 150 m	US: - CA: - CRPR: 1B.2	Blooms January - April	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Spergularia macrotheca var. Longistyla long-styled sand-spurrey	This perennial herb occurs in alkaline marshes, mud flats, meadows and hot springs < 200 m	US: - CA: - CRPR: 1B.2	Blooms February - May	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Streptanthus albidus ssp. peramoenus Most beautiful jewelflower	This annual herb occurs on serpentine or metamorphic rocky soils with chaparral openings or steep woodlands between 150 – 1400 m	US: - CA: - CRPR: 1B.2	Blooms April - September	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Streptanthus hispidus Mt. Diablo jewelflower	This annual herb occurs in rocky chaparral and valley grasslands between 600 – 1200 m	US: - CA: - CRPR: 1B.3	Blooms March - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Stuckenia filiformis ssp. alpina slender-leaved pondweed	This perennial herb occurs in freshwater wetlands, shallow clear water lakes, and drainage canals between 300 – 2150 m	US: - CA: - CRPR: 2B.2	Blooms May - July	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Suaeda californica California seablite	This shrub occurs in coastal salt marsh < 5 m	US: FE CA: - CRPR: 1B.1	Blooms July - October	**Absent**. Suitable habitat was not present within the BSA and this species was not

Species	Habitat	Status	Activity Period	Occurrence Probability
				observed during the biological survey.
Trifolium hydrophilum saline clover	This annual herb occurs in salt marsh and open alkaline soils < 300 m	US: - CA: - CRPR: 1B.2	Blooms April - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Triquetrella californica coastal triquetrella	This bryophyte occurs between rocky opening in shallow soils	US: - CA: - CRPR: 1B.2	Year round	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Tropidocarpum capparideum caper-fruited tropidocarpum	This annual herb occurs on alkaline soils within valley grasslands low hills and valleys < 400 m	US: - CA: - CRPR: 1B.1	Blooms March - April	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Viburnum ellipticum oval-leaved viburnum	This shrub occurs in chaparral, yellow pine forest, and generally north facing slopes between 300 – 1400 m	US: - CA: - CRPR: 2B.3	Blooms May - June	**Absent**. Suitable habitat was not present within the BSA and this species was not observed during the biological survey.
Mammals				
Antrozous pallidus Pallid bat	Habitats include mountainous areas, intermontane basins, and lowland desert scrub; arid deserts and grasslands, often near rocky outcrops and water; in some areas, this species also inhabits open coniferous forest and woodland. Day roosts include crevices of rock outcrops, caves, mine tunnels, buildings, bridges, and hollows of live and dead trees. Night roosts often or typically are in caves; buildings, under rock overhangs, and under bridges.	US: – CA: - CDFW: SSC	Year-round	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey.
Corynorhinus townsendii Townsend's big-eared bat	Habitat include forested regions and buildings, and in areas with a mosaic of woodland, grassland, and/or shrubland. Also known from limestone caves, lava tubes, and human-made structures in coastal lowlands, cultivated valleys, and nearby hills covered with mixed vegetation.	US: – CA: - CDFW: SSC	Year-round	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey
Eumops perotis californicus Western mastiff bat	Habitats include desert scrub to woodland. Forage in open areas. Roost in exfoliating rock slabs of vertical cliffs and rugged canyons. Live deep inside narrow crevices.	US: – CA: - CDFW: SSC	Year-round	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	Habitats include heavy chaparral; hardwood, conifer, and mixed forests, typically in densely wooded areas with heavy undergrowth; riparian woodlands. Builds house of debris on the ground or in a tree	US: – CA: - CDFW: SSC	Year round	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey
Nyctinomops macrotis Big free-tailed bat	Habitat includes rocky areas in rugged or hilly country in both lowland and highland areas. These bats roost primarily in vertical or horizontal crevices near the tops of cliffs, but sometimes they are found in buildings, caves, or occasionally tree cavities.	US: – CA: - CDFW: SSC	Birth in late spring or early summer	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey
Reithrodontomys raviventris salt-marsh harvest mouse	Habitat consists of salt and brackish marshes, where plants provide a dense mat of cover, ideally around 30-50 cm high with a high percentage (e.g., 60%) of Salicornia (pickleweed) and complex structure of Atriplex and other species.	US: FE CA: SE CDFW: FP	Breeds May - November	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey

Species	Habitat	Status	Activity Period	Occurrence Probability
	Needs access to refuge/cover on high ground, especially during highest tides in winter.			
Sorex vagrans halicoetes salt-marsh wandering shrew	Habitat consists of salt and brackish marshes. Needs access to refuge/cover on high ground, especially during highest tides in winter.	US: - CA: - CDFW: SSC	Breeds February – June; September	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey
Taxidea taxus American badger	Primary habitat requirements seem to be sufficient food and friable soils in relatively open uncultivated ground in grasslands, woodlands, and desert. Widely distributed in North America.	US: – CA: - CDFW: SSC	Year-round	**Absent**. Suitable habitat for this species were not present within the BSA and this species was not observed during the biological survey.
Vulpes macrotis mutica San Joaquin kit fox	Habitat includes alkali sink, valley grassland, and woodland, in valleys and adjacent gentle foothills. Multiple underground dens in dry soils are used throughout the year.	US: FE CA: SE CDFW: -	December - March	**Absent**. Suitable habitat for this species were not present within the BSA and this species was not observed during the biological survey.
Amphibians				
Ambystoma californiense California tiger salamander	Breeding occurs mainly December-February, after rains fill pools and ponds. In summer, CTS aestivate in small mammal burrows, leaf litter, or other moist sites within 1.6 miles of a water body.	US: FT CA: ST CDFW: WL	October - May	**Absent**. Suitable upland or wetland habitat for this species were not present within the BSA and this species was not observed during the biological survey.
Rana boylii foothill yellow-legged frog	Breeding occurs in pools of streams. Eggs usually are attached to gravel or rocks at pool or stream edges. Rarely move far away from streams	US: - CA: SE CDFW: SSC	March - June	**Absent**. Suitable upland or wetland habitat for this species were not present within the BSA and this species was not observed during the biological survey. This species was last documented in 1947 over 2-miles northwest of the biological survey.
Rana draytonii California red-legged frog	This species usually occurs in or near quiet permanent water of streams, marshes, ponds, lakes, and other quiet bodies of water supporting emergent vegetation. In summer, frogs aestivate in small mammal burrows, leaf litter, or other moist sites within 2 miles of a water body. Species disperses through a variety of habitat including valley grasslands, chaparral, sage scrub, and oak woodlands.	US: - CA: - CDFW: SSC	October - May	**Absent**. Suitable upland or wetland habitat for this species were not present within the BSA and this species was not observed during the biological survey. There are no occurrence records of this species within 2-miles of the biological survey.
Reptiles				
Anniella pulchra Northern California legless lizard	This legless lizard burrows in loose soil, especially in semi-stabilized sand dunes and in other areas with sandy soil, including habitats vegetated with oak or pine-oak woodland, or chaparral	US: - CA: - CDFW: SSC	Early spring – July	**Absent**. Suitable upland or wetland habitat for this species were not present within the BSA and this species was not observed during the biological survey.
Emys marmorata western pond turtle	Habitat includes permanent and intermittent waters of rivers, creeks, small lakes and ponds (including human-made stock ponds and sewage-treatment ponds, marshes, unlined irrigation canals, and reservoirs	US: - CA: - CDFW: SSC	June - August	**Absent**. Suitable upland or wetland habitat for this species were not present within the BSA and this species was not observed during the biological survey.
Masticophis lateralis uryxanthus Alameda whipsnake	This species inhabits chaparral foothills, sage scrub shrublands with scattered grassy patches, rocky canyons and watercourses, and nearby habitats.	US:FT CA: ST CDFW: -	March - June	**Absent**. No suitable habitat for this species is present within the BSA; This species was documented 2-miles

Species	Habitat	Status	Activity Period	Occurrence Probability
	Underground or under cover when inactive. This species also does not have a large disperse range, generally staying within close proximity to chaparral and sage scrub habitat.			north in 2018 and 1.5 east in 2012. Intervening lands and lack of suitable scrub habitat would prevent this species from dispersing into the area.
Phrynosoma blainvillii Coast horned lizard	Habitat include scrubland, grassland, coniferous woods, and broadleaf woodlands; areas with sandy soil, scattered shrubs, and ant colonies; in areas with native chaparral vegetation, and in sites with porous soils relatively free of organic debris.	US: – CA: - CDFW: SSC	Year-round, diurnal and crepuscular activity	**Absent**. Suitable upland or wetland habitat for this species were not present within the BSA and this species was not observed during the biological survey.
Birds				
Cooper's hawk ***Accipiter cooperii***	Mature pine, hardwood groves, and riparian cottonwoods and sycamores.	US: – CA: - CDFW: WL	Breeding April - June	**Absent.** Suitable habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Accipiter striatus sharp-shinned hawk	Occurs in riparian forest, conifers, hardwoods, mixed woodlands, and old fields	US: – CA: - CDFW: WL	Breeding April - may	**Absent.** Suitable nesting habitat for this species was not presentwithin the BSA, and this species was not observed during the biological survey.
Agelaius tricolor Tricolored blackbird	Open country in western Oregon, California, and northwestern Baja California. Breeds near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, tall herbs and forages in grassland and cropland habitats. Seeks cover for roosting in emergent wetland vegetation, especially cattails and tules,	US: – CA: SSC (breeding) MSCP: C	Year-round	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Aquila chrysaetos golden eagle	Golden eagles generally inhabit open and semi-open country such as prairies, sagebrush, arctic and alpine tundra, savannah or sparse woodland, and barren areas, especially in hilly or mountainous regions, in areas with sufficient mammalian prey base and near suitable nesting sites	US: – CA: - CDFW: FP	January - April	**Absent**. Suitable nesting habitat for this species was not present within the BSA and this species nor suitable burrows were observed during the biological survey.
Athene cunicularia Burrowing owl	Usually occupies ground squirrel burrows in open, dry grasslands, agricultural and range lands, railroad rights-of way, and margins of highways, golf courses, and airports. Often utilizes man-made structures, such as earthen berms, cement culverts, cement, asphalt, rock, or wood debris piles. They avoid thick, tall vegetation, brush, and trees, but may occur in areas where brush or tree cover is less than 30 percent.	US: – CA: SSC CDFW: SSC	Year-round	**Absent**. Suitable nesting habitat for this species was not present within the BSA and this species nor suitable burrows were observed during the biological survey.
Branta hutchinsii leucopareia cackling (=Aleutian Canada) goose	During migration and on wintering grounds, the geese are commonly found in marshes, pastures and grass crops, harvested agriculture fields and flood-irrigated and non-irrigated land. Breeding on Aleutian Islands	US: Delisted CA: - CDFW: WL	April - July	**Absent**. Suitable habitat for this species was not present within the BSA and this species nor suitable burrows were observed during the biological survey.
Buteo regalis ferruginous hawk	Occurs in open country, primarily prairies, plains and badlands; sagebrush, saltbush-greasewood shrubland, periphery of pinyon-juniper and other woodland, desert. Breeding occurs in native grassland and shrubland and rocky habitats	US: – CA: SSC CDFW: WL	February - October	**Absent**. Suitable nesting habitat for this species was not present within the BSA and this species nor suitable burrows were observed during the biological survey.

Species	Habitat	Status	Activity Period	Occurrence Probability
Buteo swainsoni Swainson's hawk	Riparian nesting trees, agricultural fields, and open shrublands within relatively close proximity.	US: – CA: ST CDFW: -	Breeding March - September	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Charadrius nivosus nivosus Western Snowy Plover	Beaches, dry mud or salt flats, and sandy shores of rivers, lakes, and ponds	US: FT CA: – CDFW: SSC	March - September	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey.
Circus hudsonius northern harrier	Occurs in marshes, coastal prairie, agricultural lands, and fallow lands. Nest are constructed on the ground, mounds of dirt or vegetation.	US: - CA: – CDFW: SSC	Late spring	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Coturnicops noveboracensis yellow rail	Occurs and breeds in emergent wetlands, grass or sedge marshes and wet meadows in freshwater situations.	US: - CA: – CDFW: SSC	April - July	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Elanus leucurus White-tailed kite	Nests in trees, often near a marsh, sually 6-15 m above the ground in branches near the top of a tree.	US: – CA: - CDFW: FP	Year-round	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Eremophila alpestris actia California horned lark	Grassland, tundra, sandy regions, areas with scattered low shrubs, desert playas, grazed pastures, stubble fields, open cultivated areas, and rarely open areas in forest.	US: – CA: - CDFW: WL	Breeding June - August	**Low**. Suitable habitat was observed within the BSA; this species was not observed during the biological survey and there are no records of this species within 2-miles of the BSA.
Falco mexicanus prairie falcon	Typically nests in pot hole or well-sheltered ledge on rocky cliff or steep earth embankment, 10 to more than 100 meters above base. Nests typically are placed on south-facing aspects, with overhangs offering some protection from solar radiation	US: - CA: – CDFW: WL	Breeding March - August	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Falco peregrinus anatum American peregrine falcon	Occur in open situations from tundra, moorlands, steppe, and seacoasts, especially where there are suitable nesting cliffs, to mountains, open forested regions, and human population centers.	US: Delisted CA: Delisted CDFW: FP	Breeding March - May	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Geothlypis trichas sinuosa saltmarsh common yellowthroat	Occurs and breeds in marshes and adjacent riparian lands.	US: - CA: – CDFW: SSC	Breeding March - July	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Haliaeetus leucocephalus bald eagle	Occurs and breeds in coastal areas, bays, rivers, lakes, reservoirs, or other bodies of water that reflect the general availability of primary food sources including fish, waterfowl, or seabirds	US: Delisted CA: SE CDFW: FP	Breeding October - May	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Laterallus jamaicensis coturniculus California black rail	Occurs in salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps.	US: – CA: ST CDFW: FP	Breeding April - August	**Absent**. Suitable habitat was not observed within the BSA and this species was not observed during the biological survey.

Species	Habitat	Status	Activity Period	Occurrence Probability
Melospiza melodia maxillaris Suisun song sparrow	Suisun Song Sparrows are associated primarily with tidal channels, especially in marshes where Pickleweed dominates and Gumplant lines the channels	US: - CA: - CDFW: SSC	Breeding March - May	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Melospiza melodia pusillula Alameda song sparrow	Occur and breed in tidal salt and brackish marsh	US: - CA: - CDFW: SSC	Breeding March - May	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Rynchops niger black skimmer	Occurs in coastal shorelines, islands, occasionally found in large lakes.	US: - CA: - CDFW: SSC	Breeding April - September	**Absent**. Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Setophaga petechia Yellow warbler	Occurs in open scrub, second-growth woodland, thickets, farmlands, and gardens, especially near water; riparian woodlands, especially of willows.	US: – CA: - CDFW: SSC	Summer in California	**Absent.** Suitable nesting habitat for this species was not present within the BSA, and this species was not observed during the biological survey.
Sterna antillarum browni California Least Tern	Seacoasts, beaches, bays, estuaries, lagoons, lakes, and rivers. Also nest on dredge spoils and barrier islands.	US: FE CA: SE CDFW: FP	Breeding May - August	**Absent**. Suitable habitat was not observed within the BSA and this species was not observed during the biological survey.
Crustaceans				
Branchinecta lynchi Vernal pool fairy shrimp	This species inhabits vernal pools and similar ephemeral wetlands. It is most commonly found in grassed or mud bottomed pools or basalt flow depression pools in unplowed grasslands	US: FT CA: NL CDFW	Seasonally following rains; typically January through April	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey.
Insects				
Crotch bumble bee ***Bombus crotchii***	Open grasslands and scrub habitats; food plants include *Asclepias*, *Chaenactis*, *Lupinus*, *Medicago, Phacelia*, and *Salvia*. Nesting occurs underground in holes made by other animals or in hollow logs, or tree cavity.	US: – CA: CE CDFW: –	April – August (underground nest)	**Low**. Potentially suitable foraging habitat for this species was present within the BSA. However, no nests were observed during the biological survey. In-flight individuals may traverse the BSA in search of food. There are no records of this species within 2-miles.
Bombus occidentalis western bumble bee	Occurs in open coniferous, deciduous and mixed-wood forests, wet and dry meadows, montane meadows and prairie grasslands, meadows bordering riparian zones, and along roadsides in taiga adjacent to wooded areas, urban parks, gardens and agricultural areas, subalpine habitats and more isolated natural areas. Nesting occurs underground in holes made by other animals or in hollow logs, or tree cavity.	US: – CA: CE CDFW: –	February – November (underground nest)	**Low**. Potentially suitable foraging habitat for this species was present within the BSA. However, no nests were observed during the biological survey. In-flight individuals may traverse the BSA in search of food. There are no records of this species within 2-miles.
Callophrys mossii bayensis San Bruno Elfin butterfly	The San Bruno elfin inhabits rocky outcrops and cliffs in coastal scrub on the San Francisco peninsula. The San Bruno elfin is restricted to a few small populations, the largest of which occurs on San Bruno Mountain. Its habitat has been diminished by quarrying, off-road recreation, and urban development..	US: FE CA: CE CDFW: –	Breeding February - April	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey.

Species	Habitat	Status	Activity Period	Occurrence Probability
	Grazing may have encouraged the growth of exotic plants in the area.			
Euphydryas editha bayensis Bay checkerspot butterfly	Occurs near serpentine-derived soil. The primary larvae host plant is dwarf plantain (*Plantago erecta*). The larvae require a second host plant when the plantain dries up. Under these conditions, the larvae move to purple owl's clover (*Castilleja densiflora or C. exserta*)	US: FT CA: - CDFW: –	Breeding February - May	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey.
Fishes				
Hypomesus transpacificus Delta Smelt	This euryhaline species inhabits open waters of bays, tidal rivers, channels, and sloughs; it rarely occurs in water with salinity of more than 10-12 ppt; when not spawning, it tends to concentrate where salt water and freshwater mix (salinity about 2 ppt) and zooplankton populations are dense. Spawning occurs in freshwater (sometimes in slightly brackish water), primarily in tidal dead-end sloughs and channel edgewaters.	US: FT CA: SE CDFW: –	December - July	**Absent**. Suitable habitat for this species was not present within the BSA and this species was not observed during the biological survey.

US: Federal Classification

FE = Federally Endangered; FT= Federally threatened; CE=Candidate Endangered;

- No applicable classification

CA: State Classifications

SE = State Endangered; ST = State Threatened; SR = State Rare; SSC=California Department of Fish & Wildlife Special Concern Species of Special Concern; FP= California Department of Fish & Wildlife Fully Protected species; WL= California Department of Fish & Wildlife Watch List species; SP = Special Plant. Refers to any other plant monitored by the NDDB regardless of its legal protection status.

- No applicable classification

California Native Plant Society System:

1B = Rare or Endangered in California and elsewhere
2B = Rare, Endangered or Threatened in California, but more common elsewhere
3 = Plants about which more information is needed. A Review List
.1 = Seriously endangered in California (over 80% of occurrences threatened)
.2 = Moderately threatened in California (20-80% occurrences threatened)

Note: California Rare Plant Ranks are assigned by a committee of government agency and non-governmental botanical experts and are not official State designations of rarity status.

Attachment D

Plants and Wildlife Observed

The following vascular plant and wildlife species were observed within the BSA by *AJM* during the general biological resources survey.

Common Name	Scientific Name
Plants	
Anthriscus caucalis	bur chervil
Avena barbata	Slender oat
Baccharis pilularis	coyote brush
Brassica nigra	Black mustard
Bromus diandrus	ripgut brome
Carduus pycnocephalus	Italian thistle
Croton setiger	Turkey-mullein
Daucus carota	Carrot
Erodium botrys	Broad leaf filaree
Erodium brachycarpum	Short fruited filaree
Erodium cicutarium	storksbill
Eschscholzia californica	California poppy
Foeniculum vulgare	Fennel
Gnaphalium palustre	Cudweed
Hordeum murinum	foxtail barley
Meticago lupulina	Black medic
Lysimachia arvensis	Scarlet pimpernel
Matricaria discoidea	pineapple weed
Plantago lanceolata	English plantain
Toxicodendrun diversilobum	poison oak
Mammals	
Canis latrans	Coyote
Odocoileus hemionus	black tailed deer
Otospermophilus beecheyi	California ground squirrel
Sylvilagus bachmani	Brush rabbit
Thomomys talpoides	Pocket gopher
Birds	
Buteo jamaicensis	Red-tailed hawk
Callipepla californica	California quail
Cathartes aura	Turkey vulture
Corvus corax	Common raven
Cyanocitta stelleri	Steller's jay
Melospiza melodia	Song sparrow
Melozone crissalis	California towhee
Psaltriparus minimus	Bushtit
Turdus migratorius	American robin
Reptiles	
Sceloporus occidentalis	Western fence lizard

Attachment E
Qualifications

AJM Ecological Solutions, LLC
P.O. Box 641534
San Francisco, CA 94164
Tel: (650) 833-9592
www.ajm-eco.com

SUMMARY OF EXPERIENCE

Mr. Anthony Maguire PWS, CWB® started AJM Ecological Solutions, LLC (AJM) in January 2020 and is excited to use his 20+ years' experience to help conserve natural resources while assisting clients meet their permitting needs.

Mr. Maguire earned a Bachelor of Science in Wildlife Management from Humboldt State University in 1999. His research focused primarily on avian and mammalian behavior/ecology, plant taxonomy, and wildlife survey techniques. In his final semester at Humboldt State, Mr. Maguire published a short communication in the Wilson Bulletin and later co-authored a paper, based on his senior thesis, presented at the Proceedings of the 2003 International Canada Goose Symposium. Mr. Maguire has since conducted wildlife and vegetation surveys in both terrestrial and submerged environments throughout the west and southeastern parts of the U.S. In the process, he has become a certified Professional Wetland Scientist (PWS) and a Certified Wildlife Biologist (CWB®).

AJM offers a wide variety of project experience including botanical/wildlife surveys, Part 107 sUAS certified inspections, natural community mapping (terrestrial, submerged), NEPA/CEQA permitting, mitigation design, multi-year mitigation monitoring plans, and wetland delineations. The following summarizes Mr. Maguire's achievements.

EDUCATION

Bachelors of Science, Wildlife Biology, December 1999
Humboldt State University, Arcata, CA
Associate of Science, Biology, December 1997
Canada College, Redwood City, CA

PROFESSIONAL AFFILIATIONS

The Wildlife Society
Society of Wetland Scientists
California Native Plant Society

PROFESSIONAL REGISTRATIONS

Professional Wetland Scientist (PWS) – No. 1900
Certified Wildlife Biologist (CWB®)
FAA Part 107 Certified – No. 4284408

PUBLICATIONS

Black et al. 2003.	Site Selection and Foraging Behavior of Aleutian Canada Geese in a Newly Colonized Spring Staging Area. Proceedings of the 2003 International Canada Goose Symposium.
Maguire, A. 2000.	Whimbrel Attacked by a Peregrine Falcon and Killed by a Common Raven in Northern California. Wilson Bulletin 112(3), 2000, pp. 429-430.

SPECIALIZED TRAINING COURSES:

San Joaquin Kit Fox Workshop, October 7 -10, 2019 (TWS)
Intro to Desert Tortoise and Field Techniques Workshop, November 2-3, 2018 (DTC)
Riparian Ecology and Plant Identification Workshop, August 28 - 30 2017 (CNPS)
Western Burrowing Owl Workshop, July 2016 (Elkhorn Slough National Estuarine Research Reserve)
Regional Supplemental Wetland Delineation Training, September 2014 (Richard Chinn Environmental Training, Inc.)
Biology and Conservation of the Alameda Striped Racer, May 2014 (Alameda County Resource Conservation District)
Managing Habitats for the California Red-legged Frog, November 2013 (Elkhorn Slough National Estuarine Research Reserve)
California Tiger Salamander Training, April 2013 (Elkhorn Slough National Estuarine Research Reserve)
Introduction to California Grasslands and Grass Identification, May 2012 (Pepperwood Preserve)
Habitat Conservation Planning from Tahoe to the Bay (tenth annual workshop**),** November 2012 (Northern California Conservation Planning Partners)
California Red Legged Frog Survey Training, April 2012 (Elkhorn Slough National Estuarine Research

Reserve)
Plant Taxonomy Workshop – Composites, August 2011 (Regional Park Botanical Garden)
Advanced CEQA Workshop, February 2011 (Association of Environmental Professionals)
Planning, Site Selection, and Hydrology Models for Constructed Wetlands, February 2008 (Wetland Training Institute, Inc.)
Florida Wetlands, November 2007 (Continuing Legal Education, International)
Advanced Jurisdictional Hydrology, October 2006 (Wetland Training Institute, Inc.)
Wetland Creation and Restoration, June 2005 (Ohio State University, William J. Mitsch and Roy R. "Robin" Lewis)
Hydric Soils and Whole Landscape Hydrology, October 2004 (University of Florida, Wade Hurt)
USACE Wetland Delineation and Management Training Program, September 2002 (Richard Chinn Environmental Training, Inc.)
Prescription Burn Certification Course, October1 - 5 2001 (U.S. Department of Forestry)

Representative Experience

- Black Mountain Generator Add-on, San Diego, CA (2020) – Prepared Biological Report conforming to the San Diego guidelines for projects within Multi Habitat Planning Area (MHPA). Responsible for mapping natural communities at the proposed site including buffers. Mapped natural communities and documented wildlife along 2-mile access route.

- PA-39 CDFW Lake and Streambed Alteration Agreement, Irvine, CA (Ongoing) – Responsible for mapping natural communities within the property, conducting avian nest surveys specifically including the California coastal gnatcatcher. Met with the CDFW to discuss riparian impacts, mitigation options, and construction monitoring activities. Developed construction monitoring protocol, on-site mitigation design, and a 5-year monitoring plan to ensure mitigation success.

- Communication Tower Projects (2012-2019) – Worked for Envirobusiness Inc (EBI) as the senior biologist. Oversaw the biological components to satisfy NEPA/CEQA requirements for thousands of new tower installations as well as upgrades to existing towers. Conducted special status species surveys for a wide variety of plants and animals along the west coast including WA, OR, CA, NV. Completed jurisdictional wetland delineations, evaluated hundreds of avian nests, conducted pre-construction clearance surveys, construction monitoring and facilitated environmental awareness training to work crews to reduce the likelihood of any ESA violations. In addition, responsibilities included contracting other wildlife professionals across the U.S. and reviewing all reports for accuracy and completeness.

- Pacific Commons/Warm Springs Monitoring, Fremont, CA (2011) – Conducted annual vernal pool and grassland vegetation surveys within the 875-acre property. Surveys included mapping natural communities, documenting vegetation species, counts, and cover; and documenting special status species within the adjacent grasslands.

- SDG&E Sunrise Powerlink Project (2011) – Conducted pre-construction avian nest surveys, conducted pre-construction site clearing, monitored construction activities. In duration of work, invaluable hours were spent identifying plants in the field, documenting wildlife tracks and scat, and observing wildlife behavior.

- Dry Fermentation Anaerobic Digestion Facility (2011) - Delineated wetlands within a 42.76-acre portion of the San Jose Water Pollution Control Plant. Also identified and mapped natural communities occurring within the site. Established hydrology monitoring using Indicator of reduction in soils (IRIS) tubes at wetland mitigation site.

- Florida Inland Navigation District (FIND), Indian River County, Florida (2009 multi-year) — Role within this U.S. Army Corps of Engineers (COE) and FIND sponsored dredged material management areas (DMMA) project included coordinating with and assisting the COE with the Florida Department of Environmental Protection (FDEP) permit application. Responsibilities specifically included delineating onsite wetlands, preparing the Unified Mitigation Assessment Method (UMAM) data forms, designing a 6.4-acre mangrove mitigation site, and developing a three-year mitigation monitoring plan On behalf of the COE; portions of the permit application was presented to the State.

- FIND Nassau DMMA Site NA-1 (2009) — Delineated wetlands within a 35.5-acre portion of the proposed Crane Island Dredged Material Management Area NA-1. Also identified and mapped natural communities, conducted wetland delineations, and prepared UMAM.

- St. Lucie County Erosion District, Fort Pierce Beach Nourishment Project (2005 – 2007) — Role in this multi-year beach nourishment project included permit preparation and management of the biological components of the project. Responsibilities included meeting with the FDEP to discuss various issues associated with monitoring, preparing the scope of work for biological sub consultants, writing two biological monitoring plans, and preparing the year-end reports for the County, State, and Federal review. The four-year monitoring plan included monitoring the beach nourishment area, an adjacent site to assess downdrift effects, a control area, and a mitigation site. This plan also provided a contingency monitoring plan and a contingency mitigation plan.

- Fort Pierce Beach Nourishment Project (2007) — Prepared biological monitoring plan for St. Lucie County Erosion District. This plan included monitoring the beach nourishment area, an adjacent site to assess downdrift effects, a control area, and a mitigation site. Monitoring included the benthic assemblage of nearshore hardbottom habitats, marine turtle use of nearshore and onshore habitat, and shorebird nesting. This plan also provided a contingency monitoring plan and a contingency mitigation plan.

- Florida Inland Navigation District, MSA 434 (2006) — Conducted 30-day post-construction inspection and mapping of 250,000 plants within and along the newly developed dredged material management site MSA 434.

- Jones Creek Restoration Project, Jupiter Inlet District (JID), Palm Beach County (2005) — Role in this project included coordinating and preparing a Joint Environmental Resource Permit (ERP) application for State and Federal review. A submerged resource survey in and near the proposed project area was conducted and sediment samples were collected for lab analysis. Core boring sample results were evaluated and consequently led to assistance in redesigning the restoration site to avoid re-suspending contaminated sediments. Responsibilities also included coordinating and providing the responses to the FDEP. These responses addressed concerns from the NMFS, USFWS, FFWCC, and the COE.

- Florida Inland Navigation District IR-2 (2005) — Designed 6.4-acre mangrove mitigation site to offset wetland impacts incurred during the construction of the dredged material management site IR-2. Conducted JD wetland delineation for the 123-acre parcel, identified and mapped natural communities, prepared UMAM forms for the mitigation and impact areas located within the project area. Prepared and submitted permit applications.

- Jupiter Inlet District (JID) (2004) — Conducted submerged and emergent natural resource survey for the 450-acre Loxahatchee River Central Embayment, Palm Beach County, Florida. Prepared report documenting natural resource (i.e. seagrass and mangrove) conditions within the entire embayment to support the JID bi-annual monitoring requirements.

- Volusia County NEPA Document Preparation (2003) — Prepared Environmental Assessments for Florida Inland Navigation District (FIND) dredged material management sites SL-2, V-6, and DU-3 in St. Lucie, Volusia, and Duval Counties, Florida. Field work included JD wetland delineations, gopher tortoise surveys, champion tree survey, and natural community mapping.

- Florida Inland Navigation District, SJ-1 Monitoring Services (2002) — Conducted first-year salt marsh mitigation area monitoring. Monitoring included an evaluation of vegetative community development and sub surface hydrologic data.

- Ponce DeLeon Inlet Section 1135 Ecosystem Restoration (2001 - multi-year) — Prepared U.S. Fish and Wildlife Coordination Act Report (CAR) for Ponce de Leon, Volusia County, Florida. Prepared biological portions of the Environmental Assessment. Specific items included the preparation of Essential Fish Habitat report and the gathered and interpreted essential regulatory documentation required for NEPA compliance. Developed and selected alternative restoration plans. Compiled ArcGIS data for habitat evaluations.

- Point Reyes Bird Observatory (2001) – Captured and banded song birds using mist nets, monitored nests, recorded species and pair distribution by songs/calls; conducted point counts, spot mapping, and vegetation surveys; documented avian ethology and assisted with video nest monitoring and review.

- Hoopa Valley Indian Reservation (1996) – Conducted endangered species surveys of the marbled murrelet and spotted owl, capture, measure, and band spotted owls; identified various forest species by songs/calls, located nests, and banded juveniles; conducted vegetation surveys at spotted owl nest locations, established survey routes and points using topo, compass, and altimeter.

Appendix D

Cultural Resources Assessment

Rincon Consultants, Inc.
449 15th Street, Suite 303
Oakland, California 94612
510-834-4455

August 01, 2023
Project No: 23-14577

Brian Horn
Town of Moraga
329 Rheem Boulevard
Moraga, California 94556
Submitted via email: bhorn@moraga.ca.us

Subject: Cultural Resources Assessment for the Sanders Ranch Wireless Facility Project
100 Sanders Ranch Road, Moraga, California

Dear Mr Horn:

This letter report presents the findings of a cultural resources assessment completed in support of the Sanders Ranch Wireless Facility Project (proposed project) located within the Sanders Ranch Subdivision (APN 258-300-019). The Town of Moraga retained Rincon Consultants, Inc. (Rincon) to support the proposed project's compliance with the California Environmental Quality Act (CEQA). This letter report documents the results of the tasks performed by Rincon, specifically a cultural resources records search, archival and background research, and field survey. All work was completed in accordance with CEQA and applicable local regulations, including the Town of Moraga Municipal Code.

This cultural resources assessment was conducted by Architectural Historian Project Manager JulieAnn Murphy, MSHP, who performed the cultural resources record search and is the primary author of this memorandum. Archaeologist Elaine Foster, MA oversaw the field survey performed by Archaeologist Darren Putty, MA and is a contributing author of this memorandum. Cultural Resources Director Steven Treffers provided project oversight and reviewed the memorandum for quality control. All personnel meet the Secretary of the Interior's Professional Qualification Standards (PQS) in their respective fields.

Project Site and Description

The project site is located within the Sanders Ranch Subdivision in the Town of Moraga (APN 258-300-019) (Figure 1). Specifically, the proposed project encompasses portions of Sections 19 and 20 of Township 01S, Range 02W on the Las Trampas Ridge Quadrangle, *California* United States Geological Survey (USGS) 7.5-minute topographic quadrangle.

The following project description was provided by the Town of Moraga. The project would involve the installation of six panel antennas on a 12-foot-high "top hat" extension that would be located on top of an existing Pacific Gas and Electric (PG&E) transmission tower, reaching a total height of 115 feet and 7 inches. Also installed on the tower would be three air antennas with a centerline height of 45 feet along with six Verizon Wireless radios, two Verizon Wireless Raycaps, a microwave antenna with a centerline height of 35 feet, and two hybrid wireless cables. An equipment enclosure consisting of a 19-foot by 19-foot concrete pad with 8-foot-tall composite fencing would enclose the facility's ground equipment, including an emergency generator, within the base of the PG&E transmission tower, and a new transformer would be located on a 4-foot 2-inch by 4-foot 4-inch pad approximately 9 feet west of the equipment enclosure pad. To access the facility for construction and maintenance of the facility, a new 15-foot-wide, 1,330-foot-long access driveway constructed of Class II aggregate base would be graded and built from the end of Sanders Ranch Road to the existing PG&E transmission tower. The new road would be built on some portions of slopes exceeding 20% and would cross a Moraga Open Space Ordinance (MOSO) minor ridgeline. The total proposed grading for the road is approximately 529 cubic yards of fill and 487 cubic yards of cut, totaling approximately 1,016 cubic yards of earth movement.

Methods

Background and Archival Research

Rincon completed background and archival research in support of this assessment in July 2023. A variety of primary and secondary source materials were consulted. Sources included, but were not limited to, historical maps, aerial photographs, and written histories of the area. The following sources were utilized to develop an understanding of the project site and its context:

- Contra Costa County Assessor's Office
- Historical aerial photographs accessed via NETR Online
- Historical aerial photographs accessed via University of California, Santa Barbara Library FrameFinder
- Historical USGS topographic maps
- Historical newspaper clippings obtained from Newspapers.com, ProQuest Historical Newspapers.com, and the California Digital Newspaper Collection

California Historical Resources Information System Records Search

On July 14, 2023, Rincon received California Historical Resources Information System (CHRIS) records search results from the Northwest Information Center (NWIC) (Attachment 2). The NWIC is the official state repository for cultural resources records and reports for the county in which the proposed project falls. The purpose of the records search was to identify previously recorded cultural resources, as well as previously conducted cultural resources studies within the project site and a 0.5-mile radius surrounding it. Rincon also reviewed the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), the California Historical Landmarks list, and the Built Environment Resources Directory. Additionally, Rincon reviewed the Archaeological Determination of Eligibility list.

Sacred Lands File Search

Rincon contacted the Native American Heritage Commission (NAHC) on June 14, 2023, to request a search of the Sacred Lands File (SLF), as well as a contact list of Native Americans culturally affiliated with the project site vicinity (Attachment 3).

Field Survey

Rincon Archaeologist Darren Putty, under the direction of Rincon Archaeologist Elaine Foster, conducted a pedestrian survey of the areas of the project site subject to ground disturbing project activities and immediately adjacent areas on July 20, 2023. The pedestrian survey was conducted using transect intervals spaced 10-15 meters and oriented generally from north to south. Exposed ground surfaces were examined for artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools, ceramics, fire-affected rock), ecofacts (marine shell and bone), soil discoloration that might indicate the presence of a cultural midden, soil depressions, and features indicative of the former presence of structures or buildings (e.g., standing exterior walls, postholes, foundations) or historical debris (e.g., metal, glass, ceramics). Ground disturbances such as burrows and drainages were also visually inspected. Survey accuracy was maintained using a handheld Global Positioning Satellite unit and a georeferenced map of the project site. Additionally, under the direction of architectural historian JulieAnn Murphy, the Rincon Archaeologist visually inspected the built environment resources within the project site, including buildings, structures, and landscape elements. Pursuant to California Office of Historic Preservation (OHP) Guidelines (California OHP 1995: 2), properties over 45 years of age were evaluated for inclusion in the NRHP, CRHR, and local listing and recorded on California Department of Parks (DPR) 523 series forms. Site characteristics and survey conditions were documented using field records and a digital camera. Copies of the survey notes and digital photographs are maintained at our Rincon Oakland office.

Findings

Known Cultural Resources Studies

The CHRIS records search and background research identified 25 cultural resources studies within 0.5 mile of the project site (Attachment 2). Of these studies, 18 include a portion of the project site. The entirety of the project site has been previously studied, with a full survey conducted last in 1981. Most reports encompass large areas with generalized data. Project specific reports within and adjacent to the project site the project site are discussed in further detail below.

STUDY S-002538

Study S-002538, *Draft Environmental Impact Report for Development of the Sanders Ranch in Moraga, California*, was completed by Nancy Schluntz in 1981. The archaeological survey encompassed the current project site and was conducted on foot in 15-meter transects with exception to steep slopes, which were observed from afar. Three isolated flaked scrapers were identified during the survey, one of which was located in the project site to the west of the intersection of Sanders Ranch Road and Teodora Court. These scrapers were not associated with any other artifacts, features, or archaeological sites. The report concluded that the general area has a high potential for archaeological sensitivity due to proximity to a confluence of perennial streams and recommended standard unanticipated discovery measures (Schluntz 1981).

STUDY S-002988

Study S-002988, *An Archaeological Survey of a Three Acre Parcel of Land at Sanders Ranch, Moraga, California*, was completed by Donna J. Little in 1982. The archaeological survey was conducted on-foot in 5-meter transects and encompassed an area east of the project site that has since been subject to residential development. The study noted that surface visibility was poor and that the site included vacant agricultural and residential buildings and modern refuse. The study notes the three scraper tools identified during Study S-002538, two of which were located in the study area of S-002988. The survey did not relocate the two scrapers, and no additional cultural resources were located during the field survey. The study concluded that no significant historic-period or Native American archaeological materials were present and recommended standard unanticipated discovery measures (Little 1982).

Known Cultural Resources

The CHRIS records search and background research identified one cultural resource within a 0.5 mile of the project site, which is listed in Table 1 below. No resources are recorded within or adjacent to the project site.

Table 1 Known Cultural Resources

Primary Number	Trinomial	Resource Type	Description	Recorder(s) and Year(s)	Eligibility Status	Relationship to Project Site
P-07-004972		Structure	Sanders Corral	*Michael Hibma, LSA, 2019*	6Z – Found ineligible for NRHP, CRHR or local designation through survey evaluation.	Outside

Source: NWIC

Resource P-07-004972

Resource P-07-004972, the Sanders Corral, was recorded and evaluated by Michael Hibma of LSA Associates, in May 2019. Located approximately 0.5 miles northwest of the project site, is a utilitarian agricultural structure that measures approximately 77 feet by 70 feet. The building, constructed by at least 1946, was a practical means to contain livestock before shipment from release onto grazing lands. It was owned by the Moraga Company, a major owner of the former Rancho del los Palos Colorados, who subdivided and developed much of the land of present-day Moraga and leased to ranchers, including the Sanders family, for whom the current adjacent subdivision is named. The building, vernacular and utilitarian in style is not significant for its architecture. The property was not directly associated with persons important to history, and is not associated with events that have made a significant contribution to the broad patterns of history. It was found ineligible for listing in the NRHP, CRHR, and local listing for lack of historical or architectural significance.

Aerial Imagery and Historical Topographic Maps Review

Rincon completed a review of historical ethnographic and topographic maps and aerial imagery to ascertain the development history of the project site. Historic-period ethnographic maps indicate the project site lies at a boundary of the traditional territories of the Ohlone and Bay Miwok, specifically near the bilingual Jalquin/Irgin tribe of the San Leandro Creek area and Tatcan tribe of San Ramon Valley. No specific Native American villages are depicted in the project site or general vicinity; however, multiple freshwater sources consistent with habitation patterns surround the project site (Milliken et al. 2009; EBRPD 2018). Historical topographic maps from 1897 to 1913 depict the project site as undeveloped land within Rancho Laguna de Los Palos Colorados with the Moraga Adobe, the residence of Rancho owner Joaquin Moraga, approximately 5 miles to the northwest. Some road development is depicted to the south, west, and north, and Moraga Creek is depicted approximately 0.15 miles to the south, Las Trampas Creek is approximately 0.26 miles to the north, and San Leandro Creek approximately 1.12 miles to the west (USGS 2023). By 1915, historical topographical maps show a rail line to the north of the project site. Between 1915 and 1942, the project site and surrounding area remained largely undeveloped (USGS 2023). A historical topographical map from 1942 shows increased development overall, with sparse residential development to the west of the project site, a small cluster of development northwest of the project site, and the establishment of St. Mary's College northeast of the project site (USGS 2023). Available historical aerials, beginning in 1946, confirm the development pattern and also depict sparse development north and northeast of the project site, while the project site itself remained undeveloped (NETR 2023). Historical aerial images from 1958 indicate that the transmission was constructed by this time and the area surrounding the project site remained the same until the 1960s, when increased suburban development began. By 1968, historical aerial images depict suburban tract development southwest of the project site (NETR 2023). By the 1980s, residential development increased, with additional developments constructed north and northwest of the project site. The area of the project site and its immediate surroundings remained undeveloped (NETR 2023). By 1987, there was additional residential development south and east of the project site. By 1993, the area surrounding reached its current appearance. The site continues to be undeveloped with the exception of the existing PG&E Tower Transmission (NETR 2023).

Sacred Land File Search

On July 3, 2023, the NAHC responded to Rincon's SLF request, stating that the results of the SLF search were negative. See Attachment 3 for the NAHC response.

Survey Results

Built Environment Resources

The following section summarizes the results of all background research and fieldwork as they pertain to built environment resources that may qualify as historical resources. The field work and background research resulted in the identification of one historic-age property within the project site: one transmission tower. This structure was recorded and evaluated for historical resources eligibility was recorded and evaluated for historical resources eligibility on DPR series 523 forms, which are included in Attachment 4 and summarized below.

PHYSICAL DESCRIPTION

The property consists of one built-environment feature, an approximately 0.4-mile segment of the Moraga Castro Valley Transmission Line that continues generally north-south through the project site parcel and includes a 107.3" tall PG&E Transmission Tower (Figure 2). The steel tower is installed on four concrete-poured foundations, one at each tower leg (Figure 3). The tower features an A-frame tower body with horizontal and diagonal members that continue to the tower waist and cage above. It has three cross arms, each with insulators on both ends. Cross arms connect to transmission lines above that continue in both directions beyond the boundary of the project site.

PROPERTY HISTORY

The project site is on land that was once part of the Moraga Company Ranch, owned and leased out by the Moraga Company beginning in 1913. The project site was ranched by Frank G. Sanders and his wife, Lottie Sanders, and known as Sanders Ranch. Lottie was the daughter of John Metzler Carr, an early Moraga rancher who operated the nearby 600-acre Carr Ranch (Braccini 2015). The Sanders ranched the land until the 1950s, after which the land began to be subdivided for residential development.

The transmission line was likely constructed in approximately 1950, as part of a larger project to install 83 miles of transmission line to connect the East Bay to power generated at the Contra Costa steam plant in Antioch (Contra Costa Times 1950). According to available historical aerials, the transmission line was completed by 1958 (NETR 2023). It was installed to accommodate growth following the subdivision of the area in 1947 and subsequent growth following World War II to provide power to the new households and businesses in the area. By this time, the system for transmitting electricity to household users had been established in the several decades prior. The first steel lattice towers in the United States were installed in Big Creek, California in 1913 (Wuebben 2020). The first long-distance transmission line in the state, the Vaca-Dixon line, was constructed in 1922. California has not built long-distance transmission lines since, instead relying on a connected network of shorter, regional transmission lines (Plachta 2022).

Historical aerial images confirm that the transmission line has been in place since that time, and its alignment appears to retain its original configuration (NETR 2023). The approximately 0.4-mile segment of line within the project site is part of the Moraga Castro Valley Transmission Line, which begins at the Moraga Substation in Orinda, northwest of the project site and continues for 14 miles southeast and terminates east of the Don Castro Regional Recreation Area in Castro Valley (California Energy Commission 2023). The 230kv line is owned and operated by PG&E and comprised of hundreds of lattice steel towers. Several of the towers on the line have been modified with cell sites mounted to them to provide wireless voice and data services in the area and have been raised for clearance requirements (PG&E 2012). The line has also been reconductored, or had its cable transmission wire replaced, several times over its lifespan, including work planned for 2014 (PG&E 2009).

HISTORICAL RESOURCES EVALUATION

The 0.4-mile segment of the Moraga Castro Valley Transmission Line is recommended ineligible for listing in the NRHP, CRHR, or local listing because it lacks historical or architectural significance. Located on a portion of the former Moraga Company Ranch and Sanders Ranch, research for this evaluation found no evidence suggesting the transmission line is associated with important events in the history of utility design. Constructed and installed in the 1950s, it is not an early or unique installation and is one of hundreds of regional transmission lines built in the state and area by PG&E following the construction of the first long-distance transmission line in 1922. Typical of infrastructure from the period, it is not significant in that context or in the context of any other event important to the history of the city, state, or nation. It is therefore recommended ineligible for the NRHP or CRHR under Criteria A/1 or as a Town of Moraga Landmark under Criteria 1/2/4.

Though located within the former Sanders Ranch, the transmission line, constructed in the 1950s when the ranch operations were ceasing and, is not closely associated with the lives of the Sanders or their work. Research for this study did not identify any association between the subject resource and any individual known to have made contributions important to the history of the city, state, or nation. It is therefore recommended ineligible for the NRHP or CRHR under Criteria B/2 or as a Town of Moraga Landmark under Criteria 3.

The 0.4-mile segment of the transmission line within the project site is part of an ordinary utility construction composed of a series of towers and cable wire and does not appear to be distinguished by its design. A ubiquitous and typical utility construction including one of hundreds of transmission towers built as part of a larger utility transmission line project, the segment of transmission line is unlikely to be exemplary of the work of any master engineer. Thus, the transmission line is recommended ineligible for the NRHP or CRHR under Criteria C/3 or as a Town of Moraga Landmark under Criteria 5 through 10.

Finally, because background research did not suggest the transmission line has the potential to yield information important to prehistory or history, the subject structure is recommended ineligible for the NRHP or CRHR under Criteria D/4.

As a result of this evaluation, the subject segment of the Moraga Castro Valley Transmission Line, inclusive of the tower located within the current project site is recommended ineligible for inclusion in the NRHP and CRHR. As such, it does not qualify as a historical resource as defined in Section 15064.5 of the CEQA Guidelines.

Archaeological Resources

The following section summarizes the results of all background research and fieldwork as they pertain to archaeological resources that may qualify as historical resources and/or unique archaeological resources.

Ground visibility was fair to poor (0 to 60 percent) with approximately 30 to 60 percent exposure within established access roads and 0 to 20 percent exposure elsewhere. Thick coverage of dry grasses obscured surface visibility along portions of the proposed access road and around the existing tower (Figure 4). The project site largely retains its original natural context, with land formation consisting generally of undulating hillside slopes and vegetating including dry grasses and chaparral bushes. No trees were present within areas subject to project activities, including grading and construction. The area has been subject to minimal previous disturbance, with the construction of the existing tower and access road and one dilapidated barbed wire fence with wooden posts, which did not exhibit any diagnostic features indicating age. No archaeological resources were identified during the field survey, and neither of the two flaked scrapers identified in 1981 were relocated.

Conclusions and Recommendations

The impact analysis included here is organized based on the cultural resources thresholds included in CEQA Guidelines Appendix G: Environmental Checklist Form:

a. Would the project cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?
b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?
c. Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Threshold A broadly refers to historical resources. To more clearly differentiate between archaeological and built environment resources, we have chosen to limit analysis under Threshold A to built environment resources. Archaeological resources, including those that may be considered historical resources pursuant to Section 15064.5 and those that may be considered unique archaeological resources pursuant to Section 21083.2, are considered under Threshold B.

Historical Built Environment Resources

The field survey and background research identified one built-environment historical resource in the project site, the transmission tower. As detailed above, the resource was determined ineligible for the NRHP, the CRHR, or as a Town of Moraga Landmark for lack of historical or architectural significance. The proposed project to modify the transmission tower for cell antennas and the installation of necessary associated equipment, and the construction of a new access road would not result in the substantial adverse change to the significance of a historical resource. The proposed project would result in ***no impact to historical resources*** pursuant to CEQA.

Historical and Unique Archaeological Resources

This assessment did not identify any archaeological resources or archaeological deposits within the project site. The current field survey did not relocate the scraper identified in 1981 nor did it identify substantial prehistoric or historic-period archaeological remains within areas of the project site subject to ground disturbing activities or the immediate vicinity. While the project site is surrounded by a confluence of freshwater sources consistent with habitation patterns and isolated archaeological artifacts have been identified in the general vicinity, the undulating hillside topography, lack of historic-period use or access depicted in maps and aerials, negative SLF results, and lack of specific archaeological resources recorded in the area suggest there is a low potential for encountering intact subsurface archaeological deposits. However, the lack of surface evidence of archaeological materials does not preclude their subsurface existence. Rincon presents the following recommended mitigation measure for unanticipated discoveries during construction. With adherence to this measure, Rincon recommends a finding of ***less than significant impact with mitigation for archaeological resources*** under CEQA.

Recommended Mitigation

Unanticipated Discovery of Cultural Resources

In the event that archaeological resources are unexpectedly encountered during ground-disturbing activities, work within 50 feet of the find shall halt and an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology (National Park Service 1983) shall be contacted immediately to evaluate the resource. If the resource is determined by the qualified archaeologist to be prehistoric, then a Native American representative shall also be contacted to participate in the evaluation of the resource. If the qualified archaeologist and/or Native American representative determines it to be appropriate, archaeological testing for CRHR eligibility shall be completed. If the resource proves to be eligible for the CRHR and significant impacts to the resource cannot be avoided via project redesign, a qualified archaeologist shall prepare a data recovery plan tailored to the physical nature and characteristics of the resource, per the requirements of CCR Guidelines Section 15126.4(b)(3)(C). The data recovery plan shall identify data recovery excavation methods, measurable objectives, and data thresholds to reduce any significant impacts to cultural resources related to the resource. Pursuant to the data recovery plan, the qualified archaeologist and Native American representative, as appropriate, shall recover and document the scientifically consequential information that justifies the resource's significance. The City shall review and approve the treatment plan and archaeological testing as appropriate, and the resulting documentation shall be submitted to the regional repository of the California Historical Resources Information System, per CCR Guidelines Section 15126.4(b)(3)(C).

Human Remains

No human remains are known to be present within the project site. However, the discovery of human remains is always a possibility during ground disturbing activities. If human remains are found, the State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In the event of an unanticipated discovery of human remains, the County Coroner must be notified immediately. If the human remains are determined to be of Native American origin, the Coroner will notify the Native American Heritage Commission, which will determine and notify a most likely descendant (MLD). The MLD has 48 hours from being granted site access to make recommendations for the disposition of the remains. If the MLD does not make recommendations within 48 hours, the landowner shall reinter the remains in an area of the property secure from subsequent disturbance. With adherence to existing regulations, Rincon recommends a finding of less than significant impact to human remains under CEQA.

Should you have any questions concerning this study, please do not hesitate to contact the undersigned at 925-326-1159 or jmurphy@rinconconsultants.com.

Sincerely,
Rincon Consultants, Inc.

Elaine F.

JulieAnn Murphy
Architectural Historian Project Manager

Elaine Foster
Archaeologist

Steven Treffers
Cultural Resources Director

Attachments

Attachment 1	Figures
Attachment 2	CHRIS Results
Attachment 3	NAHC Results
Attachment 4	DPR Forms

References

Braccini, Sophie

N.d. 600-Acre Carr Ranch to Become Public Open Space," Accessed online July 2023, https://www.lamorindaweekly.com/archive/issue0908/600-Acre-Carr-Ranch-to-Become-Public-Open-Space.html,

Contra Costa Times

1950 "PG&E Crews Start Work on Two-Million Dollar Transmission Line Project Here," August 14. Accessed online July 2023. https://www.newspapers.com/image/744334533/?terms=moraga%20%22transmission%20line%22&match=1.

East Bay Regional Park District (EBRPD)

2018 "Native People's of the East Bay: Past to Present," Accessed online July 2023. https://kanyonkonsulting.com/wp-content/uploads/2019/05/Native-Peoples-Map-Brochure-2018.pdf.

Little, Donna

1982 An Archaeological Survey of a Three Acre parcel of Land at Sanders Ranch, Moraga, Contra Costa County, California. Report on file with the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Milliken, Randall, Laurence Shoup, and Beverly Ortiz

2009 Ohlone/Costanoan Indians of the San Francisco Peninsula and their Neighbors, Yesterday and Today. Report on file with the National Park Service, Golden Gate National Recreation Area, San Francisco, California.

Pacific Gas & Electric

2009 PG&E's 2009 Electric Transmission Grid Expansion Plan, March 5. Accessed July 2023, file:///C:/Users/jmurphy/Downloads/TN%2051130%2004-16-09%20Transmission%20Planning%20and%20Grid%20Expantion%20Plan.pdf.

2012 Advice Letter 4097-E, dated September 24, 2012 from Edward F. Randolph of the State of California Public Utilities Commission to Brian K. Cherry of Pacific Gas & Electric.

NETR Online

2023 "Historic Aerials." Various historic aerials and topographic maps of the project area. Accessed July 2023, https://www.historicaerials.com/.

Plachta, Ari

2022 "It Takes too Long To Build New Power Lines in California," *The Sacramento Bee,* December 27.

Schluntz, Nancy

1981 Draft Environmental Impact Report for Development of the Sanders Ranch in Moraga, California (letter report). Report on file with the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Skinner, Maggie

N.d. "About Moraga California," https://www.moragahometours.com/, Accessed online July 2023.

Town of Moraga

N.d. "History," https://www.moraga.ca.us/278/History, Accessed online July 2023.

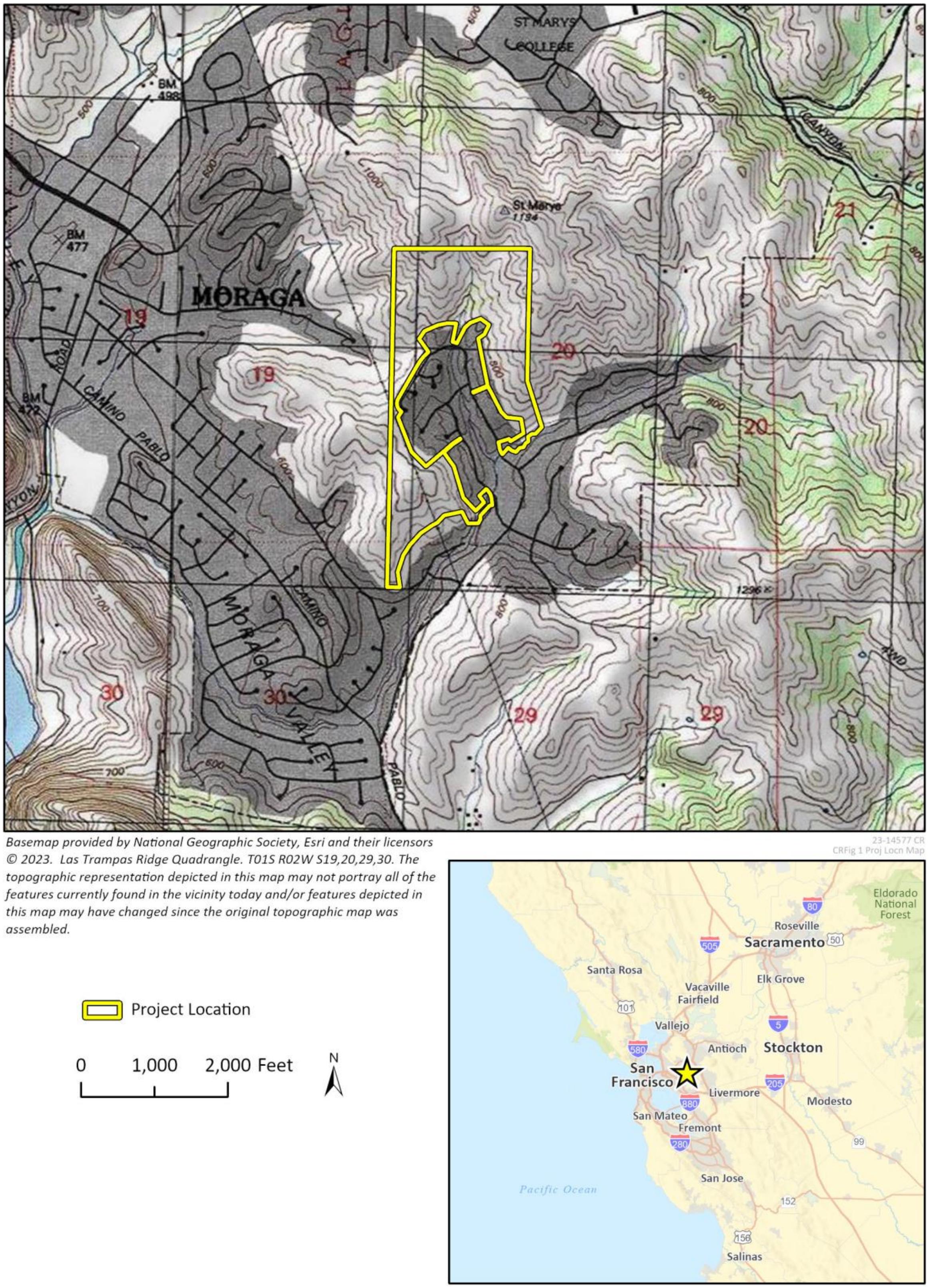
Wuebben, Daniel

2020 "Power Lines Around Los Angeles: Isolation, Interconnection, and Aesthetics," Access online July 2023, https://boomcalifornia.org/2020/05/21/power-lines-around-los-angeles-isolation-interconnection-and-aesthetics/ .

Attachment 1

Figures

Figure 1 Project Location



Basemap provided by National Geographic Society, Esri and their licensors © 2023. Las Trampas Ridge Quadrangle. T01S R02W S19,20,29,30. The topographic representation depicted in this map may not portray all of the features currently found in the vicinity today and/or features depicted in this map may have changed since the original topographic map was assembled.

Figure 2 View of Tower, View West

Figure 3 Base of Transmission Tower, View East

Figure 4 Overview of Project Site Survey Area and Representative Visibility, View Northeast

Attachment 2

CHRIS Results

Report List

22-1950 :: 23-14577 Sanders Ranch Wireless Facility ISMND

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-000595		1974	R.F. King	A Report on the Status of Generally Available Data Regarding Archaeological, Ethnographic, and Historical Resources Within a Five Mile Wide Corridor Through Portions of Colusa, Yolo, Solano, and Contra Costa Counties, California		07-000091, 48-000009, 48-000010, 48-000011, 48-000012, 48-000013, 48-000018, 48-000020, 57-000130, 57-000131
S-000848	Agency Nbr - Contract AA550-CT6-52	1976	David A. Fredrickson	A Summary of Knowledge of the Central and Northern California Coastal Zone and Offshore Areas, Vol. III, Socioeconomic Conditions, Chapter 7: Historical & Archaeological Resources	The Anthropology Laboratory, Sonoma State College; Winzler & Kelly Consulting Engineers	
S-001978		1960	Anthony V. Aiello	The Islands of Contra Costa		

Report List

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Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-002458		1981	Neil Ramiller, Suzanne Ramiller, Roger Werner, and Suzanne Stewart	Overview of Prehistoric Archaeology for the Northwest Region, California Archaeological Sites Survey: Del Norte, Humboldt, Mendocino, Lake, Sonoma, Napa, Marin, Contra Costa, Alameda	Northwest Regional Office, California Archaeological Sites Survey, Anthropological Studies Center, Sonoma State University	01-000080, 01-000084, 01-000086, 01-000104, 01-000119, 01-000124, 01-000125, 01-000126, 01-000127, 01-000137, 01-000139, 01-002053, 01-002104, 07-000047, 07-000079, 07-000080, 07-000081, 07-000082, 07-000083, 07-000092, 07-000093, 07-000105, 07-000131, 07-000146, 07-000147, 07-000148, 07-000149, 07-000150, 07-000151, 07-000168, 07-000173, 07-000175, 07-000177, 07-000185, 07-000186, 07-000190, 07-000323, 07-000440, 07-000447, 07-000448, 07-000449, 07-000462, 07-000470, 07-000474, 07-000476, 07-000481, 07-000674, 07-000710, 07-000724, 07-004621, 08-000015, 08-000018, 08-000021, 08-000090, 12-000125, 12-000175, 12-000186, 12-000194, 12-000199, 12-000202, 12-000207, 12-000209, 12-000210, 12-000211, 12-000263, 12-000264, 12-000266, 12-000336, 12-000442, 12-000445, 12-000458, 12-000824, 17-000006, 17-000026, 17-000035, 17-000072, 17-000114, 17-000177, 17-000286, 17-000287, 17-000289, 17-000290, 17-000307, 17-000320, 17-000392, 17-000407, 17-000437, 17-000446, 17-000470, 17-000531, 17-000535, 17-000546, 17-000550, 17-000551, 17-000554, 17-000572, 17-000610, 17-000639, 17-000640, 17-000673, 17-000787, 17-000812, 21-000017, 21-000034, 21-000039, 21-000051, 21-000053, 21-000057, 21-000058, 21-000106, 21-000143, 21-000163, 21-000177, 21-000217, 21-000221, 21-000235, 21-000242, 21-000245, 21-000252, 21-000262, 21-000283, 21-000290, 21-000291, 21-000295, 21-000332, 21-000335, 21-000342, 21-000346, 21-000347, 21-000368, 21-000369, 21-000370, 21-000651, 21-000653, 21-002539, 23-000143, 23-000387, 23-000450,

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22-1950 :: 23-14577 Sanders Ranch Wireless Facility ISMND

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
						23-000475, 23-000478, 23-000492, 23-000534, 23-000535, 23-000536, 23-000537, 23-000539, 23-000590, 23-000786, 23-000789, 23-000790, 23-000791, 23-000792, 23-000793, 23-000796, 23-000835, 23-001034, 23-001060, 23-001063, 23-001520, 23-002898, 23-002915, 23-002936, 23-002945, 28-000015, 28-000027, 28-000028, 28-000029, 28-000032, 28-000045, 28-000061, 28-000063, 28-000066, 28-000077, 28-000088, 28-000092, 28-000093, 28-000097, 28-000123, 28-000125, 28-000150, 28-000199, 28-000209, 28-000218, 28-000222, 28-000310, 28-000311, 28-000329, 28-000330, 28-000362, 28-000418, 28-000419, 28-000420, 28-000421, 28-000422, 28-000428, 28-000828, 28-000912, 49-000073, 49-000079, 49-000087, 49-000112, 49-000135, 49-000194, 49-000228, 49-000264, 49-000265, 49-000271, 49-000291, 49-000292, 49-000295, 49-000318, 49-000329, 49-000330, 49-000340, 49-000342, 49-000360, 49-000362, 49-000363, 49-000369, 49-000371, 49-000423, 49-000424, 49-000434, 49-000483, 49-000512, 49-000521, 49-000548, 49-000620, 49-000653, 49-000671, 49-000682, 49-000683, 49-000730, 49-000731, 49-000732, 49-000733, 49-000846, 49-000860, 49-000887, 49-000913, 49-000914, 49-000915, 49-000916, 49-000917, 49-000959, 49-000970, 49-000976, 49-000978, 49-000981, 49-000982, 49-000983, 49-000990, 49-000992, 49-001081, 49-001082, 49-001083, 49-001084, 49-001085, 49-001086, 49-001087, 49-001109, 49-001121
S-002458a		1982	Suzanne Ramiller	Prehistoric Archaeology Overview Northwest Region; California Archaeological Inventory, Volume I: Humboldt and Del Norte Counties	Anthropological Studies Center, Sonoma State University	

Report List

22-1950 :: 23-14577 Sanders Ranch Wireless Facility ISMND

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-002458b		1982	Roger H. Werner	Archaeological Overview of Mendocino and Lake Counties	Anthropological Studies Center, Sonoma State University	
S-002458c		1982	Suzanne Stewart	Prehistoric Archaeology Overview Northwest Region; California Archaeological Inventory, Volume 3: Napa and Sonoma Counties	Anthropological Studies Center, Sonoma State University	
S-002458d		1982	Suzanne B. Stewart	Archaeological Overview of Alameda, Contra Costa, and Marin Counties	Anthropological Studies Center, Sonoma State University	
S-002458e		1982	Neil Ramiller	Environmental Overview of the Northwest Region	Anthropological Studies Center, Sonoma State University	
S-002538		1981	Nancy Schluntz	Draft Environmental Impact Report for Development of the Sanders Ranch in Moraga, California (letter report).	Ecumene Associates	
S-002988	Submitter - File # 551/1427	1982	Donna J. Little	An Archaeological Survey of a Three Acre Parcel of Land at Sanders Ranch, Moraga, Contra Costa County, California.	Sonoma State University Academic Foundation, Inc.	
S-009462		1977	Teresa Ann Miller	Identification and Recording of Prehistoric Petroglyphs in Marin and Related Bay Area Counties	San Francisco State University	07-000323, 21-000087, 21-000376, 21-000378, 21-000379, 21-000380, 21-000381, 21-000382, 21-000383, 21-000384, 21-000386, 21-000387, 21-000388, 21-000389, 21-000390, 21-000391, 21-000392, 21-000393, 21-000394, 21-000395, 21-000396, 21-000397, 21-000398, 21-000399, 21-000400, 21-000401, 21-000402, 21-000546, 23-000434, 23-000789, 23-000790, 49-000629, 49-000785, 49-000787
S-009583		1978	David W. Mayfield	Ecology of the Pre-Spanish San Francisco Bay Area	San Francisco State University	

Report List

22-1950 :: 23-14577 Sanders Ranch Wireless Facility ISMND

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-009795		1986	Thomas Lynn Jackson	Late Prehistoric Obsidian Exchange in Central California	Stanford University	06-000025, 07-000047, 07-000080, 07-000188, 07-000440, 17-000320, 17-000601, 21-000163, 21-000218, 21-000235, 21-000242, 21-000283, 21-000290, 21-000368, 21-000423, 21-000628, 23-001589, 23-001659, 23-003068, 23-003119, 28-000015, 28-000068, 28-000116, 28-000199, 28-000205, 28-000828, 49-000135, 49-000360, 49-000423, 49-000424, 49-000518, 49-000521, 49-000533, 49-000536, 49-000558, 49-000801, 57-000114
S-016660		1992	Jeffrey B. Fentress	Prehistoric Rock Art of Alameda and Contra Costa Counties, California	California State University, Hayward	01-000035, 01-000039, 01-000071, 01-000080, 01-000128, 01-000137, 01-000138, 01-000144, 01-000195, 01-000198, 01-000199, 01-002112, 07-000029, 07-000094, 07-000189, 07-000193, 07-000212, 07-000216, 07-000219, 07-000230, 07-000242, 07-000255, 07-000260, 07-000271, 07-000301, 07-000302, 07-000323, 07-000344, 07-000345, 07-000346, 07-000347, 07-000348, 07-000356, 07-000362, 07-000374, 07-000725, 07-000726, 07-000727, 07-000730, 07-000734, 07-000736, 07-000738, 07-000739
S-017773	Submitter - Contract #04E634-EP; Submitter - Task Order #9	1992	Angela M. Banet	Contract 04E634-EP, Task Order #9, Historic Map Review for CALTRANS Maintenance Facilities (letter report)	Basin Research Associates, Inc.	
S-017835		1975	Judy Myers Suchey	Biological Distance of Prehistoric Central California Populations Derived from Non-Metric Traits of the Cranium	University of California, Riverside	01-000086, 01-000104, 01-000105, 06-000025, 07-000080, 07-000081, 07-000083, 07-000087, 21-000017, 21-000193, 21-000242, 21-000252, 48-000010, 57-000145
S-018217		1996	Glenn Gmoser	Cultural Resource Evaluations for the Caltrans District 04 Phase 2 Seismic Retrofit Program, Status Report	California Department of Transportation	01-000014, 01-000023, 01-000227, 07-000108, 07-000119, 38-000002, 38-000004, 41-000273, 43-000106, 43-000297, 43-000624, 43-001078, 44-000010, 44-000201, 44-000300, 49-000195

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22-1950 :: 23-14577 Sanders Ranch Wireless Facility ISMND

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-020395		1998	Donna L. Gillette	PCNs of the Coast Ranges of California: Religious Expression or the Result of Quarrying?	California State University, Hayward	07-000094, 07-000323, 12-000050, 17-000071, 17-001315, 21-000087, 21-000376, 21-000378, 21-000379, 21-000381, 21-000382, 21-000383, 21-000384, 21-000386, 21-000387, 21-000388, 21-000389, 21-000390, 21-000391, 21-000392, 21-000393, 21-000394, 21-000395, 21-000396, 21-000397, 21-000398, 21-000399, 21-000400, 21-000401, 21-000402, 21-000419, 21-000433, 21-000546, 21-000620, 21-000621, 21-000624, 21-000661, 23-000434, 23-000809, 23-000810, 23-001698, 23-001725, 23-001792, 23-001798, 23-001799, 23-001803, 23-001804, 23-001930, 23-001942, 23-001950, 23-001963, 35-000013, 43-000067, 43-000080, 43-000287, 43-000289, 43-000504, 49-000046, 49-000240, 49-000533, 49-000550, 49-000629, 49-000785, 49-000787, 49-000868, 49-000960, 49-000975, 49-001004, 49-001087, 49-001239, 49-002121
S-030204		2003	Donna L. Gillette	The Distribution and Antiquity of the California Pecked Curvilinear Nucleated (PCN) Rock Art Tradition.	University of California, Berkeley	01-002148, 21-000384, 23-000810
S-030330		2005	Lorna Billat	New Tower ("NT") Submission Packet, FCC Form 620, Alta Mesa, SF-06810A.	Earth Touch Inc	
S-030330a		2005		Cultural Resource Assessment for Alta Mesa (SF-06810A) Cellular Facility to be collocated on a rural parcel located at 1199 Alta Mesa Road in Moraga (Contra Costa County), California.	EarthTouch	
S-032596	Caltrans - EA No. 447600; Other - Contract #04A2098	2006	Randall Milliken, Jerome King, and Patricia Mikkelsen	The Central California Ethnographic Community Distribution Model, Version 2.0, with Special Attention to the San Francisco Bay Area, Cultural Resources Inventory of Caltrans District 4 Rural Conventional Highways	Consulting in the Past; Far Western Anthropological Research Group, Inc.	
S-033057		2007	Carolyn Losee	Records Search Results for T-Mobile Project, BA-21253: 1728 St. Mary's Road, Moraga, CA 94556 (letter report)	Archaeological Resources Technology	

Report List

22-1950 :: 23-14577 Sanders Ranch Wireless Facility ISMND

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-033600	Agency Nbr - Contract No. 04A2098; Caltrans - EA No. 447600	2007	Jack Meyer and Jeff Rosenthal	Geoarchaeological Overview of the Nine Bay Area Counties in Caltrans District 4	Far Western Anthropological Research Group, Inc.	01-000001, 01-000002, 01-000014, 01-000063, 01-000064, 01-000067, 01-000080, 01-000124, 01-000139, 01-000140, 01-001795, 01-002110, 01-002160, 01-002162, 01-002245, 07-000019, 07-000024, 07-000037, 07-000047, 07-000075, 07-000079, 07-000088, 07-000089, 07-000108, 07-000182, 07-000185, 07-000186, 07-000217, 07-000239, 07-000401, 07-000721, 21-000010, 21-000048, 21-002615, 28-000009, 28-000028, 28-000301, 28-000967, 38-000006, 38-000028, 38-000101, 38-000102, 38-000119, 41-000080, 41-000284, 43-000016, 43-000189, 43-000296, 43-000308, 43-000310, 43-000423, 43-000424, 43-000448, 43-000451, 43-000485, 43-000561, 43-000604, 43-000608, 43-000614, 43-000623, 43-001015, 43-001058, 43-001080, 43-001163, 43-001194, 43-001576, 48-000007, 48-000157
S-043202		2013	Lorna Billat	New Tower Submission Packet; St. Mary's College; CNU4986; 1928 St. Mary's Road, Morega.	Earth Touch	
S-046633	Other - TCNS 128541; OTIS Report Number - FCC_2015_0930_001; Submitter - 310520; Submitter - CNU4986	2015	Carolyn Losee and Stephen Geist	FCC Form 620 New Tower Submission Packet: AT&T CNU4896 St Mary's College, 1928 St. Mary's Road, Morgana, CA 94556	Archaeological Resources Technology, Geist Engineering & Environmental Group, Inc.	
S-046633a		2015	Carolyn Losee	Cultural Resources Investigation for AT&T Mobility CNU4986 "St. Mary's College" 1928 St. Mary's Road, Moraga, Contra Costa County, California 94556 (letter report)	Archaeological Resources Technology	
S-046633b		2015	Julianne Polanco	FCC_2015_0930_001; CNU4986 St Mary's College, 1928 St Mary's Road, Moraga, Contra Costa County, New Tower	Office of Historic Preservation	

Report List

22-1950 :: 23-14577 Sanders Ranch Wireless Facility ISMND

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-046633c		2017	Julianne Polanco, Stephen Geist, and Carolyn Losee	Addendum Letter Regarding FCC_2015_0930_001, Design change from two separate sectors to a combined sector with concealment, FCC Form 620 Collocation Submission Packet dated September 29, 2015, AT&T Name: St. Mary’s College, AT&T FA10151767, 1928 St. Mary’s Road, Moraga, Contra Costa County, California 94556, GE2G Project number 310520	Office of Historic Preservation, GE2G Geist Engineering & Environmental Group Inc, Archaeological Resources Technology	
S-046633d		2017	Julianne Polanco	CNU04986 St. Mary's College, 1928 St. Mary's Rd. Moraga, Contra Costa County, New Tower Addendum (FCC_2015 0930_001)	Office of Historic Preservation, Geist Engineering and Environmental Group,	
S-046633e		2017	Carolyn Losee	November 2017 Cultural Resources Investigation for AT&T Mobility CNU4986 "St. Mary's College" 1928 St. Mary's Road, Moraga, Contra Costa County, California 94556	Archaeological Resources Technology	

Report List

22-1950 :: 23-14577 Sanders Ranch Wireless Facility ISMND

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-049780	OTIS Report Number - FHWA_2016_0615_001	2017	Brian F. Byrd, Adrian R. Whitaker, Patricia J. Mikkelsen, and Jeffrey S. Rosenthal	San Francisco Bay-Delta Regional Context and Research Design for Native American Archaeological Resources, Caltrans District 4	California Department of Transportation, District 4	01-000001, 01-000002, 01-000014, 01-000015, 01-000022, 01-000033, 01-000034, 01-000038, 01-000062, 01-000066, 01-000080, 01-000084, 01-000086, 01-000087, 01-000089, 01-000104, 01-000105, 01-000106, 01-000107, 01-000116, 01-000117, 01-000139, 01-000152, 01-000175, 01-000197, 01-000201, 01-000202, 01-000234, 01-000237, 01-001795, 01-002120, 01-002160, 01-002162, 01-002245, 01-002280, 01-010509, 01-010610, 01-011556, 07-000019, 07-000021, 07-000029, 07-000033, 07-000037, 07-000047, 07-000066, 07-000070, 07-000079, 07-000080, 07-000089, 07-000093, 07-000098, 07-000105, 07-000117, 07-000118, 07-000147, 07-000148, 07-000149, 07-000150, 07-000154, 07-000168, 07-000173, 07-000174, 07-000175, 07-000176, 07-000185, 07-000186, 07-000189, 07-000197, 07-000217, 07-000227, 07-000230, 07-000238, 07-000239, 07-000242, 07-000309, 07-000359, 07-000365, 07-000366, 07-000400, 07-000401, 07-000440, 07-000441, 07-000459, 07-000461, 07-000462, 07-000721, 07-000724, 07-000790, 07-000792, 07-002570, 07-002592, 07-002650, 07-004537, 21-000002, 21-000036, 21-000043, 21-000045, 21-000048, 21-000051, 21-000057, 21-000058, 21-000066, 21-000070, 21-000072, 21-000073, 21-000074, 21-000075, 21-000097, 21-000106, 21-000109, 21-000142, 21-000143, 21-000152, 21-000163, 21-000164, 21-000165, 21-000166, 21-000167, 21-000175, 21-000177, 21-000193, 21-000195, 21-000196, 21-000199, 21-000200, 21-000217, 21-000218, 21-000219, 21-000220, 21-000221, 21-000222, 21-000256, 21-000295, 21-000305, 21-000306, 21-000327, 21-000332, 21-000337,

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
						21-000346, 21-000369, 21-000423, 21-000459, 21-000462, 21-000528, 21-000541, 21-000544, 21-000552, 21-000664, 21-000675, 21-002625, 27-000613, 28-000028, 28-000029, 28-000175, 28-000176, 28-000667, 28-000874, 38-000004, 38-000006, 38-000007, 38-000017, 38-000021, 38-000022, 38-000026, 38-000028, 38-000029, 38-000030, 38-000031, 38-000101, 38-000102, 38-000119, 38-000162, 38-000172, 38-004265, 38-004318, 38-004319, 38-004326, 38-004329, 38-004352, 38-004638, 38-004882, 38-005131, 38-005503, 41-000001, 41-000009, 41-000011, 41-000027, 41-000028, 41-000037, 41-000044, 41-000075, 41-000080, 41-000081, 41-000086, 41-000087, 41-000103, 41-000117, 41-000127, 41-000136, 41-000141, 41-000142, 41-000149, 41-000152, 41-000160, 41-000204, 41-000244, 41-000252, 41-000259, 41-000263, 41-000265, 41-000284, 41-000308, 41-000315, 41-002076, 43-000016, 43-000019, 43-000021, 43-000024, 43-000026, 43-000027, 43-000032, 43-000050, 43-000057, 43-000082, 43-000085, 43-000087, 43-000137, 43-000141, 43-000167, 43-000277, 43-000285, 43-000295, 43-000302, 43-000308, 43-000310, 43-000321, 43-000324, 43-000334, 43-000349, 43-000360, 43-000423, 43-000465, 43-000479, 43-000485, 43-000549, 43-000576, 43-000578, 43-000579, 43-000581, 43-000586, 43-000587, 43-000588, 43-000595, 43-000604, 43-000608, 43-000614, 43-000618, 43-000624, 43-000662, 43-000989, 43-000990, 43-001058, 43-001060, 43-001071, 43-001163, 43-001164, 43-001172, 43-001194, 43-001279, 43-001531, 43-001594, 43-001768, 43-001838, 43-001871, 43-002704, 43-003005,

Report List

22-1950 :: 23-14577 Sanders Ranch Wireless Facility ISMND

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
						48-000007, 48-000019, 48-000033, 48-000075, 48-000083, 48-000150, 48-000175, 48-000176, 48-000188, 48-000898, 49-000199, 49-001011, 49-001862
S-049780a		2016	Julianne Polanco	FHWA_2016_0615_001, Caltrans District 4 Archaeological Context	California Office of Historic Preservation	
S-051402	Agency Nbr - PM Number: 30931583	2013	Dylan Stapleton	Cultural Resources Constraints Report, RW-24 Valve Vault Replacement Moraga	Parus Consulting	
S-053411	OHP PRN - COE_2019_0717_002; Submitter - Project No. SFD1601	2019	Rhea Sanchez, Neal Kaptain, and Michael Hibma	Cultural Resources Study, Hetfield Estates Project, Moraga, Contra Costa County, California	LSA	07-004972
S-055537	Submitter - ALTA 2020-106	2021	Samantha Beck and Dean Martorana	Archaeological Survey Report, Sanders Ranch Falls Streambank Stabilization, Moraga, Contra Costa County, California, APN 258-710-030	Alta Archaeological Consulting	

Resource List

22-1950 :: 23-14577 Sanders Ranch Wireless Facility ISMND

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-07-004972		Resource Name - Sanders Corral; Other - Laguna De Las Palos Colorados; Other - Moraga Land Company; OHP PRN - COE_2019_0717_002	Structure	Historic	HP04	2019 (Michael Hibma, LSA)	S-053411

Attachment 3

NAHC Results

STATE OF CALIFORNIA **Gavin Newsom, *Governor***

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

July 3, 2023

JulieAnn Murphy
Rincon Consultants, Inc.

Via Email to: jmurphy@rinconconsultants.com

Re: Native American Tribal Consultation, Pursuant to the Assembly Bill 52 (AB 52), Amendments to the California Environmental Quality Act (CEQA) (Chapter 532, Statutes of 2014), Public Resources Code Sections 5097.94 (m), 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2 and 21084.3, Sanders Ranch Wireless Facility Project, Contra Costa County

To Whom It May Concern:

Pursuant to Public Resources Code section 21080.3.1 (c), attached is a consultation list of tribes that are traditionally and culturally affiliated with the geographic area of the above-listed project. Please note that the intent of the AB 52 amendments to CEQA is to avoid and/or mitigate impacts to tribal cultural resources, (Pub. Resources Code §21084.3 (a)) ("Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.")

Public Resources Code sections 21080.3.1 and 21084.3(c) require CEQA lead agencies to consult with California Native American tribes that have requested notice from such agencies of proposed projects in the geographic area that are traditionally and culturally affiliated with the tribes on projects for which a Notice of Preparation or Notice of Negative Declaration or Mitigated Negative Declaration has been filed on or after July 1, 2015. Specifically, Public Resources Code section 21080.3.1 (d) provides:

Within 14 days of determining that an application for a project is complete or a decision by a public agency to undertake a project, the lead agency shall provide formal notification to the designated contact of, or a tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, which shall be accomplished by means of at least one written notification that includes a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation pursuant to this section.

The AB 52 amendments to CEQA law does not preclude initiating consultation with the tribes that are culturally and traditionally affiliated within your jurisdiction prior to receiving requests for notification of projects in the tribe's areas of traditional and cultural affiliation. The Native American Heritage Commission (NAHC) recommends, but does not require, early consultation as a best practice to ensure that lead agencies receive sufficient information about cultural resources in a project area to avoid damaging effects to tribal cultural resources.

The NAHC also recommends, but does not require that agencies should also include with their notification letters, information regarding any cultural resources assessment that has been completed on the area of potential effect (APE), such as:

1. The results of any record search that may have been conducted at an Information Center of the California Historical Resources Information System (CHRIS), including, but not limited to:

- A listing of any and all known cultural resources that have already been recorded on or adjacent to the APE, such as known archaeological sites;
- Copies of any and all cultural resource records and study reports that may have been provided by the Information Center as part of the records search response;
- Whether the records search indicates a low, moderate, or high probability that unrecorded cultural resources are located in the APE; and
- If a survey is recommended by the Information Center to determine whether previously unrecorded cultural resources are present.

2. The results of any archaeological inventory survey that was conducted, including:

   - Any report that may contain site forms, site significance, and suggested mitigation measures.

     All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure in accordance with Government Code section 6254.10.

3. The result of any Sacred Lands File (SLF) check conducted through the Native American Heritage Commission was negative.

4. Any ethnographic studies conducted for any area including all or part of the APE; and

5. Any geotechnical reports regarding all or part of the APE.

Lead agencies should be aware that records maintained by the NAHC and CHRIS are not exhaustive and a negative response to these searches does not preclude the existence of a tribal cultural resource. A tribe may be the only source of information regarding the existence of a tribal cultural resource.

This information will aid tribes in determining whether to request formal consultation. In the event that they do, having the information beforehand will help to facilitate the consultation process.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our consultation list remains current.

If you have any questions, please contact me at my email address: Cody.Campagne@nahc.ca.gov.

Sincerely,

Cody Campagne

Cody Campagne
Cultural Resources Analyst

Attachment

Attachment 4

DPR Forms

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code **Reviewer** **Date**

Page 1 **of** 5 ***Resource Name or #:** Moraga Castro Valley Transmission Line

P1. Other Identifier:
***P2. Location:** ☐ **Not for Publication** ☑ **Unrestricted** ***a. County:** Contra Costa
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** Las Trampas Ridge **Date:** 1995 **T** 1S ; **R**2W ; **¼ of ¼ of Sec** 19,20,29,30 **;** . **B.M.**
c. Address: 100 Sanders Ranch Road, Moraga, California Zip: 94456
d. UTM: Zone: ; mE/ mN (G.P.S.)
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation: APN 258-300-019

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The property consists of one built-environment feature, an approximately 0.4-mile segment of the Moraga Castro Valley Transmission Line that continues generally north-south through the project site parcel and includes a 107.3" tall PG&E Transmission Tower. The steel tower is installed on four concrete-poured foundations, one at each tower leg. The tower features an A-frame tower body with horizontal and diagonal members that continue to the tower waist and cage above. It has three cross arms, each with insulators on both ends. Cross arms connect to transmission lines above that continue in both directions beyond the boundary of the project site.

***P3b. Resource Attributes:** (List attributes and codes) HP39. Other
***P4. Resources Present:** ☐Building ☐Structure ■Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #)
View of Moraga Castro Valley Transmission Line, View Northeast
July 2023

***P6. Date Constructed/Age and Sources:**
■Historic
☐Prehistoric ☐Both

***P7. Owner and Address:**

***P8. Recorded by:** (Name, affiliation, and address)
JulieAnn Murphy
Rincon Consultants
449 15th Street #303
Oakland, California 94612

***P9. Date Recorded:**
July 21, 2023

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")

***Attachments:** ☐NONE ☐Location Map ☐Sketch 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):

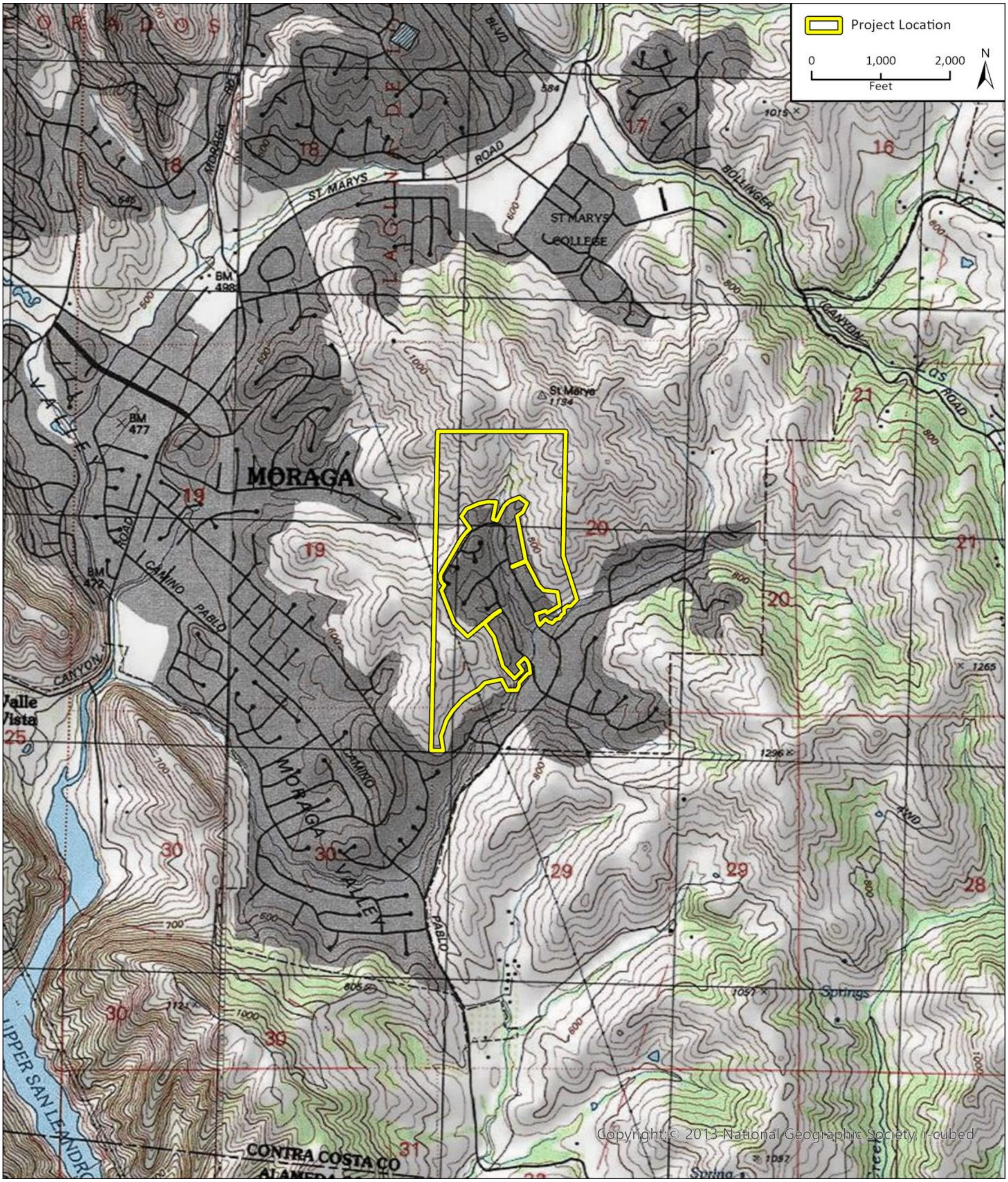
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Page 2 **of** 5 ***Resource Name or #:** Moraga Castro Valley Transmission Line

***Map Name:** Las Trampas Ridge 1995 ***Scale:** 1:24,00 ***Date of Map**:



Copyright:© 2013 National Geographic Society, i-cubed

BUILDING, STRUCTURE, AND OBJECT RECORD

Page 3 **of** 5 ***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder) Moraga Castro Valley Transmission Line

B1. Historic Name:
B2. Common Name:
B3. Original Use: Transmission Line B4. Present Use: Transmission Line
***B5. Architectural Style:** None
***B6. Construction History:** (Construction date, alterations, and date of alterations) Built in. c. 1950

***B7. Moved?** ■No ☐Yes ☐Unknown **Date:** **Original Location:**
***B8. Related Features:** N/A

B9a. Architect: N/A b. Builder: N/A
***B10. Significance: Theme:** N/A **Area:**
Period of Significance: N/A **Property Type:** Recreational **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The project site is on land that was once part of the Moraga Company Ranch, owned and leased out by the Moraga Company beginning in 1913. The project site was ranched by Frank G. Sanders and his wife, Lottie Sanders, and known as Sanders Ranch. Lottie was the daughter of John Metzler Carr, an early Moraga rancher who operated the nearby 600-acre Carr Ranch (Braccini 2015). The Sanders ranched the land until the 1950s, after which the land began to be subdivided for residential development.

The transmission line was likely constructed in approximately 1950, as part of a larger project to install 83 miles of transmission line to connect the East Bay to power generated at the Contra Costa steam plant in Antioch (Contra Costa Times 1950). According to available historical aerials, the transmission line was completed by 1958 (NETR 2023). It was installed to accommodate growth following the subdivision of the area in 1947 and subsequent growth following World War II to provide power to the new households and businesses in the area. By this time, the system for transmitting electricity to household users had been established in the several decades prior. The first steel lattice towers in the United States were installed in Big Creek, California in 1913 (Wuebben 2020). The first long-distance transmission line in the state, the Vaca-Dixon line, was constructed in 1922. California has not built long-distance transmission lines since, instead relying on a connected network of shorter, regional transmission lines (Plachta 2022).

B11. Additional Resource Attributes: (List attributes and codes)

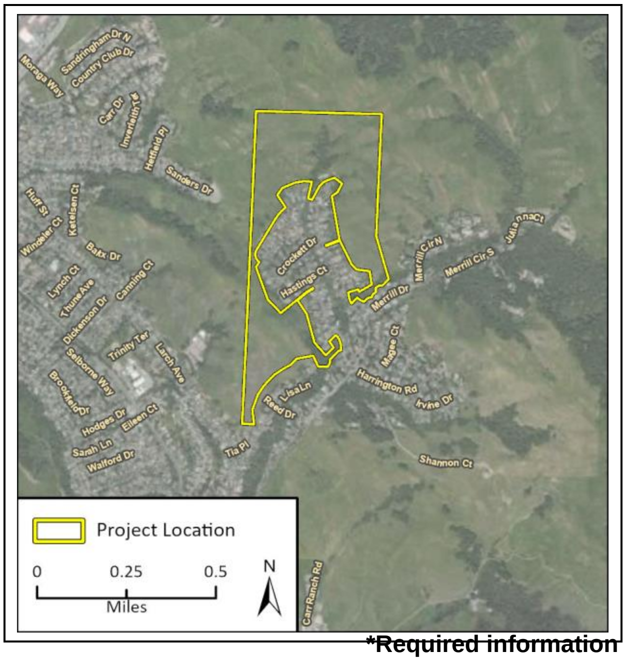
***B12. References:**

See Continuation Sheet.

B13. Remarks:
***B14. Evaluator:** JulieAnn Murphy, Rincon Consultants

***Date of Evaluation:** July 2023

(This space reserved for official comments.)



P3a. Description (Continued):

Historical aerial images confirm that the transmission line has been in place since that time, and its alignment appears to retain its original configuration (NETR 2023). The approximately 0.4-mile segment of line within the project site is part of the Moraga Castro Valley Transmission Line, which begins at the Moraga Substation in Orinda, northwest of the project site and continues for 14 miles southeast and terminates east of the Don Castro Regional Recreation Area in Castro Valley (California Energy Commission 2023). The 230kv line is owned and operated by PG&E and comprised of hundreds of lattice steel towers. Several of the towers on the line have been modified with cell sites mounted to them to provide wireless voice and data services in the area and have been raised for clearance requirements (PG&E 2012). The line has also been reconductored, or had its cable transmission wire replaced, several times over its lifespan, including work planned for 2014 (PG&E 2009).

HISTORICAL RESOURCES EVALUATION

The 0.4-mile segment of the Moraga Castro Valley Transmission Line is recommended ineligible for listing in the NRHP, CRHR, or local listing because it lacks historical or architectural significance. Located on a portion of the former Moraga Company Ranch and Sanders Ranch, research for this evaluation found no evidence suggesting the transmission line is associated with important events in the history of utility design. Constructed and installed in the 1950s, it is not an early or unique installation and is one of hundreds of regional transmission lines built in the state and area by PG&E following the construction of the first long-distance transmission line in 1922. Typical of infrastructure from the period, it is not significant in that context or in the context of any other event important to the history of the city, state, or nation. It is therefore recommended ineligible for the NRHP or CRHR under Criteria A/1 or as a Town of Moraga Landmark under Criteria 1/2/4.

Though located within the former Sanders Ranch, the transmission line, constructed in the 1950s when the ranch operations were ceasing and, is not closely associated with the lives of the Sanders or their work. Research for this study did not identify any association between the subject resource and any individual known to have made contributions important to the history of the city, state, or nation. It is therefore recommended ineligible for the NRHP or CRHR under Criteria B/2 or as a Town of Moraga Landmark under Criteria 3.

The 0.4-mile segment of the transmission line within the project site is part of an ordinary utility construction composed of a series of towers and cable wire and does not appear to be distinguished by its design. A ubiquitous and typical utility construction including one of hundreds of transmission towers built as part of a larger utility transmission line project, the segment of transmission line is unlikely to be exemplary of the work of any master engineer. Thus, the transmission line is recommended ineligible for the NRHP or CRHR under Criteria C/3 or as a Town of Moraga Landmark under Criteria 5 through 10.

Finally, because background research did not suggest the transmission line has the potential to yield information important to prehistory or history, the subject structure is recommended ineligible for the NRHP or CRHR under Criteria D/4.

As a result of this evaluation, the subject segment of the Moraga Castro Valley Transmission Line, inclusive of the tower located within the current project site is recommended ineligible for inclusion in the NRHP and CRHR. As such, it does not qualify as a historical resource as defined in Section 15064.5 of the CEQA Guidelines.

B12. References (Continued)

Braccini, Sophie

N.d. 600-Acre Carr Ranch to Become Public Open Space," Accessed online July 2023, https://www.lamorindaweekly.com/archive/issue0908/600-Acre-Carr-Ranch-to-Become-Public-Open-Space.html,

Contra Costa Times

1950 "PG&E Crews Start Work on Two-Million Dollar Transmission Line Project Here," August 14. Accessed online July 2023. https://www.newspapers.com/image/744334533/?terms=moraga%20%22transmission%20line%22&match=1.

East Bay Regional Park District (EBRPD)

2018 "Native People's of the East Bay: Past to Present," Accessed online July 2023. https://kanyonkonsulting.com/wp-content/uploads/2019/05/Native-Peoples-Map-Brochure-2018.pdf.

Little, Donna

1982 An Archaeological Survey of a Three Acre parcel of Land at Sanders Ranch, Moraga, Contra Costa County, California. Report on file with the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Milliken, Randall, Laurence Shoup, and Beverly Ortiz

2009 Ohlone/Costanoan Indians of the San Francisco Peninsula and their Neighbors, Yesterday and Today. Report on file with the National Park Service, Golden Gate National Recreation Area, San Francisco, California.

Pacific Gas & Electric

2009 PG&E's 2009 Electric Transmission Grid Expansion Plan, March 5. Accessed July 2023, file:///C:/Users/jmurphy/Downloads/TN%2051130%2004-16-09%20Transmission%20Planning%20and%20Grid%20Expantion%20Plan.pdf.

2012 Advice Letter 4097-E, dated September 24, 2012 from Edward F. Randolph of the State of California Public Utilities Commission to Brian K. Cherry of Pacific Gas & Electric.

NETR Online

2023 "Historic Aerials." Various historic aerials and topographic maps of the project area. Accessed July 2023, https://www.historicaerials.com/.

Plachta, Ari

2022 "It Takes too Long To Build New Power Lines in California," *The Sacramento Bee,* December 27.

Schluntz, Nancy

1981 Draft Environmental Impact Report for Development of the Sanders Ranch in Moraga, California (letter report). Report on file with the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Skinner, Maggie

N.d. "About Moraga California," https://www.moragahometours.com/, Accessed online July 2023.

Town of Moraga

N.d. "History," https://www.moraga.ca.us/278/History, Accessed online July 2023.

Wuebben, Daniel

2020 "Power Lines Around Los Angeles: Isolation, Interconnection, and Aesthetics," Access online July 2023, https://boomcalifornia.org/2020/05/21/power-lines-around-los-angeles-isolation-interconnection-and-aesthetics/ .

Appendix E

Geotechnical Engineering Investigation

Krazan & ASSOCIATES, INC.
GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

February 21, 2023 KA Project No. 042-22060

Ms. Farah Ali
SAC Wireless
333 University Avenue, Suite 200
Sacramento, California 95825

RE: Limited Geotechnical Engineering Investigation
Proposed Sanders Ranch PSL# 304480
100 Sanders Ranch Road
Moraga, California

Dear Ms. Ali:

In accordance with your request, we have completed the Limited Geotechnical Engineering Investigation for the above-referenced project site.

PROPOSED CONSTRUCTION

We understand that design of the proposed development is currently underway; structural load information and other final details pertaining to the structures are unavailable. On a preliminary basis, it is understood the planned development will include construction of improvements to the existing cellular facility. Included in the improvements are a new control slab, retaining walls and a roadway. It is understood the structures will be supported on shallow foundations. Footing loads are anticipated to be light to moderate. On-site paved areas and landscaping are also planned for the development of the project.

In the event, these structural or grading details are inconsistent with the final design criteria, the Soils Engineer should be notified so that we may update this writing as applicable.

SITE LOCATION AND SITE DESCRIPTION

The site is located southwest of the intersection of Crockett Drive and Brandt Drive in Moraga, California. The site is predominately surrounded by residential developments and vacant land. The existing cellular site is located in the southeast portion of the site. Several trees are located within the site. Natural drainage courses are located within the site. The site is covered by a native weed/grass growth and the surface soils have a loose consistency. The site terrain consists of rolling hills with the majority of the slopes trending down from south to north.

FIELD AND LABORATORY INVESTIGATIONS

Subsurface soil conditions were explored by drilling 8 borings to depths ranging from approximately 5½ to 10½ feet below existing site grade, using hand sampling equipment. The approximate boring locations are shown on the site plan. During drilling operations, penetration tests were performed at regular intervals to evaluate the soil consistency and to obtain information regarding the engineering properties of the subsoils. Soil samples were retained for laboratory testing. During drilling operations, the soils encountered were continuously examined and visually classified in accordance with the Unified Soil Classification System. A detailed description of the field investigation is presented in Appendix A.

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory testing program was formulated with emphasis on the evaluation of natural moisture, shear strength, expansion potential, plasticity, and moisture-density relationships of the materials encountered. In addition, chemical tests were performed to evaluate the soil-cement reactivity. Details of the laboratory test program and results of the laboratory tests are summarized in Appendix A. This information, along with the field observations, was used to prepare the final boring logs in Appendix A.

SOIL PROFILE AND SUBSURFACE CONDITIONS

Based on our findings, the subsurface conditions encountered appear typical of those found in the geologic region of the site. In general, upper soils consisted of approximately 6 to 12 inches of very loose silty clay. These soils are disturbed, have low strength characteristics and are highly compressible when saturated.

Below the loose surface soils, approximately 3 to 4 feet of firm to stiff silty clay and sandy clay or medium dense silty sand with trace clay were encountered. Field and laboratory tests suggest that these soils are moderately strong, slightly compressible and have a moderate expansion potential. Dry densities ranged from 80 to 108 pcf. Representative soil samples had angles of internal friction of 12 to 29 degrees. Representative soil samples had expansion indices of 29 to 86.

Below 4 to 5 feet, predominately stiff to very stiff silty clay and sandy clay or medium dense clayey sand were encountered. Field and laboratory tests suggest that these soils are moderately strong, slightly compressible and have a moderate expansion potential. Dry densities ranged from 79 to 105 pcf. Representative soil samples had angles of internal friction of 7 and 31 degrees. These soils had similar strength characteristics to the upper soils and extended to the termination depth of our borings.

For additional information about the soils encountered, please refer to the logs of borings in Appendix A.

GROUNDWATER

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Free groundwater was not encountered.

It should be recognized that water table elevations may fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors. Therefore, water level observations at the time of the field investigation may vary from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report.

Groundwater Influence on Structures/Construction

If earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated, "pump," or not respond to densification techniques. Based on the existing moisture contents of the upper on-site soils, it is anticipated stabilization of the on-site subgrade will be required. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill material; or mixing the soil with an approved lime or cement product. Our firm should be consulted prior to implementing remedial measures to observe the unstable subgrade conditions and provide appropriate recommendations.

Site Preparation

General site clearing should include removal of vegetation; debris; existing utilities; structures including foundations; basement walls and floors; existing stockpiled soil; trees and associated root systems; rubble; rubbish; and any loose and/or saturated materials. Site stripping should extend to a minimum depth of 2 to 4 inches, or until all organics in excess of 3 percent by volume are removed. Deeper stripping may be required in localized areas. These materials will not be suitable for use as Engineered Fill. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

Fill material was not encountered in our borings. However, fill may be present between and beyond our boring locations. It is recommended that any uncertified fill material encountered within pavement areas be removed and/or recompacted. The fill material should be moisture-conditioned to near optimum moisture and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. As an alternative, the Owner may elect not to recompact the existing fill within paved areas. However, the Owner should be aware that the paved areas may settle, which may require annual maintenance. At a minimum, it is recommended that the upper 18 inches of subgrade soil be moisture-conditioned to a minimum of 2 percent above optimum moisture content and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

Following stripping, fill removal operations and demolition activities, the exposed subgrade in exterior flatwork and pavement areas should be excavated to a depth of at least 12 inches, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. Limits of recompaction should extend a minimum of 2 feet beyond the edge of pavements or sidewalks. Prior to backfilling, the bottom of the excavation should be excavated/scarified to a depth of 8 inches, moisture-conditioned to a minimum of 2 percent above optimum moisture content and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

Several trees are located within the project site and vicinity. If not utilized for the proposed development, tree removal operations should include roots greater than 1 inch in diameter. The resulting excavations should be cleaned to firm native ground and backfilled with Engineered Fill compacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

In order to reduce the potential for excessive total and differential settlement and provide uniform support for the planned structures, it is recommended following stripping and demolition operations, the upper 2 feet of native soils beneath the proposed structural areas be excavated, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. In addition, it is recommended that the proposed foundations be supported by a minimum of 12 inches of Engineered Fill. Over-excavation should extend to a minimum of 5 feet beyond proposed footing lines. The base width of the over-excavation should be established on the basis of a 60-degree upward projection from the bottom of the footings. Prior to fill placement, the exposed subgrade soils should be scarified to a depth of 6 inches, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

It is recommended that concrete slab-on-grade and exterior flatwork areas be supported by a minimum of 24 inches of non-expansive Engineered Fill or lime-treated Engineered Fill. The intent is to support slab-on-grade and exterior flatwork areas with 24 inches of non-expansive Engineered Fill. The fill placement serves two functions: 1) it provides a uniform amount of soil, which will more evenly distribute the soil pressures and 2) it reduces moisture content fluctuation in the clayey material beneath the building area. The non-expansive fill material should be a well-graded silty sand or sandy silt soil. A clean sand or very sandy soil is not acceptable for this purpose. A sandy soil will allow the surface water to drain into the expansive clayey soil below, which may result in soil swelling. Imported Fill should be approved by the Soils Engineer prior to placement. The fill should be placed as specified as Engineered Fill.

Sand/cement slurry may also be used as an acceptable alternative to non-expansive Engineered Fill for support of foundations and slabs-on-grade. If sand/cement slurry is used for Engineered Fill, the requirement for the lateral limits of removal and recompaction extending 5 feet beyond structural elements may be omitted; recommended vertical over-excavation depths shall remain unchanged. Slurry used as Engineered Fill for support of foundations should have a minimum cement content of 2 sacks (188 pounds) per cubic yard. The slurry placement operations should include vibration of the material as it is placed to promote consolidation and to reduce air voids within the slurry. Placement of slurry should be observed and documented by Krazan & Associates, Inc. to verify the use of proper materials and procedures. In addition, the recommended allowable equivalent fluid passive pressure provided in the Foundations section of this report should be reduced by 25 percent if the alternative for slurry backfill is selected.

The upper soils, during wet winter months, become very moist due to the absorptive characteristics of the soil. Earthwork operations performed during winter months may encounter very moist unstable soils, which may require removal to grade a stable building foundation. Project site winterization consisting of placement of aggregate base and protecting exposed soils during the construction phase should be performed.

A representative of our firm should be present during all site clearing and grading operations to test and observe earthwork construction. This testing and observation is an integral part of our service as acceptance of earthwork construction is dependent upon compaction of the material and the stability of the material. The Soils Engineer may reject any material that does not meet compaction and stability requirements. Further recommendations of this report are predicated upon the assumption that earthwork construction will conform to recommendations set forth in this section and the Engineered Fill section.

R-Value Test Results & Pavement Sections

Four R-Values were obtained from the project site at the locations shown on the attached site plan. The samples were tested in accordance with the State of California Materials Manual Test Designation 301. Results of the tests are as follows:

Sample	Depth	Description	R-Value at Equilibrium
1	12-24"	Silty Clay (CL)	Less than 5
2	12-24"	Silty Clay (CL)	Less than 5
3	12-24"	Silty Clay (CL)	Less than 5
4	12-24"	Silty Clay (CL)	Less than 5

The test results are low and indicate poor subgrade support characteristics under dynamic traffic loads. The following table shows the recommended pavement sections for various traffic indices.

Location	Asphaltic Concrete	Class II Aggregate Base*	Compacted Subgrade**	Lime-Treated Subgrade***
Access Road (TI-5)	--	16.0"	18.0"	NA
Access Road (TI-5)	--	6.0"	--	18.0"

** 95% compaction based on ASTM Test Method D1557 or CAL 216*
*** 90% compaction based on ASTM Test Method D1557 or CAL 216*
**** 5% High Calcium Quick Lime compacted to a minimum of 90% compaction based on ASTM Test Method D1557 or CAL 216*

Traffic Index	Asphaltic Concrete	Class II Aggregate Base*	Class III Aggregate Subbase	Compacted Subgrade**
4.0	2.0"	8.5"	--	12.0"
4.0	2.0"	4.5"	4.5"	12.0"
4.5	3.0"	9.0"	--	12.0"
4.5	3.0"	4.0"	5.5"	12.0"
5.0	3.0"	11.0"	--	12.0"
5.0	3.0"	5.0"	6.5"	12.0"
5.5	3.0"	11.5"	--	12.0"
5.5	3.0"	5.0"	7.0"	12.0"
6.0	3.0"	13.5"	--	12.0"
6.0	3.0"	6.5"	8.0"	12.0"
6.5	3.5"	14.0"	--	12.0"
6.5	3.5"	6.0"	9.0"	12.0"
7.0	4.0"	15.5"	--	12.0"
7.0	4.0"	6.5"	10.0"	12.0"
7.5	4.0"	17.0"	--	12.0"
7.5	4.0"	7.5"	10.5"	12.0"

** 95% compaction based on ASTM Test Method D1557 or CAL 216*
*** 90% compaction based on ASTM Test Method D1557 or CAL 216*

If traffic indices are not available, an estimated (typical value) index of 4.5 may be used for light automobile traffic, and an index of 7.0 may be used for light truck traffic.

The following recommendations are for light-duty and heavy-duty Portland Cement Concrete Pavement Sections based on the design procedures developed by the Portland Cement Association.

PORTLAND CEMENT PAVEMENT
LIGHT DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
4.5	6.0"	5.0"	12.0"

HEAVY DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
7.0	7.0"	6.0"	12.0"

** 95% compaction based on ASTM Test Method D1557 or CAL 216*
*** 90% compaction based on ASTM Test Method D1557 or CAL 216*
****Minimum compressive strength of 3000 psi*

It is recommended that any uncertified fill material encountered within pavement areas be removed and/or recompacted. The fill material should be moisture-conditioned to near optimum moisture and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. As an alternative, the Owner may elect not to recompact the existing fill within paved areas. However, the Owner should be aware that the paved areas may settle, which may require annual maintenance. At a minimum, it is recommended that the upper 18 inches of subgrade soil be moisture-conditioned to a minimum of 2 percent above optimum moisture content and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

Slope Construction/Reconstruction

Slopes can be constructed/reconstructed by placement of Engineered Fill utilizing a keying and benching procedure as described below. Reconstructed slopes should be constructed at an inclination not exceeding 2:1 (horizontal to vertical) slopes or flatter. Krazan and Associates, Inc. should be retained to review all slope reconstruction plans and specifications prior to initiating the repair work.

Temporary construction slopes, in the natural soil, should be constructed in accordance with Occupational Safety and Health Administration (OSHA) standards. However, in all cases, appropriate safety precautions should be provided. Construction dewatering is not expected to present problems during late summer or early fall. During these months, subsurface flow will be minimal. Although unlikely, if water is encountered it may be handled either singularly or with a combination of discing, diverting, and pumping. This office will be in a position to assist the Contractor in designing dewatering systems if the conditions at the time of construction warrant it.

General site clearing should include removal of vegetation, landslide debris, and any loose and/or saturated materials. Excavations or depressions extending below subgrade levels should be cleaned to firm, undisturbed soil and backfilled with Engineered Fill, placed and recompacted in accordance with the recommendations stated herein.

Where fills greater than 8 feet are to be constructed on original ground that slopes at inclinations steeper than 6:1 (horizontal to vertical), benches should be cut into the existing slope as the filling operations proceed. Each bench should consist of a level terrace a minimum of 10 feet wide, with the rise to the next bench held to 4 feet or less. Where fills of comparable height will be constructed on ground that slopes at an inclination steeper than 4:1 (horizontal to vertical), a keyway should be provided in addition to the benches. Each keyway should consist of a level trench at least 10 feet wide and at least 2 feet deep, with side slopes not exceeding 1:1 (horizontal to vertical), cut into the existing slope. Where fills of comparable height will be constructed on ground that slopes at an inclination steeper than 2:1 (horizontal to vertical), geotextile fabric and retaining structures should be utilized in slope construction where subsequent specific building site investigations warrant.

Permanent cut-and-fill slopes inclined at 2:1 (horizontal to vertical) should be grossly stable. If static surcharge loading is located within a horizontal distance from the brow of the slope, equal to ⅓ the slope height (H/3) or 30 feet, whichever is less, a stability analysis should be performed. Fill slopes should be constructed by over-filling and trimming back to provide a firm, well-compacted slope face.

Slope Protection

Site grading near slopes and the embankments, including retaining walls and wing walls, should be accomplished such that excessive sheet run-off is prevented. The completed slopes should be seeded or otherwise vegetated to protect from erosion. Well-vegetated slopes, at the recommended configuration, should be reasonably protected from typical erosional effects. However, vegetated slopes may not be protected from unusual flow conditions, such as a flood event. If erosion control from unusual flow conditions is desired, more substantial erosion protection measures, such as grouted cobble slope facing or manufactured slope protection products, should be considered.

Within the side of embankments facing water flow, it is recommended that rock rip rap or concrete paving be used to prevent erosion. Rip rap or paving should be inspected regularly, to be sure that they are not dislodged or damaged. Eroded areas should be promptly repaired and reseeded or protected by rip rap or paving. As an alternative to the rip rap or paving, an erosion control geotextile material may be installed for erosion control. The geotextile protection used to guard against erosion should be approved in writing by the Soils Engineer, prior to use.

Engineered Fill

The on-site, upper native soils are predominately silty clay and sandy clay. These soils will not be suitable for reuse as non-expansive Engineered Fill. These clayey soils will be suitable for reuse for fill placement within the upper 24 inches of slab-on-grade and exterior flatwork areas, provided they are lime-treated. The preliminary application rate of lime should be 5 percent by dry weight. The lime material should be calcium oxide, commonly known as quick-lime. Additional testing is recommended to determine the appropriate application rate of lime prior to placement. These soils will be suitable for use as General Engineered Fill within pavement areas, and below 24 inches from finished pad grade within slab-on-grade areas and exterior flatwork areas, provided they are cleansed of excessive organics and debris and moisture-conditioned to at least 2 percent above optimum moisture.

The preferred materials specified for Engineered Fill are suitable for most applications with the exception of exposure to erosion. Project site winterization and protection of exposed soils during the construction phase should be the sole responsibility of the Contractor, since he has complete control of the project site at that time.

Imported Fill material should be predominately non-expansive granular material with a plasticity index less than 10 and an expansion index less than 15. Imported Fill should be free from rocks and clods greater than 4 inches in diameter. All Imported Fill material should be submitted to the Soils Engineer for approval at least 48 hours prior to delivery at the site.

Fill soils should be placed in lifts approximately 6 inches thick, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and compacted to achieve at least 90 percent maximum density as based on ASTM Test Method D1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

Foundations - Conventional

After completion of the recommended site preparation the site should be suitable for shallow footing support. The proposed equipment may be supported on a shallow foundation system bearing on a minimum of 12 inches of Engineered Fill. Spread and continuous footings can be designed for the following maximum allowable soil bearing pressures:

Load	Allowable Loading
Dead Load Only	1,650 psf
Dead-Plus-Live Load	2,200 psf
Total Load, Including Wind or Seismic Loads	2,925 psf

Footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Footings should have a minimum width of 12 inches, regardless of load. Ultimate design of foundations and reinforcement should be performed by the project's Structural Engineer.

The total movement is not expected to exceed 1 inch. Differential movement should be less than ½ inch. Most of the settlement is expected to occur during construction, as the loads are applied. However, additional post-construction movement may occur if the foundation soils are flooded or saturated.

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.3 acting between the base of foundations and the supporting subgrade. Lateral resistance for footings can alternatively be developed using an allowable equivalent fluid passive pressure of 225 pounds per cubic foot acting against the appropriate vertical footing faces. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. The passive pressure should be reduced by 25 percent to 188 pcf if the site preparation alternative for slurry backfill is selected. A ⅓ increase in the value above may be used for short duration, wind, or seismic loads.

Lateral Earth Pressures and Retaining Walls

Walls retaining horizontal backfill and capable of deflecting a minimum of 0.1 percent of its height at the top may be designed using an equivalent fluid active pressure of 55 pounds per square foot per foot of depth. Walls that are incapable of this deflection or walls that are fully constrained against deflection may be designed for an equivalent fluid at-rest pressure of 75 pounds per square foot per foot per depth. Expansive soils should not be used for backfill against walls. The wedge of non-expansive backfill material should extend from the bottom of each retaining wall outward and upward at a slope of 2:1 (horizontal to vertical) or flatter. The stated lateral earth pressures do not include the effects of hydrostatic water pressures generated by infiltrating surface water that may accumulate behind the retaining walls; or loads imposed by construction equipment, foundations, or roadways.

Retaining and/or below grade walls should be drained with either perforated pipe encased in free-draining gravel or a prefabricated drainage system. The gravel zone should have a minimum width of 12 inches, should extend upward to within 12 inches of the top of the wall, and should be encapsulated by a geotextile filter fabric, such as Mirafi 140N or equivalent. The upper 12 inches of backfill should consist of native soils, concrete, asphaltic concrete or other suitable backfill to reduce surface drainage into the wall drain system. The aggregate should conform to Class 2 permeable materials graded in accordance with CalTrans Standard Specifications (2018). Prefabricated drainage systems, such as Miradrain®, Enkadrain®, or an equivalent substitute, are acceptable alternatives in lieu of gravel provided they are installed in accordance with the manufacturer's recommendations. If a prefabricated drainage system is proposed, our firm should review the system for final acceptance prior to installation.

Drainage pipes should be placed with perforations down and should discharge in a non-erosive manner away from foundations and other improvements. The pipes should be placed no higher than 6 inches above the heel of the wall in the centerline of the drainage blanket and should have a minimum diameter of 4 inches. Collector pipes may be either slotted or perforated. Slots should be no wider than ⅛ inch, while perforations should be no more than ¼ inch in diameter. If retaining walls are less than 6 feet in height, the perforated pipe may be omitted in lieu of weep holes on 4 feet maximum spacing. The weep holes should consist of 4-inch diameter holes (concrete walls) or unmortared head joints (masonry walls) and not be higher than 18 inches above the lowest adjacent grade. Two 8-inch square overlapping patches of geotextile fabric (conforming to CalTrans Standard Specifications for "edge drains") should be affixed to the rear wall opening of each weep hole to retard soil piping.

During grading and backfilling operations adjacent to any walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall, or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand operated equipment ("whackers," vibratory plates, or pneumatic compactors) should be used to compact the backfill soils.

Seismic Parameters – 2022 California Building Code

The Site Class per Section 1613 of the 2022 California Building Code (2022 CBC) and ASCE 7-16, Chapter 20 is based upon the site soil conditions. It is our opinion that a Site Class D is most consistent with the subject site soil conditions. For seismic design of the structures based on the seismic provisions of the 2022 CBC, we recommend the following parameters:

Seismic Item	Value	CBC Reference
Site Class	D	Section 1613.2.2
Site Coefficient F_a	1.200	Table 1613.2.3 (1)
S_s	1.839	Section 1613.2.1
S_{MS}	2.207	Section 1613.2.3
S_{DS}	1.472	Section 1613.2.4
Site Coefficient F_v	1.700	Table 1613.2.3 (2)

S_1	0.692	Section 1613.2.1
S_{M1}	1.176	Section 1613.2.3
S_{D1}	0.784	Section 1613.2.4
T_S	0.533	Section 1613.2

* Based on Equivalent Lateral Force (ELF) Design Procedure being used.

LIMITATIONS

Soils Engineering is one of the newest divisions of Civil Engineering. This branch of Civil Engineering is constantly improving as new technologies and understanding of earth sciences advance. Although your site was analyzed using the most appropriate and most current techniques and methods, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to advancements in the field of Soils Engineering, physical changes in the site, either due to excavation or fill placement, new agency regulations, or possible changes in the proposed structure after the soils report is completed may require the soils report to be professionally reviewed. In light of this, the Owner should be aware that there is a practical limit to the usefulness of this report without critical review. Although the time limit for this review is strictly arbitrary, it is suggested that 2 years be considered a reasonable time for the usefulness of this report.

Foundation and earthwork construction is characterized by the presence of a calculated risk that soil and groundwater conditions have been fully revealed by the original foundation investigation. This risk is derived from the practical necessity of basing interpretations and design conclusions on limited sampling of the earth. The recommendations made in this report are based on the assumption that soil conditions do not vary significantly from those disclosed during our field investigation. If any variations or undesirable conditions are encountered during construction, the Soils Engineer should be notified so that supplemental recommendations may be made.

The conclusions of this report are based on the information provided regarding the proposed construction. If the proposed construction is relocated or redesigned, the conclusions in this report may not be valid. The Soils Engineer should be notified of any changes so the recommendations may be reviewed and re-evaluated.

This report is a Geotechnical Engineering Investigation with the purpose of evaluating the soil conditions in terms of foundation design. The scope of our services did not include any Environmental Site Assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere; or the presence of wetlands. Any statements, or absence of statements, in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessment.

The geotechnical engineering information presented herein is based upon professional interpretation utilizing standard engineering practices and a degree of conservatism deemed proper for this project. It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. We emphasize that this report is valid for the project outlined above and should not be used for any other sites.

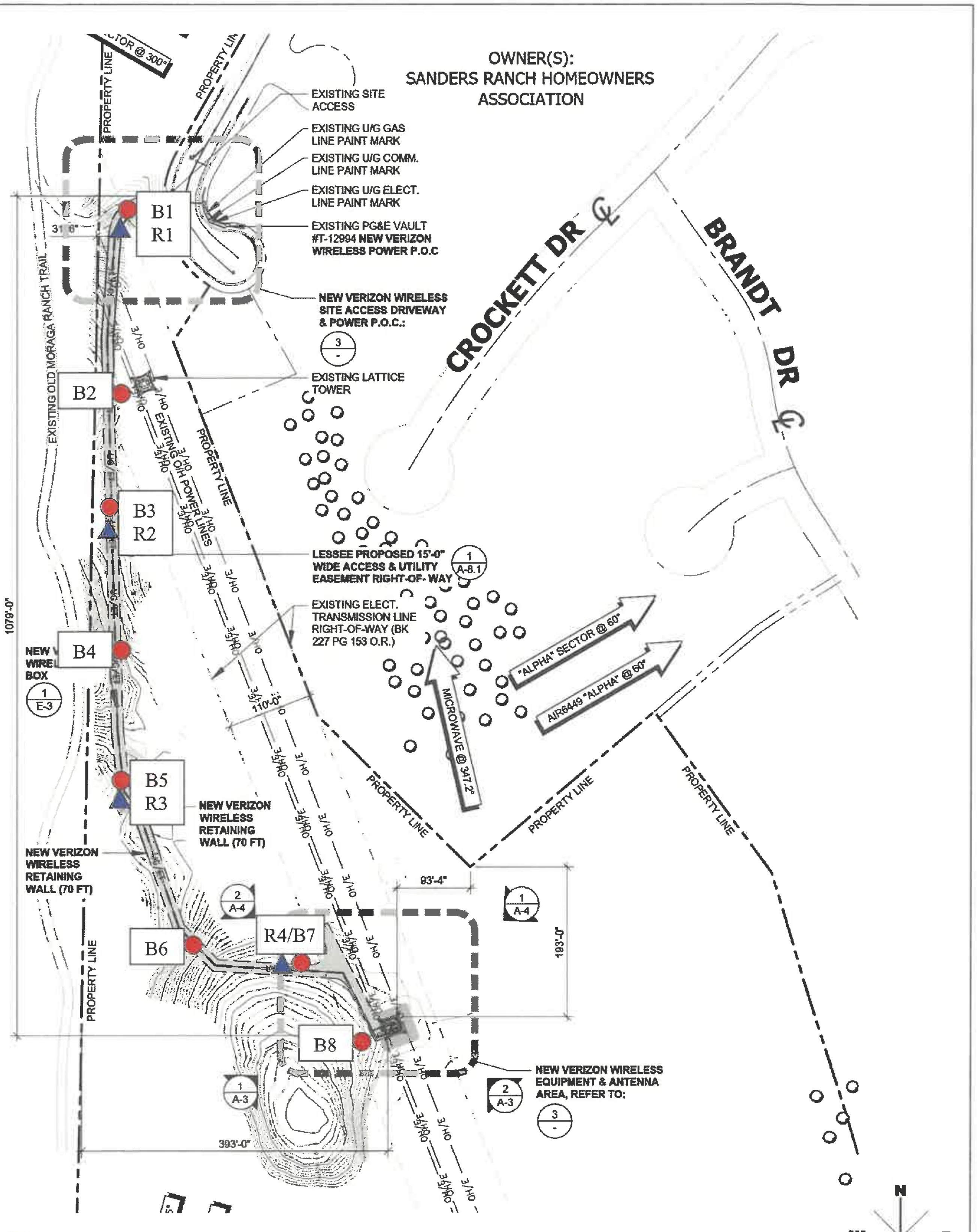
If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (559) 348-2200.

REGISTERED PROFESSIONAL ENGINEER
DAVID R. JAROSZ II
2698
GEOTECHNICAL
STATE OF CALIFORNIA

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

Dave R. Jarosz, II
Managing Engineer
RCE No. 60185/RGE No. 2698

DRJ:ht



▲ APPROXIMATE R-VALUE LOCATION

● APPROXIMATE BORING LOCATION

SITE MAP	Scale: NTS	Date: Jan. 2023	Krazan GEOTECHNICAL ENGINEERING
Sanders Ranch PSL#304480 **100 Sanders Ranch Road** **Moraga, California**	Drawn by: HT	Approved by: DJ	
	Project No. 042-22060	Figure No. 1	

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
	Clean Gravels (Less than 5% fines)		
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	▨	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	▨	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)		
	▨	GM	Silty gravels, gravel-sand-silt mixtures
	▨	GC	Clayey gravels, gravel-sand-clay mixtures
	Clean Sands (Less than 5% fines)		
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	▨	SW	Well-graded sands, gravelly sands, little or no fines
	▨	SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)		
	▨	SM	Silty sands, sand-silt mixtures
	▨	SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%	▨	ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
	▨	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	▨	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater	▨	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	▨	CH	Inorganic clays of high plasticity, fat clays
	▨	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	▨	PT	Peat and other highly organic soils

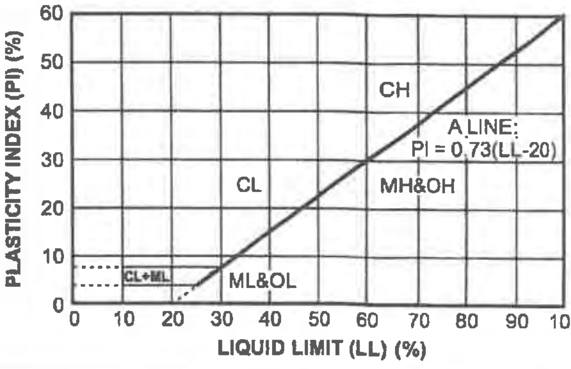
CONSISTENCY CLASSIFICATION

Description	Blows per Foot
Granular Soils	
Very Loose	< 5
Loose	5 – 15
Medium Dense	16 – 40
Dense	41 – 65
Very Dense	> 65
Cohesive Soils	
Very Soft	< 3
Soft	3 – 5
Firm	6 – 10
Stiff	11 – 20
Very Stiff	21 – 40
Hard	> 40

GRAIN SIZE CLASSIFICATION

Grain Type	*Standard Sieve Size*	*Grain Size in Millimeters*
Boulders	Above 12 inches	Above 305
Cobbles	12 to 13 inches	305 to 76.2
Gravel	3 inches to No. 4	76.2 to 4.76
Coarse-grained	3 to ¾ inches	76.2 to 19.1
Fine-grained	¾ inches to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
Coarse-grained	No. 4 to No. 10	4.76 to 2.00
Medium-grained	No. 10 to No. 40	2.00 to 0.42
Fine-grained	No. 40 to No. 200	0.42 to 0.074
Silt and Clay	Below No. 200	Below 0.074

PLASTICITY CHART



Log of Boring B1

Project: Sanders Ranch PSL#304480

Project No: 042-22060

Client: SAC Wireless

Figure No.: A-1

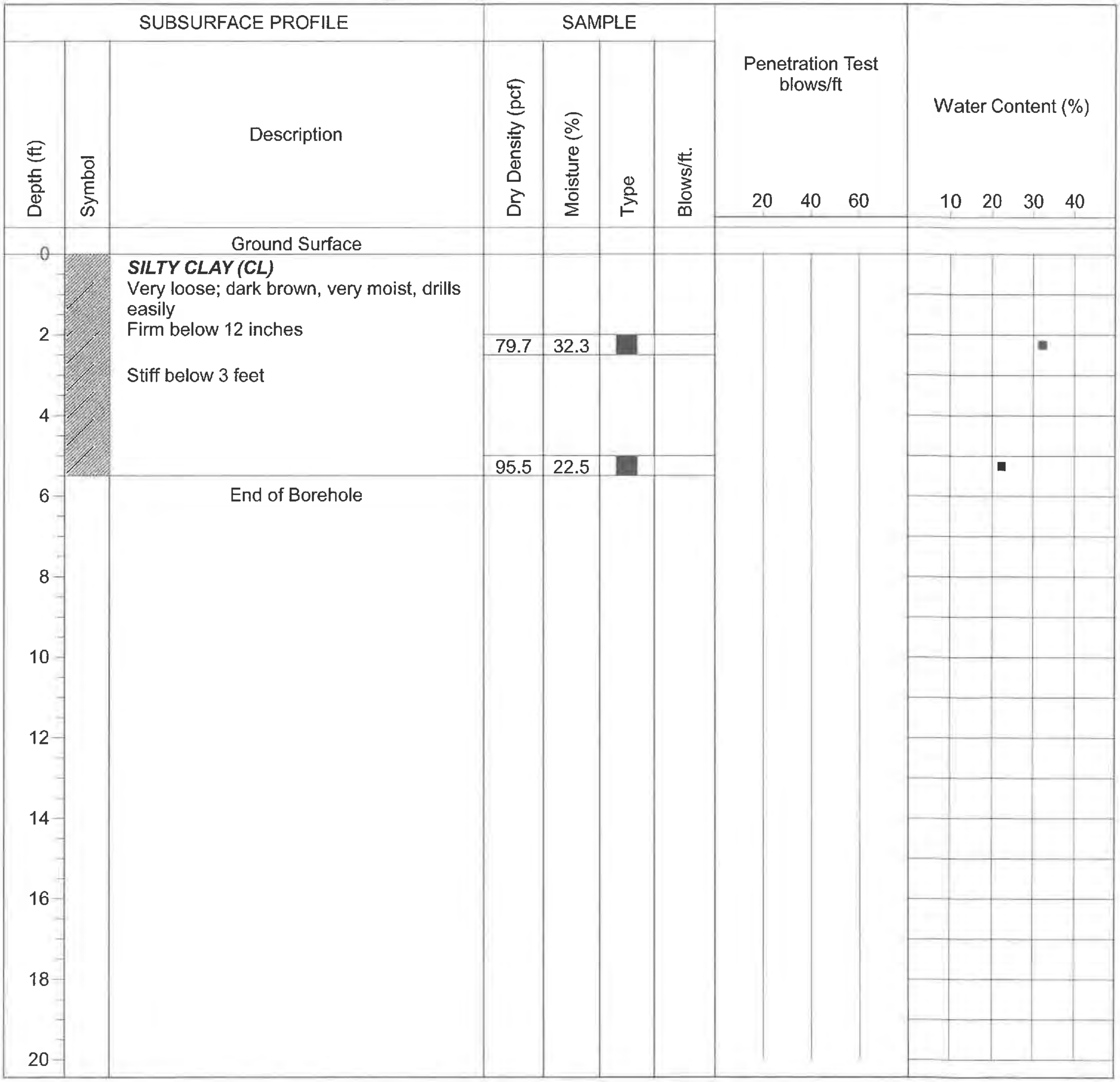
Location: 100 Sanders Ranch Road, Moraga, California

Logged By: Michael Rupright

Depth to Water>

Initial: None

At Completion: None



Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0	▨	***SILTY CLAY (CL)*** Very loose; dark brown, very moist, drills easily Firm below 12 inches Stiff below 3 feet				
2	▨		79.7	32.3	■	
5	▨		95.5	22.5	■	
6		End of Borehole				

Drill Method: Solid Flight

Drill Date: 1-24-23

Drill Rig: Hand Auger

Krazan and Associates

Hole Size: 4½ Inches

Driller: Brent Snyder

Elevation: 5½ Feet

Sheet: 1 of 1

Log of Boring B2

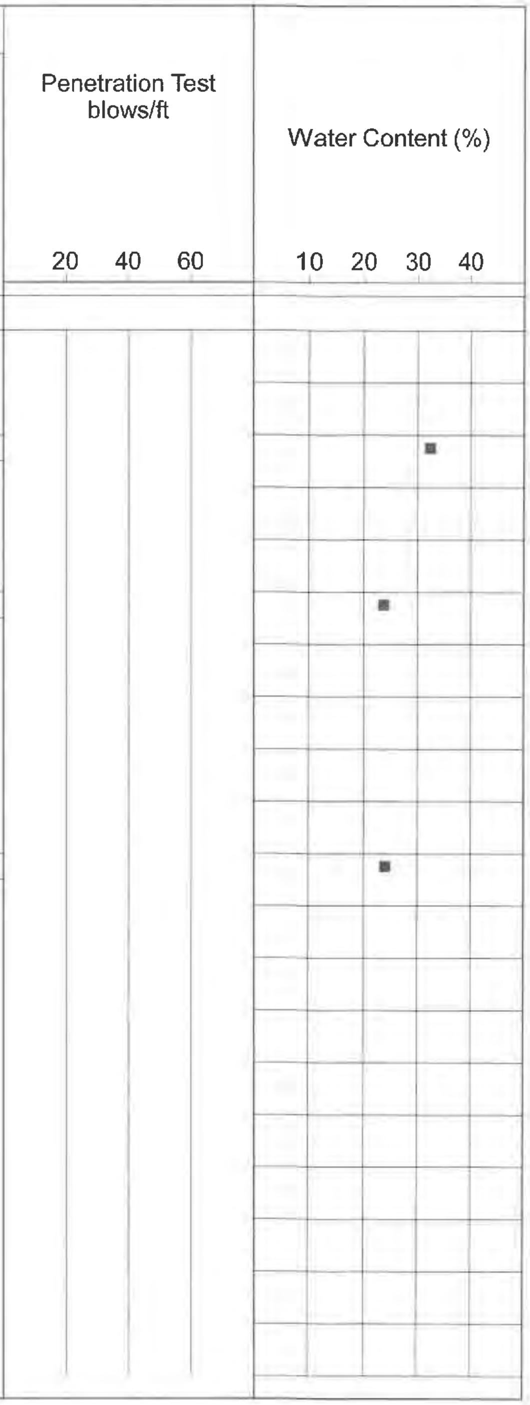
Project: Sanders Ranch PSL#304480
Project No: 042-22060

Client: SAC Wireless
Figure No.: A-2

Location: 100 Sanders Ranch Road, Moraga, California
Logged By: Michael Rupright

Depth to Water>
Initial: None
At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0	▨	***SILTY CLAY (CL)*** Very loose; dark brown, very moist, drills easily Firm below 12 inches				
2	▨			32.4	■	
4	▨	Stiff and grayish-brown below 4 feet				
	▨		96.9	23.8	■	
6	▨					
8	▨					
10	▨		98.4	24.1	■	
		End of Borehole				
12						
14						
16						
18						
20						



Drill Method: Solid Flight
Drill Date: 1-24-23

Drill Rig: Hand Auger
Hole Size: 4½ Inches

Krazan and Associates

Driller: Brent Snyder
Elevation: 10½ Feet

Sheet: 1 of 1

Log of Boring B3

Project: Sanders Ranch PSL#304480

Project No: 042-22060

Client: SAC Wireless

Figure No.: A-3

Location: 100 Sanders Ranch Road, Moraga, California

Logged By: Michael Rupright

Depth to Water>

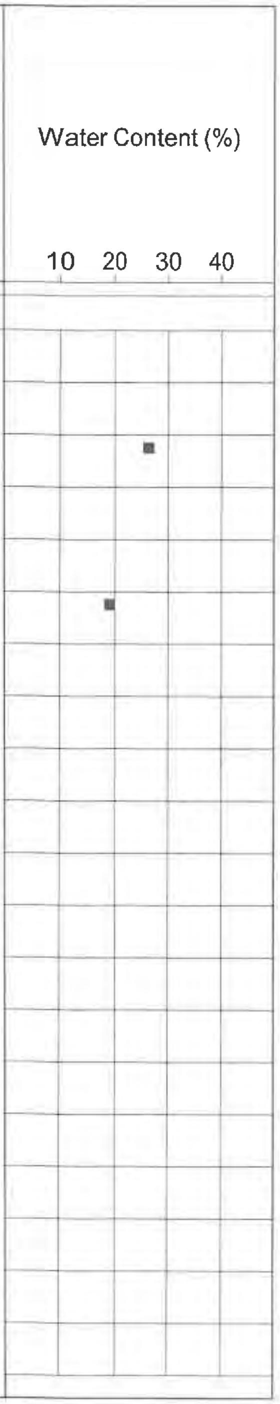
Initial: None

At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0	▨	***SILTY CLAY (CL)*** Very loose; dark brown, moist, drills easily Firm below 12 inches				
2	▨		88.6	26.5	■	
	▨	Very stiff and light brown below 3 feet				
4	▨		105.4	19.0	■	
6		End of Borehole				
8						
10						
12						
14						
16						
18						
20						

Penetration Test blows/ft

20 40 60



Drill Method: Solid Flight

Drill Rig: Hand Auger

Driller: Brent Snyder

Krazan and Associates

Drill Date: 1-24-23

Hole Size: 4½ Inches

Elevation: 5½ Feet

Sheet: 1 of 1

Log of Boring B4

Project: Sanders Ranch PSL#304480

Project No: 042-22060

Client: SAC Wireless

Figure No.: A-4

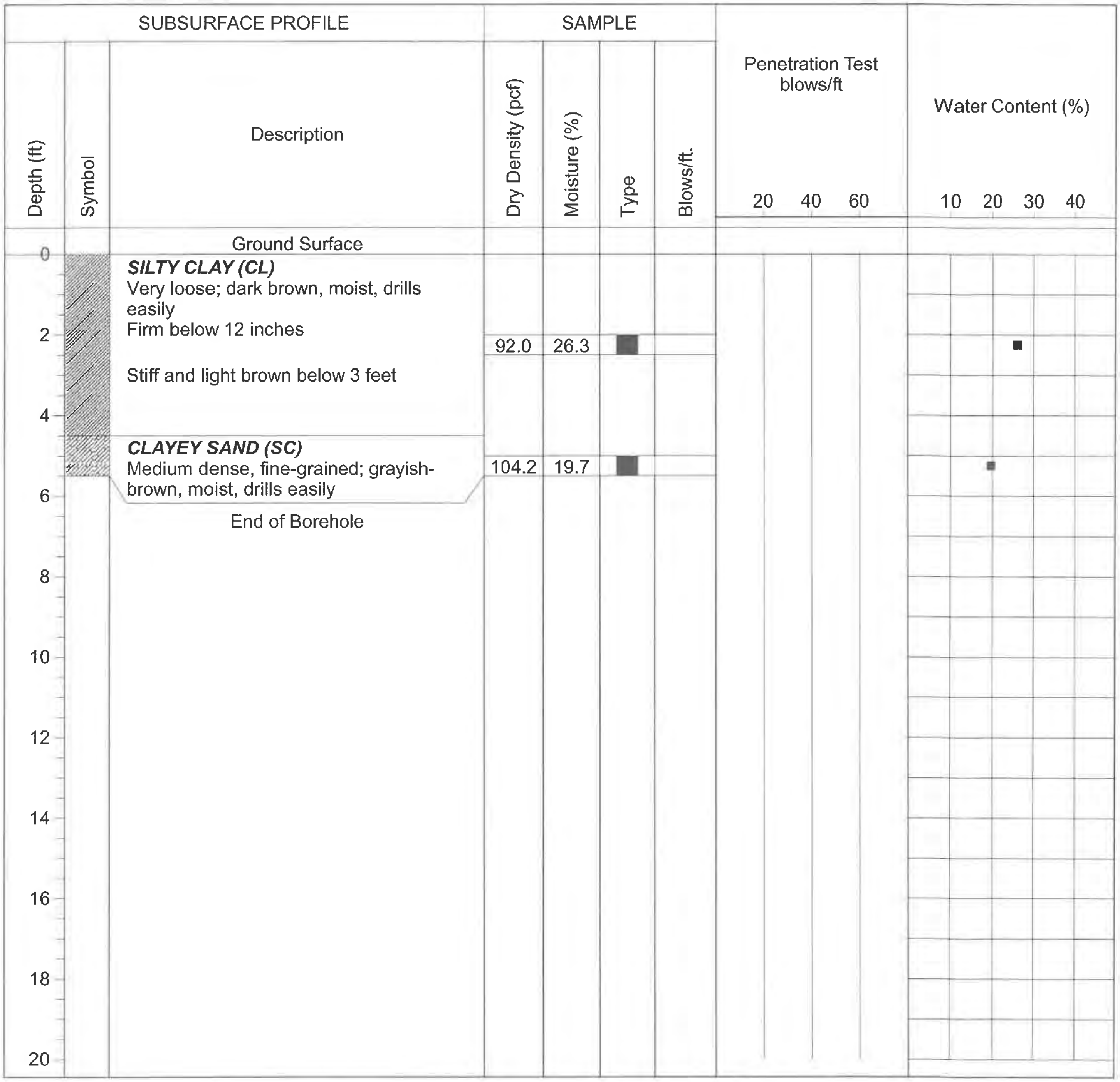
Location: 100 Sanders Ranch Road, Moraga, California

Logged By: Michael Rupright

Depth to Water>

Initial: None

At Completion: None



Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
Ground Surface				
SILTY CLAY (CL) Very loose; dark brown, moist, drills easily Firm below 12 inches	92.0	26.3	■	
Stiff and light brown below 3 feet				
CLAYEY SAND (SC) Medium dense, fine-grained; grayish-brown, moist, drills easily	104.2	19.7	■	
End of Borehole				

Drill Method: Solid Flight

Drill Date: 1-24-23

Drill Rig: Hand Auger

Krazan and Associates

Hole Size: 4½ Inches

Driller: Brent Snyder

Elevation: 5½ Feet

Sheet: 1 of 1

Log of Boring B5

Project: Sanders Ranch PSL#304480

Project No: 042-22060

Client: SAC Wireless

Figure No.: A-5

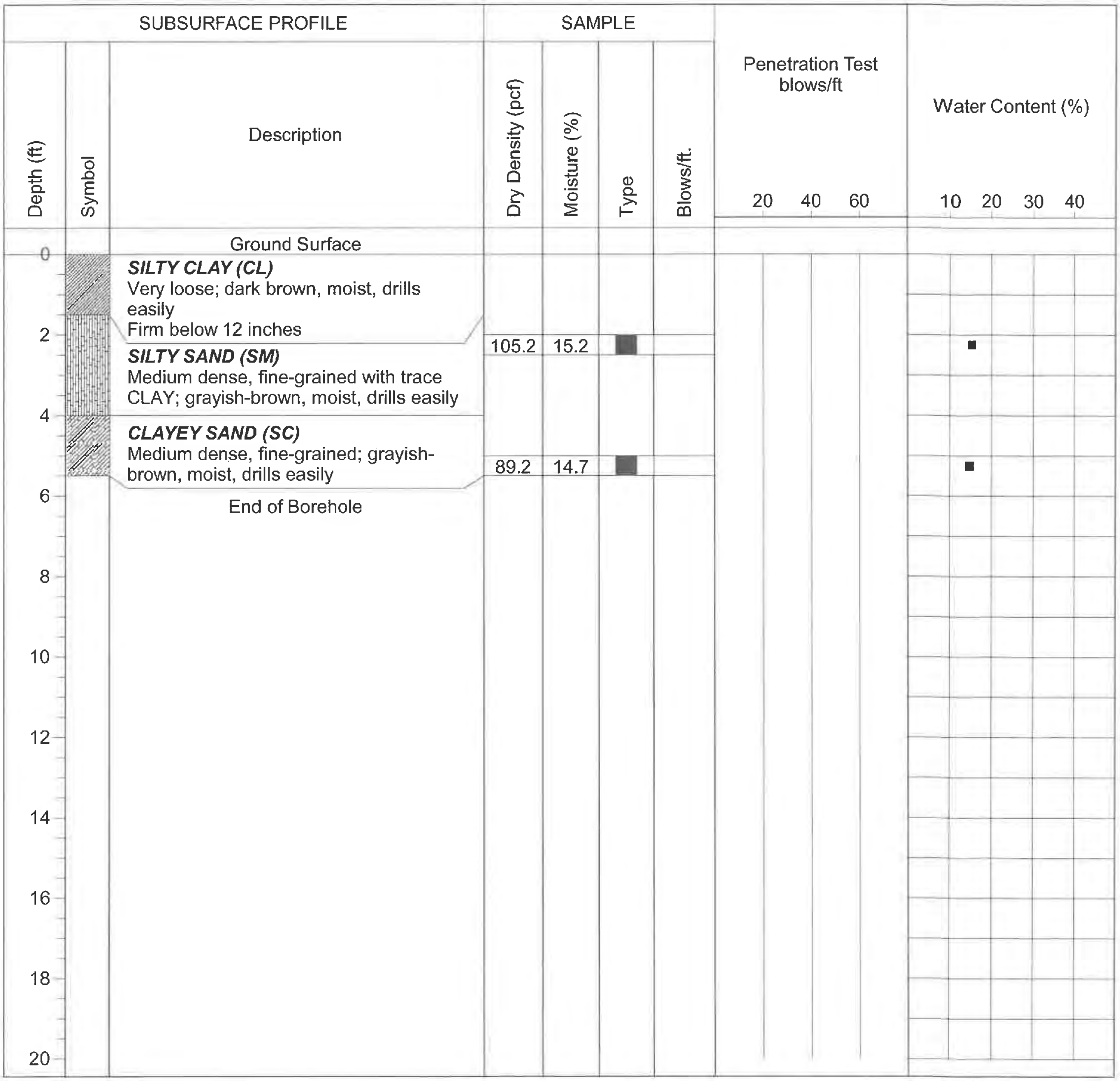
Location: 100 Sanders Ranch Road, Moraga, California

Logged By: Michael Rupright

Depth to Water>

Initial: None

At Completion: None



Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
Ground Surface				
SILTY CLAY (CL) Very loose; dark brown, moist, drills easily Firm below 12 inches	105.2	15.2	■	
SILTY SAND (SM) Medium dense, fine-grained with trace CLAY; grayish-brown, moist, drills easily				
CLAYEY SAND (SC) Medium dense, fine-grained; grayish-brown, moist, drills easily	89.2	14.7	■	
End of Borehole				

Drill Method: Solid Flight

Drill Date: 1-24-23

Drill Rig: Hand Auger

Krazan and Associates

Hole Size: 4½ Inches

Driller: Brent Snyder

Elevation: 5½ Feet

Sheet: 1 of 1

Log of Boring B6

Project: Sanders Ranch PSL#304480
Project No: 042-22060

Client: SAC Wireless
Figure No.: A-6

Location: 100 Sanders Ranch Road, Moraga, California
Logged By: Michael Rupright

Depth to Water>
Initial: None
At Completion: None

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft 20 40 60	Water Content (%) 10 20 30 40
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.		
		Ground Surface						
0	▨	***SILTY CLAY (CL)*** Very loose; dark brown, moist, drills easily Firm below 12 inches						
2	▨		92.7	22.9	■			■
4	▨							
	▨		87.5	25.9	■			■
6		End of Borehole						
8								
10								
12								
14								
16								
18								
20								

Drill Method: Solid Flight
Drill Date: 1-24-23

Drill Rig: Hand Auger
Hole Size: 4½ Inches

Krazan and Associates

Driller: Brent Snyder
Elevation: 5½ Feet

Sheet: 1 of 1

Log of Boring B7

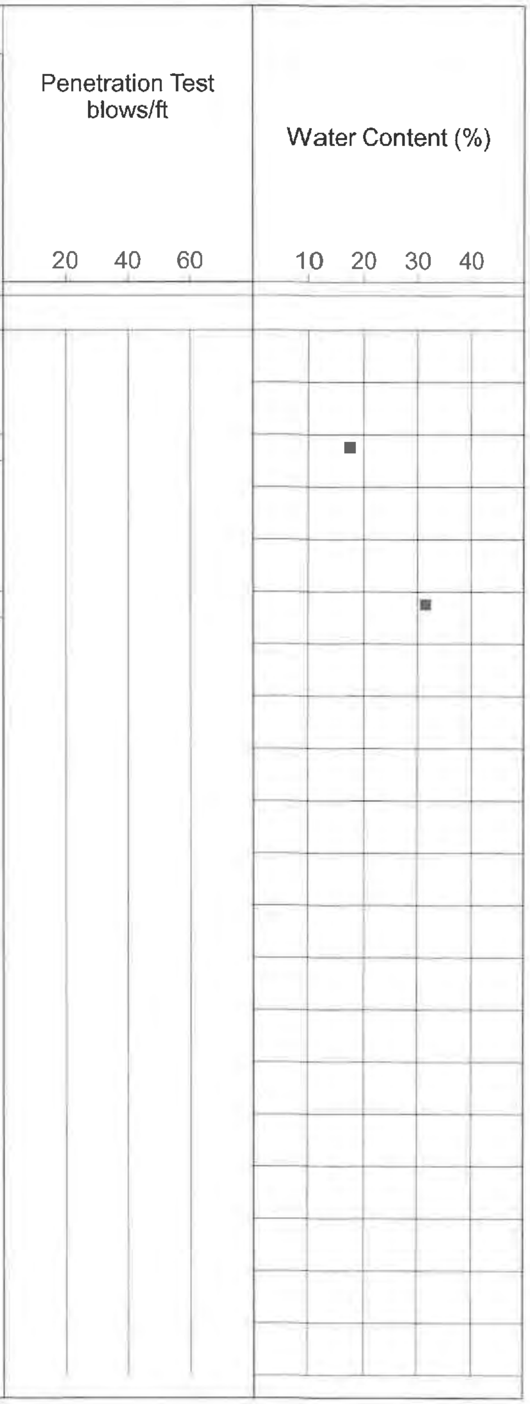
Project: Sanders Ranch PSL#304480 **Project No:** 042-22060

Client: SAC Wireless **Figure No.:** A-7

Location: 100 Sanders Ranch Road, Moraga, California **Logged By:** Michael Rupright

Depth to Water> **Initial:** None **At Completion:** None

Depth (ft)	SUBSURFACE PROFILE Description	SAMPLE Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
	Ground Surface				
0	***SILTY CLAY (CL)*** Very loose; dark brown, moist, drills easily Firm below 12 inches				
2		105.0	17.4	■	
	CLAYEY SAND (SC) Medium dense, fine- to medium-grained; brown, moist, drills easily				
4	***SANDY CLAY (CL)*** Stiff, fine-grained; dark brown, very moist, drills easily				
		78.9	31.6	■	
6	End of Borehole				
8					
10					
12					
14					
16					
18					
20					



Drill Method: Solid Flight **Drill Date:** 1-24-23

Drill Rig: Hand Auger **Krazan and Associates** **Hole Size:** 4½ Inches

Driller: Brent Snyder **Elevation:** 5½ Feet

Sheet: 1 of 1

Log of Boring B8

Project: Sanders Ranch PSL#304480

Project No: 042-22060

Client: SAC Wireless

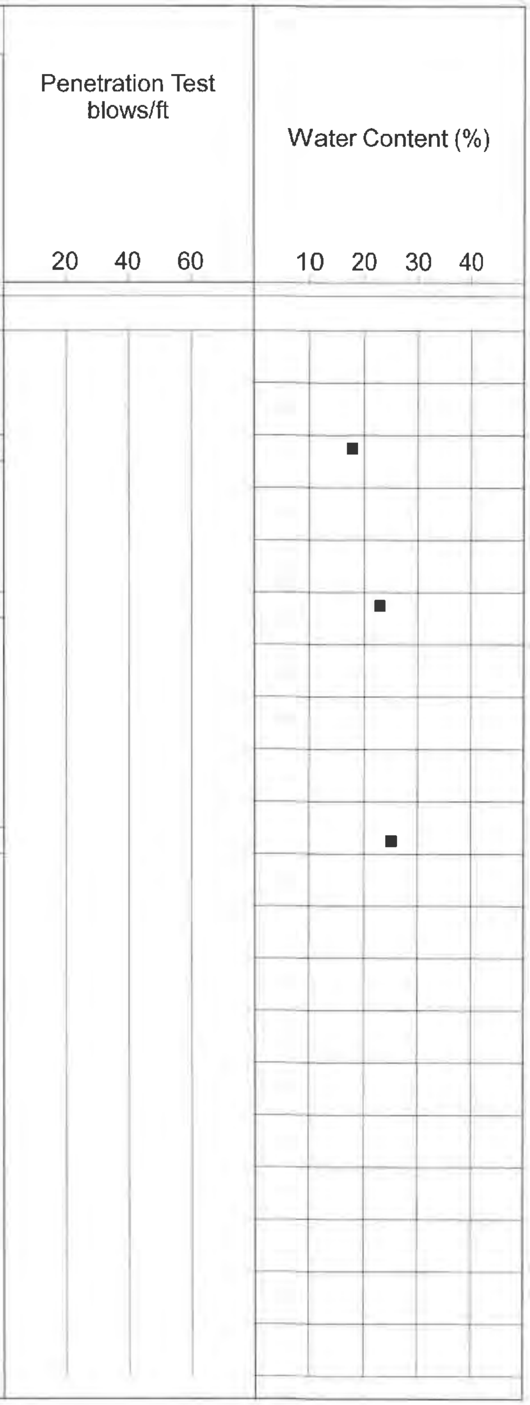
Figure No.: A-8

Location: 100 Sanders Ranch Road, Moraga, California

Logged By: Michael Rupright

Depth to Water> **Initial:** None **At Completion:** None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		Ground Surface				
0	▨	***SANDY CLAY (CL)*** Very loose, fine- to medium-grained; dark brown, moist, drills easily Firm below 12 inches				
2	▨		108.2	17.8	■	
	▨	***SILTY CLAY (CL)*** Stiff; light brown, moist, drills easily				
	▨		85.1	23.2	■	
	▨		97.9	25.3	■	
10		End of Borehole				



Drill Method: Solid Flight

Drill Rig: Hand Auger

Driller: Brent Snyder

Krazan and Associates

Drill Date: 1-24-23

Hole Size: 4½ Inches

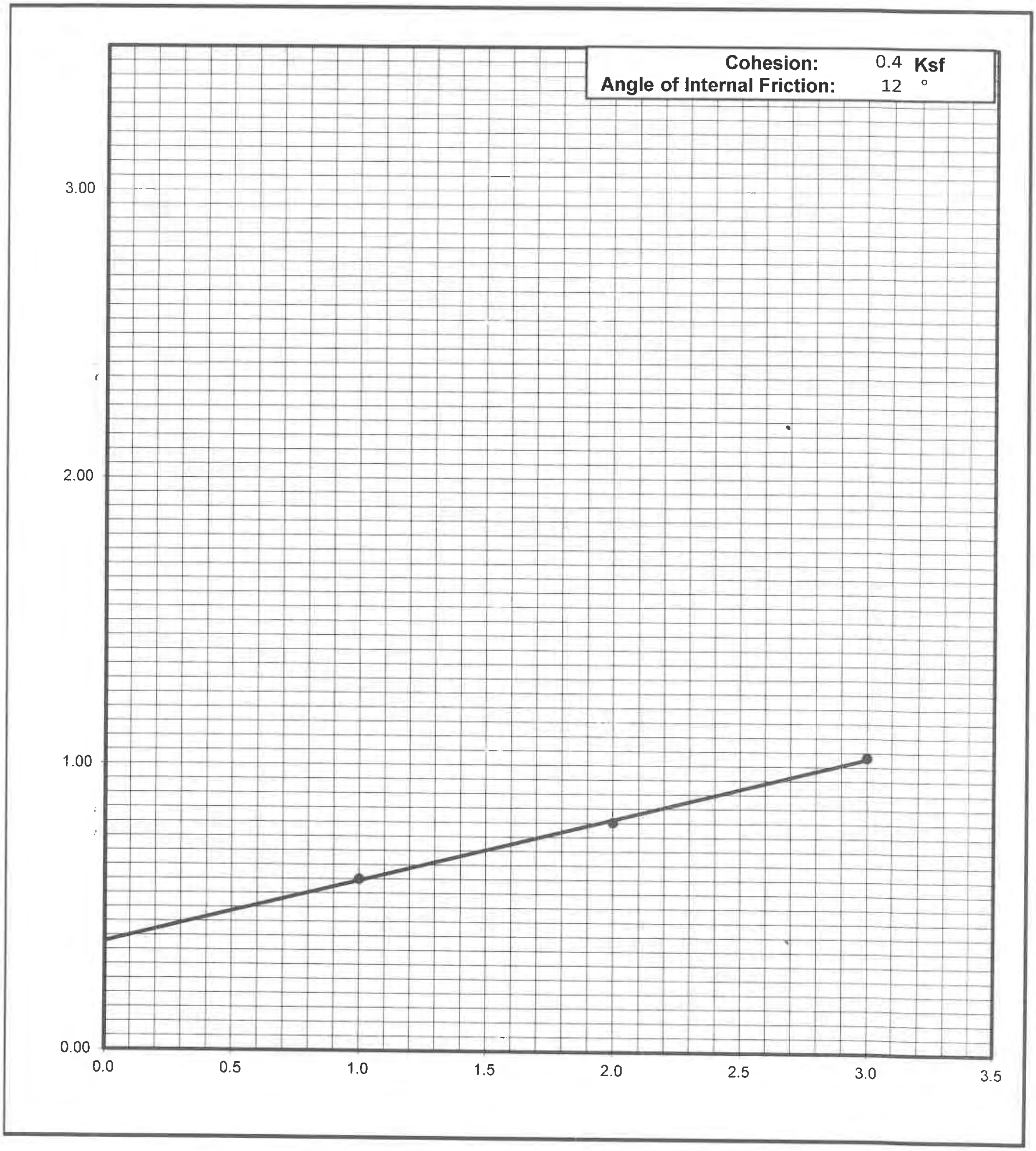
Elevation: 10 Feet

Sheet: 1 of 1

Shear Strength Diagram (Direct Shear)

ASTM D - 3080 / AASHTO T - 236

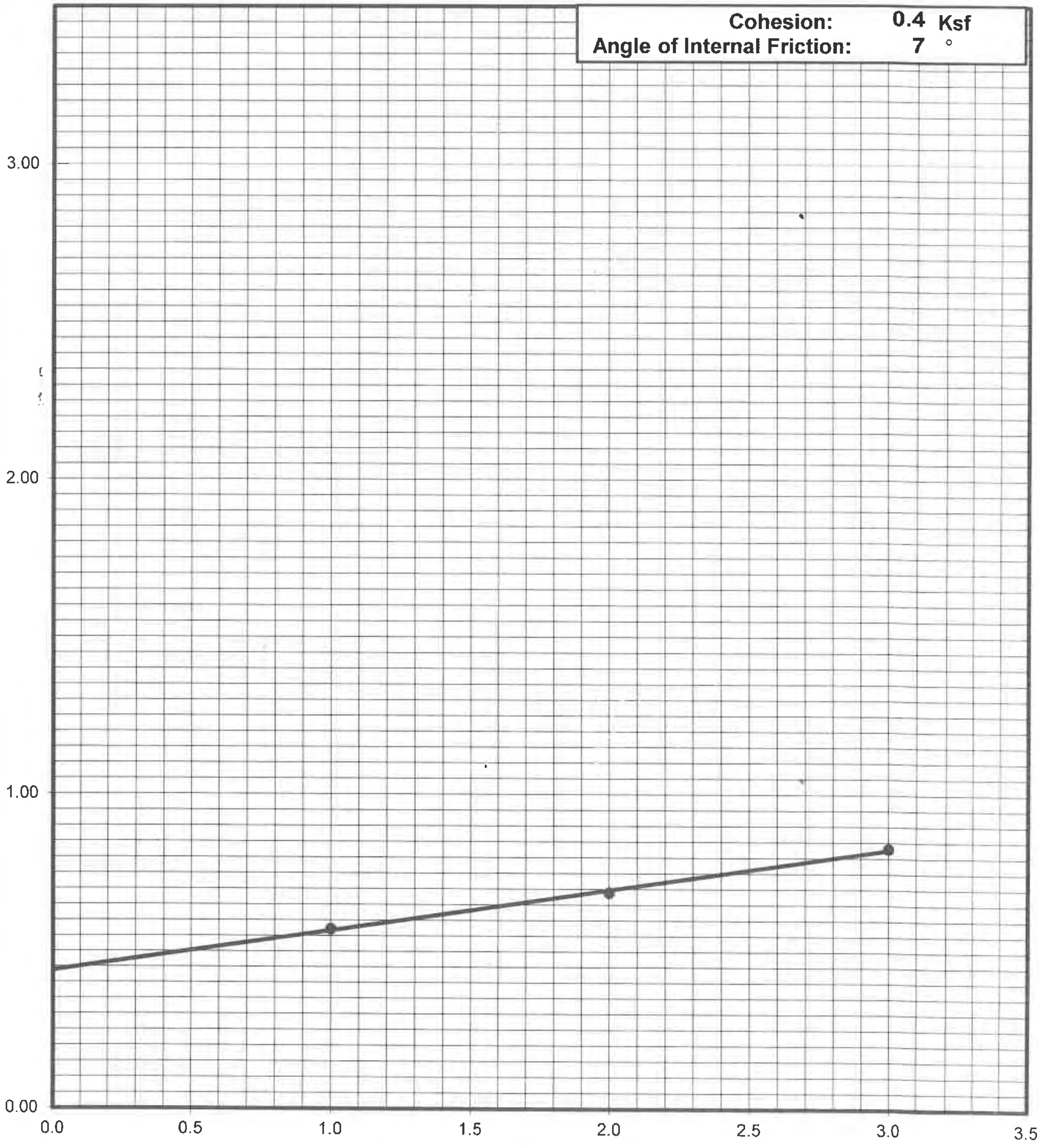
Project Number	Boring No. & Depth	Soil Type	Date
042-22060	B1 @ 2-2.5'	CL	2/16/2023



Krazan Testing Laboratory

Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
042-22060	B2 @ 5-5.5'	CL	2/16/2023

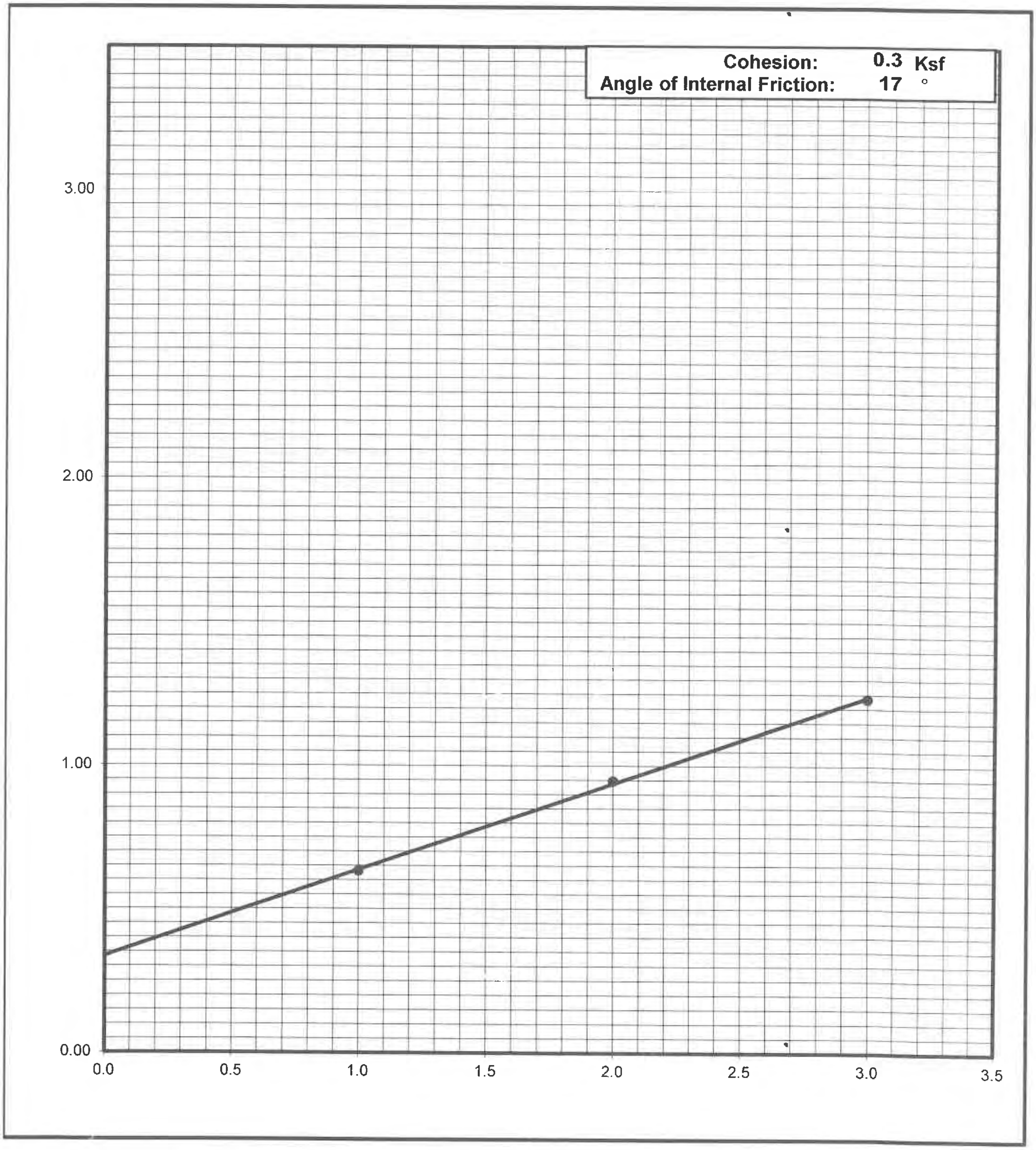


Krazan Testing Laboratory

Shear Strength Diagram (Direct Shear)

ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
042-22060	B4 @ 2-2.5'	CL	2/16/2023

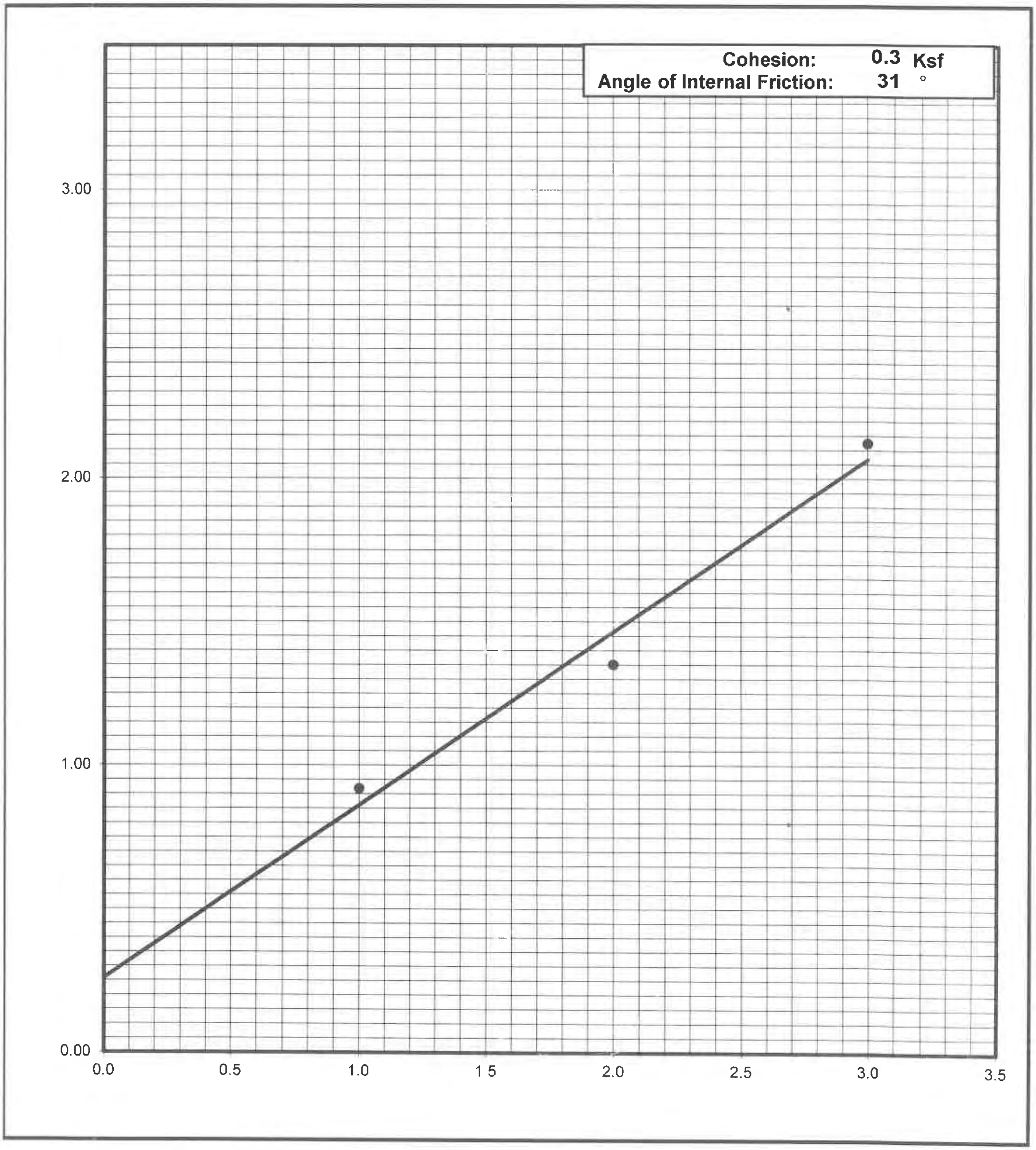


Krazan Testing Laboratory

Shear Strength Diagram (Direct Shear)

ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
042-22060	B5 @ 5-5.5'	SC	2/16/2023

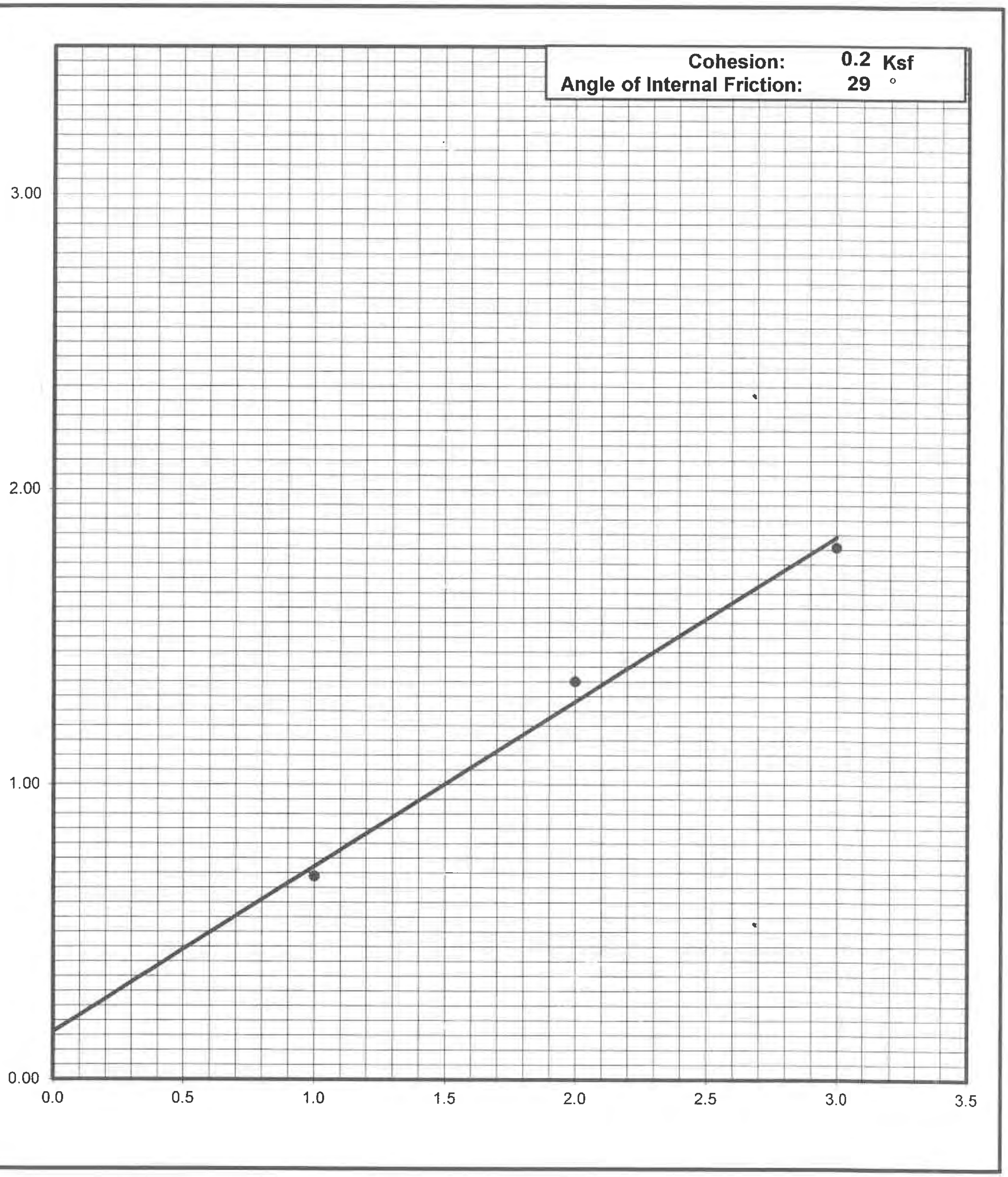


Krazan Testing Laboratory

Shear Strength Diagram (Direct Shear)

ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
042-22060	B7 @ 2-2.5'	SC	2/16/2023

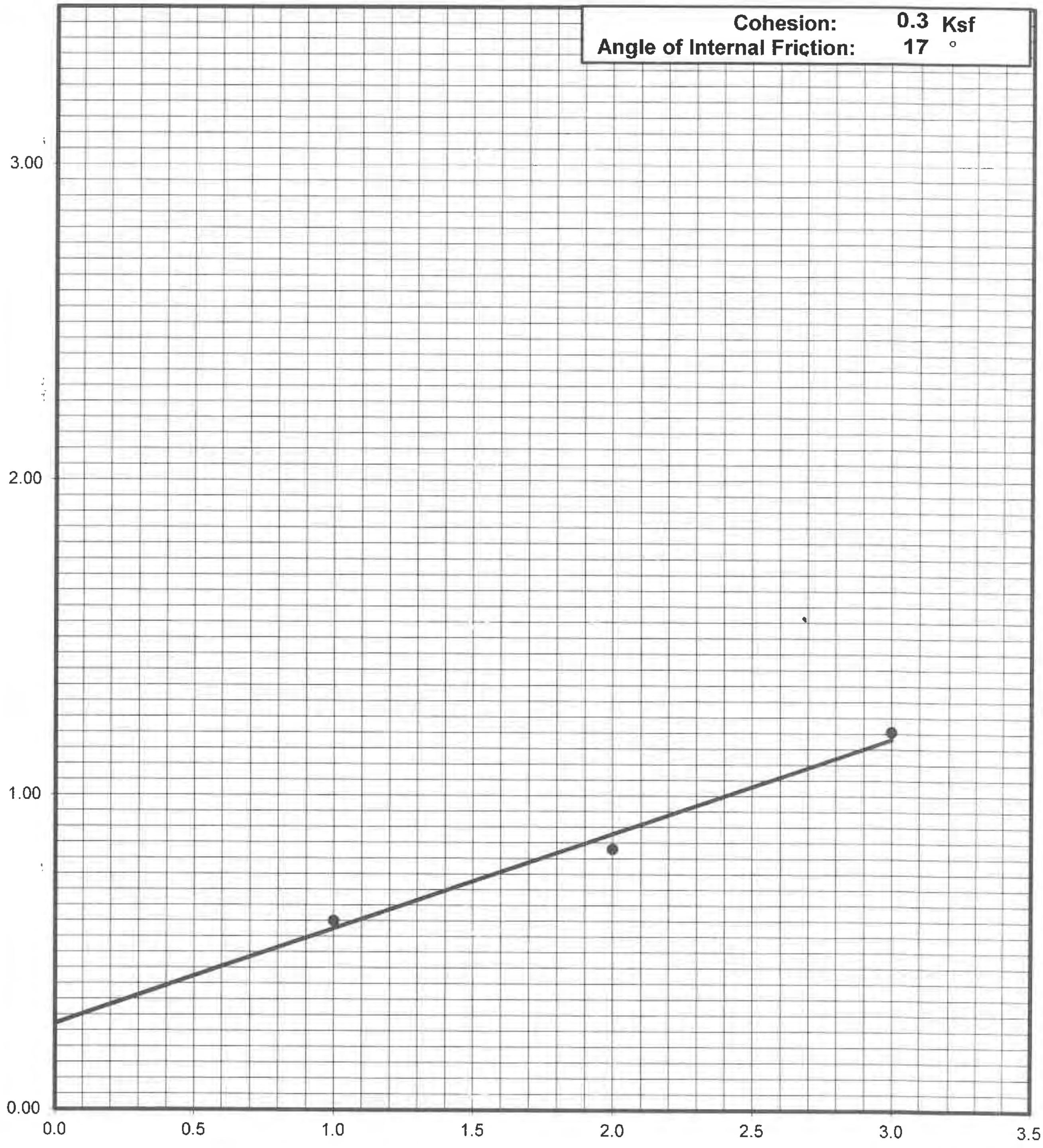


Krazan Testing Laboratory

Shear Strength Diagram (Direct Shear)

ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
042-22060	B8 @ 5-5.5'	CL	2/16/2023



Krazan Testing Laboratory

Expansion Index Test

ASTM D - 4829

Project Number : 042-22060
Project Name : Sanders Ranch PSL#304480
Date : 2/16/2023
Sample location/ Depth : B2 @ 3-4'
Sample Number : X1
Soil Classification : CL

Trial #	**1**	**2**	**3**
Weight of Soil & Mold, gms	753.8		
Weight of Mold, gms	367.0		
Weight of Soil, gms	386.8		
Wet Density, Lbs/cu.ft.	116.7		
Weight of Moisture Sample (Wet), gms	200.0		
Weight of Moisture Sample (Dry), gms	179.2		
Moisture Content, %	11.6		
Dry Density, Lbs/cu.ft.	104.5		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	51.2		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.0549

Expansion Index $_{\text{measured}}$ = 54.9

Expansion Index = 55

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Krazan Testing Laboratory

Expansion Index Test

ASTM D - 4829

Project Number	: 042-22060
Project Name	: Sanders Ranch PSL#304480
Date	: 2/16/2023
Sample location/ Depth	: B6 @ 3-4'
Sample Number	: X3
Soil Classification	: SC

Trial #	**1**	**2**	**3**
Weight of Soil & Mold, gms	765.5		
Weight of Mold, gms	367.0		
Weight of Soil, gms	398.5		
Wet Density, Lbs/cu.ft.	120.2		
Weight of Moisture Sample (Wet), gms	200.0		
Weight of Moisture Sample (Dry), gms	182.5		
Moisture Content, %	9.6		
Dry Density, Lbs/cu.ft.	109.7		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	48.3		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.0287

Expansion Index $_{\text{measured}}$ = 28.7

Expansion Index = 29

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Krazan Testing Laboratory

Expansion Index Test

ASTM D - 4829

Project Number : 042-22060
Project Name : Sanders Ranch PSL#304480
Date : 2/16/2023
Sample location/ Depth : B8 @ 3-4'
Sample Number : X4
Soil Classification : CL

Trial #	1	2	3
Weight of Soil & Mold, gms	742.6		
Weight of Mold, gms	367.2		
Weight of Soil, gms	375.4		
Wet Density, Lbs/cu.ft.	113.2		
Weight of Moisture Sample (Wet), gms	200.0		
Weight of Moisture Sample (Dry), gms	178.4		
Moisture Content, %	12.1		
Dry Density, Lbs/cu.ft.	101.0		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	48.9		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.0856

Expansion Index $_{\text{measured}}$ = 85.6

Expansion Index = 86

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

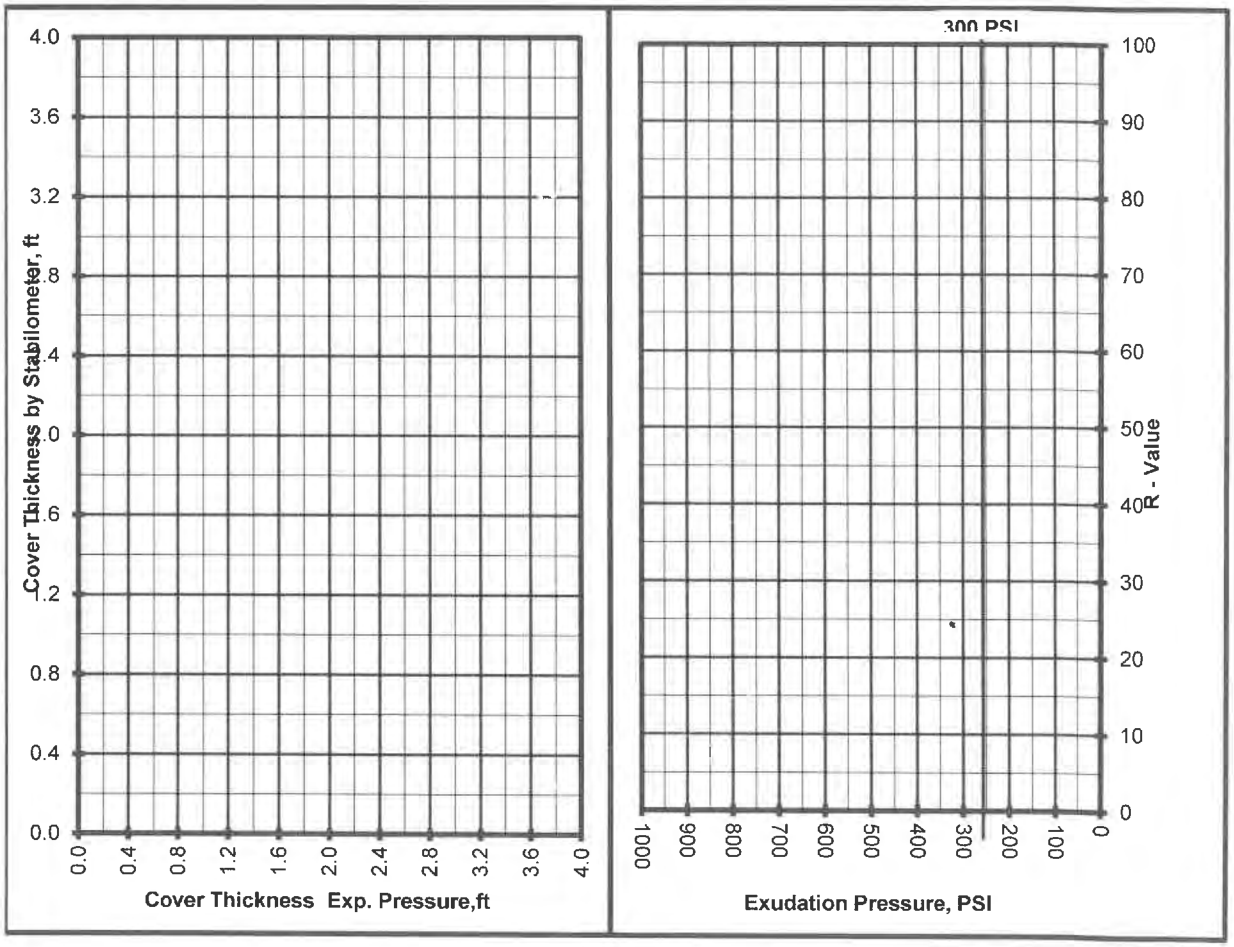
Krazan Testing Laboratory

R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number : 042-22060
Project Name : Sanders Ranch PSL#304480
Date : 1/26/2023
Sample Location/Curve Number : RV#1
Soil Classification : CL

TEST	A	B	C
Percent Moisture @ Compaction, %			
Dry Density, lbm/cu.ft.	R - Value less than 5 Sample Exuded from bottom of Mold During test		
Exudation Pressure, psi			
Expansion Pressure, (Dial Reading)			
Expansion Pressure, psf			
Resistance Value R			

R - Value at 300 PSI Exudation Pressure	< 5
R - Value by Expansion Pressure	

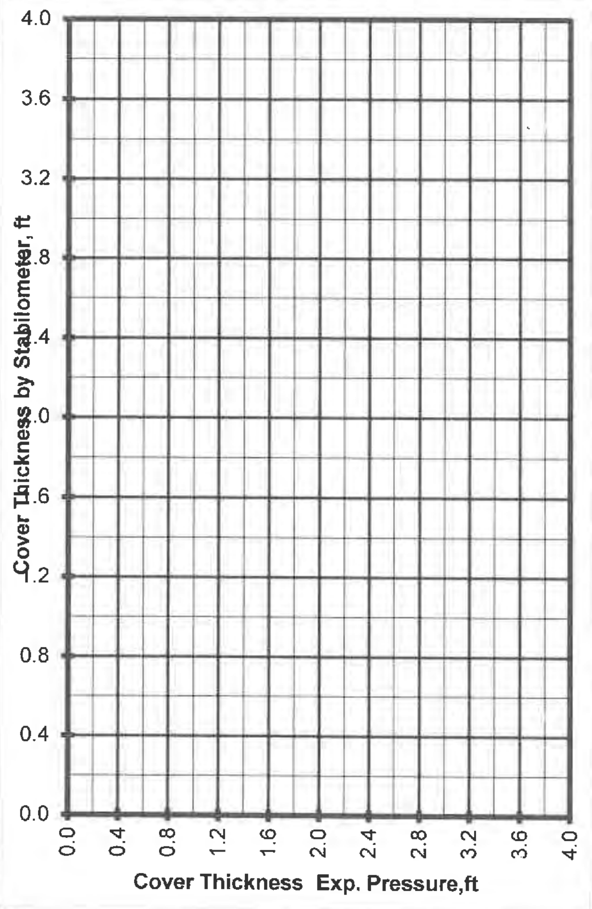


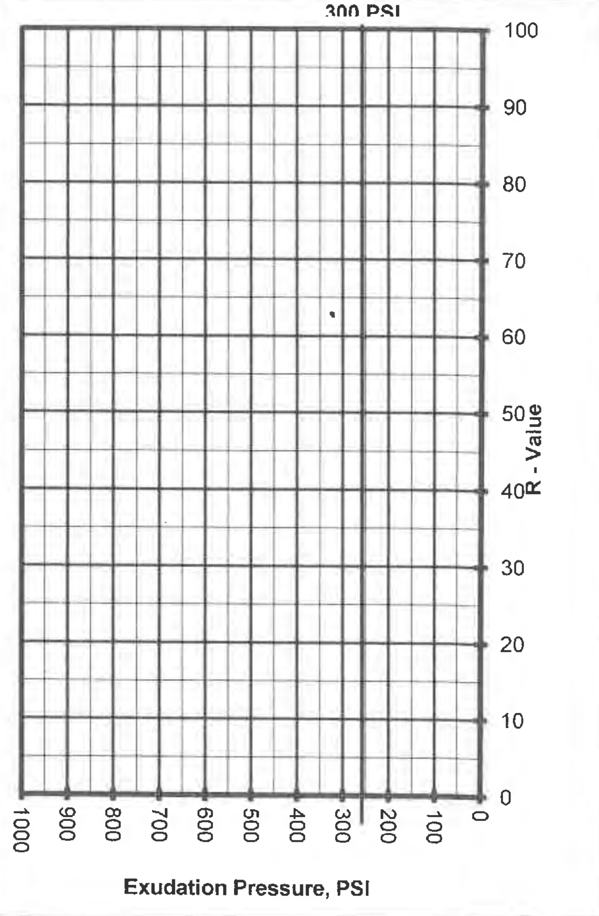
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number : 042-22060
Project Name : Sanders Ranch PSL#304480
Date : 1/26/2023
Sample Location/Curve Number : RV#2
Soil Classification : CL

TEST	A	B	C
Percent Moisture @ Compaction, %			
Dry Density, lbm/cu.ft.	R - Value less than 5 Sample Exuded from bottom of Mold During test		
Exudation Pressure, psi			
Expansion Pressure, (Dial Reading)			
Expansion Pressure, psf			
Resistance Value R			

R - Value at 300 PSI Exudation Pressure	< 5
R - Value by Expansion Pressure	



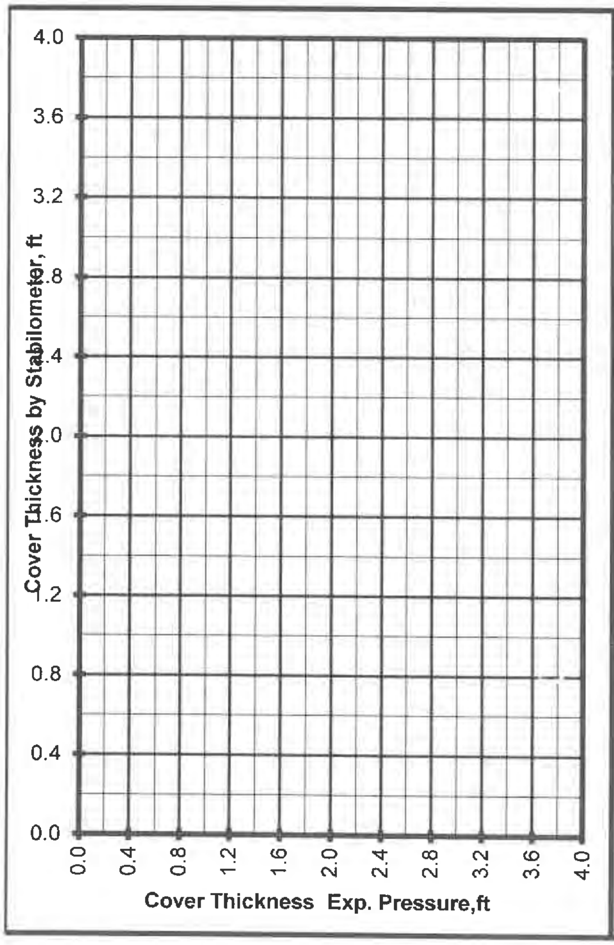


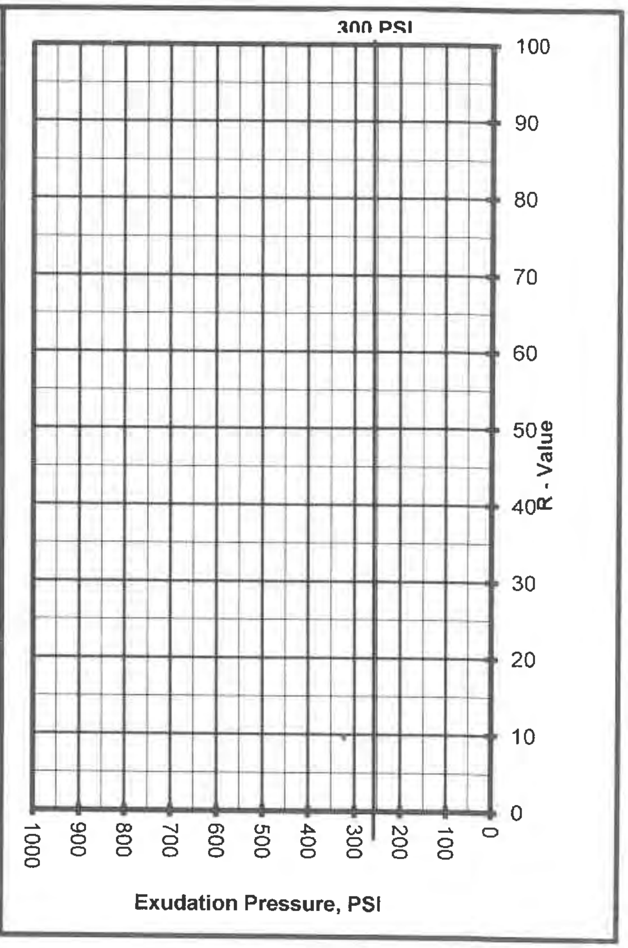
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number : 042-22060
Project Name : Sanders Ranch PSL#304480
Date : 1/26/2023
Sample Location/Curve Number : RV#3
Soil Classification : CL

TEST	A	B	C
Percent Moisture @ Compaction, %			
Dry Density, lbm/cu.ft.	R - Value less than 5 Sample Exuded from bottom of Mold During test		
Exudation Pressure, psi			
Expansion Pressure, (Dial Reading)			
Expansion Pressure, psf			
Resistance Value R			

R - Value at 300 PSI Exudation Pressure	< 5
R - Value by Expansion Pressure	



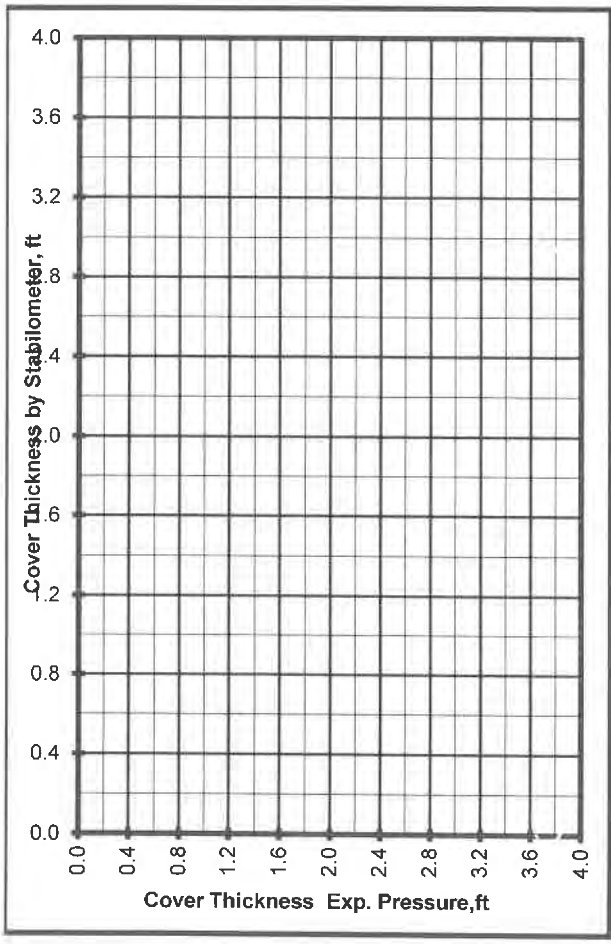


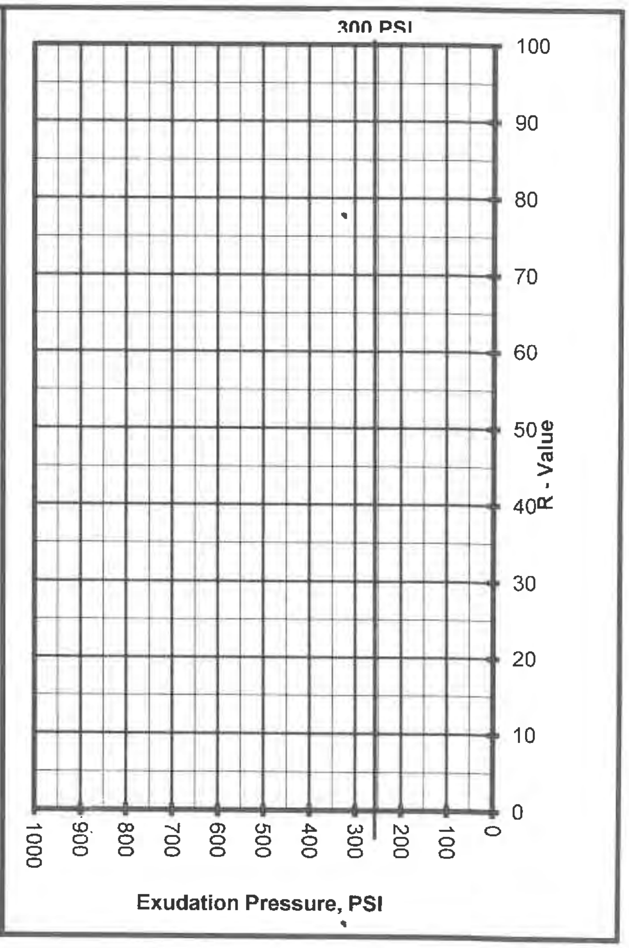
R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number : 042-22060
Project Name : Sanders Ranch PSL#304480
Date : 1/26/2023
Sample Location/Curve Number : RV#4
Soil Classification : CL

TEST	A	B	C
Percent Moisture @ Compaction, %			
Dry Density, lbm/cu.ft.	R - Value less than 5 Sample Exuded from bottom of Mold During test		
Exudation Pressure, psi			
Expansion Pressure, (Dial Reading)			
Expansion Pressure, psf			
Resistance Value R			

R - Value at 300 PSI Exudation Pressure	< 5
R - Value by Expansion Pressure	





LETS
AMERICA
Engineers & Architects

Structural Design Report

Structure: 107'-0" Lattice Tower (Concrete Pad, Cabinet & Generator Anchorage & H-Frame)

Carrier: Verizon

Site #: 304480

Site Name: Sanders Ranch

Address: 100 Sanders Ranch Road, Moraga, CA 94566

Coordinates: 37.823804°, -122.114476°

County: Contra Coasta County

Jurisdiction: Town of Moraga

LETS #: S2-SCVO-027

Date: February 28, 2023

Result

Concrete Pad: **19'-0" X 19'-0" Concrete Pad**
Cabinet Anchorage: **(4) 1/2" Dia. Hilti Kwik Bolt**
Generator Anchorage: **(4) 1/2" Dia. Hilti Kwik Bolt**
H-Frame: **(3) 3.0" STD. X 5'-6" Long Pipes & (3) 9'-9" Long Unistrut**
H-Frame Anchor Bolt: **(4) 5/8" Dia. Hilti Kwik Bolts TZ**
H-Frame Base Plate: **PL 8x8x1/2"**
Water Tank: **24" Thick Pad w/ (8)-1/2" Dia. HY-TZ Bolt**

REGISTERED PROFESSIONAL ENGINEER
MADHAN KUMAR KANTHA SAMY
77991
Expires 6/30/2023
CIVIL
STATE OF CALIFORNIA

03/03/2023

Aleida Acosta
Design Engineer

Madhan Kumar K, MS, PE
Director of Engineering

TABLE OF CONTENTS:

ANALYSIS SUMMARY:

We have completed the Structural Design of the proposed Concrete Pad, H-Frame, & Water Tank Pad Design to determine their ability to support the equipment proposed by SAC Wireless on behalf of Verizon Wireless.

Table 1 summarizes the design criteria used for our structural analysis & Table 2 summarizes proposed equipment loading. Attached is a copy of the structural calculations.

DESIGN INFORMATION:

The structural design was based on the following documentation:

1. Geotech Report by Krazan & Associates, Inc., dated February 21, 2023.
2. Construction Drawings by SAC A Nokia Company dated February 04, 2023.

ANALYSIS CRITERIA:

The proposed Concrete Pad & H-Frame have been designed per the following requirements:

Table 1 – Design Criteria

Criterion	Information Used
Codes & Referenced Standards	ASCE 7-22 2022 California Building Code ACI 318-14 TIA-222-H AISC Steel Construction 15th Edition
Jurisdiction	Town of Moraga
Wind Speed (No Ice)	92 mph nominal (3 second gust)
Exposure Category	C
Risk Category	II

APPURTENANCES:

Table 2 - Proposed Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Items	Item Manufacturer	Item Model	Number of Feed Lines	Feed Line
On Concrete Pad	7.5	4	Generic	Service Light	-	-
	4.25	1	Generic	Generator Doc Box		
		1	Generic	Shutdown Switch		
	4.0	1	Generic	Telco Box		
		1	Generic	Electrical Meters Bank		
		2	Generic	Raycap		
		3	Generic	RRUS		
	3.75	1	Generic	Misc. Cabinet		
		1	Generic	Power Cabinet		
		1	Generic	Battery Cabinet		
	3.25	1	Generic	Generator		
	2.75	1	Generic	Intersect Cabinet		
		3	Generic	H-Frame		
	2.00	1	Generic	Fire Extinguisher		
	1.25	3	Generic	RRUS		

ASSUMPTIONS AND LIMITATIONS:

1. This report is based solely on the information supplied to us as listed in the “Design Information” section of this report, and the results, in turn, are only as accurate as data extracted from this information. This report is considered void if any of the listed information or assumptions stated herein is inaccurate.
2. The proposed structures and associated components, including any modifications to them, will be installed in accordance with original design drawings and are in satisfactory condition to carry their full design capacity. The structure configuration, member sizes and material grades are as given in our attached analysis output.
3. Any existing modifications not listed in “Design Information” section of this report have not been considered in the analysis.
4. The potential may exist that the existing site conditions may not align with those assumed or anticipated. An altered field condition discovered during the installation of the Cabinet should be brought to the attention of LETS America, Inc., for subsequent consideration, analysis, and possible revision approach.

5. No materials evaluation, inspection, or monitoring of the proposed structure was performed by LETS America, Inc., for this structural review associated with the site modification for SAC Wireless (Site 304480) in Moraga, CA. Please advise if you have any questions and/or comments regarding the information contained within.

DISCLAIMER:

LETS America, Inc., makes no warranties, expressed or implied, in connection with this report, and disclaims any liability arising from material and fabrication of this Equipment Concrete Pad, Ice Bridge & Ice Shield Structure. LETS America, Inc., will not be responsible whatsoever for or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of LETS America, Inc., pursuant to this report will be limited to the total fee received for preparation of this report.

CONCLUSION:

The proposed 19’-0” X 19’-0” Concrete Slab has sufficient capacity to carry the proposed loads.
Our analysis has determined that (4) 1/2” Dia. Hilti Kwik Bolt (2) per side will needed to attach proposed Cabinet to proposed Concrete Pad.
Our analysis has determined that (4) 1/2” Dia. Hilti Kwik Bolt (2) per side will needed to attach proposed Generator to proposed Concrete Pad.
The proposed (2) 3.0” Std. X 5’-6” Long Pipes & (3) 9’-9” Long Unistrut of H-Frame has sufficient capacity to carry the proposed loads.
The proposed 5/8” Dia. Hilti Kwik Bolts TZ has sufficient capacity to carry the proposed loads on H-Frame.
The proposed PL 8 X 8 X 1/2” Base Plate has sufficient capacity to carry the proposed loads on H-Frame.
The proposed 10’-0” x 10’-0” x 2’-0” Concrete Slab has sufficient capacity to carry the proposed Water tank.
Our analysis has determined that (8) 1/2” Dia. Hilti Kwik Bolt (2) per side will be needed to attach the proposed water tank.

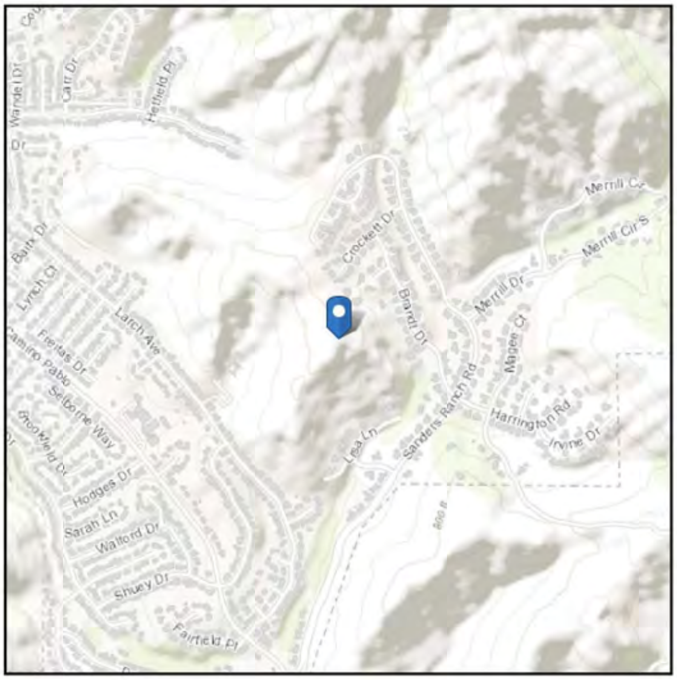
STRUCTURAL DESIGN

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-22
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 37.823804
Longitude: -122.114476
Elevation: 846.69 ft (NAVD 88)

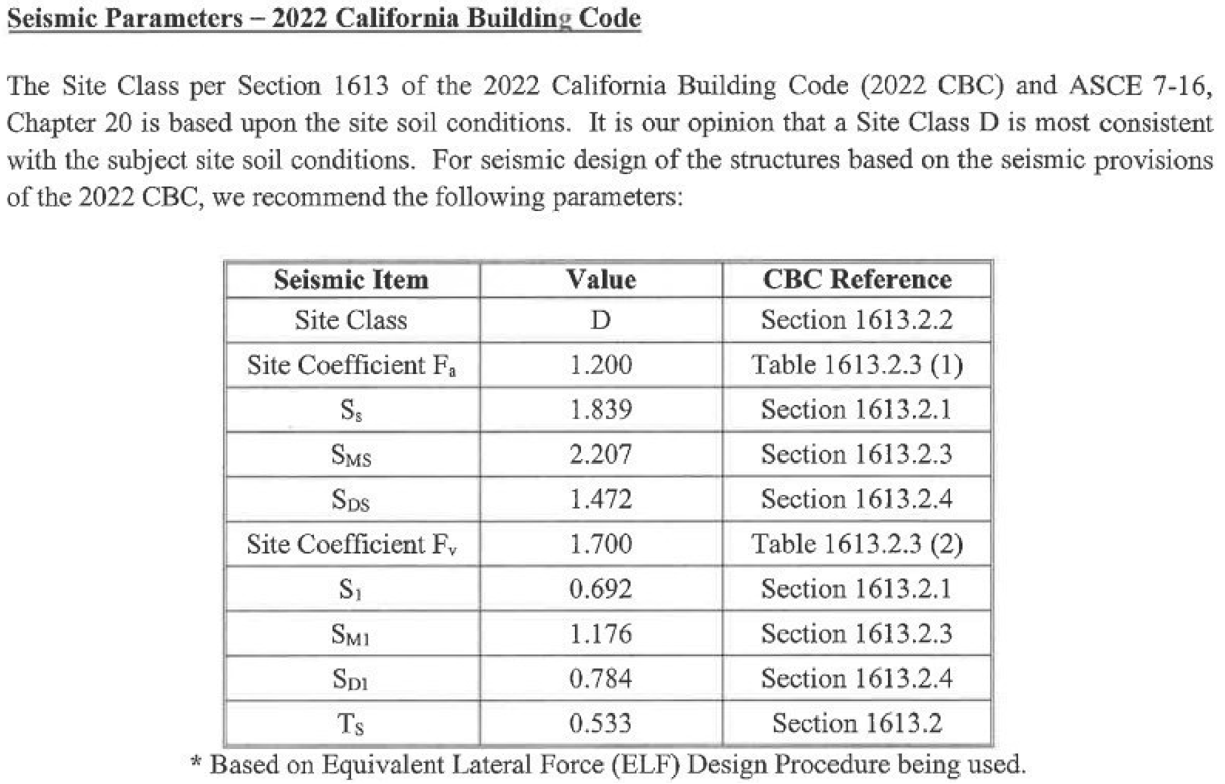


Wind

Results:

Wind Speed	92 Vmph
10-year MRI	64 Vmph
25-year MRI	70 Vmph
50-year MRI	74 Vmph
100-year MRI	79 Vmph
300-year MRI	87 Vmph
700-year MRI	92 Vmph
1,700-year MRI	99 Vmph
3,000-year MRI	103 Vmph
10,000-year MRI	113 Vmph
100,000-year MRI	129 Vmph
1,000,000-year MRI	147 Vmph

Data Source:	ASCE/SEI 7-22, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Fri Feb 03 2023



Seismic Parameters – 2022 California Building Code

The Site Class per Section 1613 of the 2022 California Building Code (2022 CBC) and ASCE 7-16, Chapter 20 is based upon the site soil conditions. It is our opinion that a Site Class D is most consistent with the subject site soil conditions. For seismic design of the structures based on the seismic provisions of the 2022 CBC, we recommend the following parameters:

Seismic Item	Value	CBC Reference
Site Class	D	Section 1613.2.2
Site Coefficient F_a	1.200	Table 1613.2.3 (1)
S_s	1.839	Section 1613.2.1
S_{MS}	2.207	Section 1613.2.3
S_{DS}	1.472	Section 1613.2.4
Site Coefficient F_v	1.700	Table 1613.2.3 (2)
S_1	0.692	Section 1613.2.1
S_{M1}	1.176	Section 1613.2.3
S_{D1}	0.784	Section 1613.2.4
T_S	0.533	Section 1613.2

* Based on Equivalent Lateral Force (ELF) Design Procedure being used.

*Geotech Report by Krazan & Associates, Inc., dated February 21, 2023.

Seismic Force to Nonstructural Components Calculations As Per ASCE 7-22 Section 13

Design Coefficients

Site Class: D
Importance Factor: 1.00 (ASCE 7-22, Table 1.5-2)
Risk Category: II (ASCE 7-22, Table 1.5-1)

S_{DS}: 1.472 (ASCE 7-22 Eq 11.4-3)
A_p: 1.000 (ASCE 7-22 Table 13.6-1)
Z: 3.3 ft (Rad Center)
H_f: 1 (ASCE 7-22 Section 13.3.1.1)
R_μ : 1 (ASCE 7-22 Section 13.3.1.2)
R: 1.25 (ASCE 7-22 Table 15.4-2)
I_e : 1 (ASCE 7-22 Table 1.5-2)

H: 6.5 ft (Overall Height)
R_{po} : 1.5 (ASCE 7-22 Table 13.6-1)
Ω_0 : 2 (ASCE 7-22 Table 15.4-2)
C_{AR} : 2.2 (ASCE 7-22 Table 13.6-1)
I_p : 1 (ASCE 7-22 Section 13.1.3)

Seismic Design Force (F_p) Calculation

F_p: 0.864 W_p (ASCE 7-22 Eq 13.3-1)
$F_{p\ Max}$: 2.355 W_p (ASCE 7-22 Eq 13.3-2)
$F_{p\ Min}$: 0.442 W_p (ASCE 7-22 Eq 13.3-3)

$$Fpmin \leq Fp \leq Fpmax$$

F_p to use: 0.864 W_p

W_p: Component Operating Weight

The Horizontal seismic design force shall be calculated as

$$F_p = 0.4SDSIpWp\left(\frac{H_f}{R_\mu}\right)\left(\frac{C_{AR}}{R_{po}}\right)$$

F_p = 0.864 W_p

CONCRETE PAD

Concrete Pad Check for the Proposed Appurtenances

S.No	Name of the Appurtenance	Weight (lbs)	Quantity	Total Weight (lbs)
1	Battery Cabinet	3,000.0	1	3000
2	Power Cabinet	1,853.0	1	1853
3	Misc. Cabinet	1,853.0	1	1853
4	Generator	3,000.0	1	3000
5	Service Light	8.5	4	34
6	Intersect Cabinet	250.0	1	250
7	Telco Cabinet	300.0	1	300
8	Electrical Meter	50.0	1	50
9	Fire Extinguisher	5.0	1	5
10	Raycap	32.0	2	64
11	Radios	75.0	3	225
12	Radios	70.0	3	210
13	H-Frame	176.7	1	177
14	H-Frame	110.5	2	221
15	Generator Doc Box	50.0	1	50
16	Shutdown Switch	50.0	1	50
			Total =	11342

Soil Bearing Check:

Soil Bearing Capacity = 2925 psf (As per Krazan & Associates, Inc., dated February 21,2023)
Total Weight = 11342 lbs
Pad Dimension= 19' X 19'
Appurtenance Load= 10172 lbs/(19' X 19')
= 31.418 psf
Concrete Pad= 150 pcf x 0.5 ft
= 75 psf
Total Load= Concrete pad + Appurtenance load
Total Load= 106.42 psf
Soil Bearing Capacity > Total Load

Minimum Steel Requirements Check:

Concrete Pad Thickness= 6 in
Concrete Pad Unit Width= 12 in
Minimum Steel Requirements= .0018 x 6" x 12"
= 0.1296 in^2
Reinforcements Provided= #4 bars @ 12" o.c.
= 0.2 in^2

Provided Steel > Required Steel

Sanders Ranch
304480
February 28, 2023

CABINET ANCHORAGE CALCULATION

CABINET OVERTURNING AND ANCHOR BOLT DESIGN

Site Name: Sanders Ranch
Site ID: 304480
Design By: RAM

DESIGN PARAMETERS:

Site Class: D
Risk Category: II
Nominal Wind Speed: 92 mph

Codes: IBC 2021
2022 CBC

CABINET INFORMATION:

We=	575	lbs	*We-Weight of empty Cabinet*
Wf=	3000	lbs	*Wf-Weight of full Cabinet*
L=	2.75	ft	*L-Length of the Cabinet*
H=	7.50	ft	*H-Height of the Cabinet*
w=	2.47	ft	*w-Width of the Cabinet*

SEISMIC LOAD CALCULATION:

S_{DS} = 1.472 R_{μ} = 1 R= 1.25 I_e= 1
a_p= 1 H_f = 1 Ω_0 = 2
I_p= 1 C_{AR}= 1 R_{po} = 1.5

$$F_p = \ 0.4S_{DS}I_p\ W_f\ [\frac{H_f}{R_\mu}][\frac{C_{AR}}{R_{po}}] =$$ 1177.6 lbs ASCE 7-22 (Tab-13.3-1)

$$F_{p\ (Max)} = 1.6S_{DS}I_pW_f =$$ 7065.6 lbs ASCE 7-22 (Tab-13.3-2)

$$F_{p\ (Min)} = 0.3S_{DS}I_pW_f =$$ 1324.8 lbs ASCE 7-22 (Tab-13.3-3)

F_p is not required to be taken as greater than (13.3-2) and F_p shall not be taken as less than (13.3-3)

$F_p =$ 1324.8 lbs

WIND LOAD CALCULATION:

Wind Speed = 92 mph
Exposure = C
K_{zt} = 1.0
K_d = 0.85
G = 0.85
Ke = 0.97

Zg = 900
α = 9.5
Kz = 0.85

F = $q_z\ K_d\ G\ C_f\ A_f$ lbs ASCE 7-22 (Tab-13.3-3)
q_z = 0.00256*Kzt*Kz*Ke*V^2 ASCE 7-22 (Tab-13.3-3)
q_z = 15.33 psf
C_f = 1.59
A_f = 20.6 ft^2
F = 428 lbs

CABINET OVERTURNING AND ANCHOR BOLT DESIGN

Site Name: Sanders Ranch
Site ID: 304480
Design By: RAM

OVERTURNING MOMENT:

$$M_{OTM(W)} = F\left(\frac{1}{2}H\right) \qquad M_{OTM(s)} = F_p\left(\frac{1}{2}H\right)$$

M_{OTM} (S)= 6624 lb-ft
M_{OTM} (W)= 2142 lb-ft

RESISTING MOMENT:

$$M_R = W_e\left(\frac{1}{2}\mathrm{w}\right)$$

M_R = 710 lb-ft

LOAD COMBINATIONS:

LC1: 1.2D+1.0W
LC2: 1.2D+1.0E
LC3: 0.9D+1.0W
LC4: 0.9D+1.0E

ASCE 7-22 Section 2.3
D-Dead Load
W-Wind Load
E-Seismic Load

CALCULATION FOR MOMENT:

$$M = M_{OTM} - M_R$$

$M_{LC1} =$ 1290 lb-ft
$M_{LC2} =$ 5772 lb-ft
$M_{LC3} =$ 1503 lb-ft
$M_{LC4} =$ 5985 lb-ft <----GOVERNS
Uplift force (T*) = M/w *Positive Direction load represents the Tension Force
T* = 2423 lbs
No. of bolts accounts for Tension = 2
Force per Bolt = 1212 lbs < 6880 lbs

SHEAR FORCE :

Shear Force (F) = 1325 lbs
No. of bolts accounts for Shear = 4
Force per Bolt = 331.20 lbs < 3180 lbs

Use (4) 1/2" DIA. Hilti Kwik Bolts TZ Stainless Steel anchors (2 per side) with 3.25 Inch Min Embedment.

Sanders Ranch
304480
February 28, 2023

GENERATOR ANCHORAGE CALCULATION

GENERATOR OVERTURNING AND ANCHOR BOLT DESIGN

Site Name: Sanders Ranch
Site ID: 304480
Design By: RAM

DESIGN PARAMETERS:

Site Class: D
Risk Category: II
Nominal Wind Speed: 92 mph

Codes: IBC 2021
2022 CBC

GENERATOR INFORMATION:

We=	1455	lbs	*We-Weight of empty Generator*
Wf=	3000	lbs	*Wf-Weight of full Generator*
L=	4.84	ft	*L-Length of the Generator*
H=	7.42	ft	*H-Height of the Generator*
w=	2.87	ft	*w-Width of the Generator*

SEISMIC LOAD CALCULATION:

S_{DS} = 1.472 R_μ = 1 R= 1.25 I_e= 1
a_p= 1 H_f = 1 Ω_0 = 2
I_p= 1 C_{AR}= 1 R_{po} = 1.5

$$F_p = 0.4S_{DS}I_p\,W_f\,[\frac{H_f}{R_\mu}][\frac{C_{AR}}{R_{po}}] =$$ 1177.6 lbs ASCE 7-22 (Tab-13.3-1)

$$F_{p\,(Max)} = 1.6S_{DS}I_pW_f =$$ 7065.6 lbs ASCE 7-22 (Tab-13.3-2)

$$F_{p\,(Min)} = 0.3S_{DS}I_pW_f =$$ 1324.8 lbs ASCE 7-22 (Tab-13.3-3)

F_p is not required to be taken as greater than (13.3-2) and F_p shall not be taken as less than (13.3-3)

$F_p =$ 1324.8 lbs

WIND LOAD CALCULATION:

Wind Speed = 92 mph
Exposure = C
K_{zt} = 1.0
K_d = 0.85
G = 0.85
Ke = 0.97

Zg = 900
α = 9.5
Kz = 0.85

F = $q_z\,K_d\,G\,C_f\,A_f$ lbs ASCE 7-22 (Tab-13.3-3)
q_z = $0.00256*Kzt*Kz*Ke*V^2$ ASCE 7-22 (Tab-13.3-3)
q_z = 15.33 psf
C_f = 1.52
A_f = 35.9 ft^2
F = 711 lbs

GENERATOR OVERTURNING AND ANCHOR BOLT DESIGN

Site Name: Sanders Ranch
Site ID: 304480
Design By: RAM

OVERTURNING MOMENT:

$$M_{OTM(W)} = F\left(\frac{1}{2}H\right) \qquad M_{OTM(s)} = F_p\left(\frac{1}{2}H\right)$$

M_{OTM} (S)= 6624 lb-ft
M_{OTM} (W)= 3555 lb-ft

RESISTING MOMENT:

$$M_R = W_e\left(\frac{1}{2}\mathrm{w}\right)$$

M_R = 2088 lb-ft

LOAD COMBINATIONS:

LC1: 1.2D+1.0W
LC2: 1.2D+1.0E
LC3: 0.9D+1.0W
LC4: 0.9D+1.0E

ASCE 7-22 Section 2.3
D-Dead Load
W-Wind Load
E-Seismic Load

CALCULATION FOR MOMENT:

$$M = M_{OTM} - M_R$$

$M_{LC1} =$ 1049 lb-ft
$M_{LC2} =$ 4118 lb-ft
$M_{LC3} =$ 1676 lb-ft
$M_{LC4} =$ 4745 lb-ft <----GOVERNS
Uplift force (T*) = M/w *Positive Direction load
T* = 1653 lbs represents the Tension Force
No. of bolts accounts for Tension = 2
Force per Bolt = 827 lbs < 6880 lbs

SHEAR FORCE :

Shear Force (F) = 1325 lbs
No. of bolts accounts for Shear = 4
Force per Bolt = 331.20 lbs < 3180 lbs

Use (4) 1/2" DIA. Hilti Kwik Bolts TZ Stainless Steel anchors (2 per side) with 3.25 Inch Min Embedment.

TABLE 4—DESIGN INFORMATION, STAINLESS STEEL KB-TZ

DESIGN INFORMATION	Symbol	Units	Nominal anchor diameter											
			$^3/_8$		$^1/_2$				$^5/_8$			$^3/_4$		
Anchor O.D.	d_a	in. (mm)	0.375 (9.5)		0.5 (12.7)				0.625 (15.9)			0.75 (19.1)		
Effective min. embedment[1]	h_{ef}	in. (mm)	2 (51)		2 (51)		$3^1/_4$ (83)		$3^1/_8$ (79)	4 (102)		$3^3/_4$ (95)		$4^3/_4$ (121)
Min. member thickness	h_{min}	in. (mm)	4 (102)	5 (127)	4 (102)	6 (152)	6 (152)	8 (203)	5 (127)	6 (152)	8 (203)	6 (152)	8 (203)	8 (203)
Critical edge distance	c_{ac}	in. (mm)	$4^3/_8$ (111)	$3^7/_8$ (98)	$5^1/_2$ (140)	$4^1/_2$ (114)	$7^1/_2$ (191)	6 (152)	7 (178)	$8^7/_8$ (225)	6 (152)	10 (254)	7 (178)	9 (229)
Min. edge distance	c_{min}	in. (mm)	$2^1/_2$ (64)		$2^7/_8$ (73)		$2^1/_8$ (54)		$3^1/_4$ (83)	$2^3/_8$ (60)		$4^1/_4$ (108)		4 (102)
	for $s \geq$	in. (mm)	5 (127)		$5^3/_4$ (146)		$5^1/_4$ (133)		$5^1/_2$ (140)	$5^1/_2$ (140)		10 (254)		$8^1/_2$ (216)
Min. anchor spacing	s_{min}	in. (mm)	$2^1/_4$ (57)		$2^7/_8$ (73)		2 (51)		$2^3/_4$ (70)	$2^3/_8$ (60)		5 (127)		4 (102)
	for $c \geq$	in. (mm)	$3^1/_2$ (89)		$4^1/_2$ (114)		$3^1/_4$ (83)		$4^1/_8$ (105)	$4^1/_4$ (108)		$9^1/_2$ (241)		7 (178)
Min. hole depth in concrete	h_o	in. (mm)	$2^5/_8$ (67)		$2^5/_8$ (67)		4 (102)		$3^3/_4$ (98)	$4^3/_4$ (121)		$4^1/_2$ (117)		$5^3/_4$ (146)
Min. specified yield strength	f_y	lb/in^2 (N/mm^2)	92,000 (634)		92,000 (634)				92,000 (634)			76,125 (525)		
Min. specified ult. Strength	f_{uta}	lb/in^2 (N/mm^2)	115,000 (793)		115,000 (793)				115,000 (793)			101,500 (700)		
Effective tensile stress area	$A_{se,N}$	in^2 (mm^2)	0.052 (33.6)		0.101 (65.0)				0.162 (104.6)			0.237 (152.8)		
Steel strength in tension	N_{sa}	lb (kN)	5,968 (26.6)		11,554 (51.7)				17,880 (82.9)			24,055 (107.0)		
Steel strength in shear	V_{sa}	lb (kN)	4,720 (21.0)		6,880 (30.6)				9,870 (43.9)			15,711 (69.9)		
Pullout strength in tension, seismic[2]	$N_{p,eq}$	lb (kN)	2,340 (10.4)		2,735 (12.2)		NA		NA	5,840 (26.0)		8,110 (36.1)		NA
Steel strength in shear, seismic[2]	$V_{sa,eq}$	lb (kN)	2,825 (12.6)		6,880 (30.6)				9,350 (41.6)			12,890 (57.3)		
Pullout strength uncracked concrete[3]	$N_{p,uncr}$	lb (kN)	2,630 (11.7)		NA		5,760 (25.6)		NA			NA		12,040 (53.6)
Pullout strength cracked concrete[3]	$N_{p,cr}$	lb (kN)	2,340 (10.4)		3,180 (14.1)		NA		NA	5,840 (26.0)		8,110 (36.1)		NA
Anchor category[4]			1		2		1							
Effectiveness factor k_{uncr} uncracked concrete			24											
Effectiveness factor k_{cr} cracked concrete[5]			17		24		17		17	17		24		17
$\Psi_{C,N} = k_{uncr}/k_{cr}$[6]			1.0											
Strength reduction factor ϕ for tension, steel failure modes[7]			0.75											
Strength reduction factor ϕ for shear, steel failure modes[7]			0.65											
Strength reduction ϕ factor for tension, concrete failure modes, Condition B[8]			0.65		0.55		0.65							
Coefficient for pryout strength, k_{cp}			1.0				2.0							
Strength reduction ϕ factor for shear, concrete failure modes, Condition B[8]			0.70											
Axial stiffness in service load range[9]	β_{uncr}	lb/in.	120,000											
	β_{cr}	lb/in.	90,000											

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 MPa For pound-inch units: 1 mm = 0.03937 inches.

[1] See Fig. 2.

[2] See Section 4.1.8 of this report. NA (not applicable) denotes that this value does not control for design.

[3] For all design cases $\Psi_{c,P}$=1.0. NA (not applicable) denotes that this value does not control for design. See Section 4.1.4 of this report.

[4] See ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable.

[5] See ACI 318-14 17.4.2.2 or ACI 318-11 D.5.2.2, as applicable.

[6] For all design cases $\Psi_{c,N}$ =1.0. The appropriate effectiveness factor for cracked concrete (k_{cr}) or uncracked concrete (k_{uncr}) must be used.

[7] The KB-TZ is a ductile steel element as defined by ACI 318 D.1.

[8] For use with the load combinations of ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2, as applicable. Condition B applies where supplementary reinforcement in conformance with ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c), as applicable, is not provided, or where pullout or pryout strength governs. For cases where the presence of supplementary reinforcement can be verified, the strength reduction factors associated with Condition A may be used.

[9] Mean values shown, actual stiffness may vary considerably depending on concrete strength, loading and geometry of application.

H-FRAME DESIGN

Horizontal Seismic Design Force (F_p): 0.864 W_P

Support Node	Max Reaction (kip)	Support Node	X-Direction Load (kips)	Z-Direction Load (kips)
N5	0.022	N5	0.019	0.019
N6	0.066	N6	0.057	0.057
N7	0.091	N7	0.079	0.079
N8	0.062	N8	0.054	0.054
N9	0.096	N9	0.083	0.083
N10	0.059	N10	0.051	0.051
N19	0.067	N19	0.058	0.058
N20	0.142	N20	0.123	0.123
N21	0.140	N21	0.121	0.121

Load Calculation

Mount Height: 2.8 ft
Nominal Wind Speed: 92.0 mph

Wind Parameters

Gust Effect Factor Gh: 0.85
K_z: 0.85
K_{zt}: 1.00
K_d: 0.85

I: 1
q_z: 17.80
C/D: 84.82

K_e: 0.97
Z_s: 839
C/D_{iz}: 84.82

Appurtenances Wind Load Calculation

Wind Load on Appurtenances = $q_z*C_a*G_h*A$ TIA-222-H (Section 2.6.11.2) C_a= 1.216
= 15.43 psf

Appurtenances

Model	Weight (lbs)	H (in)	W (in)	D (in)
Telco Box	300.0	44.0	26.0	15.0
Intersect Cabinet	250.0	59.0	29.0	12.3
Service Light	8.5	9.6	6.7	4.5

Mount Members

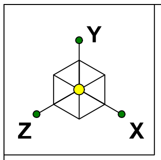
Member	W (in)	D_C (in)
Pipe 3.0" STD	3.5	3.5
P1000	1.6	3.3

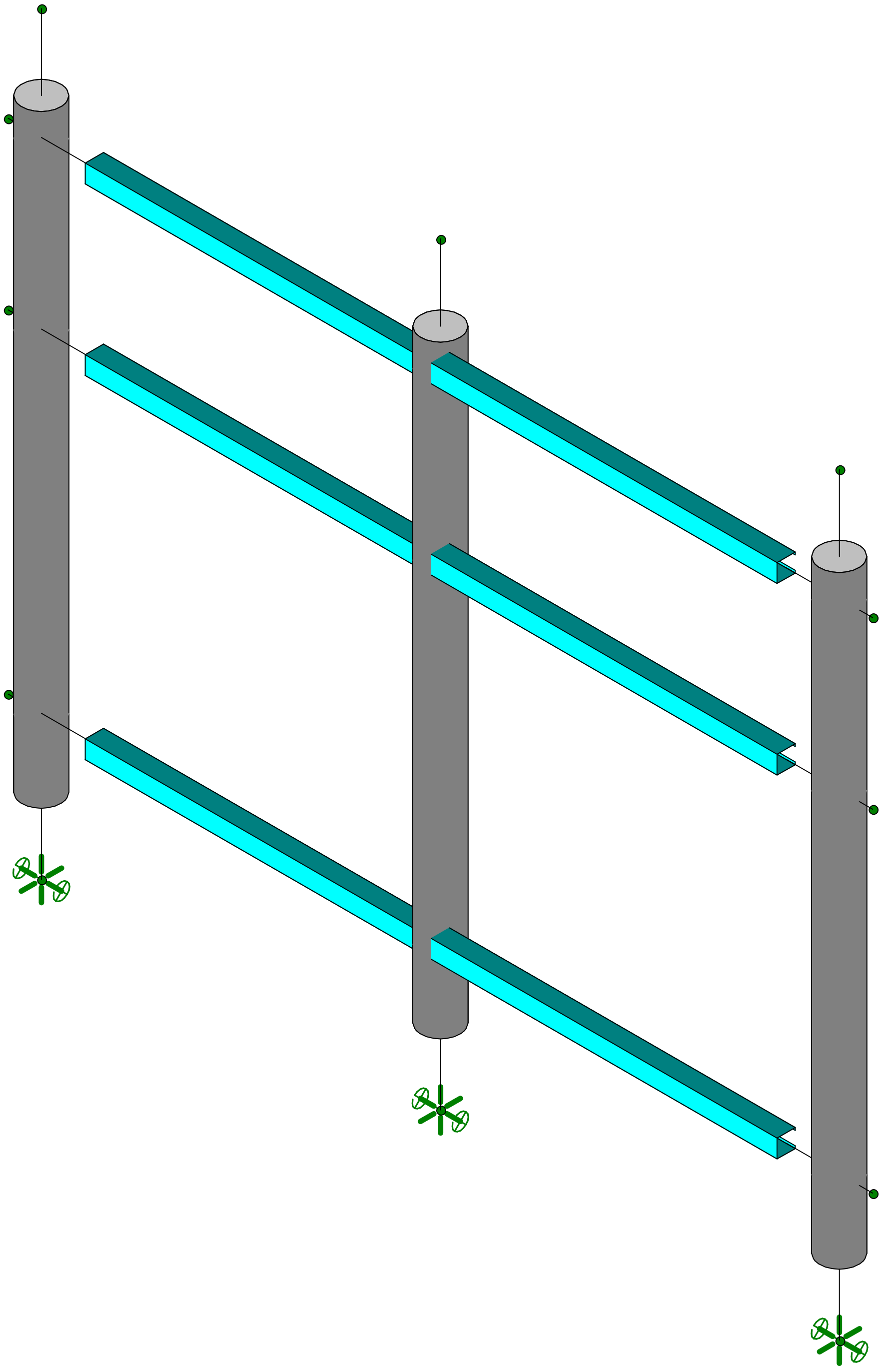
Appurtenances

S.No	Appurtenance	Elevation (ft)	Orientation (deg)	Front Exposed (%)	Side Exposed (%)	Front Wind Load (kips)	Side Wind Load (kips)
1	Telco Box	7.80	0	100%	0%	0.144	0.000
2	Intersect Cabinet	6.16	0	100%	100%	0.216	0.100
3	Service Light	5.67	0	100%	100%	0.008	0.005

Mount Members

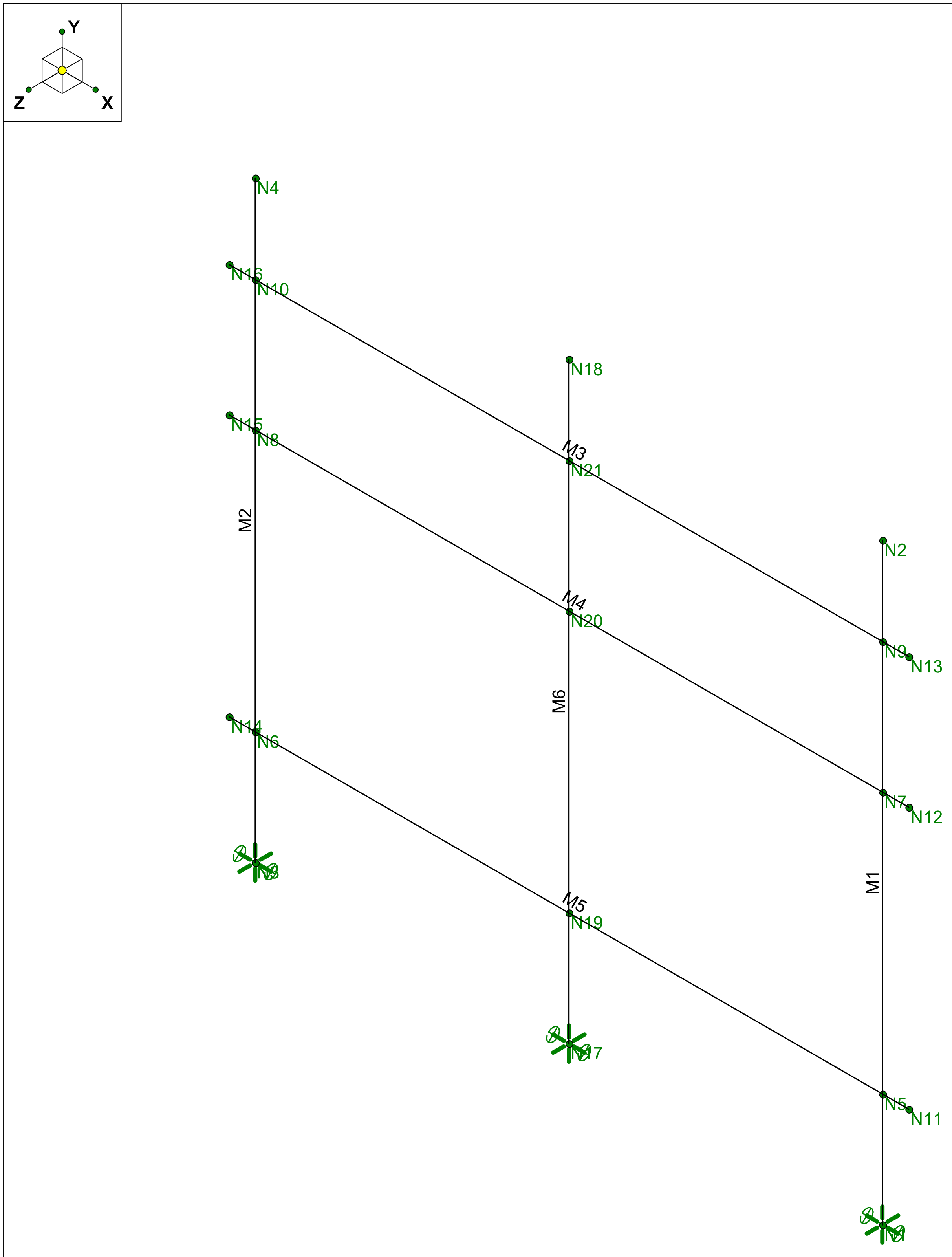
Member	Front Wind Load (k/ft)	Side Wind Load (k/ft)
Pipe 3.0" STD	0.005	0.005
P1000	0.004	0.000





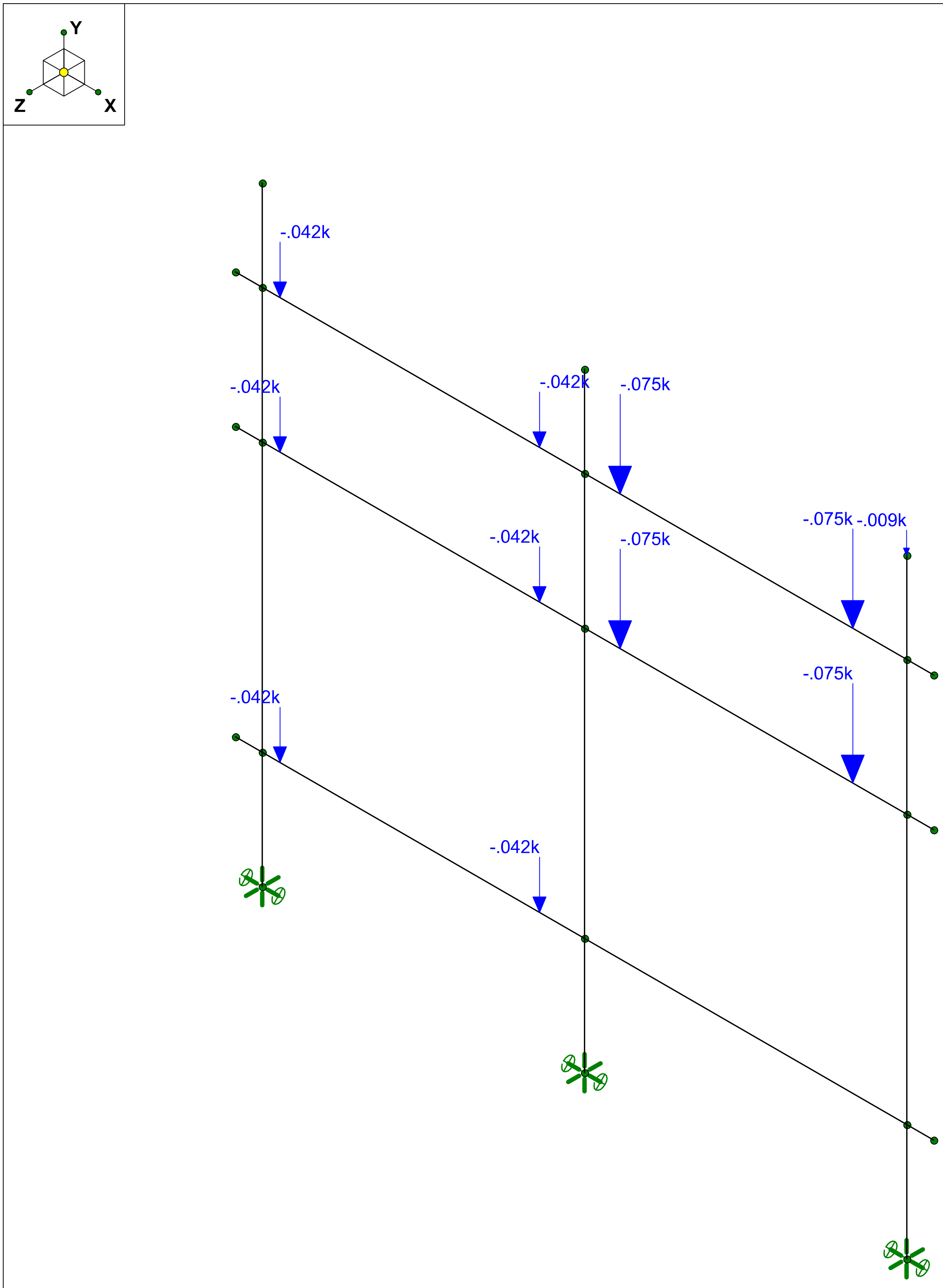
Envelope Only Solution

LETS America, Inc.	304480 - H-Frame	SK - 1
RAM		Feb 28, 2023 at 10:41 AM
S2-SCVO-027		304480.R3D



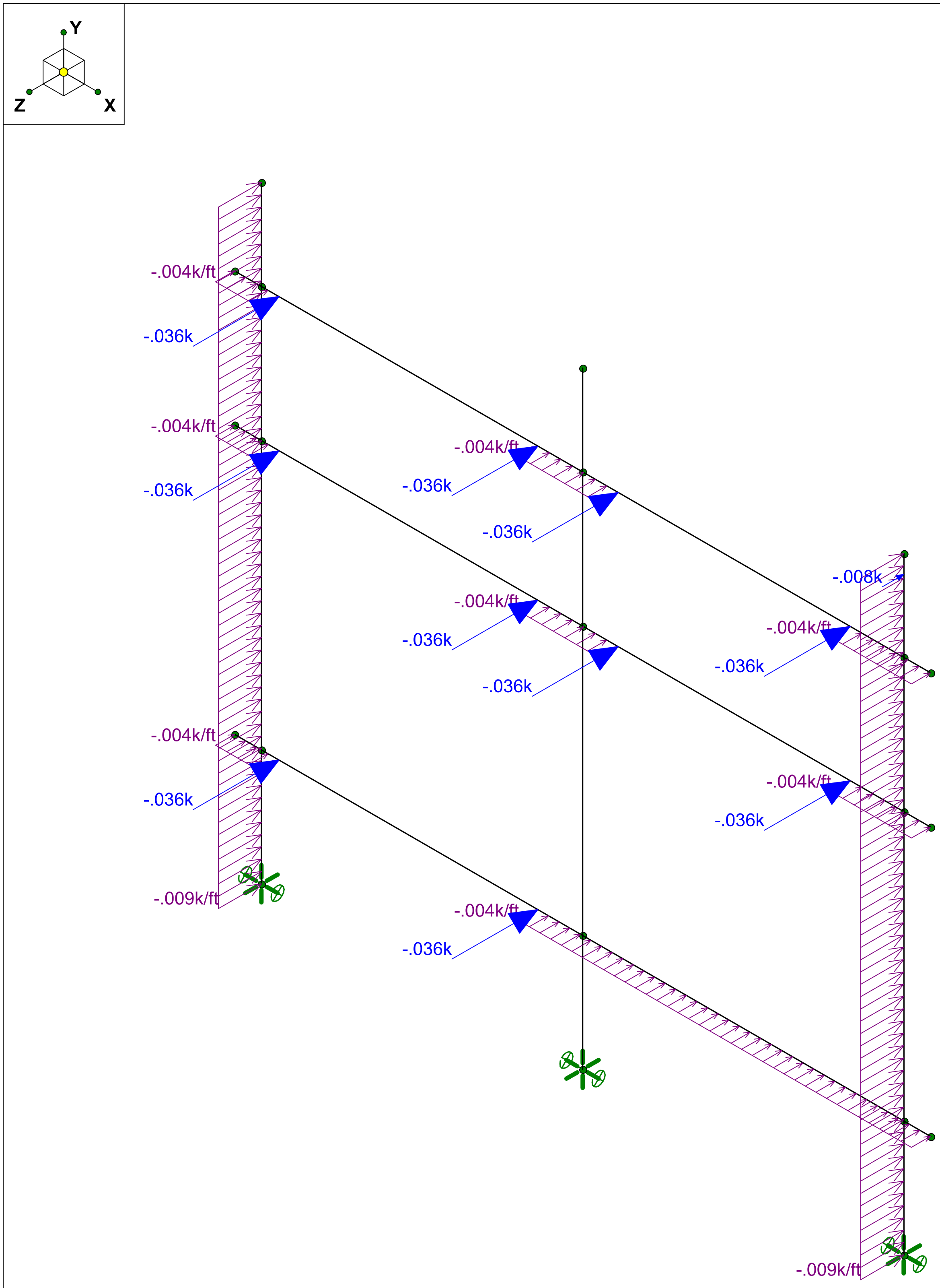
Envelope Only Solution

LETS America, Inc.	304480 - H-Frame	SK - 2
RAM		Feb 28, 2023 at 10:42 AM
S2-SCVO-027		304480.R3D



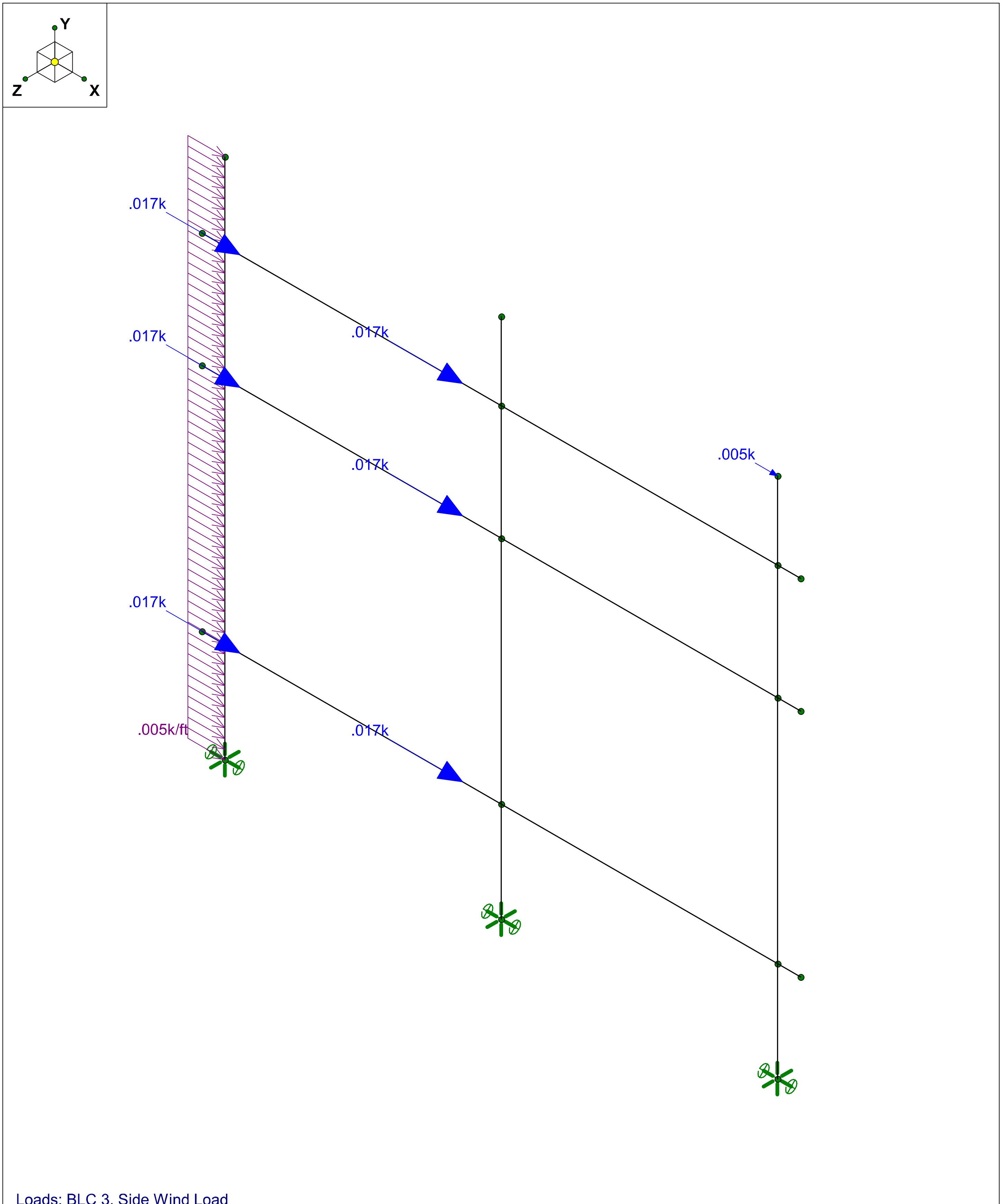
Loads: BLC 1, Dead Load
Envelope Only Solution

LETS America, Inc.	304480 - H-Frame	SK - 3
RAM		Feb 28, 2023 at 10:42 AM
S2-SCVO-027		304480.R3D



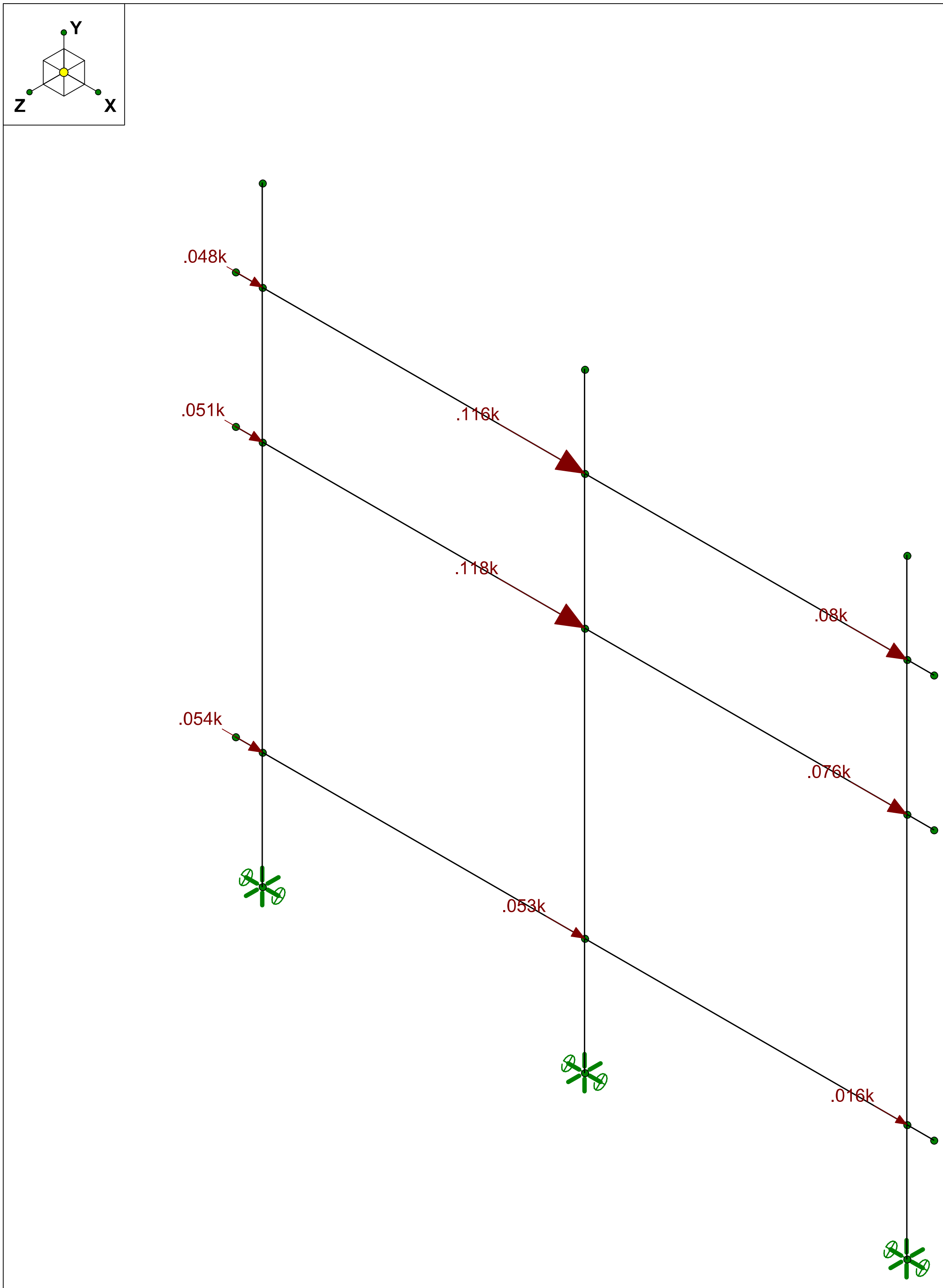
Loads: BLC 2, Front Wind Load
Envelope Only Solution

LETS America, Inc.	304480 - H-Frame	SK - 4
RAM		Feb 28, 2023 at 10:42 AM
S2-SCVO-027		304480.R3D



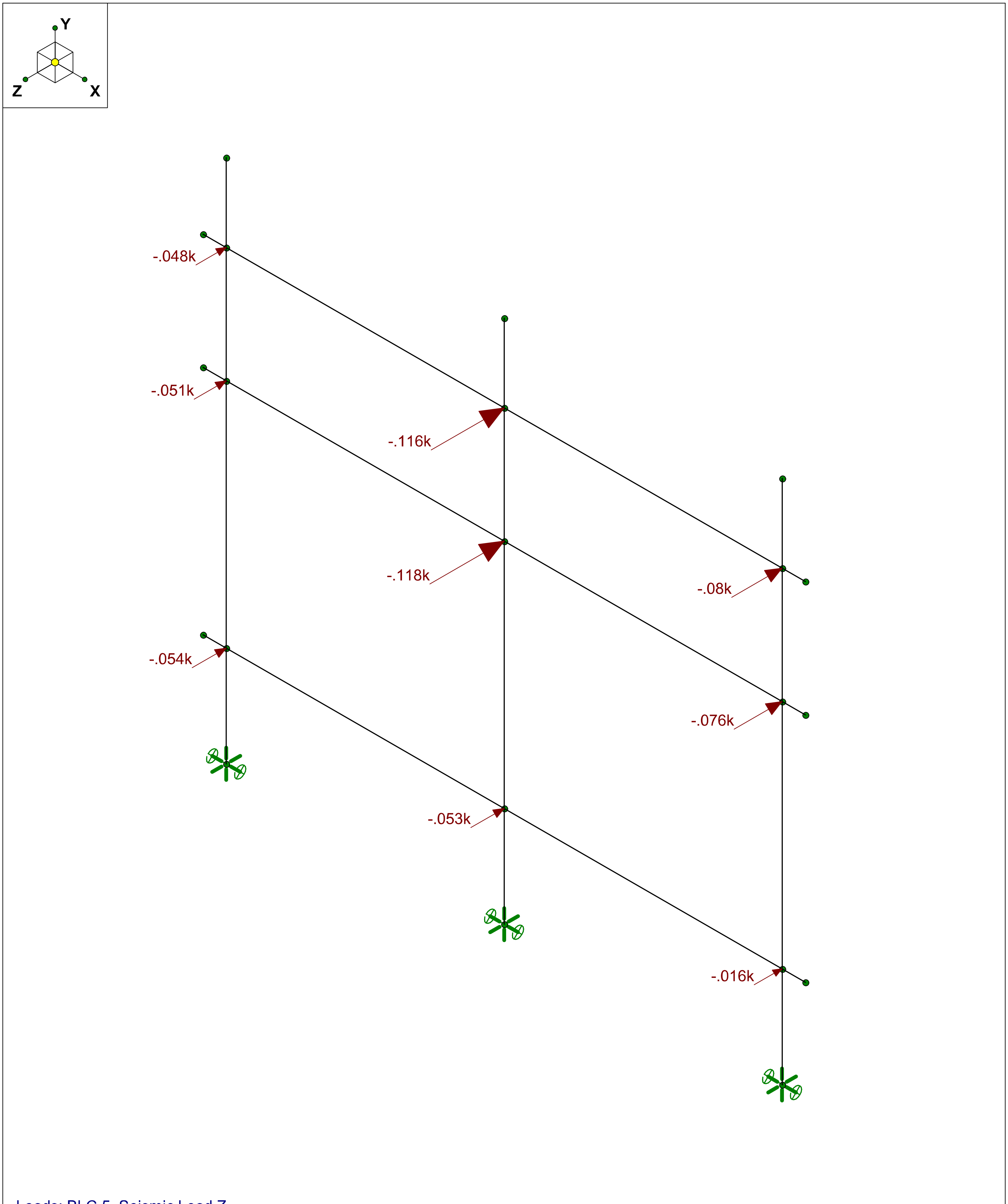
Loads: BLC 3, Side Wind Load
Envelope Only Solution

LETS America, Inc.	304480 - H-Frame	SK - 5
RAM		Feb 28, 2023 at 10:43 AM
S2-SCVO-027		304480.R3D



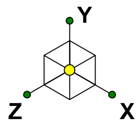
Loads: BLC 4, Seismic Load X
Envelope Only Solution

LETS America, Inc.	304480 - H-Frame	SK - 6
RAM		Feb 28, 2023 at 10:43 AM
S2-SCVO-027		304480.R3D



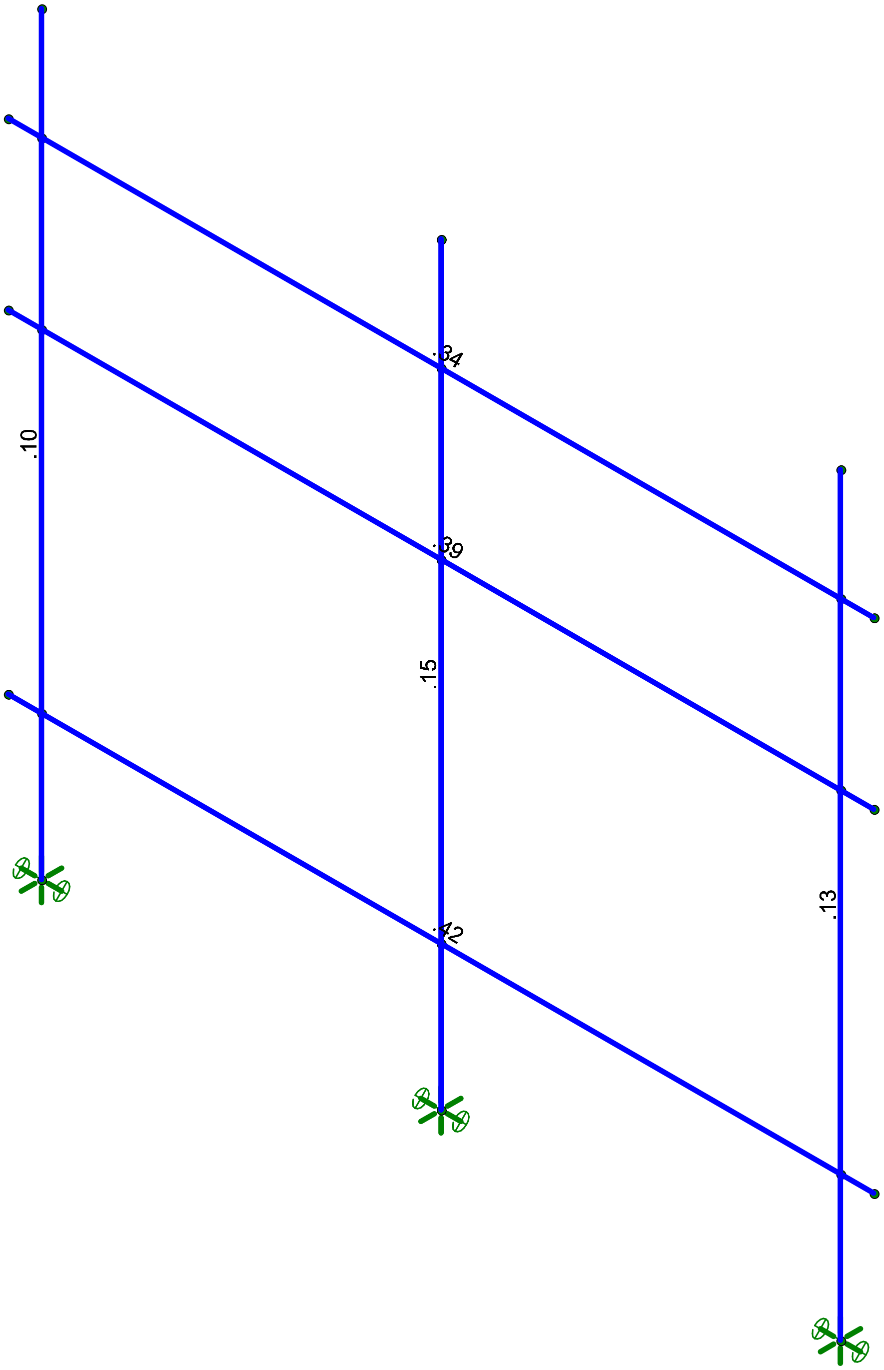
Loads: BLC 5, Seismic Load Z
Envelope Only Solution

LETS America, Inc.	304480 - H-Frame	SK - 7
RAM		Feb 28, 2023 at 10:43 AM
S2-SCVO-027		304480.R3D



Code Check
(Env)

⬛	No Calc
🟥	> 1.0
🟪	.90-1.0
🟩	.75-.90
🟦	.50-.75
🟦	0.-.50



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

LETS America, Inc.	304480 - H-Frame	SK - 8
RAM		Feb 28, 2023 at 10:43 AM
S2-SCVO-027		304480.R3D

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	None
Cold Formed Steel Code	AISI S100-16: LRFD
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	1
Ct Exp. Z	1
SD1	3
SDS	3
S1	3
TL (sec)	3
Risk Cat	I or II
Drift Cat	High Drift Design
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Material Takeoff

	Material	Size	Pieces	Length[ft]	Weight[LB]
1	Hot Rolled Steel				
2	A53 Gr.B	PIPE_3.0	3	17	119.814
3	Total HR Steel		3	17	119.814
4					
5	Cold Formed Steel				
6	A570 Gr.33	CS1.625x1.625	3	19.5	32.182
7	Total CF Steel		3	19.5	32.182

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	Density[lb/...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A53 Gr.B	29000	11154	.3	.65	490	35	1.6	60	1.2

Cold Formed Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[lb/ft...	Yield[ksi]	Fu[ksi]
1	A570 Gr.33	29500	11346	.3	.65	490	33	52

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Pipe_3.0	PIPE_3.0	Column	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	P1000	CS1.625x1.625	Beam	None	A570 Gr.33	Typical	.485	.134	.193	.002

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	10.375	0	0	0	
2	N2	10.375	5.67	0	0	
3	N3	4.375	0	0	0	
4	N4	4.375	5.67	0	0	
5	N5	10.375	1.083	0	0	
6	N6	4.375	1.083	0	0	
7	N7	10.375	3.5833	0	0	
8	N8	4.375	3.5833	0	0	
9	N9	10.375	4.83	0	0	
10	N10	4.375	4.83	0	0	
11	N11	10.625	1.083	0	0	
12	N12	10.625	3.5833	0	0	
13	N13	10.625	4.83	0	0	
14	N14	4.125	1.083	0	0	
15	N15	4.125	3.5833	0	0	
16	N16	4.125	4.83	0	0	
17	N17	7.375	0	0	0	
18	N18	7.375	5.67	0	0	
19	N19	7.375	1.083	0	0	
20	N20	7.375	3.5833	0	0	
21	N21	7.375	4.83	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction		
2	N3	Reaction	Reaction	Reaction	Reaction		
3	N17	Reaction	Reaction	Reaction	Reaction		

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			Pipe_3.0	Column	Pipe	A53 Gr.B	Typical
2	M2	N3	N4			Pipe_3.0	Column	Pipe	A53 Gr.B	Typical
3	M3	N16	N13		180	P1000	Beam	None	A570 Gr.33	Typical
4	M4	N15	N12		180	P1000	Beam	None	A570 Gr.33	Typical
5	M5	N14	N11		180	P1000	Beam	None	A570 Gr.33	Typical
6	M6	N17	N18			Pipe_3.0	Column	Pipe	A53 Gr.B	Typical

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Pipe_3.0	5.67	2.5	2.5	2.5	2.5		1	1		Lateral
2	M2	Pipe_3.0	5.67	2.5	2.5	2.5	2.5		1	1		Lateral
3	M6	Pipe_3.0	5.67	2.5	2.5	2.5	2.5		1	1		Lateral

Cold Formed Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	L-torque[ft]	Kyy	Kzz	Cb	R	a[ft]	Funct...
1	M3	P1000	6.5	3	3	3	3		1	1				Lateral
2	M4	P1000	6.5	3	3	3	3		1	1				Lateral
3	M5	P1000	6.5	3	3	3	3		1	1				Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Dead Load	None		-1			11			
2	Front Wind Load	None					11	10		
3	Side Wind Load	None					7	1		
4	Seismic Load X	None				9				
5	Seismic Load Z	None				9				

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	Dead 1.4D	Yes	Y		1	1.4																		
2	1.2D + 1W (0 Deg)	Yes	Y		1	1.2	2	1	3															
3	1.2D + 1W (30 Deg)	Yes	Y		1	1.2	2	.866	3	.5														
4	1.2D + 1W (60 Deg)	Yes	Y		1	1.2	2	.5	3	.866														
5	1.2D + 1W (90 Deg)	Yes	Y		1	1.2	2		3	1														
6	1.2D + 1W (120 Deg)	Yes	Y		1	1.2	2	-.5	3	.866														
7	1.2D + 1W (150 Deg)	Yes	Y		1	1.2	2	-.866	3	.5														
8	1.2D + 1W (180 Deg)	Yes	Y		1	1.2	2	-1	3															
9	1.2D + 1W (210 Deg)	Yes	Y		1	1.2	2	-.866	3	-.5														
10	1.2D + 1W (240 Deg)	Yes	Y		1	1.2	2	-.5	3	-.866														
11	1.2D + 1W (270 Deg)	Yes	Y		1	1.2	2		3	1														
12	1.2D + 1W (300 Deg)	Yes	Y		1	1.2	2	.5	3	-.866														
13	1.2D + 1W (330 Deg)	Yes	Y		1	1.2	2	.866	3	-.5														
14	0.9D + 1W (0 Deg)	Yes	Y		1	.9	2	1	3															
15	0.9D + 1W (30 Deg)	Yes	Y		1	.9	2	.866	3	.5														
16	0.9D + 1W (60 Deg)	Yes	Y		1	.9	2	.5	3	.866														
17	0.9D + 1W (90 Deg)	Yes	Y		1	.9	2		3	1														
18	0.9D + 1W (120 Deg)	Yes	Y		1	.9	2	-.5	3	.866														
19	0.9D + 1W (150 Deg)	Yes	Y		1	.9	2	-.866	3	.5														
20	0.9D + 1W (180 Deg)	Yes	Y		1	.9	2	-1	3															
21	0.9D + 1W (210 Deg)	Yes	Y		1	.9	2	-.866	3	-.5														
22	0.9D + 1W (240 Deg)	Yes	Y		1	.9	2	-.5	3	-.866														
23	0.9D + 1W (270 Deg)	Yes	Y		1	.9	2		3	1														
24	0.9D + 1W (300 Deg)	Yes	Y		1	.9	2	.5	3	-.866														
25	0.9D + 1W (330 Deg)	Yes	Y		1	.9	2	.866	3	-.5														
26	1.2D + EX	Yes	Y		1	1.2					4	1												
27	0.9D + EX	Yes	Y		1	.9					4	1												

Load Combinations (Continued)

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
28	1.2D - EX	Yes	Y		1	1.2					4	-1												
29	0.9D - EX	Yes	Y		1	.9					4	-1												
30	1.2D + EZ	Yes	Y		1	1.2							5	1										
31	0.9D + EZ	Yes	Y		1	.9							5	1										
32	1.2D - EZ	Yes	Y		1	1.2							5	-1										
33	0.9D - EZ	Yes	Y		1	.9							5	-1										

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	.17	28	.603	26	.185	30	.743	30	0	33	0	33
2		min	-.161	27	-.189	29	-.185	32	-.743	32	0	1	0	1
3	N3	max	.174	28	.586	28	.167	2	.581	30	0	33	0	33
4		min	-.168	27	-.202	27	-.167	8	-.581	32	0	1	0	1
5	N17	max	.271	29	.464	1	.262	31	.872	30	0	33	0	33
6		min	-.286	26	.298	27	-.262	33	-.872	32	0	1	0	1
7	Totals:	max	.613	29	.995	1	.612	31						
8		min	-.613	26	.639	14	-.612	32						

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mome...	LC
1	M1	1	max	.603	26	.163	27	.185	30	0	33	.743	32	0	33
2			min	-.189	29	-.169	28	-.185	32	0	1	-.743	30	0	1
3		2	max	.44	26	.148	26	.172	30	.018	2	.485	32	.004	12
4			min	-.051	29	-.136	29	-.172	32	-.018	8	-.485	30	-.003	17
5		3	max	.428	26	.148	26	.172	30	.018	2	.241	32	.195	29
6			min	-.06	29	-.136	29	-.172	32	-.018	8	-.241	30	-.211	26
7		4	max	.21	26	.058	26	.09	30	.013	2	.052	32	.134	29
8			min	-.017	29	.013	29	-.09	32	-.013	8	-.052	30	-.15	26
9		5	max	.012	1	.005	11	0	30	0	33	0	33	0	33
10			min	.008	14	-.004	10	0	32	0	1	0	1	0	1
11	M2	1	max	.586	28	.167	27	.167	2	0	33	.581	32	0	33
12			min	-.202	27	-.176	28	-.167	8	0	1	-.581	30	0	1
13		2	max	.367	28	.133	27	.126	30	.027	32	.359	32	.002	29
14			min	-.105	27	-.144	28	-.126	32	-.027	30	-.359	30	-.012	26
15		3	max	.355	28	.133	27	.126	30	.027	32	.18	32	.205	28
16			min	-.114	27	-.144	28	-.126	32	-.027	30	-.18	30	-.199	27
17		4	max	.168	28	.008	27	.068	30	.024	32	.04	32	.144	28
18			min	-.048	27	-.034	28	-.068	32	-.024	30	-.04	30	-.136	27
19		5	max	0	33	0	26	0	30	0	33	0	33	0	33
20			min	0	1	0	28	0	32	0	1	0	1	0	1
21	M3	1	max	0	33	0	33	0	33	0	33	0	33	0	33
22			min	0	1	0	1	0	1	0	1	0	1	0	1
23		2	max	.044	26	.097	27	.02	32	0	30	.006	8	.016	26
24			min	-.019	29	-.103	28	-.02	30	0	32	-.006	2	-.012	29
25		3	max	.104	28	.149	26	.035	20	0	30	.037	32	-.025	33
26			min	.029	15	-.198	28	-.035	14	0	32	-.037	30	-.182	28
27		4	max	.104	28	.096	27	.01	30	0	8	.009	8	.021	28
28			min	-.033	27	-.105	28	-.01	32	0	2	-.009	2	-.008	27
29		5	max	0	33	0	33	0	33	0	33	0	33	0	33

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mome...	LC
30			min	0	1	0	1	0	1	0	1	0	1	0	1
31	M4	1	max	0	33	0	33	0	33	0	33	0	33	0	33
32			min	0	1	0	1	0	1	0	1	0	1	0	1
33		2	max	.06	29	.115	27	.007	32	0	30	.007	8	.017	26
34			min	-.076	26	-.122	28	-.007	30	0	32	-.007	2	-.014	29
35		3	max	.016	23	.167	26	.04	20	0	30	.016	32	-.025	33
36			min	-.081	28	-.216	28	-.04	14	0	32	-.016	30	-.21	28
37		4	max	.022	27	.114	27	.006	30	0	8	.009	8	.023	28
38			min	-.081	28	-.123	28	-.006	32	0	2	-.009	2	-.01	27
39		5	max	0	33	0	33	0	33	0	33	0	33	0	33
40			min	0	1	0	1	0	1	0	1	0	1	0	1
41	M5	1	max	0	33	0	33	0	33	0	33	0	33	0	33
42			min	0	1	0	1	0	1	0	1	0	1	0	1
43		2	max	.02	27	.146	27	.014	30	0	30	.008	8	.022	26
44			min	-.023	28	-.153	28	-.014	32	0	32	-.008	2	-.018	29
45		3	max	.03	23	.198	26	.045	2	0	30	.019	2	-.011	33
46			min	-.028	10	-.153	28	-.045	8	0	32	-.019	8	-.237	26
47		4	max	.002	23	.148	27	.01	8	0	8	.008	8	.021	28
48			min	-.02	10	-.15	28	-.01	2	0	2	-.008	2	-.019	27
49		5	max	0	33	0	33	0	33	0	33	0	33	0	33
50			min	0	1	0	1	0	1	0	1	0	1	0	1
51	M6	1	max	.464	1	.288	26	.262	30	0	33	.872	32	0	33
52			min	.298	27	-.272	29	-.262	32	0	1	-.872	30	0	1
53		2	max	.387	1	.212	26	.192	30	.017	32	.524	32	.073	26
54			min	.249	17	-.213	28	-.192	32	-.017	30	-.524	30	-.07	29
55		3	max	.373	1	.212	26	.192	30	.017	32	.251	32	.233	28
56			min	.24	17	-.213	28	-.192	32	-.017	30	-.251	30	-.227	27
57		4	max	.187	1	.189	27	.086	30	.015	32	.05	32	.178	28
58			min	.12	17	-.235	28	-.086	32	-.015	30	-.05	30	-.173	27
59		5	max	0	33	0	26	0	30	0	33	0	33	0	33
60			min	0	1	0	28	0	32	0	1	0	1	0	1

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear..	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn...	phi*Mn...	Cb	Eqn
1	M1	PIPE_3.0	.131	0	32	.011	1.122		32	63.06	65.205	5.749	5.749	1	H1-1b
2	M2	PIPE_3.0	.103	0	32	.012	1.122		32	63.06	65.205	5.749	5.749	1	H1-1b
3	M6	PIPE_3.0	.155	0	32	.015	0		26	63.06	65.205	5.749	5.749	1	H1-1b

Envelope AISI S100-16: LRFD Cold Formed Steel Code Checks

	Member	Shape	Code...	Loc[ft]	LC	Shea...	Loc[ft]	Dir	LC	phi*Pn[...	phi*Tn[...	phi*Mn...	phi*Mn...	phi*...	phi*...	Cb	Eqn
1	M3	CS1.625x1.625	.337	3.25	28	.147	3.25	y	28	6.361	14.404	.41	.599	1.347	2.694	1	H2-1
2	M4	CS1.625x1.625	.386	3.25	28	.161	3.25	y	28	6.361	14.404	.41	.599	1.347	2.694	1	H2-1
3	M5	CS1.625x1.625	.423	3.25	26	.153	.271	y	28	6.361	14.404	.41	.599	1.347	2.694	1	H2-1

ANCHOR BOLT DESIGN – H-FRAME

5/8" DIA. Hilti Kwik Bolt TZ:

*Allowable Shear = 9870 lbs

Max. Shear (Per Risa Model) = 271/4 = 67.75 lbs per screw

67.75 lbs < 9870 lbs, Hence OK

*Allowable Tension = 5840 lbs

Max Tension (Per Risa Model) = 603/4 = 150.75 lbs per screw

150.75 lbs < 5840 lbs, Hence OK

Check:

$$\left(\frac{PULL_{max}}{T_{allowable}}\right) + \left(\frac{SHEAR_{max}}{S_{allowable}}\right) \qquad = 0.033127 < 1, \text{ Hence OK}$$

TABLE 4—DESIGN INFORMATION, STAINLESS STEEL KB-TZ

DESIGN INFORMATION	Symbol	Units	Nominal anchor diameter											
			$^{3}/_{8}$		$^{1}/_{2}$				$^{5}/_{8}$			$^{3}/_{4}$		
Anchor O.D.	d_a	in. (mm)	0.375 (9.5)		0.5 (12.7)				0.625 (15.9)			0.75 (19.1)		
Effective min. embedment[1]	h_{ef}	in. (mm)	2 (51)		2 (51)		$3^{1}/_{4}$ (83)		$3^{1}/_{8}$ (79)	4 (102)		$3^{3}/_{4}$ (95)		$4^{3}/_{4}$ (121)
Min. member thickness	h_{min}	in. (mm)	4 (102)	5 (127)	4 (102)	6 (152)	6 (152)	8 (203)	5 (127)	6 (152)	8 (203)	6 (152)	8 (203)	8 (203)
Critical edge distance	c_{ac}	in. (mm)	$4^{3}/_{8}$ (111)	$3^{7}/_{8}$ (98)	$5^{1}/_{2}$ (140)	$4^{1}/_{2}$ (114)	$7^{1}/_{2}$ (191)	6 (152)	7 (178)	$8^{7}/_{8}$ (225)	6 (152)	10 (254)	7 (178)	9 (229)
Min. edge distance	c_{min}	in. (mm)	$2^{1}/_{2}$ (64)		$2^{7}/_{8}$ (73)		$2^{1}/_{8}$ (54)		$3^{1}/_{4}$ (83)	$2^{3}/_{8}$ (60)		$4^{1}/_{4}$ (108)		4 (102)
	for $s \geq$	in. (mm)	5 (127)		$5^{3}/_{4}$ (146)		$5^{1}/_{4}$ (133)		$5^{1}/_{2}$ (140)	$5^{1}/_{2}$ (140)		10 (254)		$8^{1}/_{2}$ (216)
Min. anchor spacing	s_{min}	in. (mm)	$2^{1}/_{4}$ (57)		$2^{7}/_{8}$ (73)		2 (51)		$2^{3}/_{4}$ (70)	$2^{3}/_{8}$ (60)		5 (127)		4 (102)
	for $c \geq$	in. (mm)	$3^{1}/_{2}$ (89)		$4^{1}/_{2}$ (114)		$3^{1}/_{4}$ (83)		$4^{1}/_{8}$ (105)	$4^{1}/_{4}$ (108)		$9^{1}/_{2}$ (241)		7 (178)
Min. hole depth in concrete	h_o	in. (mm)	$2^{5}/_{8}$ (67)		$2^{5}/_{8}$ (67)		4 (102)		$3^{3}/_{4}$ (98)	$4^{3}/_{4}$ (121)		$4^{1}/_{2}$ (117)		$5^{3}/_{4}$ (146)
Min. specified yield strength	f_y	lb/in^2 (N/mm^2)	92,000 (634)		92,000 (634)				92,000 (634)			76,125 (525)		
Min. specified ult. Strength	f_{uta}	lb/in^2 (N/mm^2)	115,000 (793)		115,000 (793)				115,000 (793)			101,500 (700)		
Effective tensile stress area	$A_{se,N}$	in^2 (mm^2)	0.052 (33.6)		0.101 (65.0)				0.162 (104.6)			0.237 (152.8)		
Steel strength in tension	N_{sa}	lb (kN)	5,968 (26.6)		11,554 (51.7)				17,880 (82.9)			24,055 (107.0)		
Steel strength in shear	V_{sa}	lb (kN)	4,720 (21.0)		6,880 (30.6)				9,870 (43.9)			15,711 (69.9)		
Pullout strength in tension, seismic[2]	$N_{p,eq}$	lb (kN)	2,340 (10.4)		2,735 (12.2)		NA		NA	5,840 (26.0)		8,110 (36.1)		NA
Steel strength in shear, seismic[2]	$V_{sa,eq}$	lb (kN)	2,825 (12.6)		6,880 (30.6)				9,350 (41.6)			12,890 (57.3)		
Pullout strength uncracked concrete[3]	$N_{p,uncr}$	lb (kN)	2,630 (11.7)		NA		5,760 (25.6)		NA			NA		12,040 (53.6)
Pullout strength cracked concrete[3]	$N_{p,cr}$	lb (kN)	2,340 (10.4)		3,180 (14.1)		NA		NA	5,840 (26.0)		8,110 (36.1)		NA
Anchor category[4]			1		2		1							
Effectiveness factor k_{uncr} uncracked concrete			24											
Effectiveness factor k_{cr} cracked concrete[5]			17		24		17		17	17		24		17
$\Psi_{C,N} = k_{uncr}/k_{cr}$[6]			1.0											
Strength reduction factor ϕ for tension, steel failure modes[7]			0.75											
Strength reduction factor ϕ for shear, steel failure modes[7]			0.65											
Strength reduction ϕ factor for tension, concrete failure modes, Condition B[8]			0.65		0.55		0.65							
Coefficient for pryout strength, k_{cp}			1.0				2.0							
Strength reduction ϕ factor for shear, concrete failure modes, Condition B[8]			0.70											
Axial stiffness in service load range[9]	β_{uncr}	lb/in.	120,000											
	β_{cr}	lb/in.	90,000											

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 MPa For pound-inch units: 1 mm = 0.03937 inches.

[1] See Fig. 2.

[2] See Section 4.1.8 of this report. NA (not applicable) denotes that this value does not control for design.

[3] For all design cases $\Psi_{c,P}$=1.0. NA (not applicable) denotes that this value does not control for design. See Section 4.1.4 of this report.

[4] See ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable.

[5] See ACI 318-14 17.4.2.2 or ACI 318-11 D.5.2.2, as applicable.

[6] For all design cases $\Psi_{c,N}$ =1.0. The appropriate effectiveness factor for cracked concrete (k_{cr}) or uncracked concrete (k_{uncr}) must be used.

[7] The KB-TZ is a ductile steel element as defined by ACI 318 D.1.

[8] For use with the load combinations of ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2, as applicable. Condition B applies where supplementary reinforcement in conformance with ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c), as applicable, is not provided, or where pullout or pryout strength governs. For cases where the presence of supplementary reinforcement
can be verified, the strength reduction factors associated with Condition A may be used.

[9] Mean values shown, actual stiffness may vary considerably depending on concrete strength, loading and geometry of application.

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. H

Site Data

Site Name: *Sanders Ranch*
Site #: *304480*

Base Reactions		
TIA Revision:		
Factored Moment, Mu:	0.872	ft-kips
Factored Axial, Pu:	0.603	kips
Factored Shear, Vu:	0.216	kips

Plate Data		
W=Side:	8	in
Thick:	0.5	in
Grade:	36	ksi
Clip Distance:	0	in

Pole Data		
Diam:	3.5	in
Thick:	0.25	in
Grade:	55	ksi
# of Sides:	0	"0" IF Round

Base Plate Results	Flexural Check	
Base Plate Stress:	0.7	ksi
PL Design Bending Strength, Φ*Fy:	32.4	ksi
Base Plate Stress Ratio:	2.0%	**Pass**

WATER TANK DESIGN

Water Tank Dia. = 102 in

Height = 92 in

Tank Capacity = 3000 Gallon (11356.20 kg or 25036.13 lbs)

Weight of Empty Water Tank = 380 lbs

Total Tank weight = 0.380 kips + 25.036 kips
= 25.416 kips

Dead Load in ksf = $\frac{25.416}{\pi d^2/4}$
= $\frac{25.416}{\pi * 8.5^2/4}$
= 0.448 ksf

Wind Pressure = $q_{z*}G*C_f$ (AWWA D100)
q_z = 0.00256 $K_{z*}I*V^2$
I = 1.15
G = 1.0
Cf = 0.6
V = 9.2
K_z = 1.09

Wind Pressure = $0.00256*1.09*1.15*92^2$
= 27.16
= 27.16*1*0.6
= 16.29 psf

Wind Load in ksf = 16.29 * Area of shaft
= 16.29 * $(2\pi rh)/2$
= 16.29 * $(2\pi * 51 * 92)/2$
= 16.29 * 102.311 ft^2
= 1666.65 lbs
= 1.666 kips

Seismic Load = Fp*Dead Load
= 0.864*0.448
= 0.3871

The above values are taken from Page 19 of AWWA D100
f_c = 3000 psi

General Footing

Project File: s2-scvo-027_.ec6

DESCRIPTION: 24" Thick. Concrete Slab

Code References

Calculations per ACI 318-14, IBC 2021, CBC 2022, ASCE 7-22
Load Combinations Used : ASCE 7-22

General Information

Material Properties

f'c : Concrete 28 day strength = 3.0 ksi
fy : Rebar Yield = 60.0 ksi
Ec : Concrete Elastic Modulus = 3,122.0 ksi
Concrete Density = 150.0 pcf
φ Values Flexure = 0.90
Shear = 0.750

Analysis Settings

Min Steel % Bending Reinf. =
Min Allow % Temp Reinf. = 0.00180
Min. Overturning Safety Factor = 1.0 : 1
Min. Sliding Safety Factor = 1.0 : 1
Add Ftg Wt for Soil Pressure : Yes
Use ftg wt for stability, moments & shears : Yes
Add Pedestal Wt for Soil Pressure : No
Use Pedestal wt for stability, mom & shear : No

Soil Design Values

Allowable Soil Bearing = 2.925 ksf
Soil Density = 127.20 pcf
Increase Bearing By Footing Weight = No
Soil Passive Resistance (for Sliding) = 0.150 pcf
Soil/Concrete Friction Coeff. = 0.30

Increases based on footing Depth

Footing base depth below soil surface = 0.50 ft
Allow press. increase per foot of depth = ksf
when footing base is below = ft

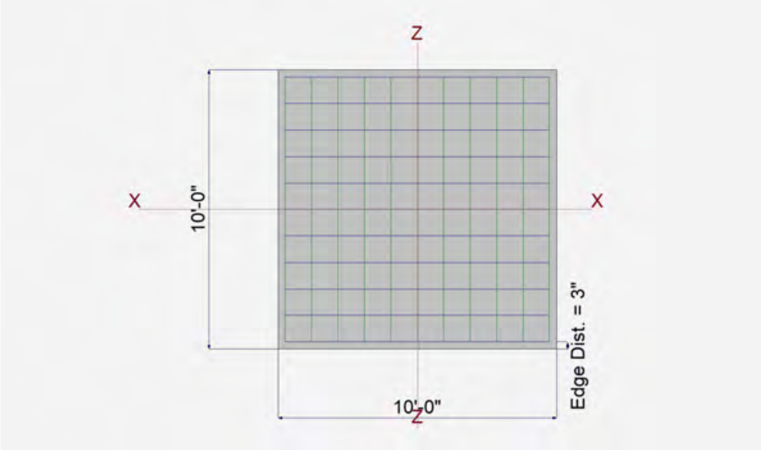
Increases based on footing plan dimension

Allowable pressure increase per foot of depth = ksf
when max. length or width is greater than = ft

Dimensions

Width parallel to X-X Axis = 10.0 ft
Length parallel to Z-Z Axis = 10.0 ft
Footing Thickness = 24.0 in

Pedestal dimensions...
px : parallel to X-X Axis = in
pz : parallel to Z-Z Axis = in
Height = in
Rebar Centerline to Edge of Concrete...
at Bottom of footing = 3.0 in



Reinforcing

Bars parallel to X-X Axis
Number of Bars = 11.0
Reinforcing Bar Size = # 8

Bars parallel to Z-Z Axis
Number of Bars = 11.0
Reinforcing Bar Size = # 8

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation n/a
Bars required within zone n/a
Bars required on each side of zone n/a

Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	0.4480							k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=					1.666			k
V-z	=						0.3871		k

General Footing

Project File: s2-scvo-027_.ec6

DESCRIPTION: 24" Thick. Concrete Slab

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.1082	Soil Bearing	0.3164 ksf	2.925 ksf	+D+0.60W about Z-Z axis
PASS	168.550	Overturning - X-X	0.5419 k-ft	91.344 k-ft	+0.60D+0.70E
PASS	45.690	Overturning - Z-Z	1.999 k-ft	91.344 k-ft	+0.60D+0.60W
PASS	5.483	Sliding - X-X	0.9996 k	5.481 k	+0.60D+0.60W
PASS	20.227	Sliding - Z-Z	0.2710 k	5.481 k	+0.60D+0.70E
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.000853	Z Flexure (+X)	0.06720 k-ft/ft	78.789 k-ft/ft	+1.20D
PASS	0.000853	Z Flexure (-X)	0.06720 k-ft/ft	78.789 k-ft/ft	+1.20D
PASS	0.000853	X Flexure (+Z)	0.06720 k-ft/ft	78.789 k-ft/ft	+1.20D
PASS	0.000853	X Flexure (-Z)	0.06720 k-ft/ft	78.789 k-ft/ft	+1.20D
PASS	0.000857	1-way Shear (+X)	0.07040 psi	82.158 psi	+1.20D
PASS	0.000857	1-way Shear (-X)	0.07040 psi	82.158 psi	+1.20D
PASS	0.000857	1-way Shear (+Z)	0.07040 psi	82.158 psi	+1.20D
PASS	0.000857	1-way Shear (-Z)	0.07040 psi	82.158 psi	+1.20D
PASS	0.001795	2-way Punching	0.2949 psi	164.317 psi	+1.20D

Detailed Results

Soil Bearing

Rotation Axis &		Xecc	Zecc	Actual Soil Bearing Stress @ Location				Actual / Allow
Load Combination...	Gross Allowable	(in)		Bottom, -Z	Top, +Z	Left, -X	Right, +X	Ratio
X-X, D Only	2.925	n/a	0.0	0.3045	0.3045	n/a	n/a	0.104
X-X, +D+0.60W	2.925	n/a	0.0	0.3045	0.3045	n/a	n/a	0.104
X-X, +D+0.450W	2.925	n/a	0.0	0.3045	0.3045	n/a	n/a	0.104
X-X, +0.60D+0.60W	2.925	n/a	0.0	0.1827	0.1827	n/a	n/a	0.062
X-X, +D+0.70E	2.925	n/a	0.2136	0.3013	0.3077	n/a	n/a	0.105
X-X, +D+0.5250E	2.925	n/a	0.1602	0.3021	0.3069	n/a	n/a	0.105
X-X, +0.60D+0.70E	2.925	n/a	0.3560	0.1795	0.1859	n/a	n/a	0.064
Z-Z, D Only	2.925	0.0	n/a	n/a	n/a	0.3045	0.3045	0.104
Z-Z, +D+0.60W	2.925	0.7879	n/a	n/a	n/a	0.2926	0.3164	0.108
Z-Z, +D+0.450W	2.925	0.5909	n/a	n/a	n/a	0.2956	0.3134	0.107
Z-Z, +0.60D+0.60W	2.925	1.313	n/a	n/a	n/a	0.1708	0.1946	0.067
Z-Z, +D+0.70E	2.925	0.0	n/a	n/a	n/a	0.3045	0.3045	0.104
Z-Z, +D+0.5250E	2.925	0.0	n/a	n/a	n/a	0.3045	0.3045	0.104
Z-Z, +0.60D+0.70E	2.925	0.0	n/a	n/a	n/a	0.1827	0.1827	0.062

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, D Only	None	0.0 k-ft	Infinity	OK
X-X, +D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.450W	None	0.0 k-ft	Infinity	OK
X-X, +0.60D+0.60W	None	0.0 k-ft	Infinity	OK
X-X, +D+0.70E	0.5419 k-ft	152.240 k-ft	280.917	OK
X-X, +D+0.5250E	0.4065 k-ft	152.240 k-ft	374.556	OK
X-X, +0.60D+0.70E	0.5419 k-ft	91.344 k-ft	168.550	OK
Z-Z, D Only	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.60W	1.999 k-ft	152.240 k-ft	76.150	OK
Z-Z, +D+0.450W	1.499 k-ft	152.240 k-ft	101.534	OK
Z-Z, +0.60D+0.60W	1.999 k-ft	91.344 k-ft	45.690	OK
Z-Z, +D+0.70E	None	0.0 k-ft	Infinity	OK
Z-Z, +D+0.5250E	None	0.0 k-ft	Infinity	OK
Z-Z, +0.60D+0.70E	None	0.0 k-ft	Infinity	OK

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
X-X, D Only	0.0 k	9.135 k	No Sliding	OK
X-X, +D+0.60W	0.9996 k	9.135 k	9.138	OK
X-X, +D+0.450W	0.7497 k	9.135 k	12.184	OK

DESCRIPTION: 24" Thick. Concrete Slab

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
X-X, +0.60D+0.60W	0.9996 k	5.481 k	5.483	OK
X-X, +D+0.70E	0.0 k	9.135 k	No Sliding	OK
X-X, +D+0.5250E	0.0 k	9.135 k	No Sliding	OK
X-X, +0.60D+0.70E	0.0 k	5.481 k	No Sliding	OK
Z-Z, D Only	0.0 k	9.135 k	No Sliding	OK
Z-Z, +D+0.60W	0.0 k	9.135 k	No Sliding	OK
Z-Z, +D+0.450W	0.0 k	9.135 k	No Sliding	OK
Z-Z, +0.60D+0.60W	0.0 k	5.481 k	No Sliding	OK
Z-Z, +D+0.70E	0.2710 k	9.135 k	33.711	OK
Z-Z, +D+0.5250E	0.2032 k	9.135 k	44.948	OK
Z-Z, +0.60D+0.70E	0.2710 k	5.481 k	20.227	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.20D	0.06720	+Z	Bottom	0.5184	AsMin	0.8690	78.789	OK
X-X, +1.20D	0.06720	-Z	Bottom	0.5184	AsMin	0.8690	78.789	OK
Z-Z, +1.20D	0.06720	-X	Bottom	0.5184	AsMin	0.8690	78.789	OK
Z-Z, +1.20D	0.06720	+X	Bottom	0.5184	AsMin	0.8690	78.789	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.20D	0.07 psi	0.07 psi	0.07 psi	0.07 psi	0.07 psi	82.16 psi	0.00	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.20D	0.29 psi	164.32 psi	0.001795	OK

ANCHOR BOLT DESIGN

WATER TANK OVERTURNING AND ANCHOR BOLT DESIGN

Site Name: Sanders Ranch
Site ID: 304480
Design By: RAM

DESIGN PARAMETERS:

Site Class:	D		Codes:	IBC 2021
Risk Category:	II			2022 CBC
Nominal Wind Speed:	92	mph		

Water Tank INFORMATION:

We=	380	lbs	*We-Weight of empty Water Tank*
Wf=	25036.13	lbs	*Wf-Weight of full Water Tank*
D=	8.50	ft	*D-Diameter of the Water Tank*
H=	7.67	ft	*H-Height of the Water Tank*

SEISMIC LOAD CALCULATION:

S_{DS} =	1.472	R_{μ} =	1	R=	1.25	I_e=	1
a_p=	1	H_f =	1			Ω_0 =	2
I_p=	1	C_{AR}=	1			R_{po} =	1.5

$$F_p = 0.4S_{DS}I_p\,W_f\,[\frac{H_f}{R_{\mu}}][\frac{C_{AR}}{R_{po}}] =$$ 9827.5 lbs ASCE 7-22 (Tab-13.3-1)

$$F_{p\,(Max)} = 1.6S_{DS}I_pW_f =$$ 58965.1 lbs ASCE 7-22 (Tab-13.3-2)

$$F_{p\,(Min)} = 0.3S_{DS}I_pW_f =$$ 11056.0 lbs ASCE 7-22 (Tab-13.3-3)

F_p is not required to be taken as greater than (13.3-2) and F_p shall not be taken as less than (13.3-3)

$F_p =$ 11056.0 lbs

WIND LOAD CALCULATION:

Wind Speed =	92	mph		Zg =	900
Exposure =	C			α =	9.5
K_z =	1.1				
I =	1.15				
G =	1.00				
F =	q_h G C_f A_s	lbs	ASCE 7-22 (Tab-13.3-3)		
q_h =	0.00256*Kz*I*V^2		ASCE 7-22 (Tab-13.3-3)		
q_h =	27.16	psf			
C_f =	0.60				
A_s =	65.2	ft^2	*As=* L*H		
F =	1062	lbs			

WATER TANK OVERTURNING AND ANCHOR BOLT DESIGN

Site Name: Sanders Ranch
Site ID: 304480
Design By: RAM

OVERTURNING MOMENT:

$$M_{OTM(W)} = F\left(\frac{1}{2}H\right) \qquad M_{OTM(s)} = F_p\left(\frac{1}{2}H\right)$$

M_{OTM} (S)= 42400 lb-ft
M_{OTM} (W)= 4073 lb-ft

RESISTING MOMENT:

$$M_R = W_e\left(\frac{1}{2}\text{w}\right)$$

M_R = 1615 lb-ft

LOAD COMBINATIONS:

LC1: 1.2D+1.0W	*ASCE 7-22 Section 2.3*
LC2: 1.2D+1.0E	*D-Dead Load*
LC3: 0.9D+1.0W	*W-Wind Load*
LC4: 0.9D+1.0E	*E-Seismic Load*

CALCULATION FOR MOMENT:

$$M = M_{OTM} - M_R$$

$M_{LC1} =$ 2135 lb-ft
$M_{LC2} =$ 40462 lb-ft
$M_{LC3} =$ 2619 lb-ft
$M_{LC4} =$ 40946 lb-ft <----GOVERNS
Uplift force (T*) = M/w *Positive Direction load
T* = 4817 lbs represents the Tension Force
No. of bolts accounts for Tension = 4
Force per Bolt = 1204.30 lbs < 8345 lbs (Bolt capacity values taken from ESR-4266)

SHEAR FORCE :

Shear Force (F) = 11056 lbs
No. of bolts accounts for Shear = 8
Force per Bolt = 1381.99 lbs < 5500 lbs (Bolt capacity values taken from ESR-4266)

Use (8) 1/2" DIA. Hilti Kwik Bolts TZ Stainless Steel anchors (2 per connection) with 3.25 Inch Min Embedment.

TABLE 5—HILTI STAINLESS STEEL KB-TZ2 DESIGN INFORMATION FOR HAMMER AND CORE DRILLED INSTALLATIONS, TENSION

Design parameter	Symbol	Units	Nominal anchor diameter (in)												
			$^1/_4$	$^3/_8$			$^1/_2$			$^5/_8$			$^3/_4$		
Effective min. embedment [1]	h_{ef}	in. (mm)	1-1/2 (38)	1-1/2 (38)	2 (51)	2-1/2 (64)	2 (51)	2-1/2 (64)	3-1/4 (83)	2-3/4 (70)	3-1/4 (83)	4 (102)	3-1/4 (83)	3-3/4 (95)	4-3/4 (121)
Tension, steel failure modes															
Strength reduction factor for steel in tension [2]	$\Phi_{sa,N}$	-	0.75	0.75			0.75			0.75			0.75		
Min. specified yield strength	f_y	lb/in^2 (N/mm^2)	100,900 (696)	96,300 (664)			96,300 (664)			91,600 (632)			84,100 (580)		
Min. specified ult. strength	f_{uta}	lb/in^2 (N/mm^2)	122,400 (844)	120,100 (828)			120,400 (830)			114,600 (790)			100,500 (693)		
Effective tensile stress area	$A_{se,N}$	In^2 (mm^2)	0.024 (15.4)	0.051 (33.2)			0.099 (63.6)			0.164 (106.0)			0.239 (154.4)		
Steel strength in tension	N_{sa}	lb (kN)	2,920 (13.0)	6,180 (27.5)			11,870 (52.8)			18,835 (83.8)			24,045 (107.0)		
Tension, concrete failure modes															
Anchor category	-	-	3	1			1			1			1		
Strength reduction factor for concrete and pullout failure in tension, (Condition B – supplementary reinforcement not present) [3,8]	$\Phi_{c,N,}$ $\Phi_{p,N}$	-	0.45	0.65			0.65			0.65			0.65		
Effectiveness factor for uncracked concrete	k_{uncr}	-	24	24			24			24			24	27[6]	24
Effectiveness factor for cracked concrete	k_{cr}	-	17	21		17	17	21	17	21		17	21	21[6]	21
Modification factor for anchor resistance, tension, uncracked concrete [4]	$\Psi_{c,N}$	-	1.0	1.0			1.0			1.0			1.0		
Critical edge distance	c_{ac}	in. (mm)	4 (102)	4-1/2 (114)	5-1/2 (140)	4-1/8 (105)	5-1/2 (140)	6-1/4 (159)	7-1/2 (191)	10 (254)	6-1/2 (165)	8-3/4 (222)	12 (305)	10 (254)	10 (254)
Pullout strength uncracked concrete [5]	$N_{p,uncr}$	lb (kN)	1,570 (7.0)	N/A	N/A	4,185 (18.6)	3,380 (15.0)	4,010 (17.8)	5,500 (24.5)	4,085 (18.2)	6,015 (26.8)	8,050 (35.8)	N/A	N/A	N/A
Pullout strength cracked concrete [5]	$N_{p,cr}$	lb (kN)	670 (3.0)	N/A	N/A	N/A	N/A	N/A	N/A[7]	N/A	N/A	N/A	N/A	N/A	8,795 (39.1)
Pullout strength seismic [5]	$N_{p,eq}$	lb (kN)	670 (3.0)	N/A	N/A	N/A	N/A	N/A	N/A[7]	N/A	N/A	N/A	N/A	N/A	8,795 (39.1)
Normalization factor, uncracked concrete	n_{uncr}	-	0.39	N/A	N/A	0.37	0.46	0.50	0.50	0.50	0.42	0.47	N/A	N/A	N/A
Normalization factor, cracked concrete, seismic	n_{cr}	-	0.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.50
Tension, axial stiffness															
Axial stiffness in service load range	β_{uncr}	lb/in.	166,490	175,800			137,145			153,925			342,680		
	β_{cr}	lb/in.	33,805	79,860			97,985			69,625			75,715		

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 MPa For pound-inch units: 1 mm = 0.03937 inches.

[1] Figure 2 of this report illustrates the installation parameters.

[2] The KB-TZ2 is considered a ductile steel element in accordance with ACI 318 (-19 and -14) 2.3 or ACI 318-11 D.1.

[3] For use with the load combinations of ACI 318 (-19 and -14) Section 5.3, ACI 318-11 Section 9.2 or 2021 IBC Section 1605.1 or 2018, 2015, 2012 IBC Section 1605.2. Condition B (supplementary reinforcement not present) applies where supplementary reinforcement in conformance with ACI 318-19 Table 17.5.3(b) or (c), ACI 318-14 section 17.3.3 (c) or ACI 318-11 Section 4.3 (c) is not provided, or where pryout strength governs. For cases where the presence of supplementary reinforcement can be verified, the resistance modification factors associated with Condition A (supplementary reinforcement present) for concrete breakout failure may be used.

[4] For all design cases, $\Psi_{c,N}$ = 1.0. The appropriate effectiveness factor for cracked concrete (k_{cr}) or uncracked concrete (k_{uncr}) must be used.

[5] For all design cases, $\Psi_{c,P}$ = 1.0. Tabular value for pullout strength is for a concrete compressive strength of 2,500 psi (17.2 MPa). Pullout strength for concrete compressive strength greater than 2,500 psi (17.2 MPa) may be increased by multiplying the tabular pullout strength by $(f'c / 2{,}500)^n$ for psi, or $(f'c / 17.2)^n$ for MPa, where n is given as n_{uncr} for uncracked concrete and n_{cr} for cracked concrete.NA (not applicable) denotes that pullout strength does not need to be considered for design.

[6] For core drill installations, k_{uncr} = 24 and k_{cr} = 17 for $^3/_4$-inch diameter anchors installed at $3^3/_4$ inches (95 mm) effective embedment.

[7] For core drill installations, $N_{p,cr}$ = 4245 lb (18.9 kN) and $N_{p,eq}$ = 4245lb (18.9 kN) for $^1/_2$-inch diameter anchors installed at $3^3/_4$ inches (95 mm) effective embedment.

[8] The supplementary reinforcement classifications “Condition A” and “Condition B” have been replaced by ACI 318-19 Table 17.5.3 (c).

TABLE 6—HILTI CARBON STEEL KB-TZ2 DESIGN INFORMATION FOR HAMMER AND CORE DRILLED INSTALLATIONS, SHEAR

Design parameter	Symbol	Units	Nominal anchor diameter (in)													
			$^1/_4$	$^3/_8$			$^1/_2$				$^5/_8$			$^3/_4$		
Anchor O.D.	d_a	in.	0.250	0.375			0.500				0.625			0.750		
		(mm)	(6.4)	(9.5)			(12.7)				(15.9)			(19.1)		
Effective min. embedment [1]	h_{ef}	in.	1-1/2	1-1/2	2	2-1/2	1-1/2	2	2-1/2	3-1/4	2-3/4	3-1/4	4	3-1/4	3-3/4	4-3/4
		(mm)	(38)	(38)	(51)	(64)	(38)	(51)	(64)	(83)	(70)	(83)	(102)	(83)	(95)	(121)
Shear, steel failure modes																
Strength reduction factor for steel in shear [2]	$\Phi_{sa,V}$	-	0.65	0.65			0.65				0.65			0.65		
Steel strength in shear	V_{sa}	lb	1,345	3,225	3,385		5,535		6,875		10,255			13,805		
		(kN)	(6.0)	(14.4)	(15.1)		(24.6)		(30.6)		(45.6)			(61.4)		
Steel strength in shear, seismic	$V_{sa,eq}$	lb	1,345	3,225	3,385		5,535		6,875		10,255			13,805		
		(kN)	(6.0)	(14.4)	(15.1)		(24.6)		(30.6)		(45.6)			(61.4)		
Shear, concrete failure modes																
Strength reduction factor for concrete breakout and pryout failure in shear, (Condition B – supplementary reinforcement not present) [3,4]	$\Phi_{c,V}$, $\Phi_{p,V}$	-	0.70	0.70			0.70				0.70			0.70		
Load bearing length of anchor in shear	l_e	in.	1-1/2	1-1/2	2	2-1/2	1-1/2	2	2-1/2	3-1/4	2-3/4	3-1/4	4	3-1/4	3-3/4	4-3/4
		(mm)	(38)	(38)	(51)	(64)	(38)	(51)	(64)	(83)	(70)	(83)	(102)	(83)	(95)	(121)
Coefficient for pryout strength	k_{cp}	-	1	1	1	2	1	1	2	2	2	2	2	2	2	2

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 MPa For pound-inch units: 1 mm = 0.03937 inches.

[1] Figure 2 of this report illustrates the installation parameters.

[2] The KB-TZ2 is considered a ductile steel element in accordance with ACI 318 (-19 and -14) 2.3 or ACI 318-11 D.1.

[3] For use with the load combinations of ACI 318 (-19 and -14) Section 5.3, ACI 318-11 Section 9.2 or 2021 IBC Section 1605.1 or 2018, 2015, 2012 IBC Section 1605.2. Condition B (supplementary reinforcement not present) applies where supplementary reinforcement in conformance with ACI 318-19 Table 17.5.3(b) or (c), ACI 318-14 section 17.3.3 (c) or ACI 318-11 Section 4.3 (c) is not provided, or where pryout strength governs. For cases where the presence of supplementary reinforcement can be verified, the resistance modification factors associated with Condition A (supplementary reinforcement present) for concrete breakout failure may be used.

[4] The supplementary reinforcement classifications "Condition A" and "Condition B" have been replaced by ACI 318-19 Table 17.5.3 (c).

TABLE 7—HILTI STAINLESS STEEL KB-TZ2 DESIGN INFORMATION FOR HAMMER AND CORE DRILLED INSTALLATIONS, SHEAR

Design parameter	Symbol	Units	Nominal anchor diameter												
			$^1/_4$	$^3/_8$			$^1/_2$			$^5/_8$			$^3/_4$		
Anchor O.D.	d_a	in.	0.250	0.375			0.500			0.625			0.750		
		(mm)	(6.4)	(9.5)			(12.7)			(15.9)			(19.1)		
Effective min. embedment [1]	h_{ef}	in.	1-1/2	1-1/2	2	2-1/2	2	2-1/2	3-1/4	2-3/4	3-1/4	4	3-1/4	3-3/4	4-3/4
		(mm)	(38)	(38)	(51)	(64)	(51)	(64)	(83)	(70)	(83)	(102)	(83)	(95)	(121)
Shear, steel failure modes															
Strength reduction factor for steel in shear [2]	$\Phi_{sa,V}$	-	0.65	0.65			0.65			0.65			0.65		
Steel strength in shear	V_{sa}	lb	1,460	4,615	4,885		8,345			12,355			16,560		
		(kN)	(6.5)	(20.5)	(21.7)		(37.1)			(55.0)			(73.7)		
Steel strength in shear, seismic	$V_{sa,eq}$	lb	1,110	4,615	4,885		8,345			12,355			13,470		
		(kN)	(4.9)	(20.5)	(21.7)		(37.1)			(55.0)			(59.9)		
Shear, concrete failure modes															
Strength reduction factor for concrete breakout and pryout failure in shear, (Condition B–supplementary reinforcement not present) [3,4]	$\Phi_{c,V}$, $\Phi_{p,V}$	-	0.7	0.7			0.7			0.7			0.7		
Load bearing length of anchor in shear	l_e	in.	1-1/2	1-1/2	2	2-1/2	2	2-1/2	3-1/4	2-3/4	3-1/4	4	3-1/4	3-3/4	4-3/4
		(mm)	(38)	(38)	(51)	(64)	(51)	(64)	(83)	(70)	(83)	(102)	(83)	(95)	(121)
Coefficient for pryout strength	k_{cp}	-	1	1	1	2	1	2	2	2	2	2	2	2	2

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 MPa For pound-inch units: 1 mm = 0.03937 inches.

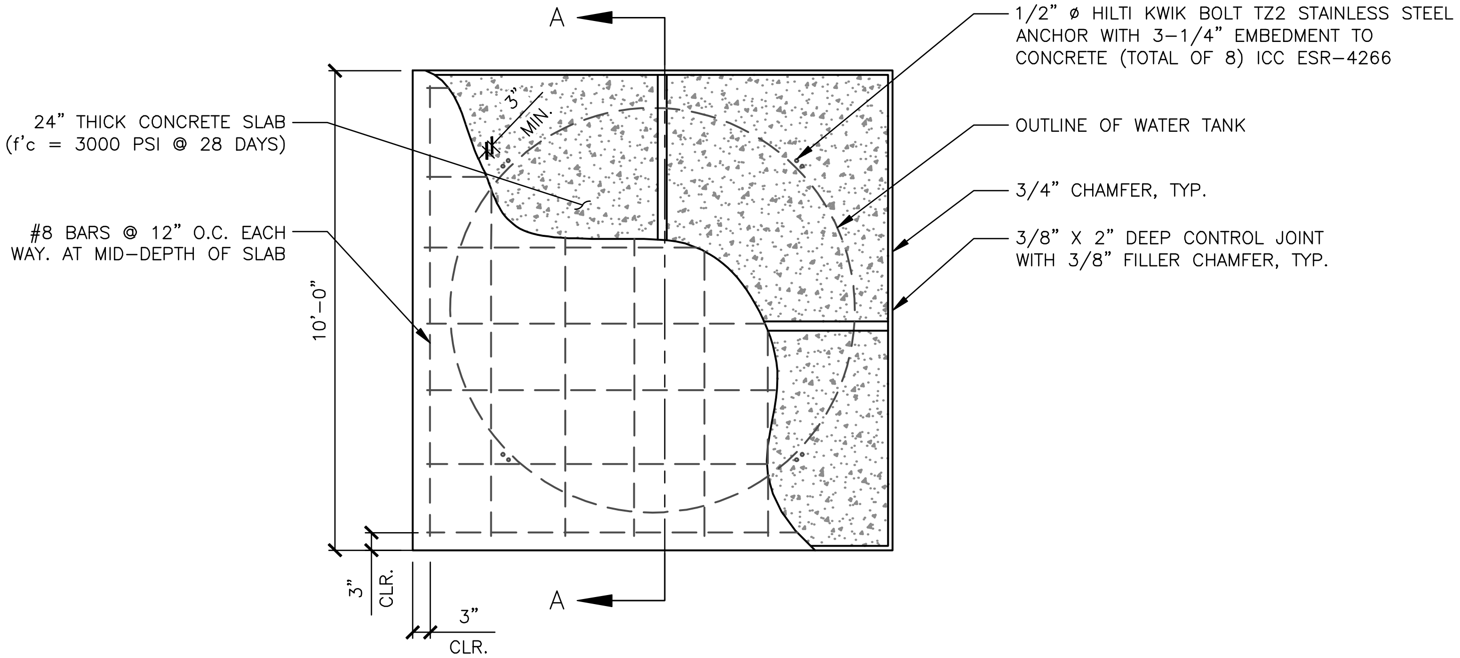
[1] Figure 2 of this report illustrates the installation parameters.

[2] The KB-TZ2 is considered a ductile steel element in accordance with ACI 318 (-19 and -14) 2.3 or ACI 318-11 D.1.

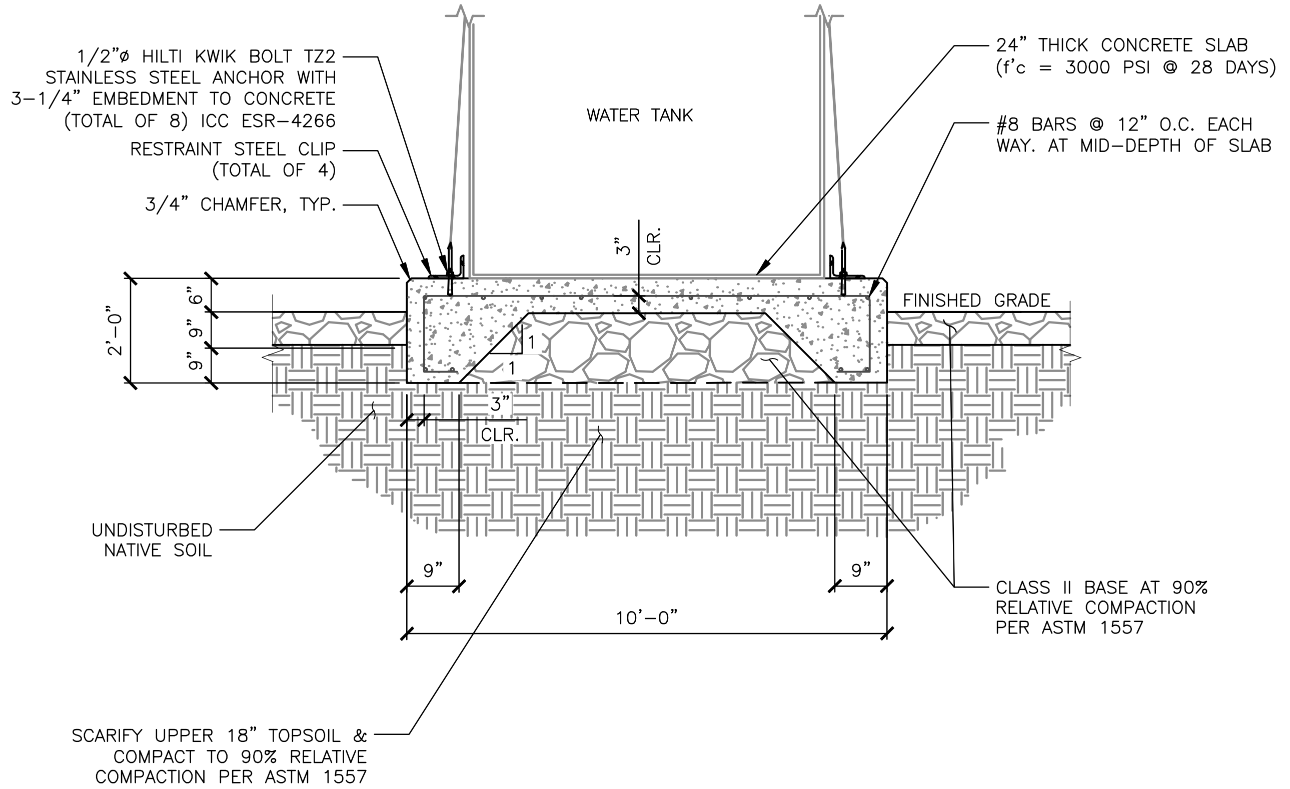
[3] For use with the load combinations of ACI 318 (-19 and -14) Section 5.3, ACI 318-11 Section 9.2 or 2021 IBC Section 1605.1 or 2018, 2015, 2012 IBC Section 1605.2. Condition B (supplementary reinforcement not present) applies where supplementary reinforcement in conformance with ACI 318-19 Table 17.5.3(b) or (c), ACI 318-14 section 17.3.3 (c) or ACI 318-11 Section 4.3 (c) is not provided, or where pryout strength governs. For cases where the presence of supplementary reinforcement can be verified, the resistance modification factors associated with Condition A (supplementary reinforcement present) for concrete breakout failure may be used.

[4] The supplementary reinforcement classifications "Condition A" and "Condition B" have been replaced by ACI 318-19 Table 17.5.3 (c).

STRUCTURAL DRAWING



PLAN



WATER TANK CONCRETE PAD DETAIL

SCALE
N.T.S.

1

CARRIER:

verizon

2785 MITCHELL DRIVE, BLDG 9
WALNUT CREEK, CA 94598

PLANS PREPARED FOR:

SAC WIRELESS
A NOKIA™ COMPANY

5015 SHOREHAM PL
SUITE 150
SAN DIEGO, CA 92122
WWW.SACW.COM
619.736.3766

PLANS PREPARED BY:

LETS AMERICA
Engineers & Architects
112 S. Kyrene Rd., Suite 1, Chandler, AZ 85226
602-526-7272 - AE@LETSinc.com - www.LETSinc.com
LETS PROJ. #: S2-SCVO-027

REVISIONS

REV.	DATE	ISSUED FOR	INITIALS
0	02/28/23	CONSTRUCTION SET	MKR

NOT FOR CONSTRUCTION UNLESS LABELED AS CONSTRUCTION SET

MADHAN KUMAR KANTHA SAMY
77991
Expires 6/30/2023

DATE: 03/03/2023

"I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED ENGINEER UNDER THE LAWS OF THE STATE OF CALIFORNIA"

SANDERS RANCH
100 SANDERS RANCH ROAD
MORAGA, CA 94566

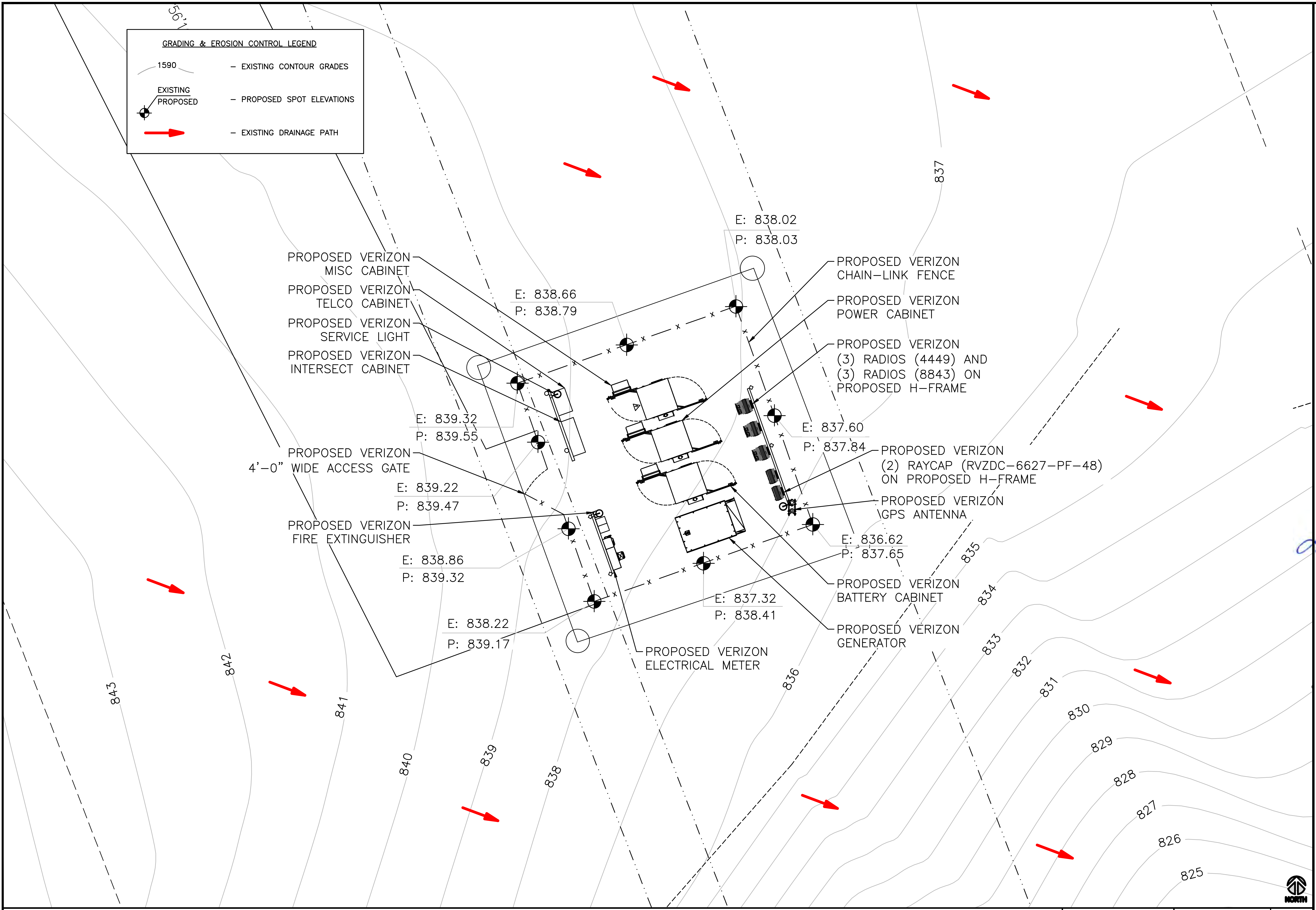
SHEET TITLE

STRUCTURAL DRAWING

SHEET NUMBER

S-1

GRADING PLAN



GRADING PLAN

40' 0 20' 40'

SCALE: 1" = 40'-0" (22x34)
(OR) 1/2" = 40'-0" (11x17)

1

NOTE: THE ORIGINAL SIZE OF THIS PLAN IS 24" X 36". SCALE RATIO IS NOT VALID FOR REDUCED OR ENLARGED SHEET SIZES

PLAN PREPARED FOR

verizon✓

10740 NALL AVE, SUITE 400
OVERLAND PARK, KS 66211
PHONE: (913) 344 2800

CLIENT:

SAC™
A Nokia company
5015 SHOREHAM PLACE, STE. 150
SAN DIEGO, CA 92122
www.sacw.com
619.736.3766

PLAN PREPARED BY:

LETS AMERICA
Engineers & Architect
112 S. Kyrene Rd., Suite 1, Chandler, AZ 85226
602-526-7272 - AE@LETSinc.com - www.LETSinc.com
LETS PROJ. #: S2-SCVO-027

REVISIONS

REV.	DATE	ISSUED FOR	INT
0	02/28/23	CONSTRUCTION SET	RAM

NOT FOR CONSTRUCTION UNLESS LABELED AS CONSTRUCTION SET

MADHAN KUMAR KANTHA SAMY
77991
Expires 6/30/2023
CIVIL

DATE 03/03/2023

"I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED ENGINEER UNDER THE LAWS OF THE STATE OF CALIFORNIA"

304480
SANDERS RANCH
100 SANDERS RANCH
ROAD, MORAGA, CA 94566.
CONTRA COASTA COUNTY

SHEET TITLE

GRADING PLAN

SHEET NUMBER

A-1

LETS AMERICA
Engineers & Architects

Retaining Wall Design Report

Structure: 107’-3” Lattice Tower (Retaining Wall)

Carrier: Verizon Wireless

Site #: 304480

Site Name: Sanders Ranch

Address: 100 Sanders Ranch Road, Moraga, CA 94566

Coordinates: 37.823804°, -122.114476°

County: Contra Costa County

Jurisdiction: Town of Moraga

LETS #: S2-SCVO-027

Date: February 28, 2023

Aleida Acosta
Design Engineer

Madhan Kumar K, MS, PE
Director of Engineering

REGISTERED PROFESSIONAL ENGINEER
MADHAN KUMAR KANTHA SAMY
77991
Expires 6/30/2023
CIVIL
STATE OF CALIFORNIA

RETAINING WALL DESIGN

Seismic Force to Nonstructural Components Calculations As Per ASCE 7-22 Section 13

Design Coefficients

Site Class: D
Importance Factor: 1.00 (ASCE 7-22, Table 1.5-2)
Risk Category: II (ASCE 7-22, Table 1.5-1)

S_{DS}:	1.472	(ASCE 7-22 Eq 11.4-3)			
A_p:	1.000	(ASCE 7-22 Table 13.6-1)			
Z:	1.6 ft	(Rad Center)	H:	3.3 ft	(Overall Height)
H_f:	1	(ASCE 7-22 Section 13.3.1.1)	R_{po} :	1.5	(ASCE 7-22 Table 13.6-1)
R_μ :	1	(ASCE 7-22 Section 13.3.1.2)	Ω_0 :	2	(ASCE 7-22 Table 15.4-2)
R:	1.25	(ASCE 7-22 Table 15.4-2)	C_{AR} :	2.2	(ASCE 7-22 Table 13.6-1)
I_e :	1	(ASCE 7-22 Table 1.5-2)	I_p :	1	(ASCE 7-22 Section 13.1.3)

Seismic Design Force (F_p) Calculation

F_p:	0.864	W_p	(ASCE 7-22 Eq 13.3-1)
$F_{p\ Max}$:	2.355	W_p	(ASCE 7-22 Eq 13.3-2)
$F_{p\ Min}$:	0.442	W_p	(ASCE 7-22 Eq 13.3-3)

$$Fpmin \leq Fp \leq Fpmax$$

F_p to use: 0.864 W_p

W_p: Component Operating Weight

The Horizontal seismic design force shall be calculated as

$$F_p = 0.4SDSIpWp\left(\frac{H_f}{R_\mu}\right)\left(\frac{C_{AR}}{R_{po}}\right)$$

F_p = 0.864 W_p

Wall Load Calculation

Wind Force $F = q_z{*}G{*}C_f{*}A$ (ASCE 7-22 Section 29.3.1)

$K_z = 0.85$ (ASCE 7-22 Table 26.10-1)

$K_e = (e^{-0.0000362*410})$ $= 0.970$ (ASCE 7-22 Table 26.9-1)

(Z_g = Ground Elevation Above Sea Level = 846.69 ft)

$K_d = 0.85$ (ASCE 7-22 Table 26.6-1)

$V = 92$ mph (From ASCE 7 Hazard Report)

$K_{Zt} = 1$ (ASCE 7-22 Section 26.8.1)

$q_z = 0.00256{*}0.85{*}0.9698{*}0.85{*}1{*}92\hat{}2$

$q_z = 15.1822$ psf

$B/s = 1/3.25 = 0.307$ $s/h = 1$

$C_f = 1.680$ (Case A & Case B)

$G = 0.85$

$F =$ qz *G*Cf

$= 15.423{*}0.85{*}1.680$

$= 21.68$ lb/ft^2

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Concrete wall_1'-6"

Code Reference:

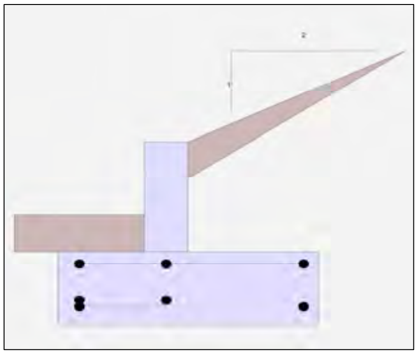
Calculations per ACI 318-14, IBC 2021, CBC 2022, ASCE 7-22
Load Combinations Used : ASCE 7-22

Criteria

Retained Height = 1.50 ft
Wall height above soil = 0.00 ft
Slope Behind Wall = 2.00
Height of Soil over Toe = 6.00 in
Water height over heel = 0.0 ft

Soil Data

Allow Soil Bearing = 2,925.0 psf
Equivalent Fluid Pressure Method
Active Heel Pressure = 35.0 psf/ft
=
Passive Pressure = 225.0 psf/ft
Soil Density, Heel = 105.00 pcf
Soil Density, Toe = 105.00 pcf
Footing||Soil Friction = 0.300
Soil height to ignore
for passive pressure = 12.00 in



Surcharge Loads

Surcharge Over Heel = 0.0 psf
Used To Resist Sliding & Overturning
Surcharge Over Toe = 100.0
NOT Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load = 0.0 lbs
Axial Live Load = 0.0 lbs
Axial Load Eccentricity = 0.0 in

Earth Pressure Seismic Load

Method : Uniform
Multiplier Used = 0.864
(Multiplier used on soil density)

Uniform Seismic Force = 2.808
Total Seismic Force = 9.126

Lateral Load Applied to Stem

Lateral Load = 75.0 #/ft
...Height to Top = 1.50 ft
...Height to Bottom = 0.50 ft
Load Type = Wind (W)
(Strength Level)

Wind on Exposed Stem = 21.7 psf
(Strength Level)

Adjacent Footing Load

Adjacent Footing Load = 0.0 lbs
Footing Width = 0.00 ft
Eccentricity = 0.00 in
Wall to Ftg CL Dist = 0.00 ft
Footing Type Spread Footing
Base Above/Below Soil
at Back of Wall = 0.0 ft
Poisson's Ratio = 0.300

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.200 g

Added seismic base force 15.8 lbs

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Concrete wall_1'-6"

Design Summary

Wall Stability Ratios

Overturning	=	4.63	OK
Sliding	=	1.64	OK
Global Stability	=	6.77	

Total Bearing Load	=	910 lbs	
...resultant ecc.	=	2.27 in	

Eccentricity within middle third

Soil Pressure @ Toe	=	418 psf	OK
Soil Pressure @ Heel	=	188 psf	OK
Allowable	=	2,925 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	650 psf	
ACI Factored @ Heel	=	293 psf	
Footing Shear @ Toe	=	0.6 psi	OK
Footing Shear @ Heel	=	5.5 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	252.0 lbs	
less 100% Passive Force	-	140.6 lbs	
less 100% Friction Force	= -	273.1 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.000
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Bottom Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Concrete		
Design Method	=	SD	SD	SD
Thickness	=	6.00		
Rebar Size	=	# 4		
Rebar Spacing	=	16.00		
Rebar Placed at	=	3 in		
Design Data				
fb/FB + fa/Fa	=	**0.083**		
Total Force @ Section				
Service Level	lbs =			
Strength Level	lbs =	186.1		
Moment....Actual				
Service Level	ft-# =			
Strength Level	ft-# =	159.7		
Moment.....Allowable	=	1,905.5		
Shear.....Actual				
Service Level	psi =			
Strength Level	psi =	5.2		
Shear.....Allowable	psi =	75.0		
Anet (Masonry)	in2 =			
Wall Weight	psf =	75.0		
Rebar Depth 'd'	in =	3.00		
Masonry Data				
f'm	psi =			
Fs	psi =			
Solid Grouting	=			
Modular Ratio 'n'	=			
Equiv. Solid Thick.	=			
Masonry Block Type	=			
Masonry Design Method	=	ASD		
Concrete Data				
f'c	psi =	2,500.0		
Fy	psi =	60,000.0		

DESCRIPTION: Concrete wall_1'-6"

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0132 in2/ft		
(4/3) * As :	0.0177 in2/ft	Min Stem T&S Reinf Area 0.216 in2	
200bd/fy : 200(12)(3)/60000 :	0.12 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.144 in2/ft	
0.0018bh : 0.0018(12)(6) :	0.1296 in2/ft	Horizontal Reinforcing Options :	
	============	One layer of :	Two layers of :
Required Area :	0.1296 in2/ft	#4@ 16.67 in	#4@ 33.33 in
Provided Area :	0.15 in2/ft	#5@ 25.83 in	#5@ 51.67 in
Maximum Area :	0.4064 in2/ft	#6@ 36.67 in	#6@ 73.33 in

Footing Data

Toe Width = 1.00 ft
Heel Width = 2.00
Total Footing Width = 3.00
Footing Thickness = 12.00 in
Key Width = 8.00 in
Key Depth = 0.00 in
Key Distance from Toe = 1.00 ft
f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	650	293 psf	
Mu' : Upward	=	305	0 ft-#	
Mu' : Downward	=	202	486 ft-#	
Mu: Design	=	104 OK	486 ft-#	OK
phiMn	=	9,850	11,029 ft-#	
Actual 1-Way Shear	=	0.60	5.48 psi	
Allow 1-Way Shear	=	75.00	75.00 psi	

Toe Reinforcing = # 4 @ 9.26 in
Heel Reinforcing = # 4 @ 9.25 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 0.78 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

DESCRIPTION: Concrete wall_1'-6"

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING.....		
Item		**Force** lbs	**Distance** ft	**Moment** ft-#
HL Act Pres (ab water tbl)		184.8	1.08	200.2
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=	45.0	2.00	90.0
Load @ Stem Above Soil	=		2.50	
Seismic Earth Load	=	6.4	1.63	10.4
Seismic Stem Self Wt	=	15.8	1.75	27.6
Total	=	252.0	**O.T.M.** =	328.2

Resisting/Overturning Ratio = **4.63**

Vertical Loads used for Soil Pressure = 910.3 lbs

		.....RESISTING.....		
		Force lbs	**Distance** ft	**Moment** ft-#
Soil Over HL (ab. water tbl)		236.3	2.25	531.6
Soil Over HL (bel. water tbl)			2.25	531.6
Water Table				
Sloped Soil Over Heel	=	59.1	2.50	147.7
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	52.5	0.50	26.3
Surcharge Over Toe	=			
Stem Weight(s)	=	112.5	1.25	140.6
Earth @ Stem Transitions	=			
Footing Weight	=	450.0	1.50	675.0
Key Weight	=		1.33	
Vert. Component	=			
Total =		910.3 lbs	**R.M.=**	1,521.1

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.006	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: Concrete wall_1'-6"

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #4 bar specified in this stem design segment (25.4.2.3a) = 18.72 in

Development length for #4 bar specified in this stem design segment = 14.40 in

Hooked embedment length into footing for #4 bar specified in this stem design segment = 7.26 in

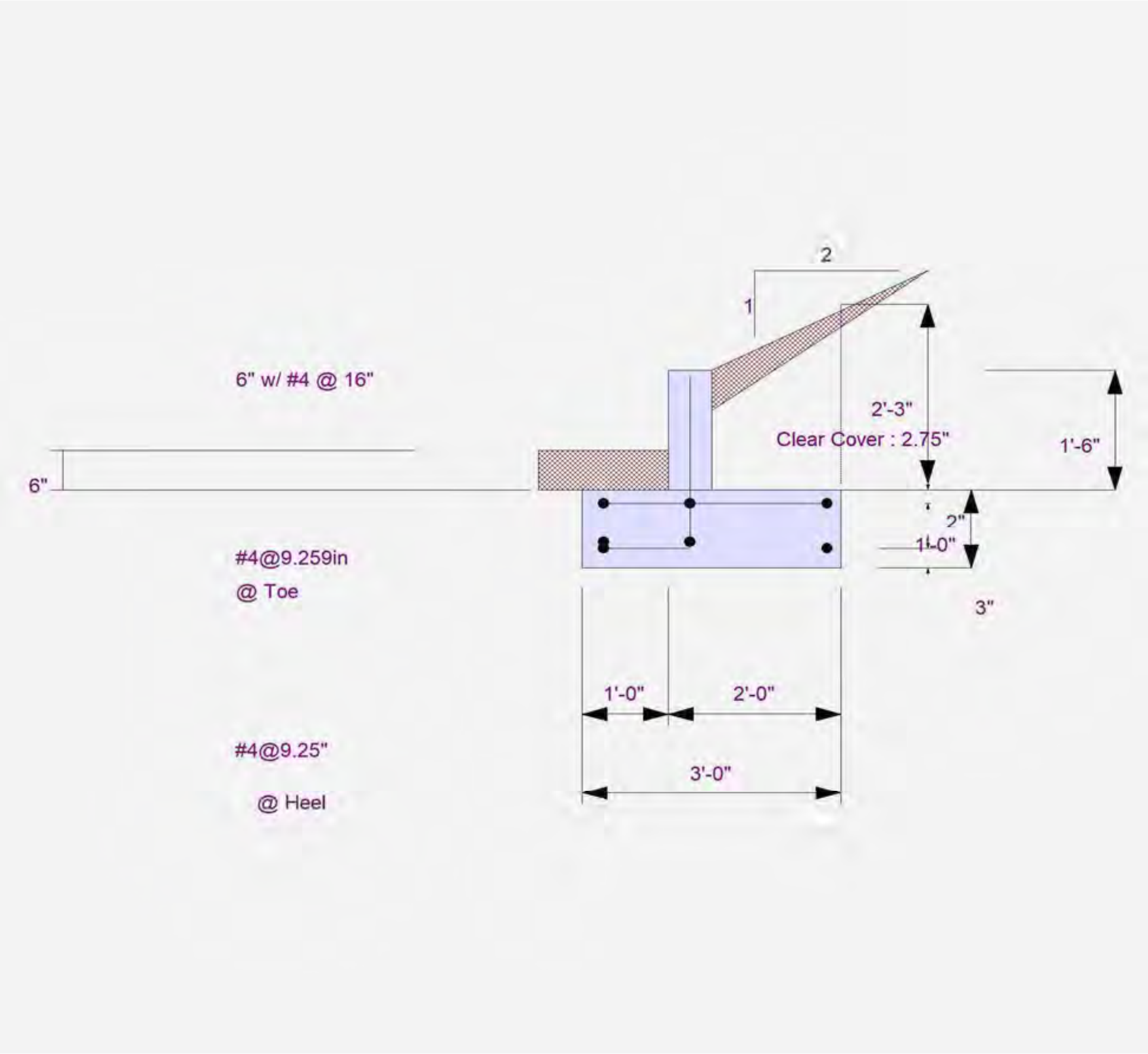
As Provided = 0.1500 in2/ft

As Required = 0.1296 in2/ft

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

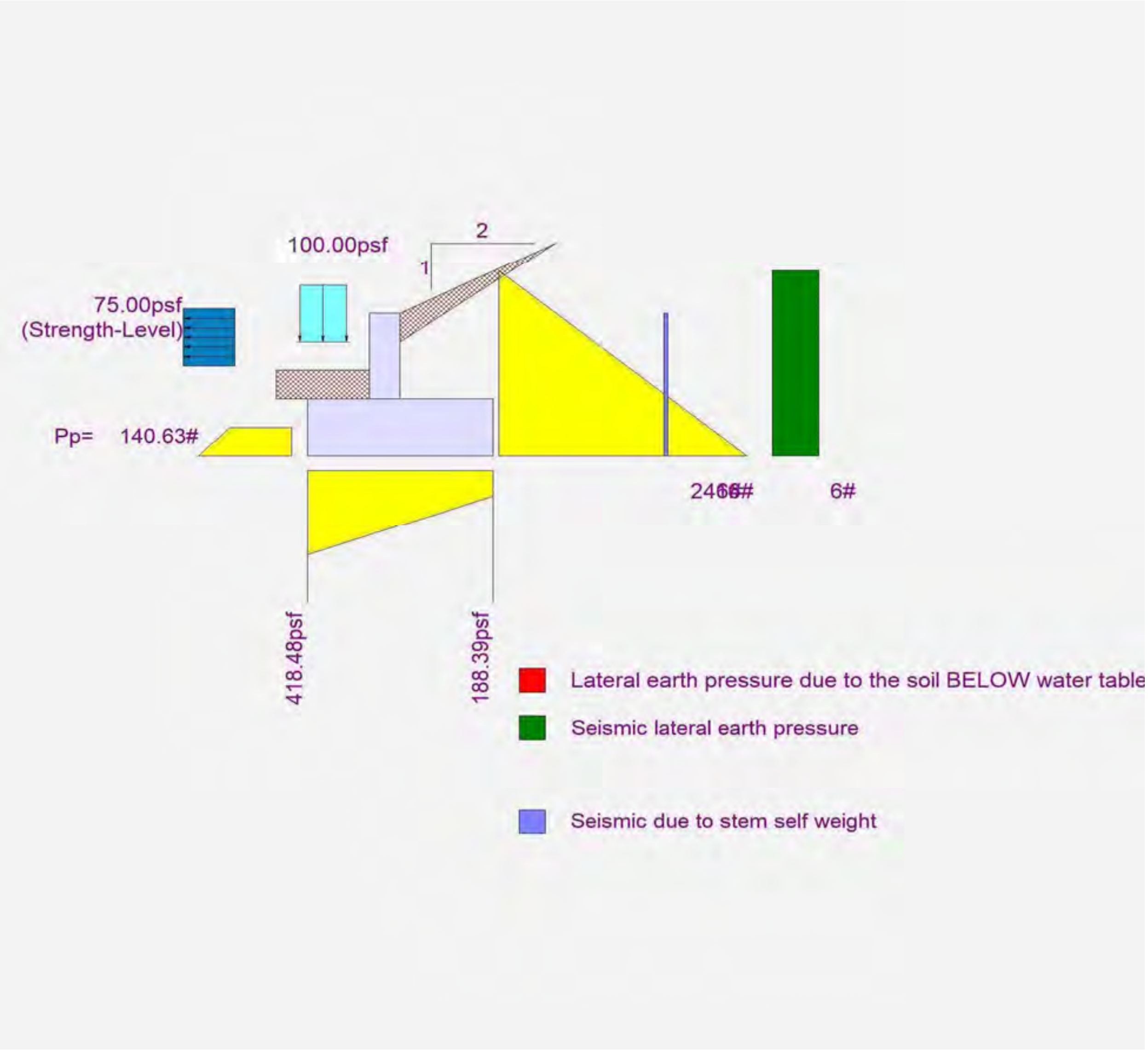
DESCRIPTION: Concrete wall_1'-6"



Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Concrete wall_1'-6"



Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Masonry Wall_1'-6"

Code References

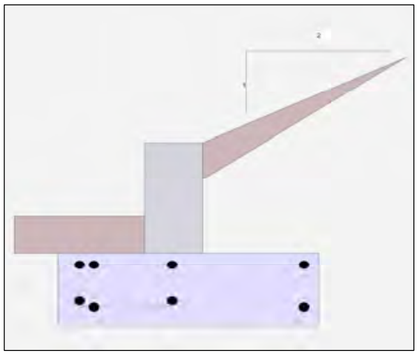
Calculations per ACI 318-14, IBC 2021, CBC 2022, ASCE 7-22

Criteria

Retained Height = 1.50 ft
Wall height above soil = 0.00 ft
Slope Behind Wall = 2.00
Height of Soil over Toe = 6.00 in
Water height over heel = 0.0 ft

Soil Data

Allow Soil Bearing = 2,925.0 psf
Equivalent Fluid Pressure Method
Active Heel Pressure = 35.0 psf/ft
=
Passive Pressure = 225.0 psf/ft
Soil Density, Heel = 105.00 pcf
Soil Density, Toe = 105.00 pcf
Footing||Soil Friction = 0.300
Soil height to ignore
for passive pressure = 12.00 in



Surcharge Loads

Surcharge Over Heel = 0.0 psf
Used To Resist Sliding & Overturning
Surcharge Over Toe = 100.0
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load = 75.0 #/ft
...Height to Top = 1.50 ft
...Height to Bottom = 0.50 ft
Load Type = Wind (W)
(Strength Level)
Wind on Exposed Stem = 21.7 psf
(Strength Level)

Adjacent Footing Load

Adjacent Footing Load = 0.0 lbs
Footing Width = 0.00 ft
Eccentricity = 0.00 in
Wall to Ftg CL Dist = 0.00 ft
Footing Type Spread Footing
Base Above/Below Soil
at Back of Wall = 0.0 ft
Poisson's Ratio = 0.300

Axial Load Applied to Stem

Axial Dead Load = 0.0 lbs
Axial Live Load = 0.0 lbs
Axial Load Eccentricity = 0.0 in

Earth Pressure Seismic Load

Method : Uniform
Multiplier Used = 0.864
(Multiplier used on soil density)

Uniform Seismic Force = 2.736
Total Seismic Force = 8.664

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.200 g

Added seismic base force 0.0 lbs

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Masonry Wall_1'-6"

Design Summary

Wall Stability Ratios

Overturning	=	4.60	OK
Sliding	=	1.63	OK
Global Stability	=	7.00	

Total Bearing Load	=	759 lbs	
...resultant ecc.	=	1.79 in	

Eccentricity within middle third

Soil Pressure @ Toe	=	328 psf	OK
Soil Pressure @ Heel	=	178 psf	OK
Allowable	=	2,925 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	520 psf	
ACI Factored @ Heel	=	282 psf	
Footing Shear @ Toe	=	0.6 psi	OK
Footing Shear @ Heel	=	0.9 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	226.6 lbs	
less 100% Passive Force	-	140.6 lbs	
less 100% Friction Force	= -	227.8 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom		
		Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Masonry		
Design Method	=	ASD	SD	SD
Thickness	=	8.00		
Rebar Size	=	# 4		
Rebar Spacing	=	32.00		
Rebar Placed at	=	Center		
Design Data				
fb/FB + fa/Fa	=	**0.153**		
Total Force @ Section				
Service Level	lbs =	88.5		
Strength Level	lbs =	186.1		
Moment....Actual				
Service Level	ft-# =	67.8		
Strength Level	ft-# =	159.7		
Moment.....Allowable	=	442.0		
Shear.....Actual				
Service Level	psi =	1.0		
Strength Level	psi =	5.2		
Shear.....Allowable	psi =	47.1		
Anet (Masonry)	in2 =	91.50		
Wall Weight	psf =	0.0		
Rebar Depth 'd'	in =	3.81		
Masonry Data				
f'm	psi =	1,750		
Fs	psi =	20,000		
Solid Grouting	=	Yes		
Modular Ratio 'n'	=	18.41		
Equiv. Solid Thick.	in =	7.63		
Masonry Block Type	=			
Masonry Design Method	=	ASD		
Concrete Data				
f'c	psi =			
Fy	psi =			

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Masonry Wall_1'-6"

Footing Data

Toe Width = 1.00 ft
Heel Width = 2.00
Total Footing Width = 3.00
Footing Thickness = 12.00 in
Key Width = 8.00 in
Key Depth = 0.00 in
Key Distance from Toe = 1.00 ft
f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	520	282 psf	
Mu' : Upward	=	247	282 ft-#	
Mu' : Downward	=	269	469 ft-#	
Mu: Design	=	-22 OK	187 ft-#	OK
phiMn	=	9,850	11,029 ft-#	
Actual 1-Way Shear	=	0.55	0.89 psi	
Allow 1-Way Shear	=	75.00	75.00 psi	

Toe Reinforcing = # 4 @ 9.26 in
Heel Reinforcing = # 4 @ 9.25 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 0.78 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Masonry Wall_1'-6"

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....

Item	Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	175.5	1.06	185.2
HL Act Pres (be water tbl)			
Hydrostatic Force			
Buoyant Force =			
Surcharge over Heel =			
Surcharge Over Toe =			
Adjacent Footing Load =			
Added Lateral Load =	45.0	2.00	90.0
Load @ Stem Above Soil =		2.50	
Seismic Earth Load =	6.1	1.58	9.6
Seismic Stem Self Wt =			
Total =	226.6	**O.T.M.** =	284.8

Resisting/Overturning Ratio = **4.60**

Vertical Loads used for Soil Pressure = 759.2 lbs

.....RESISTING.....

	Force lbs	Distance ft	Moment ft-#
Soil Over HL (ab. water tbl)	210.0	2.33	490.0
Soil Over HL (bel. water tbl)		2.33	490.0
Water Table			
Sloped Soil Over Heel =	46.7	2.56	119.3
Surcharge Over Heel =			
Adjacent Footing Load =			
Axial Dead Load on Stem =			
* Axial Live Load on Stem =			
Soil Over Toe =	52.5	0.50	26.3
Surcharge Over Toe =			
Stem Weight(s) =			
Earth @ Stem Transitions =			
Footing Weight =	450.0	1.50	675.0
Key Weight =		1.33	
Vert. Component =			
Total =	759.2 lbs	**R.M.=**	1,310.5

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.005	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: Masonry Wall_1'-6"

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing
Calculated Rebar Stress, fs = 3066.08 psi

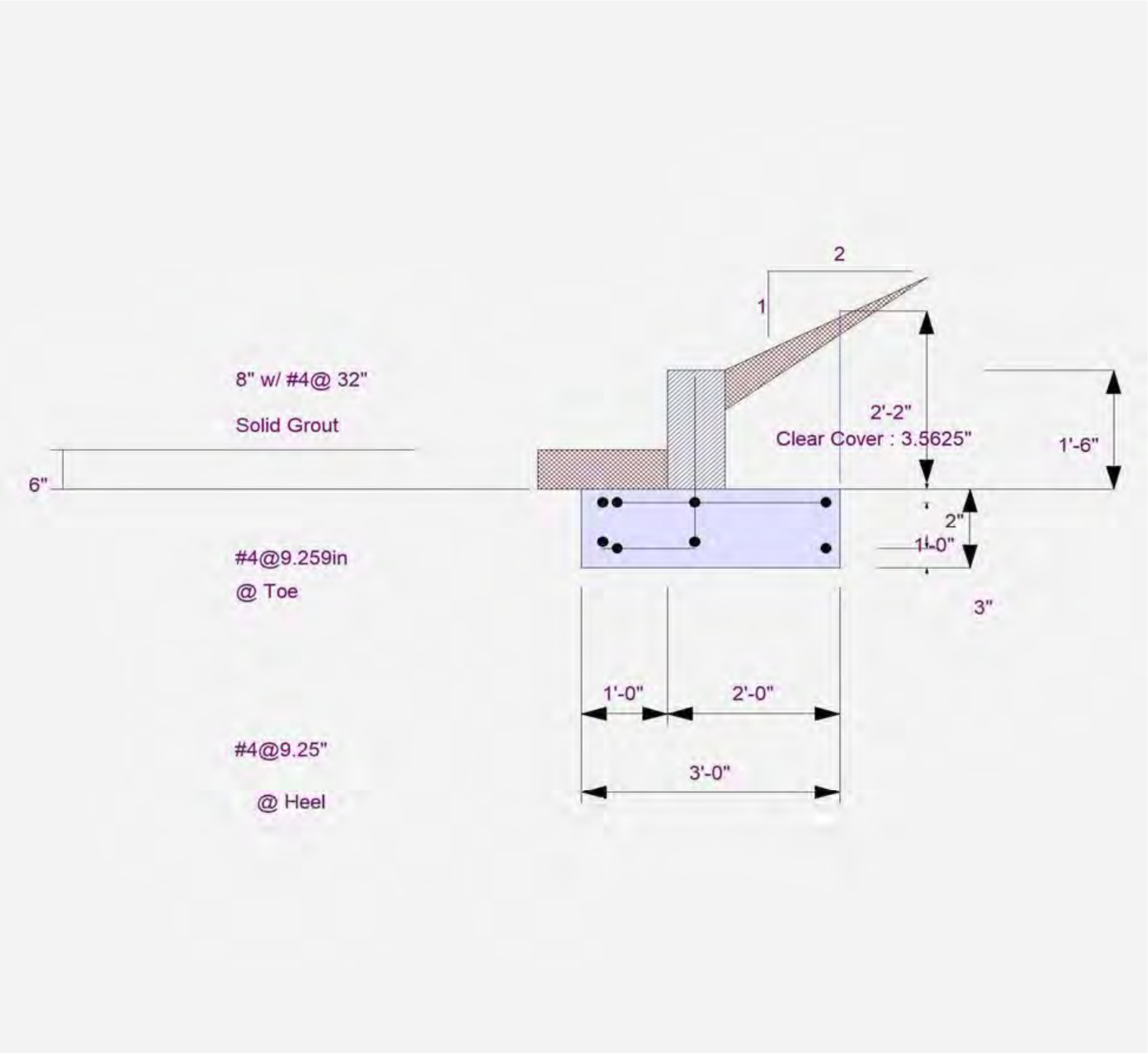
Lap Splice length for #4 bar specified in this stem design segment (25.4.2.3a) = 20.00 in
Development length for #4 bar specified in this stem design segment = 12.00 in

Hooked embedment length into footing for #4 bar specified in this stem design segment = 6.00 in
As Provided = 0.0750 in2/ft
As Required = 0.0119 in2/ft

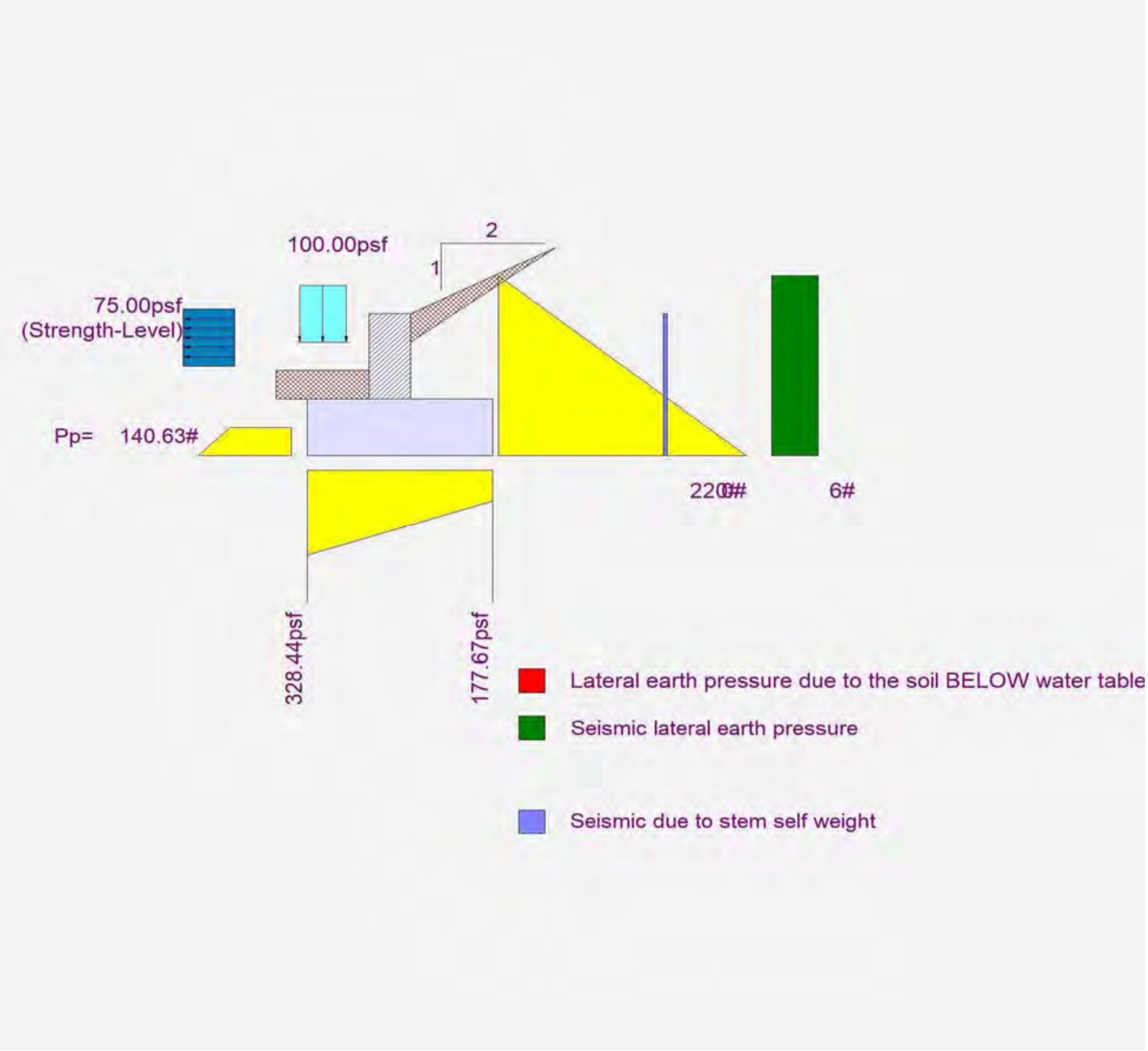
Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Masonry Wall_1'-6"



DESCRIPTION: Masonry Wall_1'-6"



Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Concrete wall_3'-3" to 1'-0"

Code References

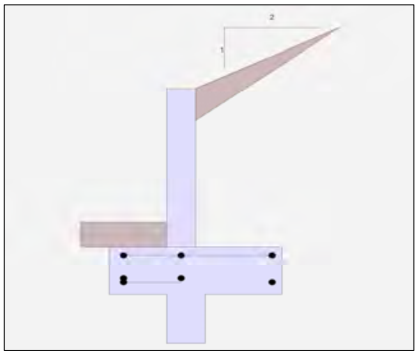
Calculations per ACI 318-14, IBC 2021, CBC 2022, ASCE 7-22

Criteria

Retained Height = 3.26 ft
Wall height above soil = 0.00 ft
Slope Behind Wall = 2.00
Height of Soil over Toe = 6.00 in
Water height over heel = 0.0 ft

Soil Data

Allow Soil Bearing = 2,925.0 psf
Equivalent Fluid Pressure Method
Active Heel Pressure = 35.0 psf/ft
=
Passive Pressure = 225.0 psf/ft
Soil Density, Heel = 105.00 pcf
Soil Density, Toe = 105.00 pcf
Footing||Soil Friction = 0.300
Soil height to ignore
for passive pressure = 12.00 in



Surcharge Loads

Surcharge Over Heel = 0.0 psf
Used To Resist Sliding & Overturning
Surcharge Over Toe = 100.0
NOT Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load = 0.0 lbs
Axial Live Load = 0.0 lbs
Axial Load Eccentricity = 0.0 in

Lateral Load Applied to Stem

Lateral Load = 75.0 #/ft
...Height to Top = 3.25 ft
...Height to Bottom = 0.50 ft
Load Type = Wind (W)
(Strength Level)
Wind on Exposed Stem = 21.7 psf
(Strength Level)

Adjacent Footing Load

Adjacent Footing Load = 0.0 lbs
Footing Width = 0.00 ft
Eccentricity = 0.00 in
Wall to Ftg CL Dist = 0.00 ft
Footing Type Spread Footing
Base Above/Below Soil
at Back of Wall = 0.0 ft
Poisson's Ratio = 0.300

Earth Pressure Seismic Load

Method : Uniform
Multiplier Used = 0.864
(Multiplier used on soil density)

Uniform Seismic Force = 4.329
Total Seismic Force = 21.686

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.200 g

Added seismic base force 34.2 lbs

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Concrete wall_3'-3" to 1'-0"

Design Summary

Wall Stability Ratios

Overturning = 2.01 OK
Sliding = 1.66 OK
Global Stability = 3.67

Total Bearing Load = 1,420 lbs
...resultant ecc. = 7.64 in
Eccentricity outside middle third
Soil Pressure @ Toe = 1,096 psf OK
Soil Pressure @ Heel = 0 psf OK
Allowable = 2,925 psf
Soil Pressure Less Than Allowable
ACI Factored @ Toe = 1,642 psf
ACI Factored @ Heel = 0 psf
Footing Shear @ Toe = 3.2 psi OK
Footing Shear @ Heel = 8.4 psi OK
Allowable = 75.0 psi

Sliding Calcs

Lateral Sliding Force = 612.4 lbs
less 100% Passive Force - 590.6 lbs
less 100% Friction Force = - 425.9 lbs
Added Force Req'd = 0.0 lbs OK
....for 1.5 Stability = 0.0 lbs OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.000
Wind, W	1.600
Seismic, E	1.000

Stem Construction

Bottom

Stem OK

Design Height Above Ftg ft = 0.00
Wall Material Above "Ht" = Concrete
Design Method = SD SD SD
Thickness = 6.00
Rebar Size = # 4
Rebar Spacing = 16.00
Rebar Placed at = 3 in

Design Data

fb/FB + fa/Fa = **0.484**

Total Force @ Section

Service Level lbs =
Strength Level lbs = 579.0

Moment....Actual

Service Level ft-# =
Strength Level ft-# = 923.6
Moment.....Allowable = 1,905.5

Shear.....Actual

Service Level psi =
Strength Level psi = 16.1
Shear.....Allowable psi = 75.0
Anet (Masonry) in2 =
Wall Weight psf = 75.0
Rebar Depth 'd' in = 3.00

Masonry Data

f'm psi =
Fs psi =
Solid Grouting =
Modular Ratio 'n' =
Equiv. Solid Thick. =
Masonry Block Type =
Masonry Design Method = ASD

Concrete Data

f'c psi = 2,500.0
Fy psi = 60,000.0

DESCRIPTION: Concrete wall_3'-3" to 1'-0"

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0765 in2/ft		
(4/3) * As :	0.1021 in2/ft	Min Stem T&S Reinf Area 0.469 in2	
200bd/fy : 200(12)(3)/60000 :	0.12 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.144 in2/ft	
0.0018bh : 0.0018(12)(6) :	0.1296 in2/ft	Horizontal Reinforcing Options :	
	============	One layer of :	Two layers of :
Required Area :	0.1296 in2/ft	#4@ 16.67 in	#4@ 33.33 in
Provided Area :	0.15 in2/ft	#5@ 25.83 in	#5@ 51.67 in
Maximum Area :	0.4064 in2/ft	#6@ 36.67 in	#6@ 73.33 in

Footing Data

Toe Width = 1.00 ft
Heel Width = 2.00
Total Footing Width = 3.00
Footing Thickness = 12.00 in

Key Width = 8.00 in
Key Depth = 12.00 in
Key Distance from Toe = 1.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,642	0 psf	
Mu' : Upward	=	716	0 ft-#	
Mu' : Downward	=	202	735 ft-#	
Mu: Design	=	514 OK	735 ft-#	OK
phiMn	=	9,850	11,029 ft-#	
Actual 1-Way Shear	=	3.22	8.39 psi	
Allow 1-Way Shear	=	75.00	75.00 psi	

Toe Reinforcing = # 4 @ 9.26 in
Heel Reinforcing = # 4 @ 9.25 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: phiMn = phi*5'lambda*sqrt(fc)*Sm

Min footing T&S reinf Area	0.78	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Concrete wall_3'-3" to 1'-0"

Summary of Overturning & Resisting Forces & Moments

.....OVERTURNING.....

Item		Force	Distance	Moment
		lbs	ft	ft-#
HL Act Pres (ab water tbl)		439.3	1.67	733.6
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=	123.8	2.88	355.8
Load @ Stem Above Soil	=		4.26	
Seismic Earth Load	=	15.2	2.51	38.0
Seismic Stem Self Wt	=	34.2	2.63	90.0
Total	=	612.4	**O.T.M.** =	1,217.4

Resisting/Overturning Ratio = **2.01**

Vertical Loads used for Soil Pressure = 1,419.5 lbs

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

.....RESISTING.....

		Force	Distance	Moment
		lbs	ft	ft-#
Soil Over HL (ab. water tbl)		513.5	2.25	1,155.3
Soil Over HL (bel. water tbl)			2.25	1,155.3
Water Table				
Sloped Soil Over Heel	=	59.1	2.50	147.7
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	52.5	0.50	26.3
Surcharge Over Toe	=			
Stem Weight(s)	=	244.5	1.25	305.6
Earth @ Stem Transitions	=			
Footing Weight	=	450.0	1.50	675.0
Key Weight	=	100.0	1.33	133.3
Vert. Component	=			
Total =		1,419.5 lbs	**R.M.=**	2,443.1

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.033	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

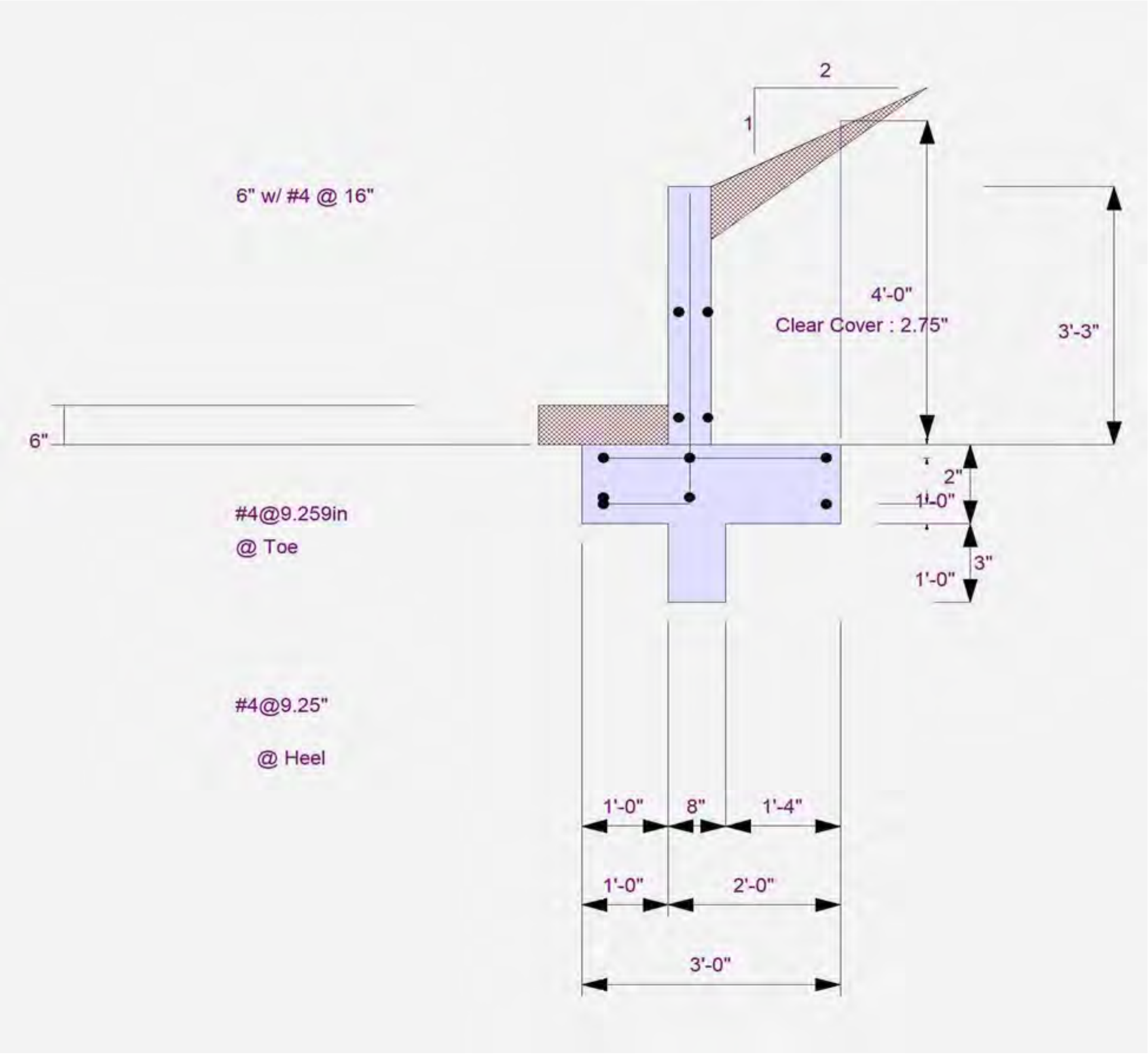
Lap Splice length for #4 bar specified in this stem design segment (25.4.2.3a) = 18.72 in
Development length for #4 bar specified in this stem design segment = 14.40 in

Hooked embedment length into footing for #4 bar specified in this stem design segment = 7.26 in
As Provided = 0.1500 in2/ft
As Required = 0.1296 in2/ft

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

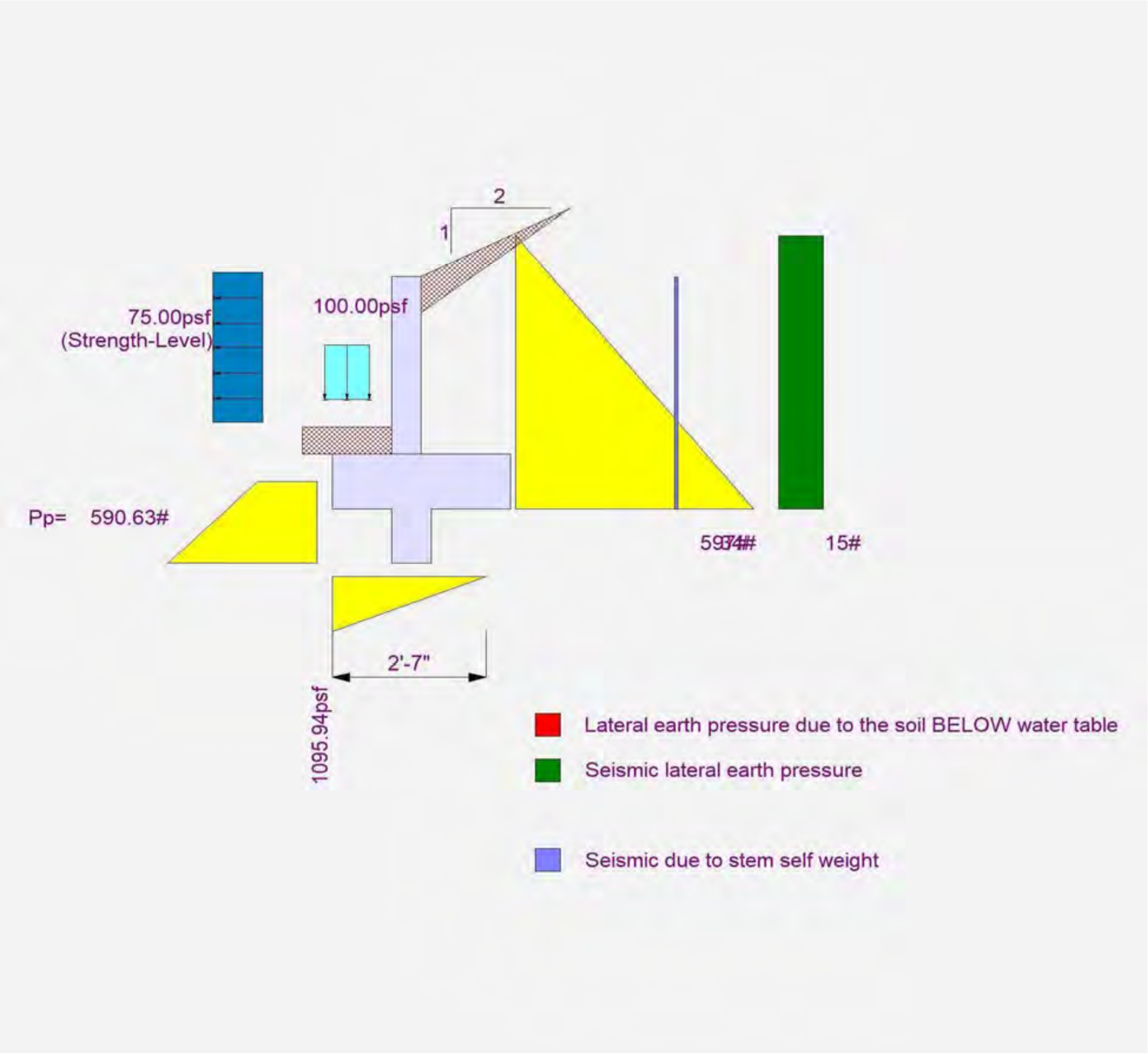
DESCRIPTION: Concrete wall_3'-3" to 1'-0"



Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Concrete wall_3'-3" to 1'-0"



Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Masonry Wall_3'-3" to 1'-0"

Code Reference:

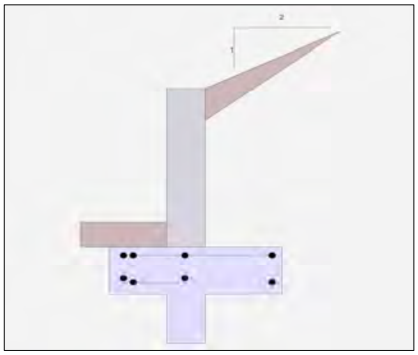
Calculations per ACI 318-14, IBC 2021, CBC 2022, ASCE 7-22

Criteria

Retained Height = 3.26 ft
Wall height above soil = 0.00 ft
Slope Behind Wall = 2.00
Height of Soil over Toe = 6.00 in
Water height over heel = 0.0 ft

Soil Data

Allow Soil Bearing = 2,925.0 psf
Equivalent Fluid Pressure Method
Active Heel Pressure = 35.0 psf/ft
=
Passive Pressure = 225.0 psf/ft
Soil Density, Heel = 105.00 pcf
Soil Density, Toe = 105.00 pcf
Footing||Soil Friction = 0.300
Soil height to ignore
for passive pressure = 12.00 in



Surcharge Loads

Surcharge Over Heel = 0.0 psf
Used To Resist Sliding & Overturning
Surcharge Over Toe = 100.0
NOT Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load = 0.0 lbs
Axial Live Load = 0.0 lbs
Axial Load Eccentricity = 0.0 in

Earth Pressure Seismic Load

Method : Uniform
Multiplier Used = 0.864
(Multiplier used on soil density)

Lateral Load Applied to Stem

Lateral Load = 75.0 #/ft
...Height to Top = 3.26 ft
...Height to Bottom = 0.50 ft
Load Type = Wind (W)
(Strength Level)
Wind on Exposed Stem = 21.7 psf
(Strength Level)

Uniform Seismic Force = 4.257
Total Seismic Force = 20.971

Adjacent Footing Load

Adjacent Footing Load = 0.0 lbs
Footing Width = 0.00 ft
Eccentricity = 0.00 in
Wall to Ftg CL Dist = 0.00 ft
Footing Type Spread Footing
Base Above/Below Soil
at Back of Wall = 0.0 ft
Poisson's Ratio = 0.300

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.200 g

Added seismic base force 0.0 lbs

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Masonry Wall_3'-3" to 1'-0"

Design Summary

Wall Stability Ratios

Overturning	=	1.85	OK
Sliding	=	1.64	OK
Global Stability	=	3.74	
Total Bearing Load	=	1,106 lbs	
...resultant ecc.	=	7.93 in	

Eccentricity outside middle third

Soil Pressure @ Toe	=	879 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,925 psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	1,341 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	6.4 psi	OK
Footing Shear @ Heel	=	5.7 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	563.6 lbs	
less 100% Passive Force	-	590.6 lbs	
less 100% Friction Force	= -	331.7 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom		
		Ratio > 1.0		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Masonry		
Design Method	=	ASD	SD	SD
Thickness	=	8.00		
Rebar Size	=	# 4		
Rebar Spacing	=	32.00		
Rebar Placed at	=	Center		
Design Data				
fb/FB + fa/Fa	=	**1.036**		
Total Force @ Section				
Service Level	lbs =	324.1		
Strength Level	lbs =	186.1		
Moment....Actual				
Service Level	ft-# =	458.2		
Strength Level	ft-# =	159.7		
Moment.....Allowable	=	442.0		
Shear.....Actual				
Service Level	psi =	3.5		
Strength Level	psi =	5.2		
Shear.....Allowable	psi =	47.1		
Anet (Masonry)	in2 =	91.50		
Wall Weight	psf =	0.0		
Rebar Depth 'd'	in =	3.81		
Masonry Data				
f'm	psi =	1,750		
Fs	psi =	20,000		
Solid Grouting	=	Yes		
Modular Ratio 'n'	=	18.41		
Equiv. Solid Thick.	in =	7.63		
Masonry Block Type	=			
Masonry Design Method	=	ASD		
Concrete Data				
f'c	psi =			
Fy	psi =			

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Masonry Wall_3'-3" to 1'-0"

Footing Data

Toe Width = 1.00 ft
Heel Width = 2.00
Total Footing Width = 3.00
Footing Thickness = 12.00 in

Key Width = 8.00 in
Key Depth = 12.00 in
Key Distance from Toe = 1.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,341	0 psf	
Mu' : Upward	=	582	55 ft-#	
Mu' : Downward	=	269	716 ft-#	
Mu: Design	=	313 OK	661 ft-#	OK
phiMn	=	9,850	11,029 ft-#	
Actual 1-Way Shear	=	6.38	5.71 psi	
Allow 1-Way Shear	=	75.00	75.00 psi	

Toe Reinforcing = # 4 @ 9.26 in
Heel Reinforcing = # 4 @ 9.25 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: phiMn = phi*5'lambda*sqrt(fc)*Sm

Min footing T&S reinf Area 0.78 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

DESCRIPTION: Masonry Wall_3'-3" to 1'-0"

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING.....		
Item		**Force** lbs	**Distance** ft	**Moment** ft-#
HL Act Pres (ab water tbl)		424.8	1.64	697.6
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=	124.2	2.88	357.7
Load @ Stem Above Soil	=		4.26	
Seismic Earth Load	=	14.7	2.46	36.2
Seismic Stem Self Wt	=			
Total	=	563.6	**O.T.M.** =	1,091.4

Resisting/Overturning Ratio = **1.85**

Vertical Loads used for Soil Pressure = 1,105.6 lbs

		.....RESISTING.....		
		Force lbs	**Distance** ft	**Moment** ft-#
Soil Over HL (ab. water tbl)		456.4	2.33	1,064.9
Soil Over HL (bel. water tbl)			2.33	1,064.9
Water Table				
Sloped Soil Over Heel	=	46.7	2.56	119.3
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	52.5	0.50	26.3
Surcharge Over Toe	=			
Stem Weight(s)	=			
Earth @ Stem Transitions	=			
Footing Weight	=	450.0	1.50	675.0
Key Weight	=	100.0	1.33	133.3
Vert. Component	=			
Total =		1,105.6 lbs	**R.M.=**	2,018.8

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.027	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: Masonry Wall_3'-3" to 1'-0"

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom

Stem Design Height: 0.00 ft above top of footing

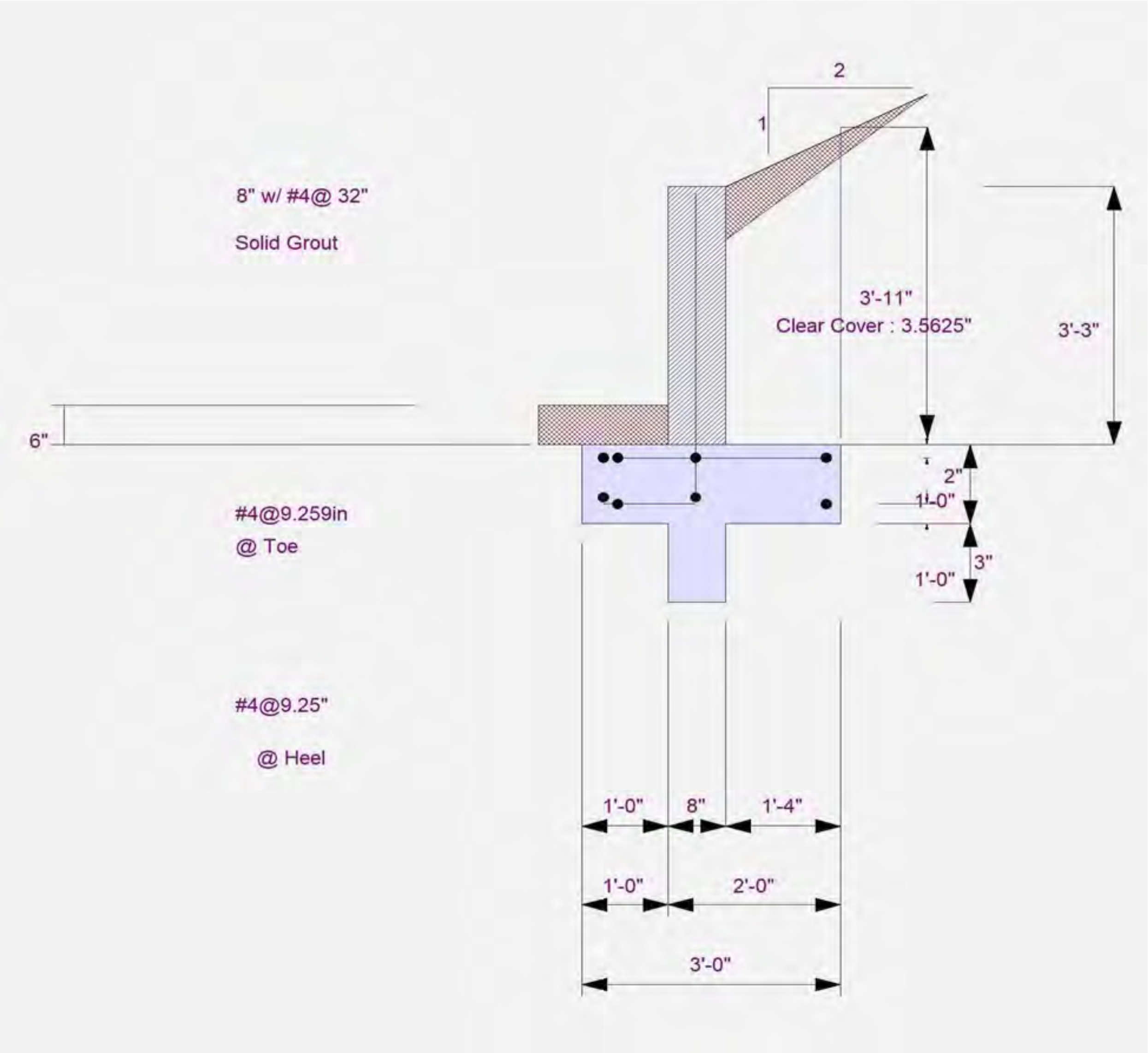
Calculated Rebar Stress, fs = 20732.22 psi

Lap Splice length for #4 bar specified in this stem design segment (25.4.2.3a) =	31.10 in
Development length for #4 bar specified in this stem design segment =	31.10 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	6.00 in
As Provided =	0.0750 in2/ft
As Required =	0.0808 in2/ft

Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

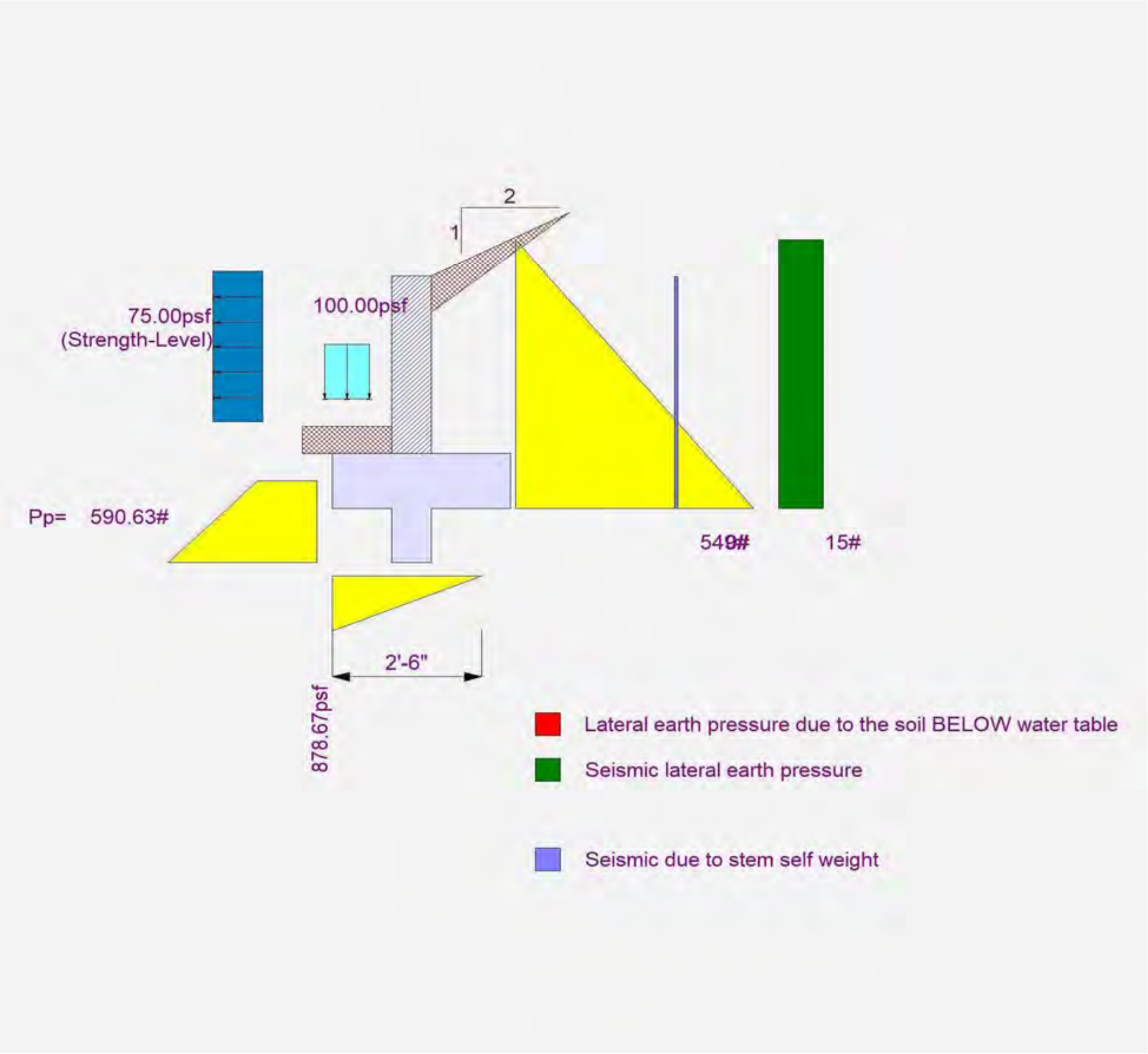
DESCRIPTION: Masonry Wall_3'-3" to 1'-0"

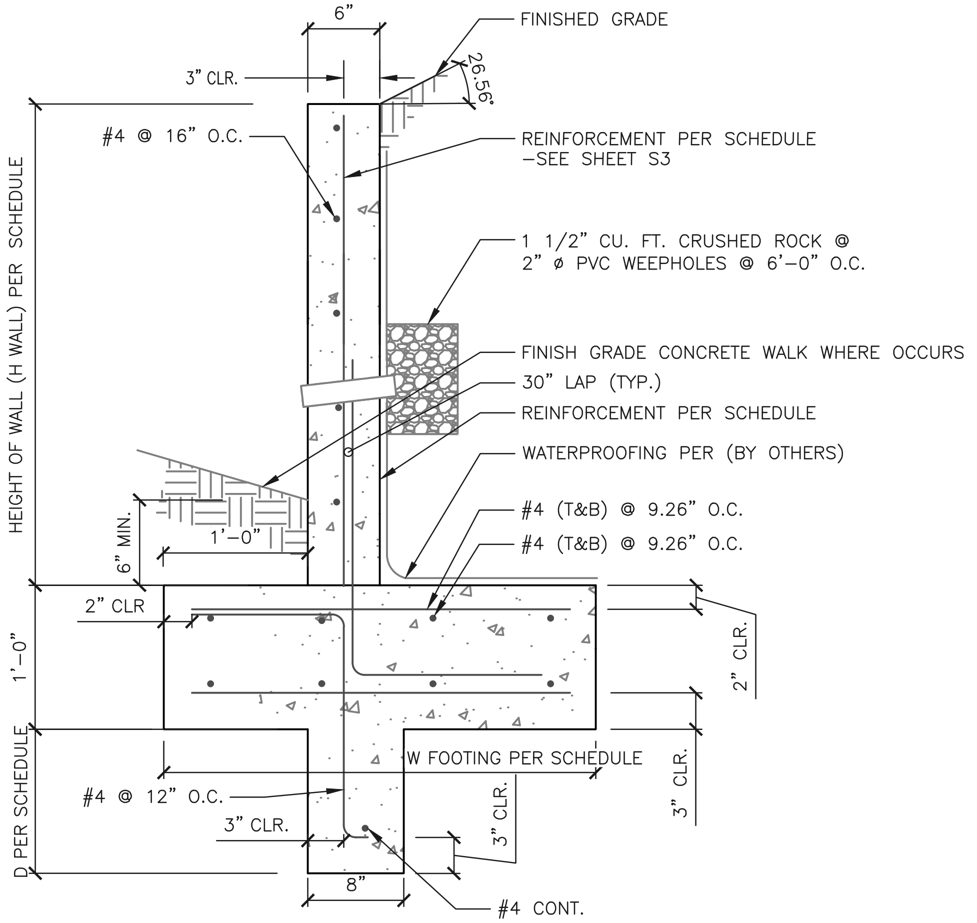


Cantilevered Retaining Wall

Project File: s2-scvo-027_.ec6

DESCRIPTION: Masonry Wall_3'-3" to 1'-0"

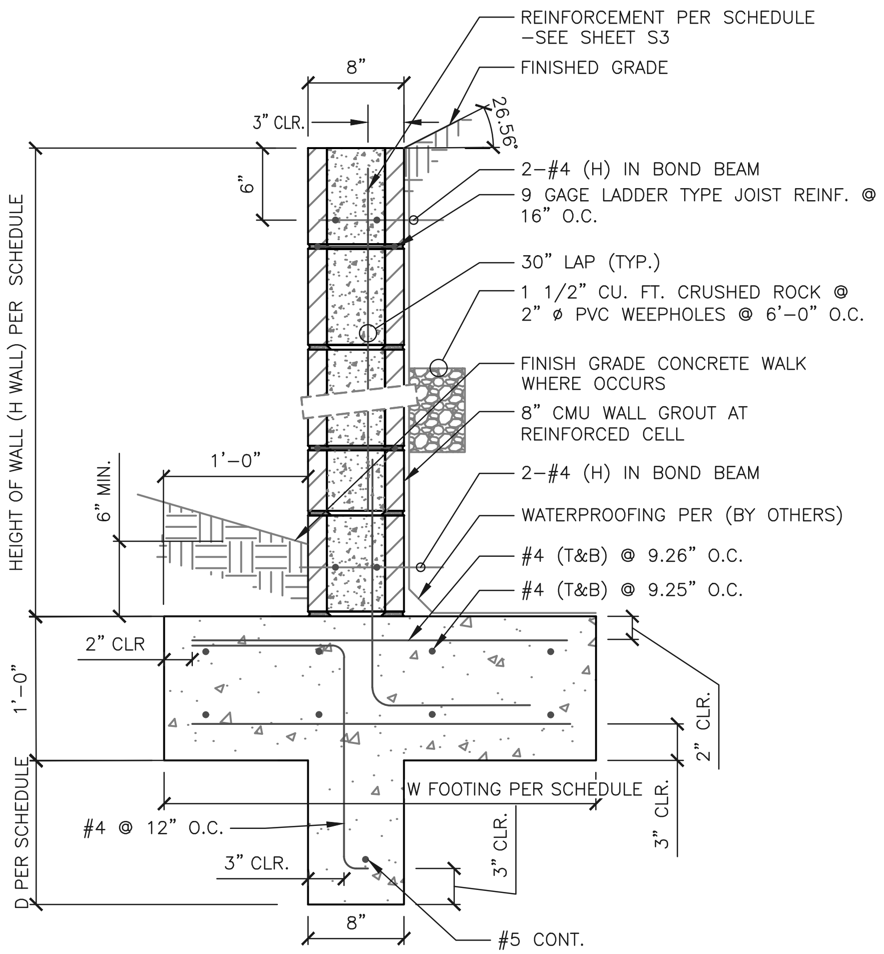




NOTES:
1. NO SPECIAL INSPECTIONS ARE REQUIRED FOR WALL & FOOTING.
2. CONCRETE F'C=3,000 PSI (DESIGN STRENGTH 2500 PSI).
3. REINFORCING STEEL FY=60 KSI.

CONCRETE RETAINING WALL

SCALE N.T.S. 2



NOTES:
1. NO SPECIAL INSPECTIONS ARE REQUIRED FOR WALL & FOOTING PERIODS.
2. CONCRETE F'C=3,000 PSI (DESIGN STRENGTH 2500 PSI).
3. REINFORCING STEEL FY=60 KSI.
4. CMU F'M=1750 PSI.

CMU RETAINING WALL

SCALE N.T.S. 1

CARRIER:

verizon✓

2785 MITCHELL DRIVE, BLDG 9
WALNUT CREEK, CA 94598

PLANS PREPARED FOR:

SAC
AE DESIGN GROUP, INC.

5015 SHOREHAM PL
SUITE 150
SAN DIEGO, CA 92122
WWW.SACW.COM
619.736.3766

PLANS PREPARED BY:

LETS AMERICA
Engineers & Architects
112 S. Kyrene Rd., Suite 1, Chandler, AZ 85226
602-526-7272 - AE@LETSinc.com - www.LETSinc.com
LETS PROJ. #: S2-SCV0-027

REVISIONS

REV.	DATE	ISSUED FOR	INITIALS
0	02/28/23	CONSTRUCTION SET	MAN

NOT FOR CONSTRUCTION UNLESS LABELED AS CONSTRUCTION SET

MADHAN KUMAR KANTHA SAMY
77991
Expires 6/30/2023
CIVIL
03/03/2023

"I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED ENGINEER UNDER THE LAWS OF THE STATE OF CALIFORNIA"

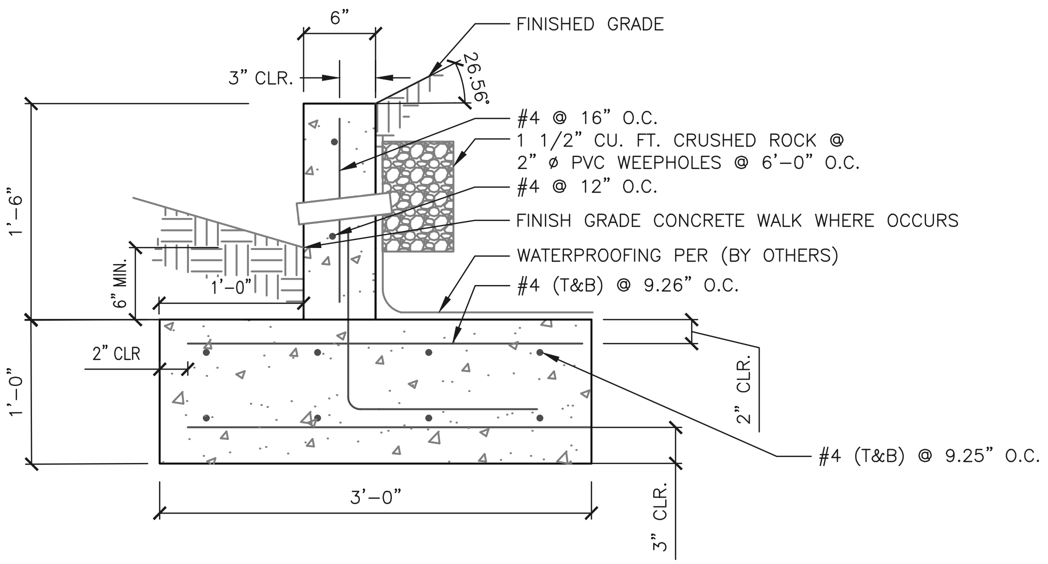
SANDERS RANCH
100 SANDERS RANCH ROAD
MORAGA, CA 94566

SHEET TITLE

STRUCTURAL DRAWINGS

SHEET NUMBER

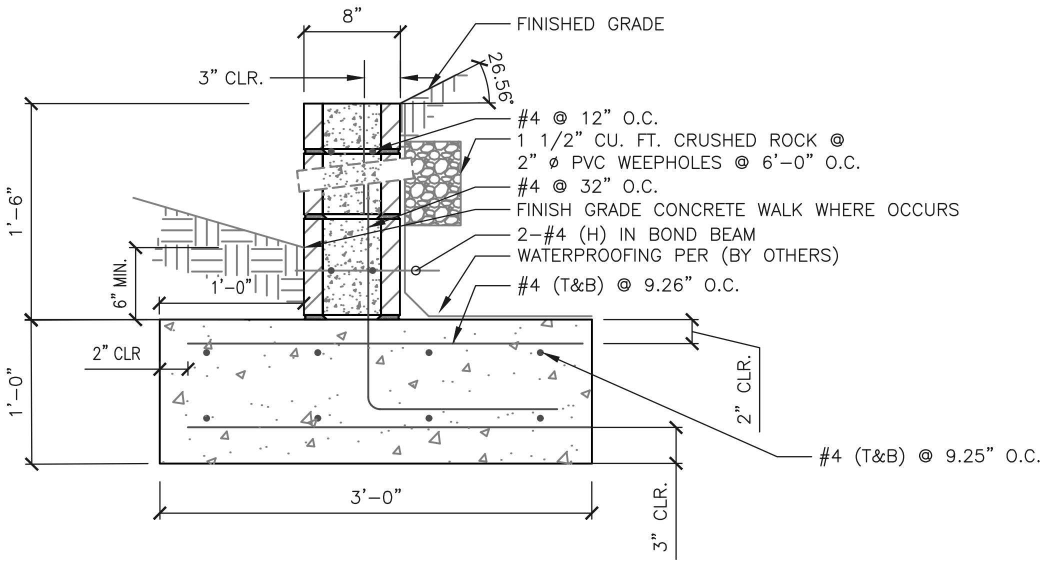
S-1



NOTES:

1. NO SPECIAL INSPECTIONS ARE REQUIRED FOR WALL & FOOTING.
2. CONCRETE F'C=3,000 PSI (DESIGN STRENGTH 2500 PSI).
3. REINFORCING STEEL FY=60 KSI.

CONCRETE RETAINING WALL 1'-6" SCALE N.T.S. 2



NOTES:

1. NO SPECIAL INSPECTIONS ARE REQUIRED FOR WALL & FOOTING.
2. CONCRETE F'C=3,000 PSI (DESIGN STRENGTH 2500 PSI).
3. REINFORCING STEEL FY=60 KSI.
4. CMU F'M=1750 PSI.

CMU RETAINING WALL 1'-6" SCALE N.T.S. 1

CARRIER:

verizon

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WALNUT CREEK, CA 94598

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100 SANDERS RANCH ROAD
MORAGA, CA 94566

SHEET TITLE

STRUCTURAL DRAWINGS

SHEET NUMBER

S-2

CONCRETE RETAINING WALL SCHEDULE				
STEM INFO			FOOTING INFO	"D" SHEAR KEY DEPTH
HEIGHT (H WALL)	"T" WALL THK.	VERTICAL REBAR	"W" FOOTING	
1'-6"	6"	#4 @ 16" O.C.	3'-0"	-
3'-3" TO 1'-0"	6"	#4 @ 16" O.C.	3'-0"	1'-0"

MASONRY RETAINING WALL SCHEDULE				
STEM INFO			FOOTING INFO	"D" SHEAR KEY DEPTH
HEIGHT (H WALL)	"T" WALL THK.	VERTICAL REBAR	"W" FOOTING	
1'-6"	8"	#4 @ 32" O.C.	3'-0"	-
3'-3" TO 1'-0"	8"	#4 @ 32" O.C.	3'-0"	1'-0"

SOIL NOTES:

1. ALLOWABLE BEARING PRESSURE 2925 PSF.
2. SOIL UNIT WEIGHT 105 PCF.
3. SOIL/FOOTING FRICTION CO-EFFICIENT 0.3.
4. ACTIVE SOIL PRESSURE 35 PSF/FT.
5. PASSIVE SOIL PRESSURE 225 PSF/FT.

NOT USED

SCALE
N.T.S.
2

CONCRETE AND MASONRY RETAINING WALL SCHEDULE

SCALE
N.T.S.
1

CARRIER:

verizon

2785 MITCHELL DRIVE, BLDG 9
WALNUT CREEK, CA 94598

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AE DESIGN GROUP, INC.

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SUITE 150
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REVISIONS			
REV.	DATE	ISSUED FOR	INITIALS
0	02/28/23	CONSTRUCTION SET	MAN

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77991
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CIVIL

03/03/2023

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SANDERS RANCH
100 SANDERS RANCH ROAD
MORAGA, CA 94566

SHEET TITLE

CONCRETE AND MASONRY RETAINING WALL SCHEDULE

SHEET NUMBER

S-3

Preliminary Drainage Report for:

Sanders Ranch Cell Site

100 Sanders Ranch Road, Moraga, CA

JD ESIGN
& CONSULTING ENGINEERS

JDESIGN
& CONSULTING ENGINEERS

EXECUTIVE SUMMARY

November 15, 2022

The purpose of this drainage report is to analyze the existing and proposed site conditions, provide methods and processes used in that analysis, and provide conclusions regarding the impact or non-impact to drainage facilities or structures downstream of the project.

The widely accepted Rational Method was used per Contra Costa County Flood Control District Hydrology Standards to determine site hydrologic values for existing and proposed conditions. The hydrology calculations were then used to determine site hydraulics and pipe sizing.

This report concludes the proposed project access road, cellular tower, equipment, and proposed drainage culvert causes no significant impact to facilities or structures downstream of the project.

The Appendices contain supporting exhibits, documentation, and calculations for this conclusion.

J.D. Christ

JD CHRISTIANSEN
No. C89629
CIVIL

JD Christiansen, PE; CA PE #C89629

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION

The proposed project is a Cellular tower site and equipment with an access road to be located within an existing PG&E electrical transmission tower at approximately 100 Sanders Ranch Road, Moraga, CA. (see Figure 1: Vicinity Map).

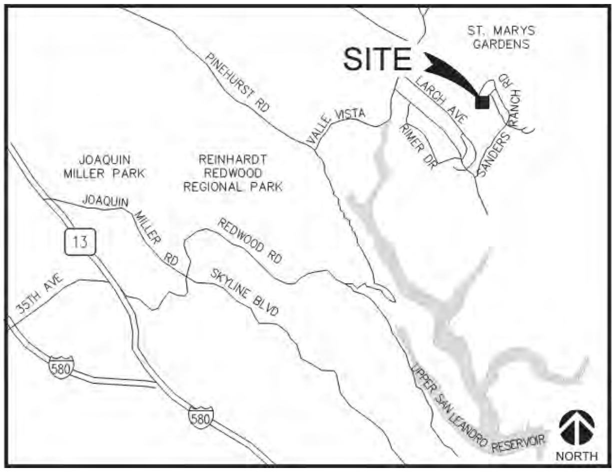


Figure 1: Vicinity Map

The proposed project is a Verizon Wireless unmanned wireless telecommunications facility consisting of a 19’x19’ equipment area under an existing PG&E tower, an access road approximately 1,300 feet long with a fire truck turnaround and underground water tank for fire control. The entire developed area is approximately 0.76-acres on a parcel totaling 100.97-acres.

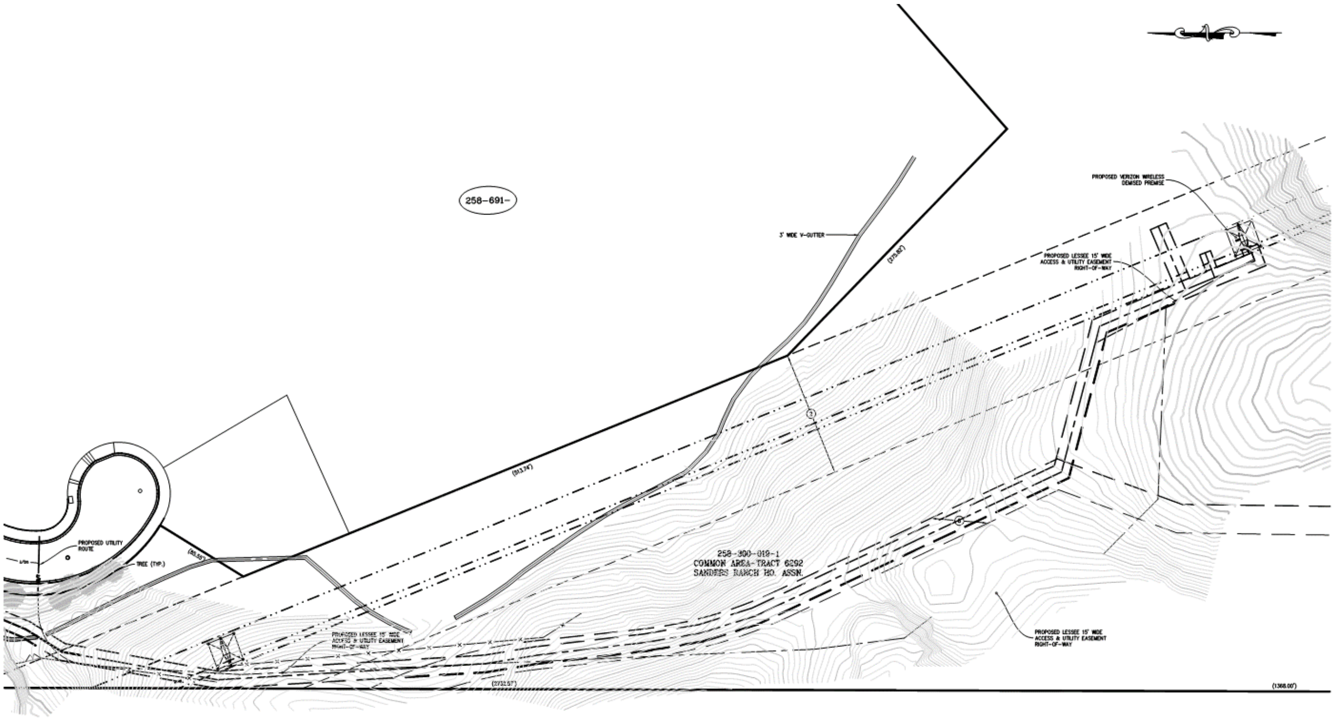


Figure 2: Proposed Site Plan

2.0 EXISTING CONDITIONS

2.1 Existing Land Uses

The site is currently undeveloped, vacant land. The site is currently zoned in the City of Moraga as MOSO-Moraga Open Space District. The project is bordered on the south and east by residential homes in the Sanders Ranch subdivision and on the west and north by MOSO zoned parcels.

2.2 Existing Site Drainage

Drainage patterns are generally steep slopes (>30%) running from the ridgeline located west of the project to the east/northeast. An existing concrete drainage channel along the western edge of the Sanders Ranch subdivision runs at slopes of 4-10%, passes through an existing pipe culvert and finally into an existing area drain inlet; this inlet is the outfall of the site. There is a single existing drainage watershed affected by the proposed development. The shed is observed from topographic data to have sheet flow which flows across the site for approximately 300 feet where it then becomes concentrated into the shallow concrete channel northeast of the site.

See Appendix A for Pre-project drainage patterns and drainage areas.

2.3 Existing Hydraulics

There is a single pipes culvert on the site which runs in line with the existing concrete channel. The pipe was observed to be an HDPE corrugated plastic pipe approximately 12" in diameter running under an existing driveway/gate access area. See Appendix A for Pre-project drainage patterns and drainage areas.

2.4 Existing Soils Data

According to the NRCS Web Soil Survey obtained on November 14, 2022, the soils on site are predominantly Los Osos clay loam (Unified Soil Classification LhF) The Los Osos series is typically found on mountain slopes (30-50% slopes), running approximately 30-45" deep to bedrock. Qualities of this soil type are well-drained very high runoff class, moderately low to moderately high water transmittal, and Hydrologic Soil Group D.

The geotechnical report prepared by Terradyne Engineering, Inc. on May 10, 2021, for SAC Wireless, LLC, is consistent with the USCS designation with the same general qualities described in the NRCS Web Soil Survey (see Appendix B for NRCS Web Soil Survey).

2.5 Groundwater

The geotechnical investigation revealed groundwater encountered during field exploration on 4-7-2021.

3.0 PROPOSED CONDITIONS

3.1 Proposed Land Use

It is understood based on information provided that the project consists of construction of approximately 1,300 feet gravel access route for access to the communication equipment at 100 Sanders Ranch, Moraga, Contra Costa County, California (APN 2583-000-19) The project will disturb less than 1-acre of land and most of the project will be pervious material except for some concrete pads and equipment located under the PG&E electrical transmission tower.

3.2 Proposed Site Drainage

Drainage of the site is proposed to result in no impact to downstream drainage structures or facilities. The project proposes maintaining existing drainage patterns except where the roadway re-routes a small portion (approximately 0.187 acres) of open area into the existing channel.

See Appendix A for Post-project drainage patterns and drainage areas.

4.0 HYDROLOGIC & HYRDRAULIC ANALYSIS

The hydrologic analysis of the project followed the Contract Costa County Flood Control District Hydrology Standards as described on the website. The Rational Method was used first to analyze the existing hydrology and determine the existing runoff flow rate from the site and second to analyze the proposed project runoff flow rate. The hydraulic analysis consisted of routing the flow through proposed surface and subsurface features using Mannings Equation. No detention was required for this project.

4.1 Methodology

Hydrology calculations for the project were prepared using Contra Costa County Flood Control District Hydrology Standards and calculations are provided in the appendices. The site is less than 200 acres, and the proposed drainage system is not complex. A single pipe culvert is proposed on-site for the access roadway to pass over the proposed concrete channel.

- Hydrologic and Hydraulic calculations performed according to CCCFCD Hydrology Standards.
- Rational Method was used ($Q=C_fiA$)
- Weighted Runoff coefficients (C-values) of 0.3 for open areas were applied per CCCFCD standards.
- A weighted average was used to calculate C-values for drainage areas containing both pervious and impervious surfaces.
- IDF curves were created for the project using the CCCFCD standard process and isohyets. (see Appendix C).
- A separate Tc was calculated for each drainage area.
- The Tc calculated for a drainage area was used in the IDF curves to determine the intensity for the watershed
- Existing drainage areas were developed from topographic data provided by a topographic survey and publicly available LiDAR data sets.
- Proposed drainage areas were developed from surface design data in AutoCAD Civil 3D.
- Design calculations were performed for 10-year and 100-year storms.
- Drop inlets and pipe network were analyzed for capacity of the 100-year storm.
- A bypass analysis was not conducted for inlets, and bypass flows were not added to downstream features.
- Culvert was sized using Manning’s Equation.

4.2 Existing Conditions and Results

The existing drainage channel along the east of the project is the only existing drainage feature receiving runoff from this project. Runoff for the existing drainage shed was calculated to be 0.20 cfs for 10-year storm and 0.28 cfs for 100-year storm. See Appendix A for the pre-construction hydrology and Appendix C for calculation and inputs.

4.3 Proposed Conditions and Results

The drainage for the proposed project drains into the concrete drainage channel along the east of the project. Runoff for the proposed drainage shed was calculated to be 0.24 cfs for 10-year storm and 0.34 cfs for 100-year storm. The net increase over existing flows were determined to be not significant. See Appendix A for the post-construction hydrology and Appendix C for calculation and inputs.

4.3.1 Site Hydrology

The post construction drainage areas were determined using the existing and proposed grading contours. A table summarizing the areas, runoff coefficients, time of concentration, intensities, and calculated flow rates for each area for both 10-year and 100-year storms is shown in Appendix C.

4.3.2 Site Hydraulics

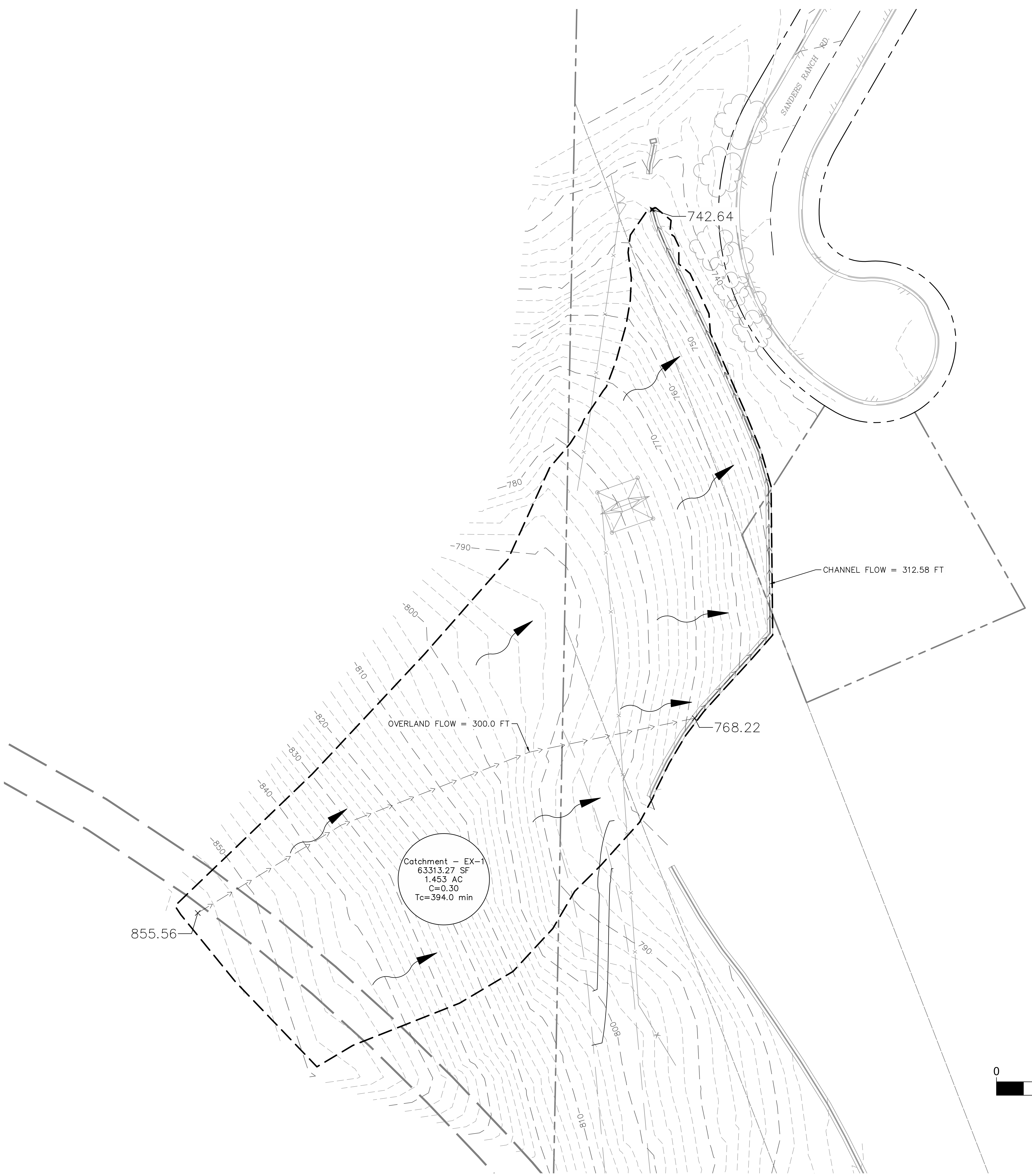
The on-site storm drainage system consists of the existing concrete lined channel and a single pipe culvert to convey site drainage to the existing outfall area drain inlet. Conveyance hydraulic calculations were performed using Hydraflow Express software which applies energy-based methodology and the FHWA Hydraulic Design Series #5 (Hydraulic Design of Highway Culverts, 3rd Edition). The flow from the proposed condition was used along with the proposed pipe criteria to determine the hydraulic grade line and flow condition and therefore a pipe size sufficient to carry the 100-year flow. A printout of the Hydraflow Express information can be found in Appendix D.

5.0 CONCLUSIONS

It is our conclusion that the development of the access route and tower on this site, while slightly raising the flows into the existing channel (Q), the amount of increased flow so small (.06 cfs for 100-year storm) it is the opinion of the Engineer of Record it will have no significant drainage impact downstream of the site. The existing on-site channeling of the storm water is sufficient and will properly convey the runoff.

APPENDIX A

Hydrology Maps



LEGEND:

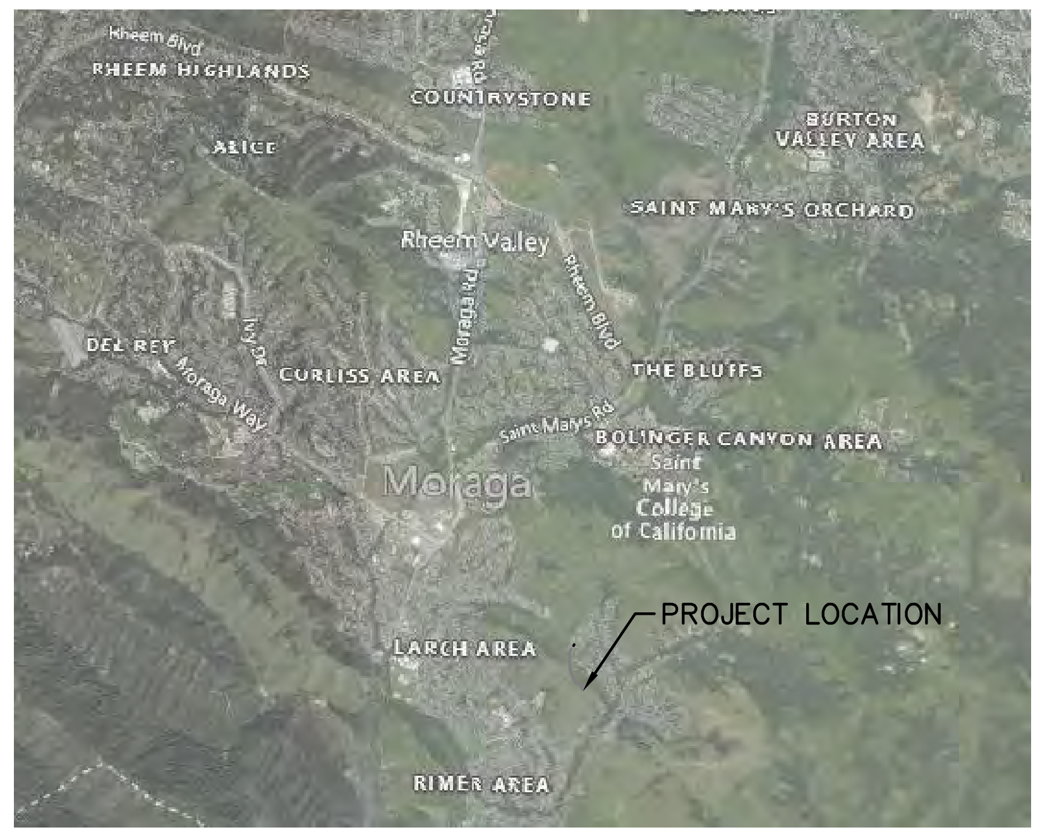
— - - —	EXISTING PROPERTY LINE
—— - ——	ROADWAY CENTERLINE
— — — —	DRAINAGE AREA BOUNDARY
—— - - ——	RIGHT–OF–WAY LINE
- ← - ← - ←	HYDRAULICALLY MOST DISTANT FLOW PATH
∼➤	FLOW DIRECTION ARROW
DA-## #.### AC	DRAINAGE AREA INFORMATION

PRE-PROJECT AREA EX-1 HYDROLOGY CALCULATIONS

Existing Conditions

Sheet Flow

Surface	Short Grass (prairie)		
Manning, n (for sheet flow)	0.15		*From TR-55 Manual Table 3-1*
Flow Length, L (ft)	300		
Mean Seasonal Precipitation (in)	29.0		*CCCFCWCD Isohyet Map*
Slope, S (ft/ft)	0.291		
T_t (hr)	6.55		*Kerby Equation (per CCCFCWCD)*
Concrete Channel Flow			
Surface	Concrete		
Flow Length, L (ft)	312.58		
Slope, S (ft/ft)	0.082		
Average Velocity, V (ft/s)	12.37		*Calculated from Mannings Equation*
Tt (hr)	0.007		*Calculated from Velocity being a function of length/time*
Time of Concentration			
Total, T_t (hr):	6.553	393.17 min	*Σ of Sheet Flow and Concentrated flow*
Peak Flow			
Rainfall Intensity (10 Year), *i* (in/hr)	0.45		*From City of Williams Design Standards, Appendix C*
Rainfall Intensity (100 Year), *i* (in/hr)	0.65		
Runoff Coeficient(10 Year), C	0.3		*Open Area (per CCCFCD Standard Runoff Coefficients)*
Runoff Coeficient(100 Year), C	0.3		
Catchment Area, A (ac)	1.453		*From Hydrology Exhibit*
Peak Flow Rate, Q_{10} (cfs)	0.20		
Peak Flow Rate, Q_{100} (cfs)	0.28		



VICINITY MAP
SCALE: 1"=5000'

0 60 120 Feet

SCALE: 1"=30'

PROJECT:

SANDERS RANCH
PSL#304480
100 SANDERS RANCH ROAD
MORAGA, CA 94566

PREPARED FOR:

verizon✓
2785 MITCHELL DRIVE, BLDG 9
WALNUT CREEK, CA 94598

VENDOR:

SAC™
A NOKIA COMPANY
SAC AE DESIGN GROUP, INC.
5015 SHOREHAM PL, SUITE 150
SAN DIEGO, CA 92122
www.sacw.com
619.736.3766

SITE NO:	PSL#304480
JDC PROJ NO:	22007001
DRAWN BY:	JDC
CHECKED BY:	JDC

REV	DATE	DESCRIPTION

ENGINEER OF RECORD:

REGISTERED PROFESSIONAL ENGINEER
J.D. CHRISTIANSEN
No. 89629
CIVIL
STATE OF CALIFORNIA

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF THE ABOVE LISTED LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

ENGINEERING FIRM:

JDESIGN
& CONSULTING ENGINEERS
15016 Lago Drive, Rancho Murieta, CA 95683

SHEET TITLE:

EXISTING
HYDROLOGY

SHEET NUMBER:

C1.7

Filename: C:\Users\JD-Laptop\OneDrive\JDC Engineers\Projects\22007001-Sanders Ranch\3_CAD\SHEETS\CD\HYDRO-22007001.dwg Print Date: 11/9/2022 6:41:02 PM By: JD-Laptop

LEGEND:

EXISTING PROPERTY LINE
ROADWAY CENTERLINE
DRAINAGE AREA BOUNDARY
RIGHT–OF–WAY LINE
HYDRAULICALLY MOST DISTANT FLOW PATH
FLOW DIRECTION ARROW
DA-## #.### AC DRAINAGE AREA INFORMATION

POST-PROJECT AREA A-1 HYDROLOGY CALCULATIONS

Existing Conditions

Sheet Flow

Surface	Short Grass (prairie)	
Manning, n (for sheet flow)	0.15	*From TR-55 Manual Table 3-1*
Flow Length, L (ft)	227.8	
Mean Seasonal Precipitation (in)	29.0	*CCCFCWCD Isohyet Map*
Slope, S (ft/ft)	0.321	
T_t (hr)	5.63	*Kerby Equation (per CCCFCWCD)*

Concrete Channel Flow

Surface	Concrete	
Flow Length, L (ft)	363.12	
Slope, S (ft/ft)	0.092	
Average Velocity, V (ft/s)	13.70	*Calculated from Mannings Equation*
Tt (hr)	0.007	*Calculated from Velocity being a function of length/time*

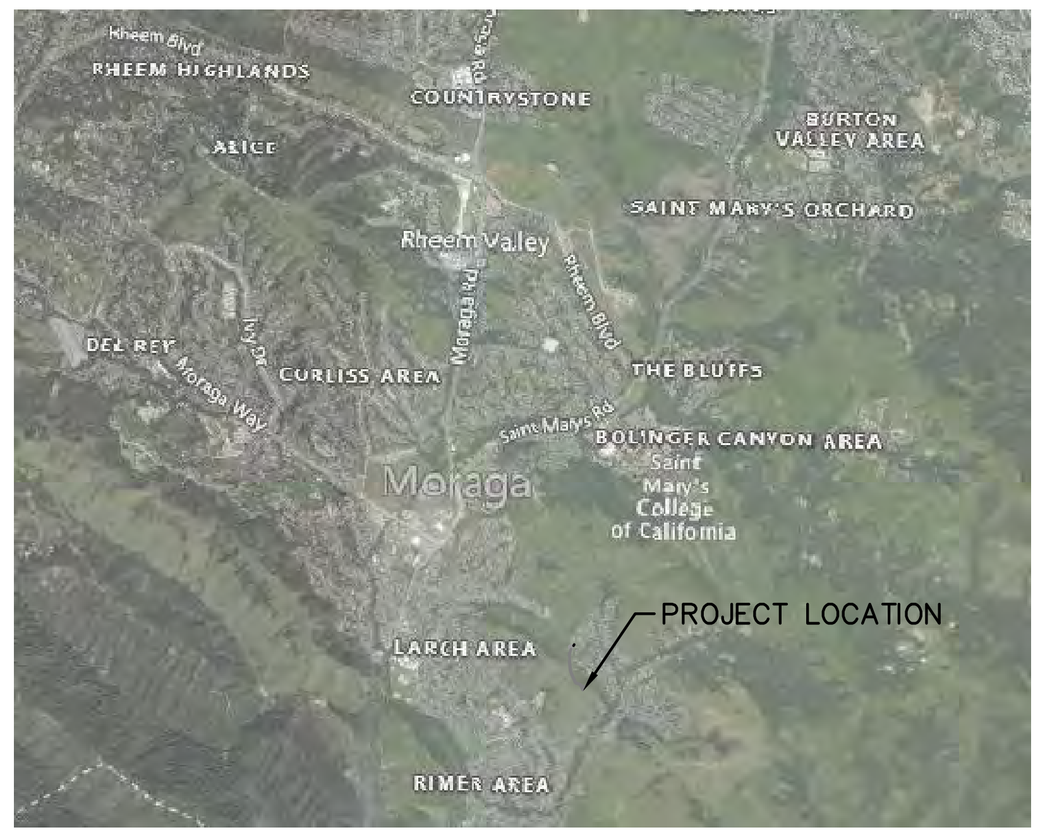
Time of Concentration

Total, T_t (hr):	5.634	338.04 min	*Σ of Sheet Flow and Concentrated flow*

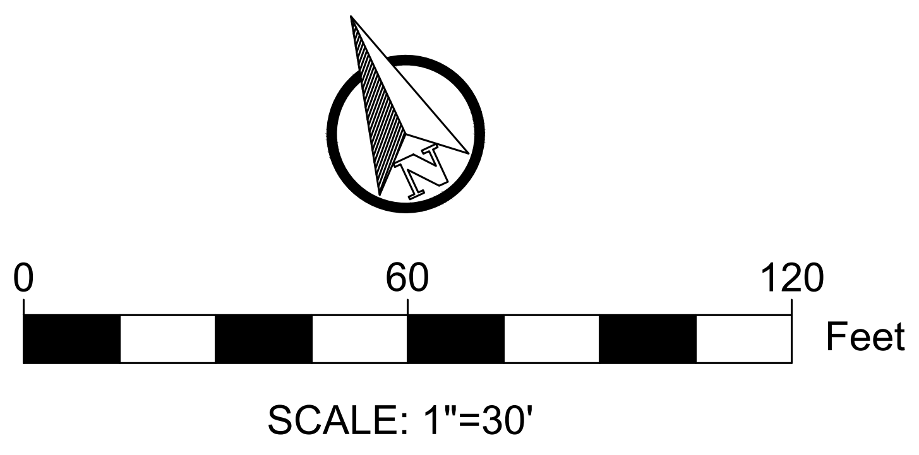
Peak Flow

Rainfall Intensity (10 Year), *i* (in/hr)	0.48	*From City of Williams Design Standards, Appendix C*
Rainfall Intensity (100 Year), *i* (in/hr)	0.70	
Runoff Coeficient(10 Year), C	0.3	*Open Area (per CCCFCD Standard Runoff Coefficients)*
Runoff Coeficient(100 Year), C	0.3	
Catchment Area, A (ac)	1.640	*From Hydrology Exhibit*

Peak Flow Rate, Q_{10} (cfs)	0.24
Peak Flow Rate, Q_{100} (cfs)	0.34



VICINITY MAP
SCALE: 1"=5000'



SCALE: 1"=30'

PROJECT:

SANDERS RANCH
PSL#304480
100 SANDERS RANCH ROAD
MORAGA, CA 94566

PREPARED FOR:

verizon
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5015 SHOREHAM PL, SUITE 150
SAN DIEGO, CA 92122
www.sacw.com
619.736.3766

SITE NO: PSL#304480
JDC PROJ NO: 22007001
DRAWN BY: JDC
CHECKED BY: JDC

REV	DATE	DESCRIPTION

ENGINEER OF RECORD:

JJ CHRISTIANSEN
No. 89629

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ENGINEERING FIRM:

JDESIGN
& CONSULTING ENGINEERS
15016 Lago Drive, Rancho Murieta, CA 95683

SHEET TITLE:

PROPOSED HYDROLOGY

SHEET NUMBER:

C1.8

APPENDIX B

NRCS Web Soil Survey Report

United States
Department of
Agriculture

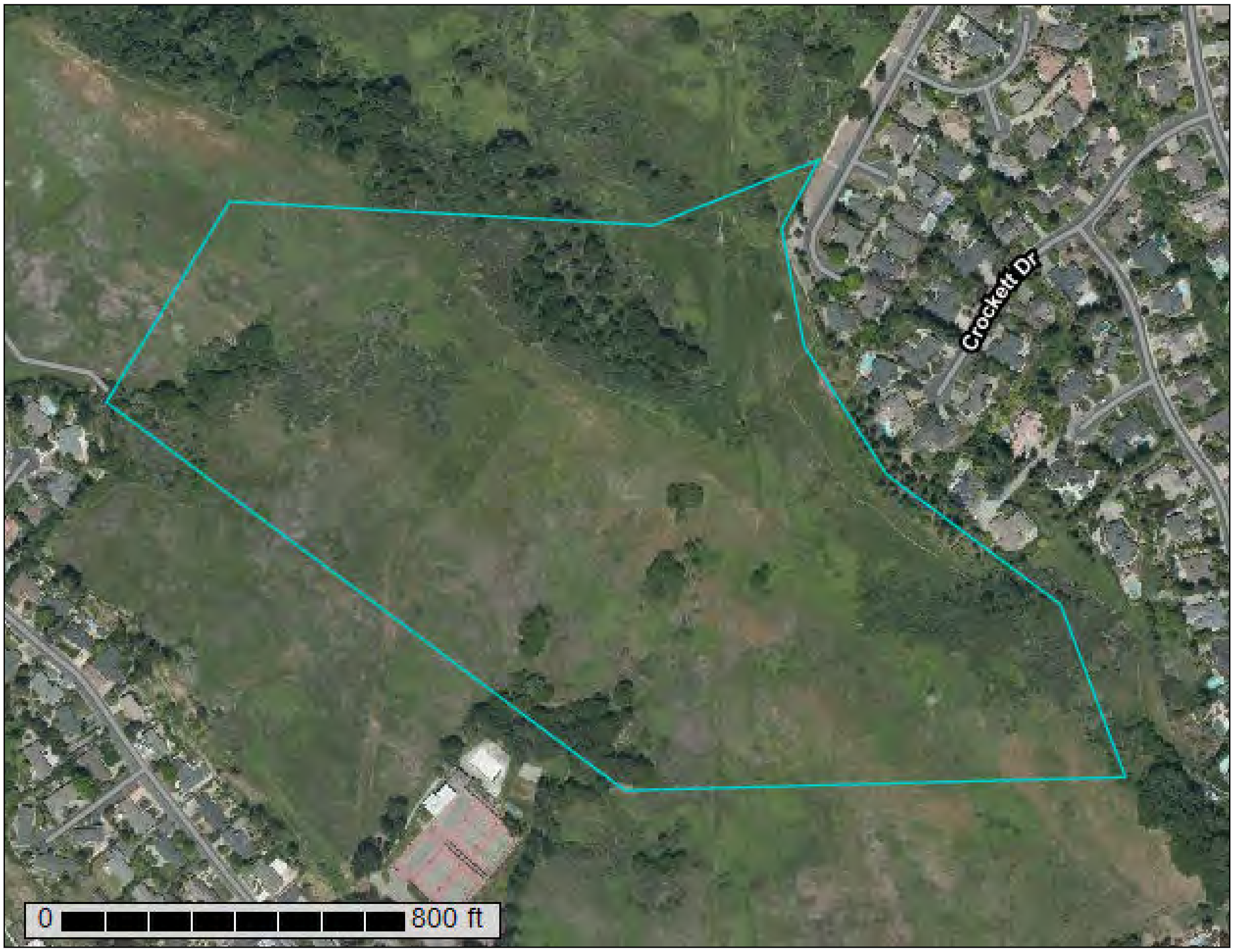
Natural
Resources
Conservation
Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Contra Costa County, California

Sanders Ranch



November 14, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:3,970 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- □ Area of Interest (AOI)

Soils

- □ Soil Map Unit Polygons
- 〰 Soil Map Unit Lines
- ■ Soil Map Unit Points

Special Point Features

- Blowout
- ☒ Borrow Pit
- Clay Spot
- ◇ Closed Depression
- Gravel Pit
- ∴ Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- ◎ Miscellaneous Water
- ◎ Perennial Water
- Rock Outcrop
- + Saline Spot
- ⁙ Sandy Spot
- Severely Eroded Spot
- ◇ Sinkhole
- Slide or Slip
- Sodic Spot
- ≣ Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- △ Other
- Special Line Features

Water Features

- 〰 Streams and Canals

Transportation

- ┼┼┼ Rails
- 〰 Interstate Highways
- 〰 US Routes
- 〰 Major Roads
- 〰 Local Roads

Background

- ■ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Contra Costa County, California
Survey Area Data: Version 19, Aug 31, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 25, 2019—Apr 29, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
LhF	Los Osos clay loam, 30 to 50 percent slopes	46.0	100.0%
Totals for Area of Interest		**46.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Contra Costa County, California

LhF—Los Osos clay loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: 2yrgf
Elevation: 250 to 1,440 feet
Mean annual precipitation: 16 to 30 inches
Mean annual air temperature: 58 to 61 degrees F
Frost-free period: 283 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Los osos and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Los Osos

Setting

Landform: Mountain slopes, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

A - 0 to 10 inches: clay loam
Bt1 - 10 to 20 inches: clay
Bt2 - 20 to 32 inches: clay
Cr - 32 to 42 inches: bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R015XD035CA - STEEP FINE LOAMY
Hydric soil rating: No

Minor Components

Alo

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Los osos, soil slips

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Lodo

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Millsholm

Percent of map unit: 2 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Altamont

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Diablo

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Map—Hydrologic Soil Group

Map Scale: 1:3,970 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

▭ Area of Interest (AOI)

Soils

Soil Rating Polygons

- 🟪 A
- 🟩 A/D
- 🟦 B
- 🟫 B/D
- 🟦 C
- 🟨 C/D
- 🟥 D
- ⬜ Not rated or not available

Soil Rating Lines

- 〰 A
- 〰 A/D
- 〰 B
- 〰 B/D
- 〰 C
- 〰 C/D
- 〰 D
- 〰 Not rated or not available

Soil Rating Points

- ◼ A
- ◼ A/D
- ◼ B
- ◼ B/D
- ◼ C
- ◼ C/D
- ◼ D
- ◻ Not rated or not available

Water Features

- 〰 Streams and Canals

Transportation

- ┼┼┼ Rails
- 〰 Interstate Highways
- 〰 US Routes
- 〰 Major Roads
- 〰 Local Roads

Background

- ▨ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Contra Costa County, California
Survey Area Data: Version 19, Aug 31, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 25, 2019—Apr 29, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
LhF	Los Osos clay loam, 30 to 50 percent slopes	D	46.0	100.0%
Totals for Area of Interest			**46.0**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

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Map—Hydrologic Soil Group

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Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- □ Area of Interest (AOI)

Soils

Soil Rating Polygons

- ■ A
- ■ A/D
- ■ B
- ■ B/D
- ■ C
- ■ C/D
- ■ D
- □ Not rated or not available

Soil Rating Lines

- 〰 A
- 〰 A/D
- 〰 B
- 〰 B/D
- 〰 C
- 〰 C/D
- 〰 D
- 〰 Not rated or not available

Soil Rating Points

- ■ A
- ■ A/D
- ■ B
- ■ B/D
- ■ C
- ■ C/D
- ■ D
- □ Not rated or not available

Water Features

- 〰 Streams and Canals

Transportation

- ┼┼┼ Rails
- 〰 Interstate Highways
- 〰 US Routes
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- 〰 Local Roads

Background

- ▨ Aerial Photography

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Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Contra Costa County, California
Survey Area Data: Version 19, Aug 31, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

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Rating Options—Hydrologic Soil Group

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Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

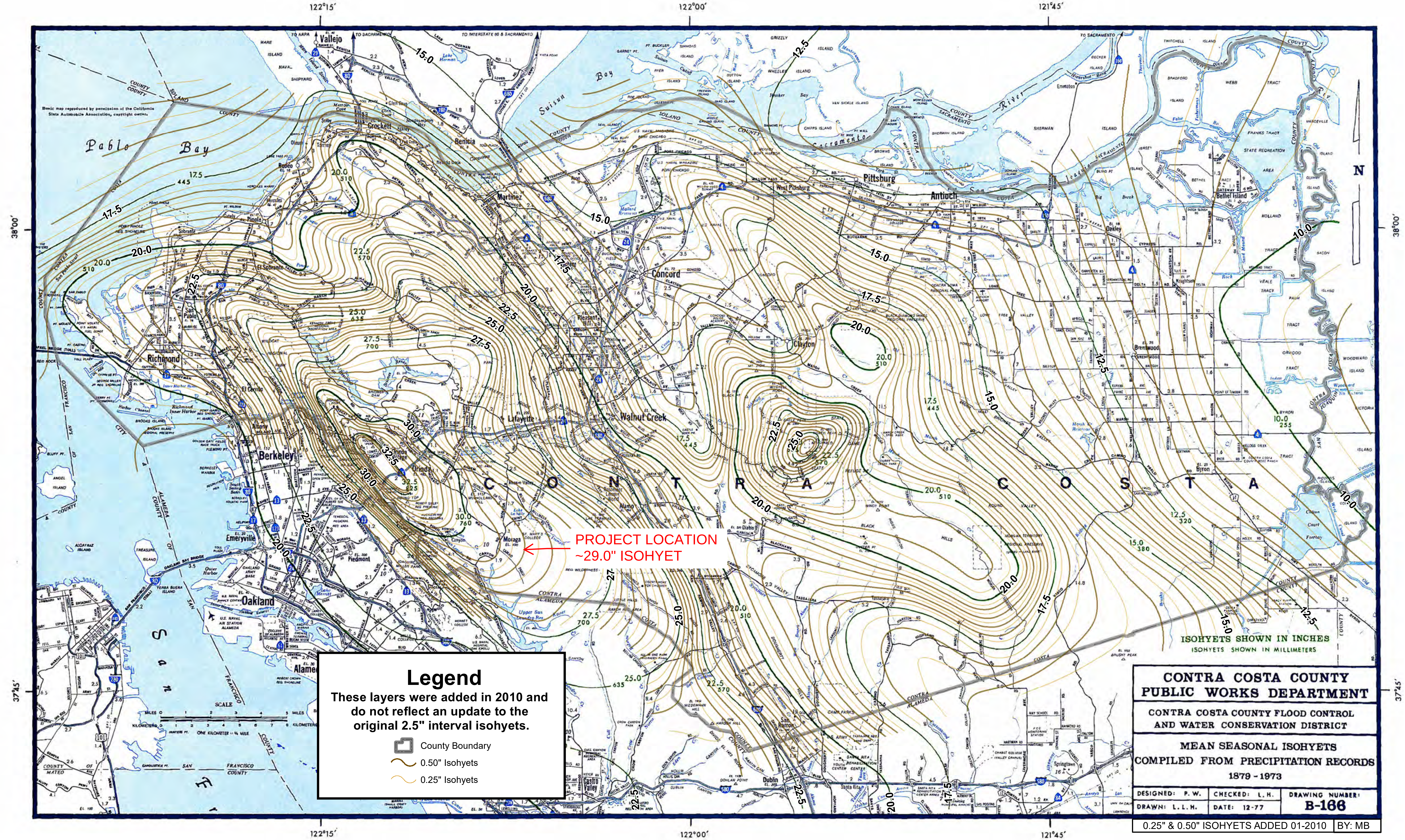
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX C

Hydrology Calculation Data



Legend

These layers were added in 2010 and do not reflect an update to the original 2.5" interval isohyets.

▢ County Boundary

〜 0.50" Isohyets

〜 0.25" Isohyets

CONTRA COSTA COUNTY PUBLIC WORKS DEPARTMENT

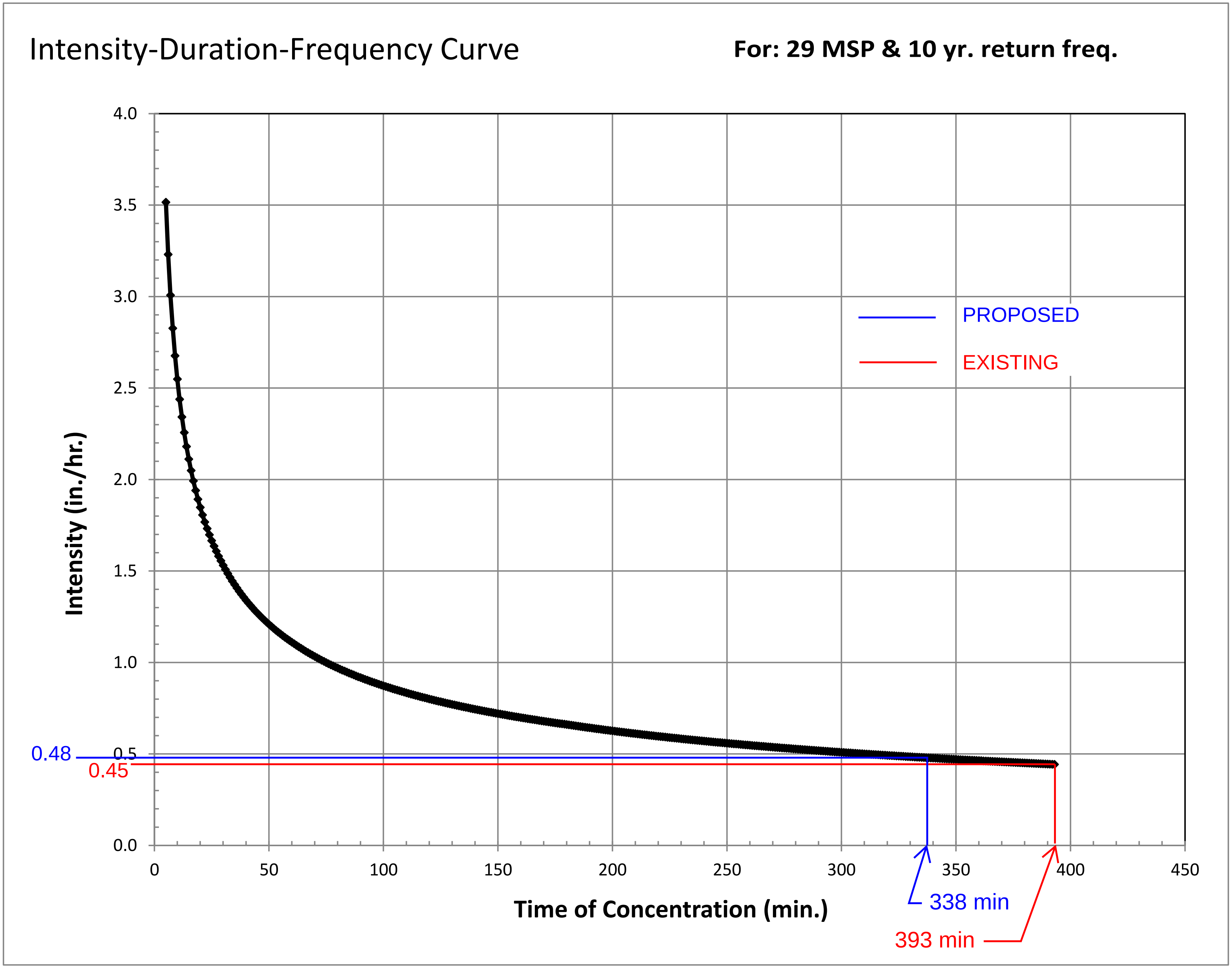
CONTRA COSTA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

MEAN SEASONAL ISOHYETS
COMPILED FROM PRECIPITATION RECORDS
1879 - 1973

DESIGNED: P. W.	CHECKED: L. H.	DRAWING NUMBER:
DRAWN: L. L. H.	DATE: 12-77	B-166

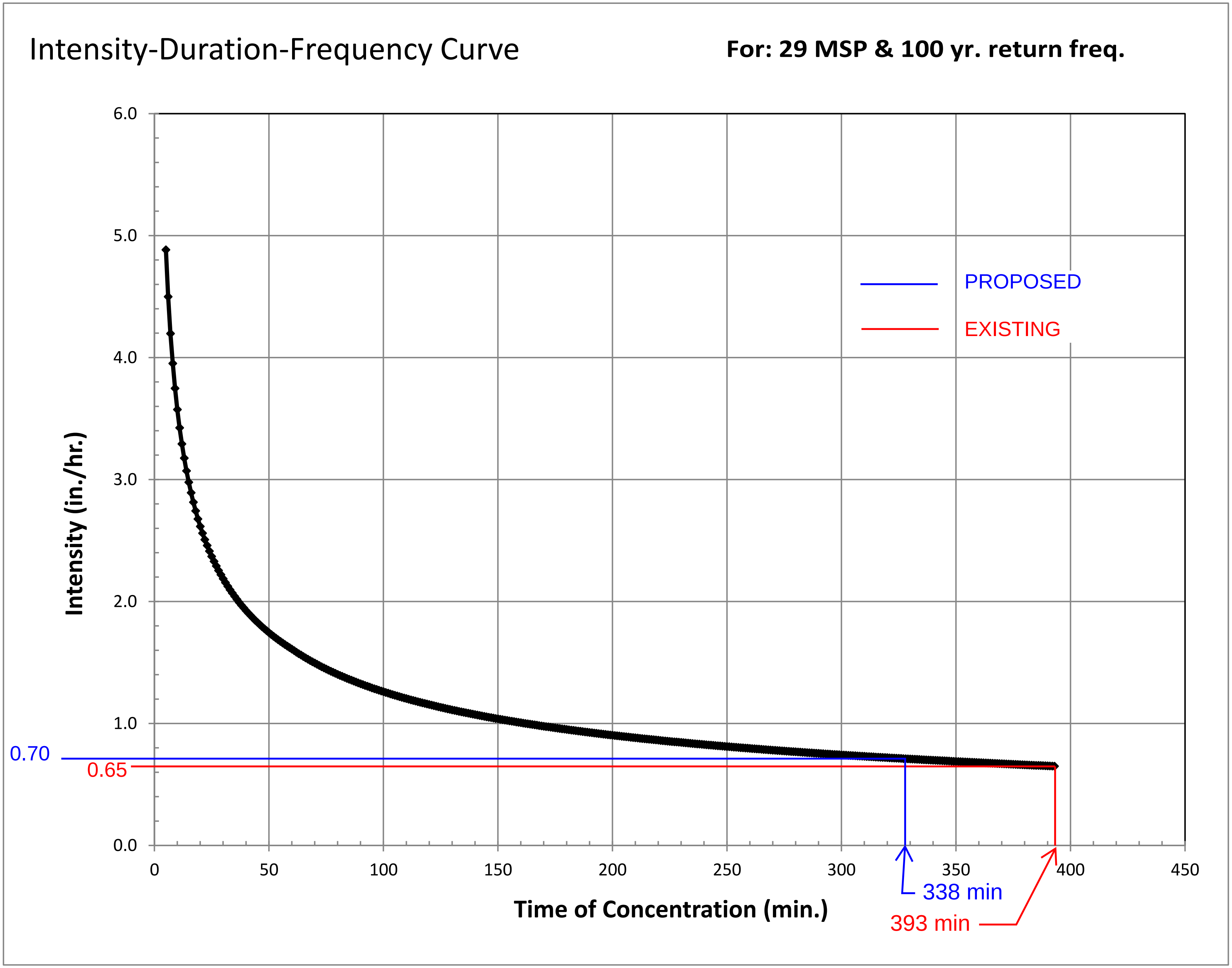
0.25" & 0.50" ISOHYETS ADDED 01-2010	BY: MB

Time values are set to null() so they don't plot if time is beyond limit set on first sheet.
Plot Limit = 393



Time values are set to null() so they don't plot if time is beyond limit set on first sheet.

Plot Limit = 393



PRE-PROJECT AREA EX-1 HYDROLOGY CALCULATIONS

Existing Conditions

Sheet Flow

Surface	Short Grass (prairie)	
Manning, n (for sheet flow)	0.15	*From TR-55 Manual Table 3-1*
Flow Length, L (ft)	300	
Mean Seasonal Precipitation (in)	29.0	*CCCFCWCD Isohyet Map*
Slope, S (ft/ft)	0.291	
T_t (hr)	6.55	*Kerby Equation (per CCCFCWCD)*

Concrete Channel Flow

Surface	Concrete	
Flow Length, L (ft)	312.58	
Slope, S (ft/ft)	0.082	
Average Velocity, V (ft/s)	12.37	*Calculated from Mannings Equation*
Tt (hr)	0.007	*Calculated from Velocity being a function of length/time*

Time of Concentration

Total, T_t (hr):	6.553	393.17 min	*Σ of Sheet Flow and Concentrated flow*

Peak Flow

Rainfall Intensity (10 Year), *i* (in/hr)	0.45	*From City of Williams Design Standards, Appendix C*
Rainfall Intensity (100 Year), *i* (in/hr)	0.65	
Runoff Coeficient(10 Year), C	0.3	*Open Area (per CCCFCD Standard Runoff Coefficients)*
Runoff Coeficient(100 Year), C	0.3	
Catchment Area, A (ac)	1.453	*From Hydrology Exhibit*

Peak Flow Rate, Q_{10} (cfs)	0.20
Peak Flow Rate, Q_{100} (cfs)	0.28

Time of Concentration:

Sheet-flow:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}S^{0.4}}$$

T_t = sheet Flow Travel Time (in-hr)

n = Overland-Flow Roughness Coefficient

L= Length of Overland-Flow Path (ft)

P_2 = 2-yr 24-hr Rainfall depth (in-in)

S_o = Slope (ft/ft)

Shallow Concentrated Flow:

$$V = 16.1345\sqrt{S_o}$$

V = Shallow-Concentrated Flow Velocity (ft/s)

S_o = Slope (ft/ft)

POST-PROJECT AREA A-1 HYDROLOGY CALCULATIONS

Existing Conditions

Sheet Flow

Surface	Short Grass (prairie)	
Manning, n (for sheet flow)	0.15	*From TR-55 Manual Table 3-1*
Flow Length, L (ft)	227.8	
Mean Seasonal Precipitation (in)	29.0	*CCCFCWCD Isohyet Map*
Slope, S (ft/ft)	0.321	
T_t (hr)	5.63	*Kerby Equation (per CCCFCWCD)*

Concrete Channel Flow

Surface	Concrete	
Flow Length, L (ft)	363.12	
Slope, S (ft/ft)	0.092	
Average Velocity, V (ft/s)	13.70	*Calculated from Mannings Equation*
Tt (hr)	0.007	*Calculated from Velocity being a function of length/time*

Time of Concentration

Total, T_t (hr):	5.634	338.04 min	*Σ of Sheet Flow and Concentrated flow*

Peak Flow

Rainfall Intensity (10 Year), *i* (in/hr)	0.48	*From City of Williams Design Standards, Appendix C*
Rainfall Intensity (100 Year), *i* (in/hr)	0.70	
Runoff Coeficient(10 Year), C	0.3	*Open Area (per CCCFCD Standard Runoff Coefficients)*
Runoff Coeficient(100 Year), C	0.3	
Catchment Area, A (ac)	1.640	*From Hydrology Exhibit*

Peak Flow Rate, Q_{10} (cfs)	0.24
Peak Flow Rate, Q_{100} (cfs)	0.34

Time of Concentration:

Sheet-flow:

$$T_t = \frac{0.007\,(nL)^{0.8}}{(P_2)^{0.5}S^{0.4}}$$

T_t = sheet Flow Travel Time (in-hr)

n = Overland-Flow Roughness Coefficient

L= Length of Overland-Flow Path (ft)

P_2 = 2-yr 24-hr Rainfall depth (in-in)

S_o = Slope (ft/ft)

Shallow Concentrated Flow:

$$V = 16.1345\sqrt{S_o}$$

V = Shallow-Concentrated Flow Velocity (ft/s)

S_o = Slope (ft/ft)

APPENDIX D

Pipe Culvert Calculations

Culvert Report

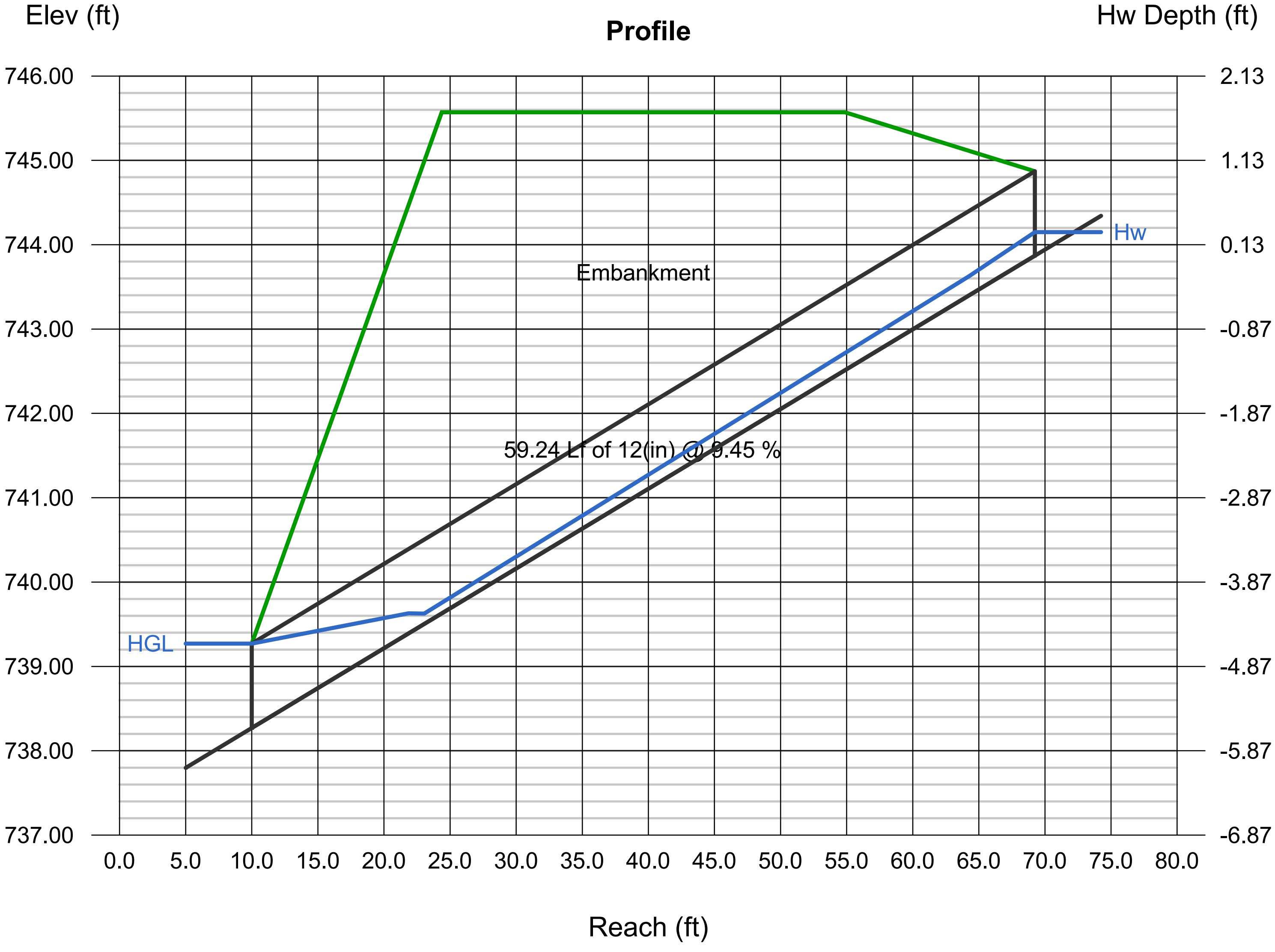
Sanders Ranch Culvert

Invert Elev Dn (ft) = 738.27
Pipe Length (ft) = 59.24
Slope (%) = 9.45
Invert Elev Up (ft) = 743.87
Rise (in) = 12.0
Shape = Circular
Span (in) = 12.0
No. Barrels = 1
n-Value = 0.013
Culvert Type = Circular Concrete
Culvert Entrance = Groove end projecting (C)
Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.2

Embankment
Top Elevation (ft) = 745.57
Top Width (ft) = 30.50
Crest Width (ft) = 20.00

Calculations
Qmin (cfs) = 0.34
Qmax (cfs) = 0.34
Tailwater Elev (ft) = Crown

Highlighted
Qtotal (cfs) = 0.34
Qpipe (cfs) = 0.34
Qovertop (cfs) = 0.00
Veloc Dn (ft/s) = 0.43
Veloc Up (ft/s) = 2.34
HGL Dn (ft) = 739.27
HGL Up (ft) = 744.11
Hw Elev (ft) = 744.15
Hw/D (ft) = 0.28
Flow Regime = Inlet Control



ENC Fencing Installation Guide

Fibergrate
Composite Structures

Building the World to Last®

HIGH PERFORMANCE COMPOSITE SOLUTIONS

ENC Fencing Installation Guide

SUGGESTED TOOL LIST

- ☐ **48" Spirit Level**
- ☐ **Laser level**
- ☐ **25 ft tape measure**
- ☐ **4 ft straight edge**
- ☐ **Chalk line**
- ☐ **Equipment for drilling post holes and mixer for concrete**
- ☐ **7.5" diameter circular saw with masonry, carbide grit, or diamond grit blade.**
- ☐ **Drill motor with 5/16", 7/16" and ¾" diameter masonry or diamond grit drill bits**
- ☐ **SAE Sockets and rachets or power tools for installing bolts**
- ☐ **Surveying and measuring equipment for laying out fence posts**
- ☐ **2" x 4" wood shoring and C-clamps for securing posts during foundation cure**
- ☐ **Come along and wire cutting tools for installing barbed wire (if specified)**

NOTE: Cuts and drilled holes must be sealed to maintain corrosion protection.

INSTALLATION INSTRUCTIONS:

1. Immediately upon receiving the shipment, inspect all materials and check against the packing list for missing items or for damaged materials. Contact Fibergrate at 800-527-4043 to report any issues with the shipment.
2. Read and review all drawings to fully understand the scope of the project, the installation details, and the basic layout. Contact Fibergrate at the number above if there are questions or issues with installing the fence per the drawings.
3. Lay out post locations using survey equipment to achieve the most accurate possible layout. Dimensions on the drawings are to the centerline of the line posts and to their outside face. Dimensions are to the outside face of the corner posts.
4. Excavate for the foundations to the depth and diameter required. Post embedment in the concrete foundation can be located on the installation drawings. Typical post embedment into the foundation is 1'-11 7/8". A 3'-6" post embedment is required for the 6" x 6" x 3/8" sq. tube posts at the two leaf vehicular gates and the posts adjacent to them used for bracing.
5. Standard line posts (4", 6", or 8" wide flange beams) and corner posts (6" x 6" x 3/8" angle) are supplied in a length of 9'-11 7/8". Allow for 8' of post to extend above ground for the installation of the fencing panels. Posts for standard vehicular gates are supplied at a length of 11'-6". Post embedment and therefore length may vary based on project requirements.
6. Install line posts, corner posts, and gate posts at the locations indicated on the drawings. Be careful to install any specially fabricated corner posts or gate posts at the correct locations and orientation. Set posts by temporarily bracing them in the excavated holes and filling the holes with concrete. Brace posts so that they are plumb in both directions and ensure that the post to post spacing is accurate to within a ±1/4 inch tolerance. Wood bracing should be clamped to the FRP posts with C-clamps – do not use temporary screws or nails into FRP members. Allow concrete to adequately cure prior to continuing with the installation process.
7. Before the concrete cures, install any horizontal and diagonal bracing at the gate posts using the stainless steel hardware indicated in the erection details. Tighten all bolts finger tight during the assembly process, then go back and fully tighten them after all braces are installed. Tighten bolts to a 'snug tight' condition – after the members are in contact, tighten the bolts as tightly as you can with a wrench by hand. Double check plumb and location of posts prior to allowing the concrete to fully cure.
8. Temporarily clamp the fencing panels in place and back drill 7/16" diameter holes in the center of the fence panel cells as indicated in the elevations and details for installation of the square fence panel clips. Use single clips at the corner posts and the interior of fence panels where indicated. Use two fence panel clips at abutments falling on the center of line posts. Install fence panel clips with the 3/8" diameter galvanized carriage bolts, nuts, and washers supplied. F-clips are used to secure the horizontal panel abutments between line posts as indicated in the drawings. Install all fence panel clips finger tight and full tighten only after all fence panels are installed to allow for small adjustments.
9. For fence panels that require cutting, refer to the 'Guide to Fabrication' on page 4 for specific cutting and sealing procedures.

10. For fences on sloped ground, install the fence panels with the panels oriented horizontally and with the combined 8' height on the down slope end of the panel. Trim the bottom edge of the lower most fence panel to conform to the bottom edge of the slope. The top of the uppermost panel will be horizontal and uncut. Installing the panels this way will result in a 'stair-step' upper edge of the fence panels.
11. Personnel gates are pre-assembled. Install by temporarily clamping in place with the top of the gate aligned with the top of the gate post and leaving a 2" gap at the bottom. The face mounted hinges attach to the outer face of the gate posts and the door swings outward – reference the detail on the drawings. Back drill the posts using a 5/16" diameter drill bit using the hinge holes as a template. Install the hinges using the ¼" diameter countersunk head stainless steel bolts provided.
12. Vehicular gates are not pre-assembled. Assemble the vehicular gate leaves following the drawings provided. Assemble the angle frame and X-braces with all bolts finger tight and ensure squareness by measuring the diagonal out to out dimension of the frame and adjusting until the two diagonal measurements are equal. When the diagonal measurements are equal, torque all bolts to a snug tight condition. Install the gate fence panels following the procedure given under (8) above. Install the top and bottom strap hinges in the locations using the 3/8" diameter carriage bolts provided. Leave the middle strap hinge off until after the gates are hung.
13. Install the top and bottom hook bolts in the 6" x 6" x 3/8" square tube posts with the hooks pointing upward. Install the hooks with a washer and nut on both the inside and outside of the square tube and with the centerline of the pivot 3" from the face of the square tube. Do not install the center hook bolt until after the gate leaves are hung.
14. Lubricate the pivot portion of the hook bolts using axle grease or white lithium grease (not provided) and hang the gate leaves. Adjust the hook bolts as required until a uniform gap of 1" exists between the two gate leaves. Torque down the nuts on the hook bolts to lock secure them in place.
15. Thread one nut and washer onto the middle hook bolt, threading it so that the washer is 3" from the centerline of the pivot. Lubricate the pivot portion of the middle hook bolt as above and slip the middle strap hinge over it. Install this assembly into the square tube post and the gate with the hook of the bolt pointed downward. This will prevent the gate leaves from being lifted off of the hook bolts as a mode of forced entry. Install the strap hinge bolts and the washer/nut on the hook bolt and adjust so that there is no binding as the gate is opened and closed.
16. Steps 16-20 are for fence installations with barbed wire. At line posts, install two 15" Universal Barb Arms as follows. Drill a 7/16" diameter hole at the centerline of the post web located 15/16" down from the cut end of the post. Interleaf the ends of the barb arms and slide them over the web of the post and secure using a 3/8" x 1-1/2" long carriage bolt as shown in the detail. The barb arms are at 45 degrees from the horizontal, one facing inward and one facing outward.
17. At pedestrian gates and the inside and outside edges of vehicular gates, barbed wire is connected to the vertical gate angles which are extended 12" above the top of the gate. The barbed wire connection consists of three ¼" diameter x 1" long zinc plated eye bolts, installed in 5/16" diameter holes drilled at equal spacings into the leg of the angle which faces the outside of the fence.
18. Barb arms at the midpoint of vehicular gate leaves are installed using two 4" x 4" x ½" x 4" long angle clips bolted into the top angle of the gate using two 3/8" x 2" hex head bolts for each angle. The barb arm connected to one angle faces inward at 45 degrees from horizontal and the other barb arm faces outward. Barb arms are secured to the angles using a single 3/8" x 2-1/4" carriage bolt which passes through both.
19. For barbed wire installations, the 6" x 6" x 3/8" corner posts are supplied long enough to be 12" above the top of the fence panels. The barbed wire is connected to six ¼" diameter x 1" long zinc plated eye bolts are installed in 5/16" diameter holes drilled at equal spacings into the two legs of the post, three eye bolts on each side.
20. The barbed wire is threaded and tensioned using the same procedure as steel fencing.

SHIPPING PRACTICES

1. Grating to be shipped as full panels (4'x12') for field cutting and notching (by others).
2. All posts are shipped in stock 20' lengths to be field cut to length and drilled (by others)
3. Field attach grating (by others).
4. Gates - field drill the posts for field assembly (by others). Gates are to be shipped unassembled. Gates will require field assembly (by others).
5. Post bracing to be shipped in 20' stock lengths to be field cut to length and drilled (by others).
6. Approximately 10% additional grating panels, post material, barbed wire, bayonets, hardware, and grating clips to be shipped.

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GUIDE TO FABRICATION

Fabrication Tips

A major advantage of using Fibergrate Composite Structures' fiberglass products is the ease of fabrication — sawing, grinding, drilling and machining is similar to working with wood, metals and plastics. If possible, perform fabrication "on-site" to increase accuracy. Be sure to allow for saw kerf (usually 3/16") when performing take-offs and layouts. For a nice looking installation, cut panels, so bars of adjoining panels are aligned and leave a solid bar on all sides.

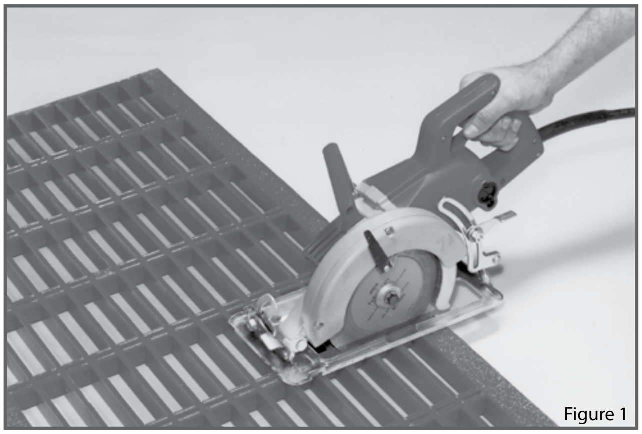

Figure 1

Figure 2

Recommended Safety Practices

Prior to cutting Fibergrate products, take the following steps:

1. Carefully read the Safety Data Sheet (SDS), formerly MSDS. If you do not have an SDS, contact Fibergrate prior to fabricating. Individuals with respiratory ailments should not fabricate FRP products. (*SDS can be downloaded at fibergrate.com*)
2. Observe common safety precautions when using cutting tools. Always wear gloves when handling Fibergrate products. Wear approved safety glasses or goggles to protect your eyes and a respirator (mask) to reduce inhalation of dust. We recommend the use of a NIOSH/MSHA approved mask for dust with a permissible exposure limit (PEL) of not less than 0.1 mg/M^3.
3. Dust from cutting FRP products can cause skin irritation. Wear clothing to reduce dust from coming into contact with skin. If cutting products causes difficulty in breathing or excessive skin irritation, stop immediately and consult a physician.
4. Observe common safety precautions when using the epoxy coating or sealing kit. Read and follow instructions provided with the coating or enclosed in the kit prior to using. Always wear personal protective equipment when working with FRP products or using a protective coating or sealing kit. Do not allow resin or catalyst to come in contact with skin.

Figure 3

Figure 4

Tools Required

1. Power saw with a masonry or diamond blade for cement board products (Figure 1); use a circular saw for straight cuts, a jig saw for circular cuts. For large fabrication jobs, use a diamond grit blade.
2. Sawhorses or platform for supporting products while cutting (Figure 2).
3. Tape measure, straight-edge and chalk-line or felt-tip pen for marking cuts.
4. Use Aervoe Epoxy 403 Clear coating (Figure 3) to seal edges after cutting*. Alternate products to use for sealing Corvex & Vi-Corr gratings are: Devcon 2-Ton Epoxy or 5 Minute Epoxy. For Corvex resins only: Rustoleum Lacquer 1906 Clear, Helmsman Spar Urethane, Krylon-Crystal Clear protective coating.

**Fibergrate's previous seal kit (Figure 4) is still available with minimum order quantity requirements.*

Procedures

1. Support panel securely so it will not flex or shift during cutting.
2. Mark cuts clearly and carefully. Avoid splitting 1/4" and 5/16" bars. Molded construction allows "stubs" to support weight.
3. Cut from the smooth side (bottom) of a grit-top panel.
4. Use even, steady pressure when cutting. Excessive pressure may cause heat and/or ragged edges. Replace dull blades to prevent heat buildup.
5. Use an epoxy sealer to coat all cut or sanded surfaces. This is recommended to prevent corrosive chemicals from reaching exposed glass fibers. Carefully read and follow the instructions provided on the epoxy coating or those included with the sealing kit.

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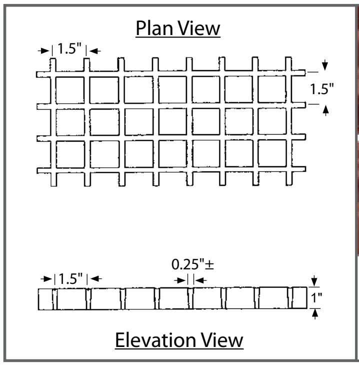
Fibergrate Composite Structures Inc. manufactures fiberglass reinforced plastic (FRP) products that combine corrosion resistance, strength, durability, safety, and low maintenance to provide a longer lasting solution for industrial and commercial applications. Fibergrate's variety of products lines are often used in conjunction with one another to create a complete FRP solution that will meet customer and industry requirements. Fibergrate® molded grating and Dynaform® structural shapes are used to construct screening and non conductive security fencing systems. These systems are designed to provide protection and security around electrical equipment, machinery, and other areas that require a non-magnetic, thermally and electrically non conductive system.

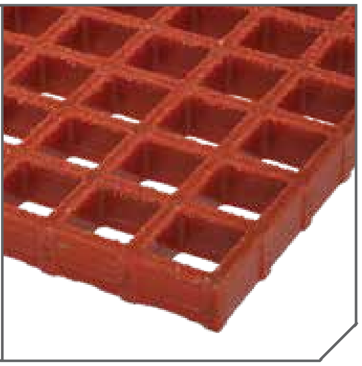
PANEL DATA

Product*	Depth	Mesh	Panel Sizes	Color	Resin
Fibergrate® Molded Grating	1"	1-1/2" x 1-1/2"	3' x 10', 4' x 8', 4' x 12'	Dark Gray	Corvex®
Micro-Mesh® Molded Grating	1"	3/4" x 3/4"	4' x 12'	Dark Gray	Corvex®

1" Deep x 1-1/2" Square Mesh

# of Bars/ Ft of Width	Load Bar Width	Open Area	Load Bar Centers	Approximate Weight
8	1/4"	70%	1-1/2"	2.5 psf

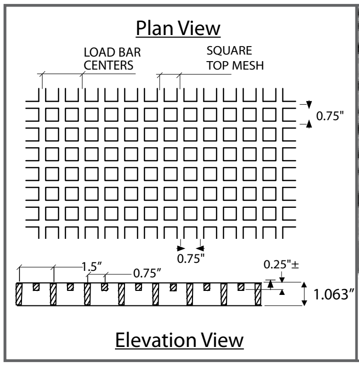


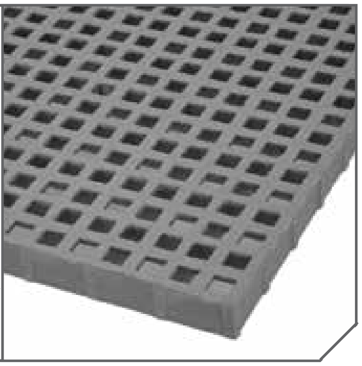


Section Properties per Ft of Width: A = 1.71 IN^2 I = 0.14 IN^4 S = 0.29 IN^3

1" Deep x 3/4" Micro-Mesh®

# of Bars/ Ft of Width	Load Bar Width	Open Area	Load Bar Centers	Approximate Weight
8	1/4"	44.4%	1-1/2"	2.9 psf



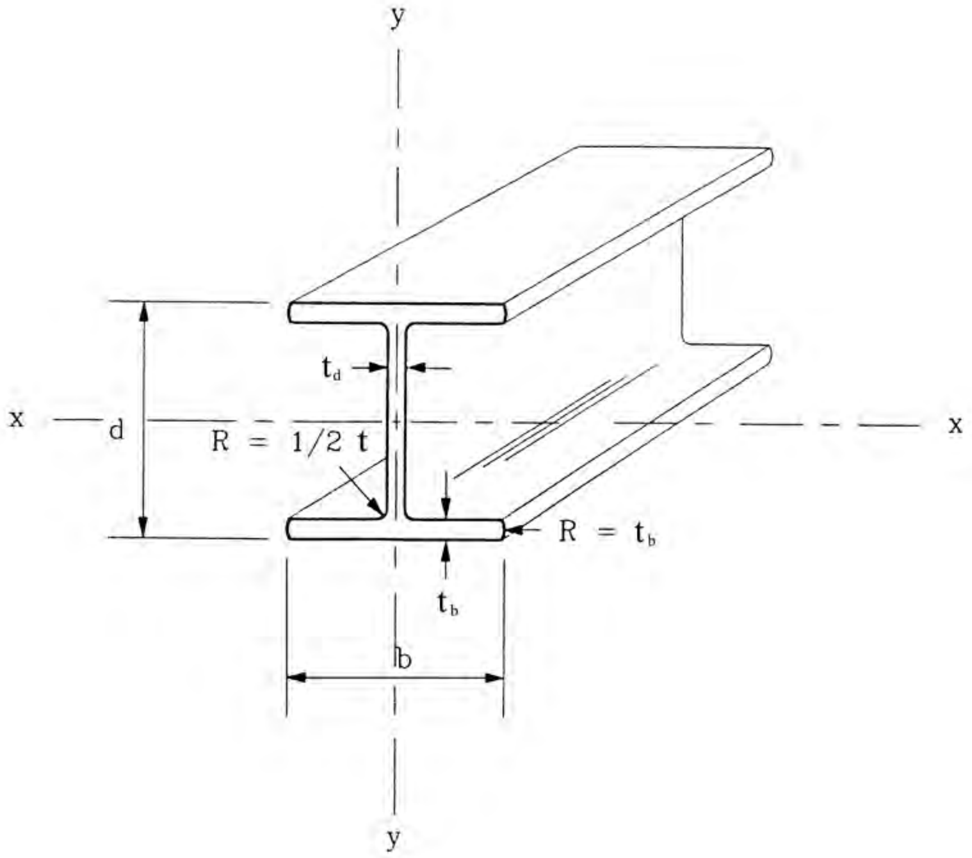


Section Properties per Ft of Width: A = 2.34 IN^2 I = 0.23 IN^4 S = 0.37 IN^3

POST DATA

Wide Flange Shapes

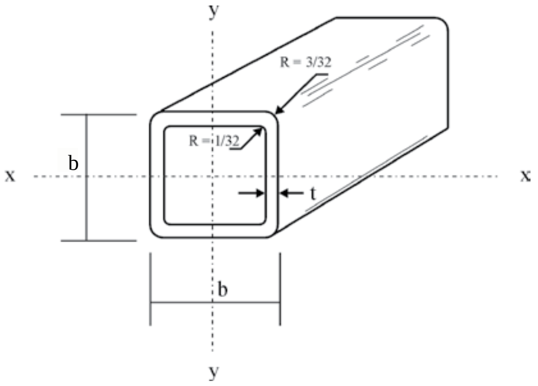
SECTION DIMENSIONS					SECTION PROPERTIES					
					X - X			Y - Y		
d	b	t	A	Wt.	I	S	r	I	S	r
in.	in.	in.	in.^{2}	lb./ft.	in.^{4}	in.^{3}	in.	in.^{4}	in.^{3}	in.
6	6	.25	4.39	3.40	28.28	9.43	2.54	9.01	3.00	1.43
6	6	.375	6.48	4.90	40.17	13.39	2.49	13.52	4.51	1.44
8	8	.375	8.73	6.49	99.19	24.80	3.37	32.03	8.01	1.92
8	8	.5	11.51	8.70	126.96	31.74	3.32	42.74	10.69	1.93



POST DATA - *CONTINUED*

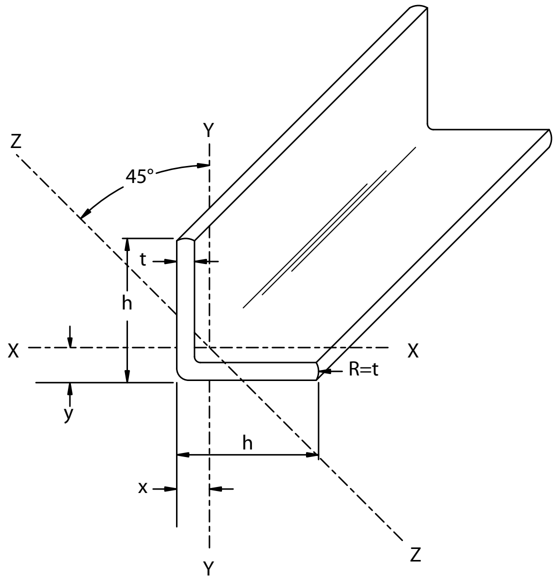
Square Tubes

SECTION DIMENSIONS				SECTION PROPERTIES		
b	t	A	Wt.	I	S	r
in.	in.	in.^{2}	lb./ft.	in.^{4}	in.^{3}	in.
4	.25	3.74	2.83	8.82	4.41	1.53
6	.375	8.236	6.57	42.991	14.33	2.284



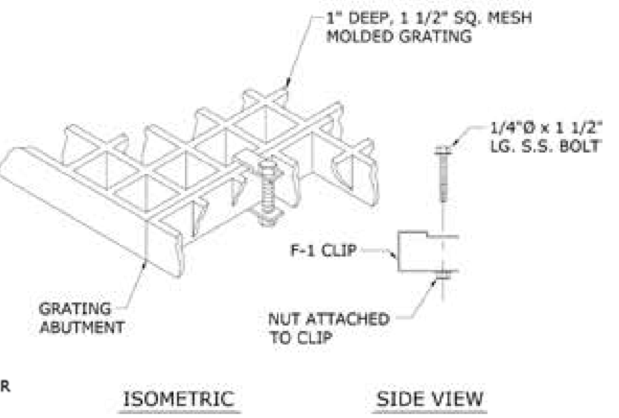
Equal Leg Angle

SECTION DIMENSIONS				SECTION PROPERTIES					
DEPTH	WALL			X - X / Y - Y				Z - Z	
h	t	A	Wt.	I	S	r	x or y	I	r
in.	in.	in.^{2}	lb./ft.	in.^{4}	in.^{3}	in.	in.	in.^{4}	in.
6	3/8	4.34	3.03	15.23	3.49	1.87	1.64	6.07	1.18



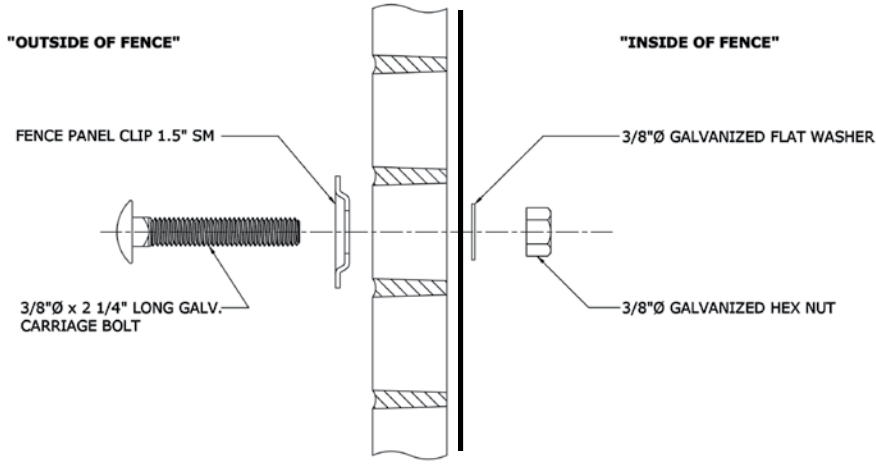
F-1 PANEL ABUTMENT CLIP

Shown with 1" Deep, 1-1/2 Square Mesh molded Fence Panel



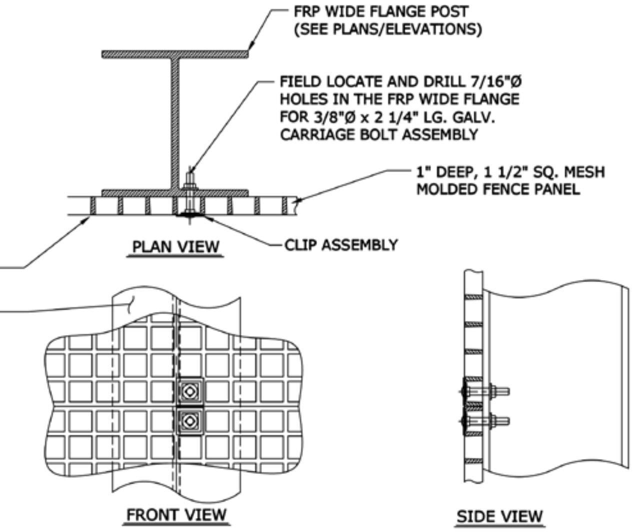
EXPLODED VIEW -CLIP ASSEMBLY

PN 710860.1



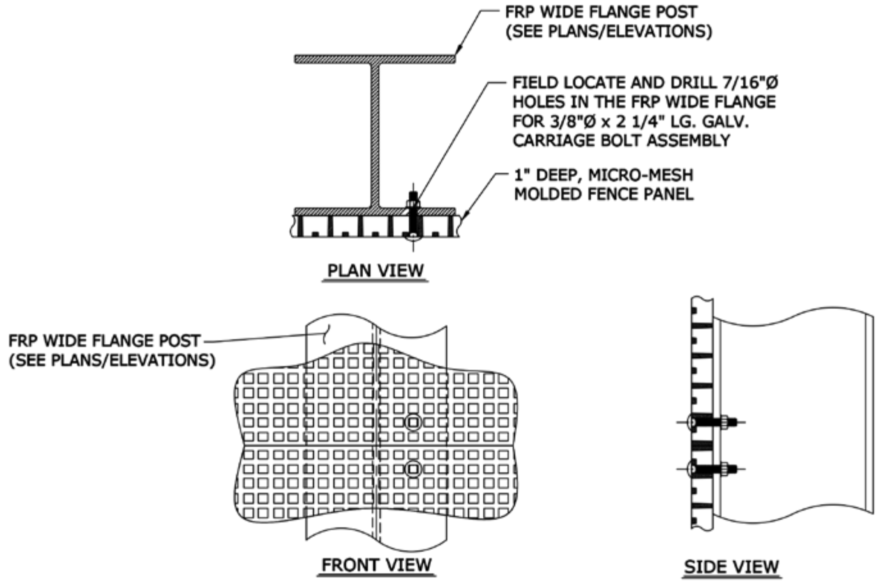
E CONNECTION WITH LINE POST

ith 1" Deep, 1-1/2" Square Mesh Molded Fence Panel



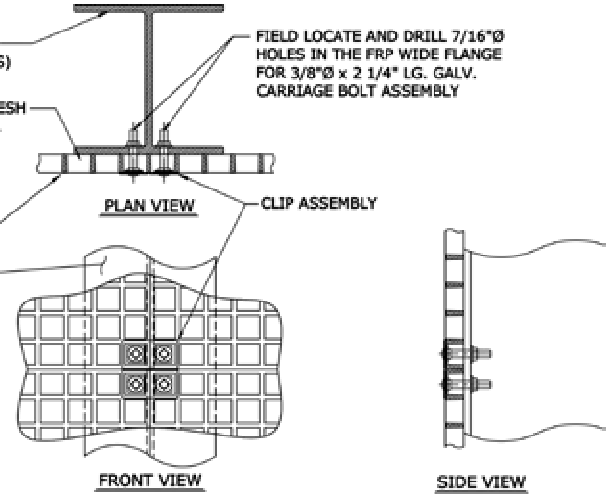
MIDDLE CONNECTION WITH LINE POST

Shown with 1" Deep, Micro-Mesh Molded Fence Panel



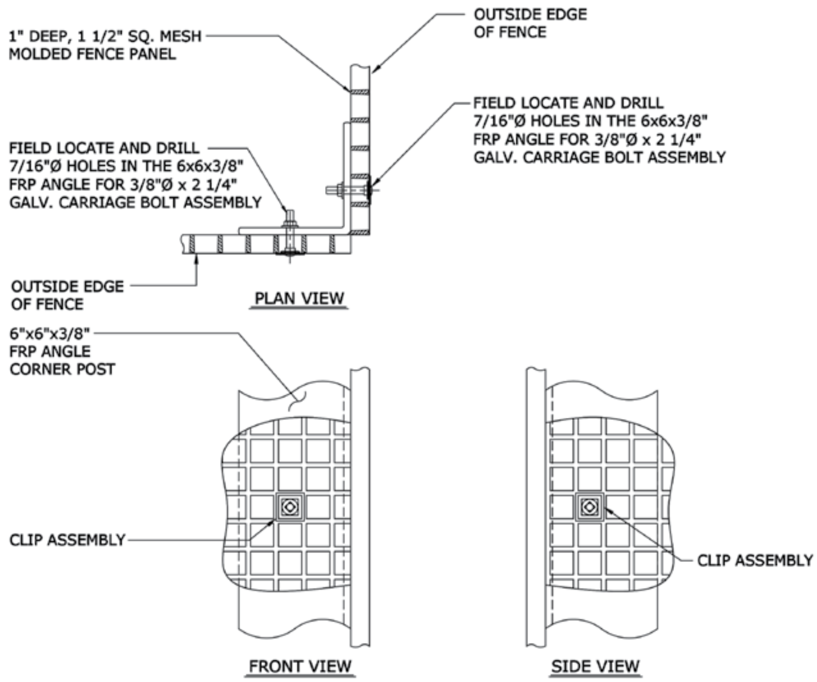
SPLICE CONNECTION WITH LINE POST

Shown with 1" Deep, 1-1/2 Square Mesh Molded Fence Panel



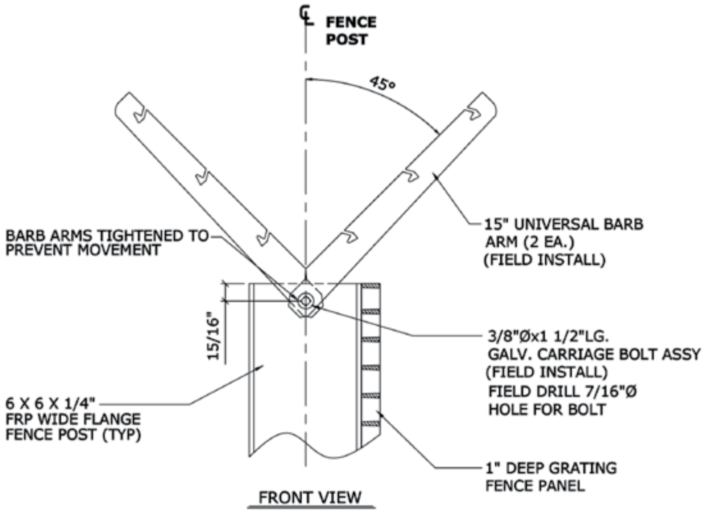
CORNER CONNECTION WITH A6 CORNER POST

Shown with 1" Deep, 1-1/2 Square Mesh Molded Fence Panel



DETAIL - 15" UNIVERSAL BARB ARM TO W6 FENCE POST

Shown with: 6 x 6 x 1/4" FRP Wide Flange



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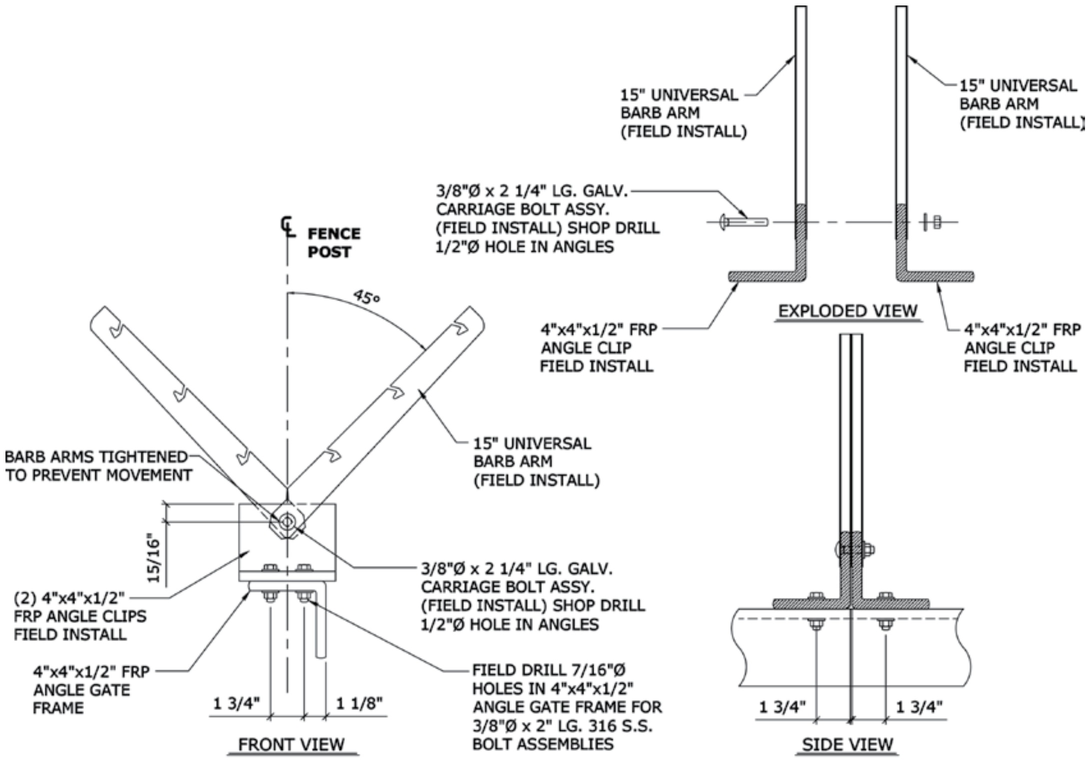
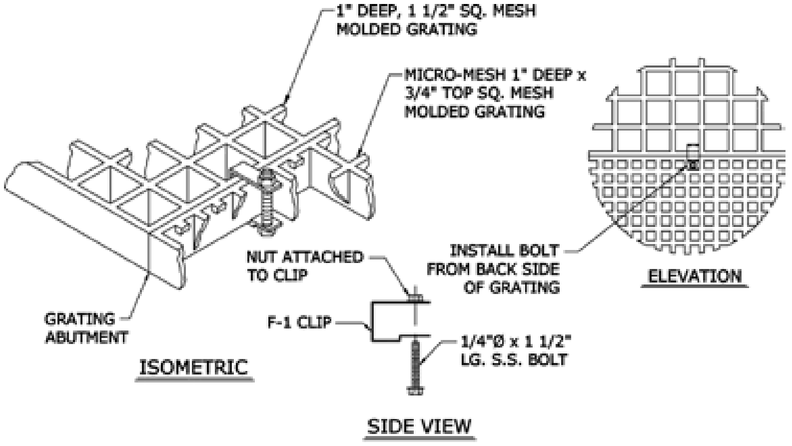
DETAIL - 15" UNIVERSAL BARB ARM CONNECTION AT TOP OF GATE

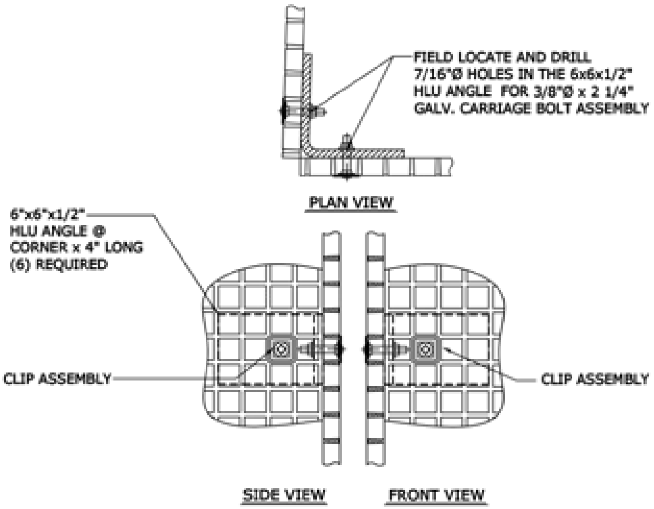


F-1 PANEL ABUTMENT CLIP

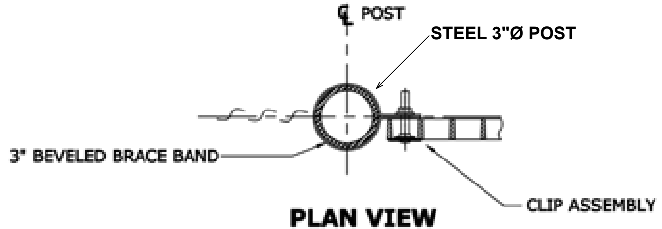
Shown with 1" Deep, 1-1/2" Square Mesh Molded Fence Panel & 1" Deep Micro-Mesh Panel



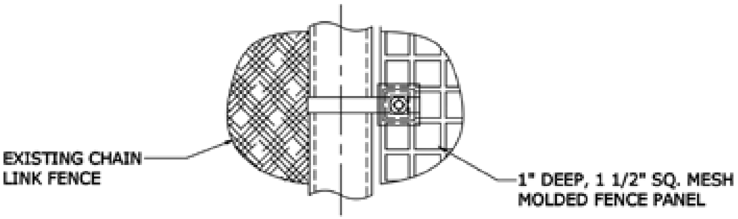
CORNER CONNECTION WITH 6" X 6" X 1/2" NON-90° ANGLE CLIPS



DETAIL - CONNECTION TO STEEL 3"Ø POST

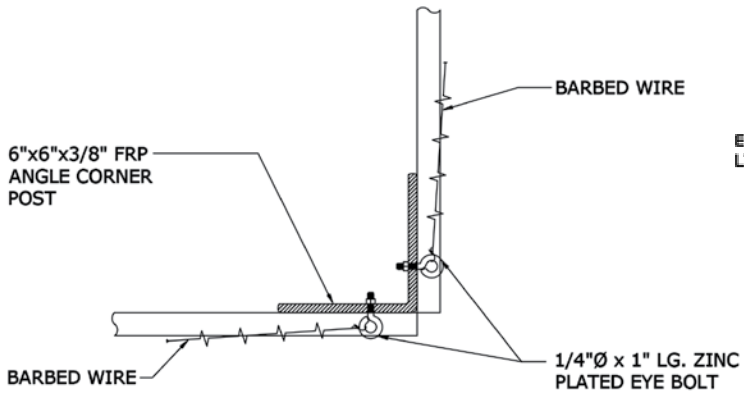


PLAN VIEW

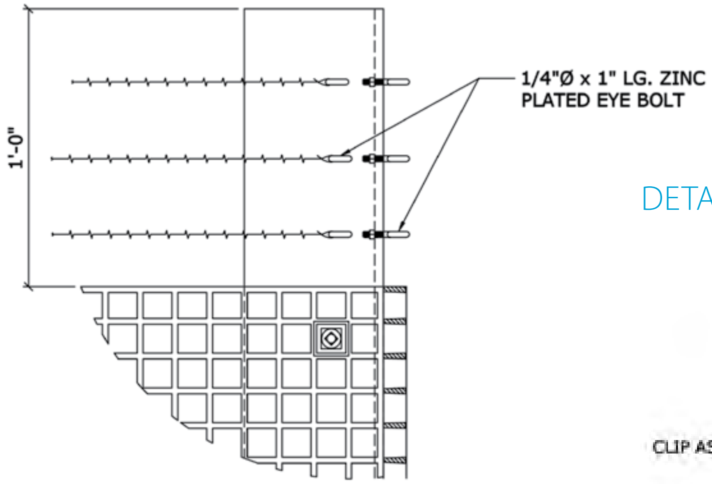


FRONT VIEW

DETAIL - BARBED WIRE AT 6" ANGLE CORNER COLUMN

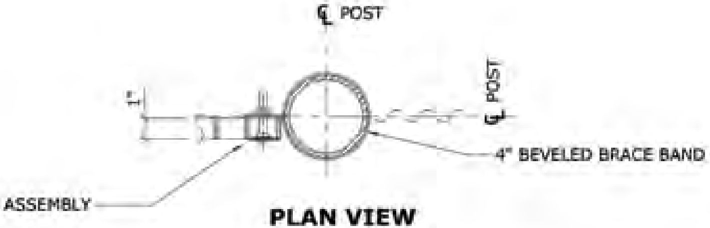


PLAN VIEW

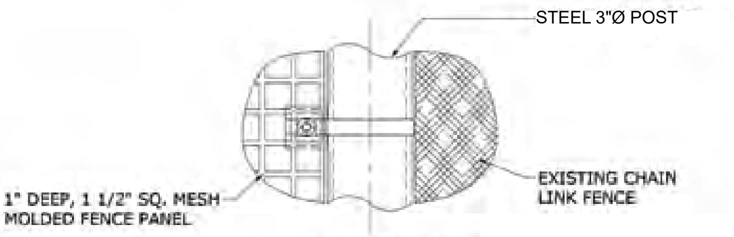


FRONT VIEW

DETAIL - CONNECTION TO STEEL 4"Ø POST



PLAN VIEW



FRONT VIEW

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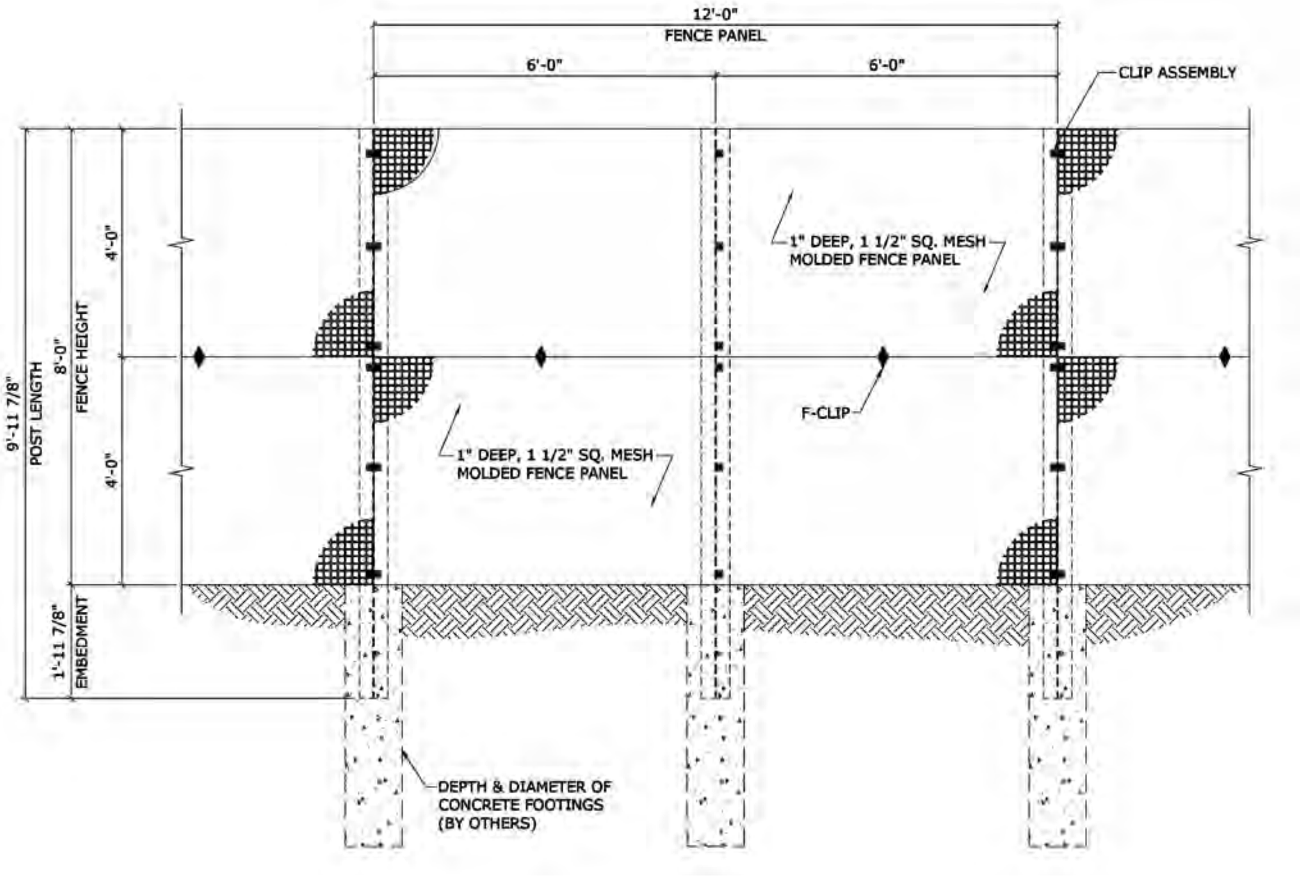
STANDARD CONSTRUCTION ELEVATIONS

	FRP POST SELECTION						
	WIND SPEED (MPH)						
FENCE HEIGHT	90	100	110	120	130	140	150
8 FT	W6	W6	W6	W6A	W6A	W8	W8
10 FT	W6A	W8	W8	W8	W8	W8A	W8A

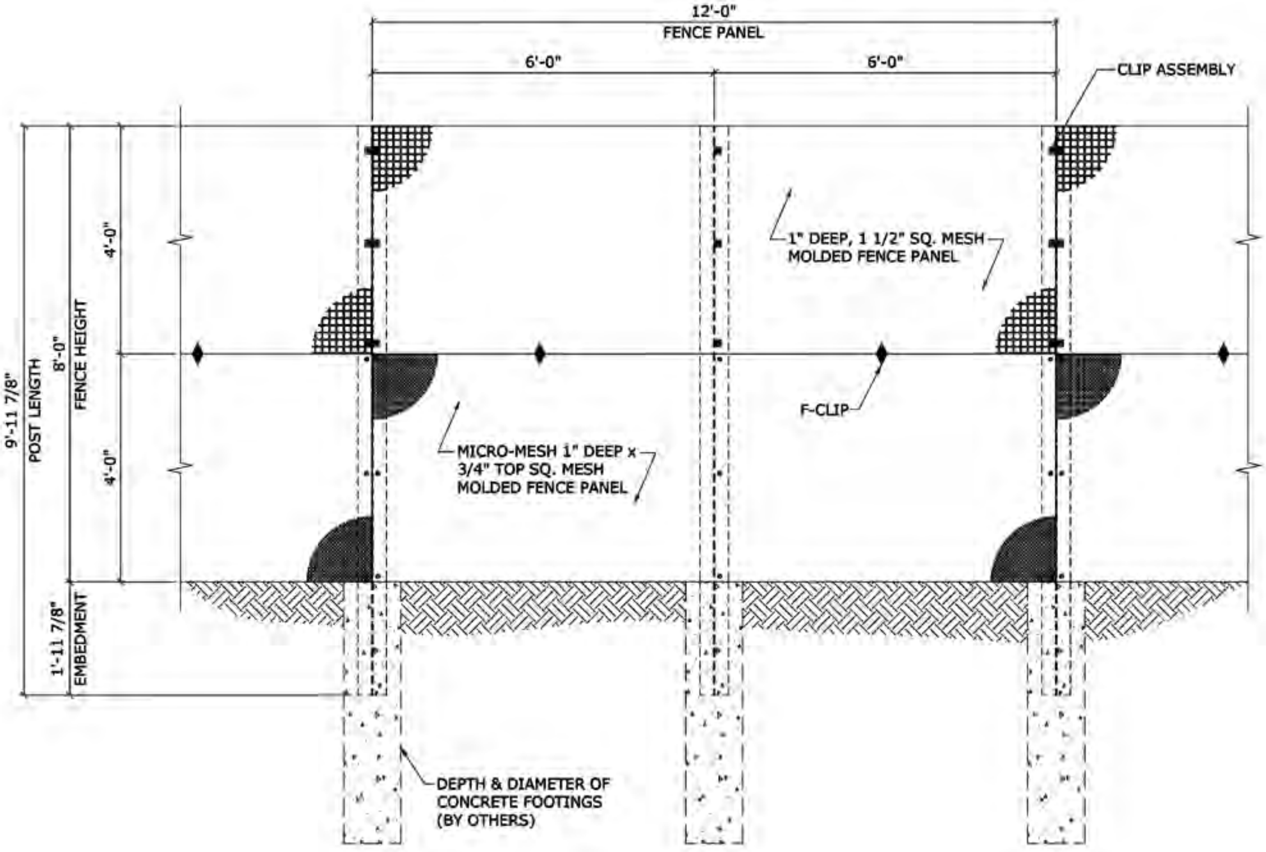
Design based on ASCE7-16 using Exposure C, and Category III
Maximum post spacing: 6 ft
Maximum post deflection: H/60

W6 = WF6x6x1/4"
W6A = WF6x6x3/8"
W8 = WF8x8x3/8"
W8A = WF8x8x1/2"

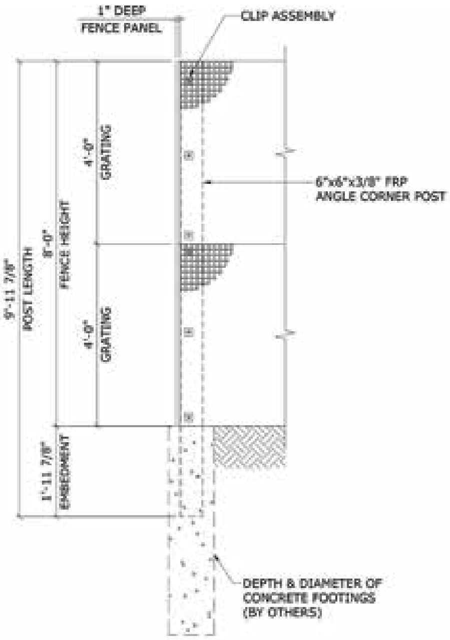
FENCE ELEVATION, 8' HEIGHT,2' EMBED, 1" DEEP 1.5" SQUARE MESH BOTH PANELS



FENCE ELEVATION, 8' HEIGHT, 2' EMBED, 1" DEEP 1.5" SQUARE MESH UPPER PANEL/ 1" MICRO-MESH LOWER



ELEVATION VIEW - 90 DEGREE CORNER WITH 6" X 6" X 3/8" FRP ANGLE POST



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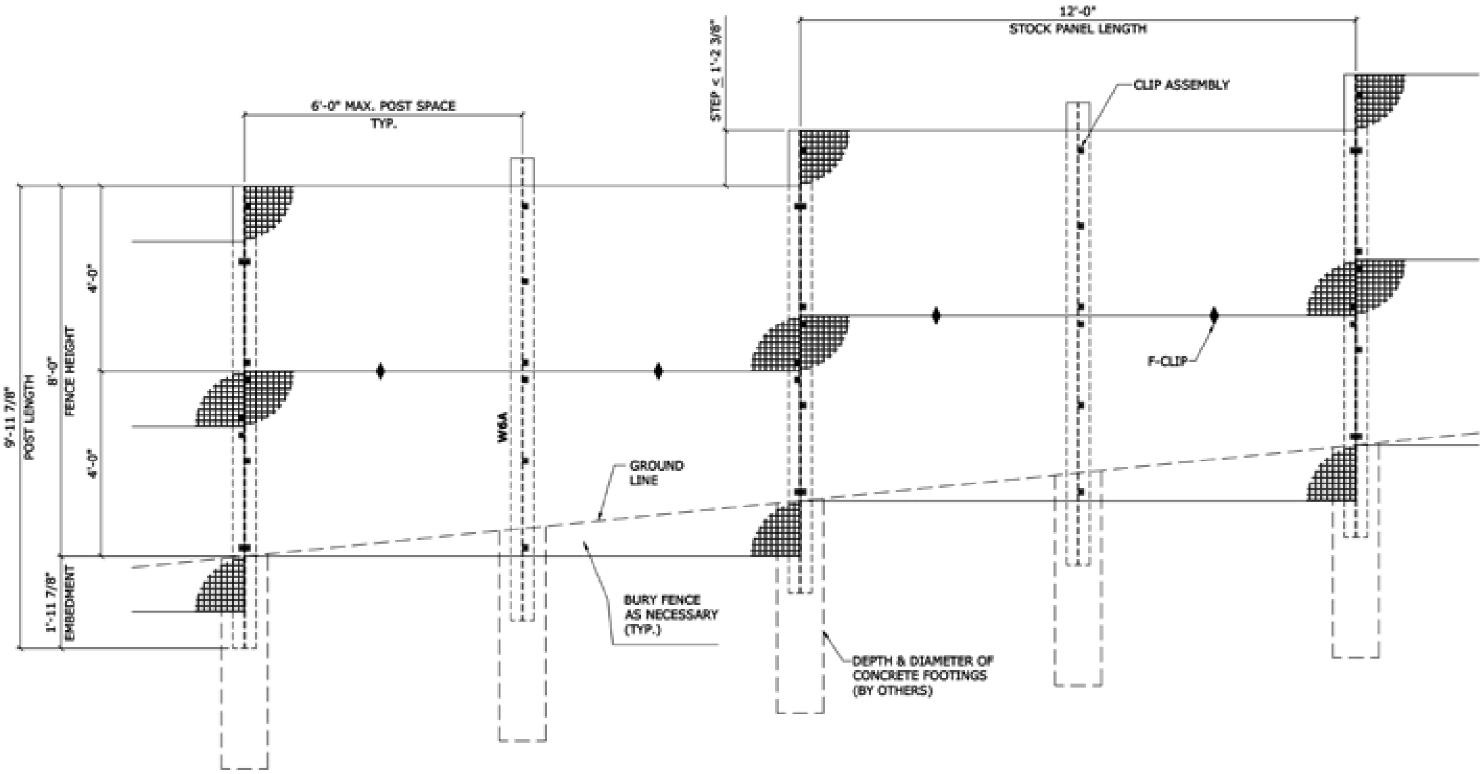
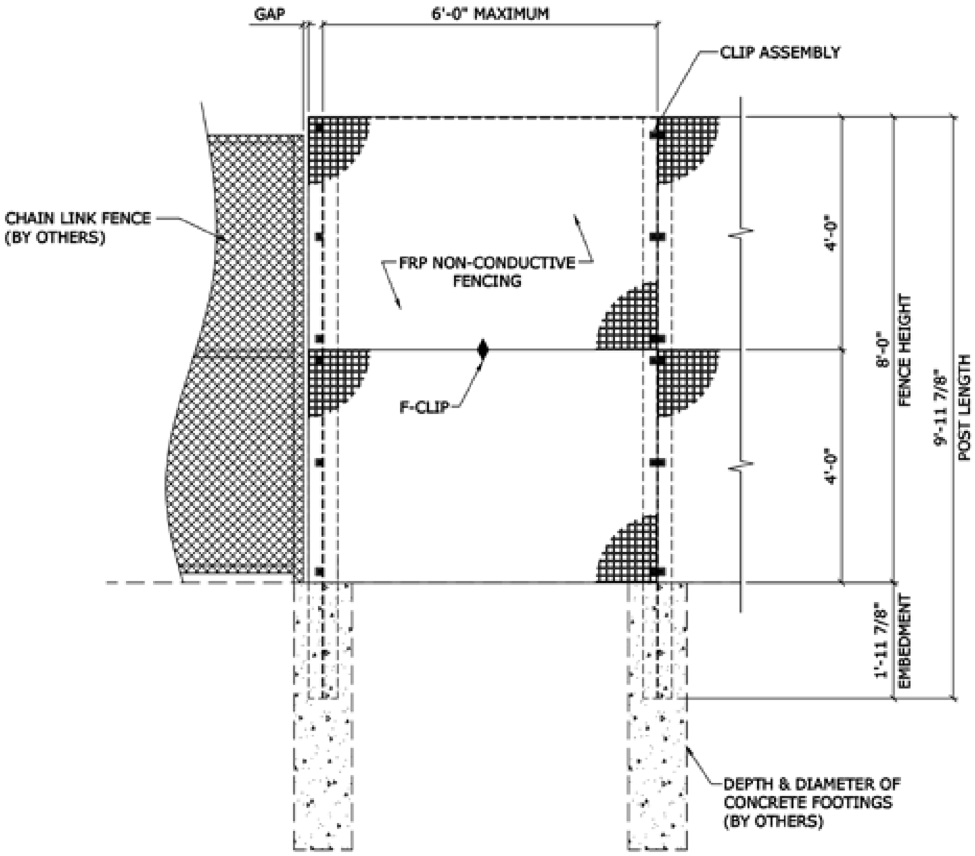
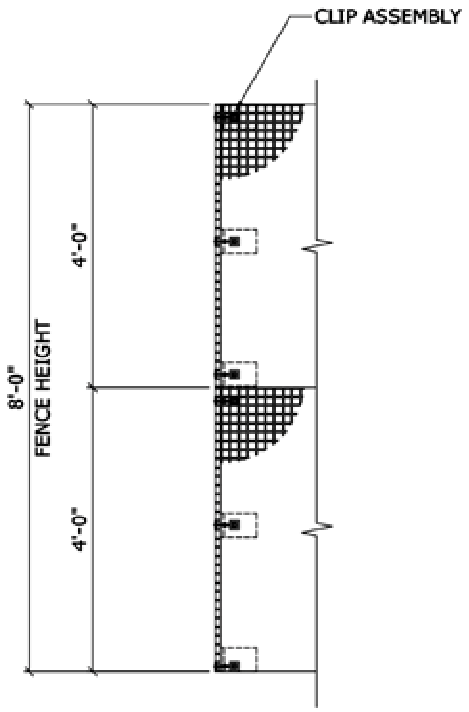
EXAMPLE FENCE ELEVATION SHOWING METHODS TO 'STAIR STEP' PANELS ON SLOPED INSTALLATIONS



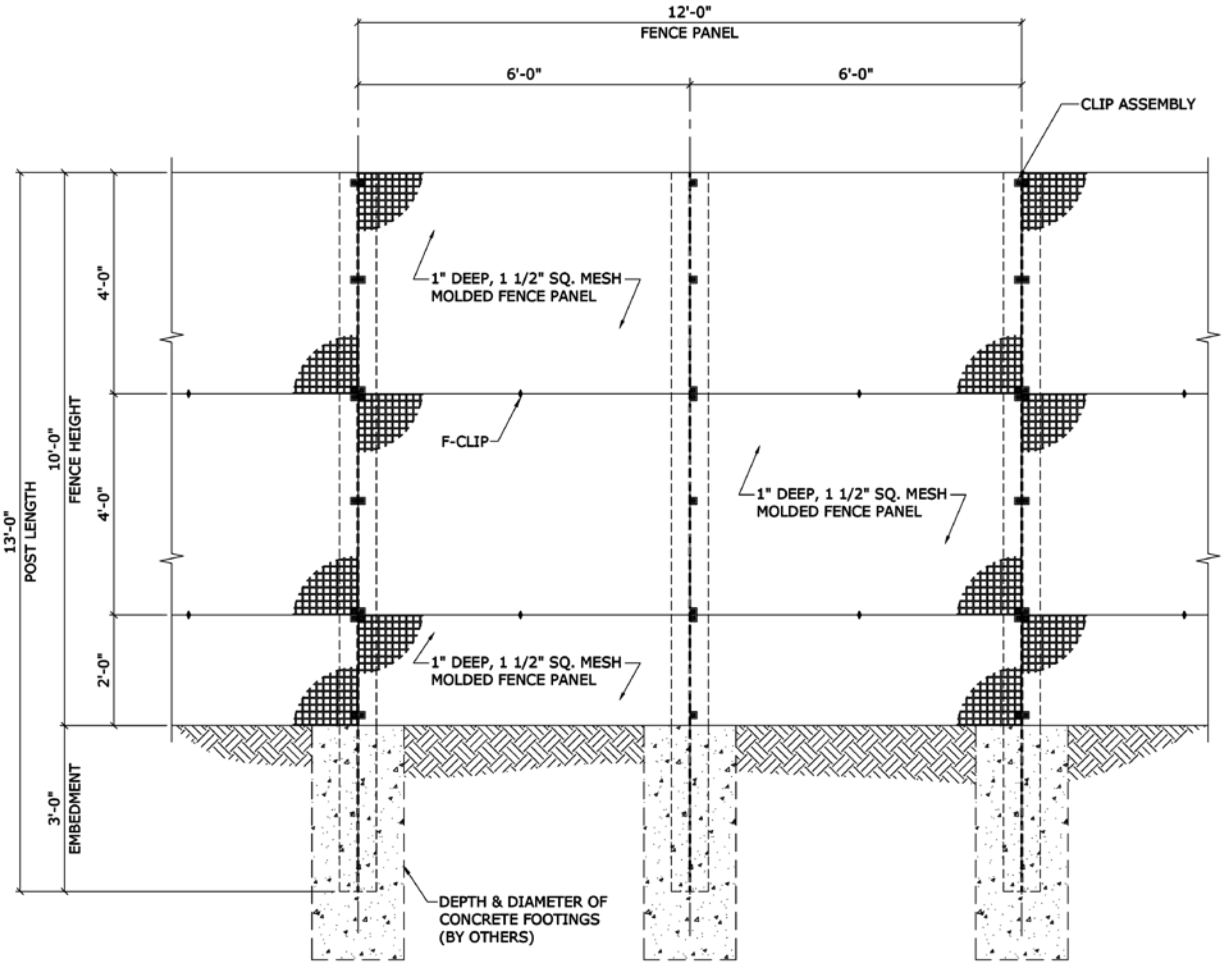
ELEVATION VIEW - NON-CONDUCTIVE FENCE TO CHAIN LENGTH FENCE WITH GAP



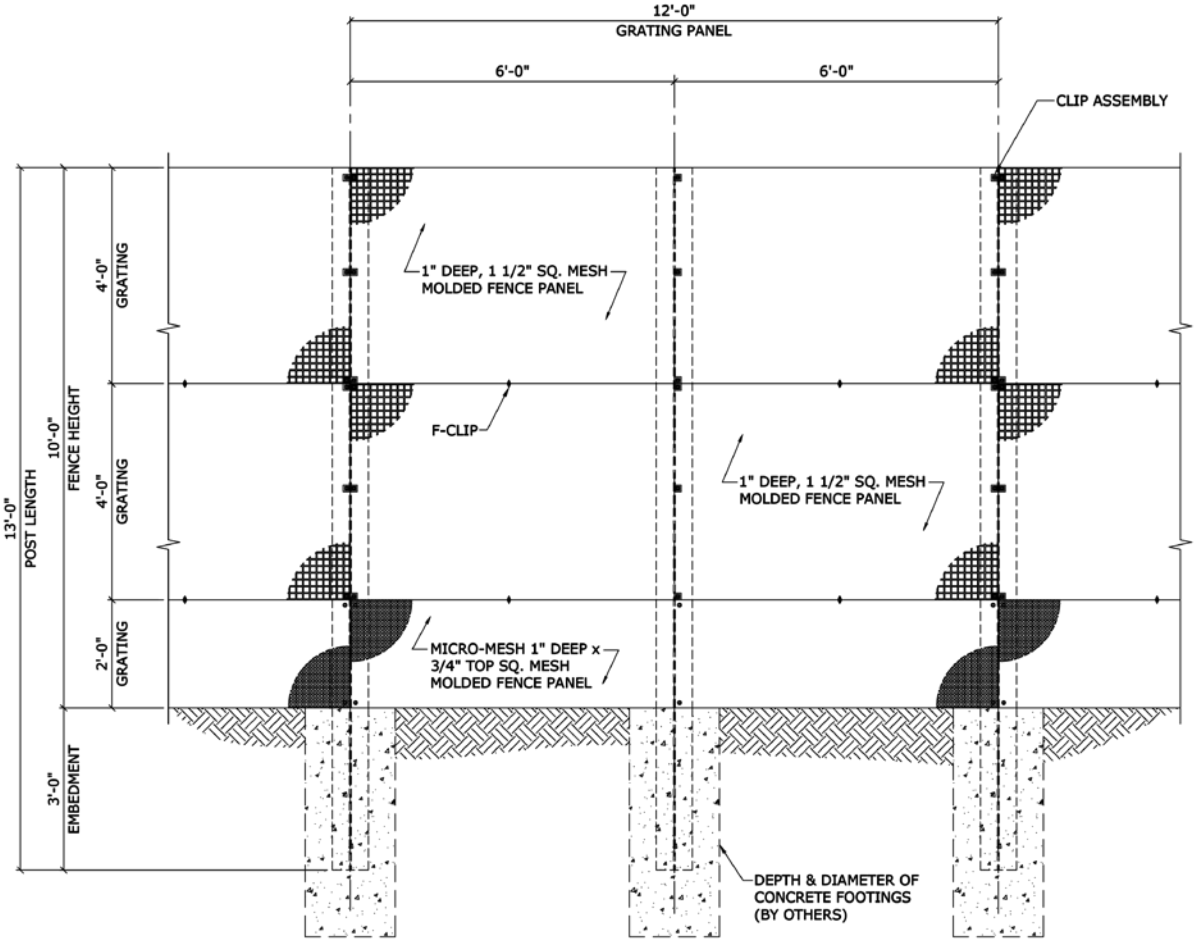
ELEVATION VIEW - NON 90 DEGREE CORNER WITH 6" X 6" X 1/2" HLU ANGLE CLIPS



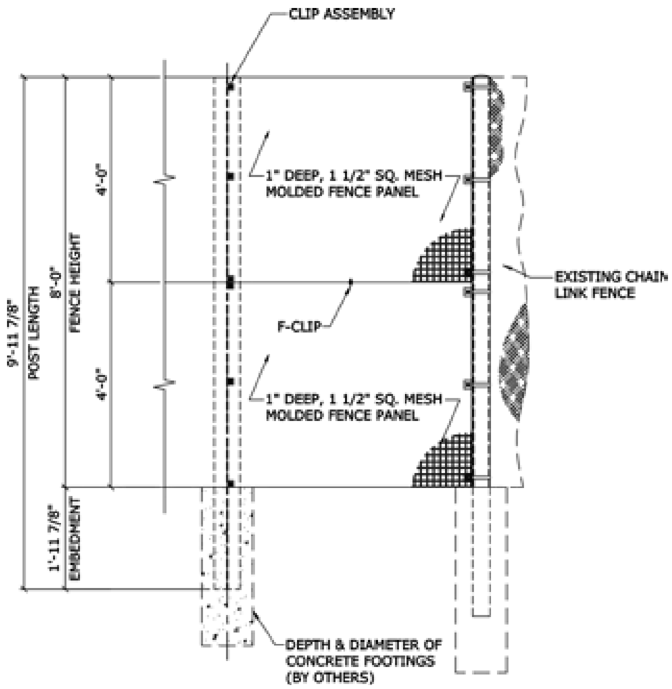
FENCE ELEVATION, 10' HEIGHT, 3' EMBED, 1" DEEP 1.5" SQUARE MESH ALL PANELS



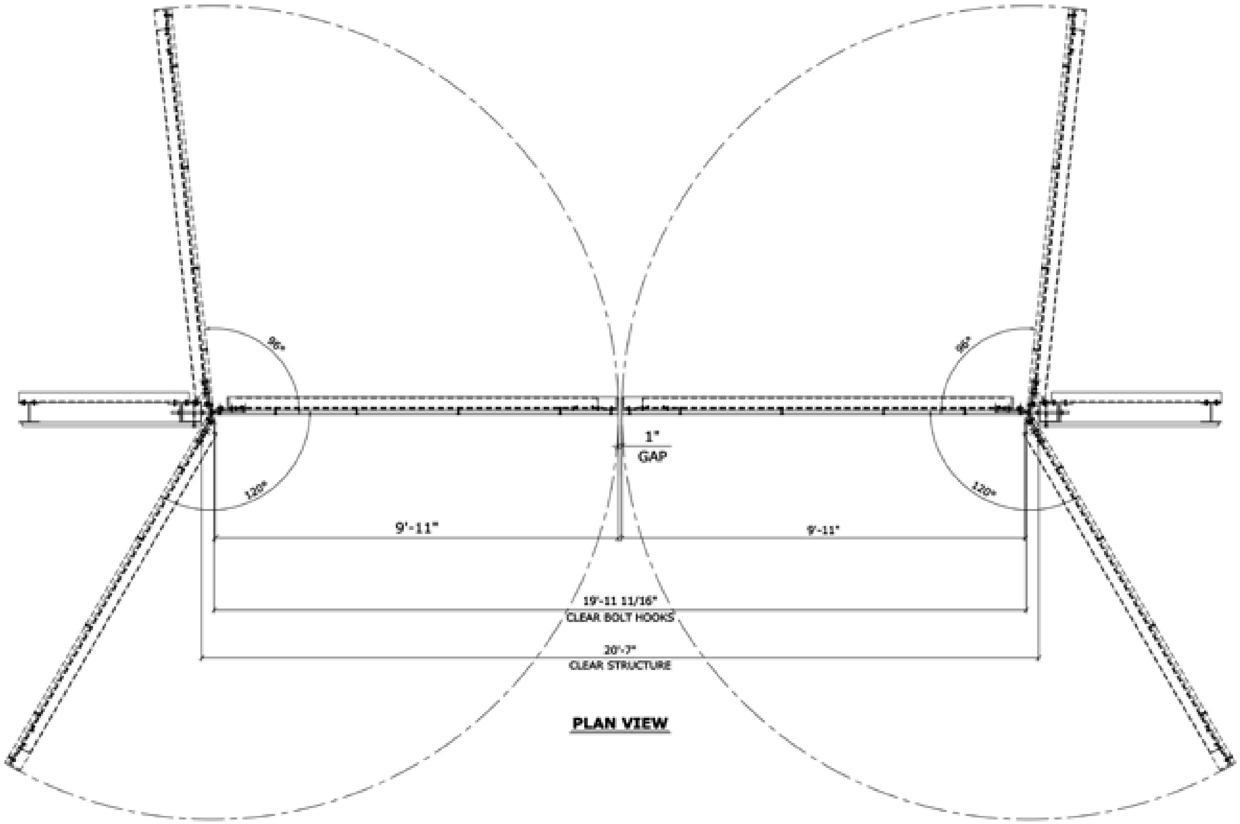
FENCE ELEVATION, 10' HEIGHT,3' EMBED 1" DEEP 1.5" SQUARE MESH UPPER PANELS/ 1" MICRO-MESH LOWER



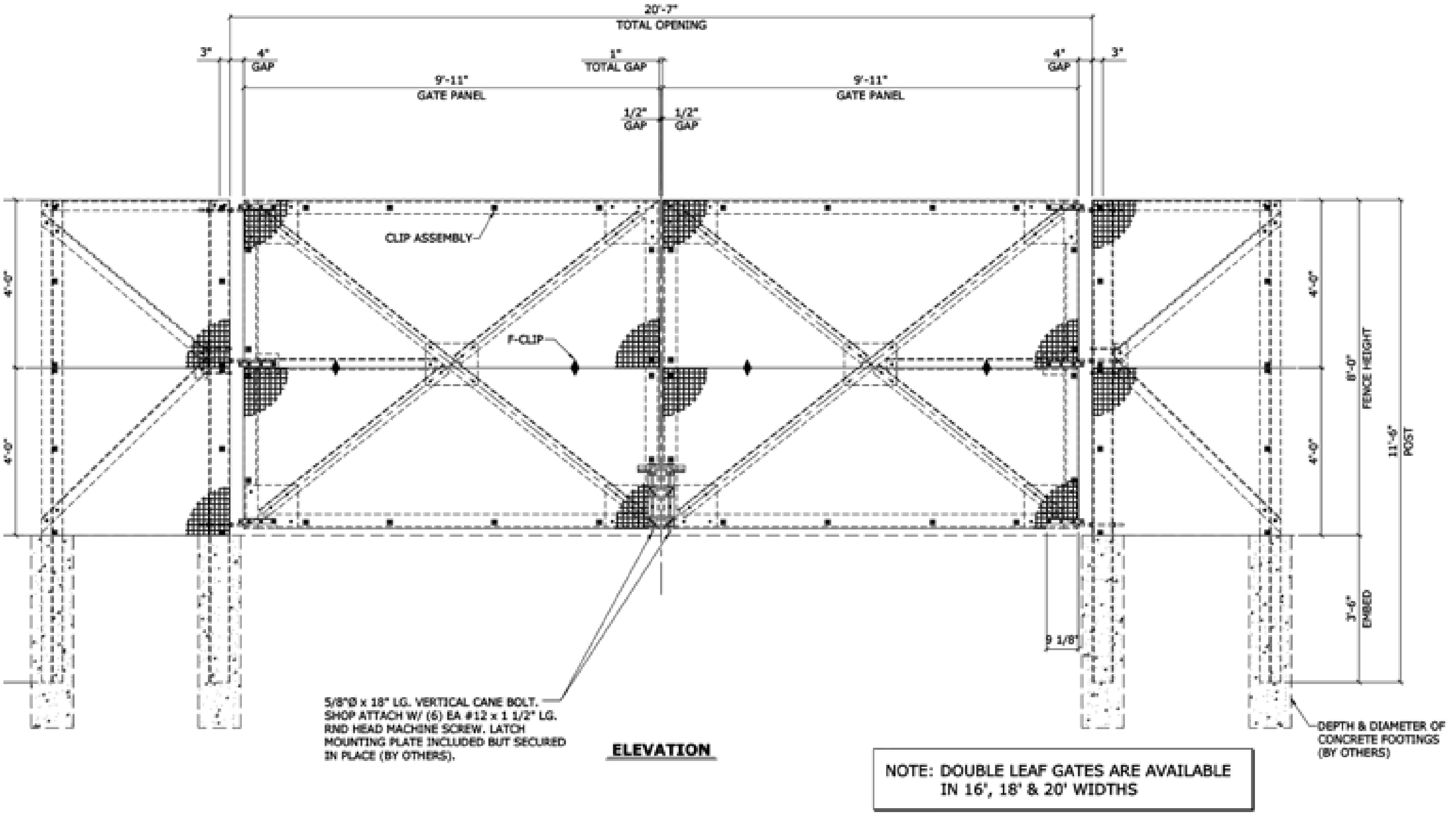
ELEVATION VIEW - NON-CONDUCTIVE FENCE TO CHAIN LENGTH FENCE CONNECTION



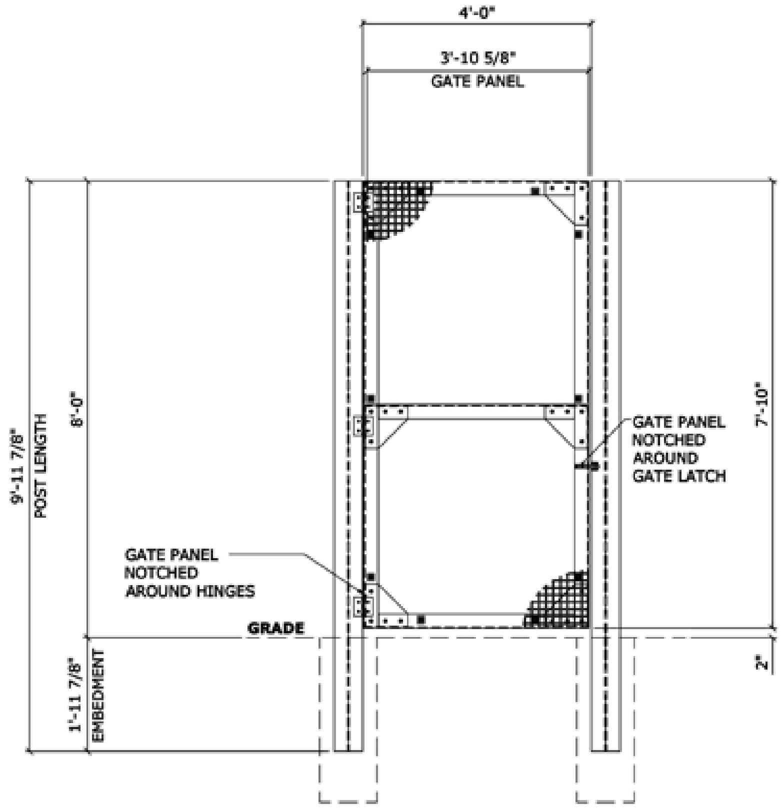
PLAN VIEW - 20' DOUBLE LEAF FRP GATE



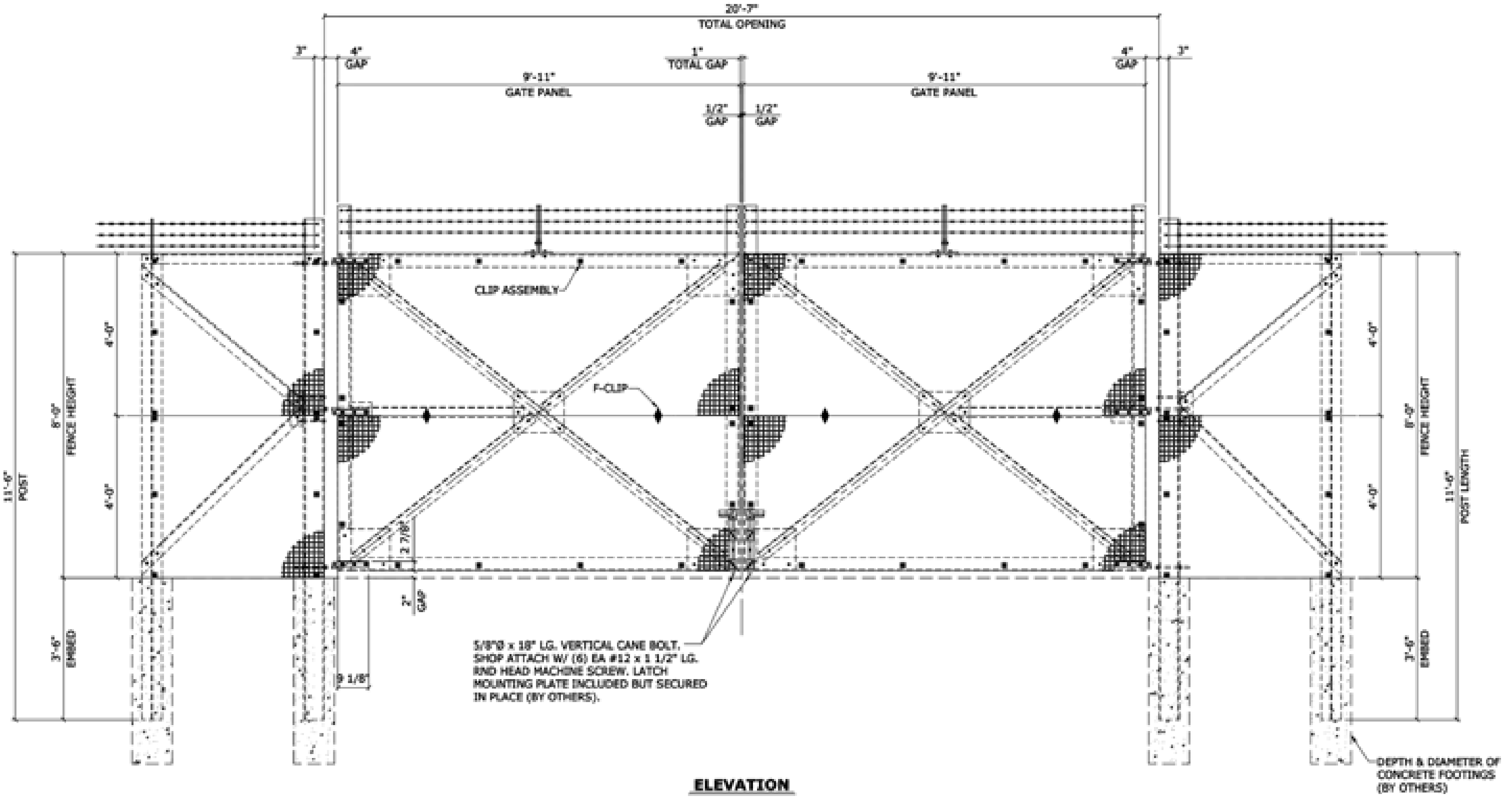
ELEVATION VIEW - 20' DOUBLE LEAF FRP GATE



ELEVATION VIEW - 4' PEDESTRIAN GATE

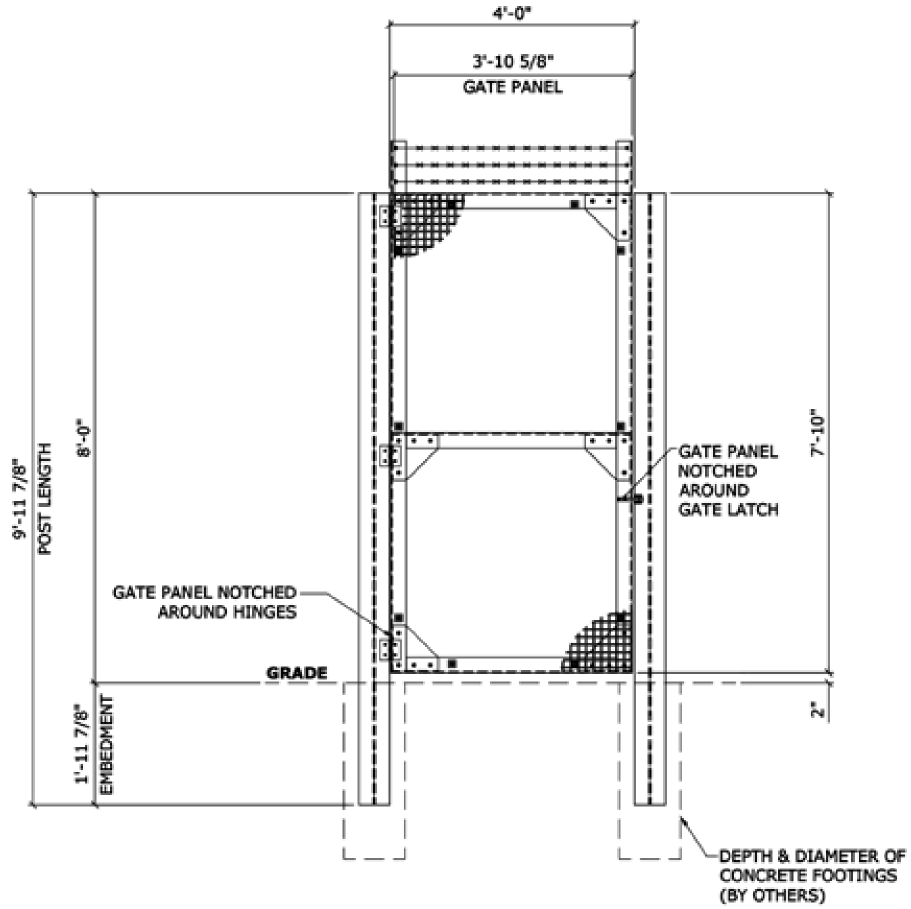


DETAIL - 20' DOUBLE LEAF FRP GATE W/ BARBED WIRE



ELEVATION

ELEVATION VIEW - 4' PEDESTRIAN GATE WITH BARBED WIRE



ENGINEERING SPECIFICATION - FIBERGRATE® FRP FENCE SYSTEM

SECTION 32 31 32

PART 1 GENERAL

1.1 SCOPE OF WORK

This section to include the supply and installation of a fiberglass reinforced plastic (FRP) Fence System as shown on the Contract Drawings.

1.2 REFERENCES

A. The latest revision of the publications listed below form a part of this specification to the extent referenced herein.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) Test Methods:

ASTM D-149 Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies

ASTM D-638 Tensile Properties of Plastics

ASTM D-696 Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics

ASTM D-790 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

ASTM D-2344 Short Beam Strength of Polymer Matrix Composite Materials and Their Laminates

ASTM D-2583 Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor

ASTM F-711 – Standard Specification for Fiberglass-Reinforced Plastic (FRP) Rod and Tube Used in Live Line Tools (Ref for Test Apparatus Only)

1.3 SUBMITTALS

A. Submit shop drawings of the FRP Fence System clearly showing material sizes, types, styles, part or catalog numbers, and details. Shop drawings should include installation instructions for the system.

B. Submit the manufacturer's published literature, certificates of compliance, and other information to support compliance with project requirements.

C. If requested, submit sample pieces of each item specified herein for acceptance by the owner.

1.4 QUALITY ASSURANCE

A. All items to be provided under this Section shall be furnished manufacturers having a minimum of ten (10) years experience in the design and manufacture fiberglass reinforced plastic systems.

B. Manufacturer shall offer a 3-year limited warranty on all FRP products against defects in materials and workmanship.

C. To insure system integrity and compatibility, all fencing materials, including fence panels, posts, and gates shall come from a single source.

D. Manufacturer shall be certified to the ISO 9001standard.

E. Manufacturer shall provide proof of certification from at least two other quality assurance programs for its facilities or products (DNV, ABS, USCG, and AARR).

F. Manufacturer shall provide proof, via independent testing less than six months old, which materials proposed as a

ENGINEERING SPECIFICATION - FIBERGRATE® FRP FENCE SYSTEM - *cont.*

solution, do not contain heavy metals in amounts greater than that allowed by current EPA requirements.

1.5 PRODUCT DELIVERY AND STORAGE

A. Delivery of Materials: Manufactured materials shall be delivered in original, unbroken pallets, packages, containers, or bundles bearing the label of the manufacturer.

B. Storage of Products: All materials shall be carefully handled to prevent damage. Materials shall be stored in such a manner to provide adequate drainage, ventilation and other weather-related damage.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. FRP Fence System shall be Fibergrate® as manufactured by

Fibergrate Composite Structures Inc.
5151 Belt Line Road, Suite 1212
Dallas, Texas 75254-7028 USA
(800) 527 4043 (972) 250 1530 Fax
Website: www.fibergrate.com
E-mail: info@fibergrate.com

2.2 MOLDED FRP FENCE PANELS

A. Fence panels shall be of a one piece molded construction with tops and bottoms of bearing bars and cross bars in the same plane. Panels shall have a square mesh pattern providing bidirectional strength. Panels shall be reinforced with continuous roving of equal number of layers in each direction. The top layer of reinforcement shall be no more than 1/8" below the top surface of the grating so as to provide maximum stiffness and prevent resin chipping of unreinforced surfaces.

B. Percentage of glass shall not exceed 35% by weight to achieve maximum impact resistance.

C. After molding, no dry glass fibers shall be visible on any surface. All bars shall be smooth and uniform with no evidence of fiber orientation irregularities, interlaminar voids, porosity, resin rich or resin starved areas.

D. Grating bar intersections are to be filleted to a minimum radius of 1/16” to eliminate local stress concentrations and the possibility of resin cracking at these locations.

E. Resin system: The resin system used in the manufacture of the fence panels shall be Corvex®. Color to be dark gray.

F. Fence panels to be 1” deep, 1-1/2” x 1-1/2” square mesh or 1” deep, 3/4” x 3/4”” Micro-Mesh®, with the load bars oriented parallel to the edges of the panels.

G. All cut edges shall be sanded smooth and sealed according to the manufacturer’s recommendations.

H. 1” deep, 1-1/2” x 1-1/2” square mesh fence panels to be installed using 3/8” dia. ASTM A307 galvanized carriage bolts with 1.5” square x 0.060” thick 316 SS fitted washers. 1” deep, 3/4” x 3/4”” Micro-Mesh® fence panels are to be installed with 3/8” dia. ASTM A307 galvanized carriage bolts fitted directly through the openings in the grating mesh. In all instances, the round head of the carriage bolt is to be fitted to the outside of the fence to prevent unauthorized disassembly.

2.3 PULTRUDED FRP LINE AND CORNER POSTS

A. Line and corner posts are to be manufactured by the pultrusion process with a glass content minimum of 45%, maximum of 55% by weight. The structural shapes shall be composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements and dimensions as specified in the Contract Documents.

ENGINEERING SPECIFICATION - FIBERGRATE® FRP FENCE SYSTEM - *cont.*

B. Fiberglass reinforcement shall be a combination of continuous roving, continuous strand mat, and surfacing veil in sufficient quantities as needed by the application and/or physical properties required.

C. Post resin shall be DYNAFORM® ISO-FR, fire retardant isophthalic polyester with a tested flame spread rating of 25 or less per ASTM E 84 Tunnel Test. Line post color to be dark gray.

D. All finished surfaces of FRP items and fabrications shall be smooth, resin rich, free of voids and without dry spots, cracks, crazes or unreinforced areas. All glass fibers shall be well covered with resin to protect against their exposure due to wear or weathering.

E. Line posts shall be 4" x 4" x ¼" or 6" x 6" x ¼" wide flange sections as specified on the project drawings.

F. Corner Posts shall be 6" x 6" x 3/8" angles or as specified on the project drawings.

G. Posts are to have the minimum longitudinal mechanical and physical properties as listed below:

Property	ASTM Method	Value	Units
Tensile Strength	D-638	30,000 (206)	psi (MPa)
Tensile Modulus	D-638	2.5×10^6 (17.2)	psi (GPa)
Flexural Strength	D-790	30,000 (206)	psi (MPa)
Flexural Modulus	D-790	1.8×10^6 (12.4)	psi (GPa)
Flexural Modulus (Full Section)	N/A	2.8×10^6 (19.3)	psi (GPa)
Short Beam Shear (Transverse)	D-2344	4,500 (31)	psi (MPa)
Shear Modulus (Transverse)	N/A	4.5×10^5 (3.1)	psi (GPa)
Coefficient of Thermal Expansion	D-696	4.4×10^{-6} (8.0×10^{-6})	in/in/°F (cm/cm/°C)
Dielectric Strength (Lengthwise)	D-149	35	kV/inch
Dielectric Strength (Perpendicular to Face)	D-149	200	volts/mil
Flame Spread	E-84	25 or less	N/A

2.3 ELECTRICAL PERFORMANCE OF FRP MATERIALS

A. 2-inch-wide x 72-inch-long strips of the line post and molded fence panels are to be tested using a the 'hot stick' test rack as described in ASTM D-711 with the electrodes set at 12 inches on center.

B. In the dry condition, each sample must be capable of resisting a 95 kV potential with a current leakage of 2 milliamps or less.

C. Testing as described above must be conducted on samples of materials of the same configuration and composition as those to be used in the fence. Testing is to be conducted at a N. A. I. L. (National Association of Independent Laboratories) lab accredited for testing high voltage personnel protective equipment.

2.4 PERSONNEL GATES

A. Personnel gates are to be factory fabricated and assembled using the FRP fence panels listed above, 3" x 3" x ¼" FRP angles, and ¼" thick FRP plate gussets. Maximum personnel gate width is 4'-0".

B. Personnel gate is to be mounted to the line post with three each 4" x 4" stainless steel surface mount hinges.

C. Personnel gate is to be equipped with a stainless steel, lockable gate latch.

ENGINEERING SPECIFICATION - FIBERGRATE® FRP FENCE SYSTEM - *cont.*

2.5 VEHICULAR GATES

A. Vehicular gates are to be factory fabricated and assembled using FRP fence panels and FRP structural shapes to conform to the design requirements of the project. Maximum two leaf gate width is 20’-0” supplied in two leaves of 10’-0” each.

B. Both the active and inactive leaf is to be equipped with a 5/8” padlockable vertical cane bolt for fixing the gate in the closed position.

C. The gate leaves are to be equipped with adjustable hinges to allow for adjustment of the gap between the leaves to eliminate the effects of soil settlement.

D. Accommodation for locking the gate leaves together is to be provided as specified by the owner.

PART 3 EXECUTION

3.1 INSPECTION

A. The owner’s representative shall field verify all site dimensions and conditions and verify that they match the shop drawings of the FRP fence.

B. Shop inspection is authorized as required by the Owner and shall be at Owner's expense. If a shop inspection is required, the fabricator shall give ample notice to Contractor prior to the beginning of any fabrication work so that an inspection may be conducted.

3.2 INSTALLATION

A. The contractor shall install the FRP Fence system in accordance with manufacturer’s installation drawings that have been released for construction.

B. Erect the FRP Line Posts with the embedment as indicated on the installation drawings. Posts are to be installed plumb and at the spacing indicated on the drawings. For posts embedded in concrete, insure that concrete has come to sufficient cure before installing the fence panels.

C. Erect the FRP Fence Panels following the installation drawings, field cutting the full-sized panels are required to fit the installation. Connect the FRP Fence Panels to the FRP Line Posts using the connection hardware provided following the details in the installation drawings.

D. Erect the Personnel and Vehicular Gates as detailed on the installation drawings. Adjust hinges, latches, and cane bolts as required to achieve a free swinging, securely latching installation.

PROJECT PHOTOS

PROJECT PHOTOS

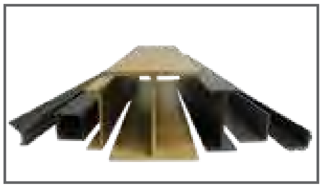
Fibergrate Products & Services

Fibergrate® Molded Grating

Fibergrate® molded gratings are designed to provide the ultimate in reliable performance, even in the most demanding conditions. Fibergrate offers the widest selection in the market with multiple resins and more than twenty grating configurations available in many panel sizes and surfaces.

Safe-T-Span® Pultruded Industrial & Pedestrian Gratings

Combining corrosion resistance, long-life and low maintenance, Safe-T-Span® provides unidirectional strength for industrial and pedestrian pultruded grating applications.

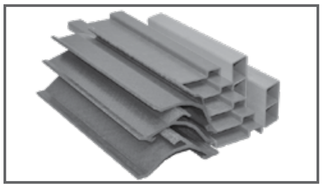


Dynaform® Structural Shapes

Fibergrate offers a wide range of standard Dynaform® pultruded structural profiles for industrial and commercial use, including I-beams, wide flange beams, round and square tubes, bars, rods, channels, leg angles and plate.

Dynarail® & DynaRound™ Guardrail, Handrail & Ladders

Easily assembled from durable components or engineered and prefabricated to your specifications, Dynarail® square tube and DynaRound™ round tube railing sytems and Dynarail® safety ladder systems meet or exceed OSHA and strict building code requirements for safety and design.

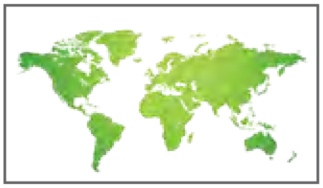


Custom Composite Solutions

Combining Fibergrate's design, manufacturing and fabrication services allows Fibergrate to offer custom composite solutions to meet our client's specific requirements. Either through unique pultruded profiles or custom open molding, Fibergrate can help bring your vision to reality.

Design & Fabrication Services

Combining engineering expertise with an understanding of fiberglass applications, Fibergrate provides turnkey design and fabrication of fiberglass structures, including platforms, catwalks, stairways, railings and equipment support structures.



Worldwide Sales & Distribution Network

Whether a customer requires a platform in a mine in South Africa to grating on an oil rig in the North Sea, or walkways in a Wisconsin cheese plant to railings at a water treatment facility in Brazil; Fibergrate has sales and service locations throughout the world to meet the needs and exceed the expectations of any customer.

Fibergrate
Composite Structures

Appendix F

Noise Assessment Letter

WATERFORD

7430 New Technology Way, Suite 150
Frederick, MD 21703
(703) 596-1022 Office
(540) 242-3195 Fax
www.waterfordconsultants.com

July 21, 2022

SAC Wireless
540 West Madison Street, 8th Floor
Chicago, IL 60661

Re: **Noise Assessment Letter**
Verizon Sanders Ranch Site
100 Sanders Ranch Road
Moraga, CA 94566

Sanders Ranch is a proposed Verizon telecommunications macro site located in Town of Moraga, CA. Verizon is proposing to add a pre-manufactured equipment cabinet with a door mounted heat exchanger and a new emergency backup generator. Based on our review of the project drawings and technical specifications, the following is a summary of our noise assessment of the proposed equipment.

Town of Moraga, Exterior noise limits

Sustained over five-minute noise shall not exceed the 55 dB during daytime hours and 50 Db during nighttime hours (beginning one hour after sunset) inside of a residence with all windows and doors closed.

NOISE ANALYSIS

Of the supporting equipment planned for this project, Table 1 below presents the primary noise sources of concern.

Table 1 – Supporting Equipment Noise Data

Noise Source	Equipment Type	Make	Model	Size	Manufacturer's Published Noise Data (dBA)	Noise Data Reference Distance (ft)
A	Heat Exchanger	Charles Industries	6000W HX	--	65	5
B	Generator	Generac	SDC20	20 KW	65 (1)	23

[1] Sound pressure is based on Gen Set with Level 2 sound attenuated enclosure, full-load operating conditions.

Our review of the package did not reveal any other significant noise sources. The equipment is proposed to be installed on private property behind an 8’ high composite fence. Ambient noise is not considered in this study.

To properly present this assessment, our noise modeling has assumed following scenarios: 1) Heat Exchanger on the pre-manufactured equipment cabinet runs continuously; 2) the generator is operating in the full load condition; 3) Ambient noise is not considered; 4) other existing on-site equipment creating noises are ignored and 5) other fencing/landscaping currently on site is not taken into consideration.

The site and its adjacent properties are located within the City limits of Moraga, CA and the telecommunication site will sit below an electric transmission tower within APN 258-300-019. The nearest adjacent residential property line is located to the North-East (APN 258-693-019). The measurement of sound shall be taken from the nearest private site’s property line, towards the source of the sound, which equates to **226 ft** distance from cabinet heat exchanger to the property line and **230 ft** from the generator to property line.

Generator is for emergency backup during power failure conditions. Generator is exercised once a week for one half hour maximum during daytime hours only. A/C unit on the pre-manufactured cabinet can run continuously and will run during day and nighttime. Noise levels measurements per Table 1, calculated to the property line of the nearest residence, is as follows:

Noise Source ‘A’ – A/C Cabinet = 23.9 dBA
Noise Source ‘B’ – Generator = 35.4 dBA

Combined Sources **– Total of 35.7 dBA**

Based on Town of Moraga’s noise standard, a noise level of **35.7 dBA** is considered acceptable during any time of the day or night. The combined anticipated level of the cabinet’s A/C unit and the Generator both meet the city’s standard even though only the A/C units are expected to run simultaneously at night. Noise levels were calculated to the property line and not the inside of the residence as stated in the standard. So as sound pressure levels attenuate with increasing distance from the sound source, noise levels at the residences are anticipated to be less than 50 dBAs, meeting the noise standards outlined in this report.

CONCLUSION

Based on the project documentation, our noise assessment indicates that the proposed Verizon Telecommunications Facility complies with requirements mandated by Town of Moraga at all residences per stated noise metrics outlined in the requirements above. To avoid any misunderstanding, I hereby state that to the best of my knowledge, belief and professional judgment, this report represents an accurate appraisal of Verizon's equipment, based upon careful evaluation of Manufacturer's data to the extent reasonably possible.

Please reach out if I can be of further assistance.

Respectfully Submitted
For the Firm,

2022.07.21 16:49:54-04'00'
Robert J Lara,