APPENDIX A

Notice of Preparation, Initial Study, Scoping Comments, and Scoping Meeting Memorandum

APPENDIX A-1

Notice of Preparation and Initial Study

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

FOR THE

TERRA LINDA HIGH SCHOOL CAPITAL IMPROVEMENTS PROJECT

August 29, 2023

San Rafael City Schools ("the District") is preparing an Environmental Impact Report ("EIR") for the proposed Terra Linda High School Capital Improvements Project ("Project"), which would modernize and/or replace existing facilities at the school campus, located at 320 Nova Albion Way, San Rafael, California, 94903. The California Environmental Quality Act (Public Resources Code Section 21000 et seq.) and its interpreting regulations (California Code of Regulations, Title 14, Section 15000 et seq.) (collectively, "CEQA") require that the District conduct environmental review of the proposed Project, which has the potential to result in physical changes in the environment. The District is the "Lead Agency" for the Project and is the public agency with the principal responsibility for approving and carrying out the Project. The District has determined that an EIR will be the required CEQA document for the Project.

The District is issuing this Notice of Preparation ("NOP") to invite comments on the scope and content of the EIR. The NOP, which is supported by an Initial Study, provides information describing the proposed Project and its potential environmental effects in order to solicit public and agency comments as to the scope of environmental issues, reasonable alternatives, and mitigation to be considered in the EIR.

RESPONDING TO THIS NOP: Responses to this NOP and any related questions or comments regarding the scope or content of the EIR must be directed in writing to:

Tim Ryan
Senior Director of Strategic Facility Planning
San Rafael City Schools
310 Nova Albion Way
San Rafael, CA 94903
tryan@srcs.org

Comments on the NOP must be received at the above mailing or email address by no later than **5:00 p.m. on Monday, October 2, 2023**. Please reference the Project title shown above in all correspondence.

Responses to this NOP should focus, specific to this Project, on the potentially significant environmental effects that the Project may have on the physical environment, ways in which those effects might be minimized, and potential alternatives to the Project that should be addressed in the EIR. This focus aligns with the purpose of the EIR to inform the public about these factors of the Project.

SCOPING MEETING: A scoping meeting for responsible, trustee agencies, and other interested persons will be held at the Terra Linda High School Innovation Hub to receive comments regarding the scope and content of the EIR for the proposed Project that will assist the District in identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in the EIR at the following time and date:

Time: 6:00 p.m.

Date: September 14, 2023

Location: Terra Linda High School Innovation Hub
320 Nova Albion Way, San Rafael, CA 94903

EXISTING CONDITIONS: The Project site currently supports the fully developed and operating Terra Linda High School campus. The high school had an enrollment of 1,200 students during the 2022-23 school year. The northern area of the campus contains the main building, administration, competition gym, and small gym/locker rooms. The San Rafael City Schools District Office is located in the northwestern portion of the campus; however, it is not a part of the Project site. The eastern and southeastern area of the campus contains the stadium, track, and baseball and softball fields. The southern and southwestern area of the campus contains the soccer fields and tennis courts. The western area of the campus contains shop buildings (e.g., wood, auto), and the central portion of the campus contains the student commons, theater, and aquatic center with the swimming pool facility. The Project site totals 28 acres in size, consisting of the existing buildings (202,632 square feet), outdoor athletic space (621,103 square feet), and parking (250 stalls). The Project site is bounded by Nova Albion Way to the north, the Miller Creek School District Office to the east, and single-family residences along Devon Drive to the south and west.

PROJECT DESCRIPTION: The District proposes the following phased capital improvements at Terra Linda High School:

Phase 1

- **Rehabilitation of Aquatics Center.** The existing outdoor swimming pool facilities (including the 25-meter by 25-yard pool) would be demolished, and a new competition-level aquatics center (with a 25-meter by 40-yard pool) would be constructed to support the existing swimming and water polo programs. The facility would meet California Interscholastic Federation (CIF) standards, which would allow the school to host CIF-level competitions. The existing pool lights would be replaced with new low-level MUSCO lighting on 50-foot poles. The existing pool deck would be removed and replaced with a larger one. A new scoreboard and LED display would be installed at the perimeter of the pool. A new concrete 5- to 6-level bleacher with a cantilever shade structure would be installed on the south side of the aquatic facility; the bleachers would require the installation of a retaining wall. The existing ancillary gym building and pump room would be demolished and replaced with an ancillary gym building and pool house. Additionally, a new pump house building would be constructed. New lockers as well as restroom facilities would be a part of the ancillary gym building to better serve the pool.
- **Modernization of Physical Education Support Spaces.** The existing locker rooms, bathrooms, team rooms, and other support spaces in the gym building would be modernized. The spaces, including the bathrooms and lockers, would be reconfigured to add a new team room and an all-gender locker room. There would be new lighting, painting, finishes, and fixtures. The exterior doors would be replaced, as would mechanical equipment. The roof would either be coated or replaced, and the existing natural gas lines servicing the building would be upsized and rerouted. Mechanical equipment serving these spaces may also be replaced.

Phase 2

- **Modernization of Main Classroom Buildings.** The interior of the main school buildings, including classrooms, labs, restrooms, and corridors, would be modernized to be more resilient to physical damage and better comply with the Americans with Disabilities Act (ADA) standards. The facilities would be improved with new LED lighting, flooring, counters, fixtures, painting and finishes, and technology. The restroom toilets would be improved to high-security, full-height partitions. The fire alarm system would be upgraded. Room configurations at select areas would be changed to better serve more modern functions; as an example, existing book storage rooms would be converted into a wellness center.

Phase 3

- **Stadium Upgrades.** A new, 1,500-square-foot concessions and restroom facility would be constructed between the stadium and gymnasium, as would a new ticket booth building. The existing scoreboard would be replaced, and the track surface would be replaced with an in-kind rubberized surface. ADA-compliant paths of travel would be provided, and two existing portable structures (each approximately 1,000 square feet) would be removed. Existing flatwork, fencing, grades, landscaping, and site lighting between the practice gym and the track would also be improved as part of the stadium upgrades. One fire hydrant would need to be relocated. The existing concession stand, a 40-foot converted storage container, would be removed.

- **New Artificial Turf at Baseball and Softball Fields.** Approximately 200,000 square feet of natural turf would be replaced with artificial turf. No "crumb rubber" materials would be present in the synthetic turf. The new fields may include other improvements, including dugouts, shot put throw station, irrigation line upgrades to adjacent landscaping, new scoreboards, and improved ADA-compliant paths of travel. No lighting is proposed for the ballfields as part of the proposed Project.

- **Tennis Court Improvements.** The existing tennis courts would be replaced, walkways would be improved to meet ADA standards, and the drinking fountain would be replaced with a new ADA-compliant fountain. The existing fencing around the tennis courts would be replaced. No lighting is proposed for the tennis courts as part of the proposed Project.

Implementation of the proposed Project would not require off-site improvements. The new facilities would tie into existing underground utilities located within the campus. It is assumed new impermeable surfaces, including artificial turf fields, would be designed to capture increased runoff. The Project would comply with the California Building Standards Code (Title 24, California Code of Regulations [CCR]) and include sustainability improvements as required by the California Green Building Standards Code (CCR Part 11, Title 24), such as water conservation features (e.g., low-flow, water-efficient plumbing fixtures for toilets and sinks, tankless water heater systems, drought-tolerant plants and low-water irrigation systems with smart sensor controls). Improvements to the aquatic center, tennis courts, turf fields, and ADA-compliant paths of travel may require the removal of existing trees.

Implementation of the proposed Project would not increase the student seating capacity of the campus. However, the proposed competitive-level aquatic center and the proposed artificial turf at the ballfields would allow extended use of the facilities by the high school and community through the Civic Center Act. Expanded activity may include CIF tournaments at the aquatic center, early morning water polo and swim team practices, and expanded use of the ballfields.

The Project would be phased to limit interruptions to existing campus operations and to avoid the need for temporary student classroom facilities during construction. Additionally, construction activities would be scheduled to minimize disruptions to campus programs and important testing days. It is assumed the aquatics programs would be temporarily relocated off-site for one season to a community facility during construction of the new facility. The approximate schedule of construction activities for each phase is as follows:

- Phase 1: June 2024–August 2025
- Phase 2: June 2026–December 2028
- Phase 3: June 2029–December 2029

POTENTIAL ENVIRONMENTAL EFFECTS: The EIR will address the following potential environmental effects: Aesthetics, Air Quality, Biological Resources, Cultural Resources, Energy, Geology/Soils, Greenhouse Gas Emissions, Hydrology/Water Quality, Noise, Recreation, Transportation/Traffic, and Tribal Cultural Resources. The following topics will not be addressed in this EIR because of the urban nature of the Project site and because the Project would not increase the seating capacity of the campus: Agriculture and Forestry Resources, Hazards and Hazardous Materials, Land Use/Planning, Mineral Resources, Population/Housing, Public Services, Utilities/Service Systems, and Wildfire.

The EIR will examine Project and cumulative effects and a reasonable range of alternatives to the Project that may be capable for reducing or avoiding potential environment effects that may be identified for the Project.

DOCUMENT AVAILABILITY: The Initial Study EIR Scoping Document and NOP for the Project are available for public review at the following locations:

- San Rafael City Schools District Office, 310 Nova Albion Way, Room 505, San Rafael, CA 94903 (during normal business hours)
- District Website: https://www.srcsbondprogram.org/

Tim Ryan
Senior Director of Strategic Facility Planning San Rafael City Schools

Initial Study

Terra Linda High School
Capital Improvements Project

Lead Agency:

San Rafael City Schools
310 Nova Albion Way
San Rafael, California 94903

SAN RAFAEL CITY SCHOOLS

Prepared by:

Michael Baker International
505 14th Street, Suite 900
Oakland, CA 94612

August 2023

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TABLE OF CONTENTS

List of Figures

ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities
afy	acre-feet per year
BAAQMD	Bay Area Air Quality Management District
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CIF	California Interscholastic Federation
CO_2	carbon dioxide
DPW	Department of Public Works
EIR	Environmental Impact Report
GHG	greenhouse gases
LGVSD	Las Gallinas Valley Sanitary District
LHMP	Local Hazard Mitigation Plan
MCE	Marin Clean Energy
MMWD	Marin Municipal Water District
MRZ	Mineral Resource Zone
NPDES	National Pollutant Discharge Elimination System
PG&E	Pacific Gas and Electric Company
PD	Planned Development
RWQCB	Regional Water Quality Control Board
SRA	State Responsibility Area
SRFD	San Rafael Fire Department
SRPD	San Rafael Police Department
SWPPP	Storm Water Pollution Prevention Plan
USFWS	US Fish and Wildlife Service
VHFHSZ	Very High Fire Hazard Severity Zones

1 PROJECT DESCRIPTION

1.1 Project Title

Terra Linda High School Capital Improvements Project

1.2 Lead Agency Name and Address

San Rafael City Schools
310 Nova Albion Way
San Rafael, California 94903

1.3 Contact Person, Email, and Phone Number

Timothy Ryan, Senior Director of Strategic Facility Planning
tryan@srcs.org | 415-492-3200

1.4 Overview of the Project

San Rafael City Schools (the District) is proposing to implement capital improvements at the Terra Linda High School campus to modernize and/or replace existing outdated and aging academic and physical education facilities and to improve access in compliance with the Americans with Disabilities Act (ADA). The proposed improvements would serve the existing student population. No increase in enrollment is proposed.

1.5 California Environmental Quality Act

The California Environmental Quality Act (CEQA) is intended to inform government decision-makers and the public about the potential environmental effects of proposed activities and to prevent significant, avoidable environmental damage. CEQA applies to activities initiated by, funded by, or requiring discretionary approvals from state or local government agencies. The proposed capital improvements at Terra Linda High School constitute a “project” as defined by CEQA (California Public Resources Code Sections 21000 et. seq.) and the CEQA Guidelines (California Code of Regulations, Title 14, Sections 15000 et seq.).

CEQA Guidelines Section 15367 states that a lead agency is “the public agency which has the principal responsibility for carrying out or approving a project.” The District is the lead agency responsible for compliance with CEQA for the proposed Project and has determined that the proposed Project will require the preparation of an environmental impact report (EIR).

This Initial Study has been prepared to provide information describing the proposed Project and its potential environmental effects. It evaluates environmental factors included in CEQA Guidelines Appendix G, Environmental Checklist Form, and identifies the proposed Project’s potentially significant environmental effects that will be further evaluated in the EIR. Environmental factors for which no significant adverse environmental impacts are expected to occur will not be carried forward for further analysis. Where impacts are determined to be significant, the EIR will identify mitigation measures. The EIR will also include an evaluation of alternatives to the proposed Project that would reduce or avoid significant environmental impacts, including a No Project Alternative.

1.6 Project Location and Setting

The Terra Linda High School campus (campus or Project site) is located within the governmental jurisdictional boundary of the City of San Rafael (City), in southeastern Marin County, California. The City is bordered on the west by the incorporated towns of San Anselmo and Ross, and on the south by the City of Larkspur and the unincorporated communities of Kentfield and Greenbrae. The eastern edge of the City is formed by the San Francisco and San Pablo Bays, and the City is bordered by the City of Novato to the north. Figure 1 shows the regional vicinity of the Project site.

The Project site, located at 320 Nova Albion Way, is in the northwestern area of the City of San Rafael. The Project site is bounded by Nova Albion Way to the north, the Miller Creek School District Office to the east, and single-family residences along Devon Drive to the south and west. The main entrance to the Project site is off Nova Albion Way. The Project site is approximately 0.9 miles west of US Route 101. Figure 2 shows the Project site location.

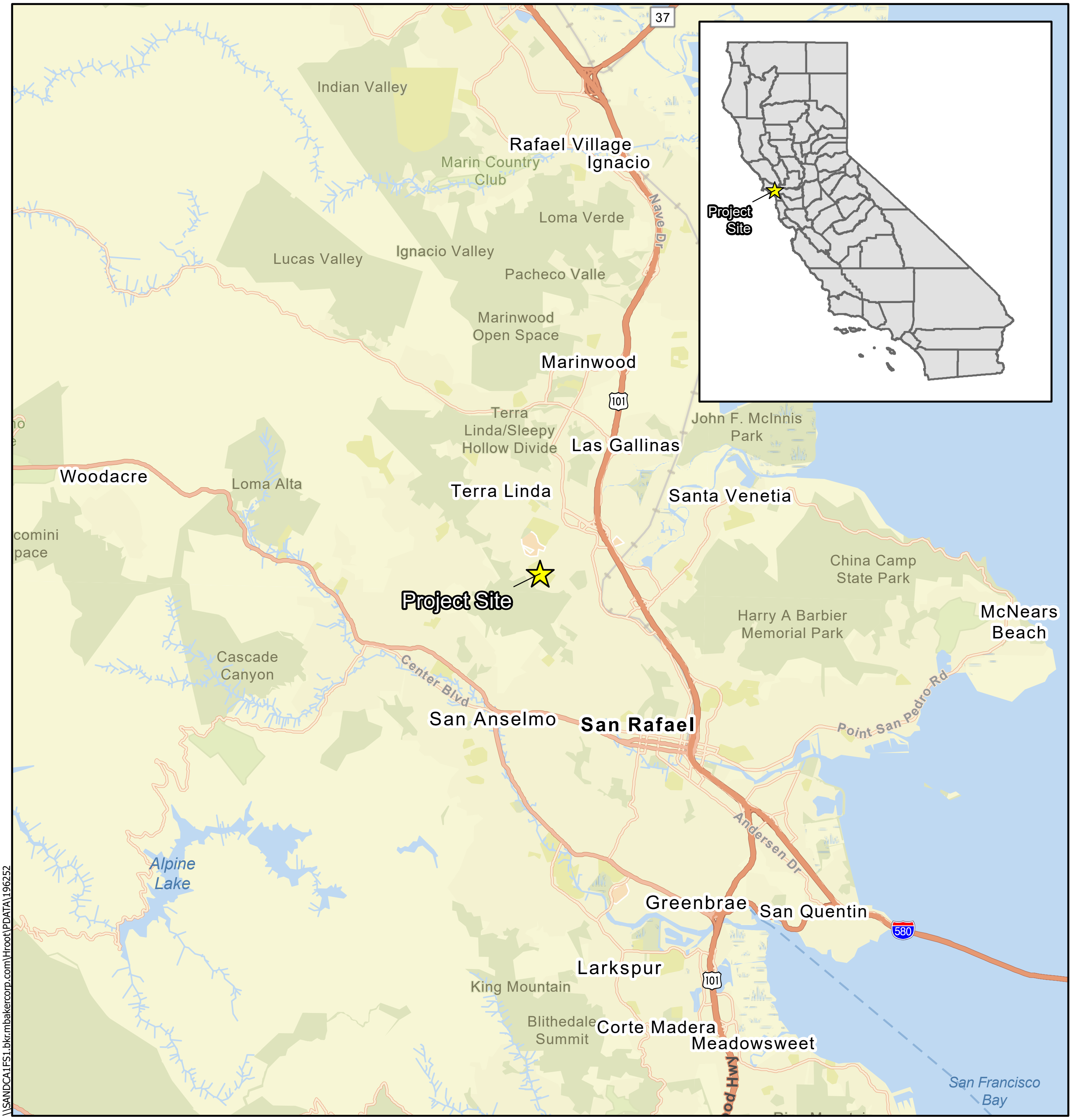
1.6.1 Existing Uses

Terra Linda High School was originally built in 1959. The campus consists of a 28-acre, irregularly shaped parcel, which is owned by the District. The northern portion contains the main classroom buildings, administration, competition gym, and small gym/locker rooms. The San Rafael City Schools District Office is located in the northwestern portion of the property; however, it is not a part of the Project site. The eastern and southeastern portions of the campus contain the stadium, track, and baseball and softball fields. The southern and southwestern portions of the campus contain soccer fields, tennis courts, and basketball courts. The western portion of the campus contains shop buildings, and the central portion of the campus contains the student commons and theater, and aquatic center with a swimming pool facility.

A summary of the existing facilities at the campus, including their size and year they were last modernized, is provided in Table 1. As shown, the District has continually maintained Terra Linda High School. In addition to the schedule shown below, the District has approved the following improvements to be implemented in 2023 and 2024. In 2023, the District will be and/or has been repairing and repaving the parking lot in the northeast corner of the campus, coating the rooftops of the shop buildings, installing a new shade structure at the career and technical education (CTE) facility, resurfacing the tennis courts, and constructing a ceramics, kiln, and glazing studio. The District has also approved new solar arrays that will be installed throughout the campus during the summer of 2024.

Table 1: Existing Facilities

Facility Use	Size	Year of Modernization
Administration	7,175 square feet	2019
Main Classroom Building	97,511 square feet	2002-2009
Commons (Student Support, Cafeteria, and Library)	32,971 square feet	2019
Theater	9,648 square feet	2006
Shop Buildings (Auto, Wood, Ceramics, and Applied Technology)	11,077 square feet	2021
Competition Gymnasium	24,343 square feet	2022
Weight Room / Dance Studio Building	9,469 square feet	2006
Swimming Pool	25 yards x 25 meters	2006
Practice Gymnasium	21,218 square feet	2019
Stadium / Track	157,889 square feet	2018
Basketball Courts	36,403 square feet	2006
Surface Parking	250 stalls	2019, 2022, 2023



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Legend

★ Project Site

Michael Baker INTERNATIONAL

0 1 2 Miles

Source: Esri, Michael Baker Intl, County of Marin, USGS, Caltrans.

TERRA LINDA HIGH SCHOOL
CAPITAL IMPROVEMENTS PROJECT

Regional Vicinity Map

Figure 1

Legend

- Terra Linda High School Campus Boundary
- District Office (Not Part of Project Site)

Michael Baker INTERNATIONAL

0 150 300 US Feet

Source: Esri, Michael Baker Intl, County of Marin.

TERRA LINDA HIGH SCHOOL
CAPITAL IMPROVEMENTS PROJECT

Project Location Map

Figure 2

1.6.2 Surrounding Land Uses

Residential uses surround the campus to the north, south, and west. The uses are predominantly single-family homes. The Miller Creek School District Office is located adjacent and to the east of the campus, and the San Rafael City Schools District Office is located in the northwest portion of the campus; however, it is not included as part of the Project site. In the greater vicinity of the campus, Kaiser Permanente San Rafael Medical Center is located approximately 1,980 feet to the north of the campus and multifamily housing and a shopping center are located approximately 1,690 feet to the northwest. The campus is also near parks and open space, including Hartzell Park, approximately 2,220 feet to the east, and Sorich Park, approximately 1,380 feet to the south.

1.6.3 Land Use and Zoning

The Project site has a City of San Rafael 2040 General Plan land use designation of Public/Quasi-Public, which includes public schools as an allowed land use type.[1] The Project site is zoned Planned Development (PD) District.[2] The purpose of the PD District is to promote and encourage cluster development on large sites to avoid sensitive areas of property; encourage innovative design on large sites by allowing flexibility in property development standards; and accommodate various types of large-scale, complex, mixed-use, phased developments.[3] School uses are permitted in the PD District except in accord with a valid development plan. A development plan is not required for existing school sites located in the PD District.[4]

1.7 Proposed Project

Facilities at the campus were originally constructed in 1959, with improvements implemented in the 1960s and early 2000s. Improvements are needed to modernize and/or replace existing academic and physical education facilities at the campus to serve the existing student population and to improve access in compliance with the ADA. Additionally, the existing swimming pool no longer meets the standards for competition pools. As such, the existing pool facilities would be removed and replaced with a new competition-level aquatics center to support the existing water sports programs.

The proposed Project would be implemented in three phases, as follows (refer to Figure 3, Conceptual Site Plan):

Phase 1

- **Rehabilitation of Aquatics Center.** The existing outdoor swimming pool facilities (including the 25-meter by 25-yard pool) would be demolished, and a new competition-level aquatics center (with a 25-meter by 40-yard pool) would be constructed to support the existing swimming and water polo programs. The facility would meet California Interscholastic Federation (CIF) standards, which would allow the school to host CIF-level competitions. The existing pool lights would be replaced with new low-level MUSCO lighting on 50-foot poles. The existing pool deck would be removed and replaced with a

1 City of San Rafael, San Rafael General Plan 2040 Land Use Map, 2021.
2 City of San Rafael, Zoning Finder, accessed August 1, 2023, https://san-rafael.maps.arcgis.com/apps/View/index.html?appid=f9a6eba03a8d44f5919bfef783f056c2.
3 San Rafael Municipal Code, Section 14.07.010.
4 Pursuant to California Government Code Section 53094 et seq., the governing board of a school district may render city or county zoning ordinances and general plan requirements inapplicable. It is anticipated that the District's Board of Education will exempt the proposed Project and campus from any zoning ordinances or regulations of the City of San Rafael, including, without limitation, the City's Municipal Code, General Plan, and related ordinances and regulations that otherwise would be applicable.

larger one. A new scoreboard and LED display would be installed at the perimeter of the pool. A new concrete 5- to 6-level bleacher with a cantilever shade structure would be installed on the south side of the aquatic facility; the bleachers would require the installation of a retaining wall. The existing ancillary gym building and pump room would be demolished and replaced with an ancillary gym building and pool house. Additionally, a new pump house building would be constructed. New lockers as well as restroom facilities would be a part of the ancillary gym building to better serve the pool.

- **Modernization of Physical Education Support Spaces.** The existing locker rooms, bathrooms, team rooms, and other support spaces in the gym building would be modernized. The spaces, including the bathrooms and lockers, would be reconfigured to add a new team room and an all-gender locker room. There would be new lighting, painting, finishes, and fixtures. The exterior doors would be replaced, as would mechanical equipment. The roof would either be coated or replaced, and the existing natural gas lines servicing the building would be upsized and rerouted. Mechanical equipment serving these spaces may also be replaced.

Phase 2

- **Modernization of Main Classroom Buildings.** The interior of the main school buildings, including classrooms, labs, restrooms, and corridors, would be modernized to be more resilient to physical damage and compliance with ADA standards. The facilities would be improved with new LED lighting, flooring, counters, fixtures, painting and finishes, and technology. The restroom toilets would be improved to high-security, full-height partitions. The fire alarm system would be upgraded. Room configurations at select areas would be changed to better serve more modern functions; as an example, existing book storage rooms would be converted into a wellness center.

Phase 3

- **Stadium Upgrades.** A new concessions and restroom facility would be constructed between the stadium and gymnasium, as would a new ticket booth building. The existing scoreboard would be replaced, and the track surface would be replaced with an in-kind rubberized surface. ADA-compliant paths of travel would be provided, and two existing portable structures (each approximately 1,000 square feet) would be removed. Existing flatwork, fencing, grades, landscaping, and site lighting between the practice gym and the track would also be improved as part of the stadium upgrades. One fire hydrant would need to be relocated slightly. The existing concession stand, a 40-foot converted storage container, would be removed.

- **New Artificial Turf at Baseball and Softball Fields.** Approximately 200,000 square feet of natural turf would be replaced with artificial turf. No “crumb rubber” materials would be present in the synthetic turf. The new fields may include other improvements, including dugouts, shot put throw station, irrigation line upgrades to adjacent landscaping, new scoreboards, and improved ADA-compliant paths of travel. No lighting is proposed for the ballfields as part of the proposed Project.

- **Tennis Court Improvements.** The existing tennis courts would be replaced, walkways would be improved to meet ADA standards, and the drinking fountain would be replaced with a new ADA-compliant fountain. The existing fencing around the tennis courts would be replaced. No lighting is proposed for the tennis courts as part of the proposed Project.

Implementation of the proposed Project would not require off-site improvements. The new facilities would tie into existing underground utilities located within the campus. It is assumed new impermeable surfaces, including artificial turf fields, would be designed to capture increased runoff.

The Project would comply with the California Building Standards Code (Title 24, California Code of Regulations [CCR]) and include sustainability improvements as required by the California Green Building Standards Code (CCR Part 11, Title 24), such as water conservation features (e.g., low-flow, water-efficient plumbing fixtures for toilets and sinks, tankless water heater systems, drought-tolerant plants and low-water irrigation systems with smart sensor controls). Improvements to the aquatic center, tennis courts, turf fields, and ADA-compliant paths of travel may require the removal of existing trees.

The proposed Project would not increase the student seating capacity of the campus. However, the proposed competitive-level aquatic center and the proposed artificial turf at the ballfields would allow extended use of the facilities by the high school and community through the Civic Center Act. Expanded activity may include CIF tournaments at the aquatic center, early morning water polo and swim team practices, and expanded use of the ballfields.

The Project would be phased to limit interruptions to existing campus operations and to avoid the need for temporary student classroom facilities during construction. Additionally, construction activities would be scheduled to minimize disruptions to campus programs and important testing days. It is assumed the aquatics programs would be temporarily relocated off-site for one season to a community facility during construction of the new facility. The approximate schedule of construction activities for each phase is as follows:

- Phase 1: June 2024–August 2025
- Phase 2: June 2026–December 2028
- Phase 3: June 2029–December 2029

1.8 Agency Actions

It is the intent of this document and the forthcoming EIR to disclose the environmental effects of the Project in order to facilitate the understanding of the Project's potentially significant environmental effects by the District Board of Education, as the decision-making body of the CEQA lead agency, prior to its consideration of the Project; by responsible agencies who may rely on the environmental document to issue permits and other authorizations; and by reviewing agencies and the public on the potential environmental consequences that may occur from the proposed Project.

Table 2: Agency Activities

Agency	Discretionary Action
Lead Agency	
San Rafael City Schools	Certification of the EIR and Project approval
Responsible Agency	
San Francisco Bay Regional Water Quality Control Board	Issuance of National Pollutant Discharge Elimination System Permit General Construction Permit and approval of Stormwater Pollution Prevention Plan
San Rafael Public Works Department	Approval of off-site improvements, if any, concerning circulation improvements, grading, and drainage
Reviewing Agency	
Division of the State Architect	Review of Project compliance with the California Building Standards Code for fire and life safety
San Rafael Fire Department	Review of Project site access, fire lane markings, pavers and entrances; fire hydrant location and distribution; fire flow
Bay Area Air Quality Management District (BAAQMD)	Review for adherence of BAAQMD CEQA Thresholds of Significance for Climate Impacts

EXISTING FACILITIES

Total Campus Area:	28 Acres
Outdoor Athletic:	621,103 SF
Parking:	250 stalls

PROPOSED IMPROVEMENTS

	Project Description
	Classroom & Campus Improvements:
1	• Main Building Modernization including LED Lighting, Flooring, Counters, Classroom Technology, Corridors, & Restroom Remodel
2	• Buildings K Modernization Building H Demolition & Replacement with New Facility
	• Security & Fire Alarm Systems Upgrades
3	**Aquatic Center with Competition Swimming & Water Polo**
	Site Work:
4	• Stadium Upgrades including Concessions, Restrooms, Ticket Booth, Portable Removal, & Track Surface, Sitework
5	• Artificial Turf Baseball & Softball Fields With Dugouts
6	• Tennis Court Replacement and Walkway Improvements

LEGEND:

Existing Building	Sport Facilities Improvements
Modernization	Asphalt Paving Improvements
New Building	Courtyard Improvements
Not Part of Project Site	New Artificial Turf

Site Plan Diagram

Michael Baker INTERNATIONAL

NOT TO SCALE

Source: San Rafael City Schools, August 21, 2023.

TERRA LINDA HIGH SCHOOL
CAPITAL IMPROVEMENTS PROJECT

Conceptual Site Plan

Figure 3

2 ENVIRONMENTAL DETERMINATION

2.1 Environmental Factors Potentially Affected

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

☒ 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/Traffic	☒ Tribal Cultural Resources
☐ Utilities/Service Systems	☐ Wildfire	☒ Mandatory Findings of Significance

For the evaluation of potential impacts, the questions in the Initial Study Checklist are stated and an answer is provided according to the analysis undertaken as part of the Initial Study. The analysis considers the long-term, direct, indirect, and cumulative impacts of the project. To each question, there are four possible responses:

- **No Impact.** The project would not have any measurable impact on the environment.
- **Less Than Significant Impact**. The project would have the potential for impacting the environment, although this impact would be below established thresholds that are considered to be significant.
- **Less Than Significant Impact With Mitigation Incorporated**. The project would have the potential to generate impacts which may be considered a significant effect on the environment, although measures or changes to the development’s physical or operational characteristics can reduce these impacts to levels that are less than significant.
- **Potentially Significant Impact**. The project would have impacts which are considered significant, and additional analysis is required to identify measures that could reduce these impacts to less than significant levels.

2.2 Environmental Determination

On the basis of this initial evaluation:

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

☐ I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

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

☐ I find that the proposed Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required.

Bob Marcucci 8/29/23

Printed Name and Signature Date

3 INITIAL STUDY CHECKLIST

3.1 Aesthetics

	Potentially Significant Impact	Less Than Significant Impact 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 publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐	☐	☐

Discussion

a) Except as provided in Public Resources Code Section 21099, would the project have a substantial adverse effect on a scenic vista?

No Impact. Scenic views or vistas are defined as panoramic public views of various natural features, including the ocean, striking or unusual natural terrain, or unique urban or historic features. Public access to these views may be from park lands, private and publicly owned sites, and public rights-of-way.

There are no officially designated scenic vistas in the City of San Rafael. However, the City identifies the following natural and built resources as visually significant, to the extent they are visible from public streets, parks, and public pathways: mountains and hillsides, including Mount Tamalpais, San Rafael Hill, San Pedro Ridge and Big Rock Ridge; San Pablo Bay and San Rafael Bay and Bay Wetlands; offshore islands; Mission San Rafael Arcangel; Marin Civic Center; and San Rafael Canal.[5] The proposed Project is not located near or within any of these natural and built resources, and thus, would not impact such resources. Therefore, no impact to scenic vistas would occur. This issue will not be further analyzed in the EIR.

b) Except as provided in Public Resources Code Section 21099, would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. There are no eligible or designated state scenic highways near the Project site.[6] The closest state scenic highway is Route 37 (eligible), located approximately 5.6 miles to the north of the Project site. Therefore, no impact related to scenic resources within a state scenic highway

5 City of San Rafael, San Rafael General Plan 2040 and Downtown Precise Plan EIR – Aesthetics, 2021.

6 California Department of Transportation, California State Scenic Highway System Map, accessed July 24, 2023, https://www.arcgis.com/apps/webappviewer/index.html?id=465dfd3d807c46cc8e8057116f1aacaa.

would occur. This issue will not be further analyzed in the EIR.

c) Except as provided in Public Resources Code Section 21099, would the project, in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

Less Than Significant Impact. The Project site is located in an urbanized neighborhood. The Project site supports an existing and developed high school campus and is surrounded by residential uses, as well as the Miller Creek School District Office. The San Rafael City Schools District Office is located in the northwest portion of the campus; however, it is not a part of the Project site. The proposed Project would consist of phased improvements for the existing aquatics center, physical education spaces, classrooms, stadium, ballfields, and tennis courts.

The proposed Project would implement improvements to modernize and/or replace the school facilities and would not conflict with the existing zoning of the Planned Development District (PD), which allows for public school uses.[7] There are no other applicable regulations governing the scenic quality of the Project site. Nevertheless, all proposed improvements would be designed to be compatible with existing campus buildings and facilities and would continue to be maintained by the District. Therefore, impacts related to the Project's consistency with regulations governing scenic quality would be less than significant, and this issue will not be further analyzed in the EIR.

d) Except as provided in Public Resources Code Section 21099, would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Potentially Significant Impact. The proposed Project includes lighting improvements for the aquatics center (50-foot light poles), physical education spaces, and classrooms, some of which may result in spillover light at nearby light-sensitive uses (i.e., residential uses) and sky glow. In addition, implementation of the proposed Project would result in the extended use of the facilities by the high school and community in the early mornings and evenings. The design of the proposed lighting systems would include features (e.g., height, shields, and shades) that would limit upward light reflection and sky glow. Furthermore, due to improved technology, the new lighting systems would likely be an improvement from the existing lights relative to adverse glare and/or nighttime lighting effects. Nonetheless, given the campus's proximity to residential neighborhoods with light-sensitive uses, additional analysis of potential light and glare impacts will be included in the EIR. Impacts are considered to be potentially significant.

[7] Pursuant to California Government Code Section 53094 et seq., the governing board of a school district may render city or county zoning ordinances and general plan requirements inapplicable. It is anticipated that the District's Board of Education will exempt the proposed Project and campus from any zoning ordinances or regulations of the City of San Rafael, including, without limitation, the City's Municipal Code, General Plan, and related ordinances and regulations that otherwise would be applicable.

3.2 Agriculture and Forestry Resources

	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Discussion

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

No Impact. The Project site currently supports the existing school campus; no agricultural uses are present on-site or in the surrounding area. Neither the Project site nor the surrounding area is designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance on the "Important Farmland in California" map prepared by the California Natural Resources Agency pursuant to the Farmland Mapping and Monitoring Program.[8] Therefore, the proposed Project would not convert farmland to a non-agricultural use, and no impact would occur. This issue will not be further analyzed in the EIR.

[8] California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program, California Important Farmland Finder, accessed July 24, 2023, https://maps.conservation.ca.gov/DLRP/CIFF/.

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

No Impact. The proposed Project would be implemented within the boundaries of the existing campus, none of which is zoned for agricultural use. Additionally, there are no Williamson Act contracts within the City.[9] Therefore, the proposed Project would not conflict with existing zoning for agricultural use or a Williamson Act contract, and no impact would occur. This issue will not be further analyzed in the EIR.

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))?

No Impact. No portion of the Project site is zoned for forestland, timberland, or Timberland Production as defined in Public Resources Code Section 12220(g) and Government Code Section 4526. Therefore, the proposed Project would not conflict with existing zoning for or cause a rezoning of forestland or timberland. No impact would occur. This issue will not be further analyzed in the EIR.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. No portion of the Project site is developed for forestland use or located adjacent to forestlands. Therefore, the proposed Project would not result in the loss of forestland or the conversion of forestland to non-forest use. No impact would occur. This issue will not be further analyzed in the EIR.

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?

No Impact. As discussed in response to checklist question 3.2(a) above, no portion of the Project site or surrounding area is identified as farmland or used for agricultural purposes. Additionally, as stated in response to checklist question 3.2(c), no portion of the campus or surrounding area is designated as forestland. Therefore, the proposed Project would not change the existing environment in a way that would result in the conversion of farmland to non-agricultural use or forestland to non-forest use, and no impact would occur. This issue will not be further analyzed in the EIR.

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9 California Department of Conservation, *Division of Land Resource Protection, The Williamson Act: 2020-2021 Status Report*, 2021, https://www.conservation.ca.gov/dlrp/wa/Documents/stats_reports/2020%20WA%20Status%20Report.pdf.

3.3 Air Quality

	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
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?	☐	☐	☒	☐

Discussion

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

Potentially Significant Impact. The Bay Area Air Quality Management District (BAAQMD) monitors air quality within the San Francisco Bay Area Air Basin, which includes the City of San Rafael and the Project site. The proposed Project would implement facility improvements at the campus, the construction of which would generate air quality emissions. Because the proposed Project would not increase the student enrollment capacity and would result instead in the extended use of the facilities by the high school and community, it is not anticipated to conflict with the BAAQMD's air quality management plan. An air quality assessment will be prepared to analyze the proposed Project's potential air quality impacts and consistency with the air quality management plan. Impacts are considered to be potentially significant, and additional analysis of this issue will be included in the EIR.

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?

Potentially Significant Impact. Implementation of the proposed Project would generate air pollutants as a result of construction and operation-related activities. Short-term impacts may result from construction equipment emissions, such as from graders, dump trucks, worker vehicle exhaust, and fugitive dust during site preparation activities. Long-term operational impacts may result from the operation of new and/or modified facilities as well as from mobile (vehicle) emissions. A technical report evaluating air quality will be prepared for the proposed Project and will address the potential for cumulative air quality impacts. Impacts are considered to be potentially significant, and additional analysis of this issue will be included in the EIR.

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

Potentially Significant Impact. Some populations and land uses are considered more sensitive to air pollutants than others. The California Air Resources Board has identified the following groups who are most likely to be affected by air pollution: children less than 14 years of age, the elderly over 65 years of age, athletes, and people with cardiovascular and chronic respiratory diseases. Sensitive receptors may include residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Some of these types of uses are located near the campus. The air quality technical report to be prepared for the proposed Project will evaluate the potential for sensitive receptors to be exposed to unhealthful pollutant concentrations as the result of Project implementation. Impacts are considered potentially significant. Additional analysis of this issue will be included in the EIR.

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

Less Than Significant Impact. Potential sources that may produce objectionable odors during construction activities include equipment exhaust, application of asphalt and architectural coatings, and other interior and exterior finishes. Although not anticipated, potential odors from these sources would be localized and generally confined to the immediate area surrounding the Project site. The proposed Project would be implemented utilizing standard construction techniques and odors would be typical of most construction sites, would be temporary in nature, and would not persist beyond the termination of construction activities. Construction impacts are therefore considered to be less than significant in this regard.

Additionally, nuisance odors are regulated under BAAQMD Regulation 7, Odorous Substances, which requires abatement of any nuisance generating an odor complaint. Regulation 7 places general limitations on odorous substances and specific emission limitations on certain odorous compounds. Odors are also regulated under BAAQMD Regulation 1, Rule 1-301, Public Nuisance, which states:

> No person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property.

BAAQMD has established odor screening thresholds for land uses that have the potential to generate substantial odor complaints, including wastewater treatment plants, landfills or transfer stations, composting facilities, confined animal facilities, food manufacturing, and chemical plants.[10] The Project site does not currently contain these uses and none of these uses would be developed as part of the proposed Project. Therefore, no impact related to odors would occur during operations, and this issue will not be further analyzed in the EIR.

10 Bay Area Air Quality Management District, California Environmental Quality Act Air Quality Guidelines, May 2017.

3.4 Biological Resources

	Potentially Significant Impact	Less Than Significant Impact 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, regulations or by the California Department of Fish and Wildlife or US 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?	☐	☐	☐	☒

Discussion

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?

Potentially Significant Impact. Sensitive plants include those listed as threatened or endangered, proposed for listing, or candidate for listing by the US Fish and Wildlife Service (USFWS) and/or California Department of Fish and Wildlife (CDFW) or those listed by the California Native Plant Society. Sensitive wildlife species are those species listed as threatened or endangered, proposed for listing, or candidate for listing by USFWS and/or CDFW, or considered special status by CDFW. Sensitive habitats are those that are regulated by USFWS and US Army Corps of Engineers, and/or those considered sensitive by CDFW.

The Project site is fully developed and vegetation on the site consists of grass-covered sports fields and ornamental landscape plantings throughout the site. Nonetheless, a biological resources technical report will be prepared to evaluate potential impacts to sensitive and/or special-status species. Impacts are considered potentially significant, and further analysis will be included in the EIR.

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, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

No Impact. The Project site is a fully developed high school campus within an urbanized neighborhood. No riparian or sensitive natural community occurs within the Project site or surrounding area.[11] Therefore, no impact to riparian or sensitive natural communities would occur with implementation of the proposed Project. This impact will not be further analyzed in the EIR.

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?

No Impact. The Project site is a fully developed high school campus within an urbanized neighborhood. No wetland habitat occurs within the Project site.[12] The closest wetland habitat to the Project site is a riverine feature, approximately 0.45 miles to the south in Sorich Park. Therefore, no impact to riparian or sensitive natural communities would occur with implementation of the proposed Project. This impact will not be further analyzed in the EIR.

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?

No Impact. In an urban context, a wildlife migration corridor can be defined as a linear landscape feature of sufficient width and buffer to allow animal movement between two comparatively undisturbed habitat fragments, or between a habitat fragment and vital resources, thereby encouraging population growth and diversity. The Project site is completely disturbed with a high school campus, surrounded by residential and school uses. The Project site is not a part of or adjacent to undisturbed habitat fragments, designated wildlife migration corridors, or vital resources. Therefore, the proposed Project would not interfere with the movement of wildlife. No impact would occur, and this issue will not be further considered in the EIR.

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

No Impact. The City of San Rafael has a tree protection ordinance (San Rafael Municipal Code Section 11.12.050) which requires that without a written permit, no cutting, pruning, breaking, injuring, removing, or spraying may be done to any living tree in, upon, or along any public street, sidewalk, or walkway in the City. The City's Public Works Department has supervision over all matters relating to trees planted on City streets, sidewalks, and walkways. The Project site is within District property and does not contain public streets, sidewalks, or walkways. The proposed Project also does not propose any improvements off-site. Therefore, no public trees protected under the City's ordinance would be impacted by the proposed Project. However, the District is

11 US Fish and Wildlife Service, National Wetlands Inventory Mapper, accessed July 24, 2023, https://www.fws.gov/wetlands/data/mapper.html.

12 US Fish and Wildlife Service, National Wetlands Inventory Mapper.

committed to taking the necessary measures to protect and preserve the on-site trees wherever possible. Therefore, no impact related to local policies or ordinances protecting biological resources would occur with implementation of the proposed Project.[13] This impact will not be further analyzed in the EIR.

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?

No Impact. The County of Marin does not have a habitat conservation or natural community conservation plan.[14] Therefore, no impact related to conflict with such plans would occur with implementation of the proposed Project. This issue will not be further analyzed in the EIR.

13 Pursuant to California Government Code Section 53094 et seq., the governing board of a school district may render city or county zoning ordinances and general plan requirements inapplicable. It is anticipated that the District's Board of Education will exempt the proposed Project and campus from any zoning ordinances or regulations of the City of San Rafael, including, without limitation, the City's Municipal Code, General Plan, and related ordinances and regulations that otherwise would be applicable.

14 California Department of Fish and Wildlife, California Natural Community Conservation Plans Map, 2019.

3.5 Cultural Resources

	Potentially Significant Impact	Less Than Significant Impact 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 dedicated cemeteries?	☒	☐	☐	☐

Discussion

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

Potentially Significant Impact. A cultural resources technical report will be prepared for the proposed Project. The Project's potential impacts on historical resources will be further evaluated in the EIR.

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

Potentially Significant Impact. The Project site is a fully developed and operating high school campus. As such, the presence of archaeological resources is unlikely. Nonetheless, the proposed Project would require ground-disturbing activities during construction, which may result in the disturbance of previously unknown archaeological resources. A cultural resources technical report will be prepared to assess the potential for impacts on archaeological resources that may be present at the Project site. Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

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

Potentially Significant Impact. The Project site is an existing developed high school campus and does not contain cemeteries or known human burial sites. However, although unlikely, ground-disturbing activities during construction may result in the disturbance of unknown human remains. A cultural resources technical report will be prepared to assess the potential for impacts on human remains that may be present at the Project site from ground-disturbing activities during construction. As impacts are considered potentially significant, additional analysis of this issue will be included in the EIR.

3.6 Energy

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

Discussion

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

Potentially Significant Impact. Sources of energy use associated with construction and operation of the proposed Project include electricity, natural gas, and transportation fuel for vehicle trips and off-road construction equipment. An analysis of energy consumption will be prepared for the proposed Project to assess energy consumption during short-term construction and long-term operational activities and to identify the potential for wasteful, inefficient, or unnecessary consumption of resources. Impacts are considered potentially significant. Additional analysis of this issue will be included in the EIR.

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

Potentially Significant Impact. Proposed improvements to the campus facilities would incorporate upgrades to existing facilities (lighting, water conservation features such as faucet aerators and high-efficiency toilets and urinals, etc.) in conformance with applicable codes and regulations pertaining to energy use and reduction. The energy analysis prepared for the proposed Project will evaluate the Project's consistency with applicable state and local energy plans relative to renewable energy and energy efficiency. Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

3.7 Geology and Soils

	Potentially Significant Impact	Less Than Significant Impact 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:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☒	☐	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
iv) Landslides?	☒	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☒	☐	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☒	☐	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐

Discussion

a) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

No Impact. The Project site is not located within a state-designated Alquist-Priolo Fault Hazard Zone.[15] The nearest Fault Hazard Zone is the Hayward Fault, located approximately 10 miles

[15] California Geological Survey, Earthquake Zones of Required Investigation Data Viewer, Search by Location, accessed July 21, 2023, https://maps.conservation.ca.gov/cgs/EQZApp/app/.

east of the Project site. No active faults are known to cross the Project site and surrounding vicinity. Therefore, the proposed Project would not directly or indirectly cause substantial adverse effects related to the rupture of a known earthquake fault. No impact would occur, and this issue will not be further addressed in the EIR.

ii. Strong seismic ground shaking?

Potentially Significant Impact. The Project site is located in a seismically active area in Northern California and is subject to strong seismic ground shaking. Additional discussion of the regional geologic setting, faults, and seismicity will be provided in the EIR.

iii. Seismic-related ground failure, including liquefaction?

Potentially Significant Impact. According to the Department of Conservation's Earthquake Zones of Required Investigation, the Project site is not located within a liquefaction zone.[16] However, the City's General Plan identifies a majority of the Project site in an area with medium liquefaction susceptibility.[17] Impacts are considered potentially significant. Additional analysis of this issue will be included in the EIR.

iv. Landslides?

Potentially Significant Impact. According to the Department of Conservation's Earthquake Zones of Required Investigation, the Project site is not located within a landslide zone.[18] However, the City's General Plan classifies the southwest portion of the Project site as moderate to very high for landslide susceptibility.[19] Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

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

Potentially Significant Impact. Construction of the proposed Project would include ground-disturbing activities, such as grading and excavation, which could result in the potential for erosion to occur at the Project site. Impacts are considered potentially significant. Additional analysis of this issue will be included in the EIR.

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?

Potentially Significant Impact. The Project site is not identified as being susceptible to subsidence.[20] However, as discussed in response to checklist question 3.7(a)(iii) and (a)(iv), a majority of the Project site in an area with medium liquefaction susceptibility and the southwest portion of the site is classified as very high for landslide susceptibility.[21,22] Impacts are considered potentially significant. The EIR will provide additional discussion on soil conditions at the Project

16 California Geological Survey, Earthquake Zones of Required Investigation Data Viewer, Search by Location, accessed July 21, 2023, https://maps.conservation.ca.gov/cgs/EQZApp/app/.
17 City of San Rafael, General Plan 2040/EIR – Geology and Soils.
18 California Geological Survey, Earthquake Zones of Required Investigation Data Viewer, Search by Location, accessed July 21, 2023, https://maps.conservation.ca.gov/cgs/EQZApp/app/.
19 City of San Rafael, General Plan 2040/EIR – Geology and Soils.
20 City of San Rafael, General Plan 2040/EIR – Geology and Soils.
21 City of San Rafael, General Plan 2040/EIR – Geology and Soils.
22 City of San Rafael, General Plan 2040/EIR – Geology and Soils.

site, including risk for on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

d) Would the project be located on expansive soil, creating substantial direct or indirect risks to life or property?

Potentially Significant Impact. Expansive soils are clay-based soils that tend to expand (increase in volume) as they absorb water and shrink (lessen in volume) as water is drawn away. If soils consist of expansive clays, foundation movement and/or damage can occur if wetting and drying of the clay does not occur uniformly across the entire area. Expansive soils are known to occur at various locations throughout the campus. Therefore, impacts are considered potentially significant. The EIR will provide additional discussion on soil conditions at the Project site, including risks associated with expansive soils.

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?

No Impact. The Terra Linda High School campus is served by existing sewer infrastructure operated by Las Gallinas Valley Sanitary District. No septic tanks or alternative wastewater disposal systems are included as part of the proposed Project. Therefore, no impact associated with the use of such systems would occur. This issue will not be further analyzed in the EIR.

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

Potentially Significant Impact. Some of the proposed improvements under the proposed Project would involve ground-disturbing activities during construction. An assessment of the potential for the Project to impact paleontological resources will be provided in the EIR. Impacts are considered potentially significant.

3.8 Greenhouse Gas Emissions

	Potentially Significant Impact	Less Than Significant Impact 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?	☒	☐	☐	☐

Discussion

a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Potentially Significant Impact. Greenhouse gas (GHG) emissions refer to a group of emissions that are generally believed to affect global climate conditions. GHGs, such as carbon dioxide (CO_2), methane, and nitrous oxide, keep the average surface temperature of the earth close to 60 degrees Fahrenheit. GHGs also include hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, black carbon (the most strongly light-absorbing component of particulate matter emitted from burning fuels such as coal, diesel, and biomass), and water vapor. CO_2 is the most abundant pollutant that contributes to climate change through fossil fuel combustion.

Temporary GHG emissions would be generated from use of off-road equipment and truck and worker vehicle trips during construction activities. During operations, the majority of permanent GHG emissions associated with land use development is typically related to vehicle trips and energy consumption. A GHG technical report will be prepared for the proposed Project, which will assess the GHG emissions associated with Project construction and operations. Impacts are considered potentially significant. Additional analysis of this issue will be included in the EIR.

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

Potentially Significant Impact. As discussed in response to checklist question 3.8(a), the proposed Project would generate GHG emissions during construction and operations. The GHG technical report prepared for the proposed Project will evaluate the Project's compliance with applicable plans, policies, and regulations adopted for the purpose of reducing GHG emissions. Impacts are considered potentially significant. Additional analysis of this issue will be included in the EIR.

3.9 Hazards and Hazardous Materials

	Potentially Significant Impact	Less Than Significant Impact 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 one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☒	☐

Discussion

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

Less Than Significant Impact. A material is considered hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local agency or if it has characteristics defined as hazardous by such an agency. A hazardous material is defined by the California Health and Safety Code, Section 25501 as follows:

> A "Hazardous material" means any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.
>
> "Hazardous materials" include, but are not limited to, hazardous substances, hazardous

> waste, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

An extremely hazardous material is defined in Title 22, Section 66260.10, of the California Code of Regulations as follows:

> A substance or combination of substances which, if human exposure should occur, may likely result in death, disabling personal injury or serious illness caused by the substance or combination of substances because of its quantity, concentration or chemical characteristics.

The release of hazardous materials into the environment could potentially contaminate soils, surface water, and groundwater supplies.

The proposed Project would involve improvements to existing campus facilities. Construction activities would involve the temporary use, storage, and transport of hazardous materials typical of construction of buildings, such as asphalt, fuels, lubricants, paints, cleaners, and solvents. Incidental spills and leaks of such substances associated with routine use during construction represent a potential hazard to human health and the environment if not properly stored and handled. The District requires that all potentially hazardous materials used during construction to be handled and disposed of in accordance with manufacturers' specifications and instructions, thereby reducing the risk of hazardous materials use. In addition, the District would comply with existing federal, state, and local regulations related to the transport, use, management, and disposal of hazardous materials, including but not limited to the Resource Conservation and Recovery Act, California Hazardous Waste Control Law, federal and state Occupational Safety and Health Acts (OSHA), Department of Transportation, Department of Toxic Substances Control, San Francisco Bay Regional Water Quality Control Board (RWQCB), BAAQMD, and the Marin County Waste Management Division. The existing regulations are aimed at the amount of hazardous materials used, accident prevention, protection from exposure to specific chemicals, and the proper storage and disposal of hazardous materials. Any associated risk would be adequately reduced to a less-than-significant level through compliance with these standards and regulations.

Additionally, the disposal of hazardous materials would occur in a manner consistent with applicable regulations and at an appropriate off-site disposal facility. Any proposed improvements that would disturb more than one acre of land would be required to prepare a Storm Water Pollution Prevention Plan (SWPPP), which would include measures to minimize the release of hazardous materials from construction sites via stormwater runoff, in compliance with the latest National Pollutant Discharge Elimination System (NPDES) permit requirements for stormwater discharges.

Operation of some improvements implemented as part of the proposed Project would involve the routine use of hazardous materials such as cleaners and common chemicals used for swimming pool facilities, landscaping, and maintenance, similar to current operations. In general, schools do not generate significant amounts of hazardous materials, and only a necessary amount of common day-to-day materials is stored on-site. These materials would be used, stored, and disposed of in accordance with existing regulations and product labeling and would not create a significant hazard to the public or to the environment. Therefore, with compliance with manufacturer's standards and all applicable local, state, and federal laws and regulations relating to environmental protection and the management of hazardous materials, impacts associated with the routine transport, use, or disposal of hazardous materials during construction and operation of the proposed Project would be less than significant. This issue will not be further analyzed in the EIR.

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?

Less Than Significant Impact. As discussed in response to checklist question 3.9(a), the District is required to comply with existing federal, state, and local regulations related to the transport, use, and disposal of hazardous materials. Disposal of hazardous materials undertaken as part of Project implementation would occur in a manner consistent with applicable regulations and at an appropriate off-site disposal facility. Additionally, any proposed improvements that would disturb more than one acre of land would be required to prepare an SWPPP to minimize the release of hazardous materials from construction sites via stormwater runoff, in compliance with the latest NPDES permit requirements for stormwater discharges.

Due to the age of some buildings on the campus, their demolition may expose lead-based paint (LBP) or asbestos-containing materials (ACM) into the environment. The District will survey for LBP and ASM prior to the demolition or renovation of any structures and removal of utility systems. In the event of the discovery of such materials, abatement would occur in accordance with federal and state requirements. Should LBP be found, suspect materials would be removed in accordance with procedural requirements and regulations for the proper removal and disposal of LBP prior to construction activities, including standard handling and disposal practices pursuant to OSHA regulations. Example procedural requirements include the use of respiratory protection devices while handling lead-containing materials, containment of materials containing lead on the proposed Project site or at locations where construction activities are performed, and certification of all consultants and contractors conducting activities involving LBP or lead hazards.

Similarly, in the event that ACMs are found on-site during construction, suspect materials would be removed by a certified asbestos abatement contractor in accordance with applicable regulations, including 40 Code of Federal Regulations Part 763 Subpart E, Asbestos-Containing Materials in Schools Rule and BAAQMD Regulation 11, Rule 2, Asbestos Demolition, Renovation and Manufacturing. In addition, development of the proposed Project would include the use of commercially sold construction materials without ACMs. With compliance with relevant regulations and requirements, the proposed Project's construction activities would not expose people to a substantial risk resulting from the release of asbestos fibers into the environment.

As discussed in response to checklist question 3.9(a), operation of the proposed Project would involve the routine use of hazardous materials, such as cleaners and common chemicals used for swimming pools, landscaping, and maintenance, similar to current operations. These materials would be used, stored, and disposed of in accordance with existing regulations and product labeling. Therefore, with compliance with existing regulations for the safe handling of hazardous materials, the proposed Project would not 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. Impacts would be less than significant, and this issue will not be further analyzed in the EIR.

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

Less Than Significant Impact. The Project site is an existing high school campus. The Miller Creek School District Office campus is located adjacent to and east of the Project site, and the San Rafael City Schools District Office is located in the northwest portion of the campus; however, it is not a part of the Project site. There are no other existing or proposed schools within a one-quarter mile radius of the Project site.

As discussed in response to checklist questions 3.9(a) and 3.9(b), the District is required to comply with existing federal, state, and local regulations related to the transport, use, handling, and disposal of hazardous materials during construction and operation of the Project. Additionally, all construction areas would be secured to limit student trespass. Hazardous materials would be appropriately stored and locked away, thus further limiting the exposure of hazardous materials to students on the campus. The District would coordinate with the construction contractor to schedule activities that would be least disruptive to school operations, such as during school breaks. Any activities requiring the abatement and removal of hazardous materials would be conducted when students are not present. The proposed Project's construction-related emissions could affect sensitive receptors, including students; this will be further addressed in the EIR, under checklist section 3.3c (i.e., whether the Project would expose sensitive receptors to substantial pollutant concentrations). If found to be potentially significant, mitigation to reduce construction-related emissions will be identified in the EIR. No other exposures of hazardous materials or emissions would occur during construction of the proposed Project.

As mentioned above, operation of the proposed Project would not be substantially different from the existing operations at the campus. The proposed use of hazardous materials, such as cleaners and common chemicals for landscaping and maintenance of the Project, including for the swimming pool, would be similar to current operations. All potentially hazardous materials are and would continue to be handled and disposed of in accordance with manufacturers' specifications and instructions. Therefore, the risk of exposing hazardous materials and emissions to students during operation of the Project would be limited.

With the exception of construction-generated emissions that will be further discussed in the EIR, the proposed Project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste that could impact Terra Linda High School. Impacts would be less than significant, and this item will not be further analyzed in the EIR.

d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Less Than Significant Impact. The Project site is not included on any hazardous waste site lists including the Department of Toxic Substances Control's EnviroStor database, which includes CORTESE sites.[23] The Environmental Protection Agency's database of regulated facilities lists Terra Linda High School as a small quantity generator; however, hazardous wastes generated by the campus would be typical of construction and operation activities for schools, as discussed in

23 California Department of Toxic Substances Control, EnviroStor Database, Search by Map Location, accessed July 20, 2023, http://www.envirostor.dtsc.ca.gov/public/.

checklist question 3.9(a).[24] According to the State Water Resources Control Board's GeoTracker site, there are no leaking underground storage tank cleanup sites within 1,000 feet of the Project site.[25] As such, the proposed Project would not create a significant hazard to the public or the environment, and impacts would be less than significant. This issue will not be further analyzed in the EIR.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

No Impact. The Project site is located approximately 1.7 miles southwest of the San Rafael Airport. The San Rafael Airport is a private airstrip with minimal air traffic.[26] The airport noise contours from 2003 for the airport do not extend much beyond the runway, and aircraft noise does not substantially affect nearby sensitive receptors. According to the San Rafael Airport Noise Contours Map, the Project site is located outside of the 60 and 55 decibel noise contours and thus would not be affected by aircraft noise.[27] As the proposed Project would involve proposed improvements to existing campus facilities, no impact would occur related to a safety hazard or excessive noise for people residing or working in the Project area. This issue will not be further analyzed in the EIR.

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

Less Than Significant Impact. The San Rafael Local Hazard Mitigation Plan (LHMP) is a guide to hazard mitigation planning within the City of San Rafael and serves as a tool to help decision-makers direct hazard mitigation activities and resources. The LHMP contains hazard mitigation actions that reduce the risk of damage or injury from hazards. Terra Linda High School is identified as a Critical Facility in the LHMP that can be used as community space in the event of an emergency. The proposed Project would not eliminate the availability of the campus for use as a critical facility. However, construction activities may limit use of the entire property. Construction areas would be fenced, and construction would be short term and completed in phases. The remainder of the campus would be available for community use, including the stadium, commons, competitive and practice gymnasiums, and parking lots. Moreover, all construction staging and loading activities would occur within the boundaries of the campus to limit traffic congestion and allow continued access on the adjacent streets. Therefore, the proposed Project would not impair implementation of the LHMP, and Project impacts on the City's LHMP would be less than significant. This issue will not be further analyzed in the EIR.

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

Less Than Significant Impact. The Project site is within the Wildland Urban Interface, defined as an area where structures and other human development meet or intermingle within wildland

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24 United States Environmental Protection Agency, Envirofacts Database, accessed July 20, 2023, https://enviro.epa.gov/.

25 California State Water Resources Control Board, GeoTracker Database, Search by Map Location, accessed July 20, 2023, http://geotracker.waterboards.ca.gov/map/.

26 City of San Rafael, General Plan 2040/EIR – Noise, pages 4.13-16 and 25.

27 City of San Rafael, General Plan 2040/EIR – Noise, pages 4.13-16 and 25.

vegetation.[28] The proposed Project would be compliant with the California Building Standards, which works to ensure fire and life safety, including from hazards related to wildland fires. Proposed new and modernized structures would be improved to meet current requirements for all fire systems, including but not limited to sprinkler systems, fire alarm systems, fire flow, and fire protection equipment. All construction plans would be checked by the Division of the State Architect. The local fire authority, San Rafael Fire Department (SRFD), would also review the plans to ensure adequate access to roads, fire lanes, and fire hydrant locations and distributions. The Project would improve the existing conditions and would not exacerbate wildland fire risks at the campus or surrounding residential uses. Impacts related to wildland fires would be less than significant, and this issue will not be further analyzed in the EIR.

28 Marin County, Wildland Urban Interface Map, accessed July 18, 2023, https://www.arcgis.com/apps/webappviewer/index.html?id=688f506cfb144067826bb35a062b0f0a.

3.10 Hydrology and Water Quality

	Potentially Significant Impact	Less Than Significant Impact 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?	☒	☐	☐	☐
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?	☒	☐	☐	☐

Discussion

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

Potentially Significant Impact. Water quality standards and waste discharge requirements, including the federal Water Pollution Control Act Amendment of 1972 (also referred to as the Clean Water Act) and the California Porter-Cologne Water Quality Control Act (Section 13000 et seq. of the California Water Code), are intended to protect the quality of waters within the state of California and require that comprehensive water quality control plans be developed. The Project site is within the jurisdiction of the San Francisco Bay RWQCB. Impacts related to water quality would fall under two general categories: short-term construction-related impacts and long-term operational impacts. Construction activities have the potential to degrade water quality through the exposure of surface runoff to exposed soils, dust, and other debris, as well as from runoff from construction equipment. Operational impacts may result from the increase in impermeable surfaces, which could increase on-site and/or off-site stormwater runoff.

The proposed Project would involve capital improvements to the high school campus. Construction-related runoff and pollutants would be controlled with the implementation of best management practices, including the SWPPP and erosion control plan. Upon Project implementation, there would be new landscaping, pathway, and turf improvements, which would result in changes to the Project site's existing hydrology and drainage conditions. Although the proposed Project is not anticipated to substantially degrade surface or ground water quality, further evaluation will be provided in the EIR. Impacts are considered potentially significant.

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?

Less Than Significant Impact. The proposed Project site is located within the San Francisco Bay Basin, and the San Francisco Bay RWQCB addresses regionwide water quality issues through the creation and triennial update of the San Francisco Bay Basin Water Quality Control Plan. The Marin Municipal Water District (MMWD) manages groundwater within the City.

The Project site is not located within the groundwater basins identified within the City (San Rafael Valley and Novato Valley Basins).[29] Groundwater resources within the City are limited due to a lack of substantial underlying groundwater aquifers and poor groundwater quality. The potential for municipal groundwater use within the boundaries of the MMWD service area is limited due to limited production capabilities, water quality constraints, and potential water rights issues. As a result, groundwater is not currently used or planned to be used as a municipal water supply source by the MMWD, though private groundwater wells are used.[30] Thus, the proposed Project would use surface water sources and would not use or decrease groundwater supplies. Although the proposed Project would involve landscaping, pathway, and turf improvements, the Project would not result in substantial changes to the existing campus hydrology, and thus, would not substantially change conditions for groundwater recharge. Therefore, impacts would be less than significant, and this issue will not be further addressed in the EIR.

c) 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:

i. Result in substantial erosion or siltation on- or off-site?

Potentially Significant Impact. No rivers or streams are present on the Project site or in the vicinity. As discussed in response to checklist question 3.7(b), construction of the proposed Project would include ground-disturbing activities, such as grading and excavation, which could result in the potential for erosion to occur at the Project site. The proposed Project would be required to implement standard temporary construction measures for erosion and sediment control. Additionally, as the proposed Project would disturb more than one acre of land, a SWPPP with erosion control measures in compliance with NPDES permit requirements will be required for the proposed Project. Nonetheless, construction activities could result in changes to existing drainage patterns. Additionally, proposed new construction, facility renovation, and the landscaping, pathway, and turf improvements could change the amount and locations of impervious surfaces at the Project site, which may have the potential to contribute to increased erosion or siltation on- or off-site. Impacts are considered potentially significant. Additional

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29 City of San Rafael, General Plan 2040/EIR – Hydrology and Water Quality, page 4.10-17.
30 City of San Rafael, General Plan 2040/EIR – Hydrology and Water Quality, page 4.10-17.

analysis of this issue will be included in the EIR.

ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Potentially Significant Impact. As discussed in response to checklist question 3.10(c)(i), construction activities could result in changes in drainage patterns. Additionally, proposed new construction, facility renovation, and the landscaping, pathway, and turf improvements could change the amount and locations of impervious surfaces at the Project site. Therefore, the Project may have the potential to increase the rate or amount of surface runoff in a manner which could result in flooding on- or off-site. Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

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?

Potentially Significant Impact. Under existing conditions, the school campus is developed with hardscape surfaces that influence infiltration and affect stormwater runoff from the site. Stormwater from the site currently is accommodated by connection to the City's public stormwater drainage system. Implementation of the proposed Project would alter existing drainage patterns on-site and increase impervious surfaces that could have the potential to concentrate and increase runoff from the site entering the existing stormwater drainage system, and to generate additional sources of polluted runoff. Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

iv. Impede or redirect flood flows?

No Impact. A 100-year flood is a flood defined as having a 1.0 percent chance of occurring in any given year. According to the Federal Emergency Management Agency, National Flood Hazard Layer Viewer, the Project site and surrounding area are located within an Area of Minimal Flood Hazard (Zone X).[31] Therefore, the Project site and the surrounding area are not at risk for flooding. The proposed Project would also include new or relocated connections to the existing stormwater drainage infrastructure to accommodate stormwater runoff from the site and to reduce the risk for the Project to contribute to adverse effects on flood flows. The proposed Project would not impede or redirect flood flows and there would be no impact. This issue will not be further analyzed in the EIR.

d) Would the project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

No Impact. As discussed in response to checklist question 3.10(c)(iv), the Project site and the surrounding area are located within an Area of Minimal Flood Hazard (Zone X). Therefore, the campus and the surrounding area are not at risk for flooding.

Tsunamis are large ocean waves that are generated by major earthquakes, undersea landslides, volcanic eruptions, or other similar seismic activity. Factors influencing the size and speed of a tsunami include the source and magnitude of the triggering event, as well as off-shore and on-shore topography. The Project site is located approximately 3.6 miles west of the San Francisco

31 Federal Emergency Management Agency, National Flood Hazard Layer Viewer, Flood Insurance Rate Map, search by location, accessed July 24, 2023, https://hazards-fema.maps.arcgis.com/.

Bay, and 14 miles east of the Pacific Ocean. The northern and southern shorelines of San Rafael are within the tsunami inundation zone. However, the Project site is not located within the tsunami inundation zone.[32]

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. There are no large bodies of water in the City that could trigger a seiche.[33] Therefore, the Project site is not within a seiche zone. As the Project site is not in a flood, tsunami, or seiche zone, there is no risk release of pollutants due to a potential inundation, and this issue will not be further analyzed in the EIR.

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

Potentially Significant Impact. The proposed Project would be required to comply with and obtain an NPDES Phase II Small Municipal Separate Storm Sewer System Permit from the RWQCB for stormwater control to minimize the discharge of pollutants. Additionally, the District would be required to prepare a SWPPP with erosion control measures in compliance with NPDES permit requirements for the proposed Project. Operational impacts may result from the increase in impermeable surfaces, which could increase stormwater runoff and impact water quality on campus. Therefore, the proposed Project has the potential to conflict with or obstruct implementation of the water quality control plan. Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

32 City of San Rafael, General Plan 2040/EIR – Hydrology and Water Quality, page 4.10-31.
33 City of San Rafael, General Plan 2040/EIR – Hydrology and Water Quality, page 4.10-31.

3.11 Land Use and Planning

	Potentially Significant Impact	Less Than Significant Impact 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?	☐	☐	☐	☒

Discussion

a) Would the project physically divide an established community?

No Impact. While there are developed residential uses within the vicinity, the Project site is a fully developed and operating high school campus. The proposed Project would involve phased improvements for the existing aquatics center, physical education spaces, classrooms, stadium, fields, and tennis courts. All development pursuant to the proposed Project would occur within the existing campus boundaries. Any construction activities would be temporary and would not encroach upon existing neighborhoods or the surrounding community. Additionally, proposed pedestrian improvements for ADA compliance would occur within the existing boundaries of the Project site. Therefore, the proposed Project would not physically divide an established community, and no impact would occur. This issue will not be further analyzed in the EIR.

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?

No Impact. The Project site has a City of San Rafael General Plan land use designation of Public/Quasi-Public, which includes public schools as an allowed land use type.[34] All development pursuant to the proposed Project would occur within the existing campus boundaries. Implementation of the proposed Project would not increase the capacity of Terra Linda High School, nor would the attendance boundaries change. No changes to the existing land use designation are required or proposed with the Project. Additionally, the proposed Project would result in a continuation of the existing use of the site (public school facilities) and would not conflict with the intended use of the campus or with surrounding land uses. Therefore, the proposed Project would not conflict with any applicable land use plan, policy, or regulation of an adopted for the purpose of avoiding or mitigating an environmental effect.[35] There would be no impact, and this issue will not be further analyzed in the EIR.

34 City of San Rafael, 2021, San Rafael General Plan 2040 Land Use Map.

35 Pursuant to California Government Code Section 53094 et seq., the governing board of a school district may render city or county zoning ordinances and general plan requirements inapplicable. It is anticipated that the District's Board of Education will exempt the proposed Project and campus from any zoning ordinances or regulations of the City of San Rafael, including, without limitation, the City's Municipal Code, General Plan, and related ordinances and regulations that otherwise would be applicable.

3.12 Mineral Resources

	Potentially Significant Impact	Less Than Significant Impact 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?	☐	☐	☐	☒

Discussion

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?

No Impact. California's Surface Mining and Reclamation Act of 1975 requires the State Geologist to classify land into mineral resource zones (MRZ) based on the known or inferred mineral resource potential of that land. The California Department of Conservation's Mineral Resources Program provides data about California's varied non-fuel mineral resources (such as metals and industrial minerals), naturally occurring mineral hazards (such as asbestos, radon, and mercury), and information about active and historic mining activities throughout the state.[36] Classification is completed by the State Geologist wherein lands classified MRZ-1 are areas where geologic information indicates no significant mineral deposits are present; lands classified MRZ-2 are areas that contain identified mineral resources; lands classified MRZ-3 are areas of undetermined mineral resource significance; and lands classified MRZ-4 are areas of unknown mineral resource potential.[37]

According to the California Geological Survey's Updated Mineral Land Classification Map, the Project site is located on lands classified MRZ-3.[38] The Project site is not located on lands that contain identified mineral resources. Additionally, the Project site does not contain any oil wells, and no oil extraction occurs within the Project site.[39] Historical uses of Terra Linda High School have not included mineral extraction, nor does the campus currently support mineral extraction. In addition, the proposed Project does not include any mineral extraction activities. Therefore, the proposed Project would not result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state, and no impact would occur. This issue will not be further analyzed in the EIR.

36 California Department of Conservation, The California Mineral Resources Program, accessed July 11, 2023, https://www.conservation.ca.gov/cgs/mrp.

37 California Department of Conservation, Guidelines for Classification and Designation of Mineral Lands, accessed July 11, 2023, https://www.conservation.ca.gov/smgb/Guidelines/Documents/ClassDesig.pdf.

38 California Department of Conservation, Updated Mineral Land Classification Map for Portland Cement Concrete-Grade Aggregate in the North San Francisco Bay Production-Consumption Region, Marin, Napa, Sonoma, and Southwestern Solano Counties, California, 2013.

39 California Department of Conservation, Geologic Energy Management Division's (CalGEM) Well Finder, accessed July 11, 2023, https://maps.conservation.ca.gov/doggr/wellfinder/#openModal/-118.10827/33.78270/16.

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?

No Impact. As described in response to checklist question 3.12(a), the Project site is not located on lands that contain identified mineral resources. Additionally, the Project site does not contain any oil wells, and no oil extraction occurs within the Project site. The San Rafael Rock Quarry and McNear Brickworks is designated as a mineral resource with local, regional, or state significance within the vicinity of the City.[40] The San Rafael Rock Quarry and McNear Brickworks is located approximately 4.9 miles east of the Project site and would not be impacted by the proposed Project. The proposed Project would involve capital improvements to campus facilities and would not affect any existing oil, gas, or other mineral resource recovery facilities. No impact would occur, and this issue will not be further analyzed in the EIR.

40 City of San Rafael, General Plan 2040/EIR – Mineral Resources, page 4.12-2.

3.13 Noise

	Potentially Significant Impact	Less Than Significant Impact 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?	☐	☐	☐	☒

Discussion

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?

Potentially Significant Impact. Construction activities have the potential to generate noise levels that exceed applicable standards in proximity to sensitive noise receptors, such as residential uses. The proposed Project would involve capital improvements including rehabilitation, modernization, upgrades, and new construction for facilities. During Project operation, the competitive-level aquatic center, proposed lighting at the aquatics center, and the proposed artificial turf at the ballfields would allow for extended use of the facilities. A noise and vibration technical report will be prepared for the proposed Project to assess the potential for short-term and long-term increases in noise levels and any associated impacts. Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

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

Potentially Significant Impact. Construction activities associated with the proposed Project may generate ground-borne vibration from use of heavy equipment. The noise and vibration technical report prepared for the proposed Project will evaluate the potential for ground-borne noise and vibration, as well as any associated impacts. Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

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

No Impact. The Project site is located approximately 1.7 miles southwest of the San Rafael Airport. The San Rafael Airport is a private airstrip with minimal air traffic.[41] The airport noise contours from 2003 for the airport do not extend much beyond the runway, and aircraft noise does not substantially affect nearby sensitive receptors. According to the San Rafael Airport Noise Contours Map, the Project site is located outside of the 60 and 55 decibel noise contours and thus would not be affected by aircraft noise.[42] As the proposed Project would involve proposed improvements to campus facilities within the existing boundaries of the Project site, no impact would occur related to excessive noise for people residing or working in the Project area. This issue will not be further analyzed in the EIR.

41 City of San Rafael, General Plan 2040/EIR - Noise, pages 4.13-16 and 25.
42 City of San Rafael, General Plan 2040/EIR - Noise, pages 4.13-16 and 25.

3.14 Population and Housing

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

Discussion

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)?

No Impact. Given the temporary nature of construction industry jobs, the relatively large regional construction industry, and the relatively nominal total number of construction workers needed during any construction phase, the labor force from within the region would be sufficient to complete Project construction without an influx of new workers and their families. Therefore, construction of the proposed Project would not directly induce population growth, and there would be no impact.

The proposed Project would consist of capital improvements at an existing school campus within a built-out, urbanized community. The Project does not include the construction of new homes, businesses, or changes to the existing land uses on-site. The Project would include improvements to existing paths of travel within the campus to meet ADA standards, such as walkways within the stadium, fields, and tennis courts; however, the Project would not extend roads or other infrastructure. Although Project implementation would allow extended use of the improved facilities by the high school and community, the Project would not increase student enrollment or capacity at the campus. Therefore, no direct or indirect increases in population growth would result with implementation of the proposed Project, and no impact would occur. This issue will not be further analyzed in the EIR.

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

No Impact. As described in response to checklist question 3.14(a), the proposed Project would occur within an established school campus. The proposed Project would not involve the removal or relocation of any housing, and therefore would not displace any people or necessitate the construction of any replacement housing. No existing residences would be displaced or removed as a result of the proposed Project. No impact would occur, and this issue will not be further analyzed in the EIR.

3.15 Public Services

	Potentially Significant Impact	Less Than Significant Impact 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, 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:				
i) Fire protection?	☐	☐	☒	☐
ii) Police protection?	☐	☐	☒	☐
ii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☐	☒

Discussion

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

i. Fire Protection?

Less Than Significant Impact. The SRFD provides fire protection services to the Project site. The SRFD operates six stations within the City, staffed with approximately 90 professionals trained in specialties including emergency medical care, firefighting, hazardous materials, and emergency preparedness.[43] The closest fire station is San Rafael Fire Station 56, located at 650 Del Ganado Road, approximately 1.1 miles northwest of the Project site.

During the proposed Project's construction, notice to and coordination with the SRFD would be ongoing and emergency access to the Project site and surrounding areas would be maintained. In addition, the proposed Project would involve upgrading fire and security alarm systems to meet current state standards, thus improving current fire protection measures, including the existing fire sprinkler systems, fire alarm systems, fire flow, and fire protection equipment. All plans would be checked by the Division of the State Architect to ensure the proposed Project complies with emergency access, fire, and life safety design standards of Title 24 of the California Code of Regulations. The SRFD would also review the plans to ensure adequate emergency access. Compliance with existing regulations and standards would minimize hazards to life and property in the event of a fire.

43 San Rafael Fire Department, "Fire Department History," accessed July 12, 2023, https://www.cityofsanrafael.org/fire-department-history/.

Furthermore, an increase in demand for fire protection services is typically associated with an increase in population. The proposed Project would not result in an increase in student enrollment or faculty at the campus or include other developments such as new residential uses that would increase the demand for fire protection services. Although Project implementation would allow extended use of the improved facilities by the high school and community, the Project site and surrounding area are already served by the SRFD, and the extension of facility hours would not result in additional need for fire protection services. Therefore, the proposed Project would not require the provision of new or physically altered fire protection facilities to maintain acceptable service ratios, response times, or other performance objectives such that environmental impacts would result. Impacts would be less than significant, and this issue will not be further analyzed in the EIR.

ii. Police protection?

Less Than Significant Impact. The San Rafael Police Department (SRPD) provides police protection services to the Project site. The SRPD has one station, located at 1375 Fifth Avenue, approximately 2 miles southeast of the Project site. The SRPD is staffed by approximately 90 employees.[44]

During construction of the proposed Project, notice to and coordination with the SRPD would be ongoing and emergency access to the Project site would be maintained. Active construction areas would be fenced and would remain secured outside of work hours. In addition, the proposed Project would involve upgrading fire and security alarm systems to meet current District standard systems, thus improving current security measures.

Similar to checklist question 3.15(a)(i), an increase in demand for police protection services is typically associated with an increase in population. The proposed Project would not result in an increase in student enrollment or faculty at the campus, nor would the Project include other developments that would increase the demand for law enforcement that would trigger the need for expanded police facilities. Although Project implementation would allow extended use of the improved facilities by the high school and community, the Project site and surrounding area are already served by the SRPD, and the extension of facility operations would not result in an additional need for police protection services. Therefore, the proposed Project would not require the provision of new or physically altered police protection facilities to maintain acceptable service ratios, response times, or other performance objectives such that environmental impacts would result. Impacts would be less than significant, and this issue will not be further analyzed in the EIR.

iii. Schools?

No Impact. The San Rafael City Schools community includes the San Rafael Elementary School District and the San Rafael High School District, with a total student population of approximately 7,000. The San Rafael High School District provides secondary education to students residing in two elementary districts (Miller Creek Elementary District and San Rafael Elementary District) and has two comprehensive 9th-12th grade high schools and a continuation high school.[45]

The proposed Project would help meet the goals of the District to maintain their capital facilities through upgrades and modernization of the aquatics center, physical education support spaces,

44 San Rafael Police Department, "Contact Us," accessed July 12, 2023, https://www.srpd.org/contact.

45 San Rafael City Schools, "About SRCS," accessed July 12, 2023, https://www.srcs.org/9419_3.

main classroom buildings, stadium, baseball and softball fields, and tennis courts. The upgrades and modernization would result in improvements to resiliency to damage, ADA access, and security and fire protection measures. As such, the proposed Project would have a beneficial impact by improving an existing school for current and future students. Additionally, implementation of the proposed Project would not increase student enrollment or capacity at the school or trigger the need for new or expanded school facilities, which is typically associated with residential development. No impact would occur. This issue will not be further analyzed in the EIR.

iv. Parks?

No Impact. The City's Department of Public Works manages the 18 parks in the City. The closest City park to the Project site is Freitas Park, located at 81 Trellis Drive, approximately 0.4 miles northwest.[46]

An increase in population or housing is generally associated with an increase in demand for parks. As discussed in Section 3.14, Population and Housing, the proposed Project would not increase the capacity of the school nor result in an increase in housing or population in the City. Thus, the Project would not result in additional demand for the City's parks. In addition, the proposed Project would upgrade the current recreational facilities on-site (e.g., the aquatics center, ballfields, and tennis courts), improving recreational amenities available for use by current and future students, as well by the public via the Civic Center Act. Therefore, the proposed Project would not create a need for new or expanded parks, and no impact would occur. This issue will not be further analyzed in the EIR.

v. Other public facilities?

No Impact. An increase in population or housing is generally associated with an increase in demand for other public facilities (e.g., libraries, community centers, wellness centers). As the proposed Project would not increase the capacity of the school or result in an increase in housing or population in the City, implementation of the proposed Project would have no impact on other public facilities. This issue will not be further analyzed in the EIR.

46 City of San Rafael, Parks, accessed July 12, 2023, https://www.cityofsanrafael.org/parks/#/maps-1/map/parks.

3.16 Recreation

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

Discussion

a) 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?

Less Than Significant Impact. The proposed Project would serve an existing student population and would not increase student enrollment. It would also not increase population in the surrounding community. The proposed Project, however, would result in extended operations of the aquatic center and ballfields, which are existing recreational facilities. Expanded use would include CIF tournaments; extended water polo and swim team practices at the aquatic facilities; and year-round use of the artificial ballfields, which would no longer be closed for seeding and maintenance. Additionally, pursuant to the Civic Center Act, the recreational facilities would continue to be available for community use. Although the Project would result in extended operations of campus recreational facilities, the Project would improve them, and the District would continue to maintain the facilities to extend their life and limit deterioration. Therefore, the Project’s potential impacts to recreational facilities would not be accelerated and are considered less than significant. This issue will not be further analyzed in the EIR.

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?

Potentially Significant Impact. Implementation of the proposed Project would involve the expansion of recreational facilities on the school property, the construction of which may have an adverse physical effect on the environment, as evaluated throughout this document. As provided herein, the Draft EIR will further evaluate the Project’s recreational facilities’ impacts on aesthetics, air quality, biological resources, cultural resources, energy, geology/soils, greenhouse gas emissions, hydrology/water quality, noise, recreation, transportation/traffic, and tribal cultural resources. As such, impacts regarding the construction of recreational facilities are considered potentially significant and will be further evaluated in the EIR.

3.17 Transportation

	Potentially Significant Impact	Less Than Significant Impact 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 uses (e.g., farm equipment)?	☐	☐	☒	☐
d) Result in inadequate emergency access?	☐	☐	☒	☐

Discussion

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

Potentially Significant Impact. The proposed Project would include improvements to pedestrian facilities, including ADA-compliant walkways and paths of travel. A transportation impact assessment technical report will be prepared for the proposed Project to evaluate the potential for the proposed improvements to conflict with a program plan, ordinance, or policy addressing the circulation system. Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

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

Potentially Significant Impact. Construction of the proposed Project would generate vehicle trips from the mobilization of workers, equipment, and haul trucks to and from the campus, resulting in a temporary increase in traffic. Although the proposed Project would not change the land use at the Project site or increase the student capacity of the school, the Project would result in extended use of the facilities with proposed improvements. The transportation impact assessment technical report will evaluate the proposed Project's potential to generate vehicle miles traveled, and its impact on vehicle miles traveled. Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

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

Less Than Significant Impact. During construction, vehicles associated with construction personnel commute trips would be a compatible use on the local road networks. Implementation of the proposed Project would include improvements to pedestrian facilities, including ADA-compliant walkways and paths of travel. However, the proposed Project would not permanently impact existing conditions for vehicular access or public roadways. The Project would not include off-site improvements or alter existing driveways or parking lots. Therefore, impacts related to hazards due to a design feature would be less than significant, and this issue will not be further analyzed in the EIR.

d) Would the project result in inadequate emergency access?

Less Than Significant Impact. Construction activities for the proposed Project would be confined to the Project site with the exception of haul trucks and construction worker trips. Any construction-related traffic would be temporary and coordinated with operations of the school, ensuring that trucks are not moving in or out of the site during drop-off or pickup times and that emergency access is not impeded. During construction, ingress and egress to the Project site would be maintained at all times. Notice to and coordination with the administrators at Terra Linda High School and emergency service providers, including the SRFD and SRPD, would be ongoing regarding the construction schedule and worksite traffic control plans so as to coordinate emergency response routing and maintain emergency access.

Implementation of the proposed Project would result in improved walkway and path of travel conditions to meet ADA standards. Existing vehicular circulation or public roadways in the Project vicinity would not be modified as part of the proposed improvements. Emergency access to the Project would remain similar to existing conditions. Therefore, construction and operation of the proposed Project would result in less than significant impacts related to inadequate emergency access. This issue will not be further analyzed in the EIR.

3.18 Tribal Cultural Resources

	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) 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	☒	☐	☐	☐
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision(c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☒	☐	☐	☐

Discussion

a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

Potentially Significant Impact. The proposed Project would involve improvements to campus facilities, which would require ground-disturbing activities during construction. Although the campus is currently developed, and therefore previously disturbed, ground-disturbing activities would have the potential to impact unknown tribal cultural resources. The cultural resources technical report prepared for the proposed Project will assess potential impacts to tribal cultural resources. Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

ii. **A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.**

Potentially Significant Impact. The proposed Project involves improvements which would include ground-disturbing activities during construction that may have the potential to impact unknown cultural resources, including tribal cultural resources. Pursuant to Assembly Bill 52, the District will notify California Native American tribes known to have interest in the area to determine Project impacts and mitigation measures. The cultural resources technical report prepared for the proposed Project will assess potential impacts to tribal cultural resources and will outline the Assembly Bill 52 consultation efforts conducted for the proposed Project. Impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

3.19 Utilities and Service Systems

	Potentially Significant Impact	Less Than Significant Impact 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?	☐	☐	☒	☐

Discussion

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?

Less Than Significant Impact.

Water

Water to the Project site is supplied by the MMWD. The MMWD serves roughly 190,000 customers within approximately 147 square miles along the eastern corridor of Marin County. The MMWD serves ten incorporated cities and towns: San Rafael, Mill Valley, Fairfax, San Anselmo, Ross, Larkspur, Corte Madera, Tiburon, Belvedere, and Sausalito. Approximately 27 percent of the MMWD's customer meters are in San Rafael. The MMWD's water supplies presently come from a combination of local surface water supplies, imported water from the Sonoma County Water Agency and recycled water.[47]

[47] City of San Rafael, General Plan 2040/EIR – Utilities and Service Systems.

Wastewater

Wastewater collection and treatment for the Project site is provided by Las Gallinas Valley Sanitary District (LGVSD). The LGVSD serves a population of approximately 32,000 persons north of Puerto Suello Hill and neighboring unincorporated areas of Marin County and covers approximately 20 square miles. The LGVSD's collection system consists of 105 miles of gravity sewer pipelines, 6.7 miles of force mains, and 28 pump stations. The LGVSD also operates the LGVSD wastewater treatment plant.[48]

Stormwater

The City of San Rafael Department of Public Works (DPW) owns and maintains the storm drain system that is located throughout the City. The storm drain system comprises 20 miles of corrugated metal pipes, 84 miles of concrete pipe, and 12 miles of plastic pipe. It has 3,800 drain inlets, 20 major headwalls, and 745 smaller headwalls. The DPW also maintains approximately 35 miles of open ditches and culverts and operates 12 stormwater pump stations. The DPW is responsible for maintaining the storm drains in City easements, and property owners are responsible for storm drains on their properties. Existing stormwater facilities include stormwater pipes on the eastern half of the campus under Nova Albion Way, Golden Hinde Boulevard, and Devon Drive.[49]

Electricity

Marin Clean Energy (MCE) is the default electricity provider for all communities in Marin County, including San Rafael, and several other communities in the San Francisco Bay Area. As a Community Choice Aggregation program and not-for-profit public agency, MCE is independently run by representatives from participating communities. MCE provides electricity generated from renewable sources such as solar, wind, bioenergy, geothermal, and hydropower, which is delivered to customers through Pacific Gas and Electric Company (PG&E) transmission lines.[50]

Natural Gas

PG&E provides natural gas services to the City and provides electricity services to customers who have opted out of participating in MCE. PG&E owns and maintains above- and belowground networks of electric and gas transmission and distribution facilities throughout the City.[51]

Telecommunications

According to the Community Services and Infrastructure Element of the San Rafael General Plan 2040, telecommunication services within the City include traditional landline telephone services, cable and satellite television services, and mobile telephone services, as well as fiber/broadband and other internet services. These services are offered by multiple providers and are regulated to varying degrees by the California Public Utilities Commission and Federal Communications Commission.[52]

Impact Analysis

Implementation of the proposed Project would not require off-site improvements. The new facilities would tie into existing underground utilities located within the campus. The proposed

48 City of San Rafael, General Plan 2040/EIR – Utilities and Service Systems.
49 City of San Rafael, General Plan 2040/EIR – Utilities and Service Systems.
50 City of San Rafael, General Plan 2040/EIR – Energy.
51 City of San Rafael, General Plan 2040/EIR – Energy.
52 City of San Rafael, General Plan 2040/EIR – Community Services and Infrastructure Element, pages 11-17.

Project would not result in an increase in student enrollment or faculty at the campus. Although the proposed pool (25 meters by 40 yards) would be larger in size compared to the existing pool (25 meters by 25 yards), once filled, the new pool would not require substantially more water to maintain than the existing pool. Water replacement related to the potential loss of water from evaporation and maintenance activities would not be substantially more than existing, especially since any additional water demand would be offset by the reduction of water usage from the proposed replacement of the natural turf with artificial turf. Moreover, all proposed improvements would be required to include water conservation features, including but not limited to low-flow, water-efficient plumbing fixtures and low-water irrigation systems with smart sensor controls. Accordingly, the Project would not increase the demand for water from the City's water supply and would not increase wastewater flows entering the City's wastewater treatment plant. Thus, the proposed Project would not require the construction of new water or wastewater facilities that would result in a physical impact to the environment. Impacts to water and wastewater facilities would be less than significant.

The school is entirely developed, and runoff off-site is collected and enters into the City of San Rafael's storm drain system. New impermeable surfaces, including artificial turf fields, would be designed and engineered to capture increased runoff and release it at a rate less than pre-construction. Accordingly, the Project would not increase off-site stormwater runoff and require the construction of new off-site stormwater drainage facilities operated by the City of San Rafael, which would result in a physical impact to the environment. Impacts would be less than significant.

The Project would relocate PG&E-owned underground feeder lines for the primary switchgear on campus. The PG&E utilities relocation would be conducted as part of the overall construction activities that would occur under the Project. The utilities relocation would not cause adverse environmental impacts beyond what is already analyzed throughout this document for the overall Project components. No natural gas or telecommunications facilities would be relocated, constructed, or expanded as a result of the proposed Project. The Project would result in less than significant impacts related to these facilities, and this issue will not be further analyzed in the EIR.

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?

Less Than Significant Impact. Construction of the proposed Project would require nominal amounts of water for activities, such as dust suppression and washing equipment. These activities would not result in significant water demand and would cease after construction is complete. During operation, the proposed Project would not result in substantially more water than existing conditions as the proposed Project would not increase capacity. Although the proposed pool would be larger in size compared to the existing pool, the increase in water usage for the proposed pool would be expected to be offset by the reduction of water usage from the replacement of the natural turf with artificial turf. Additionally, the new school buildings would be designed to meet the latest California Building Code, which would require installation of water conservation features, such as faucet aerators and high-efficiency toilets and urinals. Some new facilities would be dual plumbed with reclaimed water to further conserve water.

Water demand in the City is anticipated to increase by 1,098 acre-feet per year (afy) by 2040. In the year 2040, the MMWD is expected to have a residual water supply capacity of 110,685 afy for a normal year and 18,333 afy at the end of three multiple dry years. Therefore, the MMWD would have sufficient water supply to meet the demand of potential future buildout in the City through 2040, during normal, dry, and multiple dry years.[53] Consequently, there would be sufficient water supplies available to serve the Project site during normal, dry and multiple dry years. Moreover, proposed improvements would incorporate water conservation features, such as faucet aerators and high-efficiency toilets and urinals, etc., in conformance with applicable codes and regulations pertaining to energy use and reduction. The proposed synthetic turf fields would also reduce the demand for water at the Project site, and the proposed pool would be designed with improved systems to recycle water, as compared to the existing pool. Impacts would be less than significant, and this issue will not be further analyzed in the EIR.

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?

Less Than Significant Impact. Sanitary sewer service to the school campus would continue to be provided by the LGVSD through its wastewater collection and treatment system, similar to existing conditions. As no increase in school capacity is associated with development of the proposed Project. Expanded operational uses of the proposed facility improvements may result in a nominal increase in wastewater at the campus. However, the increase would not result in substantially greater wastewater collection and treatment demand than that associated with current operations at the Project site. Impacts would be less than significant, and this issue will not be further analyzed in the EIR.

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?

Less Than Significant Impact. The City is serviced by Marin Sanitary Service, the Marin Recycling Center, the Marin Resource Recovery Center, and the Marine Household Hazardous Waste Facility. The Redwood Landfill and Potrero Hills Landfill accept most of the solid waste from the County.[54] During construction, the proposed Project would generate solid waste from demolition and excavation activities. However, the District is required to comply with the CALGreen waste diversion requirements and with Assembly Bill 341, which mandates recycling for commercial and multifamily residential land uses as well as schools.[55]

The Project would not increase the student seating capacity of Terra Linda High School. However, it would result in extended operations of the proposed facilities, (i.e., morning and evening use of the pool and year-round availability of the ballfields). The amount of solid waste generated by the expanded operations would be minor and would not be substantial or significantly increase the amount of solid waste already generated by the existing school. Solid waste would continue to be disposed of at the Redwood Landfill and Potrero Hills Landfill, and other landfills throughout the County. The Redwood Landfill has a maximum permitted throughput of 2,300 tons/day and a remaining capacity of 26 million tons, with an estimated closure date of July 1, 2036. The Potrero Hills Landfill has a maximum permitted throughput of 4,330 tons/day and a remaining capacity of 13,872,000 tons, with an estimated closure date of February 14, 2048.[56] As the Project would not change the use of the property and the amount of solid waste that would be generated from the proposed expanded operations of the campus would be similar or negligible as compared to existing conditions, the existing landfills would have sufficient capacity to accommodate the

53 City of San Rafael, General Plan 2040/EIR – Utilities and Service Systems.
54 City of San Rafael, General Plan 2040/EIR – Utilities and Service Systems.
55 CALGreen Code: California Green Building Standards Code, California Code of Regulations, Title 24, Part 11.
56 City of San Rafael, General Plan 2040/EIR – Utilities and Service Systems.

relatively minor amounts of waste that would be generated by the proposed Project. Impacts would be less than significant, and this issue will not be further analyzed in the EIR.

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

Less Than Significant Impact. The proposed Project would comply with all federal and state statutes regarding solid waste reduction. The proposed Project would also comply with CALGreen, which requires that at least 65 percent of nonhazardous construction and demolition waste from nonresidential construction operations be recycled and/or salvaged for reuse. The proposed Project would also comply with Assembly Bill 341, which mandates recycling for schools and school districts. Therefore, the proposed Project would comply with all applicable federal, state, and local solid waste regulations, and impacts would be less than significant. This issue will not be further analyzed in the EIR.

3.20 Wildfire

	Potentially Significant Impact	Less Than Significant Impact 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 downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

Discussion

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?

Less Than Significant Impact. According to the California Department of Forestry and Fire Protection's Fire and Resource Assessment Program, the Project site is not located within a State Responsibility Area (SRA) nor does the Project site contain lands designated as Very High Fire Hazard Severity Zones (VHFHSZ).[57] However, the Project site is located near an SRA, located approximately 0.4 miles to the south, within the mountainous area of Sorich Park. The Project site is also located within the Wildland Urban Interface.[58]

The proposed Project would improve existing school facilities to meet current fire and life safety requirements in compliance with the California Building Code. Proposed facilities would be modernized and new structures would be provided with new fire systems, including but not limited to sprinkler systems, fire alarm systems, fire flow, and fire protection equipment. The SRFD would review the plans to ensure that adequate access to roads, fire lanes, and fire hydrant locations and distributions is provided. The Project would improve the existing conditions and would not exacerbate fire risks at the campus or surrounding residential uses.

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57 California Department of Forestry and Fire Protection, Fire and Resource Assessment Program, Fire Hazard Severity Zone Viewer, accessed July 14, 2023, https://egis.fire.ca.gov/FHSZ/.

58 Marin County, Wildland Urban Interface Map, accessed July 18, 2023, https://www.arcgis.com/apps/webappviewer/index.html?id=688f506cfb144067826bb35a062b0f0a.

Emergency evacuation routes in the Project area include the primary route of Nova Albion Way, and the secondary routes of Devon Drive and Tamarack Drive.[59] Project construction staging and loading areas would occur within the boundaries of the campus to maintain traffic flow on the adjacent streets and emergency routes. The District would provide ongoing notice to and coordinate with emergency service providers, including the SRFD and SRPD, regarding the construction schedule and worksite traffic control plans to coordinate emergency response routing and maintain emergency access. The Project would not increase the capacity of the school. Proposed expanded operational use of the aquatic center, ballfields, and tennis courts would not be substantially greater than that existing. Therefore, neither construction nor operation of the Project would impair the City's emergency response and evaluation plans.

Additionally, as discussed in Section 3.9(f), the Project would not remove the Terra Linda High School designation by the LHMP as a critical facility. The campus would remain available as community space in the event of an emergency, including during Project construction. The proposed Project would not conflict with City plans addressing emergency response and evacuation, and the District would cooperate with the SRFD and SRPD for emergency access. Therefore, though the proposed Project is near an SRA, it would not impair the adopted emergency evacuation or response plan. Impacts would be less than significant, and this issue will not be further analyzed in the EIR.

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?

Less Than Significant Impact. The Project site is not located in an SRA or VHFSZ; however, it is located near an SRA and within the Wildland Urban Interface. Areas with steep slopes in the City include Terra Linda Sleepy Hollow Open Space Area in the northwest corner of the City, Southern Heights Ridge on the southwestern edge of the City, and Black Canyon and San Pedro Mountain in the eastern portion of the City.[60]

The Project site is located approximately 0.4 miles north of the Terra Linda and Sleepy Hollow Open Space, which is a horseshoe-shaped preserve covering the ridges south, east, and northeast of the Project site. At its closest point, the Project site is about 200 to 300 feet north of the open hillside; residential uses and Devon Drive separate the Project site from the open hillside. The proposed Project would not affect the hillside. The Project site itself is relatively flat and the proposed improvements would occur only on the existing high school campus. Thus, the proposed Project would not create new slopes or propose development on a slope. The proposed Project would also not exacerbate wind conditions in the area; however, wildfires and fire-related air pollution hazards that could originate in the Project vicinity could be spread by prevailing winds. Furthermore, site plans for the proposed Project would be subject to review by the Division of the State Architect, based on the California Building Code and California Fire Code. Therefore, the proposed Project would not expose Project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire, and impacts would be less than significant. This issue will not be further analyzed in the EIR.

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59 Marin County, Wildland Urban Interface Map, accessed July 18, 2023, https://www.arcgis.com/apps/webappviewer/index.html?id=688f506cfb144067826bb35a062b0f0a.

60 City of San Rafael, General Plan 2040/EIR - Wildfire, page 4.18-16.

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?

Less Than Significant Impact. The Project site is not located in an SRA or VHFSZ; however, it is located near an SRA and within the Wildland Urban Interface. The proposed Project would not require the installation or maintenance of infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) associated with high fire zones that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment. The Project involves the modernization of existing school facilities on a developed school campus, surrounded by residential uses. Project implementation would not require off-site improvements, and the new facilities would tie into existing underground utilities located within the campus. Therefore, impacts would be less than significant, and this issue will not be further analyzed in the EIR.

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 downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Less Than Significant Impact. The Project site is not located in an SRA or VHFSZ; however, it is located near an SRA and within the Wildland Urban Interface. The Project would modernize existing facilities on the built-out campus. All improvements would comply with the California Building Code Standards and the Clean Water Act. Construction activities would require a SWPPP and erosion control plan to mitigate runoff. All disturbed soils would be restored with new pavement, structures, and/or landscaping to minimize erosion and to allow for continued use of the impacted area. Therefore, the Project would not cause runoff, post-fire slope instability, or drainage changes that would expose people and structures to downslope or downstream flooding or landslides. Impacts will be less than significant, and this issue will not be further analyzed in the EIR.

3.21 Mandatory Findings of Significance

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

Discussion

a) 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?

Potentially Significant Impact. As previously discussed, a biological resources technical report will be prepared for the proposed Project, which will evaluate potential impacts to special-status and/or sensitive species. Additionally, a cultural resources technical report will be prepared for the proposed Project, which will evaluate potential impacts to historical and archaeological resources, including tribal cultural resources. Impacts are considered potentially significant, and additional analysis of these issues will be included in the EIR.

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)?

Potentially Significant Impact. Pursuant to CEQA Guidelines Section 15130, the EIR will include an evaluation of the proposed Project’s potential to contribute to cumulative impacts when considered in combination with the effects of other related projects. Cumulative impacts are considered potentially significant, and additional analysis of this issue will be included in the EIR.

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

Potentially Significant Impact. The proposed Project could potentially result in environmental effects that may cause adverse effects on human beings with regard to the following environmental areas discussed in this Initial Study: aesthetics, air quality, biological resources, cultural resources, energy, geology and soils, greenhouse gas emissions, hydrology and water quality, noise, recreation, transportation, and tribal cultural resources. These issues will be further evaluated in the EIR with consideration for potential direct and indirect effects on human beings to occur.

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5 LIST OF PREPARERS

Lead Agency

San Rafael City Schools
310 Nova Albion Way
San Rafael, California 94903

Tim Ryan, Senior Director of Strategic Facility Planning

Michael Baker International (Consultant to Lead Agency)

505 14th Street, Suite 900
Oakland, CA 94612

Barbara Wu Heyman, Project Manager
Cristina Lowery, Deputy Project Manager
Nicole Marotz, Quality Assurance/Quality Control
Jessie Kang, Environmental Analyst
Connor Lance, GIS Specialist

APPENDIX A-2

Scoping Comments

From: **Penny** <[redacted]
Date: Wed, Sep 27, 2023 at 8:22 AM
Subject: TLHS
To: tryan@srcs.org <tryan@srcs.org>

Hello:
I am a neighbor located on El Pavo Real Circle. As planning for Terra Linda High goes forward, increased parking should definitely be included. Our street has nearly wall to wall cars during the school year and it is a one-way fairly narrow street. This makes access for neighbors as well as emergency and service vehicles more difficult. If the current student parking lot could be turned into a parking structure it would help alleviate the problem. Please consider this.
Penny Wells
[redacted]

From: **Valerie Koehn** <[redacted]
Date: Fri, Sep 29, 2023 at 11:02 AM
Subject: EIR SCOPING FOR TERRA LINDA HIGH SCHOOL CAPITAL IMPROVEMENT PROJECT
To: <tryan@srcs.org>
Cc: Jack <[redacted]

Hello Mr. Ryan

I am writing in FULL support of all the comments and concerns raised by our neighbor Shirley Fischer in the below copy of her email. My intention was to write to you separately, but she has expressed my thoughts to the letter.

It is in the interest of the neighboring community that you heed our concerns and make necessary changes to the project with regard to noise, aesthetics, the health of the environment, light and glare, and all of the concerns raised below.

Thank you for your attention to these matters.

Regards,
Valerie Koehn + Jack Fischer

September 27, 2023

To: Tim Ryan, Senior Director of Strategic Facility Planning San Rafael City Schools

310 Nova Albion Way San Rafael, CA 94903

Re: EIR SCOPING FOR TERRA LINDA HIGH SCHOOL CAPITAL IMPROVEMENT PROJECT

Dear Mr. Ryan,

I am writing as a 40+-year TLHS neighbor, parent of a former TLHS student, and supporter of SRSD bond Measures A, B and C.

In general, it is a pleasure to see educational facilities in our community maintained and upgraded. It is good for our kids as well as our community.

However, I have some serious concerns about the scope and impacts of the proposed 2024-2029 capital improvement project to expand the TLHS aquatic and other sports programs beyond use by local students to hosting California Interscholastic Federation (CIF) competitions. This significantly changes the footprint and the presence of the high school within the surrounding community and will significantly impact neighbors not only during the 5 ½ year construction phase but also on an ongoing basis when the new facilities are in place.

I strongly disagree with some of the impact conclusions in the Initial Study EIR Scoping Document and suggest incorporation of further considerations, including but not limited to the following items:

3.1 Aesthetics c) visual character or quality of public views of the site and its surroundings

Public views will be impacted by tree removal for the ADA pathways. Existing trees soften the visual boundary between high activity areas, such as the sports fields, and public spaces such as sidewalks and nearby private residences. This boundary has already been diminished with the removal of redwood and other boundary trees in previous phases of this project. This is a significant impact. The "less-than-significant" finding is not accurate and the project conflicts with San Rafael's General Plan 2040 (GP2040) policies on maintaining neighborhood character (CDP 2.3) and requiring street trees in major property upgrades (CDP 3.5c). The project needs to include a tree replacement plan and substantial buffer landscaping to mitigate the impact of tree removal. This should be in harmony with TLHS's goals for sustainability and green building.

3.1 d) light and glare. I concur with the conclusion impacts are potentially significant and that additional analysis of potential light and glare impacts must be included in the EIR. The analysis needs to include impacts of future "competitive-level use of aquatic center and the proposed artificial turf at the ballfields [that] would allow extended use of the facilities…[that] may include CIF tournaments at the aquatic center, early morning water polo and swim team practices, and expanded use of the ballfields." Hours of lighting during different seasons need to be analyzed and possible alternatives, such as limited hours for sports facilities lighting, need to be included in the EIR.

3.3 Air Quality. The recommended additional analysis for the EIR needs to include study of the following factors: impacts of increased traffic to more sporting events (including CIP events), consideration of the adjacent preschool & daycare facility, several group homes for the disabled on streets adjacent to TLHS, high number of elderly residents in surrounding neighborhood, and cumulative impacts with future nearby new development (245 Nova Albion Way, Northgate Town Square Project), both during construction phases and in ongoing operation.

3.4 Biological Resources

3.4 b) and c) Impacts on riparian habitats and wetlands. The project states "The new facilities would tie into existing underground utilities located within the campus." There are potential impacts on Las Gallinas Creek and its terminus in San Pablo Bay wetlands from increased runoff and stormwater drainage from the new impermeable surfaces, including artificial turf fields. Further analysis needs to be done on how "these would be designed to capture increased runoff" and possible alternatives included in the EIR, such as permeable pavement and alternative materials for playing fields (see attached article from the Marin Municipal Water District, which does NOT recommend artificial turf).

These comments also apply to analyses in section **3.10 Hydrology and Water Quality**.

3.8 Greenhouse Gas Emissions

3.8 a) generating GHG. The GHG technical report for the proposed project operation needs to include potential increased GHGs from additional vehicles traveling to the extended sports activities. This is also necessary in order to be consistent with GP2040 Goals and Policies for transportation efficiency (M-2.4) and Reduction of Vehicle Miles Traveled (VMT) (M-3.1), and possibly GP2040 Policy M-3.2 "Require[s] an analysis of projected Vehicle Miles Traveled (VMT) as part of the environmental review process for projects with the potential to significantly increase VMT."

A number one concern of neighboring residents related to this topic is **the lack of providing adequate parking for the additional vehicles that will be coming to the "extended use of facilities" including CIF competitions**. Currently, there are 1200 students enrolled and there are a total of 250 parking spaces. The spaces are for both students and faculty and for SRSD offices and no additional parking is designated for event visitors. Already student parking daily spills over onto adjacent streets, sometimes causing secondary problems such as loitering, litter, and inappropriate behavior. When TLHS hosts a large event, such as the Special Olympics, parking on neighborhood streets is fully saturated. This is a very real environmental impact on neighborhood character and quality of life, as well as potentially impacting GHG generation. Parking for the increased number, frequency, and size of sporting events needs to be analyzed and potential mitigation measures included in environmental evaluation of this project.

3.13 Noise

3.13 a) generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project.

The analysis of noise impacts during construction are very important. As experience with current construction at TLHS has demonstrated, noise can be magnified by elevation and other topographical features and needs to be evaluated not only in immediately adjacent residences and sensitive facilities (such as the preschool and group homes) but also in hillside residences.

The analysis should confirm that the project conforms to the City's Noise Ordinance (Chapter 8.13 of the San Rafael Municipal Code) as modified by Condition #113 (ED18-034) which limits the days and hours of all grading and construction activities

The methodology of estimating noise impacts from extended use of the recreational facilities needs to be carefully designed and to include alternatives, such as limiting times of facility usage or other mitigation measures to decrease noise during practices and competitions. Use of amplified sound need to be assessed and suitable policies established. This is already an issue with loud amplification of game play and spirit rallies penetrating inside neighboring residences. Use of amplified sound needs to be modified if the size and quantity of events will be increased.

3.2.1 Mandatory Findings of Significance

3.2.1 b) Does the project have impacts that are individually limited, but cumulatively considerable?

It is critical that impacts of this five-year project's **Construction Management Plan (CMP)** be analyzed in the EIR, including projected schedule of work, projected daily construction truck trips, proposed construction truck route including staging area, location of material staging areas, location of construction trailers and of construction worker parking, dust control program, prohibition of construction truck traffic encroaching into any surrounding residential neighborhood, and the name, phone number and contact information for an on-site construction manager who is responsible to implement the CMP.

This is particularly important because Northgate Town Square Project, including mall demolition and construction of 900-1440 residential units and new retail will proceed within the same time frame. The CMP needs to contain provisions for coordination with the CMP for the Northgate Project to minimize impacts on neighborhoods bordering these two projects. Since Nova Albion Way is a major arterial and exit route for the greater Terra Linda community, the EIR needs to consider the impact of this project on routine, emergency, and evacuation travel both during the construction phase and during sporting events after completion.

Thank you for your consideration of these comments.

Sincerely,

Shirley Fischer

[redacted]

October 1, 2023

To: Tim Ryan, Senior Director of Strategic Facility Planning San Rafael City Schools
310 Nova Albion Way
San Rafael, CA 94903

Re: Comments to EIR scoping for the Capital Improvement Project

I attended the September 14 meeting and was surprised at the scale of the construction project planned and the 5 ½ year length especially at the heels of the previous three-year construction project.

It was disappointing to learn that the bulk of the funding from the SRSD bond measure is being used for athletic facilities, rather than educational facilities.

I've reviewed the NOP and the EIR initial study checklist documentation and have serious misgivings about the following:

AESTHETICS
The recently completed new gymnasium which added an LED façade to the entire front wall facing Nova Albion creates a sky glow at night. So now, neighbors can no longer see the vast array of stars in the night sky as previously. This did not show up in the previous EIR study, we were blindsided, no pun intended, to this result. Hence, how will we know the real impact on the surrounding neighbors of the low level MUSCO lighting on 50-foot poles for the aquatic center, the site lighting between the gym and the track, the new scoreboards, and other 'upgrades' we are not aware of? It's difficult to bring up what we don't know. The other item that caught all the neighbors off guard with the recently completed construction was the narrowing of Nova Albion Way… how do you propose preventing these surprises from occurring with these new phases of the project?

Tree removal - in the documentation and at the September 14 meeting Michael Baker International advised that there will be trees removed but were unable to quantify the number of trees removed, exact locations or the number and the types of trees that would be planted. It is critical that a detailed landscaping plan be included, which shows the type, the number, and the location of where new trees will be planted. As mentioned in Shirley Fischer's letter to you dated September 27, 2023, '*The project needs to include a tree replacement plan and substantial buffer landscaping to mitigate the impact of tree removal. This should be in harmony with TLHS's goals for sustainability and green building*.'

AIR QUALITY
It is critical the EIR analysis measures the cumulative analysis of pollutant concentrations adversely affecting vulnerable populations nearby, i.e., two senior residences, adjacent preschool and daycare facility, Vallecito Elementary School, two group homes for the disabled, student athletes and the many seniors (65+) aging in place in nearby homes. As stated in the documentation these populations are considered more sensitive to pollutants. Therefore, EIR study should include the three phases of the project as well as the staging of the construction zone prior to commencement and until the project is completed and all trucks, materials, and construction workers are no longer on site.

AIR QUALITY POLLUTION CONTAMINATION

Consider nearby pollutants from the demolition and 5-year construction of the Northgate Town Square project which is scheduled to begin in 2024.

GREEN HOUSE EMISSIONS (GHG)
The EIR study must analyze GHGs from the construction trucks, construction worker personal vehicles during the 5 ½ year construction combined with the existing vehicle miles travels by students, teachers, district administrators and guests/visitors. Visitors not only attending current existing sports games but must include the increase in attendance by visitors, students, and athletes to *all future* California Interscholastic Federation (CIF) games that will greatly increase the number of people attending the games as well as allow extended use of facilities, expanded activities to include CIF tournaments and early morning practice of swim team/water polo and all of the ball fields.

SUSTAINABLE AND ENVIRONMENTALLY FRIENDLY STATE OF THE ART CONSTRUCTION
The construction of this new and improved high school must safeguard the health and safety of future generations by ensuring that California Green Building Standards Code, Title 24, Part II (CALGreen) is not simply met **but exceeded**. The use of best practices of low-emission and environmentally friendly construction and ongoing maintenance throughout the project, including compliance with all current and subsequent Federal, state, and local codes. This should include: dual plumbing in all buildings (purple pipes are nearby); landscaping with recycled water, drought resistant succulent plants; low body carbon building and design materials including concrete in construction; "Cool roof" construction; permeable pavement (no synthetic toxic turf) and stormwater management to catch and reuse water runoff; buildings powered by electric and/or solar renewable energy sources.

EMERGENCY EVACUATION LOCATION
TLHS has served the community as an emergency evacuation shelter. The documentation explains that the proposed new construction, facility, renovation, and the landscaping, pathway, and turf improvements could change the amount and locations of impervious surfaces, which have the potential to increase erosion or situation on-or off-site. The increase in amount of surface runoff, which could result in flooding on-or off-site. By eliminating natural turf and minimizing permeable surfaces and increasing hard scape. This will contribute to a heat island in the summer and prone to flooding in the winter. How can the community plan on this continuing to be an evacuation and shelter location?

PARKING
Today there are 1200 students and there are 250 parking spaces for students, faculty, district administrators, and visitors. There are no plans in this capital improvement project to include additional parking to accommodate the influx of future students (The Northgate Development alone will be attracting an estimated 300+ students, that's not anticipating other new growth.) and especially visitors to all the CIF games and Tournaments. This simply makes no sense and is not good planning for years to come. I strongly urge the school district, Michael Baker International and City Planning Staff to find in the 28-acre site a place to accommodate additional parking.

As a parent of a former student and a 38-year resident of Terra Linda, I sincerely want this project to be the best for our kids, community, and as a model of forward planning and thinking. Sincerely appreciate your taking into consideration my comments.

Kind regards,
Grace Geraghty

Subject: RE: EXTERNAL: Fwd: TLHS 2024-29 construction

From: **Stephanie Lovette**
Date: Mon, Oct 2, 2023 at 9:51 AM
Subject: TLHS 2024-29 construction
To: tryan@srcs.org <tryan@srcs.org>, bmarcucci@srcs.org <bmarcucci@srcs.org>

Attached please find my comments on the Initial Study for the 2024-2029 construction at TLHS.
My letter includes my ongoing interactions with the District's athletic staff regarding field scheduling and communication. It would be nice if we could have some notification regarding large and amplified events. A posted schedule of field rentals would at least give us a heads up to allow us to plan around the current disruptions.

My letter did not address this, but I am very curious why the field is being rebuilt again? The field and track reconstruction was a fairly recent project.

Thank you,
Stephanie Lovette

October 2, 2023

Stephanie Lovette

[redacted]

Mr. Tim Ryan, Senior Director of Strategic Facility Planning

Mr. Robert Marcucci, Assistant Superintendent of Business Services

310 Nova Albion Way San Rafael Ca 94903

Via Email and hand delivery

RE: Initial Study EIR for TLHS improvements

Dear Messrs. Ryan and Marcucci,

I am addressing this letter to both of you since my remarks address both the Initial Study and my concerns about the current situation at TLHS.

I have lived in my home at [redacted] since 1992. I appreciate the work that the District has been doing to upgrade the educational facilities at TLHS. I have reviewed the scope of the proposed 2024-2029 capital improvement project, and I am not supportive of the expansion of the TLHS field usage and the intensification of the weekend and night use of the fields and gym. It appears there is a push to turn the TLHS campus into a sports magnet to serve other schools and students outside of TLHS. Terra Linda High School is located within a neighborhood and lately the school has not been a good neighbor. The impacts of the school are spilling out into the neighborhood in ways that I have not previously seen. The neighborhood is being negatively impacted during the school day, after school, and on weekends.

The Initial Study needs to address the <u>cumulative</u> impacts of the increased programming at the fields and sports facilities due to the proposed project. I am not aware of any policies that the District has adopted to limit or coordinate large sports meets. Therefore, the document needs to assume all facilities will be used on Saturday and Sunday from August to June, including weekly amplified events.

My comments on the Initial Study for the 2024-2029 project are as follows:

1.6 Project location

There is no mention of the residences on Nova Albion or the adjacent courts. The construction program at TLHS has had ongoing detrimental impact on those residences. The intensification of the usage of the TLHS sports facilities, including field rentals, will directly impact those residences. The existence of those residences should be acknowledged in the document.

1.7 Proposed Project:

The discussion in the prosed project section did not describe the project in enough detail to allow for a sufficient examination of the impacts. Some examples:

- Need a better description of the new lighting on 50-foot poles in the pool area. Hours of operation, amount of light, etc.
- Need to include a discussion of the new "security" lighting that the District is currently installing so the cumulative impact of all of the increased lighting at the campus can be addressed.
- Need a better description the site lighting between the practice field and the track. How high are the poles, hours of operation, etc. Again, need a better description so the cumulative impact can be assessed.
- There will be a new scoreboards installed at the stadium, on the ball fields and at the aquatics center. Will these be lit? Hours of operation? Days of operation? How will the scoreboards be used? Many of the neighbors can see the football scoreboard from their yards and it would be quite disruptive if the scoreboards are made into perpetual reader boards like the ones on Nova Albion or at Marin Center on 101 outside of game times. Absent of specific District policy of limiting or coordinating large games, the document should address the light impacts if all the scoreboards are used at the same time.
- New lighting in pe support spaces- is this indoor or outdoor lighting? Will these lights be left on 24 hours?
- The document states that there will be no lighting on the upper ballfields but is silent on lighting for the track and football stadium. If there is not a direct statement regarding lighting in the stadium and the field, I can only assume the District plans on installing lighting over the strenuous objections of the neighborhood.

3.1 Light and glare

I agree with the conclusion that impacts are potentially significant and need to be analyzed in the EIR. The current project description does not adequately define the various potential new light sources. The analysis needs to include the cumulative impact assuming all the facilities are used at the same time. The current lighting at the school should also be included. Some of the campus buildings and other areas remain lit at night and the District will be installing new security lighting. The campus should not become a well-lit donut in the middle of a residential neighborhood where we enjoy the nighttime views of the hills and stars from our backyards and decks.

3.3 & 3.8 Air Quality and Greenhouse Gas emissions

I agree with there will be a significant impact due to the intensification of the field use. The document needs to include the impact of increased traffic due to increased sporting events, and the lack of parking at the school for those sporting events, the use of busses for CIF tournaments and lack of parking for the busses. The document should discuss the <u>cumulative</u> impact of multiple large sporting events on the same day including tournaments. The analysis should include the traffic impacts of the overlapping schedules of sporting events. There are usually two-hour overlapping times so new people come to watch the next heat or game before the attendees from the earlier heats have left. So, there is a double impact of cars circling the neighborhood.

The document should address the impact of large sporting events each weekend day from August to June. Currently the field is used all day on Saturday and Sunday during those months, although most events are not amplified. I am not aware of any District policies limiting rental of the fields or the gym after school hours including amplified events. Rental of the sports fields provides revenue to the District, and I can only assume that the District will want to maximize the use of the athletic facilities, which could mean large events every Saturday and Sunday all year.

The air quality and greenhouse gas analysis should evaluate the lack of parking, which is a major issue for the residents. The current athletic programs often take up all the parking on Nova Albion and the adjacent residential courts.

The majority of the vehicles parked on Nova Albion for sporting events are SUV and trucks, which makes it impossible to see as I am backing out of my driveway. The drivers are often quite aggressive due to their frustration at not having adequate parking and being in a hurry to see their children perform. Cars have blocked my driveway numerous times. The City of San Rafael has installed a red curblet in front of my house and the home of my neighbors. The red curblet has minorly improved the situation. Big meet days are unpleasant due to the number of angry drivers looking for parking and yelling at me when I ask them not to block my access. I used to walk over to the field and ask the event organizers to make an announcement when a car blocked my driveway but the organizers refused so now I just call the SRPD to ticket the car. It's frustrating to have a school created issue become my responsibility. The current configuration with the field entrance located directly across from my home and the District re-aligning the school exit directly into my driveway has made it nearly impossible to leave the house on days when there all day tournaments and meets.

Since the field was rebuilt, I have had trouble scheduling events at my house because there is nowhere for my guests to park on heavy sports days. Backyard get togethers are also unpleasant due to the noise of the announcers and the crowd with loud whistles. I have repeatedly requested the schedule of the events at TLHS from the District. The TLHS calendar includes the big football games, but not the track and field tournaments or the large events sponsored by other entities. The athletic office staff has not been at all helpful. I was told there is no master calendar of sports events. This makes no sense since the District is scheduling the field and getting revenue from the field rental.

The EIR should also address the air quality impacts of multiple construction projects occurring at the same time including the reuse of Northgate Mall, reuse of 245 Nova Albion Way and the potential of additional construction at the Kaiser campus.

3.13 Noise

I agree that the project will result in a potentially significant impact. As discussed above, the document should address the cumulative impact of the noise from multiple events. It should also address the impact of events that start at 8 am and go until 8 pm. The current large tournaments often run all day Saturday and Sunday and into the evening. The document should also discuss the use of amplified sound for multiple events that run all day. Potential mitigation should be discussed. At this point, our only recourse is to call the SRPD when the amplification exceeds the allowable limit. I have walked over to events and asked the organizers to turn it down but have been rebuffed since I am not with the school district. There is one organizer that routinely turns up the volume, but the District continues to rent the facilities to that organization despite our annual complaints. There is no assigned contact at the District to address these issues.

3.11 Land Use Impact

Based on the concerns listed above, I disagree that there is no land use impact. The document refers to the school enrollment remaining static but does not address the impact of increasing the number of days and hours the school is used into the weekends and evenings. The District appears to be piecemealing the environmental analysis for the various projects which does not meet the spirit of CEQA. The document should include a full evaluation of the number persons and cars from the full sports programs on weekday afternoon/evening and on weekends. The athletic program that the District is contemplating with all these improvements will have a huge impact on the neighborhood. At this point, there appears to be no limit to the hours of operation, the number of events on the same day, or the decibel levels and absolutely no provision for the increased parking needs.

Construction Management Plan

The document also needs to thoroughly analyze the District's proposed Construction Management Program including the schedule of work, the project hours, the construction truck trips and staging areas, worker parking, and the potential encroachment of construction impacts onto the neighborhood streets. The analysis should include the concurrent demolition and construction at the Mall. The two large construction projects will impact both ends of Nova Albion especially since construction staging sites will be at a premium due to the multiple projects.

I am deeply concerned about the District's capacity to adequately develop and enforce a robust construction management program to reduce neighborhood impacts. During the last rebuilding of the field, I regularly had construction trucks idling in front of my house as early as 5 am. The drivers also stood in front of my house for a nice early morning chat. The workers used noisy construction equipment at the eastern end of the field before 7 am. Note that I have bedrooms on the front of my house with single pane windows and the windows are open at night. I called multiple times to complain but the District's construction manager was not at the site that early. I ended up chasing off the trucks and contractors, which is not the way that I should have to start my day. I was challenged a few times by drivers or workers regarding the project's work hours. I had to rely on the City's construction ordinance since I could not find a posted copy of the project construction management plan.

During that project, construction trucks also stored their tractor trailers on Nova Albion for multiple days. Residents had to call the City to ticket the operators.

I am also concerned about the coordination between the District, the City and the residents based on the latest safe routes to school project. There were obstructions to my driveway that appeared and disappeared with no notice, and I could not get a straight answer on who was in charge.

I appreciate the opportunity to address the Initial Study for the 2024-2029 construction at TLHS. Please contact me if you have any questions.

Sincerely,

Stephanie Lovette

Stephanie Lovette

Mr. Ryan

Please excuse my handwritten response. I did not realize until 12:30 today that the comments were due today, and not tomorrow. I have not read the comments.

Heather Pickel

Response to Terra Linda High School Capital Improvement Project

Terra Linda High School ("TLHS") is not an island surrounded by sea but an acreage surrounded by residences and whatever TLHS does it affects the wellbeing of its neighbors. Devon Drive, where I live, is a very quiet street; there are no parties, the children are quiet, and even the dogs don't bark. Now we are to be subjected to more demolition and construction for another four years at least. We underwent three years of heavy construction of the 2 storey building. Huge construction vehicles, cranes etc. went through the school yard and on the other side of my back fence. My immediate neighbor told me that she went down in her nightclothes at 5:30 am during a hot summer to stop construction starting.

How much more are we expected to endure.

Aquatic Center

It is hardly a "Rehabilitation" but a complete demolition and rebuilding.

The demolition and rebuilding of the pool to 40 yards is to meet the California Interscholastic Federation standards and the related facilities, are purely to enable TLHS to hold regional competitions and no other purpose (Marin Catholic does not have its own pool but uses nearby pools.)

The improvements are absolutely unnecessary to serve the TLHS students. This is clearly stated in the 5th paragraph of the August 29, 2023 paper by Mr. Tim Ryan page 3.

There are other parks in the area to serve the local community.

Tennis Court Improvements

As I mentioned at the September 14, meeting, the tennis courts are only used when the Wimbledon Competition start in London. When the Wimbledon is over, the Terra Linda tennis is also over. The courts are only used for about three weeks. I see the courts from my back garden and I hear the play.

Modernization of Main Classroom Building

I will support any improvements to the main school building. I was impressed at the improvements already made to the school when I attended the September 14 meeting.

Stadium Upgrades

Here again the proposed improvements are to facilitate more sports competitions. When the sports facilities were upgraded some years ago, I contacted the President (I believe that was his title) of the Board of Directors. He reassured me evening games would not be played (I imagine into the night). Yet I heard cheering, clapping and shouting at the games during the week until the light faded. There were games on the weekend as well.

We don't want TLHS grounds turned into Levi Stadium with games played well into the night or during the day

Some of the adverse Effects on the local Residents

Even now with the traffic in the afternoon, when I leaving home or return, I use Arcitos, Los Pavados, Treffis and Esmeyer to reach Devon Drive. It is impossible to use the direct route of Nova Albion.

If there are to be more Sports competitions, the roads will be blocked in the evening and on the weekends. It will be impossible to use Nova Albion at any time of the day.

When I walk on the sidewalks, even with the strict California exhaust restrictions, I smell the exhaust fumes. (I often why people take babies for walks on the sidewalks). With the increase in vehicle for Sports events, there will be increased exhaust fumes for cars, SUV's, and the coaches. Terra Linda is surrounded by hills and the increased exhaust fumes will not quickly dissipate.

In Short, the demolition and rebuilding of the facilities mentioned in the August 29, 2023 paper are unnecessary and will create, once again, noise, pollution from the demolition itself and the increased traffic, traffic congestion, and an absolute nuisance to the local residents.

The intended Capital Improvements to its Sports facilities should not be mandated. TLHS should focus on improving its academic ~~std~~ standards. I read that its Math score was 48% and reading, if I recall correctly, was 53%.

Heather Patrick

[redacted]

From: **Jack Fischer** <[redacted]
Date: Tue, Oct 3, 2023 at 8:03 PM
Subject: TLHS EIR
To: Timothy Ryan <tryan@srcs.org>
Cc: Bob Marcucci <bmarcucci@srcs.org>, Gina Daly <gdaly@srcs.org>, Grace G [redacted]

Hello Tim Ryan and all,

Thank you ….my misgivings are that, as I understand it, there were only 3 neighbors at this most important meeting of 9/14/23 . Given that there were only 3 neighbors implies that maybe the canvassing to the neighbors was not very effective. Was there any outreach besides dropping notices in mailboxes? And how far around the neighborhood did you drop notices? Did you reach our Devon and Esmeyer Street communities?

Given the amount of responders to the EIR in the last week tells me that we should have another meeting.This is a very important issue that affects the neighborhood, the individual neighbors, and the general health of the community. These decisions are very easy to make when the decision makers do not live in the neighborhood.

I would ask that there is a call for another meeting and canvas the neighborhood in a more effective manner.

Sincerely,

Jack Fischer
[redacted]

> On Oct 3, 2023, at 2:46 PM, Timothy Ryan <tryan@srcs.org> wrote:
>
> There was a meeting on 9/14/23. Attached is the notice of that meeting mailed to neighbors and other governmental agencies for reference.
>
> Tim Ryan
> Senior Director of Strategic Facility Planning
> San Rafael City Schools
> 310 Nova Albion Way
> San Rafael, CA 94903
> (415) 492-3285
> Pronouns: he, him, his

SAN RAFAEL CITY SCHOOLS
Bond Program
Building for Student Success

"Never give up. Never give in. Never become hostile... Hate is too big a burden to bear." John Lewis

On Tue, Oct 3, 2023 at 2:31 PM Jack Fischer <[redacted]> wrote:

Hello Mr Marcucci,

I appreciate your letter.

Your note says there is a meeting at TLHS on September 14….Is that a misprint or did the meeting already happen? Or do you mean Oct 14th?

thank you,

jack fischer

On Oct 3, 2023, at 12:06 PM, Bob Marcucci <bmarcucci@srcs.org> wrote:

Hello Mr. Fischer,

I was forwarded your email to Trustee Daly regarding your input on the Terra Linda High School EIR. I believe you also sent your input to our Senior Director of Strategic Facility Planning, Tim Ryan (cc'd here). We appreciate your time in reviewing the report and providing us with valuable feedback. We have invited these comments by holding a public input meeting on Sept. 14 at TLHS. We want to learn of our neighbors' concerns and we will reference all of the letters as exhibits in the EIR. And where appropriate, we will show mitigation measures in the EIR. We acknowledge receipt of your input and will forward it to our EIR consultant.

Thank you,
--

Bob Marcucci | Assistant Superintendent of Business Services | San Rafael City Schools

bmarcucci@srcs.org | 415-492-3205 | 310 Nova Albion Way | San Rafael, CA 94903

[redacted]

[redacted]

[redacted]

<1_NOP_SRCS_TerraLindaHS_Capital_Improvements_Final.pdf>

[redacted]

Department of Toxic Substances Control

Meredith Williams, Ph.D., Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Yana Garcia
Secretary for
Environmental Protection

Gavin Newsom
Governor

GOVERNOR'S OFFICE OF PLANNING AND RESEARCH
Sep 19 2023
STATE OF CALIFORNIA

September 19, 2023

Tim Ryan
Senior Director of Strategic Facility Planning
San Rafael City Schools
310 Nova Albion Way
San Rafael, CA 94903
tryan@srcs.org

RE: NOTICE OF PREPARATION (NOP) OF A DRAFT EIR (DEIR) FOR THE TERRA LINDA HIGH SCHOOL CAPITAL IMPROVEMENTS PROJECT, DATED AUGUST 30, 2023 STATE CLEARINGHOUSE # 2023080737

Dear Tim Ryan:

The Department of Toxic Substances Control (DTSC) received a Notice of Preparation (NOP) of a Draft Environmental Report (DEIR) for the Terra Linda High School Capital Improvements Project. Based on our project review, DTSC would like to provide the following comments.

1. If the district plans to use State funds for the project, then the district shall comply with the requirements of California Education Code (CDE), sections 17210, 17213.1 and 17213.2, unless otherwise specifically exempted under section 17268. If the district is not using State funds for the project, or is otherwise specifically exempted under section 17268, DTSC recommends the district continue to investigate and clean up the Site, if necessary, under the oversight of (County) and in concurrence with all applicable DTSC guidance documents.

A local education agency may also voluntarily request the CDE site/plan approval for locally funded site acquisitions and new construction projects. In these cases, CDE will require DTSC to review and approve prior to its final approval, except when exempt under section 17268.

2. Because the project is school site related, DTSC recommends that an environmental review, such as a Phase I Environmental Site Assessment and/or Preliminary Environmental Assessment, be conducted to determine whether there has been or may have been a release or threatened release of a hazardous material, or whether a naturally occurring hazardous material is present based on reasonably available information about the property and the areas in its vicinity. Such an environmental review should generally be conducted as part of the California Environmental Quality Act (CEQA) process. If the District elects to proceed and conduct an environmental assessment at the Site under DTSC oversight, it should enter into an Environmental Oversight Agreement with DTSC to oversee the preparation of the environmental assessment.

3. If buildings or other structures are to be demolished on any project sites included in the proposed project, surveys should be conducted for the presence of lead-based paints or products, mercury, asbestos containing materials, and polychlorinated biphenyl caulk. Removal, demolition, and disposal of any of the above-mentioned chemicals should be conducted in compliance with California environmental regulations and policies. In addition, sampling near current and/or former buildings should be conducted in accordance with DTSC's 2006 *Interim Guidance Evaluation of School Sites with Potential Contamination from Lead Based Paint, Termiticides, and Electrical Transformers*

4. If any projects initiated as part of the proposed project require the importation of soil to backfill any excavated areas, proper sampling should be conducted to ensure that the imported soil is free of contamination. DTSC recommends

the imported materials be characterized according to *DTSC's 2001 Information Advisory Clean Imported Fill Material* webpage.

5. Our correspondence confirmed there was no record of a Phase 1 Environmental Site Assessment, or a Preliminary Environmental Assessment conducted on the school site therefore, these assessments should be conducted prior to the project's commencement.

DTSC appreciates the opportunity to comment on the Terra Linda High School Capital Improvements Project. If you would like to proceed with DTSC's school environmental review process, please visit DTSC's Evaluating & Clean-up School 3-Step Process to begin a Phase I Environmental Site Assessment.

If you have any questions, please respond to this letter for additional guidance.

Sincerely,

Dave Kereazis

Dave Kereazis

Associate Environmental Planner
HWMP - Permitting Division – CEQA Unit
Department of Toxic Substances Control
Dave.Kereazis@dtsc.ca.gov

cc: (via email)

Governor's Office of Planning and
Research State Clearinghouse
State.Clearinghouse@opr.ca.gov

Tamara Purvis
Associate Environmental Planner
HWMP - Permitting Division – CEQA Unit
Department of Toxic Substances Control
Tamara.Purvis@dtsc.ca.gov

Scott Wiley
Associate Governmental Program Analyst
HWMP - Permitting Division – CEQA Unit
Department of Toxic Substances Control
Scott.Wiley@dtsc.ca.gov

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

August 30, 2023

Governor's Office of Planning & Research

September 11 2023

STATE CLEARINGHOUSE

William Savidge
San Rafael City Schools
310 Nova Albion Way
San Rafael, CA 94903

Re: 2023080737, Terra Linda High School Capital Improvements Project, Marin County

Dear Mr. Savidge:

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

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

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

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

AB 52

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

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

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

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

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

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

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

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

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

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

SB 18

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

Some of SB 18's provisions include:

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

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

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

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

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

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

NAHC Recommendations for Cultural Resources Assessments

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

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (https://ohp.parks.ca.gov/?page_id=30331) for an archaeological records search. The records search will determine:

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

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

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

3. Contact the NAHC for:

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

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

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

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

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

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

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

Sincerely,

Cody Campagne

Cody Campagne
Cultural Resources Analyst

cc: State Clearinghouse

APPENDIX A-3

Scoping Meeting Memorandum

Initial Study Scoping Meeting Summary

This document summarizes the environmental scoping meeting conducted for the proposed Terra Linda High School Capital Improvements Project (Project). The meeting was held on September 14, 2023, and began at 6:00 PM and ended at 7:00 PM. The meeting was held at the Terra Linda High School Innovation Hub at 320 Nova Albion Way, San Rafael, CA, 94903. Eight people attended the meeting (see Attachment A).

The meeting was chaired by Barbara Heyman, Project Manager with Michael Baker International, who oversaw the environmental process for the proposed Project. Ms. Heyman presented a slideshow of the proposed Project (see Attachment B). The following information was discussed:

- Overview of proposed capital improvements at Terra Linda High School,
- Purpose the California Environmental Quality Act,
- Environmental Impact Report (EIR) process to be undertaken for the Project, and
- Conclusion of the Initial Study conducted for the Project (the EIR topics to be analyzed).

After the presentation, the meeting was open for public responses and comments on the Notice of Preparation. Oral testimony and written comments given at the scoping meeting are summarized below in Table 1. A comment card was submitted at the meeting (see Attachment C).

Table 1: Scoping Meeting Comments

Topic Area and EIR Reference Section	Comment Summary
Environmental Setting (Chapter 2.0)	• Concerned about conflicts with other projects, including Northgate's project nearby.
Aesthetics (Section 4.1)	• Concerned about students leaving the campus during lunch, which leads to litter and loitering around the neighborhood.
Hydrology and Water Quality (Section 4.8)	• Concerned about greywater use. • Suggested the Project use permeable pavement to catch runoff water and sustainable construction materials.
Noise (Section 4.9)	• Concerned about morning construction noise. • Concerned about the increased use of tennis courts and resulting additional noise. • Concerned about additional noise from new construction projects.
Transportation (Section 4.11)	• Concerned about existing parking issues caused by the school because students park in the neighborhood and cause secondary issues (noise, litter, etc.). • Concerned about the amount of available parking for students. • Concerned about traffic and construction impacts due to narrowing streets. • Concerned about the increase of people and traffic resulting from expanded use of District facilities.
Other	• Concerned about District's use of funds on athletic facilities versus other uses (e.g., teacher pay). • Concerned about neighborhood impacts. Neighbors are not aware of upcoming changes.

ATTACHMENT A

Scoping Meeting Sign-In Sheet

Terra Linda High School
Capital Improvements Project
EIR Scoping Meeting
September 14, 2023, 6 PM

NAME	EMAIL / TELEPHONE	ADDRESS
1. Carola Koch	[redacted]	[redacted]
2. Adolfo Medved	[redacted]	[redacted]
3. Grace Geraghty	[redacted]	[redacted]
4. Lee Matlnk		[redacted]
5. Tim Ryan		[redacted]
6. Alex Chapman	[redacted]	[redacted]
7. John DiLena		[redacted]
8. Will mcmanus	[redacted]	[redacted]
9.		
10.		
11.		
12.		

ATTACHMENT B

Scoping Meeting Presentation

Terra Linda High School
Capital Improvements Project

EIR Scoping Meeting

September 14, 2023

Michael Baker INTERNATIONAL | We Make a Difference

SAN RAFAEL CITY SCHOOLS

What is a Scoping Meeting?

Michael Baker INTERNATIONAL

- Inform participants of the District's intent to prepare an Environmental Impact Report (EIR) in compliance with the California Environmental Quality Act (CEQA)
- Introduce the project
- Present an overview of the environmental process
- Obtain input on the environmental scope and content of the EIR

Proposed Project

EXISTING FACILITIES

Total Campus Area:	28 Acres
Outdoor Athletic:	621,103 SF
Parking:	250 stalls

PROPOSED IMPROVEMENTS

	Project Description
	Classroom & Campus Improvements:
1	• Main Building Modernization including LED Lighting, Flooring, Counters, Classroom Technology, Corridors, & Restroom Remodel
2	• Buildings K Modernization Building H Demolition & Replacement with New Facility
	• Security & Fire Alarm Systems Upgrades
3	**Aquatic Center with Competition Swimming & Water Polo**
	Site Work:
4	• Stadium Upgrades including Concessions, Restrooms, Ticket Booth, Portable Removal, & Track Surface, Sitework
5	• Artificial Turf Baseball & Softball Fields With Dugouts
6	• Tennis Court Replacement and Walkway Improvements

LEGEND:

- Existing Building
- Modernization
- New Building
- Not Part of Project Site
- Sport Facilities Improvements
- Asphalt Paving Improvements
- Courtyard Improvements
- New Artificial Turf

Purpose of CEQA

Michael Baker INTERNATIONAL

<u>Disclose</u> information about potential significant environmental effects of a project

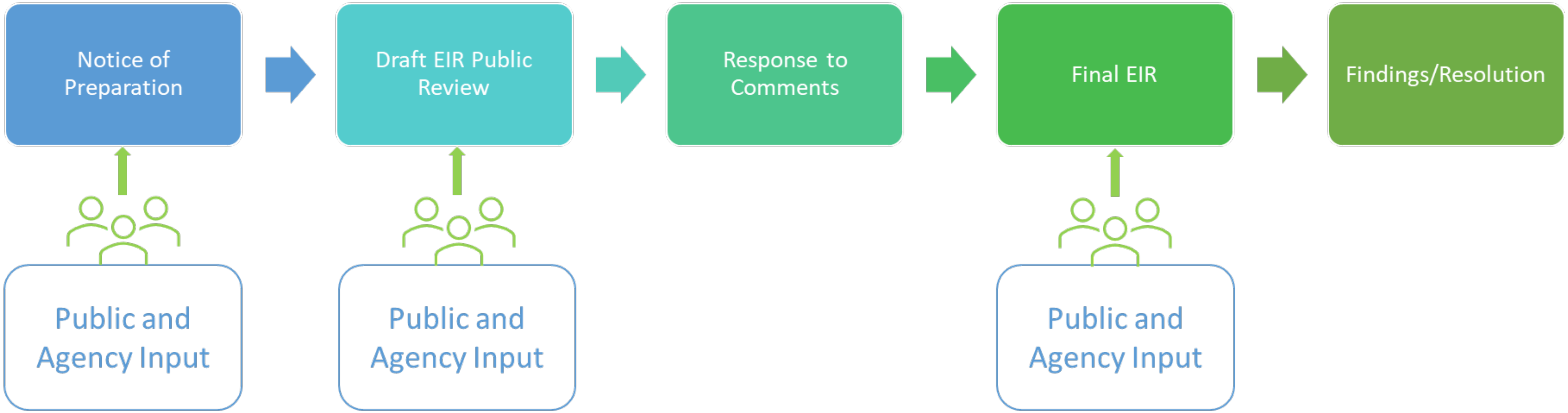
Identify ways to <u>avoid or mitigate</u> significant environmental impacts

Enhance <u>public participation</u> in the planning process

Foster interagency <u>coordination</u> in the review of projects

EIR Process

Michael Baker INTERNATIONAL



SAN RAFAEL CITY SCHOOLS

EIR Topics

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire
- Cumulative Effects
- Alternatives

EIR Topics To Be Analyzed

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hydrology and Water
- Noise
- Recreation
- Transportation
- Tribal Cultural Resources
- Cumulative Effects
- Alternatives

Next Steps

Michael Baker INTERNATIONAL

- NOP Scoping Comments due October 2, 2023
- Prepare Technical Studies
- Prepare Draft EIR
- Draft EIR 45-Day Public Review Period
- Prepare Responses to Public Comments and Final EIR
- Project Consideration

Comments

- **NOP Scoping Comments are due by 5:00 p.m. on October 2, 2023**
- Send Comments to:

  Tim Ryan, Senior Director of Strategic Facility Planning
  San Rafael City Schools
  310 Nova Albion Way
  San Rafael, CA 94903
  Phone: 415-492-3200
  Email: tryan@srcs.org

ATTACHMENT C

Scoping Meeting Comment Card

Terra Linda High School Capital Improvements Project
EIR Scoping Meeting
Public Comments

Name: CAROL Koch

Address: [redacted] [redacted]

Email: [redacted]

I would like your scope to be expanded to include adequate parking for your students. The "250 parking spots" include County parking. On my way to the meeting I procured 16 signatures from your neighbors. I could easily get 100 signatures

APPENDIX B

Air Quality & Greenhouse Gas Emissions Assessment

Air Quality & Greenhouse Gas Emissions Assessment
Terra Linda High School Capital Improvements Project

City of San Rafael, California

Prepared For:

Michael Baker International
9755 Clairemont Mesa Blvd, Suite 100
San Diego, CA 92124

Prepared By:

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS
55 Hanover Lane
Chico, CA 95926

February 2024

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ADA	Americans with Disabilities Act
ASF	Age sensitivity factor
AT	Averaging time
ATCM	Airborne Toxics Control Measure
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BMP	Best Management Practice
BR	Beathing Rate
BW	Body Weight
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCAP	Climate Change Action Plan
CEQA	California Environmental Quality Act
CIF	California Interscholastic Federation
CPF	Cancer potency factor
CH_4	Methane
City	San Rafael
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalents
DPM	Diesel particulate matter
ED	Exposure duration
EF	Exposure factor
EO	Executive Order
FAH	Fraction of time at home
GHG	Greenhouse gas emissions
GLC	Ground level concentration
hp	horsepower
HRA	Health Risk Assessment
IPCC	Intergovernmental Panel on Climate Change
$\mu g/m^3$	Micrograms per cubic meter
lbs	Pounds
L/kg	Liter per kilogram
MEIR	Maximumly Exposed Individual Resident
MEIW	Maximumly Exposed Individual Worker
mg	milligram
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NO_2	Nitrogen dioxide
NO_x	Nitrous oxides

OEHHA	Office of Environmental Health Hazard Assessment
O_3	Ozone
ppm	parts per million
PM_{10}	Coarse particulate matter
$PM_{2.5}$	Fine particulate matter
PMI	Point of Maximum Impact
PM	Particulate Matter
Project	Terra Linda High School Capital Improvements Project
REL	Reference Exposure Level
ROG	Reactive organic gases
SB	Senate Bill
SFBAAB	San Francisco Bay Area Air Basin
SIP	State Implementation Plan
SOx	Sulfur oxides
SO_2	Sulfur dioxide
TACs	Toxic air contaminants
TCM	Transportation Control Measures
TDM	Transportation Demand Management
USEPA	U.S. Environment Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile organic compounds

1 INTRODUCTION

This report documents the results of an Air Quality and Greenhouse Gas (GHG) Emissions Assessment, including a construction health risk assessment (HRA), completed for the Terra Linda High School Capital Improvements Project (Project), which proposes various improvements at the existing Terra Linda High School campus to modernize and/or replace existing outdated and aging academic and physical education facilities and to improve access in compliance with the Americans with Disabilities Act (ADA). This assessment was prepared using methodologies and assumptions recommended in the rules and regulations of the Bay Area Air Quality Management District (BAAQMD) and the City of San Rafael. Regional and local existing conditions are presented, along with pertinent emissions standards and regulations. The purpose of this assessment is to estimate criteria air pollutants, health risk and GHG emissions attributable to the Project and to determine the level of impact the Project would have on the environment. Significance levels set forth by BAAQMD and the City of San Rafael are utilized to compare modeled Project emissions and determine significance.

1.1 Project Location and Description

The Project is located in the City of San Rafel (City) on the existing Terra Linda High School campus at 320 Nova Albion Way. The Project proposes improvements that are needed to modernize and/or replace existing academic and physical education facilities at the campus to serve the existing student population and to improve access in compliance with the ADA. Table 1-1 provides a detailed description of the proposed improvements and construction timing.

Table 1-1. Proposed Improvements
Phase 1: June 2024 – November 2025
Rehabilitation of Aquatics Center: The existing outdoor swimming pool facilities (including the 25-meter by 25-yard pool) would be demolished, and a new competition- level aquatics center (with a 25-meter by 40-yard pool) would be constructed to support the existing swimming and water polo programs. The facility would meet California Interscholastic Federation (CIF) standards, which would allow the school to host CIF-level competitions. The existing pool lights would be replaced with new low-level MUSCO lighting on 50-foot poles. The existing pool deck would be removed and replaced with a larger one. A new scoreboard and LED display would be installed at the perimeter of the pool. A new concrete 5- to 6-level bleacher with a cantilever shade structure would be installed on the south side of the aquatic facility; the bleachers would require the installation of a retaining wall. The existing ancillary gym building and pump room would be demolished and replaced with a new ancillary gym building and pool house. Additionally, a new pump house building would be constructed. New lockers as well as restroom facilities would be a part of the ancillary gym building to better serve the pool. **Modernization of Physical Education Support Spaces:** The existing locker rooms, bathrooms, team rooms, and other support spaces in the gym building would be modernized. The spaces, including the bathrooms and lockers, would be reconfigured to add a new team room and an all-gender locker room. There would be new lighting, painting, finishes, and fixtures. The exterior doors would be replaced, as would mechanical equipment. The roof would either be coated or replaced, and the existing natural gas lines servicing the building would be upsized and rerouted. Mechanical equipment serving these spaces may also be replaced.
Phase 2: April 2024 – August 2028
Modernization of Main Classroom Buildings: The interior of the main school buildings, including classrooms, labs, restrooms, and corridors, would be modernized to be more resilient to physical damage and compliance with ADA standards. The facilities would be improved with new LED lighting, flooring, counters, fixtures, painting and finishes, and technology. The restroom toilets would be improved to high-security, full-height partitions. The fire alarm system would be upgraded. Room configurations at select areas would be changed to better serve more modern functions; as an example, existing book storage rooms would be converted into a wellness center.
Phase 3: May 2027 – August 2029
Stadium Upgrades: A new concessions and restroom facility would be constructed between the stadium and gymnasium, as would a new ticket booth building. The existing scoreboard would be replaced, and the track surface would be replaced with an in-kind rubberized surface. ADA-compliant paths of travel would be provided, and two existing portable structures (each approximately 1,000 square feet) would be removed. Existing flatwork, fencing, grades, landscaping, and site lighting between the practice gym and the track would also be improved as part of the stadium upgrades. One fire hydrant would need to be relocated slightly. The existing concession stand, a 40-foot converted storage container, would be removed. **New Artificial** Turf at Baseball and Softball fields: Approximately 200,000 square feet of natural turf would be replaced with artificial turf. No "crumb rubber" materials would be present in the synthetic turf. The new fields may include other improvements, including dugouts, shot put throw station, irrigation line upgrades to adjacent landscaping, new scoreboards, and improved ADA-compliant paths of travel. No lighting is proposed for the ballfields as part of the Proposed Project. **Tennis Court Improvements:** The existing tennis courts would be replaced, walkways would be improved to meet ADA standards, and the drinking fountain would be replaced with a new ADA-compliant fountain. The existing fencing around the tennis courts would be replaced. No lighting is proposed for the tennis courts as part of the Proposed Project.

Implementation of the proposed Project would not require off-site improvements. The Project would be phased to limit interruptions to existing campus operations and to avoid the need for temporary student classroom facilities during construction. Additionally, construction activities would be scheduled to minimize disruptions to campus programs and important testing days. The new facilities would tie into existing underground utilities located within the campus. The Project would comply with the California Building Standards Code (Title 24, California Code of Regulations) and include sustainability improvements as required by the California Green Building Standards Code (California Code of Regulations Part 11, Title 24), such as water conservation features (e.g., low-flow, water-efficient plumbing fixtures for toilets and sinks, tankless water heater systems, drought-tolerant plants and low-water irrigation systems with smart sensor controls). Improvements to the aquatic center, tennis courts, turf fields, and ADA-compliant paths of travel may require the removal of existing trees.

The Proposed Project would not increase the student seating capacity of the campus. However, the proposed competitive-level aquatic center and the proposed artificial turf at the ballfields would allow extended use of the facilities by the high school and community. Expanded activity may include CIF tournaments at the aquatic center, early morning water polo and swim team practices, and expanded use of the ballfields.

2 AIR QUALITY

2.1 Environmental Setting

Air quality in a region is determined by its topography, meteorology, and existing air pollutant sources. These factors are discussed below, along with the current regulatory structure that applies to the San Francisco Bay Area Air Basin (SFBAAB), which encompasses the Project Site, pursuant to the regulatory authority of the BAAQMD.

Ambient air quality is commonly characterized by climate conditions, the meteorological influences on air quality, and the quantity and type of pollutants released. The air basin is subject to a combination of topographical and climatic factors that reduce the potential for high levels of regional and local air pollutants. The following section describes the pertinent characteristics of the air basin and provides an overview of the physical conditions affecting pollutant dispersion in the Project Area.

2.1.1 *San Francisco Bay Air Basin*

The California Air Resources Board (CARB) divides the state into air basins that share similar meteorological and topographical features. The Project Site is located in the City of San Rafael, located in Marin County, which is located in the SFBAAB. The SFBAAB is approximately 5,600 square miles in area and consists of nine counties that surround the San Francisco Bay, including all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties; the southwestern portion of Solano County; and the southern portion of Sonoma County.

The topography of the SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys and bays. This complex terrain, especially the higher elevations, distorts the normal wind flow patterns in the SFBAAB. The greatest distortions occur when low-level inversions are present and the air beneath the inversion flows independently of air above the inversion, a condition that is common in the summertime.

The air flowing in from the coast to the Central Valley, called the sea breeze, begins developing at or near ground level along the coast in late morning or early afternoon. As the day progresses, the sea breeze layer deepens and increases in velocity while spreading inland. The depth of the sea breeze depends in large part upon the height and strength of the inversion. If the inversion is low and strong, and hence stable, the flow of the sea breeze will be inhibited and stagnant conditions are likely to result.

Summertime temperatures in the SFBAAB are determined by the effect of differential heating between land and water surfaces. Because land tends to heat up and cool off more quickly than water, a large-scale gradient (differential) in temperature is often created between the coast and the Central Valley, and small-scale local gradients are often produced along the shorelines of the ocean and bays.

During the summer, winds flowing from the northwest are drawn inland through the Golden Gate and over the lower portions of the San Francisco Peninsula. Immediately south of Mount Tamalpais, the northwesterly winds accelerate considerably and come more directly from the west as they stream through the Golden Gate. This channeling of wind through the Golden Gate produces a jet that sweeps eastward and splits off to the northwest toward Richmond and to the southwest toward San Jose when it meets the East Bay hills. Wind speeds may be strong locally in areas where air is channeled through a narrow opening, such as the Carquinez Strait, the Golden Gate, or the San Bruno Gap.

An inversion is a layer of warmer air over a layer of cooler air. Inversions affect air quality conditions significantly because they influence the mixing depth, i.e., the vertical depth in the atmosphere available for diluting air contaminants near the ground. The highest air pollutant concentrations in the SFBAAB generally occur during inversions. The areas having the highest air pollution potential tend to be those that experience the highest temperatures in the summer and the lowest temperatures in the winter. The coastal areas are exposed to the prevailing marine air, creating cooler temperatures in the summer, warmer temperatures in winter, and stratus clouds all year. The inland valleys are sheltered from the marine air and experience hotter summers and colder winters. Thus, the topography of the inland valleys creates conditions conducive to high air pollution potential.

2.1.2 *Criteria Air Pollutants*

Criteria air pollutants are defined as those pollutants for which the federal and state governments have established air quality standards for outdoor or ambient concentrations to protect public health with a determined margin of safety. Ozone (O_3), coarse particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$) are generally considered to be regional pollutants because they or their precursors affect air quality on a regional scale. Pollutants such as carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) are considered to be local pollutants because they tend to accumulate in the air locally. PM is also considered a local pollutant. Health effects commonly associated with criteria pollutants are summarized in Table 2-1.

Table 2-1. Summary of Criteria Air Pollutants Sources and Effects

Pollutant	Major Manmade Sources	Huma Health and Welfare Effects
CO	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, effecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
NO_2	A reddish-brown gas formed during fuel combustion for motor vehicles, energy utilities and industrial sources.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Causes brown discoloration of the atmosphere.
O_3	Formed by a chemical reaction between reactive organic gases (ROGs) and nitrous oxides (N_2O) in the presence of sunlight. Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, solvents, paints and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield.
$PM_{2.5}$ & PM_{10}	Power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles and others.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).
SO_2	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, effecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.

Source: California Air Pollution Control Offices Association (CAPCOA 2013)

2.1.2.1 Carbon Monoxide

CO, in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. CO combines with hemoglobin in the bloodstream and reduces the amount of oxygen that can be circulated through the body. High CO concentrations can cause headaches, aggravate cardiovascular disease and impair central nervous system functions. CO concentrations can vary greatly over comparatively short distances. Relatively high concentrations of CO are typically found near crowded intersections and along heavy roadways with slow moving traffic. Even under the most sever meteorological and traffic conditions, high concentrations of CO are limited to locations within relatively short distances (i.e., up to 600 feet or 185 meters) of the source. Overall CO emissions are decreasing as a result of the Federal Motor Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973.

2.1.2.2 Nitrogen Oxides

Nitrogen gas comprises about 80 percent of the air and is naturally occurring. At high temperatures and under certain conditions, nitrogen can combine with oxygen to form several different gaseous compounds collectively called nitric oxides (NOx). Motor vehicle emissions are the main source of NOx in urban areas. NOx is very toxic to animals and humans because of its ability to form nitric acid with water in the eyes, lungs, mucus membrane, and skin. In animals, long-term exposure to NOx increases susceptibility to respiratory infections, and lowering resistance to such diseases as pneumonia and influenza. Laboratory studies show that susceptible humans, such as asthmatics, who are exposed to high concentrations can suffer from lung irritation or possible lung damage. Precursors of NOx, such as NO and NO_2, attribute to the formation of O_3 and $PM_{2.5}$. Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes and with hospital admissions for respiratory conditions.

2.1.2.3 Ozone

Ozone (O_3) is a secondary pollutant, meaning it is not directly emitted. It is formed when volatile organic compounds (VOCs) also known as reactive organic gases (ROG) and NOx undergo photochemical reactions that occur only in the presence of sunlight. The primary source of ROG emissions is unburned hydrocarbons in motor vehicle and other internal combustion engine exhaust. Sunlight and hot weather cause ground-level O_3 to form. Ground-level O_3 is the primary constituent of smog. Because O_3 formation occurs over extended periods of time, both O_3 and its precursors are transported by wind and high O_3 concentrations can occur in areas well away from sources of its constituent pollutants.

People with lung disease, children, older adults, and people who are active can be affected when O_3 levels exceed ambient air quality standards. Numerous scientific studies have linked ground-level O_3 exposure to a variety of problems including lung irritation, difficult breathing, permanent lung damage to those with repeated exposure, and respiratory illnesses.

2.1.2.4 Sulfur Dioxide

SO_2 is a colorless gas with a pungent odor, however sulfur dioxide can react with other particulates in the atmosphere to for particulates which contribute to the haze effect. SO_2 standards have been developed by the EPA to regulate all sulfur oxides, however SO_2 is by far the most abundant sulfur oxide in the atmosphere. Currently, SO_2 is primarily a result of the burning of fossil fuels for power generation and other industrial sources. Modern regulations on diesel fuel have greatly reduced the amount of SO_2 in the atmosphere and there are currently no areas in California that have levels of SO_2 that are not acceptable by state or federal standards.

2.1.2.5 Particulate Matter

Particulate matter includes both aerosols and solid particulates of a wide range of sizes and composition. Of concern are those particles smaller than or equal to 10 microns in diameter size (PM_{10}) and small than or equal to 2.5 microns in diameter ($PM_{2.5}$). Smaller particulates are of greater concern because they can penetrate deeper into the lungs than larger particles. PM_{10} is generally emitted directly as a result of mechanical processes that crush or grind larger particles or form the resuspension of dust, typically through construction activities and vehicular travel. PM_{10} generally settles out of the atmosphere rapidly and is not readily transported over large distances. $PM_{2.5}$ is directly emitted in combustion exhaust and is formed in atmospheric reactions between various gaseous pollutants, including NOx, sulfur oxides (SOx) and VOCs. $PM_{2.5}$ can remain suspended in the atmosphere for days and/or weeks and can be transported long distances.

The principal health effects of airborne PM are on the respiratory system. Short-term exposure of high $PM_{2.5}$ and PM_{10} levels are associated with premature mortality and increased hospital admissions and emergency room visits. Long-term exposure is associated with premature mortality and chronic respiratory disease. According to the U.S. Environmental Protection Agency (USEPA), some people are much more sensitive than others to breathing PM_{10} and $PM_{2.5}$. People with influenza, chronic respiratory and cardiovascular diseases, and the elderly may suffer worse illnesses; people with bronchitis can expect aggravated symptoms; and children may experience decline in lung function due to breathing in PM_{10} and $PM_{2.5}$. Other groups considered sensitive include smokers and people who cannot breathe well through their noses. Exercising athletes are also considered sensitive because many breathe through their mouths.

2.1.3 *Toxic Air Contaminants*

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

There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Additionally, diesel engines emit a complex mixture of air pollutants composed of gaseous and solid material. The solid emissions in diesel exhaust are known as diesel particulate matter (DPM). In 1998, California identified DPM as a TAC based on its potential to cause cancer, premature death, and other health problems (e.g., asthma attacks and other respiratory symptoms). Those most vulnerable are children (whose lungs are still developing) and the elderly (who may have other serious health problems). Overall, diesel engine emissions are responsible for the majority of California’s known cancer risk from outdoor air pollutants. Diesel engines also contribute to California’s $PM_{2.5}$ air quality problems. Public exposure to TACs can result from emissions from normal operations, as well as from accidental releases of hazardous materials during upset conditions. The health effects of TACs include cancer, birth defects, neurological damage, and death.

2.1.3.1 **Diesel Exhaust**

CARB has identified DPM as a TAC. DPM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Diesel exhaust is a complex mixture of particles and gases produced when an engine burns diesel fuel. DPM is a concern because it causes lung cancer; many compounds found in diesel exhaust are carcinogenic. DPM includes the particle-phase constituents in diesel exhaust. The chemical composition and particle sizes of DPM vary between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), fuel formulations (high/low sulfur fuel), and the year of the engine (USEPA 2002). Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and diesel exhaust can cause coughs, headaches, lightheadedness, and nausea. DPM poses the greatest health risk among the TACs; due to their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

2.1.4 *Ambient Air Quality*

Ambient air quality at the Project Site can be inferred from ambient air quality measurements conducted at nearby air quality monitoring stations. CARB maintains more than 60 monitoring stations throughout California. O_3, PM_{10} and $PM_{2.5}$ are the pollutant species most potently affecting the Project region. The San Rafael air quality monitoring station (534 4th Street in San Rafael), which is located approximately 2.6 miles southeast of the Project Site, monitors ambient concentrations of O_3, $PM_{2.5}$ and PM_{10}. Ambient emission concentrations will vary due to localized variations in emission sources and climate and should be considered "generally" representative of ambient concentrations in the Project Area.

Table 2-2 summarizes the published data concerning O_3, $PM_{2.5}$ and PM_{10} since 2020 for each year that the monitoring data is provided.

Table 2-2. Summary of Ambient Air Quality Data

Pollutant Scenario	2020	2021	2022
O_3			
Max 1-hour concentration (ppm)	0.086	0.082	0.074
Max 8-hour concentration (ppm) (state/federal)	0.064 / 0.064	0.066 / 0.066	0.066 / 0.066
Number of days above 1-hour standard (state/federal)	0 / 0	0 / 0	0 / 0
Number of days above 8-hour standard (state/federal)	0 / 0	0 / 0	0 / 0
PM_{10}			
Max 24-hour concentration (μg/m^3) (state/federal)	118.0 / 115.7	30.0 / 29.9	40.0 / 38.2
Number of days above 24-hour standard (state/federal)	6.1 / 0	0 / 0	0 / 0
$PM_{2.5}$			
Max 24-hour concentration (μg/m^3) (state/federal)	155.5 / 155.5	29.1 / 29.1	30.8 / 30.8
Number of days above federal 24-hour standard	9.0	0.0	0.0

Source: CARB 2023
Notes: * = Insufficient data available
μg/m^3 = micrograms per cubic meter; ppm = parts per million

The USEPA and CARB designate air basins or portions of air basins and counties as being in "attainment" or "nonattainment" for each of the criteria pollutants. Areas that do not meet the standards are classified as nonattainment areas. Acceptable exceedances of the maximum value vary for the National Ambient Air Quality Standards (NAAQS) from 4th highest concentration for the 8-hour O_3 standard to 99th percentile to the SO_2 standard. The NAAQS for O_3, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over one- to three-year periods, depending on the pollutant. The California Ambient Air Quality Standards (CAAQS) are not to be exceeded during a three-year period. The attainment status for the Marin County portion of the SFBAAB, which encompasses the Project Site, is included in Table 2-3.

Table 2-3. Attainment Status of Criteria Pollutants in the Marin County Portion of the SFBAAB

Pollutant	State Designation	Federal Designation
O_3	Nonattainment	Nonattainment
PM_{10}	Nonattainment	Unclassified
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment	Unclassified/Attainment
NO_2	Attainment	Unclassified/Attainment
SO_2	Attainment	Unclassified/Attainment

Source: CARB 2022a

The determination of whether an area meets the state and federal standards is based on air quality monitoring data. Some areas are unclassified, which means there is insufficient monitoring data for determining attainment or nonattainment. Unclassified areas are typically treated as being in attainment. Because the attainment/nonattainment designation is pollutant-specific, an area may be classified as nonattainment for one pollutant and attainment for another. Similarly, because the state and federal standards differ, an area could be classified as attainment for the federal standards of a pollutant and as nonattainment for the state standards of the same pollutant. The Marin County region is designated as a nonattainment area for the federal O_3 and $PM_{2.5}$ standards and is also a nonattainment area for the state standards for O_3, PM_{10}, and $PM_{2.5}$ (CARB 2022a).

2.1.5 *Sensitive Receptors*

Sensitive receptors are defined as facilities or land uses that include members of the population who are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis.

The Project is proposing renovations to the Terra Linda High School campus. As stated above, schools are classified as noise-sensitive land uses; thus, the Project Site itself is considered a noise-sensitive land use when school is in session. The nearest existing offsite sensitive land uses to the Project Site include residences to the north, south, and west, including some that operate as group homes for elderly, and a pre-school located just east of the school. In the greater vicinity of the campus, Kaiser Permanente San Rafael Medical Center is located approximately 1,980 feet to the north of the campus and sensitive multifamily housing is located approximately 1,690 feet to the northwest. The campus is also near parks and open space, including Hartzell Park, approximately 2,220 feet to the east, and Sorich Park, approximately 1,380 feet to the south.

2.2 Regulatory Framework

2.2.1 *Federal*

2.2.1.1 Clean Air Act

The Clean Air Act (CAA) of 1970 and the CAA Amendments of 1971 required the USEPA to establish the NAAQS, with states retaining the option to adopt more stringent standards or to include other specific pollutants.

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

The USEPA has classified air basins (or portions thereof) as being in attainment, nonattainment, or unclassified for each criteria air pollutant, based on whether or not the NAAQS have been achieved. If an area is designated unclassified, it is because inadequate air quality data were available as a basis for a nonattainment or attainment designation. Table 2-3 lists the federal attainment status of the Marin County portion of the SFBAAB for the criteria pollutants.

2.2.2 *State*

2.2.2.1 California Clean Air Act

The California Clean Air Act (CCAA) allows the state to adopt ambient air quality standards and other regulations provided that they are at least as stringent as federal standards. CARB, a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and state air pollution control programs within California, including setting the CAAQS. CARB also conducts research, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions. CARB also has primary responsibility for the development of California's State Implementation Plan (SIP), for which it works closely with the federal government and the local air districts.

2.2.2.2 California State Implementation Plan

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

State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to CARB for review and approval. CARB then forwards SIP revisions to the USEPA for approval and publication in the Federal Register. The SFBAAB currently has four air quality plans in place, discussed below, which collectively constitute the SFBAAB SIP elements.

- **2001 Ozone Attainment Plan**. The 2001 Ozone Attainment Plan was developed for compliance with the NAAQS for the 1-hour O_3 standard. In June 2005, the USEPA revoked the standard for 1-hour O_3; however, the state standard for 1-hour O_3 remains. Therefore, BAAQMD continues to implement the strategies outlined in the 2001 Ozone Attainment Plan.

- **2005 Bay Area Ozone Strategy**. The 2005 Bay Area Ozone Strategy served as an update to the 2001 Ozone Attainment Plan and expanded on strategies to achieve compliance with the state 1-hour O_3 standard.

- **2010 Clean Air Plan**. The 2010 Clean Air Plan addresses various pollutants including O_3, PM, and air toxics, as well as GHG emissions within the SFBAAB. It serves to update the Bay Area 2005 Ozone Strategy in accordance with the requirements of the CCAA to implement all feasible measures, to reduce O_3, and to consider the impacts of O_3 control measures on particulate matter, air toxics, and greenhouse gas emissions in a single, integrated plan and review progress in improving air quality in recent years.

- **2017 Clean Air Plan**. In April 2017, BAAQMD adopted the 2017 Clean Air Plan, whose primary goals are to protect public health and to protect the climate. The 2017 Clean Air Plan updates the Bay Area 2010 Clean Air Plan and complies with state air quality planning requirements, as codified in the California Health and Safety Code (although the 2017 plan was delayed beyond the three-year update requirement of the code). State law requires the Clean Air Plan to include all feasible measures to reduce emissions of O_3 precursors and to reduce the transport of O_3 precursors to neighboring air basins. The 2017 Clean Air Plan contains 85 measures to address reduction of several pollutants: O_3 precursors, PM, air toxics, and GHGs. Other measures focus on a single type of pollutant: super GHGs such as methane and black carbon that consists of harmful fine particles that affect public health. These control strategies are grouped into the following categories:

    a. Stationary Source Measures

    b. Transportation Control Measures

    c. Energy Control Measures

    d. Building Control Measures

    e. Agricultural Control Measures

    f. Natural and Working Lands Control Measures

    g. Waste Management Control Measures

h. Water Control Measures

i. Super GHG Control Measures

2.2.2.3 Tanner Air Toxics Act & Air Toxics "Hot Spot" Information and Assessment Act

CARB's Statewide comprehensive air toxics program was established in 1983 with Assembly Bill (AB) 1807, the Toxic Air Contaminant Identification and Control Act (Tanner Air Toxics Act of 1983). AB 1807 created California's program to reduce exposure to air toxics and sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an airborne toxics control measure (ATCM) for sources that emit designated TACs. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate toxics best available control technology to minimize emissions.

CARB also administers the state's mobile source emissions control program and oversees air quality programs established by state statute, such as AB 2588, the Air Toxics "Hot Spots" Information and Assessment Act of 1987. Under AB 2588, TAC emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High priority facilities are required to perform a health risk assessment (HRA) and, if specific thresholds are exceeded, required to communicate the results to the public in the form of notices and public meetings. In September 1992, the "Hot Spots" Act was amended by Senate Bill (SB) 1731, which required facilities that pose a significant health risk to the community to reduce their risk through a risk management plan.

2.2.3 *Local*

2.2.3.1 Bay Area Air Quality Management District

The BAAQMD is designated by law to adopt and enforce regulations to achieve and maintain ambient air quality standards. The BAAQMD responsibilities include preparing plans for the attainment of ambient air quality standards, adopting and enforcing air pollution rules, issuing permits for and inspecting stationary air pollution sources, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, and implementing state and federal programs and regulations. The BAAQMD has also adopted various rules and regulations that are designed to reduce and control pollutant emissions from project's construction and operational activities. The following provisions are applicable to the Proposed Project are summarized as follows:

- **Regulation 2, Rule 1, General Permit Requirements:** Includes criteria for issuance or denial of permits, exemptions, appeals against decisions of the Air Pollution Control Officer and BAAQMD actions on applications.

- **Regulation 2, Rule 2, New Source Review:** Applies to new or modified sources and contains requirements for Best Available Control Technology and emission offsets. Rule 2 implements federal New Source Review and Prevention of Significant Deterioration requirements.

- **Regulation 6, Rule 1, General Requirements:** Limits the quantity of particulate matter in the atmosphere by controlling emission rates, concentration, visible emissions and opacity.

- **Regulation 6, Rule 6, Prohibition of Trackout:** Controls trackout of solid material onto public paved roads from three types of sites: large bulk material sites, large construction sites, and large disturbed area sites. Under this regulation, the owners and operators of a construction site are required to clean up trackout on public roadways within four hours of identification and at the conclusion of each workday. The rule also includes requirements regarding the emission of fugitive dust during cleanup of trackout, and requirements for monitoring and reporting trackout at regulated sites

- **Regulation 7, Odorous Substances:** Regulation 7 places general limitations on odorous substances and specific emission limitations on certain odorous compounds. A person (or facility) must meet all limitations of this regulation but meeting such limitations shall not exempt such person from any other requirements of BAAQMD, state, or national law. The limitations of this regulation shall not be applicable until BAAQMD receives odor complaints from ten or more complainants within a 90-day period, alleging that a person has caused odors perceived at or beyond the property line of such person and deemed to be objectionable by the complainants in the normal course of their work, travel, or residence. When the limits of this regulation become effective, as a result of citizen complaints described above, the limits shall remain effective until such time as no citizen complaints have been received by BAAQMD for one year. The limits of this Regulation shall become applicable again if BAAQMD receives odor complaints from five or more complainants within a 90-day period. BAAQMD staff investigate and track all odor complaints it receives and make attempts to visit the site and identify the source of the objectionable odor and assist the owner or facility in finding a way to reduce the odor.

BAAQMD Best Management Practices

The BAAQMD recommends quantifying a proposed project's construction-generated emissions by implementing the Basic Best Management Practices (BMPs) for dust and exhaust construction impacts in California Environmental Quality Act (CEQA) compliance documentation. If additional construction measures are required to reduce construction-generated emissions, the Enhanced BMPs should then be applied. Table 2-4 identifies the Basic and Enhanced BMPs. In addition, all projects must implement any applicable air toxic control measures. For example, projects that have the potential to disturb asbestos (from soil or building materials) must comply with all the requirements of CARB's air toxic control measures for construction, grading, quarrying, and surface mining operations.

Table 2-4. BAAQMD Basic and Enhanced Construction Best Management Practices
BAAQMD Basic Construction Best Management Practices
All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
All visible mud or dirt track-out 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.
All vehicle speeds on unpaved roads shall be limited to 15 mph.
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.
All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
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.
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.
BAAQMD Enhanced Best Management Practices
Limit the simultaneous occurrence of excavation, grading, and ground-disturbing construction activities.
Install wind breaks (e.g., trees, fences) on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.
Plant vegetative ground cover (e.g., fast-germinating native grass seed) in disturbed areas as soon as possible and watered appropriately until vegetation is established.
Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.
Minimize the amount of excavated material or waste materials stored at the site.
Hydroseed or apply non-toxic soil stabilizers to construction areas, including previously graded areas, that are inactive for at least 10 calendar days.

2.3 Air Quality Emissions Impact Assessment

2.3.1 *Threshold of Significance*

The impact analysis provided below is based on the following California Environmental Quality Act (CEQA) Guidelines Appendix G thresholds of significance. The Project would result in a significant impact to air quality if it would do any of the following:

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

2) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

3) Expose sensitive receptors to substantial pollutant concentrations.

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

2.3.1.1 Bay Area Air Quality Management District

To assist local jurisdictions in the evaluation of air quality impacts under CEQA, the BAAQMD has published a guidance document for the preparation of the air quality portions of environmental documents that include thresholds of significance to be used in evaluating land use proposals. Thresholds of significance are based on a source's projected impacts and are a basis from which to apply mitigation measures. BAAQMD's CEQA thresholds have also been used to determine air quality impacts in this analysis. If a project's individual emissions exceed its identified significance thresholds, the Project would be cumulatively considerable. Projects that do not exceed significance thresholds would not be considered cumulatively considerable.

The BAAQMD's established thresholds of significance for air quality for construction and operational activities of land use development projects are shown in Table 2-5.

Table 2-5. BAAQMD Significance Thresholds

Construction Related		
Air Pollutant	**Average Daily Emissions (pounds per day)**	
ROG	54	
NO_x	54	
PM_{10} (exhaust)	82	
$PM_{2.5}$ (exhaust)	54	
PM_{10}/$PM_{2.5}$ (fugitive dust)	Best Management Practices	
Local CO	None	
Operational Related		
Air Pollutant	**Average Daily Emissions (pounds per day)**	**Maximum Annual Emissions (tons per year)**
ROG	54	10
NO_x	54	10
PM_{10} (exhaust)	82	15
$PM_{2.5}$ (exhaust)	54	10
PM_{10}/$PM_{2.5}$ (fugitive dust)	None	None
Local CO	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	

Source: BAAQMD 2023

By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size, by itself, to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's individual emissions exceed its identified significance thresholds, the project would be cumulatively considerable. Projects that do not exceed significance thresholds would not be considered cumulatively considerable.

In addition to the emission of criteria air pollutants, this Projects evaluates the health risk from construction and operations of the Proposed Project. Specifically, the potential exposure of nearby existing residents to DPM emissions from off-road equipment during construction and DPM emissions from heavy-duty trucks during operations.

The BAAQMD thresholds for what constitute an exposure of substantial air toxics are as follows.

- Cancer Risk: Emit carcinogenic or toxic contaminants that exceed the maximum individual cancer risk of 10 in one million.
- Non-Cancer Risk: Emit toxic contaminants that exceed the maximum hazard quotient of 1 in one million.

Cancer risk is expressed in terms of expected incremental incidence per million population. The BAAQMD has established an incidence rate of 10 persons per million as the maximum acceptable incremental cancer risk due to TAC exposure. This threshold serves to determine whether or not a given project has a potentially significant development-specific and cumulative impact. The 10-in-one-million standard is a very health-protective significance threshold. A risk level of 10 in one million implies a likelihood that up to 10 persons out of one million equally exposed people would contract cancer if exposed continuously (24 hours per day) to the levels of TACs over a specified duration of time. This risk would be an excess cancer that is in addition to any cancer risk borne by a person not exposed to these air toxics. To put this risk in perspective, the risk of dying from accidental drowning is 1,000 in a million, which is 100 times more than the BAAQMD's threshold of 10 in one million.

The BAAQMD has also established non-carcinogenic risk parameters for use in HRAs. Noncarcinogenic risks are quantified by calculating a "hazard index," expressed as the ratio between the ambient pollutant concentration and its toxicity or Reference Exposure Level (REL). An REL is a concentration at, or below which health effects are not likely to occur. A hazard index less of than one (1.0) means that adverse health effects are not expected. Within this analysis, non-carcinogenic exposures of less than 1.0 are considered less than significant.

2.3.2 *Methodology*

Air quality impacts were assessed in accordance with methodologies recommended by the BAAQMD. Where criteria air pollutant quantification was required, emissions were modeled using the California Emissions Estimator Model (CalEEMod), version 2022.1. CalEEMod is a statewide land use emissions computer model designed to quantify potential criteria pollutant emissions associated with both construction and operations from a variety of land use projects. Project construction-generated air pollutant emissions were calculated using a combination of CalEEMod model defaults for Marin County and information provided by the Project proponent such as Project construction equipment, average hours of equipment use daily, and duration of construction activities. Operational air pollutant emissions were calculated based on the site dimensions and building square footage identified in Project Site plans and the average vehicle miles traveled (VMT) identified in the VMT Analysis prepared for the Project (Michael Baker International 2023).

Additionally, DPM concentrations and associated dispersion generated from both construction off-road equipment and construction haul trucks during construction were modeled using the HARP2 modeling program provided by CARB, with regulatory default settings, to perform the dispersion and health risk modeling for this analysis. HARP2 implements the latest regulatory guidance to develop inputs to the USEPA AERMOD dispersion model for dispersion and as the inputs for calculations for the various health risk levels. AERMOD is a steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. The resultant concentration values at vicinity sensitive receptors were then used to calculate chronic and carcinogenic health risk using the standardized equations contained in the Office of Environment Health Hazard Assessment (OEHHA) Guidance Manual for Preparation of Health Risk Assessments (2015).

2.3.3 *Impact Analysis*

2.3.3.1 Project Construction-Generated Criteria Air Quality Emissions

Emissions associated with Project construction would be temporary and short-term but have the potential to represent a significant air quality impact. Three basic sources of short-term emissions will be generated through construction of the Proposed Project: operation of the construction vehicles (i.e., tractors, forklifts, pavers), the creation of fugitive dust during clearing and grading, and the use of asphalt or other oil-based substances during paving and coating activities. Construction activities such as excavation and grading operations, construction vehicle traffic, and wind blowing over exposed soils would generate exhaust emissions and fugitive PM emissions that affect local air quality at various times during construction. Effects would be variable depending on the weather, soil conditions, the amount of activity taking place, and the nature of dust control efforts. The dry climate of the area during the summer months creates a high potential for dust generation.

Construction-generated emissions associated with the Proposed Project were calculated using the CARB-approved CalEEMod computer program, which is designed to model emissions for land use development projects, based on typical construction requirements. See Attachment A for more information regarding the construction assumptions, including construction equipment and duration, used in this analysis.

Predicted maximum daily construction-generated emissions for the Proposed Project are summarized in Table 2-6. Construction-generated emissions are short-term and of temporary duration, lasting only if construction activities occur, but would be considered a significant air quality impact if the volume of pollutants generated exceeds the BAAQMD's thresholds of significance.

Table 2-6. Construction-Related Criteria Air Pollutant Emissions

Construction Year and Activity	Pollutant (average pounds per day)					
	ROG	NO_X	PM_{10} (exhaust)	$PM_{2.5}$ (exhaust)	PM_{10} (fugitive dust)	$PM_{2.5}$ (fugitive dust)
Calendar Year 2024 Construction						
Phase 1 Demolition, Site Preparation, Building Construction & Phase 2 Building Construction	2.38	7.19	0.22	0.20	4.82	1.22
Phase 2 Demolition & Building Construction	2.19	5.30	0.14	0.13	4.79	1.21
Calendar Year 2025 Construction						
Phase 1 Site Preparation, Building Construction, & Paving	2.15	5.48	0.15	0.15	4.78	1.21
Phase 1 Building Construction, Paving, & Painting	2.96	5.68	0.13	0.14	4.78	1.21
Calendar Year 2026 Construction						
Phase 2 Demolition and Building Construction	1.86	4.20	0.09	0.08	4.78	1.21
Calendar Year 2027 Construction						
Phase 2 Demolition, Building Construction & Phase 3 Demolition, Site Preparation	2.32	6.74	0.19	0.19	6.60	2.15
Phase 3 Site Preparation & Grading	2.23	6.09	0.18	0.18	6.59	2.14
Phase 3 Grading, Building Construction, and Paving	2.12	5.02	0.13	0.12	4.79	1.22
Calendar Year 2028 Construction						
Phase 3 Paving	1.86	2.66	0.05	0.05	4.78	1.21
Phase 2 Demolition, Building Construction & Phase 3 Demolition, Site Preparation, Grading, Building Construction, Paving	2.43	7.83	1.59	0.87	6.30	1.97
Calendar Year 2029 Construction						
Phase 3 Demolition, Site Preparation, Grading, Building Construction	2.20	5.72	0.16	0.15	6.29	1.97
BAAQMD Potentially Significant Impact Threshold	*54 pounds/ day*	*54 pounds/ day*	*82 pounds/ day*	*54 pounds/ day*	*Basic Construction Best Management Practices*	*Basic Construction Best Management Practices*
Exceed BAAQMD Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Source: CalEEMod version 2022.1. Refer to Attachment A for Model Data Outputs.

Notes: Emission calculations account for the demolition and hauling of 1,124 tons of material during Phase 1, 248 tons of material during Phase 2, and 25 tons of material during Phase 3. Additionally, emission calculations account for 7,407 cubic yards of soil material export as well as 7,407 cubic yards of soil import during Phase 3. Football, water polo and swimming programs would be temporarily displaced during construction. Therefore, emission calculations for each phase account for 340 additional automobile trips cumulatively traveling 6,800 miles daily.

Specific Project construction equipment, average hours of operation daily, and construction duration provided by the Project proponent.

As shown in Table 2-6, emissions generated during Project construction would not exceed the BAAQMD's numeric thresholds of significance during construction. It is noted that the BAAQMD thresholds for fugitive dust emissions are not numeric, but instead rely on the implementation of BAAQMD BMPs (see Table 2-4 above) to be considered less than significant. Thus, the Proposed Project would need to incorporate BAAQMD Basic BMPs in order to be considered less than significant.

AQ-1: Adhere to Bay Area Air Quality Management District Basic Construction Best Management Practices

The Project shall implement the following Bay Area Air Quality Management Construction Best Management Practices:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out 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.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- 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.
- All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
- 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.
- 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.

Timing/Implementation: *During Construction*

Monitoring/Enforcement: *The San Rafael City Schools District*

With implementation of mitigation measure AQ-1, criteria pollutant emissions generated during Project construction would not result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard.

2.3.3.2 Project Operations Criteria Air Quality Emissions

Implementation of the Project would result in long-term operational emissions of criteria air pollutants such as PM_{10}, $PM_{2.5}$, CO, and SO_2 as well as O_3 precursors such as ROG and NO_X. Predicted maximum daily operational-generated emissions of criteria air pollutants for the Proposed Project are summarized in Table 2-7.

Table 2-7. Operational Criteria Air Pollutant Emissions

Emission Source	Pollutant						
	ROG	**NO_X**	**CO**	**PM_{10} (exhaust)**	**$PM_{2.5}$ (exhaust)**	**PM_{10} (fugitive dust)**	**$PM_{2.5}$ (fugitive dust)**
Average Daily Emissions (Pounds per Day)							
Area	6.04	0.04	4.63	0.01	0.01	0.00	0.00
Energy	0.14	2.46	2.07	0.19	0.19	0.00	0.00
Mobile	0.29	0.23	2.32	<0.00	<0.00	0.65	0.17
Total	**6.47**	**2.73**	**9.02**	**0.20**	**0.20**	**0.65**	**0.17**
BAAQMD Daily Significance Threshold	*54 pounds/day*	*54 pounds/day*	*9.0 ppm (8-hour average), 20.0 ppm (1-hour average)*	*82 pounds/day*	*54 pounds/day*	*None*	*None*
Exceed BAAQMD Daily Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Total Annual Emissions (Tons per Year)							
Area	1.10	0.01	0.85	<0.00	<0.00	0.00	0.00
Energy	0.02	0.45	0.38	0.03	0.03	0.00	0.00
Mobile	0.05	0.04	0.42	<0.00	<0.00	0.12	0.03
Total	**1.18**	**0.50**	**1.65**	**0.04**	**0.04**	**0.12**	**0.03**
BAAQMD Annual Significance Threshold	*10 tons/ year*	*10 tons/year*	*None*	*15 tons/year*	*10 tons/year*	*None*	*None*
Exceed BAAQMD Daily Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Source: CalEEMod version 2022.1. Refer to Attachment A for Model Data Outputs.

Notes: Emission projections predominately based on CalEEMod model defaults for Marin County, site acreage and building dimensions provided by the Project Site Plans, and average daily vehicle trips provided by Michael Baker International (2023). Specifically, KOA estimates the Project generation of an average 92 new passenger vehicles under Project conditions.

As shown in Table 2-7, the increase in operational criteria air pollutant emissions over the existing baseline would not surpass BAAQMD significance thresholds.

2.3.3.3 Project Consistency with Air Quality Planning

As part of its enforcement responsibilities, the USEPA requires each state with nonattainment areas to prepare and submit a SIP that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs. Similarly, under state law, the CCAA requires an air quality attainment plan to be prepared for areas designated as nonattainment with regard to the federal and state ambient air quality standards. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date.

As previously described, the BAAQMD is the agency responsible for enforcing many federal and state air quality requirements and for establishing air quality rules and regulations. The BAAQMD attains and maintains air quality conditions in Marin County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The most recently adopted air quality plan is the BAAQMD's 2017 Clean Air Plan, the primary goals of which are to protect public health and the climate. The 2017 Clean Air Plan includes a wide range of control measures and actions to reduce combustion-related activities, decrease combustion of fossil fuels, improve energy efficiency, and reduce emissions of potent greenhouse gases. Several measures address the reduction of multiple pollutants such as O_3 precursors, PM, air toxics, and GHG emissions.

Determination of whether a project supports the goals in the 2017 Clean Air Plan is achieved by a comparison of Project-estimated emissions with BAAQMD thresholds of significance. If project emissions would not exceed the thresholds of significance after the application of all feasible mitigation measures, the project is consistent with the goals of the 2017 Clean Air Plan. As shown in Table 2-6 and Table 2-9, emissions generated during Project construction and operations would not exceed the BAAQMD's significance thresholds. Therefore, the Project would not conflict with or obstruct reduction measures presented in the 2017 Clean Air Plan.

2.3.3.4 Exposure of Sensitive Receptors to Toxic Air Contaminants

As previously described, sensitive receptors are defined as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over age 65, children under age 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis. The nearest existing sensitive land uses to the Project Site include residences to the north, south, and west, including some that operate as group homes for elderly, and a pre-school located just east of the school. In the greater vicinity of the campus, Kaiser Permanente San Rafael Medical Center is located approximately 1,980 feet to the north of the campus and sensitive multifamily housing is located approximately 1,690 feet to the northwest. The campus is also near parks and open space, including Hartzell Park, approximately 2,220 feet to the east, and Sorich Park, approximately 1,380 feet to the south. Additionally, the Project Site, the existing Terra Linda

High School Campus, is considered a sensitive receptor as students would be present for some construction activities.

Health Risk Assessment

A HRA was performed to determine the health risk associated with construction of the Proposed Project. The HRA analyzed cancer and chronic non-cancer risk calculated for 6-years for construction emissions for residents and workers as well as 2-years for students. The students were calculated as only having a 2-year exposure scenario as most of the proposed construction would take place during the summer months when students are not present on the Project Site. In addition, the maximum annual $PM_{2.5}$ concentration was modeled for comparison with BAAQMD thresholds.

Construction Toxic Air Contaminant Emission Sources

All onsite and offsite diesel truck traffic related emissions were generated using EMFAC2021 for construction beginning in the year 2024 and conservatively utilized throughout the proposed period of construction. Construction off-road equipment for onsite activities was modeled as four area sources placed representative to Project construction. Construction on-road equipment for onsite activities were modeled as line-volume sources traversing the parking lot and proposed paths of travel leading to the construction areas on the Project Site. Construction on-road equipment for offsite activities was modeled as 160 volume sources traversing arranged as line-volume sources for northern and southern entry/exist routes. Annual off-road PM_{10} exhaust emissions generated using the CalEEMod model were used to represent emissions from onsite off-road diesel equipment used throughout construction. The annual emissions for all aspects of construction were used to conservatively estimate annual construction emissions for the estimated Project construction duration of four years. $PM_{2.5}$ emissions were modeled as total onsite and offsite $PM_{2.5}$ emissions during the highest emission year as calculated by EMFAC2021. Detailed calculations for construction emissions can be found in Attachment A and B of this document.

Dispersion Modeling

The air dispersion modeling for the HRA was performed using the USEPA AERMOD Version 21112 dispersion model. AERMOD is a steady-state, multiple-source, Gaussian dispersion model designed for use with emission sources situated in terrain where ground elevations can exceed the stack heights of the emission sources. The appropriate .dem file found at CARB's website for HARP Digital Elevation Model Files was used for elevation data for all sources and receptors in the Project domain. All regulatory defaults were used for dispersion modeling as configured in the latest version of HARP2.

AERMOD requires hourly meteorological data consisting of wind vector, wind speed, temperature, stability class, and mixing height. Pre-processed meteorological data files provided by BAAQMD using USEPA's AERMET program, designed to create AERMOD input files for the Santa Rosa monitoring station, were selected as being the most representative meteorology based on proximity. The unit emission rate of one gram per second was utilized in AERMOD to create plot files containing the dispersion factor (X/Q) for each source group. Emissions for each source group as described above were input into HARP2 to calculate the ground level concentrations (GLCs) related to Project construction. AERMOD summary files, calculations and figures can be found in Attachment B.

A uniform grid was placed over the Project Area with a spacing of 50 meters by 50 meters including 450 receptors. The grid was placed to encompass all surrounding sensitive receptors.

Risk during construction is modeled utilizing worker factors and residential factors to find the Maximumly Exposed Individual Resident (MEIR), Maximumly Exposed Individual Worker (MEIW) and maximumly exposed school child. The chronic and carcinogenic health risk calculations are based on the standardized equations contained in the OEHHA Guidance Manual (2015) as implemented in CARB's HARP2 program (CARB 2020).

Based on the OEHHA methodology, the residential inhalation cancer risk from the annual average TAC concentrations is calculated by multiplying the daily inhalation or oral dose, by a cancer potency factor, the age sensitivity factor (ASF), the frequency of time spent at home, and the exposure duration divided by averaging time, to yield the excess cancer risk. These factors are discussed in more detail below. Cancer risk must be separately calculated for specified age groups, because of age differences in sensitivity to carcinogens and age differences in intake rates (per kg body weight). Separate risk estimates for these age groups provide a health-protective estimate of cancer risk by accounting for greater susceptibility in early life, including both age-related sensitivity and amount of exposure.

Exposure through inhalation (Dose-air) is a function the breathing rate, the exposure frequency, and the concentration of a substance in the air. For residential exposure, the breathing rates are determined for specific age groups, so Dose-air is calculated for each of these age groups, 3rd trimester, 0<2, 2<9, 2<16, 16<30 and 16-70 years. To estimate cancer risk, the dose was estimated by applying the following formula to each ground-level concentration:

$$\textbf{Dose-air} = (C_{air} * \{BR/BW\} * A * EF * 10^{-6})$$

Where:

Dose-air = dose through inhalation (mg/kg/day)

C_{air} = air concentration (μg/m^3) from air dispersion model

{BR/BW} = daily breathing rate normalized to body weight (L/kg body weight – day) (361 L\kg BW-day for 3rd Trimester, 1,090 L/kg BW-day for 0<2 years, 861 L/kg BW-day for 2<9 years, 745 L/kg BW-day for 2<16 years, 335 L/kg BW-day for 16<30 years, and 290 L/kg BW-day 16<70 years)

A = Inhalation absorption factor (unitless [1])

EF = exposure frequency (unitless), days/365 days (0.96 [approximately 350 days per year])

10^{-6} = conversion factor (micrograms to milligrams, liters to cubic meters)

OEHHA developed ASFs to take into account the increased sensitivity to carcinogens during early-in-life exposure. In the absence of chemical-specific data, OEHHA recommends a default ASF of 10 for the third trimester to age 2 years, an ASF of 3 for ages 2 through 15 years to account for potential increased sensitivity to carcinogens during childhood and an ASF of 1 for ages 16 through 70 years.

Fraction of time at home (FAH) during the day is used to adjust exposure duration and cancer risk from a specific facility's emissions, based on the assumption that exposure to the facility's emissions are not occurring away from home. OEHHA recommends the following FAH values: from the third trimester to age <2 years, 85 percent of time is spent at home; from age 2 through <16 years, 72 percent of time is spent at home; from age 16 years and greater, 73 percent of time is spent at home.

To estimate the cancer risk, the dose is multiplied by the cancer potency factor, the ASF, the exposure duration divided by averaging time, and the frequency of time spent at home (for residents only):

$$\mathbf{Risk_{inh\text{-}res} = (Dose_{air} * CPH * ASF * ED/AT * FAH)}$$

Where:

$Risk_{inh\text{-}res}$	=	residential inhalation cancer risk (potential chances per million)
$Dose_{air}$	=	daily dose through inhalation (mg/kg-day)
CPF	=	inhalation cancer potency factor ($mg/kg\text{-}day^{-1}$)
ASF	=	age sensitivity factor for a specified age group (unitless)
ED	=	exposure duration (in years) for a specified age group (0.25 years for 3rd trimester, 2 years for 0<2, 7 years for 2<9, 14 years for 2<16, 14 years for 16<30, 54 years for 16-70)
AT	=	averaging time of lifetime cancer risk (years)
FAH	=	fraction of time spent at home (unitless)

Non-cancer chronic impacts are calculated by dividing the annual average concentration by the Reference Exposure Level (REL) for that substance. The REL is defined as the concentration at which no adverse non-cancer health effects are anticipated. The following equation was used to determine the non-cancer risk:

Hazard Quotient = Ci/RELi

Where:

Ci	=	Concentration in the air of substance i (annual average concentration in µg/m^3)
RELi	=	Chronic noncancer Reference Exposure Level for substance i (µg/m^3)

Cancer Risk

Construction cancer risk calculations for existing residential receptors are based on a 6-year exposure period used for construction. The calculated cancer risk accounts for 350 days per year of exposure to residential receptors. While the average American spends 87 percent of their life indoors (USEPA 2001), neither the pollutant dispersion modeling nor the health risk calculations account for the reduced exposure structures provide. Instead, health risk calculations account for the equivalent exposure of continual outdoor living. The calculated carcinogenic risk at Project vicinity receptors is depicted in Table 2-8.

Table 2-8. Maximum Cancer Risk Summary

Maximum Exposure Scenario	Total Maximum Risk
Project Construction	
6 Years Exposure Resident	6.45
6 Years Exposure Worker	4.81
2 Year Exposure Student	0.09
Significance Threshold	*10*
Exceed Threshold?	**No**

Source: ECORP Consulting 2022. See Attachment B.

As shown, impacts related to cancer risk for all modeled scenarios would be below the 10 in one million threshold. These calculations do not account for any pollutant-reducing remedial components inherent to the Project or the Project Site.

The MEIR for construction emissions are residences located directly to the north of the Project Site fronting Esmeyer Drive. The MEIW for construction emissions is located on the Project Site accounting for faculty that would be present during the summer months of construction. The maximum exposure for the students on the Project Site would occur adjacent to the main school building. The offsite Point of Maximum Impact (PMI) is located at the northeastern Project boundary line. All of the above listed points are presented in Appendix B of this document.

Non-Carcinogenic Hazards

In addition to cancer risk, the significance thresholds for TAC exposure require an evaluation of non-cancer risk stated in terms of a hazard index. Non-cancer chronic impacts are calculated by dividing the annual average concentration by the REL for that substance. The REL is defined as the concentration at which no adverse non-cancer health effects are anticipated. The potential for acute non-cancer hazards is evaluated by comparing the maximum short-term exposure level to an acute REL. RELs are designed to protect sensitive individuals within the population. The calculation of acute non-cancer impacts is similar to the procedure for chronic non-cancer impacts.

An acute or chronic hazard index of 1.0 is considered individually significant. The hazard index is calculated by dividing the acute or chronic exposure by the REL. The highest maximum chronic hazard indexes for residents and workers around the Proposed Project Site as a result of DPM exposure is shown in Table 2-9. No acute risk was analyzed for construction as DPM has no identified acute risk.

Table 2-9. Maximum Non-Carcinogenic Health Risk Summary

Exposure Scenario	Chronic Hazard Values			
	Maximum Residential Hazard	**Maximum Worker Hazard**	**Maximum Student Hazard**	**Maximum $PM_{2.5}$ Annual Concentration ($\mu g/m^3$)**
Construction	0.0039	0.0027	0.0027	0.16
Significance Threshold	*1*	*1*	*1*	*0.3*
Exceed Threshold?	**No**	**No**	**No**	**No**

Source: ECORP Consulting 2022. See Attachment B.

As shown in Table 2-9, impacts related to non-cancer risk (chronic hazard index) as a result of the Project would not surpass significance thresholds.

2.3.3.5 Carbon Monoxide Hot Spots

It has long been recognized that CO exceedances are caused by vehicular emissions, primarily when idling at intersections. Concentrations of CO are a direct function of the number of vehicles, length of delay, and traffic flow conditions. Under certain meteorological conditions, CO concentrations close to congested intersections that experience high levels of traffic and elevated background concentrations may reach unhealthy levels, affecting nearby sensitive receptors. Given the high traffic volume potential, areas of high CO concentrations, or “hot spots,” are typically associated with intersections that are projected to operate at unacceptable levels of service during the peak commute hours. It has long been recognized that CO hotspots are caused by vehicular emissions, primarily when idling at congested intersections. However, transport of this criteria pollutant is extremely limited, and CO disperses rapidly with distance from the source under normal meteorological conditions. Furthermore, vehicle emissions standards have become increasingly more stringent in the last 20 years. Currently, the allowable CO emissions standard in California is a maximum of 3.4 grams/mile for passenger cars (there are requirements for certain vehicles that are more stringent). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of increasingly sophisticated and efficient emissions control technologies, CO concentration in the SFBAAB is designated as in attainment. Detailed modeling of Project-specific CO “hot spots” is not necessary and thus this potential impact is addressed qualitatively.

A CO “hot spot” would occur if an exceedance of the state one-hour standard of 20 parts per million (ppm) or the eight-hour standard of 9 ppm were to occur. The BAAQMD concludes that under existing and future vehicle emission rates, a given project would have to increase traffic volumes at a single intersection by more than 44,000 vehicles per hour or 24,000 vehicles per hour where vertical and/or horizontal air does not mix—in order to generate a significant CO impact.

The Project would result in approximately 92 new automobile trips per day. Thus, the Proposed Project would not generate traffic volumes at any intersection of more than 44,000 vehicles per day and there is no likelihood of the Project traffic exceeding CO values.

2.3.3.6 **Odors**

Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

During construction, the Proposed Project presents the potential for generation of objectionable odors in the form of diesel exhaust in the immediate vicinity of the site. However, these emissions are short-term in nature and will rapidly dissipate and be diluted by the atmosphere downwind of the emission sources. Additionally, odors would be localized and generally confined to the construction area. Therefore, construction odors would not adversely affect a substantial number of people to odor emissions.

Land uses commonly considered to be potential sources of obnoxious odorous emissions include agriculture (farming and livestock), wastewater treatment plants, food processing plants, chemical plants, composting facilities, refineries, landfills, dairies, and fiberglass molding. The Proposed Project does not include any uses as being associated with odors.

3 GREENHOUSE GAS EMISSIONS

3.1 Greenhouse Gas Setting

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. Because the earth has a much lower temperature than the sun, it emits lower-frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead trapped, resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth. Without the greenhouse effect, the earth would not be able to support life as we know it.

Prominent GHGs contributing to the greenhouse effect are CO_2, methane (CH_4), and N_2O. Fluorinated gases also make up a small fraction of the GHGs that contribute to climate change. Fluorinated gases include chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride; however, it is noted that these gases are not associated with typical land use development. Human-caused emissions of these GHGs in excess of natural ambient concentrations are believed to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. More specifically, experts agree that human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850–1900 in 2011–2020. (Intergovernmental Panel on Climate Change [IPCC] 2023).

Table 3-1 describes the primary GHGs attributed to global climate change, including their physical properties, primary sources, and contributions to the greenhouse effect.

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. CH_4 traps over 25 times more heat per molecule than CO_2, and N_2O absorbs 298 times more heat per molecule than CO_2. Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO_2e), which weight each gas by its global warming potential. Expressing GHG emissions in CO_2e takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and TACs, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, or other forms. Despite the sequestration of CO_2, human-caused climate change is already causing damaging effects, including weather and climate extremes in every region across the globe (IPCC 2023).

Table 3-1. Summary of Greenhouse Gases	
Greenhouse Gas	**Description**
CO_2	Carbon dioxide is a colorless, odorless gas. CO_2 is emitted in a number of ways, both naturally and through human activities. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to CO_2 emissions. The atmospheric lifetime of CO_2 is variable because it is so readily exchanged in the atmosphere.[1]
CH_4	Methane is a colorless, odorless gas and is the major component of natural gas, about 87 percent by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (intestinal fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of CH_4 to the atmosphere. Natural sources of CH4 include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. The atmospheric lifetime of CH_4 is about 12 years.[2]
N_2O	Nitrous oxide is a clear, colorless gas with a slightly sweet odor. Nitrous oxide is produced by both natural and human-related sources. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. N_2O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N_2O is approximately 120 years.[3]

Sources: [1]U.S. Environmental Protection Agency (USEPA) 2023a, [2]USEPA 2023b, [3]USEPA2023c

The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; it is sufficient to say the quantity is enormous, and no single project alone would measurably contribute to a noticeable incremental change in the global average temperature or to global, local, or microclimates. From the standpoint of CEQA, GHG impacts to global climate change are inherently cumulative.

3.1.1 *Sources of Greenhouse Gas Emissions*

In 2022, CARB released the 2022 edition of the California GHG inventory covering calendar year 2020 emissions. In 2020, California emitted 369.2 million gross metric tons of CO_2e including from imported electricity. Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2020, accounting for approximately 38 percent of total GHG emissions in the state. Continuing the downward trend from previous years, transportation emissions decreased 27 million metric tons of CO_2e in 2020, though the intensity of this decrease was most likely from light duty vehicles after shelter-in-place orders were enacted in response to the COVID-19 pandemic. Emissions from the electricity sector account for 16 percent of the inventory and have remained at a similar level as in 2019 despite a 44 percent decrease in in-state hydropower generation (due to below average precipitation levels), which was more than compensated for by a 10 percent growth in in-state solar generation and cleaner imported electricity incentivized by California's clean energy policies. California's industrial sector accounts for the second largest source of the state's GHG emissions in 2020, accounting for 23 percent (CARB 2022b).

3.2 Regulatory Framework

3.2.1 *State*

3.2.1.1 Executive Order S-3-05

Executive Order (EO) S-3-05, signed by Governor Arnold Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the EO established total GHG emission targets for the state. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

3.2.1.2 Assembly Bill 32 Climate Change Scoping Plan and Updates

In 2006, the California legislature passed Assembly Bill (AB) 32 (Health and Safety Code § 38500 et seq., or AB 32), also known as the Global Warming Solutions Act. AB 32 required CARB to design and implement feasible and cost-effective emission limits, regulations, and other measures, such that statewide GHG emissions are reduced to 1990 levels by 2020 (representing a 25 percent reduction in emissions). Pursuant to AB 32, CARB adopted a Scoping Plan in December 2008, which outlined measures to meet the 2020 GHG reduction goals. California exceeded the target of reducing GHG emissions to 1990 levels by the year 2017.

The Scoping Plan is required by AB 32 to be updated at least every five years. The latest update, the 2022 Scoping Plan Update, outlines strategies and actions to reduce greenhouse gas emissions in California. The plan focuses on achieving the state's goal of reaching carbon neutrality by 2045 and reducing greenhouse gas emissions to 40 percent below 1990 levels by 2030. The plan includes a range of strategies across various sectors, including transportation, industry, energy, and agriculture. Some of the key strategies include transitioning to zero-emission vehicles, expanding renewable energy sources, promoting sustainable land use practices, implementing a low-carbon fuel standard, and reducing emissions from buildings. Additionally, the plan addresses equity and environmental justice by prioritizing investments in communities most impacted by pollution and climate change. The plan also aims to promote economic growth and job creation through the transition to a low-carbon economy.

3.2.1.3 Senate Bill 32 and Assembly Bill 197 of 2016

In August 2016, Governor Brown signed SB 32 and AB 197, which serve to extend California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include § 38566, which contains language to authorize CARB to achieve a statewide GHG emission reduction of at least 40 percent below 1990 levels by no later than December 31, 2030.

3.2.1.4 Senate Bill X1-2 of 2011, Senate Bill 350 of 2015, and Senate Bill 100 of 2018

In 2018, SB 100 was signed codifying a goal of 60 percent renewable procurement by 2030 and 100 percent by 2045 Renewables Portfolio Standard.

3.2.1.5 2022 Building Energy Efficiency Standards for Residential and Nonresidential Buildings

The Building and Efficiency Standards (Energy Standards) were first adopted and put into effect in 1978 and have been updated periodically in the intervening years. These standards are a unique California asset that have placed the State on the forefront of energy efficiency, sustainability, energy independence and climate change issues. The 2022 California Building Codes include provisions related to energy efficiency to reduce energy consumption and greenhouse gas emissions from buildings. Some of the key energy efficiency components of the codes are:

1. Energy Performance Requirements: The codes specify minimum energy performance standards for the building envelope, lighting, heating and cooling systems, and other components.
2. Lighting Efficiency: The codes require that lighting systems meet minimum efficiency standards, such as the use of energy-efficient light bulbs and fixtures.
3. Heating, Ventilation, and Air Conditioning (HVAC) Systems: The codes establish requirements for HVAC systems, including the use of high-efficiency equipment, duct sealing, and controls.
4. Building Envelope: The codes include provisions for insulation, air sealing, glazing, and other building envelope components to reduce energy loss and improve indoor comfort.
5. Renewable Energy: The codes encourage the use of renewable energy systems, such as photovoltaic panels and wind turbines, to reduce dependence on non-renewable energy sources.
6. Commissioning: The codes require the commissioning of building energy systems to ensure that they are installed and operate correctly and efficiently.

Overall, the energy efficiency provisions of the 2022 California Building Codes aim to reduce the energy consumption of buildings, lower energy costs for building owners and occupants, and reduce the environmental impact of the built environment. The 2022 Building Energy Efficiency Standards improve upon the 2019 Energy Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The exact amount by which the 2022 Building Codes are more efficient compared to the 2019 Building Codes would depend on the specific provisions that have been updated and the specific building being considered. However, in general, the 2022 Building Codes have been updated to include increased requirements for energy efficiency, such as higher insulation and air sealing standards, which are intended to result in more efficient buildings. The 2022 standards are a major step toward meeting Zero Net Energy.

3.2.2 *Local*

3.2.2.1 Bay Area Air Quality Management District

To provide guidance to local lead agencies on determining significance for GHG emissions in CEQA documents, BAAQMD CEQA Guidelines include guidance on assessing GHGs and climate change impacts as required under CEQA Section 15183.5(b). On April 20, 2023, the BAAQMD 2022 CEQA Guidelines were adopted. These guidelines present a project-level operational threshold of significance for GHG emissions based on compliance with a Qualified GHG Reduction Strategy or adherence to a suite of BAAQMD performance standards for land uses projects directly related to building design, transportation and consistency with the CEQA Guidelines Section 15183.5(b). This approach for analyzing potential impacts associated with GHG emissions is endorsed by the California Supreme Court in Center for Biological Diversity v. Department of Fish & Wildlife (2015) (62 Cal.4th 204), which evaluates a project based on its effect on California's efforts to meet the state's long-term climate goals. As the Supreme Court held in that case, a project that would be consistent with meeting those goals can be found to have a less-than-significant impact on climate change under CEQA. If a project would contribute its "fair share" of what will be required to achieve those long-term climate goals, then a reviewing agency can find that the impact will not be significant because the project will help to solve the problem of global climate change (BAAQMD 2023). Applying this approach, the BAAQMD has analyzed what will be required of new land use development projects to achieve California's long-term climate goal of carbon neutrality by 2045. The BAAQMD has found, based on this analysis, that a new land use development project being built today needs to incorporate the following design elements to do its "fair share" of implementing the goal of carbon neutrality by 2045:

1) Buildings
    a) The project will not include natural gas appliances or natural gas plumbing (in both residential and nonresidential development).
    b) 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.
2) Transportation
    a) 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:
        i) Residential projects: 15 percent below the existing VMT per capita
        ii) Office projects: 15 percent below the existing VMT per employee
        iii) Retail projects: no net increase in existing VMT

b) Achieve compliance with off-street electric vehicle requirements in the most recently adopted version of CALGreen Tier 2.

BAAQMD Best Management Practices

Because construction emissions are temporary and variable, the BAAQMD has not developed a quantitative threshold of significance for construction related GHG emissions. In order to minimize GHG emissions and emissions of other air quality pollutants, projects should incorporate the best management practices for reducing GHG emissions listed in Table 3-2 to reduce emissions from construction-related activities.

Table 3-2. BAAQMD Best Management Practice for Construction-Related GHG Emissions
Use zero-emission and hybrid-powered equipment to the greatest extent possible, particularly if emissions are occurring near sensitive receptors or located within a BAAQMD-designated Community Air Risk Evaluation area or Assembly Bill 617 community.
Require all diesel-fueled off-road construction equipment be equipped with EPA Tier 4 Final compliant engines or better as a condition of contract.
Require all on-road heavy-duty trucks to be zero emissions or meet the most stringent emissions standard, such as model year 2024 or 2026, as a condition of contract.
Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to no more than 2 minutes (A 5-minute limit is required by the state airborne toxics control measure [Title 13, Sections 2449(d)(3) and 2485 of the California Code of Regulations (CCR)]). Provide clear signage that posts this requirement for workers at the entrances to the site and develop an enforceable mechanism to monitor idling time to ensure compliance with this measure.
Prohibit off-road diesel-powered equipment from being in the "on" position for more than 10 hours per day.
Use California Air Resources Board–approved renewable diesel fuel in off-road construction equipment and on-road trucks.
Use USEPA SmartWay certified trucks for deliveries and equipment transport.
Require all construction equipment to be maintained and properly tuned in accordance with manufacturer's specifications. Equipment should be checked by a certified mechanic and determined to be running in proper condition prior to operation.
Where grid power is available, prohibit portable diesel engines and provide electrical hook ups for electric construction tools, such as saws, drills and compressors, and using electric tools whenever feasible.
Where grid power is not available, use alternative fuels, such as propane or solar electrical power, for generators at construction sites.
Encourage and provide carpools, shuttle vans, transit passes, and/or secure bicycle parking to construction workers and offer meal options onsite or shuttles to nearby meal destinations for construction employees.
Reduce electricity use in the construction office by using LED bulbs, powering off computers every day, and replacing heating and cooling units with more efficient ones.
Minimize energy used during site preparation by deconstructing existing structures to the greatest extent feasible.
Recycle or salvage nonhazardous construction and demolition debris, with a goal of recycling at least 15 percent more by weight than the diversion requirement in Title 24.
Use locally sourced or recycled materials for construction materials (goal of at least 20 percent based on costs for building materials and based on volume for roadway, parking lot, sidewalk and curb materials). Wood products used should be certified through a sustainable forestry program.
Use low-carbon concrete, minimize the amount of concrete used and produce concrete on-site if it is more efficient and lower emitting than transporting ready-mix.
Develop a plan to efficiently use water for adequate dust control since substantial amounts of energy can be consumed during the pumping of water.
Include all requirements in applicable bid documents, purchase orders, and contracts, with successful contractors demonstrating the ability to supply the compliant on- or off-road construction equipment for use prior to any ground-disturbing and construction activities.

3.2.2.2 City of San Rafael Climate Change Action Plan 2023

The City Climate Change Action Plan (CCAP), adopted in 2019, includes measures to reduce the City's GHG emissions, in compliance with the AB 32 Scoping Plan. The City's CAP was adopted with the purpose of reducing GHGs community-wide and is projected to achieve a Citywide GHG reduction of 42 percent below 2005 emission levels by 2030. Key elements of the plan included:

1. Greenhouse Gas Reduction Targets: The CCAP sets specific targets for reducing GHG emissions within the city in alignment with state climate goals.
2. Transportation Initiatives: The CCAP includes measures to encourage the use of sustainable transportation options, such as walking, cycling, and public transit. It also promotes electric vehicles and seeks to improve the city's infrastructure to support the use of electric vehicles.
3. Energy Efficiency: The CCAP includes measures to improve energy efficiency in buildings, both residential and commercial. This could involve encouraging energy-efficient construction practices, retrofitting existing buildings, and promoting renewable energy sources.
4. Renewable Energy: The CAP may have outlined strategies for increasing the use of renewable energy sources, such as solar and wind power, to reduce the carbon footprint associated with electricity consumption.
5. Water Conservation: The CCAP includes water conservation measures to reduce energy consumption and promote sustainable water management.
6. Public Outreach and Education: The CCAP contains public engagement and education campaigns to raise awareness about climate change issues and encourage residents and businesses to participate in the city's sustainability efforts.
7. Adaptation Strategies: To address the impacts of climate change that were already occurring or anticipated in the future, the CCAP contains adaptation strategies, such as measures to protect against sea-level rise, extreme weather events, and other climate-related risks.
8. Monitoring and Reporting: The CCAP contains provisions for regular monitoring of progress and reporting to track the city's achievements toward its emission reduction goals.

3.2.2.3 California Air Pollution Control Officers Association

The California Air Pollution Control Officers Association (CAPCOA) is an association of air pollution control officers representing all 35 local air quality agencies across California, including the BAAQMD. Established in 1976, CAPCOA's primary objectives include the advancement of clean air initiatives and to provide a platform for the exchange of knowledge, experience, and information among air quality regulatory bodies statewide. The association is dedicated to fostering unity and efficiency, aiming to promote consistency in methods and practices pertaining to air pollution control. CAPCOA convenes regularly with federal and state air quality officials to formulate statewide regulations and ensure uniform adherence to established rules.

CAPCOA has instituted a GHG significance threshold of 900 metric tons of CO_2e annually for the evaluation of proposed land use development projects. This threshold, indicating a 90 percent capture rate, encompasses projects representing approximately 90 percent of GHG emissions from new sources. The 900 metric tons of CO_2e per year threshold is typically utilized to classify small projects within California as inconsequential, as it accounts for less than one percent of the future 2050 statewide GHG emissions target. CAPCOA considers the 900 metric ton threshold sufficiently low to capture a significant portion of future residential and nonresidential development necessary for accommodating statewide population and economic growth. Simultaneously, it establishes the emission threshold at a level that excludes small projects contributing a relatively minor fraction of cumulative statewide GHG emissions.

3.3 Greenhouse Gas Emissions Impact Assessment

3.3.1 *Thresholds of Significance*

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. The Project would result in a significant impact to greenhouse gas emissions if it would:

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

2) Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

The Appendix G thresholds for GHG's do not prescribe specific methodologies for performing an assessment, do not establish specific thresholds of significance, and do not mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance consistent with the manner in which other impact areas are handled in CEQA. With respect to GHG emissions, the CEQA Guidelines § 15064.4(a) states that lead agencies "shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions resulting from a project. The CEQA Guidelines note that an agency has the discretion to either quantify a project's GHG emissions or rely on a "qualitative analysis or other performance-based standards." (14 California Code of Regulations [CCR] 15064.4(b)). A lead agency may use a "model or methodology" to estimate GHG emissions and has the discretion to select the model or methodology it considers "most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change." (14 CCR 15064.4(c)). Section 15064.4(b) provides that the lead agency should consider the following when determining the significance of impacts from GHG emissions on the environment:

1. The extent a project may increase or reduce GHG emissions as compared to the existing environmental setting.
2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4(b)).

In addition, Section 15064.7(c) of the CEQA Guidelines specifies that "[w]hen adopting or using thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence" (14 CCR 15064.7(c)). The CEQA Guidelines also clarify that the effects of GHG emissions are cumulative and should be analyzed in the context of CEQA's requirements for cumulative impact analysis (see CEQA Guidelines § 15130(f)). As a note, the CEQA Guidelines were amended in response to SB 97. In particular, the CEQA Guidelines were amended to specify that compliance with a GHG emissions reduction plan renders a cumulative impact insignificant.

Per CEQA Guidelines § 15064(h)(3), a project's incremental contribution to a cumulative impact can be found not cumulatively considerable if the project would comply with an approved plan or mitigation program that provides specific requirements that would avoid or substantially lessen the cumulative problem within the geographic area of the project. To qualify, such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency. Examples of such programs include a "water quality control plan, air quality attainment or maintenance plan, integrated waste management plan, habitat conservation plan, natural community conservation plans [and] plans or regulations for the reduction of greenhouse gas emissions." Put another way, CEQA Guidelines § 15064(h)(3) allows a lead agency to make a finding of less than significant for GHG emissions if a project complies with adopted programs, plans, policies and/or other regulatory strategies to reduce GHG emissions.

The local air quality agency regulating the SFBAAB, including the Project Site, is the BAAQMD, the regional air pollution control officer for the basin. As previously stated, the BAAQMD recently approved the BAAQMD 2022 CEQA Guidelines. These guidelines present a project-level operational threshold of significance for GHG emissions based on adherence to a suite of BAAQMD performance standards for land uses projects directly related to building design, transportation and consistency with the CEQA Guidelines Section 15183.5(b) or compliance with a Qualified GHG Reduction Strategy. BAAQMD has developed the BAAQMD performance standards for land uses projects based on typical residential and commercial land use projects and typical long-term communitywide planning documents such as general plans and similar long-range development plans. According to the BAAQMD, these performance standards may not be appropriate for other types of projects that do not fit into the mold of a typical residential or commercial project or general plan update (BAAQMD 2023). The BAAQMD states that lead agencies should keep this point in mind when evaluating other types of projects (BAAQMD 2023). Additionally, the BAAQMD performance standards are intended for new land use development projects to achieve California's long-term climate goal of carbon neutrality by 2045. The Proposed Project is not a typical residential or commercial project and does not involve a new land use. Therefore, the BAAQMD performance standards for land uses projects based on typical new residential and new commercial land use projects are not appropriate for use in this analysis. The City CCAP is a Qualified GHG Reduction Strategy and is intended to make San Rafael a more sustainable community by reducing GHGs by providing guidance to adapt to the effects of climate change. However, the City of San Rafael GHG-reduction standards are not binding on the San Rafael City Schools District. Therefore, an analysis of Project consistency with the City of San Rafael CCAP is also not appropriate.

As previously described, CAPCOA is an association of air pollution control officers representing all 35 local air quality agencies across California, including the BAAQMD. CAPCOA has instituted a GHG significance threshold of 900 metric tons of CO_2e annually for the evaluation of proposed land use development projects. This threshold, indicating a 90 percent capture rate, encompasses projects representing approximately 90 percent of GHG emissions from new sources. The 900 metric tons of CO_2e per year threshold is typically utilized to classify small projects within California as inconsequential, as it accounts for less than one percent of the future 2050 statewide GHG emissions target. CAPCOA considers the 900 metric ton threshold sufficiently low to capture a significant portion of future residential and nonresidential development necessary for accommodating statewide population and economic growth. Simultaneously, it establishes the emission threshold at a level that excludes small projects contributing a relatively minor fraction of cumulative statewide GHG emissions. The Project is compared to the CAPCOA significance threshold of 900 metric tons annually.

3.3.2 *Methodology*

Operations of the Proposed Project are compared for consistency with the BAAQMD performance standards for land uses projects to determine the level of impact from the project contributions of GHG emissions. Emissions were modeled using CalEEMod, version 2022.1. CalEEMod is a statewide land use emissions computer model designed to quantify potential GHG emissions associated with both construction and operations from a variety of land use projects. Project construction-generated air pollutant emissions were calculated using a combination of CalEEMod model defaults for Marin County and information provided by the Project proponent such as Project construction equipment, average hours of equipment use daily, and duration of construction activities. Operational air pollutant emissions were calculated based on the site dimensions and building square footage identified in Project Site plans and the average VMT identified in the VMT Analysis prepared for the Project (Michael Baker International 2023). The modernized buildings under the Proposed Project would not result in the consumption of energy or the generation of solid waste beyond existing conditions. It is noted that the Project is replacing the existing boilers at the practice gym with high efficiency electric heat pumps and is also replacing the existing boilers at the aquatics center with high efficiency boilers, resulting in a 5.1 percent reduction in the consumption of natural gas compared with existing conditions. Solid waste associated with the new aquatics center is accounted for in the emissions calculations since it proposed to increase in size compared to existing conditions.

3.3.3 *Impact Analysis*

3.3.3.1 Generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

Construction

Construction-related activities that would generate GHG emissions include worker commute trips, haul trucks carrying supplies and materials to and from the Project Site, and off-road construction equipment (e.g., dozers, loaders, excavators). Table 3-3 illustrates the specific construction generated GHG emissions that would result from construction of the Project. Once construction is complete, the generation of these GHG emissions would cease.

Table 3-3. Construction Related Greenhouse Gas Emissions	
Description	**CO_2e Emissions (Metric Tons/Year)**
Calendar Year 2024 Construction	
Phase 1 Demolition, Site Preparation, Building Construction & Phase 2 Demolition & Building Construction	815
Calendar Year 2025 Construction	
Phase 1 Site Preparation, Building Construction, Paving & Painting	771
Calendar Year 2026 Construction	
Phase 2 Demolition and Building Construction	684
Calendar Year 2027 Construction	
Phase 2 Demolition, Building Construction & Phase 3 Demolition, Site Preparation, Grading, Building Construction, and Paving	897
Calendar Year 2028 Construction	
Phase 2 Demolition, Building Construction & Phase 3 Demolition, Site Preparation, Grading, Building Construction, Paving	835
Calendar Year 2029 Construction	
Phase 3 Demolition, Site Preparation, Grading, Building Construction	744
Annual Significant Impact Threshold	*900*
Exceed Significant Impact Threshold During Any Year of Construction?	**No**

Sources: CalEEMod version 2022.1. Refer to Attachment A for Model Data Outputs

Notes: Emission calculations account for the demolition and hauling of 1,124 tons of material during Phase 1, 248 tons of material during Phase 2, and 25 tons of material during Phase 3. Additionally, emission calculations account for 7,407 cubic yards of soil material export as well as 7,407 cubic yards of soil import during Phase 3. Football, water polo and swimming programs would be temporarily displaced during construction. Therefore, emission calculations for each phase account for 340 additional automobile trips cumulatively traveling 6,800 miles daily.

Specific Project construction equipment, average hours of operation daily, and construction duration provided by the Project proponent.

As shown in Table 3-3, Project construction would result in the generation of a maximum 897 metric tons of CO_2e during the course of any single year of construction. This is below the CAPCOA significance threshold of 900 metric tons of CO_2e. Once construction is complete, the generation of these GHG emissions would cease. Furthermore, GHG emissions generated by the construction sector have been declining in recent years. For instance, construction equipment engine efficiency has continued to improve year after year. The first federal standards (Tier 1) for new off-road diesel engines were adopted in 1994 for engines over 50 horsepower (hp) and were phased in from 1996 to 2000. In 1996, a Statement of Principles pertaining to off-road diesel engines was signed between the USEPA, CARB, and engine makers (including Caterpillar, Cummins, Deere, Detroit Diesel, Deutz, Isuzu, Komatsu, Kubota, Mitsubishi, Navistar, New Holland, Wis-Con, and Yanmar). On August 27, 1998, the USEPA signed the final rule reflecting the provisions of the Statement of Principles. The 1998 regulation introduced Tier 1 standards for equipment under 50 hp and increasingly more stringent Tier 2 and Tier 3 standards for all equipment with phase-in schedules from 2000 to 2008. As a result, all off-road, diesel-fueled construction equipment manufactured in 2006 or later has been manufactured to Tier 3 standards. Tier 3 engine standards reduce precursor and subset GHG emissions such as nitrogen oxide by as much as 60 percent. On May 11, 2004, the USEPA signed the final rule introducing Tier 4 emission standards, which were phased in over the period of 2008-2015. The Tier 4 standards require that emissions of nitrogen oxide be further reduced by about 90 percent. All off-road, diesel-fueled construction equipment manufactured in 2015 or later will be manufactured to Tier 4 standards.

In addition, the California Energy Commission recently released the 2019 Building Energy Efficiency Standards contained in the California Code of Regulations, Title 24, Part 6 (also known as the California Energy Code). Both the 2016 and 2019 updates to the Building Energy Efficiency Standards focus on several key areas to improve the energy efficiency of newly constructed buildings and additions, and alterations to existing buildings. For instance, effective January 1, 2017, owners/builders of construction projects have been required to divert (recycle) 65 percent of construction waste materials generated during the project construction phase. This requirement greatly reduces the generation of GHG emissions by reducing decomposition at landfills, which is a source of CH_4, and reducing demand for natural resources.

Operations

Long-term operational GHG emissions attributable to the Project are identified in Table 3-4.

Table 3-4. Operational-Related Greenhouse Gas Emissions	
Description	**CO_2e Emissions (Metric Tons/Year)**
Area Source Emissions	3
Energy Emissions	-2
Mobile Source Emissions	108
Waste Emissions	18
Water Emissions	20
Proposed Project Operations Total	**147**
Annual Significant Impact Threshold	*900*
Exceed Significant Impact Threshold?	**No**

Sources: CalEEMod 2021.1

Notes: Emission projections predominately based on CalEEMod model defaults for Marin County, site acreage and building dimensions provided by the Project Site Plans, and average daily vehicle trips provided by Michael Baker International (2023). Specifically, Michael Baker International estimates the Project generation of an average 92 new passenger vehicles under Project conditions. Modernized buildings under the Proposed Project would not result in the consumption of energy or the generation of solid waste beyond existing conditions. The Project is replacing the existing boilers at the practice gym with high efficiency electric heat pumps and is also replacing the existing boilers at the aquatics center with high efficiency boilers, resulting in a 5.1 percent reduction in the consumption of natural gas compared with existing conditions. Solid waste associated with the new aquatics center is accounted for in the emissions calculations since it is increasing in size compared to existing conditions. Emissions estimates conservatively do not account for solid waste generated at the existing aquatics center under current conditions.

As shown in Table 3-4, Project operations would result in the increased generation of 147 metric tons of CO_2e per year. This is below the CAPCOA significance threshold of 900 metric tons of CO_2e.

3.3.3.2 Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

The Project would not conflict with any adopted plans, policies, or regulations adopted for the purpose of reducing GHG emissions. As discussed previously, the Proposed Project-generated GHG emissions would not surpass the CAPCOA GHG significance threshold, which was developed in consideration of statewide GHG reduction goals. Additionally, it is noted that the Project would be designed in a manner that is consistent with relevant energy conservation plans designed to encourage development that results in the efficient use of energy resources. During Phase 2 of the Proposed Project, there would be renovations to the interior of the main school buildings, including classrooms, labs, restrooms, and corridors. These improvements would ensure that the buildings are more energy efficient and more effective at reducing the need for heating and air conditioning compared with existing conditions. The new facilities would be improved with new LED lighting, which have greater energy efficiency and lifespan than traditional fluorescent light bulbs. Additionally, the Project Site will be utilizing solar energy by installing solar arrays at the same time as the Proposed Project. Specifically, Terra Linda High School will construct five new solar arrays that will be installed throughout the campus, projected to begin installation in summer of 2024. These will be located on the roof of the Gymnasium, as a canopy above the parking lot, act as shade structures adjacent to the tennis courts, and be mounted to the ground adjacent to the baseball fields. This, however, is not a part of the Proposed Project, but a project that will occur at the same time as the Proposed Project.

Nevertheless, this will give Terra Linda High School campus the capacity to generate their own energy in a sustainable manner.

The Project would be built to the Energy Efficiency Standards for Residential and Nonresidential Buildings, as specified in Title 24, Part 6, of the California Code of Regulations (Title 24). Title 24 was established in 1978 in response to a legislative mandate to reduce California's energy consumption. Title 24 is updated approximately every three years; the 2019 Title 24 updates went into effect on January 1, 2020. The 2022 standards went into effect became effective January 1, 2023. The 2022 Energy Standards improve upon the 2019 Energy Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The 2022 update to the Energy Standards focuses on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings, encouraging better energy efficiency, strengthening ventilation standards, and more. The 2022 Energy Standards are a major step toward meeting Zero Net Energy. Buildings permitted on or after January 1, 2023, must comply with the 2022 Standards. Compliance with Title 24 is mandatory at the time new building permits are issued by city and county governments. Thus, the modernization of school buildings proposed by the Project would result in greater energy efficiency compared to existing conditions. Specifically, the Project is replacing the existing boilers at the practice gym with high efficiency electric heat pumps and is also replacing the existing boilers at the aquatics center with high efficiency boilers, resulting in a 5.1 percent reduction in the consumption of natural gas compared with existing conditions.

For these reasons, the Project would not conflict with any applicable plan, policy or regulation related to the reduction in GHG emissions.

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ATTACHMENT A

CalEEMod Output Files – Criteria Air Pollutant and Greenhouse Gas Emissions

Terra Linda HS Capital Improvements - Phase 1 Construction Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Terra Linda HS Capital Improvements - Phase 1 Construction
Construction Start Date	6/4/2024
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.60
Precipitation (days)	18.8
Location	320 Nova Albion Way, San Rafael, CA 94903, USA
County	Marin
City	San Rafael
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	915
EDFZ	2
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.21

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
Recreational Swimming Pool	9.84	1000sqft	0.23	9,840	0.00	0.00	—	—

Health Club	21.2	1000sqft	0.49	21,218	0.00	0.00	—	—
Health Club	5.30	1000sqft	0.12	5,305	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.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.47	11.0	15.8	0.03	0.39	1.05	1.44	0.36	0.21	0.57	—	3,227	3,227	0.20	0.17	3.16	3,285
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.47	5.42	8.31	0.01	0.21	0.20	0.41	0.20	0.05	0.25	—	1,453	1,453	0.06	0.04	0.03	1,465
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.20	3.28	5.19	0.01	0.12	0.13	0.25	0.11	0.03	0.14	—	909	909	0.04	0.02	0.29	917
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.22	0.60	0.95	< 0.005	0.02	0.02	0.04	0.02	0.01	0.03	—	150	150	0.01	< 0.005	0.05	152

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

Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.15	11.0	15.8	0.03	0.39	1.05	1.44	0.36	0.21	0.57	—	3,227	3,227	0.20	0.17	3.16	3,285
2025	5.47	8.35	12.4	0.02	0.33	0.33	0.66	0.30	0.08	0.38	—	2,133	2,133	0.09	0.05	1.62	2,150
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.60	5.42	8.31	0.01	0.21	0.20	0.41	0.20	0.05	0.25	—	1,453	1,453	0.06	0.04	0.03	1,465
2025	5.47	5.06	8.24	0.01	0.18	0.20	0.38	0.16	0.05	0.21	—	1,447	1,447	0.06	0.04	0.03	1,459
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.23	2.16	3.21	< 0.005	0.08	0.13	0.21	0.08	0.03	0.10	—	597	597	0.03	0.02	0.22	605
2025	1.20	3.28	5.19	0.01	0.12	0.13	0.25	0.11	0.03	0.14	—	909	909	0.04	0.02	0.29	917
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.04	0.39	0.59	< 0.005	0.02	0.02	0.04	0.01	< 0.005	0.02	—	98.9	98.9	0.01	< 0.005	0.04	100
2025	0.22	0.60	0.95	< 0.005	0.02	0.02	0.04	0.02	0.01	0.03	—	150	150	0.01	< 0.005	0.05	152

3. Construction Emissions Details

3.1. Demolition (2024) - Unmitigated

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

Location	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	0.48	4.47	6.25	0.01	0.16	—	0.16	0.15	—	0.15	—	909	909	0.04	0.01	—	912

Demolition	—	—	—	—	—	0.56	0.56	—	0.08	0.08	—	—	—	—	—	—	—
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.36	0.50	< 0.005	0.01	—	0.01	0.01	—	0.01	—	72.2	72.2	< 0.005	< 0.005	—	72.4
Demolition	—	—	—	—	—	0.04	0.04	—	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.06	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	12.0	12.0	< 0.005	< 0.005	—	12.0
Demolition	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.57	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	120	120	< 0.005	< 0.005	0.52	122
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
Hauling	0.02	1.10	0.62	< 0.005	0.01	0.18	0.20	0.01	0.05	0.06	—	733	733	0.10	0.12	1.53	773
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.96	8.96	< 0.005	< 0.005	0.02	9.09
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
Hauling	< 0.005	0.09	0.05	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	< 0.005	—	58.3	58.3	0.01	0.01	0.05	61.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.48	1.48	< 0.005	< 0.005	< 0.005	1.50
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
Hauling	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	9.65	9.65	< 0.005	< 0.005	0.01	10.2

3.3. 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	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	0.12	1.20	1.92	< 0.005	0.05	—	0.05	0.05	—	0.05	—	290	290	0.01	< 0.005	—	291
Dust From Material Movement	—	—	—	—	—	0.00	0.00	—	0.00	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	1.20	1.92	< 0.005	0.05	—	0.05	0.05	—	0.05	—	290	290	0.01	< 0.005	—	291

Dust From Material Movement	—	—	—	—	—	0.00	0.00	—	0.00	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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.43	0.69	< 0.005	0.02	—	0.02	0.02	—	0.02	—	104	104	< 0.005	< 0.005	—	104
Dust From Material Movement	—	—	—	—	—	0.00	0.00	—	0.00	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.08	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	17.2	17.2	< 0.005	< 0.005	—	17.3
Dust From Material Movement	—	—	—	—	—	0.00	0.00	—	0.00	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.11	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	24.1	24.1	< 0.005	< 0.005	0.10	24.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.01	0.01	0.10	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	22.5	22.5	< 0.005	< 0.005	< 0.005	22.7
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
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.07	8.07	< 0.005	< 0.005	0.02	8.19
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.34	1.34	< 0.005	< 0.005	< 0.005	1.36
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
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

3.5. Site Preparation (2025) - Unmitigated

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

Location	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	0.11	1.10	1.91	< 0.005	0.04	—	0.04	0.04	—	0.04	—	290	290	0.01	< 0.005	—	291
Dust From Material Movement	—	—	—	—	—	0.00	0.00	—	0.00	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.11	1.10	1.91	< 0.005	0.04	—	0.04	0.04	—	0.04	—	290	290	0.01	< 0.005	—	291
Dust From Material Movement	—	—	—	—	—	0.00	0.00	—	0.00	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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.45	0.78	< 0.005	0.02	—	0.02	0.02	—	0.02	—	119	119	< 0.005	< 0.005	—	120
Dust From Material Movement	—	—	—	—	—	0.00	0.00	—	0.00	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.08	0.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	19.8	19.8	< 0.005	< 0.005	—	19.8
Dust From Material Movement	—	—	—	—	—	0.00	0.00	—	0.00	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.11	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	23.6	23.6	< 0.005	< 0.005	0.10	24.0
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
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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.09	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	22.0	22.0	< 0.005	< 0.005	< 0.005	22.3
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
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.09	9.09	< 0.005	< 0.005	0.02	9.22
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.50	1.50	< 0.005	< 0.005	< 0.005	1.53
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
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

3.7. 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	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	0.41	3.92	5.55	0.01	0.16	—	0.16	0.15	—	0.15	—	855	855	0.03	0.01	—	858
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.41	3.92	5.55	0.01	0.16	—	0.16	0.15	—	0.15	—	855	855	0.03	0.01	—	858
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	1.19	1.68	< 0.005	0.05	—	0.05	0.04	—	0.04	—	259	259	0.01	< 0.005	—	260
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.22	0.31	< 0.005	0.01	—	0.01	0.01	—	0.01	—	43.0	43.0	< 0.005	< 0.005	—	43.1
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.69	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	147	147	< 0.005	0.01	0.64	149
Vendor	0.01	0.22	0.13	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	147	147	0.01	0.02	0.37	154
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.61	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	137	137	< 0.005	0.01	0.02	139
Vendor	0.01	0.24	0.13	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	147	147	0.01	0.02	0.01	154
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.18	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	41.8	41.8	< 0.005	< 0.005	0.08	42.4
Vendor	< 0.005	0.07	0.04	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	44.7	44.7	< 0.005	0.01	0.05	46.7

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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.92	6.92	< 0.005	< 0.005	0.01	7.02
Vendor	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.40	7.40	< 0.005	< 0.005	0.01	7.74
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

3.9. Building Construction (2025) - Unmitigated

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

Location	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	0.38	3.68	5.54	0.01	0.13	—	0.13	0.12	—	0.12	—	855	855	0.03	0.01	—	858
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.38	3.68	5.54	0.01	0.13	—	0.13	0.12	—	0.12	—	855	855	0.03	0.01	—	858
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24	2.27	3.41	< 0.005	0.08	—	0.08	0.08	—	0.08	—	527	527	0.02	< 0.005	—	529
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.04	0.41	0.62	< 0.005	0.01	—	0.01	0.01	—	0.01	—	87.3	87.3	< 0.005	< 0.005	—	87.6
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.04	0.64	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	144	144	< 0.005	0.01	0.59	146
Vendor	0.01	0.21	0.12	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	145	145	0.01	0.02	0.37	151
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.57	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	134	134	< 0.005	0.01	0.02	136
Vendor	0.01	0.22	0.13	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	145	145	0.01	0.02	0.01	151
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.34	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	83.3	83.3	< 0.005	< 0.005	0.16	84.5
Vendor	< 0.005	0.14	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	89.2	89.2	0.01	0.01	0.10	93.2
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.06	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	13.8	13.8	< 0.005	< 0.005	0.03	14.0
Vendor	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	14.8	14.8	< 0.005	< 0.005	0.02	15.4
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

3.11. Paving (2025) - Unmitigated

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

Location	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	0.51	4.37	5.31	0.01	0.19	—	0.19	0.18	—	0.18	—	823	823	0.03	0.01	—	826
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.24	0.29	< 0.005	0.01	—	0.01	0.01	—	0.01	—	45.1	45.1	< 0.005	< 0.005	—	45.3
Paving	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.04	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.47	7.47	< 0.005	< 0.005	—	7.50
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.74	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	165	165	< 0.005	0.01	0.67	168
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
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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.48	8.48	< 0.005	< 0.005	0.02	8.61
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.40	1.40	< 0.005	< 0.005	< 0.005	1.42
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
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

3.13. Architectural Coating (2025) - Unmitigated

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

Location	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	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	4.88	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	—	134

Architectu Coatings	4.88	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.15	0.19	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	22.7	22.7	< 0.005	< 0.005	—	22.8
Architectu ral Coatings	0.83	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.76	3.76	< 0.005	< 0.005	—	3.77
Architectu ral Coatings	0.15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.13	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	28.9	28.9	< 0.005	< 0.005	0.12	29.3
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
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.11	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	26.9	26.9	< 0.005	< 0.005	< 0.005	27.3
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

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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.59	4.59	< 0.005	< 0.005	0.01	4.66
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.76	0.76	< 0.005	< 0.005	< 0.005	0.77
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
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

4. Operations Emissions Details

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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	6/24/2024	8/1/2024	5.00	29.0	—
Site Preparation	Site Preparation	7/2/2024	7/29/2025	5.00	281	—
Building Construction	Building Construction	7/30/2024	11/11/2025	5.00	336	—

Paving	Paving	7/30/2025	8/26/2025	5.00	20.0	—
Architectural Coating	Architectural Coating	9/1/2025	11/25/2025	5.00	62.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Demolition	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Demolition	Tractors/Loaders/Backhoes	Diesel	Average	2.00	6.00	84.0	0.37
Demolition	Excavators	Diesel	Average	1.00	6.00	36.0	0.38
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Building Construction	Cranes	Diesel	Average	1.00	0.50	367	0.29
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Building Construction	Excavators	Diesel	Average	2.00	6.00	36.0	0.38
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	7.00	84.0	0.37
Paving	Cement and Mortar Mixers	Diesel	Average	4.00	6.00	10.0	0.56
Paving	Pavers	Diesel	Average	1.00	7.00	81.0	0.42
Paving	Rollers	Diesel	Average	1.00	7.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	12.5	12.8	LDA,LDT1,LDT2
Demolition	Vendor	—	7.20	HHDT,MHDT
Demolition	Hauling	9.69	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	2.50	12.8	LDA,LDT1,LDT2
Site Preparation	Vendor	—	7.20	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	15.3	12.8	LDA,LDT1,LDT2
Building Construction	Vendor	5.96	7.20	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	17.5	12.8	LDA,LDT1,LDT2
Paving	Vendor	—	7.20	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	3.05	12.8	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	7.20	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

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%
Sweep paved roads once per month	9%	9%

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	43,535	14,512	—

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Ton of Debris)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	1,124	—
Site Preparation	—	—	0.00	0.00	—
Paving	0.00	0.00	0.00	0.00	0.66

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Demolished Area	2	36%	36%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Recreational Swimming Pool	0.66	0%
Health Club	0.00	0%
Health Club	0.00	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
2025	0.00	204	0.03	< 0.005

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	8.93	annual days of extreme heat
Extreme Precipitation	14.0	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	6.34	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 (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
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	4	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	4	1	1	4
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	10.6
AQ-PM	21.9
AQ-DPM	34.2
Drinking Water	7.43
Lead Risk Housing	29.0
Pesticides	9.90
Toxic Releases	38.2
Traffic	59.0
Effect Indicators	—
CleanUp Sites	0.00
Groundwater	3.30
Haz Waste Facilities/Generators	81.5
Impaired Water Bodies	0.00
Solid Waste	22.1
Sensitive Population	—
Asthma	17.4
Cardio-vascular	23.7
Low Birth Weights	30.8
Socioeconomic Factor Indicators	—
Education	46.8
Housing	34.2
Linguistic	64.1
Poverty	50.0
Unemployment	83.2

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	76.22225074
Employed	97.33093802
Median HI	69.74207622
Education	—
Bachelor's or higher	80.97010137
High school enrollment	100
Preschool enrollment	61.06762479
Transportation	—
Auto Access	10.39394328
Active commuting	65.75131528
Social	—
2-parent households	71.73104068
Voting	98.49865264
Neighborhood	—
Alcohol availability	66.46990889
Park access	81.35506224
Retail density	79.30193764
Supermarket access	54.22815347
Tree canopy	91.64634929
Housing	—
Homeownership	46.43911202
Housing habitability	14.07673553
Low-inc homeowner severe housing cost burden	59.822918

Low-inc renter severe housing cost burden	60.07955858
Uncrowded housing	56.30694213
Health Outcomes	—
Insured adults	71.87219299
Arthritis	0.0
Asthma ER Admissions	61.2
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	60.2
Cognitively Disabled	32.0
Physically Disabled	5.0
Heart Attack ER Admissions	81.8
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	63.2
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	63.4
Children	65.5
Elderly	4.5
English Speaking	40.8
Foreign-born	51.4
Outdoor Workers	87.7
Climate Change Adaptive Capacity	—
Impervious Surface Cover	74.4
Traffic Density	81.1
Traffic Access	59.7
Other Indices	—
Hardship	18.8
Other Decision Support	—
2016 Voting	96.7

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	19.0
Healthy Places Index Score for Project Location (b)	82.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
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
Construction: Construction Phases	Construction timing per Project Description
Construction: Paving	Pavement at aquatics center, including concrete bleachers
Construction: Off-Road Equipment	Equipment per construction contractor
Construction: Trips and VMT	Worker trips and trip length adjusted to account for displaced sport related trips, which include 340 additional trips daily and 6,800 additional miles traveled daily.

Terra Linda HS Capital Improvements - Phase 2 Construction Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Terra Linda HS Capital Improvements - Phase 2 Construction
Construction Start Date	6/1/2026
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.60
Precipitation (days)	18.8
Location	320 Nova Albion Way, San Rafael, CA 94903, USA
County	Marin
City	San Rafael
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	915
EDFZ	2
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.21

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
High School	24.4	1000sqft	0.56	24,378	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.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.84	14.7	20.7	0.03	0.53	0.37	0.90	0.49	0.08	0.57	—	3,127	3,127	0.14	0.07	1.48	3,153
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.37	2.85	3.94	0.01	0.10	0.05	0.15	0.09	0.01	0.11	—	576	576	0.03	0.01	0.10	580
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.07	0.52	0.72	< 0.005	0.02	0.01	0.03	0.02	< 0.005	0.02	—	95.4	95.4	< 0.005	< 0.005	0.02	96.0

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

2024	1.84	14.7	20.7	0.03	0.53	0.37	0.90	0.49	0.08	0.57	—	3,127	3,127	0.14	0.07	1.48	3,153
2026	1.63	13.5	20.3	0.03	0.38	0.31	0.69	0.35	0.07	0.42	—	3,048	3,048	0.13	0.06	1.17	3,070
2027	1.59	13.4	20.7	0.03	0.33	0.31	0.64	0.31	0.07	0.37	—	3,101	3,101	0.13	0.06	1.06	3,123
2028	1.48	12.7	20.1	0.03	0.28	0.31	0.59	0.26	0.07	0.32	—	3,032	3,032	0.13	0.05	0.96	3,052
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
2026	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
2027	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
2028	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.37	2.85	3.94	0.01	0.10	0.05	0.15	0.09	0.01	0.11	—	576	576	0.03	0.01	0.10	580
2026	0.21	1.72	2.58	< 0.005	0.05	0.04	0.09	0.04	0.01	0.05	—	389	389	0.02	0.01	0.07	392
2027	0.20	1.71	2.63	< 0.005	0.04	0.04	0.08	0.04	0.01	0.05	—	396	396	0.02	0.01	0.06	399
2028	0.19	1.62	2.56	< 0.005	0.04	0.04	0.08	0.03	0.01	0.04	—	387	387	0.02	0.01	0.05	390
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.07	0.52	0.72	< 0.005	0.02	0.01	0.03	0.02	< 0.005	0.02	—	95.4	95.4	< 0.005	< 0.005	0.02	96.0
2026	0.04	0.31	0.47	< 0.005	0.01	0.01	0.02	0.01	< 0.005	0.01	—	64.5	64.5	< 0.005	< 0.005	0.01	64.9
2027	0.04	0.31	0.48	< 0.005	0.01	0.01	0.02	0.01	< 0.005	0.01	—	65.5	65.5	< 0.005	< 0.005	0.01	66.0
2028	0.03	0.30	0.47	< 0.005	0.01	0.01	0.01	0.01	< 0.005	0.01	—	64.1	64.1	< 0.005	< 0.005	0.01	64.6

3. Construction Emissions Details

3.1. Demolition2a (2024) - Unmitigated

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

Location	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	0.48	4.47	6.25	0.01	0.16	—	0.16	0.15	—	0.15	—	909	909	0.04	0.01	—	912
Demolition	—	—	—	—	—	0.12	0.12	—	0.02	0.02	—	—	—	—	—	—	—
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.37	0.51	< 0.005	0.01	—	0.01	0.01	—	0.01	—	74.7	74.7	< 0.005	< 0.005	—	74.9
Demolition	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.07	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	12.4	12.4	< 0.005	< 0.005	—	12.4
Demolition	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.03	0.53	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	110	110	< 0.005	< 0.005	0.47	112

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
Hauling	< 0.005	0.24	0.13	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	156	156	0.02	0.03	0.33	165
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.46	8.46	< 0.005	< 0.005	0.02	8.59
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
Hauling	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	12.9	12.9	< 0.005	< 0.005	0.01	13.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.40	1.40	< 0.005	< 0.005	< 0.005	1.42
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
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.13	2.13	< 0.005	< 0.005	< 0.005	2.24

3.3. Demolition2b (2026) - Unmitigated

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

Location	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	0.43	4.08	6.21	0.01	0.12	—	0.12	0.11	—	0.11	—	908	908	0.04	0.01	—	911
Demolition	—	—	—	—	—	0.07	0.07	—	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.56	0.85	< 0.005	0.02	—	0.02	0.01	—	0.01	—	124	124	0.01	< 0.005	—	125
Demolition	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.10	0.16	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	20.6	20.6	< 0.005	< 0.005	—	20.7
Demolition	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.46	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	106	106	< 0.005	< 0.005	0.40	107
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
Hauling	< 0.005	0.13	0.08	< 0.005	< 0.005	0.02	0.03	< 0.005	0.01	0.01	—	90.1	90.1	0.01	0.01	0.18	94.9
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	13.6	13.6	< 0.005	< 0.005	0.02	13.8
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
Hauling	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	12.3	12.3	< 0.005	< 0.005	0.01	13.0
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.25	2.25	< 0.005	< 0.005	< 0.005	2.28

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
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.04	2.04	< 0.005	< 0.005	< 0.005	2.15

3.5. Demolition2c (2027) - Unmitigated

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

Location	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	0.41	3.96	6.20	0.01	0.10	—	0.10	0.09	—	0.09	—	908	908	0.04	0.01	—	911
Demolition	—	—	—	—	—	0.07	0.07	—	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.54	0.85	< 0.005	0.01	—	0.01	0.01	—	0.01	—	124	124	0.01	< 0.005	—	125
Demolition	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.10	0.16	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	20.6	20.6	< 0.005	< 0.005	—	20.7
Demolition	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.42	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	104	104	< 0.005	< 0.005	0.36	105
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
Hauling	< 0.005	0.12	0.08	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	88.0	88.0	0.01	0.01	0.17	92.6
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	13.3	13.3	< 0.005	< 0.005	0.02	13.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	12.1	12.1	< 0.005	< 0.005	0.01	12.7
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.21	2.21	< 0.005	< 0.005	< 0.005	2.24
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
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.00	2.00	< 0.005	< 0.005	< 0.005	2.10

3.7. Demolition2d (2028) - Unmitigated

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

Location	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	0.40	3.86	6.20	0.01	0.09	—	0.09	0.08	—	0.08	—	908	908	0.04	0.01	—	911
Demolition	—	—	—	—	—	0.07	0.07	—	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.53	0.85	< 0.005	0.01	—	0.01	0.01	—	0.01	—	124	124	0.01	< 0.005	—	125
Demolition	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.10	0.16	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	20.6	20.6	< 0.005	< 0.005	—	20.7
Demolition	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.02	0.40	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	102	102	< 0.005	< 0.005	0.33	103
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
Hauling	< 0.005	0.12	0.07	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	85.7	85.7	0.01	0.01	0.15	90.3

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	13.1	13.1	< 0.005	< 0.005	0.02	13.3
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
Hauling	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	11.7	11.7	< 0.005	< 0.005	0.01	12.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.17	2.17	< 0.005	< 0.005	< 0.005	2.20
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
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.94	1.94	< 0.005	< 0.005	< 0.005	2.05

3.9. Building Construction2a (2024) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.26	9.76	13.2	0.02	0.36	—	0.36	0.33	—	0.33	—	1,748	1,748	0.07	0.01	—	1,754
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.31	2.41	3.26	< 0.005	0.09	—	0.09	0.08	—	0.08	—	431	431	0.02	< 0.005	—	432

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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.44	0.59	< 0.005	0.02	—	0.02	0.01	—	0.01	—	71.3	71.3	< 0.005	< 0.005	—	71.6
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.43	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	90.0	90.0	< 0.005	< 0.005	0.39	91.5
Vendor	0.01	0.17	0.10	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	115	115	0.01	0.02	0.29	120
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.09	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	20.8	20.8	< 0.005	< 0.005	0.04	21.1
Vendor	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	28.2	28.2	< 0.005	< 0.005	0.03	29.5
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.44	3.44	< 0.005	< 0.005	0.01	3.49
Vendor	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.67	4.67	< 0.005	< 0.005	0.01	4.89
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

3.11. Building Construction2b (2026) - Unmitigated

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

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

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.12	9.04	13.1	0.02	0.26	—	0.26	0.24	—	0.24	—	1,747	1,747	0.07	0.01	—	1,753
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	1.12	1.62	< 0.005	0.03	—	0.03	0.03	—	0.03	—	215	215	0.01	< 0.005	—	216
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.20	0.30	< 0.005	0.01	—	0.01	0.01	—	0.01	—	35.7	35.7	< 0.005	< 0.005	—	35.8
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.02	0.37	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	86.6	86.6	< 0.005	< 0.005	0.33	88.0
Vendor	< 0.005	0.15	0.09	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	110	110	0.01	0.02	0.26	115
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.0	10.0	< 0.005	< 0.005	0.02	10.2
Vendor	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	13.6	13.6	< 0.005	< 0.005	0.01	14.2
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.66	1.66	< 0.005	< 0.005	< 0.005	1.68
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.25	2.25	< 0.005	< 0.005	< 0.005	2.35
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

3.13. Building Construction2c (2027) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.10	9.14	13.5	0.02	0.23	—	0.23	0.21	—	0.21	—	1,808	1,808	0.07	0.01	—	1,814
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	1.13	1.67	< 0.005	0.03	—	0.03	0.03	—	0.03	—	223	223	0.01	< 0.005	—	224
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.02	0.21	0.30	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	36.9	36.9	< 0.005	< 0.005	—	37.0
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.35	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	85.0	85.0	< 0.005	< 0.005	0.30	86.4
Vendor	< 0.005	0.14	0.09	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	108	108	0.01	0.02	0.23	113
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.82	9.82	< 0.005	< 0.005	0.02	9.96
Vendor	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	13.3	13.3	< 0.005	< 0.005	0.01	13.9
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.63	1.63	< 0.005	< 0.005	< 0.005	1.65
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.20	2.20	< 0.005	< 0.005	< 0.005	2.31
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

3.15. Building Construction2d (2028) - Unmitigated

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

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

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.01	8.55	13.0	0.02	0.19	—	0.19	0.17	—	0.17	—	1,747	1,747	0.07	0.01	—	1,753
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	1.05	1.61	< 0.005	0.02	—	0.02	0.02	—	0.02	—	215	215	0.01	< 0.005	—	216
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.19	0.29	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	35.7	35.7	< 0.005	< 0.005	—	35.8
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.33	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	83.5	83.5	< 0.005	< 0.005	0.27	84.0
Vendor	< 0.005	0.14	0.08	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	105	105	0.01	0.01	0.21	110
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.65	9.65	< 0.005	< 0.005	0.01	9.79
Vendor	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	13.0	13.0	< 0.005	< 0.005	0.01	13.6
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.60	1.60	< 0.005	< 0.005	< 0.005	1.62
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.15	2.15	< 0.005	< 0.005	< 0.005	2.24
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

4. Operations Emissions Details

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	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	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	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Sequeste	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequeste red	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Demolition2a	Demolition	4/1/2024	5/10/2024	5.00	30.0	—
Demolition2b	Demolition	6/1/2026	8/7/2026	5.00	50.0	—
Demolition2c	Demolition	6/3/2027	8/11/2027	5.00	50.0	—
Demolition2d	Demolition	6/3/2028	8/11/2028	5.00	50.0	—
Building Construction2a	Building Construction	4/8/2024	8/10/2024	5.00	90.0	—
Building Construction2b	Building Construction	6/9/2026	8/10/2026	5.00	45.0	—
Building Construction2c	Building Construction	6/8/2027	8/9/2027	5.00	45.0	—
Building Construction2d	Building Construction	6/6/2028	8/7/2028	5.00	45.0	—

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
Demolition2a	Tractors/Loaders/Backhoes	Diesel	Average	2.00	6.00	84.0	0.37
Demolition2a	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Demolition2a	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Demolition2a	Excavators	Diesel	Average	1.00	6.00	36.0	0.38
Demolition2b	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Demolition2b	Tractors/Loaders/Backhoes	Diesel	Average	2.00	6.00	84.0	0.37
Demolition2b	Excavators	Diesel	Average	1.00	6.00	36.0	0.38
Demolition2b	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Demolition2c	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Demolition2c	Tractors/Loaders/Backhoes	Diesel	Average	2.00	6.00	84.0	0.37
Demolition2c	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Demolition2c	Excavators	Diesel	Average	1.00	6.00	36.0	0.38
Demolition2d	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Demolition2d	Tractors/Loaders/Backhoes	Diesel	Average	2.00	6.00	84.0	0.37
Demolition2d	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Demolition2d	Excavators	Diesel	Average	1.00	6.00	36.0	0.38
Building Construction2a	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37

Building Construction2a	Concrete/Industrial Saws	Diesel	Average	2.00	0.50	33.0	0.73
Building Construction2a	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Building Construction2a	Air Compressors	Diesel	Average	6.00	6.00	37.0	0.48
Building Construction2a	Excavators	Diesel	Average	2.00	6.00	36.0	0.38
Building Construction2b	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Building Construction2b	Excavators	Diesel	Average	2.00	6.00	36.0	0.38
Building Construction2b	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Building Construction2b	Air Compressors	Diesel	Average	6.00	6.00	37.0	0.48
Building Construction2b	Concrete/Industrial Saws	Diesel	Average	2.00	0.50	33.0	0.73
Building Construction2c	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Building Construction2c	Concrete/Industrial Saws	Diesel	Average	6.00	0.50	33.0	0.73
Building Construction2c	Air Compressors	Diesel	Average	6.00	6.00	37.0	0.48
Building Construction2c	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Building Construction2c	Excavators	Diesel	Average	2.00	6.00	36.0	0.38
Building Construction2d	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Building Construction2d	Concrete/Industrial Saws	Diesel	Average	2.00	0.50	33.0	0.73
Building Construction2d	Air Compressors	Diesel	Average	6.00	6.00	37.0	0.48
Building Construction2d	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Building Construction2d	Excavators	Diesel	Average	2.00	6.00	36.0	0.38

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition2a	—	—	—	—
Demolition2a	Worker	12.5	11.7	LDA,LDT1,LDT2
Demolition2a	Vendor	—	8.40	HHDT,MHDT
Demolition2a	Hauling	2.07	20.0	HHDT
Demolition2a	Onsite truck	—	—	HHDT
Building Construction2a	—	—	—	—
Building Construction2a	Worker	10.2	11.7	LDA,LDT1,LDT2
Building Construction2a	Vendor	4.00	8.40	HHDT,MHDT
Building Construction2a	Hauling	0.00	20.0	HHDT
Building Construction2a	Onsite truck	—	—	HHDT
Demolition2b	—	—	—	—
Demolition2b	Worker	12.5	11.7	LDA,LDT1,LDT2
Demolition2b	Vendor	—	8.40	HHDT,MHDT
Demolition2b	Hauling	1.24	20.0	HHDT
Demolition2b	Onsite truck	—	—	HHDT
Demolition2c	—	—	—	—
Demolition2c	Worker	12.5	11.7	LDA,LDT1,LDT2
Demolition2c	Vendor	—	8.40	HHDT,MHDT
Demolition2c	Hauling	1.24	20.0	HHDT
Demolition2c	Onsite truck	—	—	HHDT
Demolition2d	—	—	—	—
Demolition2d	Worker	12.5	11.7	LDA,LDT1,LDT2
Demolition2d	Vendor	—	8.40	HHDT,MHDT
Demolition2d	Hauling	1.24	20.0	HHDT
Demolition2d	Onsite truck	—	—	HHDT
Building Construction2b	—	—	—	—

Building Construction2b	Worker	10.2	11.7	LDA,LDT1,LDT2
Building Construction2b	Vendor	4.00	8.40	HHDT,MHDT
Building Construction2b	Hauling	0.00	20.0	HHDT
Building Construction2b	Onsite truck	—	—	HHDT
Building Construction2c	—	—	—	—
Building Construction2c	Worker	10.2	11.7	LDA,LDT1,LDT2
Building Construction2c	Vendor	4.00	8.40	HHDT,MHDT
Building Construction2c	Hauling	0.00	20.0	HHDT
Building Construction2c	Onsite truck	—	—	HHDT
Building Construction2d	—	—	—	—
Building Construction2d	Worker	10.2	11.7	LDA,LDT1,LDT2
Building Construction2d	Vendor	4.00	8.40	HHDT,MHDT
Building Construction2d	Hauling	0.00	20.0	HHDT
Building Construction2d	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%
Sweep paved roads once per month	9%	9%

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 (Building Square Footage)	Acres Paved (acres)
Demolition2a	0.00	0.00	0.00	5,305	—
Demolition2b	0.00	0.00	0.00	5,305	—
Demolition2c	0.00	0.00	0.00	5,305	—
Demolition2d	0.00	0.00	0.00	5,305	—

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Demolished Area	2	36%	36%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
High School	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	0.00	204	0.03	< 0.005
2027	0.00	204	0.03	< 0.005
2028	0.00	204	0.03	< 0.005
2024	0.00	204	0.03	< 0.005

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	8.93	annual days of extreme heat
Extreme Precipitation	14.0	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	6.34	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 (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
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	4	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	4	1	1	4
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	10.6
AQ-PM	21.9
AQ-DPM	34.2
Drinking Water	7.43
Lead Risk Housing	29.0
Pesticides	9.90
Toxic Releases	38.2
Traffic	59.0
Effect Indicators	—
CleanUp Sites	0.00

Groundwater	3.30
Haz Waste Facilities/Generators	81.5
Impaired Water Bodies	0.00
Solid Waste	22.1
Sensitive Population	—
Asthma	17.4
Cardio-vascular	23.7
Low Birth Weights	30.8
Socioeconomic Factor Indicators	—
Education	46.8
Housing	34.2
Linguistic	64.1
Poverty	50.0
Unemployment	83.2

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	76.22225074
Employed	97.33093802
Median HI	69.74207622
Education	—
Bachelor's or higher	80.97010137
High school enrollment	100
Preschool enrollment	61.06762479
Transportation	—

Auto Access	10.39394328
Active commuting	65.75131528
Social	—
2-parent households	71.73104068
Voting	98.49865264
Neighborhood	—
Alcohol availability	66.46990889
Park access	81.35506224
Retail density	79.30193764
Supermarket access	54.22815347
Tree canopy	91.64634929
Housing	—
Homeownership	46.43911202
Housing habitability	14.07673553
Low-inc homeowner severe housing cost burden	59.822918
Low-inc renter severe housing cost burden	60.07955858
Uncrowded housing	56.30694213
Health Outcomes	—
Insured adults	71.87219299
Arthritis	0.0
Asthma ER Admissions	61.2
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	60.2
Cognitively Disabled	32.0
Physically Disabled	5.0
Heart Attack ER Admissions	81.8
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	63.2
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	63.4
Children	65.5
Elderly	4.5
English Speaking	40.8
Foreign-born	51.4
Outdoor Workers	87.7
Climate Change Adaptive Capacity	—
Impervious Surface Cover	74.4
Traffic Density	81.1
Traffic Access	59.7
Other Indices	—

Hardship	18.8
Other Decision Support	—
2016 Voting	96.7

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	19.0
Healthy Places Index Score for Project Location (b)	82.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
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
Construction: Construction Phases	Construction duration per Project Description
Construction: Off-Road Equipment	Equipment per construction contractor
Construction: Trips and VMT	—

Terra Linda HS Capital Improvements - Phase 3 Construction Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Terra Linda HS Capital Improvements - Phase 3 Construction
Construction Start Date	6/5/2029
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.60
Precipitation (days)	18.8
Location	320 Nova Albion Way, San Rafael, CA 94903, USA
County	Marin
City	San Rafael
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	915
EDFZ	2
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.21

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

Fast Food Restaurant w/o Drive Thru	2.50	1000sqft	0.06	2,500	0.00	0.00	—	—
General Office Building	1.30	1000sqft	0.03	1,300	0.00	0.00	—	—
Other Non-Asphalt Surfaces	236	1000sqft	5.42	0.00	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.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.46	30.7	40.6	0.06	1.14	13.9	15.1	1.05	6.87	7.91	—	6,898	6,898	0.32	0.25	3.13	6,923
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.00	9.80	14.5	0.02	0.35	0.95	1.31	0.33	0.16	0.49	—	3,128	3,128	0.21	0.18	0.06	3,188
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.58	5.60	6.98	0.01	0.20	2.04	2.24	0.19	0.97	1.16	—	1,480	1,480	0.09	0.07	0.37	1,503
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.11	1.02	1.27	< 0.005	0.04	0.37	0.41	0.03	0.18	0.21	—	245	245	0.01	0.01	0.06	249

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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	2.24	21.6	21.8	0.04	0.82	13.7	14.5	0.76	6.87	7.63	—	5,194	5,194	0.32	0.25	3.13	5,279
2028	3.46	30.7	40.6	0.06	1.14	13.9	15.1	1.05	6.86	7.91	—	6,898	6,898	0.27	0.06	0.92	6,923
2029	3.37	29.3	40.3	0.06	1.07	13.9	15.0	0.98	6.86	7.84	—	6,890	6,890	0.27	0.06	0.83	6,915
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	1.00	9.80	14.5	0.02	0.35	0.95	1.31	0.33	0.16	0.49	—	3,128	3,128	0.21	0.18	0.06	3,188
2028	0.79	7.31	11.9	0.02	0.22	0.06	0.28	0.20	0.01	0.21	—	1,799	1,799	0.07	0.02	0.01	1,806
2029	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.58	5.60	6.98	0.01	0.20	2.04	2.24	0.19	0.97	1.16	—	1,480	1,480	0.09	0.07	0.37	1,503
2028	0.44	3.95	5.39	0.01	0.14	1.53	1.67	0.13	0.75	0.88	—	899	899	0.04	0.01	0.05	903
2029	0.37	3.21	4.40	0.01	0.12	1.53	1.64	0.11	0.75	0.86	—	753	753	0.03	0.01	0.04	756
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.11	1.02	1.27	< 0.005	0.04	0.37	0.41	0.03	0.18	0.21	—	245	245	0.01	0.01	0.06	249
2028	0.08	0.72	0.98	< 0.005	0.03	0.28	0.31	0.02	0.14	0.16	—	149	149	0.01	< 0.005	0.01	149
2029	0.07	0.59	0.80	< 0.005	0.02	0.28	0.30	0.02	0.14	0.16	—	125	125	< 0.005	< 0.005	0.01	125

3. Construction Emissions Details

3.1. Demolition3a (2027) - Unmitigated

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

Location	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	0.18	1.72	2.39	< 0.005	0.04	—	0.04	0.04	—	0.04	—	350	350	0.01	< 0.005	—	352
Demolition	—	—	—	—	—	0.02	0.02	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.09	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	19.2	19.2	< 0.005	< 0.005	—	19.3
Demolition	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.18	3.18	< 0.005	< 0.005	—	3.19
Demolition	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.03	0.02	0.34	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	83.1	83.1	< 0.005	< 0.005	0.29	84.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.03	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	24.8	24.8	< 0.005	< 0.005	0.05	26.1
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.26	4.26	< 0.005	< 0.005	0.01	4.32
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
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.36	1.36	< 0.005	< 0.005	< 0.005	1.43
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.71	0.71	< 0.005	< 0.005	< 0.005	0.72
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
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.23	0.23	< 0.005	< 0.005	< 0.005	0.24

3.3. Demolition3b (2028) - Unmitigated

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

Location	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	0.17	1.69	2.39	< 0.005	0.04	—	0.04	0.04	—	0.04	—	350	350	0.01	< 0.005	—	352
Demolition	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.19	0.26	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	38.4	38.4	< 0.005	< 0.005	—	38.5
Demolition	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.03	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.36	6.36	< 0.005	< 0.005	—	6.38
Demolition	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.32	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	81.6	81.6	< 0.005	< 0.005	0.26	82.1
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
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.38	8.38	< 0.005	< 0.005	0.01	8.50
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
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

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.39	1.39	< 0.005	< 0.005	< 0.005	1.41
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
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

3.5. Demolition3c (2029) - Unmitigated

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

Location	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	0.17	1.68	2.39	< 0.005	0.04	—	0.04	0.03	—	0.03	—	351	351	0.01	< 0.005	—	352
Demolition	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.18	0.26	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	38.4	38.4	< 0.005	< 0.005	—	38.6
Demolition	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.03	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.36	6.36	< 0.005	< 0.005	—	6.38

Demolitio	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.30	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	80.2	80.2	< 0.005	< 0.005	0.23	80.7
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
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.23	8.23	< 0.005	< 0.005	0.01	8.36
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.36	1.36	< 0.005	< 0.005	< 0.005	1.38
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
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

3.7. Site Preparation3a (2027) - Unmitigated

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

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

Off-Road Equipment	1.97	18.0	17.6	0.03	0.76	—	0.76	0.70	—	0.70	—	3,338	3,338	0.14	0.03	—	3,350
Dust From Material Movement	—	—	—	—	—	13.1	13.1	—	6.74	6.74	—	—	—	—	—	—	—
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.27	2.46	2.41	< 0.005	0.10	—	0.10	0.10	—	0.10	—	457	457	0.02	< 0.005	—	459
Dust From Material Movement	—	—	—	—	—	1.80	1.80	—	0.92	0.92	—	—	—	—	—	—	—
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.45	0.44	< 0.005	0.02	—	0.02	0.02	—	0.02	—	75.7	75.7	< 0.005	< 0.005	—	76.0
Dust From Material Movement	—	—	—	—	—	0.33	0.33	—	0.17	0.17	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.34	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	83.1	83.1	< 0.005	< 0.005	0.29	84.4

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.03	1.84	1.13	0.01	0.02	0.35	0.37	0.02	0.09	0.11	—	1,315	1,315	0.16	0.21	2.50	1,383
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.7	10.7	< 0.005	< 0.005	0.02	10.8
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
Hauling	< 0.005	0.26	0.15	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	180	180	0.02	0.03	0.15	189
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.76	1.76	< 0.005	< 0.005	< 0.005	1.79
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
Hauling	< 0.005	0.05	0.03	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	29.8	29.8	< 0.005	< 0.005	0.02	31.3

3.9. Site Preparaton3b (2028) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.96	17.7	17.6	0.03	0.75	—	0.75	0.69	—	0.69	—	3,340	3,340	0.14	0.03	—	3,351
Dust From Material Movement	—	—	—	—	—	13.1	13.1	—	6.73	6.73	—	—	—	—	—	—	—
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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	1.94	1.93	< 0.005	0.08	—	0.08	0.08	—	0.08	—	366	366	0.01	< 0.005	—	367
Dust From Material Movement	—	—	—	—	—	1.44	1.44	—	0.74	0.74	—	—	—	—	—	—	—
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.35	0.35	< 0.005	0.01	—	0.01	0.01	—	0.01	—	60.6	60.6	< 0.005	< 0.005	—	60.8
Dust From Material Movement	—	—	—	—	—	0.26	0.26	—	0.13	0.13	—	—	—	—	—	—	—
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.32	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	81.6	81.6	< 0.005	< 0.005	0.26	82.1
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
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.38	8.38	< 0.005	< 0.005	0.01	8.50
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.39	1.39	< 0.005	< 0.005	< 0.005	1.41
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
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

3.11. Site Prepareation3c (2029) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.92	16.7	17.4	0.03	0.71	—	0.71	0.65	—	0.65	—	3,337	3,337	0.14	0.03	—	3,349
Dust From Material Movement	—	—	—	—	—	13.1	13.1	—	6.73	6.73	—	—	—	—	—	—	—
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	1.83	1.91	< 0.005	0.08	—	0.08	0.07	—	0.07	—	366	366	0.01	< 0.005	—	367

Dust From Material Movement	—	—	—	—	—	1.44	1.44	—	0.74	0.74	—	—	—	—	—	—	—
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.33	0.35	< 0.005	0.01	—	0.01	0.01	—	0.01	—	60.6	60.6	< 0.005	< 0.005	—	60.8
Dust From Material Movement	—	—	—	—	—	0.26	0.26	—	0.13	0.13	—	—	—	—	—	—	—
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.30	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	80.2	80.2	< 0.005	< 0.005	0.23	80.7
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
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.23	8.23	< 0.005	< 0.005	0.01	8.36
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.36	1.36	< 0.005	< 0.005	< 0.005	1.38
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

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

3.13. Grading3a (2027) - Unmitigated

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

Location	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	0.70	6.23	10.4	0.01	0.25	—	0.25	0.23	—	0.23	—	1,581	1,581	0.06	0.01	—	1,587
Dust From Material Movement	—	—	—	—	—	0.54	0.54	—	0.06	0.06	—	—	—	—	—	—	—
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.70	6.23	10.4	0.01	0.25	—	0.25	0.23	—	0.23	—	1,581	1,581	0.06	0.01	—	1,587
Dust From Material Movement	—	—	—	—	—	0.54	0.54	—	0.06	0.06	—	—	—	—	—	—	—
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	1.11	1.85	< 0.005	0.04	—	0.04	0.04	—	0.04	—	282	282	0.01	< 0.005	—	283

Dust From Material Movement	—	—	—	—	—	0.10	0.10	—	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.20	0.34	< 0.005	0.01	—	0.01	0.01	—	0.01	—	46.6	46.6	< 0.005	< 0.005	—	46.8
Dust From Material Movement	—	—	—	—	—	0.02	0.02	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.42	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	104	104	< 0.005	< 0.005	0.36	105
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
Hauling	0.02	1.41	0.87	0.01	0.01	0.27	0.28	0.01	0.07	0.08	—	1,011	1,011	0.12	0.16	1.92	1,064
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.38	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	96.8	96.8	< 0.005	< 0.005	0.01	98.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	1.48	0.87	0.01	0.01	0.27	0.28	0.01	0.07	0.08	—	1,011	1,011	0.12	0.16	0.05	1,062
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.07	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17.3	17.3	< 0.005	< 0.005	0.03	17.6
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
Hauling	< 0.005	0.26	0.15	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	180	180	0.02	0.03	0.15	189

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.87	2.87	< 0.005	< 0.005	< 0.005	2.91
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
Hauling	< 0.005	0.05	0.03	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	29.8	29.8	< 0.005	< 0.005	0.02	31.3

3.15. Grading3b (2028) - Unmitigated

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

Location	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	0.67	5.92	10.4	0.01	0.22	—	0.22	0.20	—	0.20	—	1,581	1,581	0.06	0.01	—	1,587
Dust From Material Movement	—	—	—	—	—	0.53	0.53	—	0.06	0.06	—	—	—	—	—	—	—
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.65	1.14	< 0.005	0.02	—	0.02	0.02	—	0.02	—	173	173	0.01	< 0.005	—	174
Dust From Material Movement	—	—	—	—	—	0.06	0.06	—	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

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.12	0.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	28.7	28.7	< 0.005	< 0.005	—	28.8
Dust From Material Movement	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.02	0.40	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	102	102	< 0.005	< 0.005	0.33	103
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
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.5	10.5	< 0.005	< 0.005	0.02	10.6
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.73	1.73	< 0.005	< 0.005	< 0.005	1.76
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
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

3.17. Grading3c (2029) - Unmitigated

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

Location	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	0.65	5.63	10.4	0.01	0.20	—	0.20	0.18	—	0.18	—	1,581	1,581	0.06	0.01	—	1,586
Dust From Material Movement	—	—	—	—	—	0.53	0.53	—	0.06	0.06	—	—	—	—	—	—	—
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.62	1.14	< 0.005	0.02	—	0.02	0.02	—	0.02	—	173	173	0.01	< 0.005	—	174
Dust From Material Movement	—	—	—	—	—	0.06	0.06	—	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.11	0.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	28.7	28.7	< 0.005	< 0.005	—	28.8
Dust From Material Movement	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.02	0.38	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	100	100	< 0.005	< 0.005	0.29	101
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
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.3	10.3	< 0.005	< 0.005	0.01	10.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.70	1.70	< 0.005	< 0.005	< 0.005	1.73
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
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

3.19. Building Construction3a (2027) - Unmitigated

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

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

Off-Road Equipment	0.57	5.45	9.01	0.01	0.15	—	0.15	0.14	—	0.14	—	1,333	1,333	0.05	0.01	—	1,338
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.81	1.34	< 0.005	0.02	—	0.02	0.02	—	0.02	—	198	198	0.01	< 0.005	—	199
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.15	0.24	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	32.8	32.8	< 0.005	< 0.005	—	32.9
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.4	11.4	< 0.005	< 0.005	< 0.005	11.5
Vendor	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	16.8	16.8	< 0.005	< 0.005	< 0.005	17.6
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.70	1.70	< 0.005	< 0.005	< 0.005	1.72
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.50	2.50	< 0.005	< 0.005	< 0.005	2.62
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.28	0.28	< 0.005	< 0.005	< 0.005	0.28

Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.41	0.41	< 0.005	< 0.005	< 0.005	0.43
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

3.21. Building Construction3a (2028) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.55	5.30	9.01	0.01	0.13	—	0.13	0.12	—	0.12	—	1,333	1,333	0.05	0.01	—	1,338
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.37	0.63	< 0.005	0.01	—	0.01	0.01	—	0.01	—	93.9	93.9	< 0.005	< 0.005	—	94.2
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.07	0.12	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.5	15.5	< 0.005	< 0.005	—	15.6
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.2	11.2	< 0.005	< 0.005	< 0.005	11.3
Vendor	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	16.4	16.4	< 0.005	< 0.005	< 0.005	17.1
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.79	0.79	< 0.005	< 0.005	< 0.005	0.80
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.16	1.16	< 0.005	< 0.005	< 0.005	1.21
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.13	0.13	< 0.005	< 0.005	< 0.005	0.13
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.19	0.19	< 0.005	< 0.005	< 0.005	0.20
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

3.23. Building Construction3b (2028) - Unmitigated

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

Location	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	0.55	5.30	9.01	0.01	0.13	—	0.13	0.12	—	0.12	—	1,333	1,333	0.05	0.01	—	1,338
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.65	1.11	< 0.005	0.02	—	0.02	0.02	—	0.02	—	164	164	0.01	< 0.005	—	165
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.12	0.20	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	27.2	27.2	< 0.005	< 0.005	—	27.3
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.0	12.0	< 0.005	< 0.005	0.04	12.0
Vendor	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	16.4	16.4	< 0.005	< 0.005	0.03	17.2
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.38	1.38	< 0.005	< 0.005	< 0.005	1.40
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.02	2.02	< 0.005	< 0.005	< 0.005	2.11
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.23	0.23	< 0.005	< 0.005	< 0.005	0.23
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.33	0.33	< 0.005	< 0.005	< 0.005	0.35
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

3.25. Building Construction3c (2029) - Unmitigated

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

Location	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	0.54	5.20	9.01	0.01	0.12	—	0.12	0.11	—	0.11	—	1,333	1,333	0.05	0.01	—	1,337
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.57	0.99	< 0.005	0.01	—	0.01	0.01	—	0.01	—	146	146	0.01	< 0.005	—	147
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.10	0.18	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	24.2	24.2	< 0.005	< 0.005	—	24.3
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.8	11.8	< 0.005	< 0.005	0.03	11.8
Vendor	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	15.9	15.9	< 0.005	< 0.005	0.03	16.7
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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.21	1.21	< 0.005	< 0.005	< 0.005	1.22
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.75	1.75	< 0.005	< 0.005	< 0.005	1.83
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.20	0.20	< 0.005	< 0.005	< 0.005	0.20
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.29	0.29	< 0.005	< 0.005	< 0.005	0.30
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

3.27. Paving (2027) - Unmitigated

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

Location	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	0.23	2.04	2.67	< 0.005	0.09	—	0.09	0.09	—	0.09	—	400	400	0.02	< 0.005	—	401
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.23	2.04	2.67	< 0.005	0.09	—	0.09	0.09	—	0.09	—	400	400	0.02	< 0.005	—	401
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.58	0.76	< 0.005	0.03	—	0.03	0.02	—	0.02	—	114	114	< 0.005	< 0.005	—	115
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.11	0.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	18.9	18.9	< 0.005	< 0.005	—	19.0
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.17	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	41.5	41.5	< 0.005	< 0.005	0.14	42.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.15	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	38.7	38.7	< 0.005	< 0.005	< 0.005	39.3
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
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.1	11.1	< 0.005	< 0.005	0.02	11.3
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

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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.84	1.84	< 0.005	< 0.005	< 0.005	1.87
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
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

3.29. Paving (2028) - Unmitigated

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

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.22	1.97	2.67	< 0.005	0.08	—	0.08	0.08	—	0.08	—	400	400	0.02	< 0.005	—	401
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.14	0.19	< 0.005	0.01	—	0.01	0.01	—	0.01	—	28.2	28.2	< 0.005	< 0.005	—	28.3
Paving	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.67	4.67	< 0.005	< 0.005	—	4.68

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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.14	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	38.1	38.1	< 0.005	< 0.005	< 0.005	38.6
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
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.69	2.69	< 0.005	< 0.005	< 0.005	2.73
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.45	0.45	< 0.005	< 0.005	< 0.005	0.45
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
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

4. Operations Emissions Details

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	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	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	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequeste red	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequeste red	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequeste red	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Demolition3a	Demolition	5/10/2027	6/4/2027	5.00	20.0	—
Demolition3b	Demolition	6/12/2028	8/4/2028	5.00	40.0	—
Demolition3c	Demolition	6/11/2029	8/3/2029	5.00	40.0	—
Site Preparation3a	Site Preparation	5/10/2027	7/18/2027	5.00	50.0	—
Site Preparaton3b	Site Preparation	6/12/2028	8/4/2028	5.00	40.0	—
Site Prepareation3c	Site Preparation	6/11/2029	8/3/2029	5.00	40.0	—
Grading3a	Grading	7/19/2027	10/16/2027	5.00	65.0	—
Grading3b	Grading	6/12/2028	8/4/2028	5.00	40.0	—
Grading3c	Grading	6/11/2029	8/3/2029	5.00	40.0	—
Building Construction3a	Building Construction	10/17/2027	2/5/2028	5.00	80.0	—
Building Construction3b	Building Construction	6/6/2028	8/7/2028	5.00	45.0	—
Building Construction3c	Building Construction	6/11/2029	8/3/2029	5.00	40.0	—
Paving	Paving	8/8/2027	2/5/2028	5.00	130	—

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
Demolition3a	Excavators	Diesel	Average	2.00	6.00	36.0	0.38
Demolition3a	Concrete/Industrial Saws	Diesel	Average	1.00	0.50	33.0	0.73

Demolition3a	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Demolition3b	Concrete/Industrial Saws	Diesel	Average	1.00	0.50	33.0	0.73
Demolition3b	Excavators	Diesel	Average	2.00	6.00	36.0	0.38
Demolition3b	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Demolition3c	Concrete/Industrial Saws	Diesel	Average	1.00	0.50	33.0	0.73
Demolition3c	Excavators	Diesel	Average	2.00	6.00	36.0	0.38
Demolition3c	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Site Preparation3a	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Site Preparation3a	Rubber Tired Dozers	Diesel	Average	2.00	8.00	367	0.40
Site Preparaton3b	Rubber Tired Dozers	Diesel	Average	2.00	8.00	367	0.40
Site Preparaton3b	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Site Prepareation3c	Rubber Tired Dozers	Diesel	Average	2.00	8.00	367	0.40
Site Prepareation3c	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Grading3a	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading3a	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Grading3a	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Grading3b	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Grading3b	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading3b	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Grading3c	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Grading3c	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading3c	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37

Building Construction3a	Generator Sets	Diesel	Average	1.00	2.00	14.0	0.74
Building Construction3a	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction3a	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Building Construction3a	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Building Construction3a	Excavators	Diesel	Average	1.00	6.00	36.0	0.38
Building Construction3b	Generator Sets	Diesel	Average	1.00	2.00	14.0	0.74
Building Construction3b	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Building Construction3b	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction3b	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Building Construction3b	Excavators	Diesel	Average	1.00	6.00	36.0	0.38
Building Construction3c	Generator Sets	Diesel	Average	1.00	2.00	14.0	0.74
Building Construction3c	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Building Construction3c	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction3c	Excavators	Diesel	Average	1.00	6.00	36.0	0.38
Building Construction3c	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Paving	Pavers	Diesel	Average	1.00	7.00	81.0	0.42
Paving	Rollers	Diesel	Average	1.00	7.00	36.0	0.38

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition3a	—	—	—	—
Demolition3a	Worker	10.0	11.7	LDA,LDT1,LDT2
Demolition3a	Vendor	—	8.40	HHDT,MHDT

Demolition3a	Hauling	0.35	20.0	HHDT
Demolition3a	Onsite truck	—	—	HHDT
Site Preparation3a	—	—	—	—
Site Preparation3a	Worker	10.0	11.7	LDA,LDT1,LDT2
Site Preparation3a	Vendor	—	8.40	HHDT,MHDT
Site Preparation3a	Hauling	18.5	20.0	HHDT
Site Preparation3a	Onsite truck	—	—	HHDT
Grading3a	—	—	—	—
Grading3a	Worker	12.5	11.7	LDA,LDT1,LDT2
Grading3a	Vendor	—	8.40	HHDT,MHDT
Grading3a	Hauling	14.2	20.0	HHDT
Grading3a	Onsite truck	—	—	HHDT
Building Construction3a	—	—	—	—
Building Construction3a	Worker	1.47	11.7	LDA,LDT1,LDT2
Building Construction3a	Vendor	0.62	8.40	HHDT,MHDT
Building Construction3a	Hauling	0.00	20.0	HHDT
Building Construction3a	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	5.00	11.7	LDA,LDT1,LDT2
Paving	Vendor	—	8.40	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Demolition3b	—	—	—	—
Demolition3b	Worker	10.0	11.7	LDA,LDT1,LDT2
Demolition3b	Vendor	—	8.40	HHDT,MHDT
Demolition3b	Hauling	0.00	20.0	HHDT
Demolition3b	Onsite truck	—	—	HHDT

Demolition3c	—	—	—	—
Demolition3c	Worker	10.0	11.7	LDA,LDT1,LDT2
Demolition3c	Vendor	—	8.40	HHDT,MHDT
Demolition3c	Hauling	0.00	20.0	HHDT
Demolition3c	Onsite truck	—	—	HHDT
Site Preparaton3b	—	—	—	—
Site Preparaton3b	Worker	10.0	11.7	LDA,LDT1,LDT2
Site Preparaton3b	Vendor	—	8.40	HHDT,MHDT
Site Preparaton3b	Hauling	0.00	20.0	HHDT
Site Preparaton3b	Onsite truck	—	—	HHDT
Site Prepareation3c	—	—	—	—
Site Prepareation3c	Worker	10.0	11.7	LDA,LDT1,LDT2
Site Prepareation3c	Vendor	—	8.40	HHDT,MHDT
Site Prepareation3c	Hauling	0.00	20.0	HHDT
Site Prepareation3c	Onsite truck	—	—	HHDT
Grading3b	—	—	—	—
Grading3b	Worker	12.5	11.7	LDA,LDT1,LDT2
Grading3b	Vendor	—	8.40	HHDT,MHDT
Grading3b	Hauling	0.00	20.0	HHDT
Grading3b	Onsite truck	—	—	HHDT
Grading3c	—	—	—	—
Grading3c	Worker	12.5	11.7	LDA,LDT1,LDT2
Grading3c	Vendor	—	8.40	HHDT,MHDT
Grading3c	Hauling	0.00	20.0	HHDT
Grading3c	Onsite truck	—	—	HHDT
Building Construction3b	—	—	—	—
Building Construction3b	Worker	1.47	11.7	LDA,LDT1,LDT2

Building Construction3b	Vendor	0.62	8.40	HHDT,MHDT
Building Construction3b	Hauling	0.00	20.0	HHDT
Building Construction3b	Onsite truck	—	—	HHDT
Building Construction3c	—	—	—	—
Building Construction3c	Worker	1.47	11.7	LDA,LDT1,LDT2
Building Construction3c	Vendor	0.62	8.40	HHDT,MHDT
Building Construction3c	Hauling	0.00	20.0	HHDT
Building Construction3c	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Ton of Debris)	Acres Paved (acres)
Demolition3a	0.00	0.00	0.00	25.1	—
Demolition3b	0.00	0.00	0.00	25.1	—
Demolition3c	0.00	0.00	0.00	25.1	—
Site Preparation3a	—	7,407	5.00	0.00	—
Site Preparaton3b	—	—	40.0	0.00	—
Site Prepareation3c	—	—	40.0	0.00	—

Grading3a	7,407	—	10.0	0.00	—
Grading3b	—	—	20.0	0.00	—
Grading3c	—	—	20.0	0.00	—
Paving	0.00	0.00	0.00	0.00	5.42

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Demolished Area	2	36%	36%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Fast Food Restaurant w/o Drive Thru	0.00	0%
General Office Building	0.00	0%
Other Non-Asphalt Surfaces	5.42	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2029	0.00	204	0.03	< 0.005
2027	0.00	204	0.03	< 0.005
2028	0.00	204	0.03	< 0.005

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	8.93	annual days of extreme heat
Extreme Precipitation	14.0	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	6.34	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 (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters

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	4	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	4	1	1	4
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	10.6
AQ-PM	21.9
AQ-DPM	34.2
Drinking Water	7.43
Lead Risk Housing	29.0
Pesticides	9.90
Toxic Releases	38.2
Traffic	59.0
Effect Indicators	—
CleanUp Sites	0.00
Groundwater	3.30
Haz Waste Facilities/Generators	81.5
Impaired Water Bodies	0.00

Solid Waste	22.1
Sensitive Population	—
Asthma	17.4
Cardio-vascular	23.7
Low Birth Weights	30.8
Socioeconomic Factor Indicators	—
Education	46.8
Housing	34.2
Linguistic	64.1
Poverty	50.0
Unemployment	83.2

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	76.22225074
Employed	97.33093802
Median HI	69.74207622
Education	—
Bachelor's or higher	80.97010137
High school enrollment	100
Preschool enrollment	61.06762479
Transportation	—
Auto Access	10.39394328
Active commuting	65.75131528
Social	—

2-parent households	71.73104068
Voting	98.49865264
Neighborhood	—
Alcohol availability	66.46990889
Park access	81.35506224
Retail density	79.30193764
Supermarket access	54.22815347
Tree canopy	91.64634929
Housing	—
Homeownership	46.43911202
Housing habitability	14.07673553
Low-inc homeowner severe housing cost burden	59.822918
Low-inc renter severe housing cost burden	60.07955858
Uncrowded housing	56.30694213
Health Outcomes	—
Insured adults	71.87219299
Arthritis	0.0
Asthma ER Admissions	61.2
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	60.2
Cognitively Disabled	32.0
Physically Disabled	5.0

Heart Attack ER Admissions	81.8
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	63.2
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	63.4
Children	65.5
Elderly	4.5
English Speaking	40.8
Foreign-born	51.4
Outdoor Workers	87.7
Climate Change Adaptive Capacity	—
Impervious Surface Cover	74.4
Traffic Density	81.1
Traffic Access	59.7
Other Indices	—
Hardship	18.8
Other Decision Support	—
2016 Voting	96.7

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	19.0
Healthy Places Index Score for Project Location (b)	82.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
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
Construction: Construction Phases	Construction duration per Project Description
Construction: Off-Road Equipment	Equipment per construction contractor
Construction: Trips and VMT	Worker trips adjusted to account for displaced sports-related trips, which include an additional 340 trips daily and 6,800 vehicle miles daily

Terra Linda HS Capital Improvements - Trips by Displaced Athletic Facilities Custom Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Terra Linda HS Capital Improvements - Trips by Displaced Athletic Facilities
Operational Year	2023
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.60
Precipitation (days)	18.8
Location	320 Nova Albion Way, San Rafael, CA 94903, USA
County	Marin
City	San Rafael
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	915
EDFZ	2
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.21

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
High School	161	1000sqft	3.69	160,676	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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
High School	1.84	2.13	23.0	0.05	0.04	4.78	4.82	0.04	1.21	1.25	—	5,452	5,452	0.19	0.18	25.0	5,536
Total	1.84	2.13	23.0	0.05	0.04	4.78	4.82	0.04	1.21	1.25	—	5,452	5,452	0.19	0.18	25.0	5,536
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
High School	1.80	2.52	20.9	0.05	0.04	4.78	4.82	0.04	1.21	1.25	—	5,143	5,143	0.21	0.20	0.65	5,209
Total	1.80	2.52	20.9	0.05	0.04	4.78	4.82	0.04	1.21	1.25	—	5,143	5,143	0.21	0.20	0.65	5,209
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
High School	0.23	0.31	2.66	0.01	< 0.005	0.62	0.62	< 0.005	0.16	0.16	—	610	610	0.02	0.02	1.27	619
Total	0.23	0.31	2.66	0.01	< 0.005	0.62	0.62	< 0.005	0.16	0.16	—	610	610	0.02	0.02	1.27	619

5. Activity Data

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

High School	340	0.00	0.00	88,645	6,800	0.00	0.00	1,772,891

Terra Linda HS Capital Improvements - Project Operations Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Terra Linda HS Capital Improvements - Project Operations
Operational Year	2029
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.60
Precipitation (days)	18.8
Location	320 Nova Albion Way, San Rafael, CA 94903, USA
County	Marin
City	San Rafael
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	915
EDFZ	2
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.20

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
Government Office Building	7.17	1000sqft	0.16	7,175	0.00	0.00	—	—

High School	97.5	1000sqft	2.24	97,511	0.00	0.00	—	—
High School	63.2	1000sqft	1.45	63,165	0.00	0.00	—	—
Health Club	24.3	1000sqft	0.56	24,343	0.00	0.00	—	—
Health Club	21.2	1000sqft	0.49	21,218	0.00	0.00	—	—
Recreational Swimming Pool	9.84	1000sqft	0.23	9,840	0.00	0.00	—	—
Other Non-Asphalt Surfaces	194	1000sqft	4.46	0.00	0.00	0.00	—	—
Parking Lot	250	Space	2.25	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

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.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	7.26	2.75	14.0	0.02	0.21	0.66	0.87	0.20	0.17	0.37	49.5	4,487	4,537	5.41	0.09	2.71	4,702
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.71	2.70	4.47	0.02	0.19	0.66	0.85	0.19	0.17	0.36	49.5	4,411	4,461	5.42	0.09	0.95	4,625
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	6.47	2.73	9.02	0.02	0.20	0.65	0.85	0.20	0.17	0.36	49.5	4,433	4,482	5.42	0.09	1.68	4,647

Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.18	0.50	1.65	< 0.005	0.04	0.12	0.16	0.04	0.03	0.07	8.19	734	742	0.90	0.02	0.28	769

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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.30	0.21	2.53	0.01	< 0.005	0.66	0.66	< 0.005	0.17	0.17	—	676	676	0.02	0.02	1.80	686
Area	6.83	0.08	9.39	< 0.005	0.02	—	0.02	0.01	—	0.01	—	38.6	38.6	< 0.005	< 0.005	—	38.8
Energy	0.14	2.46	2.07	0.01	0.19	—	0.19	0.19	—	0.19	—	3,736	3,736	0.39	0.02	—	3,752
Water	—	—	—	—	—	—	—	—	—	—	19.2	36.3	55.6	1.98	0.05	—	119
Waste	—	—	—	—	—	—	—	—	—	—	30.2	0.00	30.2	3.02	0.00	—	106
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.90	0.90
Total	7.26	2.75	14.0	0.02	0.21	0.66	0.87	0.20	0.17	0.37	49.5	4,487	4,537	5.41	0.09	2.71	4,702
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.29	0.24	2.40	0.01	< 0.005	0.66	0.66	< 0.005	0.17	0.17	—	639	639	0.03	0.03	0.05	647
Area	5.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.14	2.46	2.07	0.01	0.19	—	0.19	0.19	—	0.19	—	3,736	3,736	0.39	0.02	—	3,752
Water	—	—	—	—	—	—	—	—	—	—	19.2	36.3	55.6	1.98	0.05	—	119
Waste	—	—	—	—	—	—	—	—	—	—	30.2	0.00	30.2	3.02	0.00	—	106
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.90	0.90
Total	5.71	2.70	4.47	0.02	0.19	0.66	0.85	0.19	0.17	0.36	49.5	4,411	4,461	5.42	0.09	0.95	4,625
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mobile	0.29	0.23	2.32	0.01	< 0.005	0.65	0.66	< 0.005	0.17	0.17	—	641	641	0.03	0.02	0.78	650
Area	6.04	0.04	4.63	< 0.005	0.01	—	0.01	0.01	—	0.01	—	19.0	19.0	< 0.005	< 0.005	—	19.1
Energy	0.14	2.46	2.07	0.01	0.19	—	0.19	0.19	—	0.19	—	3,736	3,736	0.39	0.02	—	3,752
Water	—	—	—	—	—	—	—	—	—	—	19.2	36.3	55.6	1.98	0.05	—	119
Waste	—	—	—	—	—	—	—	—	—	—	30.2	0.00	30.2	3.02	0.00	—	106
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.90	0.90
Total	6.47	2.73	9.02	0.02	0.20	0.65	0.85	0.20	0.17	0.36	49.5	4,433	4,482	5.42	0.09	1.68	4,647
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.05	0.04	0.42	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.03	—	106	106	< 0.005	< 0.005	0.13	108
Area	1.10	0.01	0.85	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.15	3.15	< 0.005	< 0.005	—	3.16
Energy	0.02	0.45	0.38	< 0.005	0.03	—	0.03	0.03	—	0.03	—	619	619	0.06	< 0.005	—	621
Water	—	—	—	—	—	—	—	—	—	—	3.18	6.01	9.20	0.33	0.01	—	19.7
Waste	—	—	—	—	—	—	—	—	—	—	5.00	0.00	5.00	0.50	0.00	—	17.5
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.15	0.15
Total	1.18	0.50	1.65	< 0.005	0.04	0.12	0.16	0.04	0.03	0.07	8.19	734	742	0.90	0.02	0.28	769

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

Government Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High School	0.30	0.21	2.53	0.01	< 0.005	0.66	0.66	< 0.005	0.17	0.17	—	676	676	0.02	0.02	1.80	686
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	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	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.30	0.21	2.53	0.01	< 0.005	0.66	0.66	< 0.005	0.17	0.17	—	676	676	0.02	0.02	1.80	686
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High School	0.29	0.24	2.40	0.01	< 0.005	0.66	0.66	< 0.005	0.17	0.17	—	639	639	0.03	0.03	0.05	647
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	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	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.29	0.24	2.40	0.01	< 0.005	0.66	0.66	< 0.005	0.17	0.17	—	639	639	0.03	0.03	0.05	647
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High School	0.05	0.04	0.42	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.03	—	106	106	< 0.005	< 0.005	0.13	108
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	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	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.05	0.04	0.42	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.03	—	106	106	< 0.005	< 0.005	0.13	108

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

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	84.5	84.5	0.01	< 0.005	—	85.3
High School	—	—	—	—	—	—	—	—	—	—	—	404	404	0.07	0.01	—	408
Health Club	—	—	—	—	—	—	—	—	—	—	—	264	264	0.04	0.01	—	267
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	48.0	48.0	0.01	< 0.005	—	48.5
Total	—	—	—	—	—	—	—	—	—	—	—	801	801	0.13	0.02	—	809
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	84.5	84.5	0.01	< 0.005	—	85.3
High School	—	—	—	—	—	—	—	—	—	—	—	404	404	0.07	0.01	—	408
Health Club	—	—	—	—	—	—	—	—	—	—	—	264	264	0.04	0.01	—	267

Recreational Swimming	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	48.0	48.0	0.01	< 0.005	—	48.5
Total	—	—	—	—	—	—	—	—	—	—	—	801	801	0.13	0.02	—	809
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	14.0	14.0	< 0.005	< 0.005	—	14.1
High School	—	—	—	—	—	—	—	—	—	—	—	67.0	67.0	0.01	< 0.005	—	67.6
Health Club	—	—	—	—	—	—	—	—	—	—	—	43.7	43.7	0.01	< 0.005	—	44.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	7.94	7.94	< 0.005	< 0.005	—	8.02
Total	—	—	—	—	—	—	—	—	—	—	—	133	133	0.02	< 0.005	—	134

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

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	< 0.005	0.04	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	53.6	53.6	< 0.005	< 0.005	—	53.8
High School	0.10	1.89	1.59	0.01	0.14	—	0.14	0.14	—	0.14	—	2,260	2,260	0.20	< 0.005	—	2,266
Health Club	0.03	0.52	0.44	< 0.005	0.04	—	0.04	0.04	—	0.04	—	621	621	0.05	< 0.005	—	623
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	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	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.14	2.46	2.07	0.01	0.19	—	0.19	0.19	—	0.19	—	2,935	2,935	0.26	0.01	—	2,943
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	< 0.005	0.04	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	53.6	53.6	< 0.005	< 0.005	—	53.8
High School	0.10	1.89	1.59	0.01	0.14	—	0.14	0.14	—	0.14	—	2,260	2,260	0.20	< 0.005	—	2,266
Health Club	0.03	0.52	0.44	< 0.005	0.04	—	0.04	0.04	—	0.04	—	621	621	0.05	< 0.005	—	623

Recreational Swimming	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	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	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.14	2.46	2.07	0.01	0.19	—	0.19	0.19	—	0.19	—	2,935	2,935	0.26	0.01	—	2,943
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	8.87	8.87	< 0.005	< 0.005	—	8.90
High School	0.02	0.35	0.29	< 0.005	0.03	—	0.03	0.03	—	0.03	—	374	374	0.03	< 0.005	—	375
Health Club	0.01	0.10	0.08	< 0.005	0.01	—	0.01	0.01	—	0.01	—	103	103	0.01	< 0.005	—	103
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	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	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.02	0.45	0.38	< 0.005	0.03	—	0.03	0.03	—	0.03	—	486	486	0.04	< 0.005	—	487

4.3. Area Emissions by Source

4.3.1. Unmitigated

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

Source	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	4.64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.54	0.08	9.39	< 0.005	0.02	—	0.02	0.01	—	0.01	—	38.6	38.6	< 0.005	< 0.005	—	38.8
Total	6.83	0.08	9.39	< 0.005	0.02	—	0.02	0.01	—	0.01	—	38.6	38.6	< 0.005	< 0.005	—	38.8
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	4.64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	5.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.85	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landscape Equipme	0.14	0.01	0.85	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.15	3.15	< 0.005	< 0.005	—	3.16
Total	1.10	0.01	0.85	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.15	3.15	< 0.005	< 0.005	—	3.16

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	2.73	5.16	7.89	0.28	0.01	—	16.9
High School	—	—	—	—	—	—	—	—	—	—	10.2	19.3	29.5	1.05	0.03	—	63.4
Health Club	—	—	—	—	—	—	—	—	—	—	5.16	9.75	14.9	0.53	0.01	—	32.0
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	1.12	2.11	3.22	0.11	< 0.005	—	6.91
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	19.2	36.3	55.6	1.98	0.05	—	119

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	2.73	5.16	7.89	0.28	0.01	—	16.9
High School	—	—	—	—	—	—	—	—	—	—	10.2	19.3	29.5	1.05	0.03	—	63.4
Health Club	—	—	—	—	—	—	—	—	—	—	5.16	9.75	14.9	0.53	0.01	—	32.0
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	1.12	2.11	3.22	0.11	< 0.005	—	6.91
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	19.2	36.3	55.6	1.98	0.05	—	119
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	0.45	0.85	1.31	0.05	< 0.005	—	2.80
High School	—	—	—	—	—	—	—	—	—	—	1.69	3.20	4.89	0.17	< 0.005	—	10.5
Health Club	—	—	—	—	—	—	—	—	—	—	0.85	1.61	2.47	0.09	< 0.005	—	5.30
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	0.18	0.35	0.53	0.02	< 0.005	—	1.14

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	3.18	6.01	9.20	0.33	0.01	—	19.7

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

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

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High School	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Health Club	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	30.2	0.00	30.2	3.02	0.00	—	106
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	30.2	0.00	30.2	3.02	0.00	—	106

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High School	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Health Club	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	30.2	0.00	30.2	3.02	0.00	—	106
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	30.2	0.00	30.2	3.02	0.00	—	106
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
High School	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Health Club	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	5.00	0.00	5.00	0.50	0.00	—	17.5

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	5.00	0.00	5.00	0.50	0.00	—	17.5

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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.02	0.02
High School	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.62	0.62
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.22	0.22
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.90	0.90
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Government Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.02	0.02
High School	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.62	0.62
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.22	0.22
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.90	0.90
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
High School	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.10	0.10
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.04	0.04
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.15	0.15

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

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

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

Equipment Type	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	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	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	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequeste red	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequeste red	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

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

Government Office Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High School	92.0	92.0	92.0	33,580	938	938	938	342,368
High School	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recreational Swimming Pool	0.00	0.00	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	0.00	0.00
Parking Lot	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	323,868	107,956	17,538

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)
Government Office Building	151,219	204	0.0330	0.0040	167,262
High School	439,227	204	0.0330	0.0040	4,279,805
High School	284,519	204	0.0330	0.0040	2,772,343
Health Club	252,396	204	0.0330	0.0040	1,035,643
Health Club	219,995	204	0.0330	0.0040	902,694
Recreational Swimming Pool	0.00	204	0.0330	0.0040	0.00
Other Non-Asphalt Surfaces	0.00	204	0.0330	0.0040	0.00
Parking Lot	85,857	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)
Government Office Building	1,425,383	0.00
High School	3,237,818	0.00
High School	2,097,371	0.00
Health Club	1,439,722	0.00
Health Club	1,254,899	0.00
Recreational Swimming Pool	581,969	0.00
Other Non-Asphalt Surfaces	0.00	0.00
Parking Lot	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Government Office Building	0.00	—
High School	0.00	—
High School	0.00	—
Health Club	0.00	—
Health Club	0.00	—
Recreational Swimming Pool	56.1	—
Other Non-Asphalt Surfaces	0.00	—
Parking Lot	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
Government Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Government Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
High School	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
High School	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
High School	Stand-alone retail refrigerators and freezers	R-134a	1,430	< 0.005	1.00	0.00	1.00
High School	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
High School	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00

High School	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
High School	Stand-alone retail refrigerators and freezers	R-134a	1,430	< 0.005	1.00	0.00	1.00
High School	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Health Club	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Health Club	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Health Club	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Health Club	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Recreational Swimming Pool	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Recreational Swimming Pool	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

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

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

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

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

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

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	8.93	annual days of extreme heat
Extreme Precipitation	14.0	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	6.34	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 (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
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	4	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	4	1	1	4
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	10.6
AQ-PM	21.9
AQ-DPM	34.2

Drinking Water	7.43
Lead Risk Housing	29.0
Pesticides	9.90
Toxic Releases	38.2
Traffic	59.0
Effect Indicators	—
CleanUp Sites	0.00
Groundwater	3.30
Haz Waste Facilities/Generators	81.5
Impaired Water Bodies	0.00
Solid Waste	22.1
Sensitive Population	—
Asthma	17.4
Cardio-vascular	23.7
Low Birth Weights	30.8
Socioeconomic Factor Indicators	—
Education	46.8
Housing	34.2
Linguistic	64.1
Poverty	50.0
Unemployment	83.2

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	76.22225074

Employed	97.33093802
Median HI	69.74207622
Education	—
Bachelor's or higher	80.97010137
High school enrollment	100
Preschool enrollment	61.06762479
Transportation	—
Auto Access	10.39394328
Active commuting	65.75131528
Social	—
2-parent households	71.73104068
Voting	98.49865264
Neighborhood	—
Alcohol availability	66.46990889
Park access	81.35506224
Retail density	79.30193764
Supermarket access	54.22815347
Tree canopy	91.64634929
Housing	—
Homeownership	46.43911202
Housing habitability	14.07673553
Low-inc homeowner severe housing cost burden	59.822918
Low-inc renter severe housing cost burden	60.07955858
Uncrowded housing	56.30694213
Health Outcomes	—
Insured adults	71.87219299
Arthritis	0.0

Asthma ER Admissions	61.2
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	60.2
Cognitively Disabled	32.0
Physically Disabled	5.0
Heart Attack ER Admissions	81.8
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	63.2
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	63.4
Children	65.5
Elderly	4.5
English Speaking	40.8

Foreign-born	51.4
Outdoor Workers	87.7
Climate Change Adaptive Capacity	—
Impervious Surface Cover	74.4
Traffic Density	81.1
Traffic Access	59.7
Other Indices	—
Hardship	18.8
Other Decision Support	—
2016 Voting	96.7

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	19.0
Healthy Places Index Score for Project Location (b)	82.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
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
Operations: Vehicle Data	New trips associated with school gymnasiums and aquatics center accounted for in high school land use.
Operations: Solid Waste	Modernized land uses generate solid waste under existing conditions and the Proposed Project would not increase this. Solid waste generated at the new aquatics center accounted since it would be expanded compared with existing conditions

Terra Linda HS Capital Improvements - Existing Energy Consumption Custom Report

Table of Contents

4. Operations Emissions Details

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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	84.5	84.5	0.01	< 0.005	—	85.3
High School	—	—	—	—	—	—	—	—	—	—	—	404	404	0.07	0.01	—	408
Health Club	—	—	—	—	—	—	—	—	—	—	—	264	264	0.04	0.01	—	267
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	48.0	48.0	0.01	< 0.005	—	48.5
Total	—	—	—	—	—	—	—	—	—	—	—	801	801	0.13	0.02	—	809
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Government Office Building	—	—	—	—	—	—	—	—	—	—	—	84.5	84.5	0.01	< 0.005	—	85.3
High School	—	—	—	—	—	—	—	—	—	—	—	404	404	0.07	0.01	—	408
Health Club	—	—	—	—	—	—	—	—	—	—	—	264	264	0.04	0.01	—	267
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	48.0	48.0	0.01	< 0.005	—	48.5
Total	—	—	—	—	—	—	—	—	—	—	—	801	801	0.13	0.02	—	809
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	—	—	—	—	—	—	—	—	—	—	—	14.0	14.0	< 0.005	< 0.005	—	14.1
High School	—	—	—	—	—	—	—	—	—	—	—	67.0	67.0	0.01	< 0.005	—	67.6
Health Club	—	—	—	—	—	—	—	—	—	—	—	43.7	43.7	0.01	< 0.005	—	44.1
Recreational Swimming Pool	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

Parking Lot	—	—	—	—	—	—	—	—	—	—	—	7.94	7.94	< 0.005	< 0.005	—	8.02
Total	—	—	—	—	—	—	—	—	—	—	—	133	133	0.02	< 0.005	—	134

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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	< 0.005	0.04	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	53.6	53.6	< 0.005	< 0.005	—	53.8
High School	0.10	1.90	1.60	0.01	0.14	—	0.14	0.14	—	0.14	—	2,271	2,271	0.20	< 0.005	—	2,277
Health Club	0.03	0.52	0.44	< 0.005	0.04	—	0.04	0.04	—	0.04	—	621	621	0.05	< 0.005	—	623
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	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	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.14	2.47	2.07	0.01	0.19	—	0.19	0.19	—	0.19	—	2,945	2,945	0.26	0.01	—	2,954
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Government Office Building	< 0.005	0.04	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	53.6	53.6	< 0.005	< 0.005	—	53.8
High School	0.10	1.90	1.60	0.01	0.14	—	0.14	0.14	—	0.14	—	2,271	2,271	0.20	< 0.005	—	2,277
Health Club	0.03	0.52	0.44	< 0.005	0.04	—	0.04	0.04	—	0.04	—	621	621	0.05	< 0.005	—	623
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	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	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.14	2.47	2.07	0.01	0.19	—	0.19	0.19	—	0.19	—	2,945	2,945	0.26	0.01	—	2,954
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Government Office Building	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	8.87	8.87	< 0.005	< 0.005	—	8.90
High School	0.02	0.35	0.29	< 0.005	0.03	—	0.03	0.03	—	0.03	—	376	376	0.03	< 0.005	—	377
Health Club	0.01	0.10	0.08	< 0.005	0.01	—	0.01	0.01	—	0.01	—	103	103	0.01	< 0.005	—	103
Recreational Swimming Pool	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	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	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

Parking Lot	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.02	0.45	0.38	< 0.005	0.03	—	0.03	0.03	—	0.03	—	488	488	0.04	< 0.005	—	489

5. Activity Data

5.11. Operational Energy Consumption

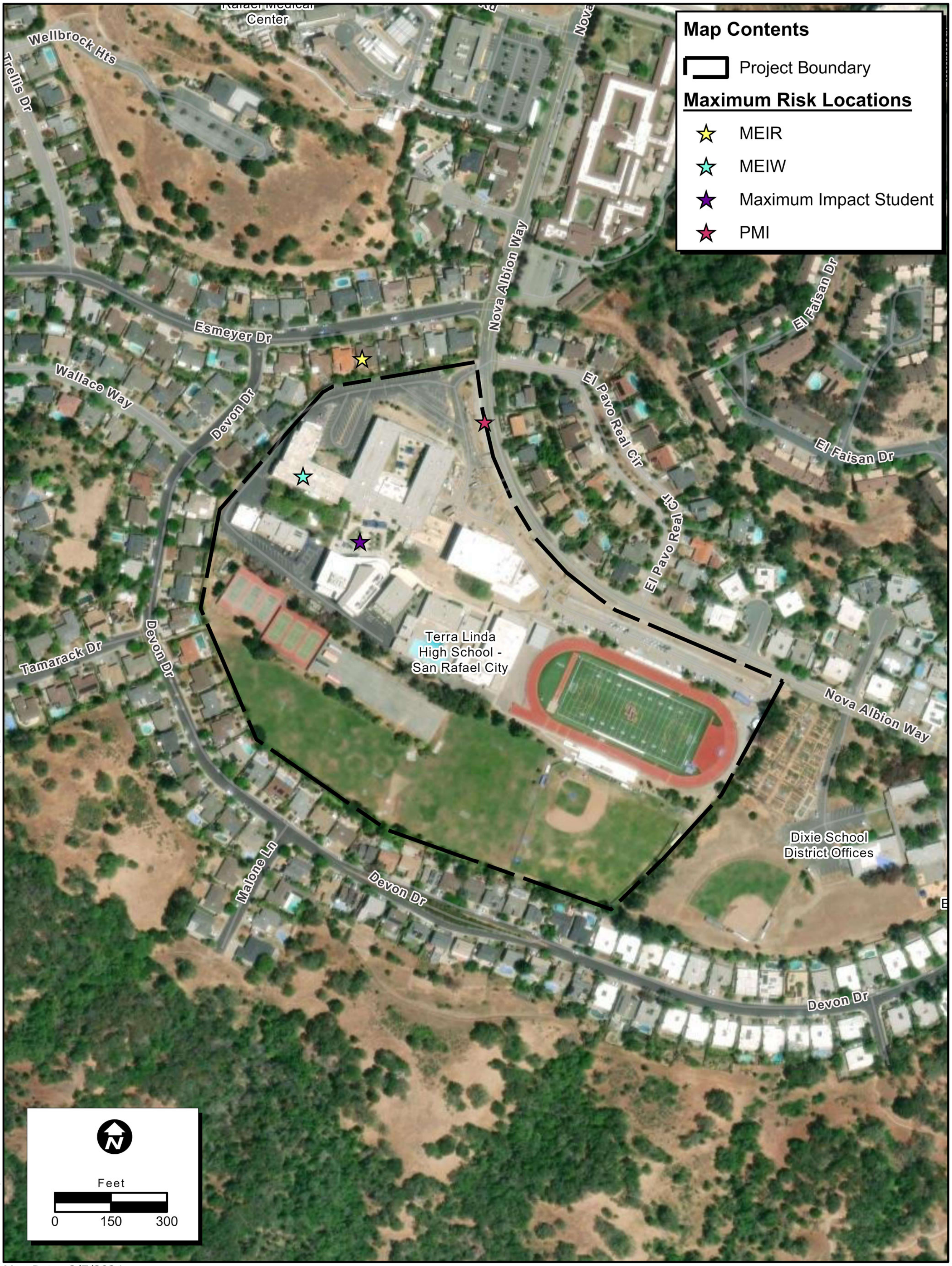
5.11.1. Unmitigated

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)
Government Office Building	151,219	204	0.0330	0.0040	167,262
High School	439,227	204	0.0330	0.0040	4,279,805
High School	284,519	204	0.0330	0.0040	2,805,190
Health Club	252,396	204	0.0330	0.0040	1,035,643
Health Club	219,995	204	0.0330	0.0040	902,694
Recreational Swimming Pool	0.00	204	0.0330	0.0040	0.00
Other Non-Asphalt Surfaces	0.00	204	0.0330	0.0040	0.00
Parking Lot	85,857	204	0.0330	0.0040	0.00

ATTACHMENT B

Health Risk Analysis Output Files



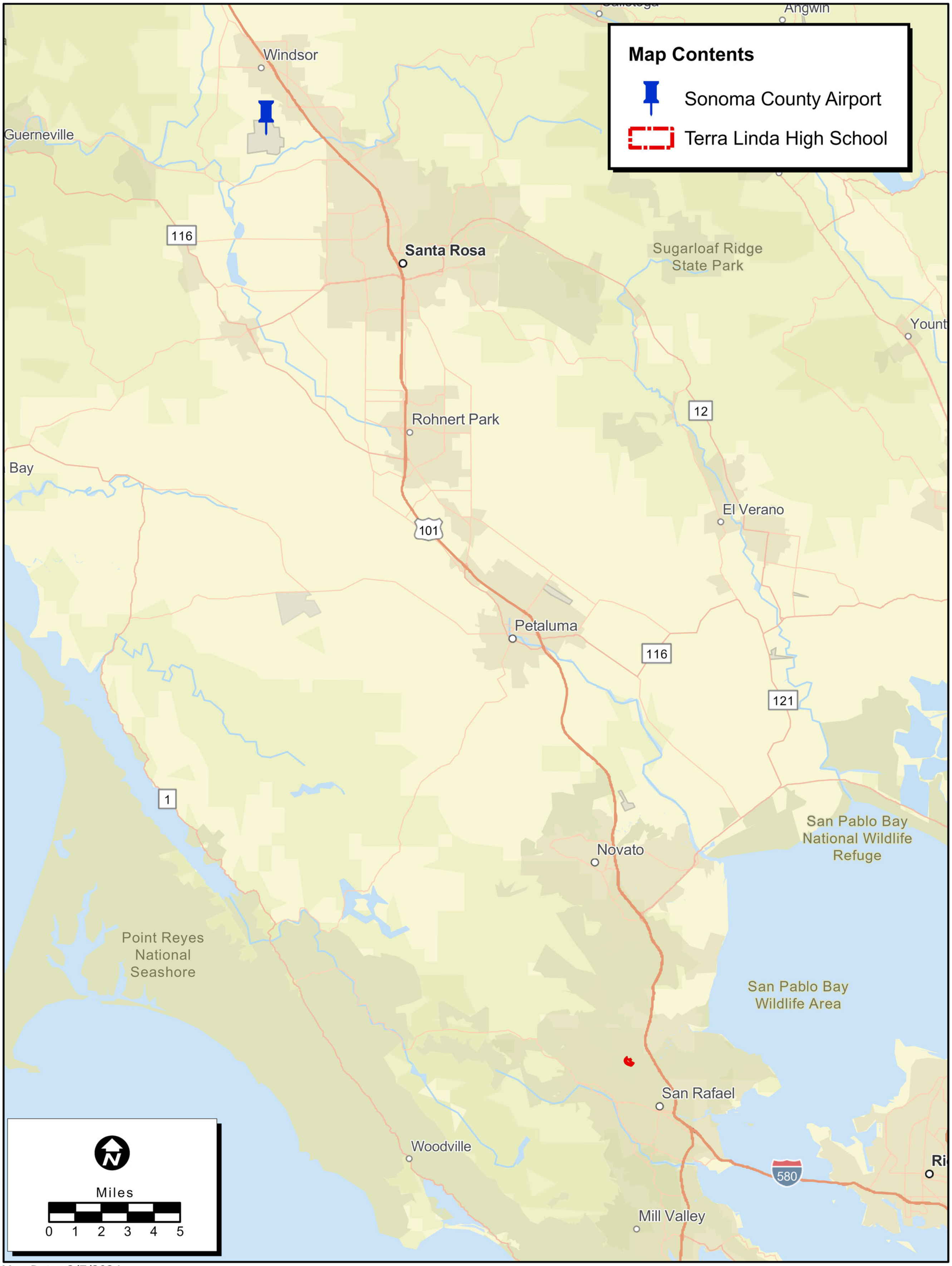
Location: W:\Projects\2023\2023-141 Terra Linda HS Modernization Project - San Rafael\Emissions\HRA\Mapping\Terra Linda HRA Mapping.aprx - Portrait Template (agne - 2/7/2024)

Map Date: 2/7/2024
Sources: Esri 2024

Maximum Risk Locations

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Terra Linda High School Modernization Project, 2023-141



Location: W:\Projects\2023\2023-141 Terra Linda HS Modernization Project - San Rafael\Emissions\HRA\Mapping\Terra Linda HRA Mapping.aprx - Location Template (agne - 2/7/2024)

Map Date: 2/7/2024

Sources: ESRI 2023

Meteorological Station Location

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

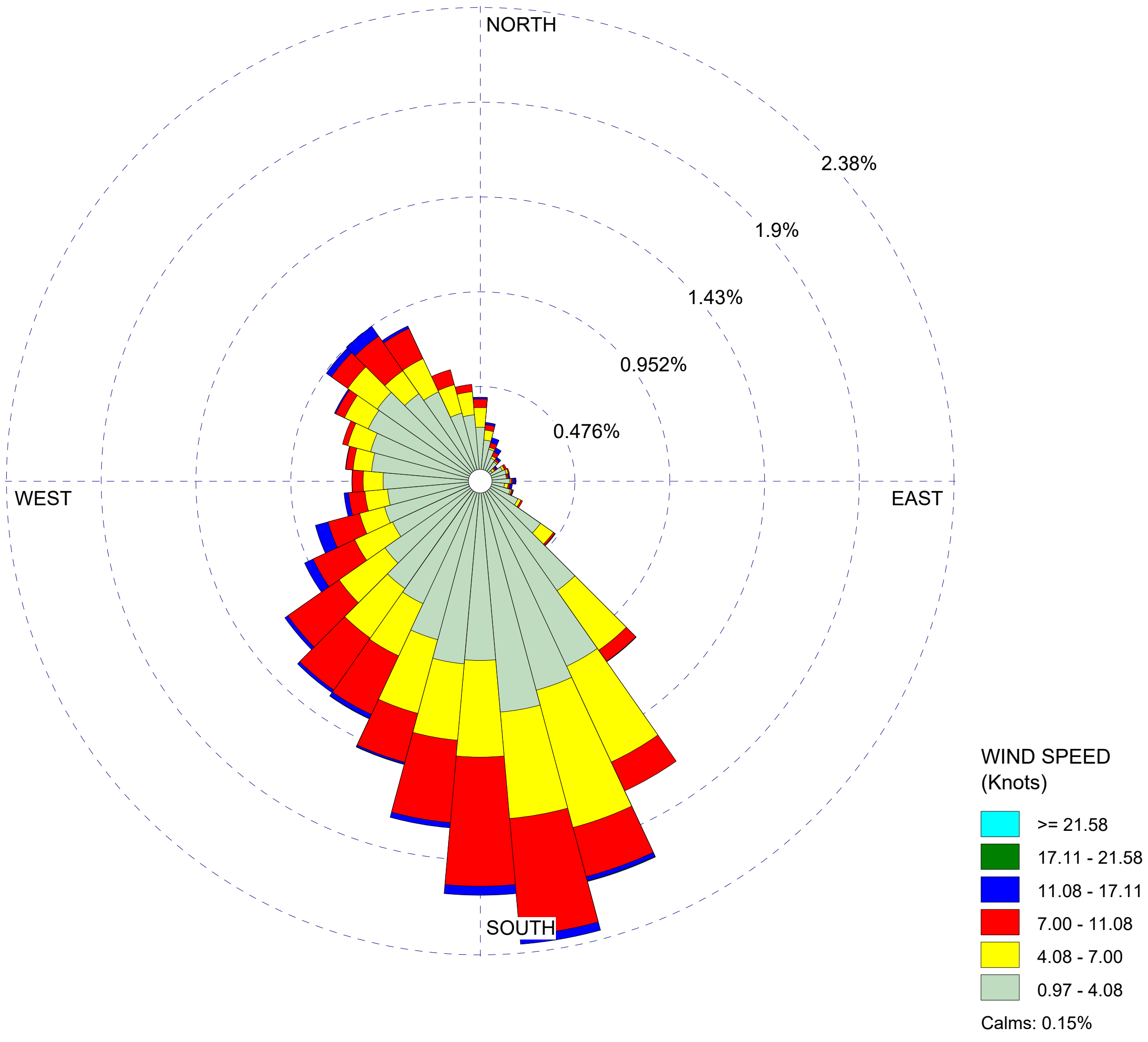
Terra Linda High School Modernization Project, 2023-141

WIND ROSE PLOT:

Station #23213

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2013 - 00:00** **End Date: 1/1/2018 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.15%**	TOTAL COUNT: **12600 hrs.**	
	AVG. WIND SPEED: **4.20 Knots**	DATE: **11/3/2023**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Construction Health Risk Assessment Emissions Calculations

HARP2 Emissions Inputs

Table B-1. HARP2 Construction Source Information and Modeled DPM Emissions

Source Description	Source ID	Type	DPM Emissions Max Hourly (lb/hr)	DPM Emissions Annual (lb/yr)	$PM_{2.5}$ Emissions[2] Max Hourly (lb/hr)	$PM_{2.5}$ Emissions[2] Annual (lb/yr)
Offsite North	SLINE1	Line Volume	0.00051	0.15	0.00071	0.21
Offsite South	SLINE2	Line Volume	0.00056	0.17	0.00078	0.23
Onsite (Foorball parking Lot)	SLINE3	Line Volume	0.00112	0.33	0.00156	0.46
Onsite	SLINE4	Line Volume	0.00112	0.33	0.00156	0.46
Max Onsite Construction 1 (CalEEMod)[1]	AREA1	Area	0.0150	1.900	0.101	3.960
Max Onsite Construction 2 (CalEEMod)[1]	AREA2	Area	0.0126	1.867	0.100	2.600
Max Onsite Construction 3 (CalEEMod)[1]	AREA3	Area	0.0037	0.975	0.050	0.640
Max Onsite Construction 4 (CalEEMod)[1]	AREA4	Area	0.0208	2.083	0.140	4.520
Max Onsite Construction 5 (CalEEMod)[1]	AREA5	Area	0.0680	9.933	0.132	4.100
Max Onsite Construction 6 (CalEEMod)[1]	AREA6	Area	0.0660	9.733	0.082	3.260

(1) Onsite Area construction sources modeled as maximum annual CallEEMod emissions / area source area.

(2) Offsite PM2.5 emissions modeled as 1.4 diesel exhaust to account for aditional dust particles under 2.5 microns.

Construction Health Risk Assessment Emissions Calculations

Diesel Truck Roadway Link Emission Assumptions and Calculations

Table B-2. Modeled Roadway Dimensions				
Roadway Link Description	**AERMOD ID**	**Length (m)**	**Width[1] (m)**	**Area (m^2)**
Offsite North	SLINE1	895.8	9.0	2,936.0
Offsite South	SLINE2	985.5	9.0	3,231.0
Onsite (Football Field Parking)	SLINE3	985.5	9.0	695.0
Onsite	SLINE4	985.5	9.0	2,073.0

(1) All roadways modeled with 4.5 meter width per lane.

Table B-3. Total Diesel Trip Information[1]	
Daily Maximum	54

(1) Daily Maximum trip count taken from the phase with the highest output from CalEEMod Emissions Modeling Report (ECORP, 2024)

Table B-4. Vehicle EMFAC2021 Emission Rates						
	Type	**DPM Emission Rates[2] (g/mi)**				
Vehicle Type	**Breakdown[1]**	**Idle[3]**	**5 mph**	**15 mph**	**45 mph**	**Composite[4]**
LDT	0.0%	0.091	0.015	0.010	0.014	0.014
MDT	10.0%	0.055	0.034	0.027	0.017	0.011
HHDT	90.0%	0.013	0.013	0.011	0.111	0.005
	Vehicle Composite	0.018	0.015	0.013	0.102	0.084

(1) Type breakdown from CalEEMod Emissions Modeling Report (ECORP, 2024)

(2) PM10 exhaust emission factors for 2024 EMFAC2021 aggregate model years for Diesel Fuel type.

(3) Idle emission rates in grams per hour per EMFAC2021 outputs.

(4) Composite factor is 70% @ 45 mph + 15% @ 15 mph + 15% @ 5 mph + 1 minute idle per mile

Table B-5. Percentage Project Trips			
	Trip Information		
Roadway Link	**Percentage Total Trips**	**Peak Hourly[1]**	**Average Daily**
Offsite North	50%	2.5	27.0
Offsite South	50%	2.5	27.0
Onsite (Football Field Parking)	100%	4.9	54.0
Onsite	100%	4.9	54.0

(1) Peak hourly is represented as average daily emissions divided by 11 per industry standard estimate.

<u>Equations:</u>

Construction Health Risk Assessment Emissions Calculations
Diesel Truck Roadway Link Emission Assumptions and Calculations

Emissions (lbs/hr) = Houly Trips * Composite Emission Factor (g/mi) * Distance (m) / 454 (g/lb) / 1,609 (m/mi)

Emissions (lbs/yr) = Daily Trips * Composite EF (g/mi) * Distance (m) * const days (d) / 454 (g/lb) / 1,609 (m/mi)

Construction Health Risk Assessment Emissions Calculations
Diesel Truck Roadway Link Emission Assumptions and Calculations

Table B-6. Calculated Truck Emissions		
	Emissions	
Roadway Link	Peak Hourly (lbs/hr)	Annual (lbs/yr)
Offsite North	0.00051	0.151
Offsite South	0.00056	0.166
Onsite (Football Field Parking)	0.00112	0.332
Onsite	0.00112	0.332

Control Pathway

Dispersion Options

Titles

C:\Users\rworden\Desktop\Terra Linda AERMOD\Terra Linda AERMOD.isc

Dispersion Options

- [x] Regulatory Default
- [ ] Non-Default Options

Dispersion Coefficient

Urban

Population:
Name (Optional):
Roughness Length:

Output Type

- [x] Concentration
- [ ] Total Deposition (Dry & Wet)
- [ ] Dry Deposition
- [ ] Wet Deposition

Plume Depletion

- [ ] Dry Removal
- [ ] Wet Removal

Output Warnings

- [ ] No Output Warnings
- [ ] Non-fatal Warnings for Non-sequential Met Data

Pollutant / Averaging Time / Terrain Options

Pollutant Type

Averaging Time Options

Hours

1	2	3	4	6	8	12	24
[x]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[x]

- [ ] Month
- [ ] Period
- [x] Annual

Exponential Decay

Option not available
Half Life of 4 hrs will be used

Terrain Height Options

- [ ] Flat
- [x] Elevated

SO: Meters
RE: Meters
TG: Meters

Flagpole Receptors

- [ ] Yes
- [x] No

Default Height = 0.00 m

Control Pathway

Optional Files

☐ Re-Start File	☐ Init File	☐ Multi-Year Analyses	☐ Event Input File	☒ Error Listing File

Detailed Error Listing File

Filename: Terra Linda AERMOD.err

Source Pathway - Source Inputs

AERMOD

Source Pathway - Source Inputs

AERMOD

Area Sources

Source Type	Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation (Optional)	Release Height [m]	Emission Rate [g/ (s-m^2)]	Length of X Side [m]	Length of Y Side [m]	Orientation Angle from North [deg]	Initial Vertical Dim. [m]
AREA	AREA13	539287.05 Football	4205842.23	24.92	5.00	1.00000	74.78	168.51	113.45	2.00
AREA	AREA1	539163.27 Pool & LR	4205856.17	24.55	5.00	1.00000	29.74	94.95	115.25	2.00
AREA	AREA2	539164.79 Pool & LR Dust	4205853.13	24.61	0.00	1.00000	25.88	90.31	115.56	2.00
AREA	AREA3	539053.40 Building Imporvemetns 1	4205962.07	24.70	5.00	1.00000	58.92	21.81	17.70	2.00
AREA	AREA4	539060.63 Buildng Improvemetns 1 Dust	4205979.86	24.67	0.00	1.00000	17.19	57.16	110.32	2.00
AREA	AREA5	539153.49 Builsing Improvements 2	4205928.07	24.62	5.00	1.00000	22.31	71.17	20.38	2.00
AREA	AREA6	539180.07 Building Improvements 2 Dust	4205992.40	24.62	0.00	1.00000	65.56	16.84	110.25	2.00
AREA	AREA7	539024.20 Building Imporvemetns 3	4205941.04	24.94	5.00	1.00000	16.64	61.22	111.04	2.00
AREA	AREA8	539022.07 Building Improvemetns 3 Dust	4205928.78	24.89	0.00	1.00000	55.01	9.30	20.99	2.00
AREA	AREA9	539091.17 Building Improvemetns 4	4205878.60	24.73	5.00	1.00000	42.15	23.36	20.75	2.00
AREA	AREA10	539101.24 Building Imporvemetns 4 Dust	4205896.26	24.64	0.00	1.00000	16.24	33.37	107.10	2.00
AREA	AREA11	539167.15 Baeball Field	4205681.52	30.12	5.00	1.00000	205.82	97.51	21.93	2.00
AREA	AREA12	539207.70 Baseball Field Dust	4205762.06	28.61	0.00	1.00000	83.50	189.04	111.49	2.00

Source Pathway - Source Inputs

AERMOD

Source Type	Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation (Optional)	Release Height [m]	Emission Rate [g/ (s-m^2)]	Length of X Side [m]	Length of Y Side [m]	Orientation Angle from North [deg]	Initial Vertical Dim. [m]
AREA	AREA14	539290.36 Football Dust	4205829.83	25.12	0.00	1.00000	57.27	144.95	110.27	2.00
AREA	AREA15	539027.52 Tennis	4205891.00	27.23	5.00	1.00000	42.24	89.98	120.58	2.00
AREA	AREA16	539030.82 Tennis Dust	4205880.25	27.56	0.00	1.00000	22.58	67.51	113.75	2.00

Line Volume Sources

Source Type: LINE VOLUME

Source: SLINE1 (Construction Traffic)

Length of Side [m]	Emission Rate [g/ s]	Building Height [m]	X Coordinate for Points [m]	Y Coordinate for points [m]	Base Elevation [m]	Release Height [m]
9.00	1.00000	Surface-Based	539190.47	4206031.46	22.66	2.55
			539221.91	4206057.18	21.23	2.55
			539296.21	4206334.40	14.51	2.55
			539350.51	4206454.43	12.35	2.55
			539416.25	4206517.30	11.61	2.55
			539521.99	4206663.06	8.17	2.55
			539582.01	4206797.38	6.62	2.55
			539596.30	4206808.81	6.63	2.55

Source Type: LINE VOLUME

Source: SLINE2 (Traffic South)

Length of Side [m]	Emission Rate [g/ s]	Building Height [m]	X Coordinate for Points [m]	Y Coordinate for points [m]	Base Elevation [m]	Release Height [m]
9.00	1.00000	Surface-Based	539341.94	4205857.13	24.80	2.55
			539613.44	4205748.53	23.04	2.55
			539664.88	4205748.53	22.10	2.55
			539807.78	4205911.43	19.00	2.55
			539847.79	4205934.29	16.73	2.55
			539910.67	4206037.18	12.03	2.55
			539947.82	4206008.60	11.50	2.55
			540153.59	4206057.18	10.30	2.55

Source Pathway - Source Inputs

AERMOD

Source Type: LINE VOLUME
Source: SLINE3 (Onsite HDT (football field))

Length of Side [m]	Emission Rate [g/ s]	Building Height [m]	X Coordinate for Points [m]	Y Coordinate for points [m]	Base Elevation [m]	Release Height [m]
9.00	1.00000	Surface-Based	539282.45	4205867.39	24.54	0.00
			539280.98	4205862.99	24.54	0.00
			539422.91	4205803.57	24.61	0.00
			539446.38	4205789.64	24.69	0.00
			539457.75	4205789.64	24.45	0.00
			539463.99	4205803.57	24.19	0.00

Source Type: LINE VOLUME
Source: SLINE4 (Onsite HDT (Tennis/ Building))

Length of Side [m]	Emission Rate [g/ s]	Building Height [m]	X Coordinate for Points [m]	Y Coordinate for points [m]	Base Elevation [m]	Release Height [m]
9.00	1.00000	Surface-Based	539188.09	4206032.77	22.72	0.00
			539179.73	4206016.05	23.55	0.00
			539133.74	4206036.95	23.59	0.00
			539115.83	4205986.78	24.32	0.00
			539091.94	4205995.74	24.41	0.00
			539097.91	4206029.78	24.02	0.00
			539060.88	4205998.73	24.56	0.00
			539039.38	4205960.51	24.87	0.00
			539029.23	4205946.77	24.90	0.00
			539018.48	4205941.40	25.18	0.00
			539016.09	4205930.65	25.06	0.00
			539014.30	4205927.06	25.12	0.00
			539114.03	4205848.83	25.92	0.00
			539149.87	4205823.75	25.61	0.00
			539200.03	4205802.25	24.71	0.00
			539240.04	4205783.14	25.16	0.00
			539260.35	4205822.55	24.81	0.00

Source Pathway - Source Inputs

AERMOD

Volume Sources Generated from Line Sources

Line Source ID	Volume Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation [m]	Release Height [m[	Emission Rate [g/s]	Length of Side [m]	Building Height [m]	Initial Lateral Dimencion [m]	Initial Vertical Dimencion [m]
SLINE1	L0000001	539193.95	4206034.31	22.64	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000002	539207.89	4206045.71	21.97	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000003	539221.82	4206057.11	21.17	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000004	539226.54	4206074.45	20.65	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000005	539231.20	4206091.84	20.15	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000006	539235.86	4206109.23	19.42	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000007	539240.52	4206126.61	18.81	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000008	539245.18	4206144.00	18.17	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000009	539249.84	4206161.38	17.72	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000010	539254.50	4206178.77	17.44	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000011	539259.16	4206196.16	17.10	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000012	539263.82	4206213.54	16.78	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000013	539268.48	4206230.93	16.42	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000014	539273.14	4206248.32	16.11	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000015	539277.80	4206265.70	15.79	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000016	539282.46	4206283.09	15.44	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000017	539287.12	4206300.47	15.15	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000018	539291.78	4206317.86	14.80	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000019	539296.58	4206335.20	14.51	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000020	539304.00	4206351.60	14.17	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000021	539311.41	4206368.00	13.90	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000022	539318.83	4206384.40	13.72	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000023	539326.25	4206400.80	13.51	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000024	539333.67	4206417.20	13.17	2.55	0.02000	9.00	Surface-Based	8.37	2.37

Source Pathway - Source Inputs

AERMOD

Line Source ID	Volume Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation [m]	Release Height [m[	Emission Rate [g/s]	Length of Side [m]	Building Height [m]	Initial Lateral Dimencion [m]	Initial Vertical Dimencion [m]
SLINE1	L0000025	539341.09	4206433.60	12.77	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000026	539348.51	4206450.00	12.49	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000027	539360.01	4206463.51	12.20	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000028	539373.01	4206475.95	11.94	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000029	539386.02	4206488.39	11.66	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000030	539399.03	4206500.84	11.33	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000031	539412.04	4206513.28	11.32	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000032	539423.40	4206527.16	11.07	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000033	539433.97	4206541.73	10.38	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000034	539444.54	4206556.30	10.01	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000035	539455.11	4206570.87	9.68	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000036	539465.68	4206585.44	9.31	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000037	539476.25	4206600.01	9.07	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000038	539486.82	4206614.58	8.84	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000039	539497.39	4206629.15	8.65	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000040	539507.96	4206643.72	8.48	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000041	539518.53	4206658.29	8.25	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000042	539526.93	4206674.11	8.05	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000043	539534.27	4206690.54	7.86	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000044	539541.61	4206706.98	7.68	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000045	539548.96	4206723.41	7.48	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000046	539556.30	4206739.85	7.28	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000047	539563.64	4206756.28	7.11	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000048	539570.98	4206772.71	6.89	2.55	0.02000	9.00	Surface-Based	8.37	2.37
	L0000049	539578.33	4206789.15	6.70	2.55	0.02000	9.00	Surface-Based	8.37	2.37

Source Pathway - Source Inputs

AERMOD

Line Source ID	Volume Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation [m]	Release Height [m[	Emission Rate [g/s]	Length of Side [m]	Building Height [m]	Initial Lateral Dimencion [m]	Initial Vertical Dimencion [m]
SLINE1	L0000050	539589.02	4206802.99	6.57	2.55	0.02000	9.00	Surface-Based	8.37	2.37

Line Source ID	Volume Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation [m]	Release Height [m[	Emission Rate [g/s]	Length of Side [m]	Building Height [m]	Initial Lateral Dimencion [m]	Initial Vertical Dimencion [m]
SLINE2	L0000051	539346.12	4205855.46	24.80	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000052	539362.83	4205848.77	24.98	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000053	539379.54	4205842.09	24.98	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000054	539396.26	4205835.40	24.95	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000055	539412.97	4205828.72	24.82	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000056	539429.68	4205822.03	24.62	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000057	539446.39	4205815.35	24.44	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000058	539463.11	4205808.66	24.27	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000059	539479.82	4205801.98	24.10	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000060	539496.53	4205795.29	23.96	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000061	539513.25	4205788.61	23.79	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000062	539529.96	4205781.92	23.61	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000063	539546.67	4205775.24	23.52	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000064	539563.38	4205768.55	23.41	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000065	539580.10	4205761.87	23.32	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000066	539596.81	4205755.18	23.22	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000067	539613.53	4205748.53	23.07	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000068	539631.53	4205748.53	22.75	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000069	539649.53	4205748.53	22.46	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000070	539666.63	4205750.51	22.20	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000071	539678.50	4205764.04	22.39	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000072	539690.37	4205777.58	22.52	2.55	0.01818	9.00	Surface-Based	8.37	2.37

Source Pathway - Source Inputs

AERMOD

Line Source ID	Volume Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation [m]	Release Height [m[	Emission Rate [g/s]	Length of Side [m]	Building Height [m]	Initial Lateral Dimencion [m]	Initial Vertical Dimencion [m]
SLINE2	L0000073	539702.24	4205791.11	22.56	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000074	539714.11	4205804.64	22.47	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000075	539725.98	4205818.17	22.38	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000076	539737.85	4205831.70	22.22	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000077	539749.72	4205845.23	22.04	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000078	539761.59	4205858.77	21.80	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000079	539773.46	4205872.30	21.10	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000080	539785.33	4205885.83	20.32	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000081	539797.20	4205899.36	19.50	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000082	539809.47	4205912.39	18.81	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000083	539825.10	4205921.33	17.98	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000084	539840.73	4205930.26	17.06	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000085	539852.94	4205942.71	15.94	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000086	539862.32	4205958.07	15.19	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000087	539871.71	4205973.43	14.16	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000088	539881.09	4205988.79	13.40	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000089	539890.48	4206004.15	12.90	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000090	539899.87	4206019.51	12.34	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000091	539909.25	4206034.86	12.09	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000092	539922.79	4206027.85	11.84	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000093	539937.05	4206016.88	11.54	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000094	539952.12	4206009.61	11.16	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000095	539969.64	4206013.75	10.67	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000096	539987.15	4206017.88	10.25	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000097	540004.67	4206022.02	9.86	2.55	0.01818	9.00	Surface-Based	8.37	2.37

Source Pathway - Source Inputs

AERMOD

Line Source ID	Volume Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation [m]	Release Height [m[	Emission Rate [g/s]	Length of Side [m]	Building Height [m]	Initial Lateral Dimencion [m]	Initial Vertical Dimencion [m]
SLINE2	L0000098	540022.19	4206026.16	9.64	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000099	540039.71	4206030.29	9.46	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000100	540057.23	4206034.43	9.41	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000101	540074.75	4206038.57	9.58	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000102	540092.26	4206042.70	9.62	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000103	540109.78	4206046.84	9.79	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000104	540127.30	4206050.97	9.96	2.55	0.01818	9.00	Surface-Based	8.37	2.37
	L0000105	540144.82	4206055.11	10.18	2.55	0.01818	9.00	Surface-Based	8.37	2.37

Line Source ID	Volume Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation [m]	Release Height [m[	Emission Rate [g/s]	Length of Side [m]	Building Height [m]	Initial Lateral Dimencion [m]	Initial Vertical Dimencion [m]
SLINE3	L0000106	539281.02	4205863.12	24.53	0.00	0.08333	9.00	Surface-Based	8.37	2.37
	L0000107	539297.45	4205856.09	24.74	0.00	0.08333	9.00	Surface-Based	8.37	2.37
	L0000108	539314.06	4205849.14	24.93	0.00	0.08333	9.00	Surface-Based	8.37	2.37
	L0000109	539330.66	4205842.19	24.98	0.00	0.08333	9.00	Surface-Based	8.37	2.37
	L0000110	539347.27	4205835.24	25.09	0.00	0.08333	9.00	Surface-Based	8.37	2.37
	L0000111	539363.87	4205828.29	25.16	0.00	0.08333	9.00	Surface-Based	8.37	2.37
	L0000112	539380.47	4205821.34	25.09	0.00	0.08333	9.00	Surface-Based	8.37	2.37
	L0000113	539397.08	4205814.39	24.91	0.00	0.08333	9.00	Surface-Based	8.37	2.37
	L0000114	539413.68	4205807.44	24.74	0.00	0.08333	9.00	Surface-Based	8.37	2.37
	L0000115	539429.79	4205799.49	24.59	0.00	0.08333	9.00	Surface-Based	8.37	2.37
	L0000116	539445.26	4205790.30	24.46	0.00	0.08333	9.00	Surface-Based	8.37	2.37
	L0000117	539459.93	4205794.50	24.25	0.00	0.08333	9.00	Surface-Based	8.37	2.37

Line Source ID	Volume Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation [m]	Release Height [m[	Emission Rate [g/s]	Length of Side [m]	Building Height [m]	Initial Lateral Dimencion [m]	Initial Vertical Dimencion [m]

Source Pathway - Source Inputs

AERMOD

Line Source ID	Volume Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation [m]	Release Height [m[	Emission Rate [g/s]	Length of Side [m]	Building Height [m]	Initial Lateral Dimencion [m]	Initial Vertical Dimencion [m]
SLINE4	L0000118	539186.07	4206028.74	22.86	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000119	539176.26	4206017.62	23.45	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000120	539159.88	4206025.07	23.66	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000121	539143.49	4206032.52	23.69	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000122	539131.29	4206030.08	23.80	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000123	539125.23	4206013.13	24.10	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000124	539119.18	4205996.18	24.23	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000125	539108.31	4205989.60	24.30	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000126	539092.03	4205996.25	24.45	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000127	539095.14	4206013.98	24.35	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000128	539096.41	4206028.53	24.06	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000129	539082.62	4206016.96	24.31	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000130	539068.83	4206005.39	24.47	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000131	539057.14	4205992.08	24.56	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000132	539048.32	4205976.39	24.65	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000133	539039.49	4205960.70	24.78	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000134	539028.61	4205946.46	24.90	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000135	539017.03	4205934.88	25.00	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000136	539021.90	4205921.10	24.84	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000137	539036.06	4205909.99	24.80	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000138	539050.23	4205898.88	24.83	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000139	539064.39	4205887.77	24.84	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000140	539078.55	4205876.67	24.87	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000141	539092.71	4205865.56	24.90	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000142	539106.88	4205854.45	24.94	0.00	0.02857	9.00	Surface-Based	8.37	2.37

Source Pathway - Source Inputs

AERMOD

Line Source ID	Volume Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation [m]	Release Height [m[	Emission Rate [g/s]	Length of Side [m]	Building Height [m]	Initial Lateral Dimencion [m]	Initial Vertical Dimencion [m]
SLINE4	L0000143	539121.33	4205843.73	25.10	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000144	539136.07	4205833.40	25.23	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000145	539150.94	4205823.29	25.20	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000146	539167.48	4205816.20	24.96	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000147	539184.02	4205809.11	24.76	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000148	539200.56	4205802.00	24.67	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000149	539216.80	4205794.24	24.82	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000150	539233.04	4205786.48	24.97	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000151	539244.73	4205792.25	24.75	0.00	0.02857	9.00	Surface-Based	8.37	2.37
	L0000152	539252.98	4205808.25	24.75	0.00	0.02857	9.00	Surface-Based	8.37	2.37

Source Pathway

AERMOD

Building Downwash Information

Option not in use

Emission Rate Units for Output

For Concentration

Unit Factor:	1E6
Emission Unit Label:	GRAMS/SEC
Concentration Unit Label:	MICROGRAMS/M**3

Source Groups

Source Group ID	List of Sources in Group (Source Range or Single Sources)
SLINE4	SLINE4
SLINE3	SLINE3
SLINE2	SLINE2
SLINE1	SLINE1
AREA9	AREA9
AREA8	AREA8
AREA7	AREA7
AREA6	AREA6
AREA5	AREA5
AREA4	AREA4
AREA3	AREA3
AREA2	AREA2
AREA16	AREA16
AREA15	AREA15
AREA14	AREA14

Source Pathway

Source Group ID:	List of Sources in Group (Source Range or Single Sources)
AREA13	AREA13
AREA12	AREA12
AREA11	AREA11
AREA10	AREA10
AREA1	AREA1
ALL	All Sources Included

Meteorology Pathway

AERMOD

Met Input Data

Surface Met Data

Filename: SANTA_ROSA_2017.SFC

Format Type: Default AERMET format

Profile Met Data

Filename: SANTA_ROSA_2017.PFL

Format Type: Default AERMET format

Wind Speed

☐ Wind Speeds are Vector Mean (Not Scalar Means)

Wind Direction

Rotation Adjustment [deg]:

Potential Temperature Profile

Base Elevation above MSL (for Primary Met Tower): 3.00 [m]

Meteorological Station Data

Stations	Station No.	Year	X Coordinate [m]	Y Coordinate [m]	Station Name
Surface		2017			
Upper Air		2017			OAKLAND/WSO AP
On-Site		2017			

Data Period

Data Period to Process

Start Date: 1/1/2017 Start Hour: 1 End Date: 1/1/2018 End Hour: 24

Wind Speed Categories

Stability Category	Wind Speed [m/s]	Stability Category	Wind Speed [m/s]
A	1.54	D	8.23
B	3.09	E	10.8
C	5.14	F	No Upper Bound

APPENDIX C

Biological Evaluation Report

September 29, 2023

Barbara Wu Heyman
Senior Environmental Project Manager
Michael Baker International
barbara.heyman@mbakerintl.com– *Sent via email*

Re: Biological evaluation for Terra Linda High School Master Plan Improvements Project, San Rafael, California

Barbara:

This letter provides the results of a biological evaluation for proposed site and facility improvements at Terra Linda High School (Study Area) located at 310 Nova Albion Way (APN 175-060-31) in the City of San Rafael, Marin County, California. This evaluation was prepared in support of California Environmental Quality Act documentation for the school's Master Plan Improvements Project (Project). A site visit was performed in August 2023 to assess the property for: (1) the presence of sensitive land cover types such as wetlands or riparian habitat, and 2) the potential to support special-status species.

The study Area is a 29.5-acre developed parcel, surrounded on three sides by residential development. This assessment is based on information available at the time of the study and on-site conditions that were observed on the date of the site visit.

SUMMARY OF FINDINGS

The Study Area is a developed and maintained educational campus with associated facilities. No sensitive land cover types or aquatic features are present within the Study Area, and special-status plant and wildlife species are variably unlikely or have no potential to be present there. If trees outside of the area of direct evaluation must be impacted, a bat roost habitat assessment should be performed. If trees and shrubbery are impacted during the nesting bird season (February 1 to August 31), a nesting bird survey should be performed prior to impacts and any active nests found sufficiently avoided.

PROJECT DESCRIPTION

The Project consists of improvements to school facilities as part of an ongoing modernization effort for the campus. Forthcoming primary improvements are focused on physical education and sports facilities, as well as updates to classroom buildings. It is WRA's understanding that focal elements for this assessment include stadium upgrades (including to the track surface), installation of artificial turf baseball and softball fields, and tennis court surface and walkway improvements. All improvements will occur within the campus property, with no impacts to adjacent, off-site trees (in public rights-of-way).[1]

METHODS

Prior to the site visit, background literature was reviewed to determine the potential presence of regulated or otherwise sensitive land cover types (including aquatic resources), and special-status plant and wildlife species. Resources reviewed included California Department of Fish and Wildlife (CDFW) Natural Diversity Database records (CNDDB; CDFW 2023) and California Native Plant Society (CNPS) Inventory records (CNPS 2023) for the San Rafael and Novato USGS 7.5-minute quadrangles. For special-status wildlife, Shuford (1993), Shuford and Gardali (2008), and Thomson et al. (2016) were also reviewed.

Following the background literature review, WRA biologist Jason Yakich (author) conducted a site visit on August 2, 2023. The Study Area was examined for indicators of wetlands, streams, and areas with an Ordinary High Water Mark (OHWM) potentially under the jurisdiction of the U.S. Army Corps of Engineers, Regional Water Quality Control Board, and/or CDFW. The Study Area was also examined to determine if special-status species or suitable habitat to support such species was present. Trees and vegetation throughout most of the Study Area were evaluated directly where potential impacts and disturbances to vegetation (including removal) may occur as per WRA's understanding of the Project; vegetation in some peripheral portions of the site was not evaluated (see Figure A-1; Attachment A).

RESULTS

The Study Area is 29.5 acres in size and consists of a public high school and associated facilities; it is entirely developed or otherwise managed and maintained for human use. It is abutted by residential (suburban) development on all sides except to the east where additional school facilities and development elements are present.

Terrestrial Land Cover Types

The bulk of the Study Area consists of buildings, hardscape substrates, and maintained athletic fields and facilities. No sensitive terrestrial land cover types are present within the Study Area. Landscaping is present throughout much of the Study Area, including in rows and clusters adjacent to campus buildings and along the peripheries of athletic facilities including tennis and basketball courts, the existing stadium and track, and similar features.

Landscaping in the evaluated areas features a mix of native and non-native (ornamental) tree and shrub species; the native species were presumably deliberately planted. Native species are present primarily adjacent to the basketball and tennis courts as well as in some peripheral areas. Ornamental species are found throughout the Study Area including within central portions of the campus, e.g., adjacent to buildings. Native trees present include coast live oak (*Quercus agrifolia*), valley oak (*Q. lobata*), and coast redwood

[1] *Tree protections as per City of San Rafael municipal code (Chapter 11.12) apply only to trees planted on/along public streets and other rights-of-way.*

(*Sequoia sempervirens*); primary non-native trees include Monterey pine (*Pinus radiata*), sweetgum (*Liquidambar* sp.), elm (*Ulmus* sp.), privet (*Ligustrum* sp.; larger individuals), weeping willow (*Salix babylonica*), and peppertree (*Schinus mole*). Native shrubs include toyon (*Heteromeles arbutifolia*) and coyote brush (*Baccharis pilularis*), complimented by non-native privet, cotoneaster (*Contoneaster* sp.), and others. Himalayan blackberry (*Rubus armeniacus*) is present as groundcover and non-woody shrubbery in some lesser-disturbed areas. On-site landscape trees are outside of the City of San Rafael rights-of-way and thus not subject to protections under municipal code.

Aquatic Features

No wetlands, streams, or other aquatic features potentially jurisdictional to the Corps or RWQCB are present within the Study Area.

Special-status Species

A list of special-status species documented from the vicinity and their potential to occur in the Study Area is provided in Attachment B.

Plants

Based on a search of the databases provided in the methods section above, 54 special-status plant species have been documented within the vicinity of the Study Area. All of these species were determined to be unlikely or have no potential to occur within the Study Area for one or more of the following reasons:

- The Study Area is a thoroughly developed and maintained educational campus, characteristically lacking in native plant diversity (although some native species are used in landscaping), likely precluding the presence of special-status plant species;
- The Study Area is fully surrounded by properties that are developed and landscaped, thus limiting the potential habitat and seed sources for special-status species in the surrounding area;
- The Study Area does not contain hydrologic conditions (e.g., seasonal wetlands, freshwater, brackish, or salt marsh) necessary to support the special-status plant(s);
- The Study Area does not contain edaphic (soil) conditions (e.g., serpentine or volcanics) necessary to support the special-status plant(s);
- The Study Area does not contain vegetation communities (e.g., natural chaparral, coastal scrub, vernal pools) associated with the special-status plant(s).

Wildlife

Based on a search of the databases and references provided in the methods section above, a total of 39 special-status wildlife species have been documented within the vicinity of the Study Area (as defined for plants above).[2] All of these species were determined to be

[2] *As defined herein, special-status species (both plants and wildlife) include those listed under the federal and/or California Endangered Species Acts. For plants, species with California Rare Plant Rank 1 to 4 are also included. For wildlife, CDFW Species of Special Concern, state Fully Protected*

unlikely or have no potential to occur within the Study Area for one or more of the following reasons:

- Aquatic habitats (e.g., rivers/streams, ponds) necessary to support the special-status wildlife species are not present in the Study Area;
- Vegetation types (e.g., grassland, chaparral, marsh) that provide nesting and/or foraging resources necessary to support the special-status wildlife species are not present within the Study Area;
- Structures or vegetative substrates (e.g., emergent wetland/marsh vegetation, large tree cavities/snags, old growth forest) necessary to provide nesting or cover habitat to support the special-status wildlife species are not present or within the Study Area;
- Host plants (e.g., dog violet, harlequin lotus) necessary to provide larval and nectar resources for the special-status wildlife species are not present in the Study Area;
- The Study Area is outside (e.g., north of, west of, etc.) of the special-status wildlife species known local range (including nesting/breeding range, for birds);
- The Study Area is within a developed (suburban and residential) portion of Marin County and is subject to regular human disturbance.

General Wildlife

Trees (and other vegetation) within the evaluated area are unlikely to support bat roosting, including maternity (breeding) roosting. Native trees and many of the non-native landscape species present within the evaluated areas are relatively small, lacking developed cavities/hollows or other roost substrates (e.g., exfoliating bark). Larger landscape trees present such as mature Monterey pines, elms, and sweetgums also lacked any apparent cavities and other relevant substrates; these trees appear subject to regular maintenance (trimming and limb removal) for safety and aesthetic purposes that preclude formation of hollows, areas of loose bark, and/or other conditions that may support bat roosting. Buildings within the Study Area scheduled for renovations are all well-maintained and regularly occupied structures, lacking ingress/egress points to secluded areas and as such are also unlikely to support any bat roosting.

While the environment is disturbed overall, vegetation within the Study Area (trees and shrubbery) has some potential to be used by a variety of native birds for nesting. The likelihood of such would depend on several factors, primarily the frequency and magnitude of disturbance due to school and vegetation maintenance activities, as well as characteristics of the vegetation in question (e.g., foliage density, species). Although the inspection was not exhaustive, no obvious nest structures were observed during the site visit including remnant structures on buildings.

The Study Area does not provide any noteworthy wildlife corridor or movement functions. It is a developed and maintained school facility, featuring only very limited semi-natural cover, and is directly surrounded on three sides by suburban development. The Project will not alter the Study Area's developed land covers in any meaningful way (in the wildlife movement context) nor result in any impacts to local wildlife movement.

Species, and others with established CEQA protections (e.g., rookeries of herons/egrets, bat species of high or moderate conservation priority by the Western Bat Working Group) are also included.

RECOMMENDATIONS

Bats

As stated above, trees within the directly evaluated areas are unlikely to be used for bat roosting, nor are buildings scheduled for renovation or other disturbance. However, note that on-site trees in other areas, namely trees along the Study Area's eastern and southern perimeters, were not evaluated directly. If disturbance of these trees (including trimming of large limbs) is required to accommodate the Project, the following measures are recommended.

Prior to any tree removal, a qualified biologist should conduct a habitat assessment for bats. A qualified bat biologist must have: 1) at least two years of experience conducting bat surveys that resulted in detections for relevant species, such as pallid bat, with verified project names, dates, and references, and 2) experience with relevant equipment used to conduct bat surveys. The habitat assessment should be conducted a minimum of 30 to 90 days prior to tree removal and should include a visual inspection of potential roosting features (e.g., cavities, crevices in wood and bark, exfoliating bark, suitable canopy for foliage roosting species).

If the qualified biologist identifies potential bat habitat trees, then tree trimming and tree removal should not proceed unless the following occurs: 1) a qualified biologist conducts night emergence surveys or completes visual examination of roost features that establishes absence of roosting bats, or 2) tree trimming and tree removal occurs only during seasonal periods of bat activity, from approximately March 1 through April 15 and September 1 through October 15, and tree removal occurs using the two-step removal process. Two-step tree removal would be conducted over two consecutive days. The first day (in the afternoon), under the direct supervision and instruction by a qualified biologist with experience conducting two-step tree removal, limbs and branches should be removed by a tree cutter using chainsaws only; limbs with cavities, crevices or deep bark fissures should be avoided. The second day the entire tree should be removed.

Nesting Birds

Non-status bird species with baseline protections under the federal Migratory Bird Protection Act and California Fish and Game Code (sections 3503, 3503.5 and 3513) may use vegetation within the Study Area (namely trees and shrubs) for nesting. To avoid impacts to nesting birds WRA recommends that removal of trees and shrubs (including tree trimming) be performed from September 1 to January 31, outside of the general nesting bird season. This seasonal avoidance may also apply to other Project activities that occur in proximity to trees and vegetation, including (but not limited to) ground disturbance and the demolition of existing structures and facilities. If such avoidance is not feasible, a pre-construction nesting bird survey by a qualified biologist should be performed no more than 14 days prior to the initiation of tree/vegetation removal or other relevant disturbances. The survey should cover impacted vegetation/substrates and surrounding areas (as accessible) within approximately 250 feet. If active bird nests are found during the survey, an appropriate no-disturbance buffer should be established by the qualified biologist. Once it is determined that the young have fledged (left the nest) or the nest otherwise becomes inactive (e.g., due to predation), the buffer may be removed and work may be initiated within the formerly buffered area.

SUMMARY

The Study Area does not contain wetlands, streams, or other sensitive land cover types. Special-status plant and wildlife species were determined to be unlikely or have no potential to occur within the Study Area. Bat roosting is unlikely within the trees that were directly evaluated; if relevant, trees outside of the evaluation area should be assessed prior to any impacts and the avoidance measures included herein adhered to. If trees and other vegetation are impacted during the general nesting bird season (February 1 to August 31), a nesting bird survey should be performed and any active nests found sufficiently avoided.

If you have questions or require additional information, please contact me.

Sincerely,

Jason Yakich
Senior Biologist
yakich@wra-ca.com

Enclosures: Attachment A – Figure A-1
Attachment B – Special-status Species Occurrence Potentials

REFERENCES

[CDFW] California Department of Fish and Wildlife. 2023. California Natural Diversity Database (CNDDB), Wildlife and Habitat Data Analysis Branch. Sacramento, CA. Accessed: August 2023.

[CNPS] California Native Plant Society. 2023. Online Inventory of Rare, Threatened, and Endangered Plants of California. Available at: http://www.rareplants.cnps.org/. Accessed: August 2023.

Shuford, W. D. 1993. The Marin County Breeding Bird Atlas: A Distributional and Natural History of Coastal California Birds. California Avifauna Series 1. Bushtit Books, Bolinas, CA.

Shuford, W.D. and Gardali, T., eds. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Thomson, R.C., Wright, A.N., Shaffer, H.B. 2016. California Amphibian and Reptile Species of Special Concern. University of California Press and California Department of Fish and Wildlife. California.

Attachment A
MIchael Baker Intl.; Sept. 2023

Figure A-1. Study Area

Terra Linda High School
San Rafael, Marin County, California

Table B. Potential for special-status wildlife species to occur in the Study Area. List compiled from CDFW's Natural Diversity Database (CDFW 2023), CNPS (2023), and other sources, for the San Rafael and San Quentin USGS 7.5 minute quadrangles.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
PLANTS				
Franciscan onion *Allium peninsulare* var. *franciscanum*	CRPR 1B	Cismontane woodland, valley and foothill grassland; on clay substrate, often derived from serpentine. Elevation range 170 – 985 feet. Blooms: May – June.	**No Potential.** The Study Area is developed and lacks clay substrates.	No further actions are recommended.
Napa false indigo *Amorpha californica* var. *napensis*	CRPR 1B.2	Openings in broadleaf upland forest, chaparral, cismontane woodland. Elevation range: 395 – 6560 feet. Blooms: April – July.	**Unlikely.** The Study Area is developed and provides no typical habitat.	No further actions are recommended.
bent-flowered fiddleneck *Amsinckia lunaris*	CRPR 1B.2	Cismontane woodland, valley and foothill grassland, coastal bluff scrub; located on gravelly substrates, frequently derived from serpentine. Elevation range: 10 – 1625 feet. Blooms: March – June.	**No Potential.** The Study Area is developed and lacks gravelly, serpentine-derived substrates.	No further actions are recommended.
coast rock cress *Arabis blepharophylla*	CRPR 4.3	Broadleaf upland forest, coastal bluff scrub, coastal prairie, coastal scrub; located on rocky sites, often on coastal bluffs. Elevation range: 10 – 3575 feet. Blooms: February – May.	**No Potential.** The Study Area is developed and lacks rocky substrates or coastal bluff habitat.	No further actions are recommended.
Mt. Tamalpais manzanita *Arctostaphylos montana* ssp. *montana*	CRPR 1B.3	Chaparral, valley and foothill grassland. Elevation ranges from 525 to 2495 feet. Blooms Feb-Apr.	**Unlikely.** The Study Area is developed and provides no typical habitat.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
Marin manzanita *Arctostaphylos virgata*	CRPR 1B.2	Broadleaf upland forest, closed-cone coniferous forest, chaparral, North Coast coniferous forest; on sandstone and granitic substrates. Elevation range: 195 – 2275 feet. Blooms: January – March.	**No Potential.** The Study Area is developed and lacks sandstone or granitic substrates.	No further actions are recommended.
Carlotta Hall's lace fern *Aspidotis carlotta-halliae*	CRPR 4.2	Chaparral, cismontane woodland. Generally serpentine slopes, crevices, outcrops. Elevation ranges from 330 to 4595 feet. Blooms Jan-Dec.	**Unlikely.** The Study Area is developed and lacks serpentine outcrops.	No further actions are recommended.
Brewer's milk-vetch *Astragalus breweri*	CRPR 4.2	Chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland. Commonly on or near volcanic or serpentine substrates. Elevation ranges from 295 to 2395 feet. Blooms Apr-Jun.	**No Potential.** The Study Area is developed and lacks volcanic or serpentine substrates.	No further actions are recommended.
Thurber's reed grass *Calamagrostis crassiglumis*	CRPR 2B.1	Mesic areas within coastal scrub, freshwater marshes and swamps; typically in marshy swales surrounded by scrub or grassland. Elevation range: 10 – 45 feet. Blooms: May – July.	**No Potential.** The Study Area is developed and lacks freshwater marsh habitat or coastal scrub.	No further actions are recommended.
serpentine reed grass *Calamagrostis ophiditis*	CRPR 4.3	Chaparral, lower montane coniferous forest, meadows and seeps, valley and foothill grassland. Elevation ranges from 295 to 3495 feet. Blooms Apr-Jul.	**No Potential.** The Study Area is developed and lacks serpentine outcrops.	No further actions are recommended.
Brewer's calandrinia *Calandrinia breweri*	CRPR 4.2	Chaparral, coastal scrub (disturbed; often appears after burns). Elevation ranges from 35 to 4005 feet. Blooms (Jan)Mar-Jun.	**Unlikely.** The Study Area is developed and lacks coastal scrub or native chaparral.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
Oakland star-tulip *Calochortus umbellatus*	CRPR 4.2	Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland. Elevation ranges from 325 to 2295 feet. Blooms Mar-May.	**Unlikely.** The Study Area is developed and lacks any typical forest or woodland habitat.	No further actions are recommended.
Mt. Saint Helena morning-glory *Calystegia collina* ssp. *oxyphylla*	CRPR 4.2	Chaparral, lower montane coniferous forest, valley and foothill grassland (serpentine). Elevation ranges from 915 to 3315 feet. Blooms Apr-Jun.	**No Potential.** The Study Area is developed and lacks serpentine substrates.	No further actions are recommended.
johnny-nip *Castilleja ambigua* var. *ambigua*	CRPR 4.2	Coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, vernal pools margins (mesic). Elevation ranges from 0 to 1425 feet (0 to 435 meters). Blooms Mar-Aug.	**No Potential.** The Study Area is developed and lacks coastal prairie or coastal scrub and mesic substrates.	No further actions are recommended.
glory bush *Ceanothus gloriosus* var. *exaltatus*	CRPR 4.3	Chaparral; typically located within maritime influence. Elevation range: 95 – 1985 feet. Blooms: March – June, sometimes August.	**No Potential.** The Study Area is developed and lacks maritime chaparral.	No further actions are recommended.
Point Reyes bird's-beak *Chloropyron maritimum* ssp. *palustre*	CRPR 1B.2	Marshes and swamps (coastal salt). Elevation ranges from 0 to 35 feet. Blooms Jun-Oct.	**No Potential.** The Study Area is developed and lacks marsh/swamp habitat.	No further actions are recommended.
San Francisco Bay spineflower *Chorizanthe cuspidata* var. *cuspidata*	CRPR 1B.2	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub (sandy). Elevation ranges from 5 to 705 feet. Blooms Apr-Jul(Aug).	**No Potential.** The Study Area is developed and lacks coastal prairie or coastal scrub, as well as native sandy substrates.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
Mt. Tamalpais thistle *Cirsium hydrophilum* var. *vaseyi*	CRPR 1B.2	Broadleafed upland forest, chaparral, meadows and seeps (serpentine). Elevation ranges from 785 to 2035 feet. Blooms May-Aug.	**No Potential.** The Study Area is developed lacks serpentines seeps and streams.	No further actions are recommended.
California lady's-slipper *Cypripedium californicum*	CRPR 4	Bogs and fens, lower montane coniferous forest; situated at seeps and along streambanks, typically serpentine; serpentine indicator: BE. Elevation range: 2750 – 9020 feet. Blooms: April – August, sometimes September.	**No Potential.** The Study Area is developed and lacks serpentine seeps, bogs, and fens.	No further actions are recommended.
western leatherwood *Dirca occidentalis*	CRPR 1B.2	Broadleaf upland forest, chaparral, closed-cone coniferous forest, cismontane woodland, North Coast coniferous forest, riparian forest, riparian woodland; located on brushy, mesic slopes in woodland and forest. Elevation range: 165 – 1285 feet. Blooms: January – April.	**No Potential.** The Study Area is developed and lacks native woodland or forest and mesic substrates.	No further actions are recommended.
California bottle-brush grass *Elymus californicus*	CRPR 4.3	Broadleafed upland forest, cismontane woodland, north coast coniferous forest, riparian woodland. Elevation ranges from 50 to 1540 feet. Blooms May-Aug.	**No Potential.** The Study Area is developed and lacks native woodland or forest.	No further actions are recommended.
Tiburon buckwheat *Eriogonum luteolum* var. *caninum*	CRPR 1B.2	Chaparral, cismontane woodland, coastal prairie, valley and foothill grassland. Elevation ranges from 0 to 2295 feet. Blooms May-Sep.	**Unlikely.** The Study Area is developed and lacks native chaparral, woodland, or other typical habitats/substrates.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
San Francisco wallflower *Eryngium franciscanum*	CRPR 4.2	Chaparral, coastal dunes, coastal scrub, valley and foothill grassland. Elevation ranges from 0 to 1805 feet. Blooms Mar-Jun.	**No Potential.** The Study Area is developed and lacks any native typical substrates.	No further actions are recommended.
minute pocket moss *Fissidens pauperculus*	CRPR 1B.2	North coast coniferous forest (grows on damp soil along the coast). Elevation ranges from 35 to 3360 feet.	**No Potential.** The Study Area is developed and lacks coniferous forest.	No further actions are recommended.
Marin checker lily *Fritillaria lanceolata* var. *tristulis*	CRPR 1B.1	Coastal bluff scrub, coastal scrub, coastal prairie; observed in canyons, riparian areas, and rock outcrops; often located on serpentine substrate. Elevation range: 45 – 490 feet. Blooms: February – May.	**No Potential.** The Study Area is developed and lacks any coastal scrub, coastal prairie, riparian, or serpentine substrates.	No further actions are recommended.
dark-eyed gilia *Gilia millefoliata*	CRPR 1B.2	Coastal dune. Elevation range: 5 – 100 feet. Blooms: April – July.	**No Potential.** The Study Area is developed and lacks coastal dunes.	No further actions are recommended.
Diablo helianthella *Helianthella castanea*	CRPR 1B.2	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. Elevation ranges from 195 to 4265 feet. Blooms Mar-Jun.	**No Potential.** The Study Area is developed and lacks any forest/woodland or native scrub or chaparral; this species is considered locally extirpated.	No further actions are recommended.
Hayfield tarplant *Hemizonia congesta* ssp. *congesta*	CRPR 1B	Coastal scrub, valley and foothill grassland. Elevation range: 65 – 1840 feet. Blooms: April – October.	**Unlikely.** The Study Area is developed and lacks coastal scrub or grassland habitat.	No further actions are recommended.
Marin western flax *Hesperolinon congestum*	FT, ST, CRPR 1B.1	Chaparral, valley and foothill grassland (serpentine). Elevation ranges from 15 to 1215 feet. Blooms Apr-Jul.	**No Potential.** The Study Area is developed and lacks any serpentine substrates.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
Santa Cruz tarplant *Holocarpha macradenia*	FT, SE, CRPR 1B.1	Coastal prairie, coastal scrub, valley and foothill grassland. Elevation ranges from 35 to 720 feet. Blooms Jun-Oct.	**No Potential.** The Study Area is developed and lacks typical native habitats; this species is considered extirpated from Marin County.	No further actions are recommended.
thin-lobed horkelia *Horkelia tenuiloba*	CRPR 1B.2	Broadleaf upland forest, coastal scrub, valley and foothill grassland, chaparral; in mesic openings, on sandy substrate. Elevation range: 165 – 1640 feet. Blooms: May – July.	**No Potential.** The Study Area is developed and lacks any mesic and/or native sandy substrates.	No further actions are recommended.
harlequin lotus *Hosackia gracilis*	CRPR 4.2	Broadleaf upland forest, coastal bluff scrub, closed-cone coniferous forest, cismontane woodland, coastal prairie, coastal scrub, meadows and seeps, marshes and swamps, North Coast coniferous forest, valley and foothill grassland; located in wetlands and roadside ditches. Elevation range: 0 – 2275 feet. Blooms: March – July.	**No Potential.** The Study Area is developed and lacks any native wetlands or mesic substrates.	No further actions are recommended.
coast iris *Iris longipetala*	CRPR 4.2	Coastal prairie, lower montane coniferous forest, meadows and seeps; located on mesic sites. Elevation range: 0 – 1950 feet. Blooms: March – May.	**No Potential.** The Study Area is developed and lacks any native wetlands or mesic substrates.	No further actions are recommended.
southwestern spiny rush *Juncus acutus* ssp. *leopoldii*	CRPR 4.2	Coastal dunes, marshes and swamps, meadows and seeps (saline). Elevation ranges from 10 to 2955 feet. Blooms (Mar)May-Jun.	**No Potential.** The Study Area is developed and lacks mesic habitat and saline influences.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
small groundcone *Kopsiopsis hookeri*	CRPR 2B.3	North coast coniferous forest (generally parasitic on salal [*Gaultheria shallon*]). Elevation ranges from 295 to 2905 feet. Blooms Apr-Aug.	**No Potential.** The Study Area is developed and lacks coniferous forest.	No further actions are recommended.
bristly leptosiphon *Leptosiphon acicularis*	CRPR 4.2	Chaparral, cismontane woodland, coastal prairie, valley and foothill grassland. Elevation ranges from 180 to 4920 feet. Blooms Apr-Jul.	**Unlikely.** The Study Area is developed and lacks native chaparral, woodland, or grassland.	No further actions are recommended.
large-flowered leptosiphon *Leptosiphon grandiflorus*	CRPR 4.2	Cismontane woodland, closed-cone coniferous forest, coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub, valley and foothill grassland (sandy soil). Elevation ranges from 15 to 4005 feet. Blooms Apr-Aug.	**No Potential.** The Study Area is developed and lacks typical habitats and native sandy substrates.	No further actions are recommended.
woolly-headed lessingia *Lessingia hololeuca*	CRPR 3	Broadleaf upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland; typically on clay, serpentine substrate. Elevation range: 3 – 2885 feet. Blooms: April – June.	**No Potential.** The Study Area is developed and lacks forest, scrub or grassland habitats; clay/serpentine substrates are absent.	No further actions are recommended.
Tamalpais lessingia *Lessingia micradenia* var. *micradenia*	CRPR 1B.2	Chaparral, valley and foothill grassland. Elevation ranges from 330 to 1640 feet. Blooms (Jun)Jul-Oct.	**Unlikely.** The Study Area is developed and lacks chaparral or grassland habitats.	No further actions are recommended.
marsh microseris *Microseris paludosa*	CRPR 1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. Elevation range: 5 – 300 feet. Blooms: April – June.	**No Potential.** The Study Area is developed and lacks forest/woodland, coastal scrub, and grassland.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
Marin County navarretia *Navarretia rosulata*	CRPR 1B.2	Chaparral, closed-cone coniferous forest. Elevation ranges from 655 to 2085. Blooms May-Jul.	**No Potential.** The Study Area is developed and lacks coniferous forest.	No further actions are recommended.
white-rayed pentachaeta *Pentachaeta bellidiflora*	FE, SE, CRPR 1B.1	Cismontane woodland, valley and foothill grassland (usually serpentine). Elevation ranges from 115 to 2035 feet. Blooms Mar-May.	**No Potential.** The Study Area is developed and lacks serpentine substrates; this species is considered extirpated from Marin County.	No further actions are recommended.
Gairdner's yampah *Perideridia gairdneri* ssp. *gairdneri*	CRPR 4.2	Broadleaf upland forest, chaparral, coastal prairie, valley and foothill grassland, vernal pools; located in vernally mesic sites. Elevation range: 0 to 1985 feet. Blooms: June – October.	**No Potential.** The Study Area is developed and lacks vernally wet/mesic substrates.	No further actions are recommended.
hairless popcornflower *Plagiobothrys glaber*	CRPR 1A	Marshes and swamps, meadows and seeps. Elevation ranges from 50 to 590 feet. Blooms Mar-May.	**No Potential.** The Study Area is developed and lacks forest habitat and mesic substrates; this species is considered extinct.	No further actions are recommended.
North Coast semaphore grass *Pleuropogon hooverianus*	ST, CRPR 1B.1	Broad-leafed upland forest, meadows and seeps, north coast coniferous forest (wet grassy, usually shady areas, sometimes freshwater marsh; associated with forest environments). Elevation ranges from 35 to 2200 feet. Blooms Apr-Jun.	**No Potential.** The Study Area is developed and lacks forest habitat and mesic substrates.	No further actions are recommended
Marin knotweed *Polygonum marinense*	CRPR 3.1	Marshes and swamps. Elevation ranges from 0 to 35 feet (0 to 10 meters). Blooms (Apr)May-Aug(Oct).	**No Potential.** The Study Area is developed and lacks marshes/swamps.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
Tamalpais oak *Quercus parvula* var. *tamalpaisensis*	CRPR 1B.3	Lower montane coniferous forest. Elevation ranges from 330 to 2460 feet (100 to 750 meters). Blooms Mar-Apr.	**No Potential.** The Study Area is developed and lacks coniferous forest.	No further actions are recommended.
Lobb's aquatic buttercup *Ranunculus lobbii*	CRPR 4.2	Cismontane woodland, north coast coniferous forest, valley and foothill grassland; vernal pools. Elevation ranges from 50 to 1540 feet (15 to 470 meters). Blooms Feb-May.	**No Potential.** The Study Area is developed and lacks vernal pools or other seasonal aquatic features.	No further actions are recommended.
Point Reyes checkerbloom *Sidalcea calycosa* ssp. *rhizomata*	CRPR 1B.2	Marshes and swamps. Elevation ranges from 10 to 245 feet. Blooms Apr-Sep.	**No Potential.** The Study Area is developed and lacks marshes/swamps.	No further actions are recommended.
Santa Cruz microseris *Stebbinsoseris decipiens*	CRPR 1B.2	Broad-leafed upland forest, chaparral, closed-cone coniferous forest, coastal prairie, coastal scrub, valley and foothill grassland (open areas in loose or disturbed soil, usually derived from sandstone, shale or serpentine, on seaward slopes). Elevation ranges from 35 to 1640 feet. Blooms Apr-May.	**Unlikely.** The Study Area is developed and lacks any typical native substrates.	No further actions are recommended.
Tamalpais jewelflower *Streptanthus batrachopus*	CRPR 1B.3	Chaparral, closed-cone coniferous forest (talus serpentine outcrops). Elevation ranges from 1000 to 2135 feet. Blooms Apr-Jul.	**No Potential.** The Study Area is developed and lacks native chaparral, coniferous forest, or serpentine outcrops.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
Mt. Tamalpais bristly jewelflower *Streptanthus glandulosus* ssp. *pulchellus*	CRPR 1B.2	Chaparral, valley and foothill grassland. Elevation ranges from 490 to 2625 feet. Blooms May-Jul(Aug).	**Unlikely.** The Study Area is developed and lacks any typical native substrates.	No further actions are recommended.
marsh zigadenus *Toxicodendron fontanum*	CRPR 4.2	Chaparral, cismontane woodland, lower montane coniferous forest, marshes and swamps, meadows and seeps (vernally moist or marshy areas; often on serpentine). Elevation ranges from 50 to 3280 feet. Blooms Apr-Jul.	and lacks any mesic or serpentine substrates.	No further actions are recommended.
two-fork clover *Trifolium amoenum*	FE, CRPR 1B.1	Coastal bluff scrub, valley and foothill grassland. Elevation ranges from 15 to 1360 feet. Blooms Apr-Jun.	**No Potential.** The Study Area is developed and lacks coastal scrub or grassland habitat; locally this species is only known from one extant occurrence in Dillon Beach.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
MAMMALS				
pallid bat *Antrozous pallidus*	SSC, WBWG High	Found in deserts, grasslands, shrublands, woodlands, and forests. Most common in open, forages along river channels. Roost sites include crevices in rocky outcrops and cliffs, caves, mines, trees and various manmade structures such as bridges, barns, and buildings (including occupied buildings). Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Unlikely.** On-site buildings are occupied and maintained, lacking ingress/egress to potential refugia. Trees within the Study Are are mostly non-native ornamentals or otherwise small; most are maintained for aesthetics and safety, precluding refugia formation. Peripheral trees along eastern and southern margins of site not assessed.	If peripheral trees are impacted, perform bat assessment and avoidance procedures (see report body).
Townsend's western big-eared bat *Corynorhinus townsendii townsendii*	SSC, WBWG High	Humid coastal regions of northern and central California. Roost in limestone caves, lava tubes, mines, buildings etc. Will only roost in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to disturbance	**No Potential.** On-site buildings are occupied and maintained, lacking ingress/egress to potential refugia.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
western red bat *Lasiurus blossevillii*	SSC, WBWG High	Highly migratory and typically solitary, roosting primarily in the foliage of trees or shrubs. Associated with broad-leaved, riparian tree species including cottonwoods, sycamores, alders, and maples. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas.	**Unlikely.** The Study Area lacks large broad-leaved riparian trees and other typical roosting substrates.	No further actions are recommended.
San Pablo vole *Microtus californicus sanpabloensis*	SSC	Salt marshes of San Pablo Creek, on the south shore of San Pablo Bay. Constructs burrows in soft soil. Feeds on grasses, sedges and herbs.	**No Potential.** The Study Area is developed, lacking any tidal or otherwise saline marsh.	No further actions are recommended.
fringed myotis *Myotis thysanodes*	WBWG High	Associated with a wide variety of habitats including dry woodlands, desert scrub, mesic coniferous forest, grassland, and sage-grass steppes. Buildings, mines and large trees and snags are important day and night roosts.	**Unlikely.** On-site buildings are occupied and maintained, lacking ingress/egress to potential refugia. Trees within the Study Are are mostly non-native ornamentals or otherwise small; most are maintained for aesthetics and safety, precluding refugia formation. Peripheral trees along eastern and southern margins of site not assessed.	If peripheral trees are impacted, perform bat assessment and avoidance procedures (see report body).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
salt marsh harvest mouse *Reithrodontomys raviventris*	FE, SE, SFP	Found only in the saline emergent wetlands of the San Francisco Bay Estuary and its tributaries. Pickleweed marsh is primary habitat but also uses other thick wetland vegetation. Does not burrow, builds loosely organized nests. Requires higher areas for flood escape.	**No Potential.** The Study Area is urband and developed, lacking any tidal or otherwise saline marsh.	No further actions are recommended.
salt-marsh wandering shrew *Sorex vagrans halicoetes*	SSC	Salt marshes of the south arm of San Francisco Bay. Medium high marsh 6 to 8 feet above sea level where abundant driftwood is scattered among pickleweed and affiliated marsh species.	**No Potential.** The Study Area is urband and developed, lacking any tidal or otherwise saline marsh.	No further actions are recommended.
American badger *Taxidea taxus*	SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats. Requires friable soils and open, uncultivated ground. Preys on burrowing rodents.	**No Potential.** The Study Area is totally developed, lacking any habitat for this species.	No further actions are recommended.
BIRDS				
grasshopper sparrow *Ammodramus savannarum*	SSC	Summer resident. Breeds in open grasslands in lowlands and foothills, generally with low- to moderate-height grasses and scattered shrubs. Well-hidden nests are placed on the ground.	**No Potential.** The Study Area is totally developed, lacking any grassland habitat for this species.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
great egret *Ardea alba*	none; breeding sites protected by CDFW	Year-round resident. Nests colonially or semi-colonially, usually in trees, occasionally on the ground or elevated platforms. Breeding sites usually in close proximity to foraging areas: marshes, lake margins, tidal flats, and rivers. Forages primarily on fishes and other aquatic prey, also smaller terrestrial vertebrates.	**Unlikely.** Trees within the Study Area are generally small and unlikely to be used for nesting; the Study Area is developed, with no indication of presence observed.	No further actions are recommended.
great blue heron *Ardea herodias*	none; breeding sites protected by CDFW	Year-round resident. Nests colonially or semi-colonially in tall trees and cliffs, also sequested terrestrial substrates. Breeding sites usually in close proximity to foraging areas: marshes, lake margins, tidal flats, and rivers. Forages primarily on fishes and other aquatic prey, also smaller terrestrial vertebrates.	**Unlikely.** Trees within the Study Area are generally small and unlikely to be used for nesting; the Study Area is developed, with no indication of presence observed.	No further actions are recommended.
short-eared owl *Asio flammeus*	SSC	Occurs year-round, but primarily as a winter visitor; breeding very restricted in most of California. Found in open, treeless areas (e.g., marshes, grasslands) with elevated sites for foraging perches and dense herbaceous vegetation for roosting and nesting. Preys mostly on small mammals, particularly voles.	**No Potential.** The Study Area is developed, lacking open, undeveloped land.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
burrowing owl *Athene cunicularia*	SSC	Year-round resident and winter visitor. Occurs in open, dry grasslands and scrub habitats with low-growing vegetation, perches and abundant mammal burrows. Preys upon insects and small vertebrates. Nests and roosts in old mammal burrows, most commonly those of ground squirrels.	**No Potential.** The Study Area is developed, lacking mammal burrows or analogous refugia.	No further actions are recommended.
western snowy plover *Charadrius nivosus (alexandrines) nivosus*	FT, SSC	Federal listing applies only to the Pacific coastal population. Year-round resident and winter visitor. Occurs on sandy beaches, salt pond levees, and the shores of large alkali lakes. Nests on the ground, requiring sandy, gravelly or friable soils.	**No Potential.** The Study Area is developed, lacking beaches or mudflats.	No further actions are recommended.
northern harrier *Circus cyaneus*	SSC	Year-round resident and winter visitor. Found in open habitats including grasslands, prairies, marshes and agricultural areas. Nests on the ground in dense vegetation, typically near water or otherwise moist areas. Preys on small vertebrates.	**No Potential.** The Study Area is developed, lacking open, undeveloped areas.	No further actions are recommended.
snowy egret *Egretta thula*	no status (breeding sites protected by CDFW)	Year-round resident. Nests colonially, usually in trees, at times in sequestered beds of dense emergent vegetation (e.g., tules). Rookery sites usually situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, and borders of lakes.	**Unlikely.** Trees within the Study Area are generally small and unlikely to be used for nesting; the Study Area is developed, with no indication of presence observed.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
white-tailed kite *Elanus leucurus*	SFP	Year-long resident of coastal and valley lowlands, including agricultural areas. Nests in a variety of tree types. Preys on small diurnal mammals and occasional birds, insects, reptiles, and amphibians.	**Unlikely.** The Study Area is developed, lacking any nearby foraging habitat.	No further actions are recommended.
San Francisco (saltmarsh) common yellowthroat *Geothlypis trichas sinuosa*	SSC	Resident of the San Francisco Bay region, in fresh and salt water marshes. Requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	**No Potential.** The Study Area is developed, lacking marsh or wetlands.	No further actions are recommended.
California black rail *Laterallus jamaicensis coturniculus*	ST, SFP	Year-round resident in marshes (saline to freshwater) with dense vegetation within four inches of the ground. Prefers larger, undisturbed marshes that have an extensive upper zone and are close to a major water source. Extremely secretive and cryptic.	**No Potential.** The Study Area is developed, lacking marsh or wetlands.	No further actions are recommended.
Samuels (San Pablo) song sparrow *Melospiza melodia samuelis*	SSC	Year-round resident of tidal marshes along the north side of San Francisco and San Pablo Bays. Typical habitat is dominated by pickleweed, with gumplant and other shrubs present in the upper zone for nesting. May forage in areas adjacent to marshes.	**No Potential.** The Study Area is developed, lacking any tidal or otherwise saline marsh.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
black-crowned night heron *Nycticorax nycticorax*	no status (breeding sites protected by CDFW)	Year-round resident. Nests colonially, usually in trees but also in patches of emergent vegetation. Rookery sites are often on islands and usually located adjacent to foraging areas: margins of lakes and bays.	**Unlikely.** Trees and shrubs within the Study Area are generally small and unlikely to be used for nesting; the Study Area is developed, with no indication of presence observed.	No further actions are recommended.
Bryant's savannah sparrow *Passerculus sandwichensis alaudinus*	SSC	Year-round resident associated with the coastal fog belt, primarily between Humboldt and northern Monterey Counties. Occupies low tidally influenced habitats and adjacent areas; often found where wetland communities merge into grassland. May also occur in drier grasslands. Nests near the ground in taller vegetation, including along roads, levees, and canals.	**No Potential.** The Study Area is developed, lacking open, undeveloped areas.	No further actions are recommended.
California Ridgway's (clapper) rail *Rallus obsoletus obsoletus*	FE, SE, SFP	Year-round resident in tidal marshes of the San Francisco Bay estuary. Requires tidal sloughs and intertidal mud flats for foraging, and dense marsh vegetation for nesting and cover. Typical habitat features abundant growth of cordgrass and pickleweed. Feeds primarily on molluscs and crustaceans.	**No Potential.** The Study Area is developed, lacking tidal marsh.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
yellow warbler *Setophaga petechia brewsteri*	SSC	Summer resident throughout much of California. Breeds in riparian vegetation close to water, including streams and wet meadows. Microhabitat used for nesting variable, but dense willow growth is typical. Occurs widely on migration.	**Unlikely.** The Study Area is developed, lacking natural streams or wetlands and associated riparian vegetation. May occur occasionally on migration.	No further actions are recommended.
northern spotted owl *Strix occidentalis caurina*	FT,ST, SSC	Year-round resident in dense, structurally complex forests, generally with old-growth or otherwise mature conifers. In Marin County, uses both coniferous and mixed (coniferous-hardwood) forests. Nests on platform-like substrates in the forest canopy, including in tree cavities. Preys mostly on mammals.	**No Potential.** The Study Area is developed, lacking dense coniferous or mixed forest.	No further actions are recommended.
REPTILES AND AMPHIBIANS				
western pond turtle *Actinemys marmorata*	SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation. Require basking sites such as partially submerged logs, vegetation mats, or open mud banks, and suitable upland habitat (sandy banks or grassy open fields) for egg-laying.	**No Potential.** The Study Area is surrounded by development, lacking any ponds or streams.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
California giant salamander *Dicamptodon ensatus*	SSC	Occurs in the north-central Coast Ranges. Moist coniferous and mixed forests are typical habitat; also uses woodland and chaparral. Adults are terrestrial and fossorial, breeding in cold, permanent or semi-permanent streams. Larvae usually remain aquatic for over a year.	**No Potential.** The Study Area is developed, lacking any streams or suitable upland habitat.	No further actions are recommended.
California red-legged frog *Rana draytonii*	FT, SSC	Lowlands and foothills in or near permanent sources of deep water with dense emergent and/or overhanging riparian vegetation. Favors perennial to intermittent ponds, stream pools and wetlands. Requires 11 to 20 weeks of continuous inundation for larval development. Disperses through upland habitats during and after rains.	**No Potential.** The Study Area is surrounded by development, lacking any natural water bodies.	No further actions are recommended.
foothill yellow-legged frog *Rana boylii*	SSC	Found in or near rocky streams in a variety of habitats. Prefers partly-shaded, shallow streams and riffles with a rocky substrate; requires at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis. Feeds on both aquatic and terrestrial invertebrates. Highly aquatic.	**No Potential.** The Study Area is surrounded by development, lacking any natural streams.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
FISHES				
Acipenser medirostris green sturgeon	FT, SSC	Spawns in the Sacramento River and Klamath Rivers, at temperatures between 8-14 degrees C. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock.	**No Potential.** The Study Area lacks any anadromous streams/waters.	**Not Present.** No further recommendations for this species.
Coho salmon - central CA coast ESU *Oncorhynchus kisutch*	FE, SE	Federal listing includes populations between Punta Gorda and San Lorenzo River. State listing includes populations south of San Francisco Bay only. Occurs inland and in coastal marine waters. Requires beds of loose, silt-free, coarse gravel for spawning. Also needs cover, cool water and sufficient dissolved oxygen.	**No Potential.** The Study Area lacks any anadromous streams/waters.	No further actions are recommended.
steelhead - central CA coast DPS *Oncorhynchus mykiss irideus*	FT, NMFS	Occurs from the Russian River south to Soquel Creek and Pajaro River. Also in San Francisco and San Pablo Bay Basins. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for 1 or more years before migrating downstream to the ocean.	**No Potential.** The Study Area lacks any anadromous streams/waters.	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
tidewater goby *Eucyclogobius newberryi*	FE, SSC	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River. Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.	**No Potential.** The Study Area lacks any brackish or estuarine waters.	No further actions are recommended.
longfin smelt *Spirinchus thaleichthys*	FC, ST	Euryhaline, nektonic and anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15 to 30 ppt, but can be found in completely freshwater to almost pure seawater.	**No Potential.** The Study Area lacks any anadromous or estuarine streams/waters.	No further actions are recommended.
INVERTEBRATES				
western bumble bee *Bombus occidentalis*	SC	Formerly common throughout much of western North America; populations from southern British Columbia to central California have nearly disappeared. Occurs in a wide variety of habitat types. Nests are constructed annually in pre-existing cavities, usually on the ground (e.g., mammal burrows). Many plant species are visited and pollinated.	**No Potential.** This species is considered extirpated in the Bay Area.	No further actions are recommended.
monarch butterfly *Danaus plexippus*	FC; winter roosts protected by CDFW	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (usually eucalyptus, Monterey pine, Monterey cypress), with nectar and water sources nearby.	**Unlikely (winter roosting).** The Study Area does not provide stands or clusters of typical, mature roost trees (e.g., eucalyptus, Monterey pine).	No further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE	RECOMMENDATIONS
Mission blue butterfly *Icaricia icarioides missionensis*	FE	Inhabits grasslands and coastal chaparral of the San Francisco peninsula and southern Marin County, but mostly found on San Bruno Mountain. Three larval host plants: *Lupinus albifrons*, *L. variicolor*, and *L. formosus*, of which *L. albifrons* is favored.	**No Potential.** The Study Area is developed, lacking the host plants of this species.	No further actions are recommended.
Myrtle's silverspot butterfly *Speyeria zerene myrtleae*	FE	Restricted to the fog belt of northern Marin and southernmost Sonoma County, including the Point Reyes Peninsula; extirpated from coastal San Mateo County. Occurs in coastal prairie, dunes, and grassland. Larval foodplant is typically *Viola adunca*. Adult flight season may range from late June to early September.	**No Potential.** The Study Area is developed, lacking the host plants of this species.	No further actions are recommended.
California freshwater shrimp *Syncaris pacifica*	FE, SE	Endemic to Marin, Napa, and Sonoma counties. Found in low elevation, low gradient streams where riparian cover is moderate to heavy. Favors shallow pools away from the main stream flow. Winter: undercut banks with exposed roots; summer: leafy branches touching water.	**No Potential.** The Study Area is surrounded by development, lacking any natural streams.	No further actions are recommended.

*** Key to status codes:**

FC	Federal Candidate
FE	Federal Endangered
FT	Federal Threatened
Rank 1A	CNPS Rank 1A: Plants presumed extinct in California
Rank 1B	CNPS Rank 1B: Plants rare, threatened or endangered in California and elsewhere
Rank 2B	CNPS Rank 2B: Plants rare, threatened, or endangered in California, but more common elsewhere
Rank 3	CNPS Rank 3: Plants about which more Information is needed (a review list)
Rank 4	CNPS Rank 4: Plants of limited distribution (a watch list)
SC	State Candidate
SE	State Endangered
SFP	State Fully Protected Animal
SSC	CDFW Species of Special Concern
ST	State Threatened
WBWG	Western Bat Working Group High or Medium-high Priority Species

APPENDIX D

Cultural Resources Survey Report

CULTURAL RESOURCES SURVEY REPORT

TERRA LINDA HIGH SCHOOL

320 NOVA ALBION WAY, SAN RAFAEL, MARIN COUNTY, CALIFORNIA

PREPARED BY:

MOLLY FIERER-DONALDSON
ARCHAEOLOGICAL/HISTORICAL CONSULTANTS

PREPARED FOR:
BARBARA WU HEYMAN
MICHAEL BAKER INTERNATIONAL

TIM RYAN
SENIOR DIRECTOR OF STRATEGIC FACILITY PLANNING
SAN RAFAEL CITY SCHOOLS

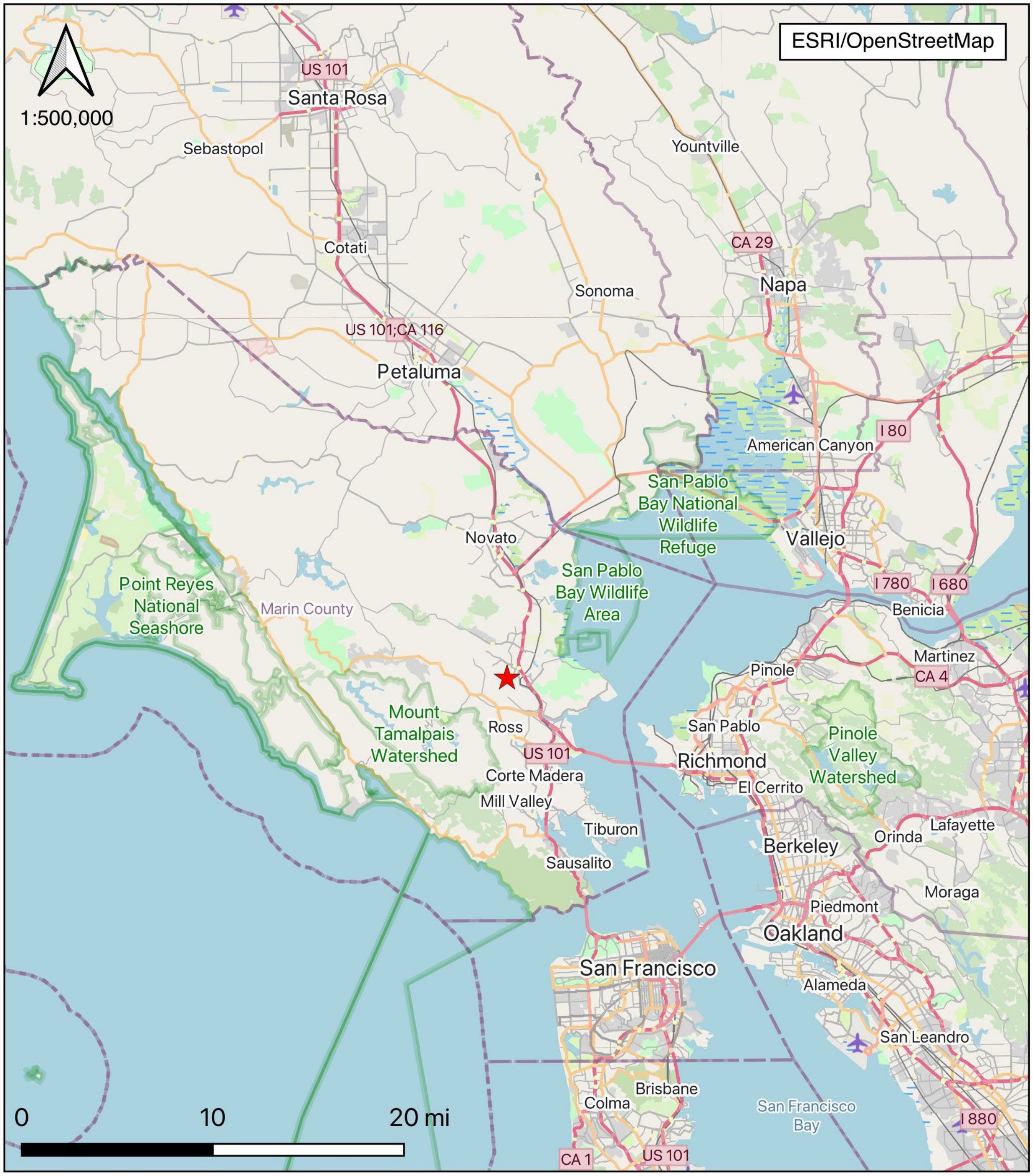
OCTOBER 2023

TABLE OF CONTENTS

INTRODUCTION AND SUMMARY OF FINDINGS

San Rafael City Schools proposes capital improvements at Terra Linda High School, 320 Nova Albion Way, in the City of San Rafael, Marin County (hereafter called "the project area"). Project elements include rehabilitation of the aquatics center, modernization of physical education and main classroom facilities, stadium upgrades, and tennis court improvements. To ensure that the proposed project does not impact historical resources as defined in the CEQA Guidelines (14 CCR §15064.5), Archaeological/Historical Consultants completed a cultural resources survey and sensitivity analysis of the area of proposed improvements.

No Native American archaeological or historic-era resources were identified in this study, and no part of the project area is sensitive for buried archaeological or historic-era resources. Therefore, the project does not appear to have the potential to affect historical resources as defined in 14 CCR §15064.5. It is possible that previously unknown archaeological materials may be encountered during construction. If buried cultural materials are encountered during construction, work should stop in that area until a qualified archaeologist can evaluate the nature and significance of the find.



Project Location Map

Terra Linda High School, San Rafael

Legend

★ Project Location

Figure 1: Project Location

AHC-HERITAGE.COM

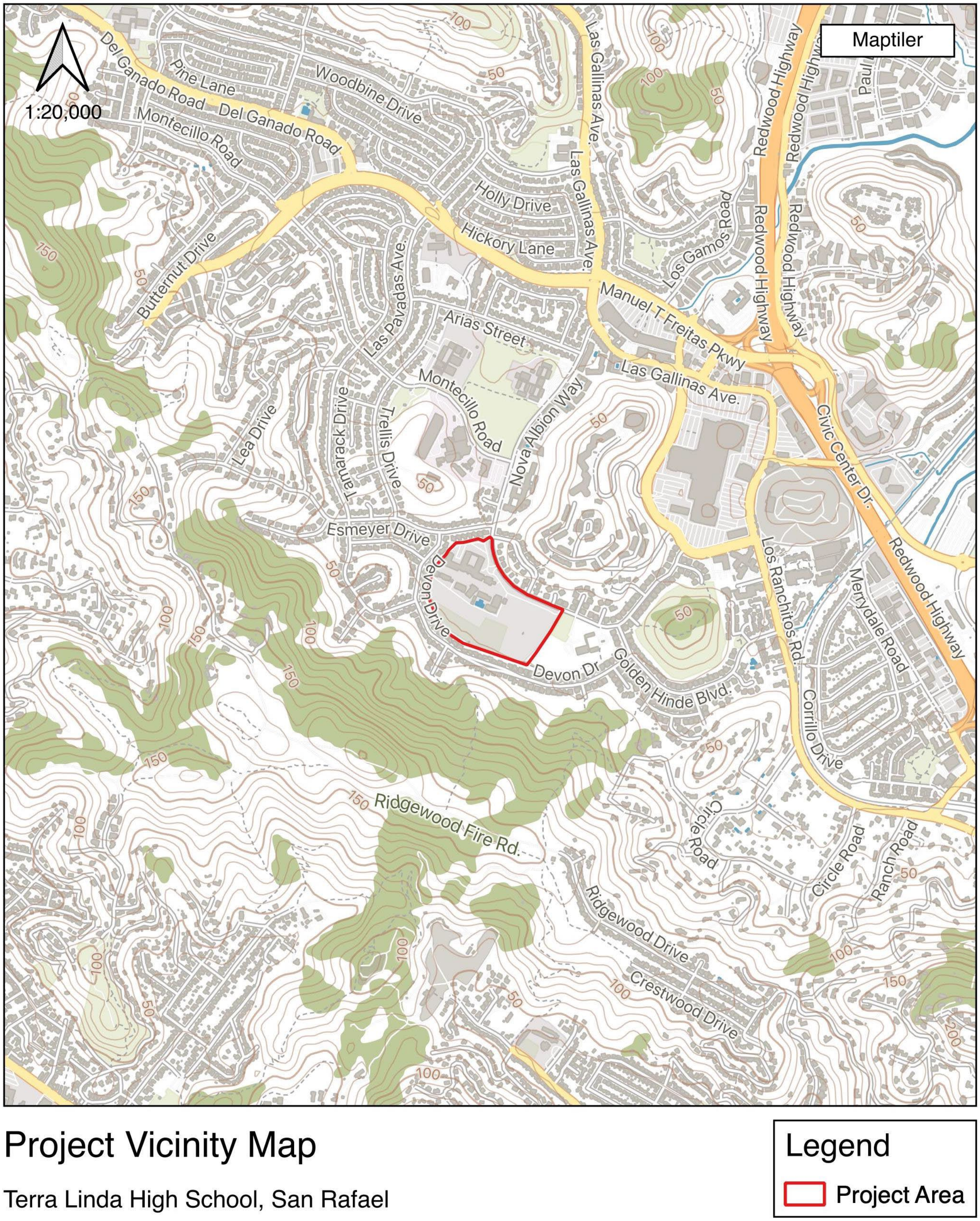


Figure 2: Project Vicinity

Figure 3: Project Parcels

PREVIOUS STUDIES AND ARCHIVAL RESEARCH

RECORD SEARCH RESULTS

A record search for the project area and a ¼-mile radius around it was completed at the Northwest Information Center on July 27, 2023 (NWIC 23-0018). No resources have been previously recorded within the project area. No previous studies have included the project area, and only one has come within a ¼ mile radius.

PREVIOUS STUDIES

In 2012, an archaeological survey report was prepared for the Abovenet Lucasfilm Segments 2 & 3 Project, part of which came within 500 feet of the northeast corner of the project area. The study encountered no cultural resources (Koenig 2012; S-039157).

NATIVE AMERICAN CONSULTATION

A Sacred Lands File search was requested from the Native American Heritage Commission (NAHC), and a reply was received on July 21, 2023. The results of the search were negative. Native American groups on the NAHC contact list were contacted and invited to consult on the project (see Table 1 below).

Table 1: Individuals on the contact list provided by the Native American Heritage Commission

Name	Organization or Tribe	Location	Replied?
Gene Buvelot	Federated Indians of Graton Rancheria	Rohnert Park, CA	N
Greg Sarris	Federated Indians of Graton Rancheria	Rohnert Park, CA	N
Buffy McQuillen	Federated Indians of Graton Rancheria	Rohnert Park, CA	Y
Bunny Tarin	Guidiville Rancheria of California	Talmage, CA	N
Michael Derry	Guidiville Rancheria of California	Talmage, CA	N

- On August 15, 2023, Hector Garcia Cabrales, Cultural Resources Specialist, responded by email for Buffy McQuillen, Tribal Heritage Preservation Office, on behalf of Graton Rancheria, requesting consultation under AB52. The request also stated that they would like to receive a copy of any Cultural Resource Studies, information solicited from the California Historical Resources Information System (CHRIS), and results from a search of the Sacred Lands File through the Native American Heritage Commission. The requested documents were provided to the Tribe on August 24, 2023.
- On October 5th, representatives from the Federated Indians of Graton Rancheria (FIGR) and San Rafael Schools, met together to consult about the proposed project. In that meeeting, FIGR requested the search radius for previously recorded Native American archaeological sites at the Northwest Information Center's archive be expanded to one mile. This was completed and the results reported in a technical memorandum (Fierer-Doandson 2023).

No additional responses were received by October 24, 2023.

Please see Appendix 2 for a full record of Native American Correspondence.

BACKGROUND

ENVIRONMENT

The project area is in the neighborhood of Terra Linda in the Santa Margarita Valley at an elevation of 100 ft above sea level (asl) in the south, sloping down to 75 ft asl in the north. To the south and west are the hills of the Terra Linda/Sleepy Hollow Preserve, rising to a height of about 600 ft asl. The slopes are covered in coyote brush, toyon, buckwheat, valley oak, coast live oak, and California bay trees. Prior to development, fluvial drainages flowed out of the hills, crossed the project area, and traveled north between the two hills to the northeast and northwest of the project area before joining with additional drainages to head east to the Bay, which in the early historic era was 0.7 miles to the east of the project area (USGS 1897; Marin County Parks 2022).

PREHISTORY

While humans arrived in California by the Terminal Pleistocene (13,500-11,700 calibrated radiocarbon years before present [cal BP]), no archaeological materials firmly datable to this period have been found in the San Francisco Bay Area. The Early Holocene (11,700-8,200 cal BP) is slightly better attested and is characterized by mobile foragers using wide-stemmed and leaf-shaped projectile points and large milling slabs (Milliken *et al.* 2007:112). However, given the rise in sea levels in the Middle Holocene, most evidence of the earliest human habitation in the region is likely to be underwater or deeply buried (Rosenthal and Meyer 2007).

The Middle Holocene (8,200-4,200 cal BP), by contrast, is better documented through radiocarbon dates from more than 60 sites in the Bay and Delta regions. This period saw the introduction of the mortar and pestle, side-notched points, and expanded ground stone and shell bead technologies in regional and inter-regional trading networks that extended as far as the Bodie Hills and Napa Valley (Byrd et al. 2017; Milliken et al. 2007:114-115). At the end of this period, the slowing rise in sea level allowed for the formation of extensive marshes and increased use of estuarine resources, leading to the formation of the first shell middens.

Archaeologists divide the Late Holocene into five periods: Early (4200–2550 cal BP), Early/Middle Transition (2550–2150 cal BP), Middle (2150–930 cal BP), Middle/Late Transition (930–685 cal BP), and Late (685–180 cal BP; Hylkema 2002; Milliken *et al.* 2007).

The Early Period saw the establishment of many large shellmounds around the Bay Area, increasing sedentism, "regional symbolic integration, and increased regional trade," and the establishment of the first large cemeteries. Typical artifact assemblages in this period included mortars, stemmed, broad-leaf projectile points, rectangular and spire-lopped Olivella snail beads, Haliotis (abalone) beads and pendants, notched and grooved net sinkers, and bone awls. *Olivella* and *Haliotis* beads and pendants were also produced as regional trade items (Lightfoot 1997:138; Milliken et al. 2007:114-115, Hylkema 2002:241).

The Middle Period on the San Francisco Bay saw an apparent cultural intensification that included refinement and changes in bead and bone ornaments, projectile point types, and the introduction of coiled basketry. Higher populations and more permanent settlements were accompanied by increased social stratification and ritual complexity. A shift from marine to terrestrial resources is also evident (Lightfoot 1997; Lightfoot and Luby 2012). In the later Middle Period, another major cultural shift seems to have occurred, with the collapse of trade networks, site abandonment, and the introduction of new bead forms. In Marin County, the Middle Period saw the concurrent use of semi-sedentary villages and mobile forager camps (Milliken et al. 2007:106, 115; Moratto 1984:235, 278).

The Late Period saw a new increase in population size, sedentary villages, and social and religious complexity in the Bay region (Byrd et al. 2017; Milliken et al. 2007:116). The cultural pattern that had emerged by the time of Spanish contact included:

> …large populations; a greater number of settlements and more evidence of status differentiation among them; a greater emphasis on gathering vegetal foods, especially acorns; more intensive trade and highly developed exchange systems; the spread of secret societies and cults together with their associated architectural features and ceremonial traits; and, in late prehistory, the appearance of clamshell disk beads as a currency for exchange (Moratto 1984:283).

The Late Period archaeological record also documents the increased gathering of small seeds and the consumption of a wider range of animal species, including marine mammals. In Marin County, settlement focused on semi-permanent villages, usually in oak woodlands (Milliken *et al.* 2007:106, 117; Moratto 1984:235, 283).

Since the late 1940s, numerous stratified prehistoric occupation sites on the Marin bayside have been scientifically excavated, demonstrating that ancestral Coast Miwok populations occupied many significant sites over millennia. These include investigations at CA-MRN-115 in China Camp State Park (Moratto 1984:272, Schneider 2010), CA-MRN-20 at Strawberry Point (Richardson Bay), Olompali, the largest Coast Miwok site at 32 hectares (CA-MRN-193, Schneider 2010:68), the East Marin Islands (Luby 1994), Angel Island (DeGeorgey 2007), and De Silva Island in Richardson Bay (Moratto 1984: 275). In San Rafael, excavations in 1998 at the Dominican College shellmounds (CA-MRN-254) identified a year-round settlement in the Middle Period and Late Period Phase 1 (Bieling 1998), while 2014 test excavations at CA-MRN-85 in downtown San Rafael identified remnant shell middens with artifacts dating from 1880 to 445 BP (Shoup 2014). In Larkspur, 2013-2014, excavations at the Rose Lane site on Corte Madera Creek discovered a village site with over 600 burials (Bever 2014).

At Miller Creek, north of San Rafael, excavations at MRN-138 by San Francisco State University in the early 1970s located the likely site of the ethnographically known village of Shotomoko-Cha and demonstrated occupation of the site by at least 700 BCE (Moratto 1984:273). Within San Rafael, 1998 excavations at the Dominican College shellmounds (MRN-254, which may be the same site as MRN-86, see Stewart 1999:16) identified a year-round settlement in the Middle Period and Late Period Phase 1 (Bieling 1998).

ETHNOGRAPHY

The project area is within the traditional territory of the Coast Miwok, which stretches from a rough line between Bodega and Glen Ellen to the north, Sonoma in the east, and the Pacific Coast in the west (Kelly 1978:414). With Costanoan/Ohlone, Miwok is one of two branches of the Utian language family, which arrived in California around 4,000 years ago (Golla 2007:76).

The Coast Miwok of the San Rafael, Greenbrae, and Point San Quentin areas identified themselves as Tamal Aguastos in Mission records. Four Tamal Aguasto villages are known from ethnography and Mission registers; Milliken estimates that these four communities, which occupied around 54 square miles, had about 395 residents before missionization, or 7.3 people per square mile (Kelly 1978:415, Milliken 2009:72, Milliken 1995:242). The Tamal Aguasto villages were actively connected to neighboring communities by marriage; there were pre-Mission period marriages between Tamal Aguasto and Huimens of Richardson Bay, Guaulens of Bolinas Bay, Tamals of the Nicasio area, Omiomi of the Novato region, and Huichun Costanoan/Ohlones from the East Bay (Milliken 2009:72-73).

Coast Miwok villages included conical, grass-covered houses built on a frame of willow or driftwood and covered with grass thatching (Kelly 1978:417). Socially, the pre-contact Coast Miwok are characterized as complex hunter-gatherers, featuring sedentism, some social hierarchy, property ownership, and complex religious and symbolic systems. Coast Miwok material culture included sophisticated basketry, rope, and nets for fishing and trapping; bows, arrows, and slings for hunting; advanced stoneworking technologies; and elaborate feather decorations.

One male and two female leaders provided leadership within villages or tribelets. A nonhereditary male headman called *hoypuh* acted as a mediator between individuals and families, arranged marriages, and acted as a negotiator with other groups. The *hoypuh kuleyih* was a female leader in charge of the Acorn Dance, Sünwele Dance, and the Bird Cult; the *maien* was the head of the women's ceremonial house but seemed to have enjoyed broad authority: ethnographic informant Tom Smith reported that she would 'boss everyone around' (Kelly 1978:415-419; Goerke 2007:28-29). Though social stratification was limited, individuals could own specific oak trees and areas of land, while clamshell discs were used as a form of money and a medium of exchange. Social life was focused around music and dance, secret societies, and storytelling (Kelly 1978:418, Goerke 2007:5-7). Five kinds of expert doctors were recognized in Coast Miwok society, several of whom also dispensed poison; some experienced dancers were also said to have healing abilities (Kelly 1978:419).

Coast Miwok territory included a wide range of ecological zones: from the project area, for instance, a day's walk encompasses mountain chaparral, redwood forest, oak woodland, riparian zones, and saltwater marshes. Native people used the full range of food resources presented by this diversity. Acorns and, to a lesser extent, buckeye nuts, laurel nuts, and grass seeds were staple starches; kelp was extensively harvested along the coast. Deer, elk, bear, and rabbit were commonly hunted land mammals. Coast Miwok people seem to have avoided sea mammals but harvested steelhead, salmon, crab, mussels, and clams from Bay and coastal zones, as well as waterfowl such as geese and mudhens from Bay marshes. Herbs such as tobacco and datura were smoked, most often by men.

Coast Miwok material culture also made full use of the region's resources. Personal clothing was limited to a loincloth or apron for men and a double apron of deerskin or tule for women, though deerskin throws and blankets made of rabbit or rat fur were used in colder periods of the year. Fiber arts included sophisticated basketry, rope, and nets for fishing and trapping. Bows and arrows, and slings were used for hunting. In addition to advanced stoneworking technologies, Coast Miwok artisans also produced elaborate feather decorations (Goerke 2007:5-7; Kelly 1978:418).

HISTORY

EUROPEAN CONTACT AND THE MISSION PERIOD

The first contact between Coast Miwok people and Europeans came in June-July 1579 when Francis Drake and his men spent five weeks reconditioning their ship at a cove on the Marin Coast, commonly identified as Drake's Bay. The second contact came in November 1595, when a Manila galleon commanded by Sebastián Rodriguez Cermeño was wrecked in Drake's Bay; survivors of the ship were offered hospitality and food in local Coast Miwok villages. Ceramics, coins, and other objects traded by Drake or washed up from the lost galleon have been discovered at Coast Miwok village sites throughout Marin County.

The establishment of a mission system by Franciscan priests in Alta California was part of a strategic effort to extend Spanish power to Alta California against an ongoing Russian advance down the Pacific Coast. The missions, supported by small military detachments, were to convert local Native Americans and establish agricultural plantations using their labor (Shoup and Milliken 1999:17). Yet, as a matter of policy, the Spanish viceroy in Mexico wanted to keep the costs of Alta California as low as possible; the Franciscan order was therefore given almost total political control over the territory on the understanding that they would subsidize the costs of settlement, especially the maintenance of the military detachments assigned to the area (Jackson and Castillo 1995:11).

Mission San Francisco de Asís (commonly known as Mission Dolores) and the San Francisco Presidio were established in 1776. They marked the arrival of both Spanish rule and the Mission system in northern California. Between 1800 and 1803, 463 Coast Miwok speakers were baptized at Mission Dolores; a total of 2,828 Coast Miwok were baptized at Missions Dolores, San José, and San Rafael by 1832 (Milliken 2009:9). The Tamal Aguasto communities of the San Rafael area went to Mission Dolores in three waves: 11 people were baptized in 1795, 198 in 1800-1803, and 42 in 1808. In total, 283 of the 288 Tamal Aguasto baptisms in the Mission system took place at San Francisco by 1814, before the founding of Mission San Rafael (Milliken 2009:9, 21-22). Milliken estimates that this represented 86% of the area's adult population, suggesting that San Rafael and its hinterlands were largely abandoned during the first decade of the 19th century.

Coast Miwok people came into the missions through a mixture of choice, persuasion, and force. European diseases ran rampant, with death tolls reaching 8% per year, higher among women and children. By 1810, traditional cultures were collapsing throughout coastal and central California (Milliken 1995:221). Apart from aggressive 'recruiting' by Spanish soldiers, these social traumas seem to have induced some Coast Miwok to voluntarily enter the Mission system. High death rates and harsh rules sparked both active resistance by Miwok leaders such as Marino and Pomponio, who fled the Missions and clashed with Spanish troops (Goerke 2007:105), but also passive resistance by many Miwok individuals who bent the rules of the Mission system to temporarily return to their traditional lifeways (Schneider 2010:22).

When Mission San Rafael was founded in 1817, the first residents were already-baptized neophytes from Mission Dolores, including many Coast Miwok. A mixture of people from diverse geographic areas at the Mission resulted in the creation of hybrid communities. In the wake of the secularization of the Missions in 1834, Native American survivors of Mission San Rafael attempted to formally claim land in the area but were largely unsuccessful; the number of Indian residents of southern Marin County fell from 365 in 1838 to 165 in 1839 (Jackson and Castillo 1995:94). Coast Miwok people continued to live in isolated communities such as Nicasio and the Bodega area (Milliken 2009:54; Goerke 2007:191). In 1920, the Bureau of Indian Affairs purchased a 15-acre parcel near Graton, Sonoma County, to serve as a reservation for Pomo, Coast Miwok, and other Indians. After the Bureau of Indian Affairs withdrew federal recognition in 1958, a 40-year struggle for the restoration of tribal status resulted in the recognition of the Federated Indians of Graton Rancheria in 2000 (Graton Rancheria 2016). Since that time, the Federated Indians of Graton Rancheria have operated as a sovereign tribal nation.

MEXICAN AND AMERICAN PERIODS

The 1833 secularization law passed by the Mexican Congress was promulgated in California in August 1834. Father Quijas, who had arrived in San Rafael that year, continued to serve as parish priest for the remainder of the decade (Bancroft 1886:346). In 1837, Timoteo Murphy (1800-1853) was appointed administrator of the Mission by General Vallejo, in which role he served from 1837 to 1842. He also served as Indian agent for the Marin Indians, Land Commissioner, and Juez de Paz. Murphy, a native of Ireland, arrived in California in 1828 and worked in Monterey and then San Francisco for the English firm Hartnell & Company. He was a local agent for the hunting and shipping of otter hides for several years before becoming friendly with Vallejo. In 1844, Murphy received the grant to Rancho San Pedro, Santa Margarita, y las Gallinas, a 5-square league (8,931 acres) area that includes much of today's San Rafael and Santa Venetia. Murphy seems to have outfitted his new Rancho by confiscating livestock from the San Rafael Mission (Goerke 2007:161). Murphy built the first adobe house in San Rafael in 1844 at the corner of 4th and C Streets (Hoover et al. 1966:181; Kyle et al. 1990:174). After Murphy's death in 1853, his property passed to his brother, Matthew, and nephew, John Lucas (Prendergast 1942:39).

HISTORY OF THE PROJECT AREA

The project area is located in the Santa Margarita Valley on a portion of Rancho San Pedro, Santa Margarita, y las Gallinas that became the property of Don Timoteo's nephew, John Lucas (1826-1900) (Austin & Witney 1873). Specifically, it is near the southwestern border of the 2,340 acres that comprised the Lucas Home Ranch, only part of the 7,600 acres he inherited from his uncle. John Lucas was born in Ireland and first came to California in 1852. After briefly returning to Ireland in 1853, he moved permanently to California in 1855. He married Maria Sweetman (1827-1910), and they had several children. The family first lived in San Rafael but moved onto Lucas's estate in 1863 (*Marin Journal* 1900). According to the 1870 US Census non-population schedule, the ranch's agriculture mainly consisted of growing barley along with some oats and wheat. The ranch also had 60 milch cows, 10 working oxen, 100 additional cattle, 25 horses, and 10 pigs. Just before John's death in 1900, he and Maria moved to Bolinas, where she also remained for the rest of her life.

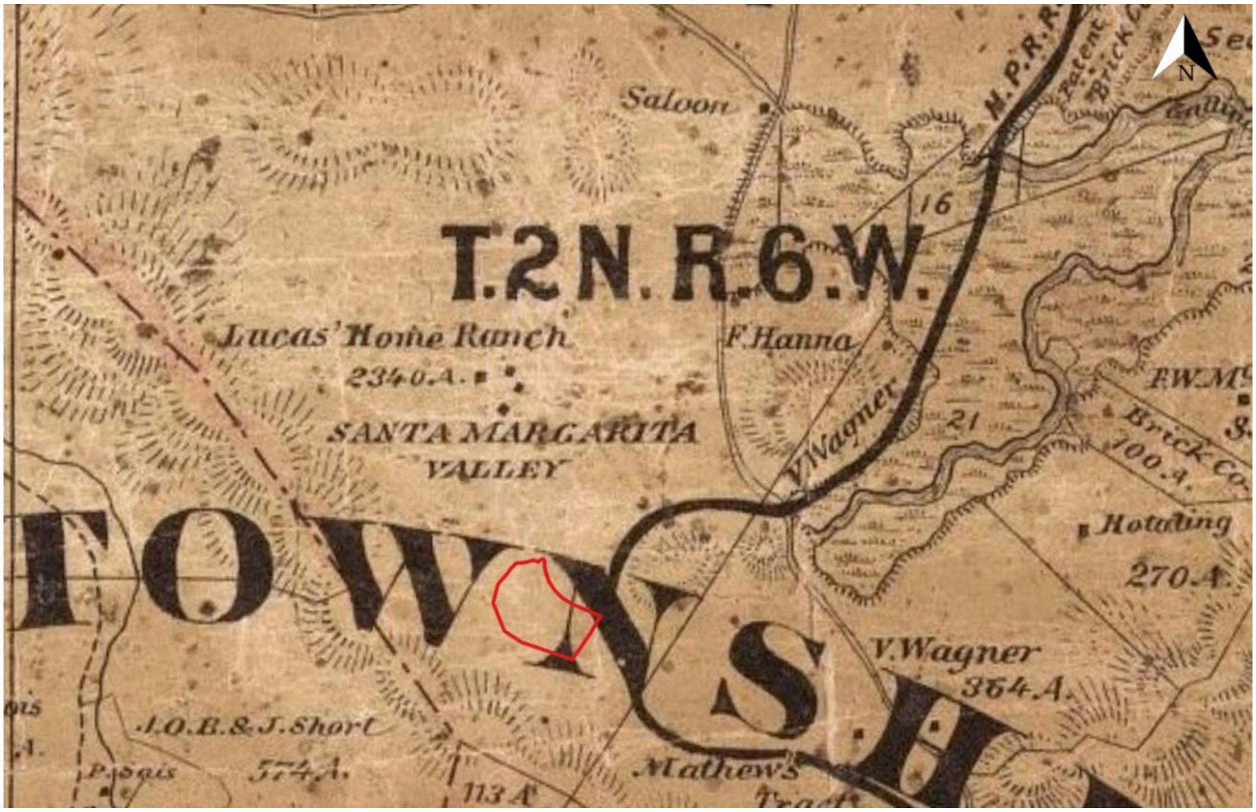


Figure 4: 1873 Austin & Whitney Marin County Map with the project area outlined in red

By the time of the 1911 W.B. Walkup and Sons Marin County Map, the project area had become the property of Manuel Teixeira Freitas (1853-1923), who owned most of the Santa Margarita Valley after the Lucas family. Originally from the Azores, he came to California in 1871. He was the Vice Consul of Portugal in San Francisco and was involved as a director in multiple banks in San Francisco and San Mateo Counties. He owned approximately 6,000 acres in the Santa Margarita Valley, where the project area is located, and an additional ranch in Solano County. His Marin County property was devoted mainly to cattle, and there were three large dairies with about 1,000 dairy cows. Freitas's business office was in San Francisco; however, he lived with his wife Maria (1878-1919) and eight children in San Rafael on 5th Avenue (Kingsbury 1905; Harper 1913).

Neither the Lucas nor Freitas families built any structures in the project area. Likewise, historic topographical maps and aerial photographs show the project area as undeveloped through the middle of the 20th century. The first buildings visible on the project area belong to Terra Linda High School, built in 1960 (Fairchild Aerial Surveys 1931; Jack Ammann Photogrammetric Engineers 1946; Cartwright Aerial Surveys 1957, 1964).

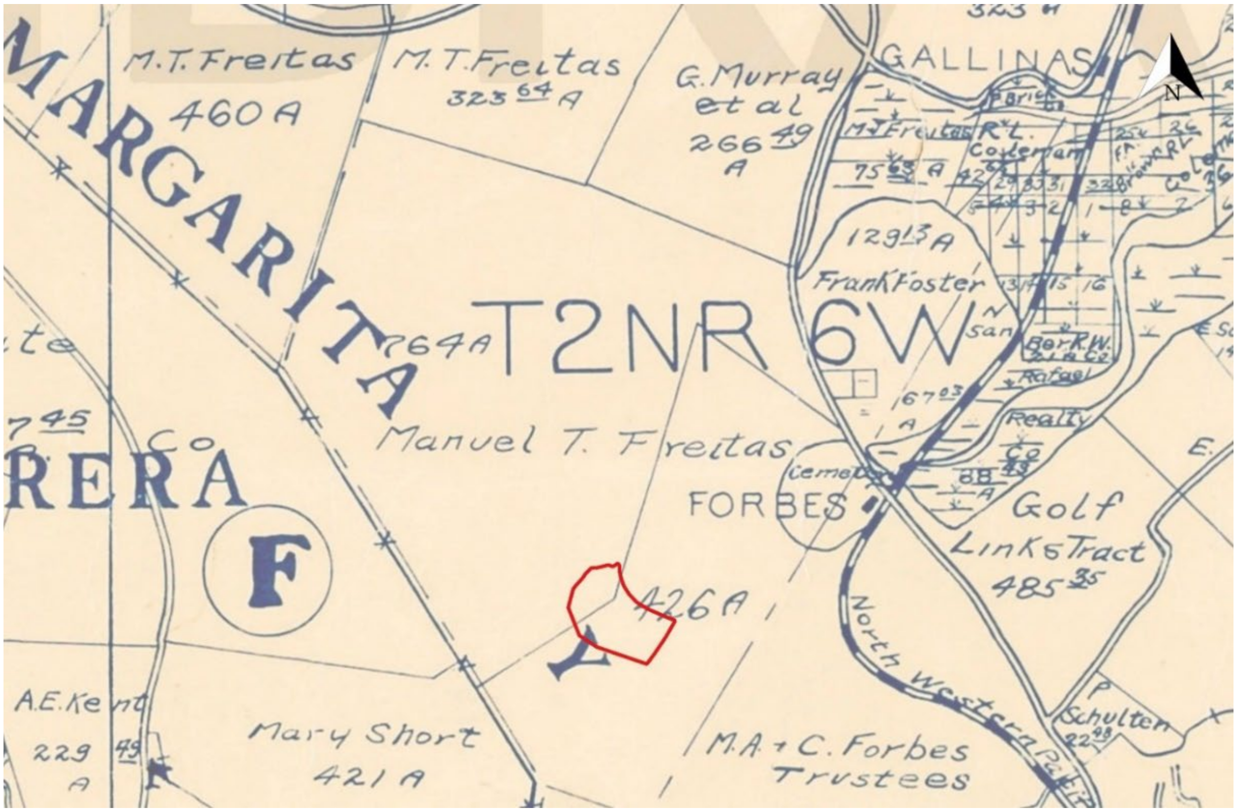


Figure 5: 1911 Walkup & Sons Marin County Map with project area outlined in red

Figure 6: 1946 aerial photograph showing the project area outlined in red (Jack Ammann Photogrammetric Engineers 1946)

ARCHAEOLOGICAL SURVEY

FIELD METHODS AND SURVEYOR'S QUALIFICATIONS

Dr. Molly Fierer-Donaldson of Archaeological/Historical Consultants surveyed the accessible parts of the project area in 15m transects on July 27, 2023. Dr. Fierer-Donaldson meets the Secretary of the Interior's Standards for Archaeology and is a Registered Professional Archaeologist. Dr. Fierer-Donaldson has over five years of experience in California archaeology. A pedestrian survey was used to inspect the project area for cultural resources. Open patches of ground were closely inspected for evidence of Native American and historic-era occupation, including midden soil, shell, bone, modified lithic materials, fire-affected rock, and historic debris and features.

SURVEY RESULTS

The majority of the project area was covered in concrete parking lots or buildings. The rest was a series of athletic fields and courts, of which only the soccer and baseball fields were grass, while the tennis, basketball, track, and football fields were all covered in different types of artificial surfaces. Construction was ongoing in the parking lot areas on the northwestern portion of the property, which was fenced off.

Figure 7: Construction work in the parking lot in front of the east wing of the structures

Only 11 acres of the 29-acre property contained visible soil; most of it was altered by the grass turf laid down to create sports fields. Around the edges of the fields, in the clear area behind the garden and tennis courts, and in the rear of one of the buildings where an excavator had dug a 1.5-foot deep square hole were the only locations where the soil could be observed. All the grass fields were walked in 15-meter transects, looking for places where soil could be examined. The soil was scraped and examined at the excavation location behind the San Rafael City Schools District Office in the northern portion of the project area. The soil was very dry and compact pale brown (Munsell 10 YR 6/3) clay loam with 5% subangular gravels at the surface, while the stratum below was brownish yellow (Munsell 10YR 6/6) clay loam. Soils in the cleared area and at the eastern and southeastern edge of the property next to the sports fields were also dry and compact pale brown (Munsell 10YR 6/3) clay loam with 10-15% subangular to subrounded gravels. No Native American or historic-era cultural resources or soils were observed.

Figure 8: Excavated area behind the San Rafael Schools District Office

Figure 9: Profile of excavated area showing brownish yellow clay loam lower stratum (left); pale brown clay loam soil scrape of surface next to excavated area (right)

Figure 10: The clear area behind the garden and tennis court

Figure 11: Pale brown clay loam soil in the clear area behind the tennis courts

Figure 12: Soccer field (left); south border next to the soccer and baseball fields

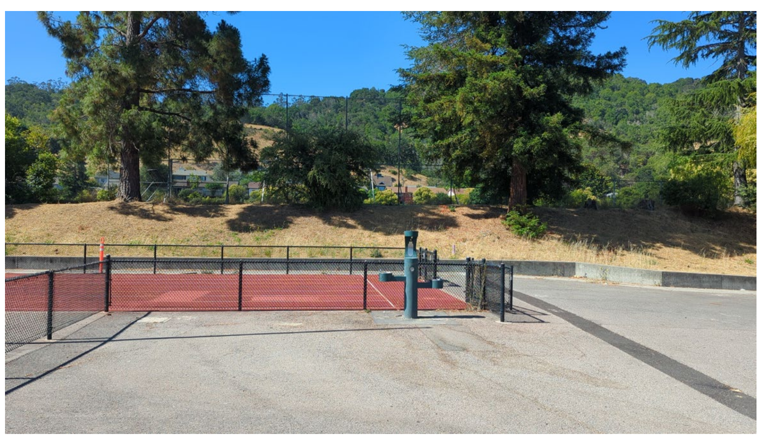


Figure 13: Soil next to the soccer fields and baseball (left) slope between the football field and soccer fields

ARCHAEOLOGICAL SENSITIVITY ANALYSIS

NATIVE AMERICAN SITE SENSITIVITY

Archaeological sites are not randomly distributed but are found in areas that would have been attractive for human habitation in prehistory. Such areas are usually relatively flat and have year-round access to fresh water. Soils that developed in the Holocene era (the last 11,700 years) are also more likely to contain deeply stratified archaeological deposits due to continuous human settlement in California during this period. Conversely, areas with very steep slopes, soils of Pleistocene or older age, and without access to water are unlikely to contain substantial archaeological deposits.

The project area is located on a Holocene alluvial fan classified by the USDA as Xerorthents-Urbanland 0 to 9 percent slopes, which indicates an area that has undergone significant human modification with soils rearranged either in a cut and fill or as tailings (Xerorthents) and areas consisting largely of the built environment (Urbanland) (USDA 2022; Witter et al. 2006).

According to the San Francisco Bay Area EcoAtlas, during the early historic period, streams draining the hills to the southwest used to travel north through the western side of the project area to join other drainages before heading east to meet the historic Baylands that previously reached a point 0.7 miles east of the project area. (SFEI 1998; BAARI 2017). As the project area is not close to any perennial water courses, there are no known Native American sites within ¼ mile, and it is located in soils characterized by extensive human modification and urbanization, it has a low sensitivity for buried Native American archaeological sites.

HISTORIC-PERIOD ARCHAEOLOGICAL SENSITIVITY

Several factors can be used to infer an area's sensitivity for buried historic-period archaeological resources. These include surface scatters of artifacts, documentary sources (historic maps, deeds, or photographs), standing buildings or structures that suggest patterns of land use (homes, barns, ponds, fences, industrial facilities), and ecological or landscape features (steep hills, bodies of water, wetlands) (Caltrans 2007).

According to historic research, survey and topographic maps, as well as aerial photographs, the project area remained undeveloped through the middle of the 20th century. Historic-period land use prior to 1960 appears to have been limited to ranching. The first buildings were constructed on the project area in 1960 and belonged to Terra Linda High School, which were unlikely to have left intact historic-period resources (Fairchild Aerial Surveys 1931; Jack Ammann Photogrammetric Engineers 1946; Cartwright Aerial Surveys 1957, 1964).

FINDINGS AND RECOMMENDATIONS

As noted above, no Native American archaeological or historic-era resources were identified in this study, and no part of the project area is sensitive for buried archaeological or historic-era resources. Therefore, the project does not appear to have the potential to affect historical resources as defined in 14 CCR §15064.5.

It is possible that previously unknown archaeological materials may be encountered during construction. If buried cultural materials are encountered during construction, work should stop in that area until a qualified archaeologist can evaluate the nature and significance of the find.

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W.B. Walkup and Son
1911 *Map of Marin County, California*. W.B. Walkup and Son, San Francisco, CA.

APPENDIX 1: NORTHWEST INFORMATION CENTER RECORD SEARCH

ARCHAEOLOGICAL/HISTORICAL CONSULTANTS
609 AILEEN STREET, OAKLAND, CA 94609 / 510.224.4076 / AHC-HERITAGE.COM

October 24, 2023

Timothy Ryan
San Rafael City Schools
310 Nova Albion Way
San Rafael, CA 94903

RE: Results Summary, Northwest Information Center Search for Terra Linda High School, San Rafael, Marin County

Dear Mr. Ryan,

San Rafael City Schools proposes capital improvements at Terra Linda High School, 320 Nova Albion Way, in the City of San Rafael, Marin County (hereafter called "the project area"). In September 2023, Archaeological/Historical Consultants (A/HC) completed a cultural resources survey and sensitivity analysis of the area of proposed improvements. The report requested a search of previously recorded cultural resources in the project area and a ¼-mile radius from the Northwest Information Center (NWIC) at Sonoma State University. During the October 5th meeting between San Rafael City Schools and the Federated Indians of the Graton Rancheria (FIGR), FIGR requested that the search radius be expanded to one mile around the project area.

In response to FIGR's request, A/HC initiated an expanded search of the Northwest Information Center (NWIC) to include previously recorded cultural resources within a one-mile radius of the project area. The search was completed on October 14, 2023 (NWIC file #23-0480), and identified five resources within one mile of the project area (P-21-000153, P-21-000154, P-21-000156, P-000943, and P-21-002618) and 64 previous studies. Of those five resources, two are historic-period resources: the Mt. Olivet Cemetery (P-21-000943) and a portion of the Sonoma Valley Branch of the Northwestern Pacific Railroad (P-21-002618). The other three are prehistoric Native American resources originally identified during Nels Nelson's survey of the Bay Area in 1907:

P-21-000153/CA-MRN-128/Nelson's No. 128. Nelson recorded the site as "Shellmound. Situated at the base of the round hill mentioned above, on the northwest side." Unfortunately, he does not describe the site any further, and no other information is available about the site. The NWIC places the site's location about 10-15 feet above sea level and 0.9 miles east of the project area, approximately 275 feet from the tidal marsh during the early historic period (SFEI 1998).

P-21-000154/CA-MRN-129/Nelson's No. 129. Nelson described the site as "Shellmound. Situated at the head of the marsh east of the San Rafael-Petaluma wagon road, south of the small hillock lying in the angle made by the road and railroad…The site is low, near the marsh and not much above its level… The mound is ovoid and measures 115 x 210 feet. It is 3-4 feet high and nearly flat-topped." He also noted that a portion had been excavated, and local informants said much of the mound had been removed. No further information about the site exists, and it has not been relocated. The NWIC places the site about 10-15 feet above sea level and 0.8 miles east of the project area, approximately 320 feet from the edge of the tidal marsh during the early historic period (SFEI 1998).

P-21-000156/CA-MRN-131/Nelson's No. 131. According to Nelson's notes, "At present, there is little evidence of any mound, but its presence some years ago is vouched for by two individuals. According to them, it was a real mound of considerable size. And there is little reason to doubt the story for the place is very suitable, not far back of the marsh or above its level, with constant water supply furnished by the creek passing on the north side." In 1955, F. A. Riddell provided an updated account with the information that the site area was located in the vicinity of Hyacinth and Hickory and was "completely covered by the building of homes," and "covered with ca. 1 ft of topsoil." The map provided by the NWIC places this site near Trellis Drive and Monticello Road, approximately 0.3 miles south of the location described by Riddell and approximately 70 feet above sea level. However, the site appears to be mapped in error because there is no creek near this location, which is not near the tidal marsh. The location near Hyacinth and Hickory, given by Riddell, is currently 20 feet above sea level, approximately 0.8 miles north of the project area and 0.4 miles west of the historic extent of the Baylands tidal marsh. The creek mentioned in Nelson's original report would be a portion of Gallinas Creek, which is now channelized along Manuel T. Freitas Way; however, historical ecology maps from the early historic period place it around 350 feet from the site's location (SFEI 1998). This data suggests Riddell's location is a better match for Nelson's original description, and the one provided by the NWIC is in error.

The 65 previous studies identified in the record search area concentrated north and east of the project area around the modern bay margin or south of the project area on the other side of the hills (please see Appendix 1). None of these studies recorded any additional sites within one mile of the project area.

Data from the expanded record search do not change the results of the archaeological sensitivity analysis presented in our October report. As the search shows, recorded resources suggest Native American sites in the region were located near the edges of the tidal marsh along the margins of the San Francisco Bay and close to the level of the marsh. Additionally, the sites were near places with large perennial creeks or locations where multiple drainages joined together, forming small creeks to provide reliable freshwater sources.

The project area is nestled in foothills located 0.7 miles from the tidal marsh in the early historic period. It sits at 80-100 feet above sea level. A single seasonal drainage exits the hills south of the project area and travels through it to the north. This drainage appears to have been too small to provide a year-round freshwater source. This additional research confirms the project area has a low probability of containing buried Native American archaeological sites, as most were located on different landforms where tidal marsh, bay, and freshwater resources were more accessible.

Sincerely,

Molly Fierer-Donaldson

Molly Fierer-Donaldson
Staff Archaeologist
Archaeological/Historical Consultants

Reference

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APPENDIX 2: SACRED LANDS FILE SEARCH AT THE NATIVE AMERICAN HERITAGE COMMISSION

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 21, 2023

Molly Fierer-Donaldson
Archaeological/Historical Consultants

Via Email to: molly.fierer@ahc-heritage.com

Re: 23-31 Terra Linda High School Project, Marin County

To Whom It May Concern:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

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

Sincerely,

Cody Campagne

Cody Campagne
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Marin County
7/21/2023

Tribe Name	Contact Person	Contact Address	Phone #	Email Address
Federated Indians of Graton Rancheria	Gene Buvelot,	6400 Redwood Drive, Suite 300 Rohnert Park, CA, 94928	(707) 566-2288	gbuvelot@gratonrancheria.com
Federated Indians of Graton Rancheria	Greg Sarris, Chairperson	6400 Redwood Drive, Suite 300 Rohnert Park, CA, 94928	(707) 566-2288	gbuvelot@gratonrancheria.com
Federated Indians of Graton Rancheria	Buffy McQuillen, THPO	6400 Redwood Drive, Suite 300 Rohnert Park, CA, 94928	(707) 566-2288	thpo@gratonrancheria.com
Guidiville Rancheria of California	Bunny Tarin, Tribal Administrator	PO Box 339 Talmage, CA, 95481	(707) 462-3682	admin@guidiville.net
Guidiville Rancheria of California	Michael Derry, Historian	PO Box 339 Talmage, CA, 95481	(707) 391-1665	historian@guidiville.net

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 23-31 Terra Linda High School Project, Marin County.

SAN RAFAEL CITY SCHOOLS

www.srcs.org 310 Nova Albion Way, San Rafael, CA 94903 (415) 492-3205 Fax (415) 492-3532

August 4, 2023

Tribal Historic Preservation Office
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928

Re: AB 52 Tribal Consultation for Proposed Improvements to Terra Linda High School, 320 Nova Albion Way, San Rafael, Marin County

Dear Tribal Historic Preservation Office,

San Rafael City Schools is proposing capital improvements at Terra Linda High School located at 320 Nova Albion Way in the City of San Rafael, including rehabilitation of the aquatics center, modernization of physical education and main classroom facilities, stadium upgrades, and tennis court improvements.

San Rafael City Schools would like to invite you to consult on the proposed project pursuant to the provisions of AB52. The District would welcome your help in identifying, preserving, and/or mitigating project impacts to Native American cultural places, including sacred sites, cemeteries, Historic Resources, and Tribal Cultural Resources (as defined in Public Resources Code §5024.1, §5097.9, and §21074).

Many of the improvements will be interior upgrades. However, the plan also calls for demolishing the existing swimming pool (25 meters by 25 yards) and building a larger one (25 meters by 40 yards), a larger pool deck, new bleachers, a retaining wall, and a pool equipment storage structure at the aquatics center. Stadium upgrades will include a new 1,500 square foot concessions and restroom between the stadium and gymnasium, removal of two portable structures, and replacement of the track surface with a rubberized one. The softball and baseball fields would see their 200,000 square feet of natural turf replaced by artificial turf, plus improvements to the dugouts, irrigation lines and landscaping, and ADA-compliant travel paths.

A record search at the Northwest Information Center identified no Native American archaeological sites within the project area or a 1/4-mile radius, though no previous investigation has covered the project area. A search of the Sacred Lands File by the Native American Heritage Commission in July 2023 was negative.

San Rafael City Schools invites your participation in identifying within the project area. If your Tribe would like to comment or consult on the Project under AB 52, please respond in writing to our cultural resource's consultants within 30 days of the date of this letter:

Archaeological/Historical Consultants
Attention: Molly Fierer-Donaldson
609 Aileen Street
Oakland, CA 94609-1609

SAN RAFAEL CITY SCHOOLS

www.srcs.org 310 Nova Albion Way, San Rafael, CA 94903 (415) 492-3205 Fax (415) 492-3532

You can also reach our consultants by telephone at (510) 224-4076 or by email at molly.fierer@ahc-heritage.com. Please provide written comments within 30 days (September 4, 2023). If San Rafael Schools does not receive a response from you within 30 days, we will assume that the Tribe has declined consultation on this project.

Thank you for your attention, and we look forward to hearing from you.

Sincerely,

Tim Ryan
Senior Director of Strategic Facility Planning
San Rafael City Schools

23-31 Consultation Log: Terra Linda High School, San Rafael, Marin County

On July 21, 2023, the Native American Heritage Permission provided a contact list of individuals and tribes in Marin County who might be interested in consultation regarding a project in San Rafael. On August 4, 2023, San Rafael City Schools sent US-certified mail letters concerning AB52 Tribal Consultation for proposed improvements to Terra Linda High School, 320 Nova Albion Way, San Rafael, Marin County. On August 22, 2023, follow-up emails and on August 24, 2023, follow-up calls were made to those who had not responded to the original request.

Graton Rancheria

On August 15, 2023, Hector Garcia Cabrales, Cultural Resources Specialist, responded by email for Buffy McQuillen, Tribal Heritage Preservation Office, on behalf of Graton Rancheria, requesting consultation under AB52. The request stated that they would like to receive a copy of any Cultural Resource Studies, information solicited from the California Historical Resources Information System (CHRIS), and results from a search of the Sacred Lands File through the Native American Heritage Commission. The requested documents were provided to the Tribe on August 24, 2023.

Guidiville Rancheria

A follow-up phone call was made on August 24, 2023, when no response to US mail or email requests was received. The individual who normally responds to consultation requests, Bunny Tarin, the Tribal Administrator, was in a meeting, and a message was left. No response was received before September 4, 2023.

Gmail

Molly Fierer-Donaldson <molly.fierer@ahc-heritage.com>

Terra Linda High School Improvements (AB 52)

1 message

THPO@gratonrancheria.com <THPO@gratonrancheria.com> Tue, Aug 15, 2023 at 10:18 AM
To: Molly Fierer-Donaldson <molly.fierer@ahc-heritage.com>
Cc: Hector Garcia <HGarcia@gratonrancheria.com>

Dear Ms. Fierer,

The Tribe has received the project notification letter dated August 4, 2023, requesting interest and input regarding the project at 320 Nova Albion Way, San Rafael. We appreciate your effort to contact the Tribe. The Tribal Heritage Preservation Office staff has reviewed the project information. Please see the attached AB 52 response letter and we look forward to hearing from you.

Sincerely,

Buffy McQuillen

Tribal Heritage Preservation Officer (THPO)

Native American Graves Protection and Repatriation Act (NAGPRA)

Office: 707.566.2288; ext. 137

Cell: 707.318.0485

FAX: 707.566.2291

Hector Garcia Cabrales

Cultural Resources Specialist

Federated Indians of Graton Rancheria

6400 Redwood Drive, Suite 300

Rohnert Park, CA 94928

Office: 707.566.2288, ext. 138

Mobile: 707.478.1737

Email: hgarcia@gratonrancheria.com

Terra Linda High School_320 Nova Abion Way_FIGR AB 52 Ltr 8.15.23.pdf
791K

FEDERATED INDIANS OF
GRATON
RANCHERIA

Submitted via electronic e-mail: molly.fierer@ahc-heritage.com

August ~~11~~ 15, 2023

RE: Formal Request for Tribal Consultation Pursuant to the California Environmental Quality Act (CEQA), Public Resources Code section 21080.3.1, subds. (b), (d) and (e) for the *proposed improvements to Terra Linda High School, 320 Nova Albion Way, San Rafael, Marin County.*

Dear Agency Representative:

This letter constitutes a formal request for tribal consultation under the provisions of the California Environmental Quality Act (CEQA) (Public Resources Code section 21080.3.1 subdivisions (b), (d) and (e) for the mitigation of potential project impacts to tribal cultural resources for a project within the Federated Indians of Graton Rancheria's ancestral lands.

Receiving this letter sets forth the Tribe's formal request for consultation on the following topics checked below, which shall be included in consultation if requested (Public Resources Code section 21080.3.2, subd. (a)):

___x__ Alternatives to the project
___x__ Recommended mitigation measures
___x__ Significant effects of the project

The Tribe also requests consultation on the following discretionary topics checked below (Public Resources Code section 21080.3.2, subd. (a)):

___x__ Type of environmental review necessary
___x__ Significance of tribal cultural resources, including any regulations, policies or standards used by your agency to determine significance of tribal cultural resources
___x__ Significance of the project's impacts on tribal cultural resources
___x__ Project alternatives and/or appropriate measures for preservation or mitigation that we may recommend, including, but not limited to:

(1) Avoidance and preservation of the resources in place, pursuant to Public Resources Code section 21084.3, including, but not limited to, planning and construction to avoid the resources and protect the cultural and natural context, or planning greenspace, parks or other open space, to incorporate the resources with culturally appropriate protection and management criteria;
(2) Treating the resources with culturally appropriate dignity taking into account the tribal cultural values and meaning of the resources, including but not limited to the following:
    a. Protecting the cultural character and integrity of the resource;

b. Protection the traditional use of the resource; and
c. Protecting the confidentiality of the resource.

(3) Permanent conservation easements or other interests in real property, with culturally Appropriate management criteria for the purposes of preserving or utilizing the resources or places.
(4) Protecting the resource.

Additionally, the Tribe would like to receive any cultural resources assessments or other assessments that have been completed on all or part of the project's potential "area of project effect" (APE), including, but not limited to:

(1) The results of any record search(es) conducted at an archaeological information center of the California Historical Resources Information System (CHRIS), including, but not limited to:

(a) Any known cultural resources that have already been recorded on or adjacent to the potential APE;
(b) Whether the probability is low, moderate or high that cultural resources are located in the potential APE; and
(c) If a survey is required to determine whether previously unrecorded cultural resources are present in the potential APE.

(2) The results of any archaeological inventory survey that was conducted of all or part of the potential APE, including, but not limited to:

(a) Any report that may contain site forms, site significance, and suggested mitigation measures.

(3) The results of any Sacred Lands File searches conducted through the Native American Heritage Commission for all or part of the potential APE;
(4) Any ethnographic studies conducted for any area including all or part of the potential APE;
(5) Any geotechnical reports regarding all or part of the potential APE; and
(6) The administrative drafts of all environmental documents.

We would like to remind your agency that CEQA Guidelines section 15126.4, subdivision (b)(3) states that preservation in place is the preferred manner of mitigating impacts to archaeological sites. Section 15126.4, subd. (b)(3) of the CEQA Guidelines has been interpreted by the California Court of Appeal to mean that "feasible preservation in place must be adopted to mitigate impacts to historical resources of an archaeological nature unless the lead agency determines that another form of mitigation is available and provides superior mitigation of impacts." *Madera Oversight Coalition v. County of Madera* (2011) 199 Cal.App.4th 48,

FEDERATED INDIANS OF
GRATON
RANCHERIA

disapproved on other grounds, *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013) 57 Cal.4th 439.

The Tribe would like to begin consultation within 30 days of your receipt of this letter. Please contact my office at (707) 566-2288 or by email at bmcquillen@gratonrancheria.com as the person who will serve as the lead contact on behalf of the Tribe.

Sincerely,

Buffy McQuillen

Buffy McQuillen, THPO/NAGPRA
Federated Indians of Graton Rancheria

APPENDIX E

Energy Consumption Assessment

Energy Consumption Assessment for the Terra Linda High School Capital Improvements Project

City of San Rafael, California

Prepared For:

Michael Baker International
9755 Clairemont Mesa Blvd, Suite 100
San Diego, CA 92124

Prepared By:

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS
55 Hanover Lane
Chico, CA 95926

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CONTENTS

LIST OF TABLES

APPENDIX

LIST OF ACRONYMS AND ABBREVIATIONS

Term	**Definition**
ADA	American with Disabilities Act
CalEEMod	California Emissions Estimator Model
CalGreen	California Green Building Standards Code
CAISO	California Independent System Operator
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CIF	California Interscholastic Federation
City	San Rafael

CO_2	Carbon dioxide
County	Marin County
CPUC	California Public Utilities Commission
EMFAC	EMission FACtor
EO	Executive Order
EV	Electric vehicle
IEPR	Integrated Energy Policy Report
kv	Kilovolt
kWh	Kilowatt-hours
MCE	Marin Clean Energy
PG&E	Pacific Gas and Electric
Project	Terra Linda High School Capital Improvements Project
RPS	Renewables Portfolio Standard
SB	Senate Bill

1.0 INTRODUCTION

This report documents the results of an Energy Consumption Assessment completed for the Terra Linda High School Capital Improvements Project (Project), which proposes various improvements at the existing Terra Linda High School campus to modernize and/or replace existing outdated and aging academic and physical education facilities and to improve access in compliance with the Americans with Disabilities Act (ADA). This report was prepared to analyze the potential direct and indirect environmental impacts associated with Project energy consumption, including the depletion of nonrenewable resources (e.g., oil, natural gas, coal) during the construction and operational phases. The impact analysis focuses on the four sources of energy that are relevant to the Proposed Project: electricity, natural gas, the equipment-fuel necessary for Project construction, and the automotive fuel necessary for Project operations.

1.1 Project Location and Background

The Project is located in the City of San Rafael (City) on the existing Terra Linda High School campus at 320 Nova Albion Way. The Project proposes improvements that are needed to modernize and/or replace existing academic and physical education facilities at the campus to serve the existing student population and to improve access in compliance with the ADA. Table 1-1 provides a detailed description of the proposed improvements and construction timing.

Table 1-1. Proposed Improvements

Phase 1: June 2024 – November 2025
Rehabilitation of Aquatics Center: The existing outdoor swimming pool facilities (including the 25-meter by 25-yard pool) would be demolished, and a new competition- level aquatics center (with a 25-meter by 40-yard pool) would be constructed to support the existing swimming and water polo programs. The facility would meet California Interscholastic Federation (CIF) standards, which would allow the school to host CIF-level competitions. The existing pool lights would be replaced with new low-level MUSCO lighting on 50-foot poles. The existing pool deck would be removed and replaced with a larger one. A new scoreboard and LED display would be installed at the perimeter of the pool. A new concrete 5- to 6-level bleacher with a cantilever shade structure would be installed on the south side of the aquatic facility; the bleachers would require the installation of a retaining wall. The existing ancillary gym building and pump room would be demolished and replaced with a new ancillary gym building and pool house. Additionally, a new pump house building would be constructed. New lockers as well as restroom facilities would be a part of the ancillary gym building to better serve the pool. **Modernization of Physical Education Support Spaces:** The existing locker rooms, bathrooms, team rooms, and other support spaces in the gym building would be modernized. The spaces, including the bathrooms and lockers, would be reconfigured to add a new team room and an all-gender locker room. There would be new lighting, painting, finishes, and fixtures. The exterior doors would be replaced, as would mechanical equipment. The roof would either be coated or replaced, and the existing natural gas lines servicing the building would be upsized and rerouted. Mechanical equipment serving these spaces may also be replaced.
Phase 2: April 2024 – August 2028
Modernization of Main Classroom Buildings: The interior of the main school buildings, including classrooms, labs, restrooms, and corridors, would be modernized to be more resilient to physical damage and compliance with ADA standards. The facilities would be improved with new LED lighting, flooring, counters, fixtures, painting and finishes, and technology. The restroom toilets would be improved to high-security, full-height partitions. The fire alarm system would be upgraded. Room configurations at select areas would be changed to better serve more modern functions; as an example, existing book storage rooms would be converted into a wellness center.
Phase 3: May 2027 – August 2029
Stadium Upgrades: A new concessions and restroom facility would be constructed between the stadium and gymnasium, as would a new ticket booth building. The existing scoreboard would be replaced, and the track surface would be replaced with an in-kind rubberized surface. ADA-compliant paths of travel would be provided, and two existing portable structures (each approximately 1,000 square feet) would be removed. Existing flatwork, fencing, grades, landscaping, and site lighting between the practice gym and the track would also be improved as part of the stadium upgrades. One fire hydrant would need to be relocated slightly. The existing concession stand, a 40-foot converted storage container, would be removed. **New Artificial** Turf at Baseball and Softball fields: Approximately 200,000 square feet of natural turf would be replaced with artificial turf. No "crumb rubber" materials would be present in the synthetic turf. The new fields may include other improvements, including dugouts, shot put throw station, irrigation line upgrades to adjacent landscaping, new scoreboards, and improved ADA-compliant paths of travel. No lighting is proposed for the ballfields as part of the Proposed Project. **Tennis Court Improvements:** The existing tennis courts would be replaced, walkways would be improved to meet ADA standards, and the drinking fountain would be replaced with a new ADA-compliant fountain. The existing fencing around the tennis courts would be replaced. No lighting is proposed for the tennis courts as part of the Proposed Project.

Implementation of the Proposed Project would not require off-site improvements. The Project would be phased to limit interruptions to existing campus operations and to avoid the need for temporary student classroom facilities during construction. Additionally, construction activities would be scheduled to minimize disruptions to campus programs and important testing days. The new facilities would tie into existing underground utilities located within the campus. The Project would comply with the California Building Standards Code (Title 24, California Code of Regulations) and include sustainability improvements as required by the California Green Building Standards Code (California Code of Regulations Part 11, Title 24), such as water conservation features (e.g., low-flow, water-efficient plumbing fixtures for toilets and sinks, tankless water heater systems, drought-tolerant plants and low-water irrigation systems with smart sensor controls). Improvements to the aquatic center, tennis courts, turf fields, and ADA-compliant paths of travel may require the removal of existing trees.

The Proposed Project would not increase the student seating capacity of the campus. However, the proposed competitive-level aquatic center and the proposed artificial turf at the ballfields would allow extended use of the facilities by the high school and community. Expanded activity may include CIF tournaments at the aquatic center, early morning water polo and swim team practices, and expanded use of the ballfields which is anticipated to generate 92 additional daily vehicle trips over existing conditions (Michael Baker International 2023).

2.0 ENERGY CONSUMPTION

2.1 Environmental Setting

Energy relates directly to environmental quality. Energy use can adversely affect air quality and other natural resources. The vast majority of California's air pollution is caused by burning fossil fuels. Consumption of fossil fuels is linked to changes in global climate and depletion of stratospheric ozone. Transportation energy use is related to the fuel efficiency of cars, trucks, and public transportation; choice of different travel modes (auto, carpool, and public transit); vehicle speeds; and miles traveled by these modes. Construction and routine operation and maintenance of transportation infrastructure also consume energy. In addition, residential, commercial, and industrial land uses consume energy, typically through the usage of natural gas and electricity.

2.2 Energy Types and Sources

California relies on a regional power system comprised of a diverse mix of natural gas, renewable, hydroelectric, and nuclear generation resources. Natural gas provides California with a majority of its electricity followed by renewables, large hydroelectric and nuclear. Pacific Gas & Electric (PG&E) provides electricity and natural gas to the City of San Rafael. The company has various sources of clean power to offer its customers, stating that in 2021, approximately 93 percent of the customer's electricity comes from GHG-free resources, including renewables, nuclear, and hydroelectric power (PG&E 2023). Furthermore, PG&E delivered approximately 50 percent of the electricity that they provided was from renewable resources that qualified under the California Renewables Portfolio Standard (RPS), and the company remains on track for the new RPS mandate from SB 100, which mandates 60 RPS by 2030. PG&E also offers a program to customers to purchase up to 100 percent of their electricity from either solar or regional renewable energy sources. The company currently provides 5.5 million customers with electricity and natural gas throughout the state of California.

The Project Area is located in Marin County (County), where Marin Clean Energy (MCE) offers an opt-in renewable energy service. MCE is a nonprofit public agency that offers clean energy options to several counties in the Bay Area, including Contra Costa, Marin, Napa, and Solano counties, serving over 585,000 customers. Customers of PG&E can enroll in MCE's energy generation service, which will provide customers with the choice to have 60 percent or 100 percent of their electricity supplied from renewable energy sources. However, PG&E still provides electricity delivery service to customers, such as meter reading and power line maintenance. Additionally, MCE has developed several plans that promotes goals such as supplying 95 percent carbon free energy by the end of 2023 (MCE 2023).

The California Public Utilities Commission (CPUC) regulates PG&E. The CPUC has developed energy efficiency programs such as smart meters, low-income programs, distribution generation programs, self-generation incentive programs, and a California solar initiative. Additionally, the California Energy Commission (CEC) maintains a power plant database that describes all of the operating power plants in the state by county.

2.2.1 Existing Transmission and Distribution Facilities

The components of transmission and distribution systems include the generating facility, switching yards and stations, primary substation, distribution substations, distribution transformers, various sized transmission lines, and the customers. The United States (U.S.) contains over a quarter million miles of transmission lines, most of them capable of handling voltages between 115 kilovolts (kv) and 345 kv, and a handful of systems of up to 500 kv and 765 kv capacity. Transmission lines are rated according to the amount of power they can carry, the product of the current (rate of flow), and the voltage (electrical pressure). Generally, transmission is more efficient at higher voltages. Generating facilities, hydro-electric dams, and power plants usually produce electrical energy at fairly low voltages, which is increased by transformers in substations. From there, the energy proceeds through switching facilities to the transmission lines. At various points in the system, the energy is "stepped down" to lower voltages for distribution to customers. Power lines are either high voltage (115, 230, 500, and 765 kv) transmission lines or low voltage (12, 24, and 60 kv) distribution lines. Overhead transmission lines consist of the wires carrying the electrical energy (conductors), insulators, support towers, and grounded wires to protect the lines from lightening (called shield wires). Towers must meet the structural requirements of the system in several ways. They must be able to support both the electrical wires, the conductors, and the shield wires under varying weather conditions, including wind and ice loading, as well as a possible unbalanced pull caused by one or two wires breaking on one side of a tower. Every mile or so, a "dead-end" tower must be able to take the strain resulting if all the wires on one side of a tower break. Every change in direction requires a special tower design. In addition, the number of towers required per mile varies depending on the electrical standards, weather conditions, and the terrain. All towers must have appropriate foundations and be available at a fairly regular spacing along a continuous route accessible for both construction and maintenance. A ROW is a fundamental requirement for all transmission lines. A ROW must be kept clear of vegetation that could obstruct the lines or towers by falling limbs or interfering with the sag or wind sway of the overhead lines. If necessary, land acquisition and maintenance requirements can be substantial. The dimension of a ROW depends on the voltage and number of circuits carried and the tower design. Typically, transmission line ROWs range from 100 to 300 feet in width. The electric power supply grid within Los Angeles County is part of a larger supply network operated and maintained by SCE that encompasses nearly the entire southern California region. This system ties into yet a larger grid known as the California Power Pool that connects with the San Diego Gas and Electric and Pacific Gas and Electric Companies. These companies coordinate the development and operation, as well as purchase, sale, and exchange of power throughout the State of California. Within the County, SCE owns most of the transmission and distribution facilities.

The California Independent System Operator (CAISO) manages the flow of electricity across the high-voltage, long-distance power lines (high-voltage transmissions system) that make up 80 percent of California's and a small part of Nevada's grid. This nonprofit public benefit corporation keeps power moving to and throughout California by operating a competitive wholesale electricity market, designed to promote a broad range of resources at lower prices, and managing the reliability of the electrical transmission grid. In managing the grid, CAISO centrally dispatches generation and coordinates the movement of wholesale electricity in California. As the only independent grid operator in the western U.S., CAISO grants equal access to 26,000 circuit miles of transmission lines and coordinates competing and diverse energy resources into the grid where it is distributed to consumers. Every five minutes, CAISO forecasts electrical demand and dispatches the lowest cost generator to meet demand while ensuring enough transmission capacity for delivery of power.

CAISO conducts an annual transmission planning process that uses engineering tools to identify any grid expansions necessary to maintain reliability, lower costs or meet future infrastructure needs based on public policies. CAISO engineers design, run and analyze complex formulas and models that simulate grid use under wide-ranging scenarios, such as high demand days coupled with wildfires. This process includes evaluating power plant proposals submitted for study into the interconnection queue to determine viability and impact to the grid. The long-term comprehensive transmission plan, completed every 15 months, maps future growth in electricity demand and the need to meet state energy and environmental goals that require the CAISO grid to connect to renewable-rich, but remote areas of the Western landscape. CAISO promotes energy efficiency through resource sharing. CAISO electricity distribution management strategy designed so that an area with surplus electricity can benefit by sharing megawatts with another region via the open market. This allows the dispatch of electricity as efficiently as possible. By maximizing megawatts as the demand for electricity increases, CAISO helps keep electricity flowing during peak periods.

2.3 Energy Consumption

Electricity use is measured in kilowatt-hours (kWh), and natural gas use is measured in therms. Vehicle fuel use is typically measured in gallons (e.g., gallons of gasoline or diesel fuel), although energy use for electric vehicles is measured in kWh. As previously stated, this impact analysis focuses on the four sources of energy that are relevant to the Proposed Project: electricity usage, natural gas usage, the equipment-fuel necessary for Project construction, and the automotive fuel necessary for Project operations.

The electricity consumption associated with all nonresidential uses in Marin County from 2018 to 2022 is shown in Table 2-1. As indicated, electricity consumption has decreased since 2018.

Table 2-1. Nonresidential Electricity Consumption in Marin County 2018-2022

Year	Electricity Consumption (kilowatt hours)
2022	618,916,795
2021	622,918,340
2020	626,508,356
2019	692,874,596
2018	677,776,197

Source: CEC 2023

Natural gas consumption in Marin County from 2018 to 2022 is shown in Table 2-2. Natural gas consumption has decreased in the County since 2018.

Table 2-2. Nonresidential Natural Gas Consumption in Marin County 2018-2022	
Year	**Natural Gas Consumption (kilowatt hours)**
2022	18,464,623
2021	18,034,674
2020	16,795,816
2019	19,080,801
2018	19,288,790

Source: CEC 2023

Automotive fuel consumption in Marin County from 2018 to 2022 is shown in Table 2-3. Automotive fuel consumption has decreased in the County since 2018.

Table 2-3. Automotive Fuel Consumption in Marin County 2018-2022	
Year	**Total Fuel Consumption**
2022	128,607,865
2021	129,810,242
2020	116,504,351
2019	130,496,253
2018	132,915,614

Source: California Air Resources Board (CARB) 2022

2.4 Regulatory Framework

2.4.1 State

2.4.1.1 Integrated Energy Policy Report

Senate Bill (SB) 1389 (Bowen, Chapter 568, Statutes of 2002) requires the CEC to prepare a biennial integrated energy policy report (IEPR) that assesses major energy trends and issues facing California's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the State's economy; and protect public health and safety (Public Resources Code Section 25301a). Each biennial IEPR takes into account various factors such as energy supply, demand, infrastructure, environmental considerations, and economic impacts. The report aims to address key energy challenges and provide recommendations to achieve a reliable, affordable, and sustainable energy system for California.

Some of the key areas typically covered in the report include:

1. Renewable Energy: The IEPR focuses on promoting renewable energy sources such as solar, wind, geothermal, and biomass. It assesses the state's progress in meeting its renewable energy goals, identifies barriers, and proposes strategies to increase renewable energy generation and integration into the grid.

2. Energy Efficiency: The report highlights the importance of energy efficiency measures to reduce energy consumption and greenhouse gas emissions. It explores policies and initiatives to promote energy-efficient technologies and practices in buildings, transportation, and industries.

3. Grid Modernization: The IEPR addresses the modernization and optimization of the electrical grid infrastructure to accommodate a higher penetration of renewable energy, improve grid reliability, and support emerging technologies such as energy storage and electric vehicles.

4. Transportation: The report typically includes a section on transportation, focusing on reducing dependence on fossil fuels and promoting the adoption of electric vehicles (EVs) and alternative fuels. It may discuss infrastructure development, incentives, and policies to accelerate the transition to cleaner transportation options.

5. Climate Change Mitigation: Given California's commitment to combating climate change, the IEPR often emphasizes strategies to reduce greenhouse gas emissions and achieve the state's climate goals. This may include discussions on carbon pricing, cap-and-trade programs, and the integration of climate considerations into energy planning.

6. Energy Resilience: The report may address strategies to enhance the resilience of the energy system, considering factors such as extreme weather events, natural disasters, and cybersecurity risks. It could discuss measures to ensure the reliable and uninterrupted supply of energy during emergencies.

7. Economic Impacts and Equity: The IEPR often explores the economic implications of energy policies and initiatives, including job creation, investment opportunities, and the equitable distribution of benefits across different communities and socioeconomic groups.

The CEC prepares these assessments and associated policy recommendations every two years, with updates on alternate years, as part of the IEPR.

The 2023 IEPR focuses on next steps for transforming transportation energy use in California. The 2023 IEPR addresses the role of transportation in meeting state climate, air quality, and energy goals; the transportation fuel supply; the Alternative and Renewable Fuel and Vehicle Technology Program; current and potential funding mechanisms to advance transportation policy; transportation energy demand forecasts; the status of statewide plug-in electric vehicle infrastructure; challenges and opportunities for electric vehicle infrastructure.

2.4.1.2 Executive Order B-55-18

In September 2018 Governor Jerry Brown Signed Executive Order (EO) B-55-18, which establishes a new statewide goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter." Carbon neutrality refers to achieving a net zero carbon dioxide emissions. This can be achieved by reducing or eliminating carbon emissions, balancing carbon emissions with carbon removal, or a combination of the two. This goal is in addition to existing statewide targets for greenhouse gas emission reduction. EO B-55-18 requires the California Air Resource Board (CARB) to "work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal.

2.4.1.3 Senate Bill 1368

On September 29, 2006, Governor Arnold Schwarzenegger signed into law Senate Bill (SB) 1368 (Perata, Chapter 598, Statutes of 2006). The law limits long-term investments in baseload generation by the state's utilities to those power plants that meet an emissions performance standard jointly established by the CEC and the CPUC.

The CEC has designed regulations that:

- Establish a standard for baseload generation owned by, or under long-term contract to, publicly owned utilities, of 1,100 pounds carbon dioxide per megawatt hour. This would encourage the development of power plants that meet California's growing energy needs while minimizing their emissions of greenhouse gas.
- Require posting of notices of public deliberations by publicly owned utilities on long-term investments on the CEC website. This would facilitate public awareness of utility efforts to meet customer needs for energy over the long term while meeting the State's standards for environmental impact.
- Establish a public process for determining the compliance of proposed investments with the Emissions Performance Standard (Perata, Chapter 598, Statutes of 2006).

2.4.1.4 Senate Bill 1368 Renewable Energy Sources (Renewable Portfolio Standards)

Established in 2002 under SB 1078 and accelerated by SB 107 (2006) and SB 2 (2011), California's Renewables Portfolio Standard (RPS) obligates investor-owned utilities, energy service providers, and community choice aggregators to procure 33 percent of their electricity from renewable energy sources by 2020. Eligible renewable resources are defined in the 2013 RPS to include biodiesel; biomass; hydroelectric and small hydro (30 megawatts or less); Los Angeles Aqueduct hydro power plants; digester gas; fuel cells; geothermal; landfill gas; municipal solid waste; ocean thermal, ocean wave, and tidal current technologies; renewable derived biogas; multi-fuel facilities using renewable fuels; solar photovoltaic; solar thermal electric; wind; and other renewables that may be defined later. Governor Jerry Brown signed SB 350 on October 7, 2015, which expands the RPS by establishing a goal of 60 percent of the total electricity sold to retail customers in California per year by December 31, 2030. In addition, SB 350 includes the goal to double the energy efficiency savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses upon which an energy efficiency program is focused) of retail customers through energy conservation and efficiency. The bill also requires the CPUC, in consultation with the CEC, to establish efficiency targets for electrical and gas corporations consistent with this goal. SB 350 also provides for the transformation of CAISO into a regional organization to promote the development of regional electricity transmission markets in the western states and to improve the access of consumers served by the CAISO to those markets, pursuant to a specified process. In 2018, SB 100 was signed by Governor Brown, codifying a goal of 60 percent renewable procurement by 2030 and 100 percent by 2045 Renewables Portfolio Standard.

2.5 Energy Consumption Impact Assessment

2.5.1 Thresholds of Significance

The impact analysis provided below is based on the following California Environmental Quality Act Guidelines Appendix G thresholds of significance. The Project would result in a significant impact to energy if it would do any of the following:

1) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

2) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

The impact analysis focuses on the four sources of energy that are relevant to the Proposed Project: electricity usage, natural gas usage, the equipment fuel necessary for Project construction and the automotive fuel necessary for Project operations. Addressing energy impacts requires an agency to make a determination as to what constitutes a significant impact. There are no established thresholds of significance, statewide or locally, for what constitutes a wasteful, inefficient, and unnecessary consumption of energy for a proposed land use. For the purposes of this analysis, the amount of electricity and natural gas estimated to be consumed by the Project is quantified and compared to that consumed by all nonresidential land uses in Marin County. Similarly, the amount of fuel necessary for Project construction and operations is calculated and compared to that consumed in Marin County.

2.5.2 Methodology

The levels of construction and operational related energy consumption estimated to be consumed by the Project include the number of kWh of electricity, therms of natural gas, and gallons of gasoline. The amount of total construction-related fuel used was estimated using ratios provided in the Climate Registry's General Reporting Protocol for the Voluntary Reporting Program, Version 2.1. Electricity consumption estimates were calculated using the California Emissions Estimator Model (CalEEMod), version 2022.1. CalEEMod is a statewide land use computer model designed to quantify resources associated with both construction and operations from a variety of land use projects. Operational automotive fuel consumption has been calculated with Emission FACtor (EMFAC) 2021. EMFAC 2021 is a mathematical model that was developed to calculate emission rates and rates of gasoline consumption from motor vehicles that operate on highways, freeways, and local roads in California.

2.5.3 Impact Analysis

2.5.3.1 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?

The Project is proposing improvements to the Terra Linda High School campus that involves renovation activities at both the Main Building and Physical Education support spaces; stadium improvements such as a new concessions booth, a new scoreboard, and new track surfacing; a new aquatics center to support water polo and competitive swimming; and the replacement of the natural turf at the baseball and softball fields with artificial turf. Although the Project would not increase student enrollment it is anticipated that the proposed improvements will result in the generation of 92 additional daily vehicle trips.

For the purpose of this analysis, the amount of operational electricity and natural gas to be consumed by the Project is quantified and compared to that consumed by all nonresidential land uses in Marin County. The amount of fuel necessary for Project construction is calculated and compared to that consumed in Marin County. Similarly, the amount of fuel necessary for Project operations is calculated and compared to that consumed in Marin County. Energy consumption associated with the Proposed Project is summarized in Table 2-4.

Table 2-4. Proposed Project Energy and Fuel Consumption		
Energy Type	**Annual Energy Consumption**	**Percentage Increase Countywide**
Project Energy Consumption		
Electricity Consumption[1]	1,433,213 kilowatt-hours	0.232 percent
Natural Gas Consumption[1]	91,599 therms	0.496 percent
Automotive Fuel Consumption		
Project Construction Calendar Year One[2]	80,296 gallons	0.062 percent
Project Construction Calendar Year Two[2]	75,961 gallons	0.059 percent
Project Construction Calendar Year Three[2]	67,389 gallons	0.052 percent
Project Construction Calendar Year Four[2]	88,374 gallons	0.068 percent
Project Construction Calendar Year Five[2]	82,266 gallons	0.063 percent
Project Construction Calendar Year Six[2]	73,300 gallons	0.056 percent
Project Operations[3]	33,580 gallons	0.025 percent

Source: [1]CalEEMod; [2]Climate Registry 2016; [3]EMFAC2021 (CARB 2022)

Notes: The Project increases in electricity consumption are compared with all nonresidential uses in Marin County in 2022, the latest data available. The Project increases in natural gas consumption are compared with all nonresidential uses in Marin County in 2022, the latest data available. The Project increases in construction fuel consumption and operational fuel consumption are compared with the anticipated countywide fuel consumption in 2022, the most recent full year of data.

Fuel necessary for Project construction would be required for the operation and maintenance of construction equipment and the transportation of materials to the Project Site. The fuel expenditure necessary to construct the campus improvements and renovations would be temporary, lasting only as long as Project construction. As indicated in Table 2-3, the Project's gasoline fuel consumption is estimated to be 80,296 gallons during the first calendar year of construction, 75,961 gallons during the second calendar year of construction, 67,389 gallons during the third calendar year of construction, 88,374 gallons during the fourth calendar year of construction, 82,266 gallons during the fifth calendar year of construction, and 73,300 gallons during the sixth calendar year of construction. This would increase the annual countywide gasoline fuel use in the county by 0.062 percent, 0.059 percent, 0.052 percent, 0.068 percent, 0.063 percent, and 0.056 percent respectively. As such, Project construction would not have a significant effect on local and regional energy supplies. No unusual Project characteristics would necessitate the use of construction equipment that would be less energy efficient than at comparable construction sites in the region or the state. Construction contractors would purchase their own gasoline and diesel fuel from local suppliers and would judiciously use fuel supplies to minimize costs due to waste and subsequently maximize profits. Additionally, construction equipment fleet turnover and increasingly stringent state and federal regulations on engine efficiency combined with state regulations limiting engine idling times and requiring recycling of construction debris, would further reduce the amount of transportation fuel demand during Project construction.

Operations of the Proposed Project would include electricity and natural gas usage. As shown in Table 2-3, the annual electricity consumption due to operations would be 1,433,213 kilowatt-hours resulting in an increase of 0.232 percent in the typical annual electricity consumption attributable to all nonresidential uses in Marin County. However, this is potentially a conservative estimate as Terra Linda High School is proposing the installation of five new solar arrays at multiple locations across the campus. These will be located on the roof of the Gymnasium, as a canopy above the parking lot, act as shade structures adjacent to the tennis courts, and be mounted to the ground adjacent to the baseball fields. This, however, is not a part of the Proposed Project, but a project that will occur at the same time as the Proposed Project. Thus, this reduction in energy usage was not accounted for in the analysis. Additionally, in September 2018 Governor Jerry Brown Signed EO B-55-18, which established a new statewide goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter." Carbon neutrality refers to achieving net zero carbon dioxide (CO_2) emissions. This can be achieved by reducing or eliminating carbon emissions, balancing carbon emissions with carbon removal, or a combination of the two. This goal is in addition to existing statewide targets for greenhouse gas emission reduction. Governor's Executive Order B-55-18 requires CARB to "work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal. The Proposed Project is estimated to consume approximately 91,599 therms annually during operations. This would result in the increase of 0.496 percent in the typical annual natural gas consumption attributable to all nonresidential uses in Marin County. While the Proposed Project would consume energy, the modernized buildings under the Proposed Project would not result in the consumption of energy beyond existing conditions. For example, since the Project would replace the existing boilers at the practice gym with high efficiency electric heat pumps and would also replace the existing boilers at the aquatics center with high efficiency boilers, it would result a 5.1 percent reduction in the consumption of natural gas compared with existing conditions. Similarly, Project electricity consumption is expected to be the same or less than existing conditions as the Project would be built to the Energy Efficiency Standards for Residential and Nonresidential Buildings, as specified in Title 24, Part 6, of the California Code of Regulations (Title 24). Title 24 was established in 1978 in response to a legislative mandate to reduce California's energy consumption. Title 24 is updated approximately every three years; the 2022 standards became effective January 1, 2023. The 2022 update to the Energy Standards focuses on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings, encouraging better energy efficiency, strengthening ventilation standards, and more. The 2022 Energy Standards are a major step toward meeting Zero Net Energy. Buildings permitted on or after January 1, 2023, must comply with the 2022 Standards. Compliance with Title 24 is mandatory at the time new building permits are issued by local governments. Thus, the modernization of school buildings proposed by the Project would most likely result in greater electricity efficiency compared to existing conditions.

The Project is estimated to generate approximately 92 daily trips. As indicated in Table 2-3, this would equate to a consumption of approximately 33,580 gallons of automotive fuel per year, which would lead to a countywide percentage increase in gasoline fuel of 0.025 percent.

Energy consumption associated with the Project would not be considered inefficient, wasteful, or unnecessary in comparison to other similar developments in the region.

2.5.3.2 Would the Project Conflict with or Obstruct a State or Local Plan for Renewable Energy or Energy Efficiency?

The IEPR provides policy recommendations to be implemented by energy providers in California. Electricity would be provided to the Project by MCE via PG&E transmission lines. As previously described, MCE provides electricity services to Marin County generated from renewable energy sources that offer cleaner and more sustainable power. Furthermore, MCE has developed several plans that aim to supply their customers with at least 95 percent carbon free energy by the end of 2023 (MCE 2023). Therefore, electricity consumed as a part of the Proposed Project will be primarily sourced from renewable energy sources. Therefore, MCE is consistent with, and would not otherwise interfere with, nor obstruct implementation of the goals presented in the 2023 IEPR. By extension, the Proposed Project, which would purchase electricity from MCE via PG&E transmission lines, would not interfere with the goals of the 2023 IEPR.

Furthermore, Terra Linda High School will construct five new solar arrays that will be installed throughout the campus, projected to begin installation in summer of 2024. These will be located on the roof of the Gymnasium, as a canopy above the parking lot, act as shade structures adjacent to the tennis courts, and be mounted to the ground adjacent to the baseball fields. This, however, is not a part of the Proposed Project, but a project that will occur at the same time as the Proposed Project. Nevertheless, this will give Terra Linda High School campus the capacity to generate their own energy in a sustainable manner.

The Proposed Project would have natural gas provided by PG&E. Thus, because PG&E complies with the 2023 IEPR, the Proposed Project which would purchase natural gas from PG&E, is consistent with, and would not otherwise interfere with, nor obstruct implementation of the goals presented in the 2023 IEPR. Additionally, as previously described the Project would result in a reduction of natural gas consumption compared with existing conditions. Specifically, since the Project would replace the existing boilers at the practice gym with high efficiency electric heat pumps and would also replace the existing boilers at the aquatics center with high efficiency boilers, it would result a 5.1 percent reduction in the consumption of natural gas compared with existing conditions.

The Project would be designed in a manner that is consistent with relevant energy conservation plans designed to encourage development that results in the efficient use of energy resources. During Phase 2 of the Proposed Project, there will be renovations to the interior of the main school buildings, including classrooms, labs, restrooms, and corridors. These improvements will ensure that the buildings are more energy efficient and more effective at reducing the need for heating and air conditioning. The new facilities would be improved with new LED lighting, which have greater energy efficiency and lifespan than traditional fluorescent light bulbs.

Finally, the Project would be built to the Energy Efficiency Standards for Residential and Nonresidential Buildings, as specified in Title 24, Part 6, of the California Code of Regulations (Title 24). Title 24 was established in 1978 in response to a legislative mandate to reduce California's energy consumption. Title 24 is updated approximately every three years; the 2022 standards went into effect became effective January 1, 2023. The 2022 Energy Standards improve upon the 2019 Energy Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. Additionally, the Project would comply with the requirements of CALGreen, which establishes mandatory green building standards for all buildings in California. The Project would include the following sustainable features:

- Solar photovoltaic, as a part of the aquatics grandstand shade structure.
- Increased building insulation values in new walls and attic spaces.
- Increased windows to maximize daylighting and minimize the need for artificial lights.
- High-efficiency windows and doors.
- Efficient heating, ventilation, and air conditioning systems.
- Use of Energy Star products.
- Low-flow, water-efficient plumbing fixtures for toilets and sinks.
- High-efficiency boilers.
- High-efficiency electric heat pumps.
- Tankless water heater system.
- LED technology for interior and exterior improvements (aquatic lights and scoreboards).
- Recycled water for common area landscape irrigation and building plumbing where feasible.
- Drought-tolerant plants in landscape design to minimize irrigation on-site.
- Low-water irrigation systems with smart sensor controls.

For these reasons, implementation of the Project would be consistent with renewable energy or energy efficiency plans.

3.0 REFERENCES

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APPENDIX A

Energy Consumption Modeling Output

Proposed Project
Total Construction-Related and Operational
Gasoline Usage

Table 1. Construction in First Calendar Year			
Action	**Carbon Dioxide Equivalents (CO_2e) in Metric Tons[1]**	**Conversion of Metric Tons to Kilograms[2]**	**Construction Equipment Emission Factor[2]**
Project Construction	815	815,000	10.15
Total Gallons Consumed During First Calendar Year of Construction:			**80,296**

Table 2. Construction in Second Calendar Year			
Action	**Carbon Dioxide Equivalents (CO_2e) in Metric Tons[1]**	**Conversion of Metric Tons to Kilograms[2]**	**Construction Equipment Emission Factor[2]**
Project Construction	771	771,000	10.15
Total Gallons Consumed During Second Calendar Year of Construction:			**75,961**

Table 3. Construction in Third Calendar Year			
Action	**Carbon Dioxide Equivalents (CO_2e) in Metric Tons[1]**	**Conversion of Metric Tons to Kilograms[2]**	**Construction Equipment Emission Factor[2]**
Project Construction	684	684,000	10.15
Total Gallons Consumed During Third Calendar Year of Construction:			**67,389**

Table 4. Construction in Fourth Calendar Year			
Action	**Carbon Dioxide Equivalents (CO_2e) in Metric Tons[1]**	**Conversion of Metric Tons to Kilograms[2]**	**Construction Equipment Emission Factor[2]**
Project Construction	897	897,000	10.15
Total Gallons Consumed During Fourth Calendar Year of Construction:			**88,374**

Proposed Project
Total Construction-Related and Operational
Gasoline Usage

Table 5. Construction in Fifth Calendar Year			
Action	**Carbon Dioxide Equivalents (CO_2e) in Metric Tons[1]**	**Conversion of Metric Tons to Kilograms[2]**	**Construction Equipment Emission Factor[2]**
Project Construction	835	835,000	10.15
Total Gallons Consumed During Fifth Calendar Year of Construction:			**82,266**

Table 6. Phase 3 - Construction in Sixth Calendar Year			
Action	**Carbon Dioxide Equivalents (CO_2e) in Metric Tons[1]**	**Conversion of Metric Tons to Kilograms[2]**	**Construction Equipment Emission Factor[2]**
Project Construction	744	744,000	10.15
Total Gallons Consumed During Sixth Calendar Year of Construction:			**73,300**

Sources:

[1] Terra Linda High School Capital Improvements Project Air Quality and Greenhouse Gas Emissions Assessment. 2023.

[2]Climate Registry. 2016. *General Reporting Protocol for the Voluntary Reporting Program version 2.1.* January 2016. https://theclimateregistry.org/wp-content/uploads/2023/08/General-Reporting-Protocol-v3.0.pdf

Proposed Project
Total Construction-Related and Operational
Gasoline Usage

Table 7 Total Onroad Vehicle Gallons Consumed in Marin County								
Area	Sub-Area	Calendar Year	Season	Veh_tech	EMFAC 2021 Category	Total Onroad Vehicle Gallons Consumed in Marin County in 2029	Total Onroad Vehicle Miles Traveled in Marin County in 2029	Total Passenger Vehicle Miles per Gallon in Marin County in 2029
Sub-Areas	Marin County	2029	Annual	All Vehicles	All Vehicles	111,423,380	3,069,464,800	27.55

Sources:
[3]California Air Resource Board. 2021. EMFAC2021 Mobile Emissions Model.

Table 8. Total Gallons During Project Operations				
Project Daily Trips[3]	Estimated Miles per Gallon[4]	Project Onroad Vehicle Daily Miles Traveled	Project Onroad Vehicle Daily Fuel Consumption	Project Onroad Vehicle Annual Fuel Consumption
92	27.55	2,534.39	92.00	**33,580**

Sources:
[3]Michael Baker International 2023; [4]CalEEMod 2022.1.

APPENDIX F

Geotechnical Investigation & Geologic Hazards Study Report for the Terra Linda High School Aquatic Center Project

Geotechnical Investigation & Geologic Hazards Study Report
Terra Linda High School
Aquatic Center Project
320 Nova Albion Way, San Rafael, Marin County, California

SUBMITTED TO:

San Rafael City Schools
c/o Will McManus, Greystone West
310 Nova Albion Way, Room 505
San Rafael, CA 94903
will@greystonewest.com

September 29, 2023

A3GEO

A3GEO, Inc. • 821 Bancroft Way, Berkeley CA 94710

A3GEO

September 29, 2023

San Rafael City Schools
c/o Will McManus, Greystone West
310 Nova Albion Way, Room 505
San Rafael, CA 94903
will@greystonewest.com

RE: Geotechnical Investigation & Geologic Hazards Study Report
Terra Linda High School Aquatic Center Project
320 Nova Albion Way
San Rafael, Marin County, California

Dear Mr. McManus:

This report presents the results of a geotechnical investigation and geologic hazard study by A3GEO, Inc. (A3GEO), and Lettis Consultants International, Inc. (LCI) for Terra Linda High School Aquatic Center Project in San Rafael, California. Our services were authorized by San Rafael City Schools (District) under an Independent Consultant Agreement for Geotechnical Engineering Services entered into on 23 May 2023. We obtained information about the Project from the 100% Design Development drawings by LIONÄKIS.

The attached report provides information on geotechnical, geologic, and seismic conditions, presents our assessment of potential site hazards and constraints, and includes design level geotechnical recommendations for the Aquatic Center Project. The geotechnical and geologic study described in the attached report includes nine new borings, which we used to characterize geotechnical and geologic conditions in a manner consistent with California Geological Survey Note 48 guidelines. The conclusions and recommendations presented in this report were developed in accordance with generally accepted geotechnical principles and practices at the time that the report was prepared.

Should you have questions or comments concerning our findings, the design concepts discussed, or our recommendations, please do not hesitate to call.

Sincerely,

A3GEO, Inc.

REGISTERED PROFESSIONAL ENGINEER
WAYNE DAVID MAGNUSEN
2705
GEOTECHNICAL
STATE OF CALIFORNIA

Wayne Magnusen, PE, GE
Principal Engineer
Cell: (510) 325-5724

REGISTERED PROFESSIONAL ENGINEER
TIMOTHY P. SNEDDON
2809
GEOTECHNICAL
STATE OF CALIFORNIA

Timothy P. Sneddon, PE, GE
Principal Engineer
email: tim@a3geo.com

Lettis Consultants, International, Inc.

John N. Baldwin, CEG
Principal Geologist
(925) 482-0360

REGISTERED GEOLOGIST
JOHN N. BALDWIN
No. 2167
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

TABLE OF CONTENTS

LIST OF TABLES

1. INTRODUCTION

1.01 Overview

This report presents the results of a design level geotechnical investigation and geologic hazard study by A3GEO, Inc. (A3GEO) and Lettis Consultants International, Inc. (LCI) for the Terra Linda High School Aquatic Center project in San Rafael, California. The Terra Linda High School (TLHS) campus boundary is indicated on the Campus Location Map (Figure 1). TLHS is located at 320 Nova Albion Way, San Rafael, in Marin County California.

The TLHS Aquatic Center Project (Project) will construct multiple new buildings and a new swimming pool within the Site indicated on the Campus Aerial Photograph (Figure 2). Also shown on Figure 2 are the approximate locations of the nine borings drilled by A3GEO for this Study (A3-23-1 through A3-23-9) as well as the approximate locations of previous subsurface explorations by A3GEO and Miller Pacific Engineering Group (MPEG).

Our services were authorized by San Rafael City Schools (District) under an Independent Consultant Agreement for Geotechnical Engineering Services entered into on 23 May 2023. References used in preparing this design level geotechnical investigation and geologic hazard study report are listed in Section 10.

1.02 Project Description

We obtained information about the Project from the 100% Design Development drawings by LIONÄKIS (2023). The site overview below shows the locations of the five new buildings (identified as buildings H, S, T, Q, and R) and the new swimming pool that are the primary subjects of this geotechnical and geologic hazard study report. The red outline shows the approximate limits of the Project site (Site).

Site Overview (Google Earth Aerial Imagery)

We understand all of the planned buildings are one story high and will have concrete masonry unit (CMU) walls. Additional information obtained from the referenced plans (LIONÄKIS, 2023) follows.

Building H is irregular (non-rectangular) in plan, measuring roughly 167 feet by 66 feet in maximum plan dimensions with an *overall footprint area of approximately 10,000 square feet*. The building will contain a weight room, a mat room, a dance room, restrooms, storage rooms, electrical and mechanical rooms, a booster room, and a custodial room. Building H will be supported on continuous spread footing foundations and will have a concrete slab-on-grade floor. The building will be built at the site of an existing building that will be demolished as part of the Project. Building H is the largest new building currently planned. Approximate coordinates at the center of Building H are Latitude 37.99950 and Longitude -122.55356.

Building S is irregular (non-rectangular) in plan measuring roughly 55 feet by 25 feet in maximum plan dimensions with an *overall footprint area of approximately 1,250 square feet*. The building will contain a swimming pool equipment room and a chemical storage room. Building S will be supported on continuous spread footing foundations and will have a concrete slab-on-grade floor. The pool equipment room will have a partially recessed floor surrounded by walls that will serve as a backwash pit. Building S will be partially notched into an existing slope and reinforced concrete foundation stem walls near the rear of the building will function as approximately 2-foot-high to 7-foot-high retaining walls.

Building T is rectangular in plan measuring roughly 51 feet by 25 feet in plan dimensions with an *overall footprint area of approximately 1,250 square feet.* The building will contain a pool storage room. Building T will be supported on continuous spread footing foundations and will have a concrete slab-on-grade floor. The building will be partially notched into an existing slope and reinforced concrete foundation stem walls near the rear of the building will function as approximately 1-foot-high to 4-foot-high retaining walls.

Building Q is rectangular in plan measuring roughly 8.5 feet by 12.5 feet in plan dimensions with an *overall footprint area of approximately 183 square feet.* The building will contain a ticket room, a storage room, and a restroom. Building Q will be supported on continuous spread footing foundations and will have a concrete slab-on-grade floor.

Building R is irregular (non-rectangular) in plan measuring roughly 40 feet by 24 feet in maximum plan dimensions with an *overall footprint area of approximately 905 square feet*. The building will be used to sell concessions. Building R will be supported on continuous spread footing foundations and will have a concrete slab-on-grade floor.

The new **Swimming Pool** is rectangular in plan measuring roughly 132 feet by 75 feet in plan dimensions. The new pool will be located at the site of the school's existing pool, which is smaller and will be demolished as part of the Project. The deep end of the new pool (towards the west) will be a little over 12 feet deep. The available plans (LIONÄKIS, 2023) indicate that the pool structure and the pool deck that surrounds it will be designed by others.

Grandstands are planned south of the pool between Buildings S and T where there is an existing slope. In this general area, the existing ground surface will be reconfigured by grading.

Other geotechnical aspects of the Project include excavations, utility installations, backfilling, and exterior flatwork e.g., (stairs, curbs, pavements, and slabs-on-grade). Non-geotechnical aspects of the project include interior renovations involving Building K, which are not a subject of this geotechnical and geologic report.

1.03 Purpose and Scope

The primary purposes of this study were to (1) evaluate site conditions and geologic hazards in a manner consistent with current California Geological Survey Note 48 guidelines; and 2) develop design-level geotechnical conclusions and recommendations for the proposed Project. The scope of this design level geotechnical investigation and geologic hazard study consisted of:

- Reviewing existing data;
- Performing site reconnaissance;
- Drilling nine new borings in areas where improvements are planned;
- Performing geotechnical and geochemical laboratory tests;
- Characterizing geotechnical and geologic conditions; and
- Preparing this design-level report in accordance with CGS Note 48.

Our scope of services did not include an environmental assessment or investigation of the site for the presence of toxic material in the soil, groundwater, or air.

1.04 This Report

The remainder of this report is organized as follows:

Section 2 describes our methods of investigation;
Section 3 describes the geologic, seismic, and historical setting of the site;
Section 4 describes site-specific geotechnical conditions;
Section 5 presents an evaluation of engineering geologic conditions;
Section 6 presents an assessment of site geologic hazards;
Section 7 discusses geotechnical considerations for the proposed improvements;
Section 8 presents recommendations for the proposed improvements;
Section 9 outlines the limitations of our study;
Section 10 presents a list of selected references.

2. METHODS OF INVESTIGATION

2.01 Review of Geologic, Seismic, and Historical Information

We reviewed a variety of published and unpublished references containing information on geologic, seismic and historical conditions. Selected references are described below; a list of references used in preparing this report is presented in Section 10.

The geologic references that we reviewed included maps prepared by Rice, Smith and Strand (1976); Blake, Graymer and Jones (2000); and Graymer, and others (2006). There are no zoned active faults within the USGS San Rafael 7.5 minute quadrangle so there is no official Alquist-Priolo Earthquake Fault Zones Map (A-P Map) for the site area. CGS also prepares Seismic Hazard Zone maps delineating zones of required investigation for earthquake-induced landsliding and liquefaction, but no map has yet been issued for the site area.

Geologic hazard maps prepared for the local General Plan are contained in California Division of Mines and Geology (CDMG) Open-File Report 76-2 (Rice, Smith and Strand, 1976). We reviewed the Slope Stability Map from this publication as well as the more recent map of Slides and Earth Flows in USGS Open-File Report 97-745C (Wentworth and others, 1997). The latest version of the Marin General Plan references the Liquefaction Susceptibility Map in USGS Open-File Report 00-444 (Knudsen et al., 2000), which we reviewed together with the accompanying Quaternary Deposits Map. We also reviewed the more recent liquefaction susceptibility and quaternary deposit maps by Witter and others (2006).

To evaluate flood hazards, we reviewed the Tsunami Inundation Map for Emergency Planning (CGS, 2009) and online flood maps prepared by the Federal Emergency Management Agency (FEMA) (FEMA, 2016).

The earliest historic map that we reviewed showing the site area was an 1873 map of Marin County (Austin, 1873). As part of our preliminary study of the TLHS campus (A3GEO, 2017) we obtained historical aerial photographs of the area from Pacific Aerial Surveys (a Quantum Spatial Company) in Novato, California. In all, Pacific Aerial Surveys provided 10 vintages of geo-referenced aerial photographs taken between 1950 and 2016. The complete set of georeferenced aerial photographs with identifying information is attached in Appendix A.

2.02 Borings (This Study)

As part of this Study, A3GEO advanced nine borings (A3-23-1 through A3-23-9) at the approximate locations indicated on the Site Plan (Figure 3). The logs of borings A3-23-1 through A3-23-9 are included in Appendix B. Figure 3 also shows the locations of the five interpretative cross sections developed for this study, which are discussed further in Section 5.02, Geologic Cross Sections.

Table 1 - Summary of Borings Drilled for This Study

Location	Drill Date	Surface Elevation (feet)	Boring Depth (feet)	Bottom of Boring Elevation (feet)
A3-23-1	7/31/23	80.7	20.5	60.2
A3-23-2	7/31/23	82.6	21.3	61.3
A3-23-3	7/31/23	91.0	25.8	65.2
A3-23-4	8/1/23	80.7	25.1	55.6
A3-23-5	8/3/23	80.8	25.1	55.7
A3-23-6	8/3/23	80.7	25.1	55.6
A3-23-7	8/2/23	80.9	25.4	55.5
A3-23-8	8/2/23	80.8	25.1	55.7
A3-23-9	8/1/23	80.8	25.1	55.7

All nine of our borings extended into rock. A planned tenth boring was not drilled due to utility constraints.

Borings A3-23-1 through A3-23-9 were drilled using a truck-mounted drill rig equipped with continuous flight solid stem augers. During drilling, an A3GEO engineer visually/manually classified the soil in general accordance with ASTM D2488 classifications, which are based on the Unified Soil Classification System (USCS). Soil samples were obtained using a 2-inch outside diameter Standard Penetration Test (SPT) sampler without liners and a 3-inch outside diameter Modified California (MC) sampler with liners. The samplers were driven using a standard 140-pound automatic hammer with an approximate 30-inch fall. The hammer blows required to drive the sampler the final 12 inches of each 18-inch drive are presented on the boring logs. Sampler blow counts obtained using the MC sampler were adjusted to approximate SPT N-values using a factor of 0.63 to account for differences in sampler end area. Where a full 12-inch drive could not be achieved, the number of blows and corresponding amount of sampler penetration are indicated on the logs. Groundwater depth measurements made during and after drilling are shown on the logs. Following our groundwater depth measurements, the boreholes were backfilled with grout.

Samples from borings A3-23-1 through A3-23-9 were transported to A3GEO's laboratory for further review by LCI's Certified Engineering Geologist. Field logs were checked and revised, where appropriate, based on laboratory test data and detailed observations of the sampled materials. The logs of borings A3-23-1 through A3-23-9 are attached in Appendix B followed by 1) a Key to Exploratory Boring Logs that describes the USCS and the symbols used on the logs; and 2) a Key to Rock Descriptions. The boring logs in Appendix B represent our interpretation of the subsurface materials at the boring locations at the time of drilling and the passage of time may result in changes in the subsurface conditions. The A3GEO boring locations indicated on the attached figures were determined by measuring from existing improvements and should be considered approximate. The ground surface elevations indicated on the logs in Appendix B were estimated using a more detailed AutoCAD version of the Project topographic survey drawing shown on Figure 3.

2.03 Laboratory Tests (This Study)

Samples from A3GEO borings were examined in our laboratory to check field classifications and assign laboratory tests. Our geotechnical laboratory testing program was directed toward a quantitative and qualitative evaluation of the physical properties of the soils that underlie the site. The following geotechnical laboratory tests were performed:

- Moisture content per ASTM D-2216;
- Dry density per ASTM D-2937;
- Atterberg limits per ASTM D-4318;
- Particle size distribution per ASTM D422;
- Unconsolidated-Undrained Triaxial Compression per ASTM D2850;
- Consolidated-Undrained Triaxial Compression with Pore Pressure per ASTM D4767; and
- Consolidation per ASTM D2435

The results of geotechnical laboratory tests are shown on the boring logs in Appendix B at the corresponding sample depths. Laboratory data sheets for borings A3-23-1 through A3-23-9 are attached in Appendix C.

We screened for naturally occurring corrosive materials by conducting a suite of geochemical laboratory tests on samples of near-surface soil obtained from Borings A3-23-4. A3-23-6, and A3-23-8. The geochemical laboratory tests were performed by Cooper Testing Labs, Inc. and included measurements of:

- Resistivity (100% saturated) per Caltrans 643;
- Chloride ion concentration per Caltrans 422 (modified);
- Sulfate ion concentration per Caltrans 417 (modified);
- pH per Caltrans 643; and
- Moisture per ASTM D2216.

The corrosivity test results are included at the end of Appendix C.

2.04 Previous Borings and CPTs by A3GEO

This report builds upon the information, data and interpretations presented in previous A3GEO design level geotechnical investigation and geologic studies for the TLHS campus (A3GEO, 2018; A3GEO, 2021), which were approved by the CGS.

***A3GEO, 2018* -** "Geotechnical Investigation and Geologic Hazards Study Report, Terra Linda High School, 320 Nova Albion Way, San Rafael, Marin County, California", 16 February 2018.

***A3GEO, 2021* -** "Geotechnical Investigation and Geologic Hazards Study Report, Terra Linda High School – Kiln Room Addition, 320 Nova Albion Way, San Rafael, Marin County, California", 22 December 2021.

The approximate locations of previous borings and CPTs by A3GEO are indicated on the attached figures. Logs of previous A3GEO borings and CPTs are attached in Appendix D. Summary information on A3GEO's previous borings and CPTs follows; more detailed information can be found in the referenced reports.

2.04.1 A3GEO (2018) Borings

A3GEO (2018) includes a total of 14 borings advanced at multiple locations within the TLHS campus using either a Mobile B61 truck-mounted hollow stem auger rig or Rhino M5T limited access rig. Information on the depths of the borings follows (elevations shown derived from the available County-provided LiDAR dataset and/or a 2017 site survey drawing by HED (HED, 2017).

Table 2 - Summary of A3GEO (2018) Borings

Location	Surface Elevation (feet)	Boring Depth (feet)	Bottom of Boring Elevation (feet)
B-1	81.1	16.3	64.8
B-2	81.2	13.3	67.9
B-3	81.0	21.0	60.0
B-4	81.1	21.0	60.1
B-5	91.4	20.4	71.0
A3-17-1	79.5	25.3	54.2
A3-17-2	80.5	21.5	59.0
A3-17-3	81.0	15.8	65.2
A3-17-4	80.5	15.0	65.5
A3-17-5	81.0	16.0	65.0
A3-17-6	81.0	11.4	69.6
A3-17-7	81.0	19.9	61.1
A3-17-8	81.0	13.3	67.7
A3-17-9	81.0	19.3	61.7

2.04.2 A3GEO (2018) CPTs

A3GEO (2018) includes four cone penetration tests (CPT-1 through CPT-4) at TLHS that extend to maximum depths until refusal was encountered under the weight of a 30-ton truck. Information on the depths of the CPTs follows (elevations shown derived from the available County-provided LiDAR dataset).

Table 3 - Summary of November 2017 CPTs

Location	Surface Elevation (feet)	CPT Depth (feet)	Bottom of CPT Elevation (feet)
CPT-1	80.7	24.6	56.1
CPT-2	76.8	21.3	55.5
CPT-3	79.1	22.6	56.5
CPT-4	80.6	18.2	62.4

The CPT logs in Appendix D include geotechnical material descriptions interpreted based on the normalized soil behavior type (SBT_N) as prescribed by Robertson, 1990.

2.04.3 <u>A3GEO (2021) Borings</u>

A3GEO (2021) included two borings advanced at the kiln addition (Ceramics Building) project site using a track-mounted drill rig equipped with 4-inch-diameter continuous flight augers. Information on the depths of the borings follows (elevations shown were estimated from a site survey drawing provided to A3GEO on 4 November 2021).

Table 4 - Summary of November 2021 Borings

Location	Surface Elevation (feet)	Boring Depth (feet)	Bottom of Boring Elevation (feet)
A3-21-1	81.0	25.1	55.9
A3-21-2	81.0	26.0	55.0

Borings A3-21-1 and A3-21-2 extended approximately 13.1 feet and 10.2 feet into bedrock, respectively.

2.05 Previous Borings and CPTs by MPEG (2003)

We reviewed the following geotechnical/geologic report prepared by Miller Pacific Engineering Group (MPEG):

> ***MPEG, 2003 -*** Miller Pacific Engineering Group (MPEG), 2003, “Geotechnical Investigation and Geologic Hazards Evaluation, Terra Linda High School, San Rafael, California,” consulting report dated October 31, 2003, MPEG Project 779.12.

The referenced report includes the logs of borings and CPTs performed at the approximate locations shown on the attached figures. The logs of MPEG’s borings and CPTs are attached in Appendix E.

Table 5 - Summary of August 2003 Borings and CPT

Location	Surface Elevation (feet)	Boring/CPT Depth (feet)	Bottom of Boring Elevation (feet)
B-1	79.6 feet	25.3	56.1
B-2	79.6 feet	16.0	63.6
CPT-1	Not specified	17.5	-

MPEG’s boring logs state that ground surface elevations refer to “City of San Rafael Topo Map, DPW, 1998”, however the datum for this map is not specified. A3GEO contacted the City of San Rafael Department of Public Works to inquire about this map but were unsuccessful in learning what vertical datum the elevations on DPW topo map utilized. Based on the elevations shown on the logs, we believe it is likely that the elevations shown on the MPEG, 2003 logs refer to NGVD 29, which we converted to NAVD 88 when developing our cross sections. MPEG’s CPT log does not specify a ground surface elevation.

2.06 1958 TLHS Campus Plans

We reviewed the following set of plans obtained from the District's archives:

> ***GM&P, 1958*** - Grommé Mulvin & Priestley (GM&P), 1958, *"New High School, San Rafael High School District for the Terra Linda Area, Marin County, California,"* 48-sheet plan set dated December 16, 1958.

The following sheets from the 1958 campus drawings are attached in Appendix F:

- Sheet A1 includes a Site Plan showing the locations of five proposed buildings identified as Buildings A through E. Building C on this drawing is the existing building now identified as Building K.
- Sheet A1A includes a more detailed Partial Site Plan that includes predevelopment "original" topographic contours and spot elevations in planned building areas that are identified as "existing grade". Sheet 1A also includes a Profile at A-A', which is oriented upslope-downslope relative to the original topography west of the Project site.
- Sheet S1 includes a floor and foundation plan for Building C (now Building K).
- Sheets S5 through S6 include wall sections showing Building C (now Building K) footings.
- Sheet A1A includes the locations "original grade test holes", the logs of which have not been located.

Elevations on the 1958 plans are relative to U.S.C. & G.S. datum, which is equivalent to the National Geodetic Vertical Datum of 1929 (NGVD 29) with respect to elevations. NVGD 29 elevations can be converted to NAVD 88 elevations by adding 2.67 feet (NOAA, 2018).

2.07 1961 Building H Plans

We reviewed the following set of plans provided to us by Greystone West Company (construction management).

> ***GM&P, 1961*** - Grommé Mulvin & Priestley (GM&P), 1961, *"Add'n IV – Girls' P.E. Locker Room. Terra Linda High School, Nova Albion Way, San Rafael, California,"* 19-sheet plan set dated November 6, 1961.

The following sheets from the 1961 Building H drawings are included in Appendix G:

- Sheet A-1 includes a Site Plan showing the planned location of Building H and the swimming pool.
- Sheets S-1 through S-3 include a Floor and Foundation Plan and wall sections showing Building H footings.

3. GEOLOGIC, SEISMIC, AND HISTORICAL INFORMATION

3.01 Regional Geologic Setting

The geology of the San Francisco Bay Region includes three “basement” rock complexes; the Great Valley complex, the Franciscan Complex and the Salinian complex all of which are Mesozoic in age (225 to 65 million years old). Within the region, the Mesozoic basement rocks are locally overlain by a diverse sequence of Cenozoic Era (younger than 65 million years) sedimentary and volcanic rocks. Since their deposition, the Mesozoic and Cenozoic rocks have been extensively deformed by repeated episodes of folding and faulting. Significantly, the Bay Area experienced several episodes of uplift and faulting during the late Tertiary Period (about 25 million to 2 million years ago) that produced the region’s characteristic northwest-trending mountain ranges and valleys.

World-wide climate fluctuations during the Pleistocene (about 1.8 million to 11 thousand years ago) resulted in several distinct glacial periods. A lowering of sea level accompanied each glacial advance as water became stored in vast ice sheets. Melting of the ice during warm intervals caused corresponding rises in sea level. High sea levels favored rapid and widespread deposition in the bay and surrounding floodplains. Low sea levels during glacial advances steepened the gradients of streams and rivers draining to the sea thereby encouraging erosional down cutting. The most recent glacial interval ended about 15,000 years ago. Evidence suggests that during the maximum extent of this latest glaciation, sea level was 300 to 400 feet below its present elevation and the valley now occupied by San Francisco Bay drained to the Pacific Ocean more than 30 miles west of the Golden Gate. Near the beginning of the Holocene age (about 11 thousand years ago) the rising sea re-entered the Golden Gate, and sediments accumulated rapidly beneath the rising San Francisco Bay and on the surrounding floodplains. The Holocene-age surface deposits are generally less dense and weaker than Pleistocene-age soils that predate the last sea level rise.

3.02 Regional Active Faults

Within the San Francisco Bay Region, the relative motion of the Pacific and North American crustal plates is presently accommodated by a series of northwest-trending active faults that exist over a width of more than 50 miles. Approximate distances and directions from the site to Bay Area active faults (Jennings and Bryant, 2010) follow and are also shown on Figure 4:

Table 6 - Approximate Distances and Directions to Bay Area Active Faults

Fault System	Approximate Distance from Site	Approximate Direction from Site
San Andreas	8.5 miles	West-southwest
San Gregorio	9.0 miles	West-southwest
Hayward	10.0 miles	East
Rodgers Creek	12.5 miles	Northeast
West Napa[1]	25.0 miles	East-northeast
Concord-Green Valley	26.5 miles	East
Calaveras	31.0 miles	Southeast
Greenville – Clayton - Marsh Creek	33.0 miles	East-southeast

Faults that are defined as active typically exhibit: 1) evidence of Holocene-age (younger than 11,000 years) displacement, 2) measurable aseismic fault creep, 3) close proximity to linear concentrations or trends of earthquake epicenters, and/or 4) prominent tectonic-related geomorphology. The major faults listed in the preceding table are near-vertical and generally exhibit right-lateral strike-slip movement (which means that the

[1] In 2014, a Magnitude 6.0 earthquake occurred on the West Napa fault and as a consequence the southern extent of this feature is presently being reevaluated.

movement is predominantly horizontal and when viewed from one side of the fault, the opposite side of the fault is observed as being displaced to the right).

3.03 Regional Seismicity

Since 1836, six earthquakes of magnitude 6.5 or greater have occurred in the Bay Area (Bakun, 1999); the dates, magnitudes (M) and epicentral locations of these six large earthquakes are summarized in the table that follows.

Table 7 - Magnitude 6.5 or Greater Earthquakes; 1836-1998 (Bakun, 1999; Tuttle and Sykes, 1992)

Date	Magnitude	Epicenter Location
June 10, 1836	6.5	East of Monterey Bay
June 1838	6.8 – 7.2	Peninsula section of the San Andreas fault
October 8, 1865	6.5	Southwest of San Jose
October 21, 1868	6.8	Southern Hayward fault (Hayward Earthquake)
April 18, 1906	7.8	San Andreas fault (San Francisco Earthquake)
October 18, 1989	6.9	Santa Cruz Mountains (Loma Prieta Earthquake)

The Working Group on California Earthquake Probabilities (WGCEP) has developed authoritative estimates of the magnitude, location, and frequency of future earthquakes in California, which are published in Uniform California Earthquake Forecast (UCERF) reports. The most recent forecast (UCERF3) indicates the following likelihoods for one or more earthquake events of the specified magnitude occurring within the San Francisco region in the next 30 years (starting in 2014).

Table 8 - San Francisco Region UCERF3 Forecast (WGCEP, 2013)

Earthquake Magnitude (greater than or equal to)	30-year Likelihood of one or more earthquake events
≥ 5.0	100%
≥ 6.0	98%
≥ 6.7	72%
≥ 7.0	51%
≥ 7.5	20%
≥ 8.0	4%

The WGCEP has also made estimates of the likelihood of earthquakes with magnitude greater than or equal to 6.7 occurring on specific faults; these probabilities are summarized in the table that follows.

Table 9 - San Francisco Region UCERF3 Forecast (Aagaard et al., 2016)

Earthquake Fault	30-year Likelihood of one or more earthquake events with M≥6.7
Hayward - Rodgers Creek	33%
Calaveras	26%
San Andreas	22%
Hunting Creek, Berryessa, Green Valley, Concord, Greenville	16%
Maacama	8%
San Gregorio	6%

Compared to the previous forecast (UCERF 2; WGCEP, 2008) the likelihoods of moderate-sized earthquakes (magnitude 6.5 to 7.5) are generally lower whereas those of larger events are higher. This change reflects a better understanding of the regional fault system and the potential for multi-fault ruptures on many faults.

3.04 Local Geology

The TLHS campus is situated on a gentle, northeast-sloping alluvial fan bounded by lower hills of Mount Tamalpais to the south and a set of northwest-trending hills to the northeast. The hills in the direct vicinity of the site are comprised of Franciscan bedrock. The hills southwest of the site are part of a continuous range extending northwest from downtown San Rafael with localized peaks at elevations above +600 feet (Figure 1; USGS, 2015). To the northeast of the site are smaller isolated hills the closest of which to the campus rises to above elevation +200 feet.

The Predevelopment Aerial Photograph on Figure 5 shows the alluvial fan upon which the school is presently located was once incised by several creeks emanating from the hills to the southwest and an unnamed northwesterly-flowing creek along the northeastern property boundary. Similarly, a creek within the central part of the property is shown as incising into the alluvial fan and subsequently was straightened to meet the northwest-flowing creek (Figure 5). This unnamed creek is now buried and is located along the southeastern margin of the Project site close to Boring A3-23-4 and Building R. Site reconnaissance shows that the approximate location of this creek is now redirected into a buried culvert.

A review of the 1950 photograph on Figure 5 also shows many of the tonal lineaments traversing the alluvial fan are discontinuous in length and typically associated with northeast flowing streams and swales traversing the broad alluvial surface. In addition, the historical pre-development aerial photograph shows fence lines defining property boundaries. (Figure 5; Appendix A).

A recent USGS geologic map[2] (Blake, Graymer and Jones, 2000) showing the site area is presented on Figure 6. Blake, Graymer and Jones (2000) map the hills that surround the TLHS campus predominantly as Franciscan Complex Mélange described as follows:

> ***Mélange (map symbol fsr) -*** *A tectonic mixture of variably sheared shale and sandstone containing (1) hard tectonic inclusions largely of greenstone, chert, graywacke, and their metamorphosed equivalents, plus exotic high-grade metamorphic rocks and serpentinite and (2) variably resistant masses of graywacke, greenstone, and serpentinite up to several miles in longest dimension, and including minor discrete masses of limestone too small to be shown. Blocks and resistant masses have survived the extensive shearing evident in the mélange's matrix, and range in abundance from less than 1 to 50 percent or more of the rock mass. The degree of shearing in the unit ranges from gouge to unsheared rock, with resistant masses relatively unsheared and matrix sheared. Severely sheared shale is abundant in areas where blocks are abundant. Fresh, relatively unsheared rock is hard, the larger resistant masses are pervasively fractured, and blocks are commonly tough and relatively unfractured. Sandstone is graywacke, grayish green where fresh, weathering to brown, commonly medium to coarse grained, containing abundant angular lithic grains and no detrital potassium feldspar, except rarely as much as 5 percent. Graywacke is locally veined with quartz and carbonate, and usually contains microscopic secondary pumpellyite. Topography of coherent masses resembles that of unit Kfs, whereas highly sheared matrix typically yields subdued, gently-rounded topography.*

As shown on Figure 6, Blake, Graymer and Jones (2000) map Franciscan Complex Mélange extending onto the far western corner of the TLHS campus. The remainder of the TLHS campus is mapped by Blake, Graymer and Jones (2000) as Quaternary (less than about 2.6 million year old) alluvium described as follows:

> ***Alluvium, Quaternary (map symbol Qal)****—Sand, gravel, silt, and clay; loose to soft and friable*

As shown on Figure 6, Blake, Graymer and Jones (2000) also map a northwest-trending inferred fault concealed by alluvium below the front (northeast) part of the campus passing near Nova Albion Way and the

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[2] Geologic maps generally show materials interpreted to be present at or near the ground surface.

creek bounding the northeastern property boundary. This inferred fault is the projection of a fault mapped in the hills farther to the northwest and is not considered active.

An earlier geologic map by Rice, Smith and Strand (1976) shows the TLHS campus underlain by Quaternary alluvium and colluvium; alluvium refers to deposits that have been deposited by streams whereas colluvium refers to soils that have moved downslope by gravity. Witter et al., 2006, (Figure 7) describe the surficial geology at the site as Holocene alluvial fan deposits (Witter et al., 2006). The alluvium projects to the northeast where it merges with Holocene bay mud mapped several thousand feet to the northeast of the site.

3.05 Liquefaction Mapping

Liquefaction is a phenomenon by which certain types of soils that are below groundwater can lose strength (liquefy), compress (settle) and gain mobility (flow) in response to earthquake groundshaking. Liquefaction is considered a geologic hazard and CGS has issued official seismic hazard maps showing “zones of require investigation” for liquefaction for many parts of California; however, no such maps have yet been issued for Marin County.

The U. S. Geological Survey (USGS) has published maps of liquefaction susceptibility for the central San Francisco Bay Region (Knudsen et al., 2000; Witter et al., 2006). As shown on Figures 8a and 8b, both USGS maps show all of the TLHS campus within an area of “Moderate” liquefaction susceptibility. The main differences between the two maps pertains to the region east of the site where locations of previously mapped “High” liquefaction susceptibility were reduced to “Moderate” liquefaction susceptibility following completion of more detailed Quaternary mapping. The summary description for this liquefaction susceptibility category (from Witter et al., 2006) follows.

> *Expect about 20 to 30 percent of future liquefaction effects to occur within geologic units assigned MODERATE susceptibility (with about 1 occurrence for every 50 square kilometers). Geologic map units within this category include latest Pleistocene to Holocene deposits from a variety of environments. Gravel quarries and percolation ponds (historical) are also assigned to this category. Together, units assigned MODERATE susceptibility cover 2,314 square kilometers of the central San Francisco Bay region. About 25 percent of historical liquefaction occurrences fall within map units assigned MODERATE susceptibility (about 0.02 occurrences per square kilometer).*

The referenced liquefaction susceptibility mapping by the USGS is based on accompanying regional-level maps of Quaternary deposits coupled with groundwater depth estimates, earthquake ground motion estimates, and documented historical accounts of liquefaction occurrence. As such, the USGS susceptibility maps (Figures 8a and 8b) are not “site-specific” as no onsite data was used in their development.

3.06 Landslide Mapping

Landsliding is considered a geologic hazard and CGS has issued official seismic hazard maps showing “zones of required investigation” for earthquake-induced landsliding for many parts of California; however no such maps have yet been issued for Marin County. The landslide map on Figure 9 (Wentworth et al., 1997) shows areas of “mostly landslides” at higher elevations in the hills southeast of the TLHS campus and areas of “few landslides” extending into adjacent residential neighborhoods and onto the far western portion of the TLHS campus. Generalized explanations of the mapping shown on Figure 9 follow.

> ***Mostly Landslides -** consists of mapped landslides, intervening areas typically narrower than 1500 feet, and narrow borders around landslides.*
>
> ***Few Landslides -** contains few, if any, large, mapped landslides, but locally contains scattered small landslides and questionably identified larger landslides.*
>
> ***Surficial Deposits -** Slides and earth flows do not occur on nearly flat ground -- they require slopes*

that are steep and long enough to permit failure. We can thus exclude gently sloping ground from principal consideration. This boundary typically occurs at a slope of about 15 percent.

Comparisons between Figure 9 (Landslide Hazard Map) and Figure 6 (Geologic Map) suggest that the mapped area of “few landslides” within the TLHS campus correlates to the geologic mapping of Franciscan Mélange in the same area. An earlier geologic map that includes landslides (Rice, Smith and Strand, 1976) generally shows the TLHS campus as free of landslide deposits. This is consistent with the site reconnaissance that shows the Site located within alluvial fan deposits and well outboard of the steep and potentially more landslide-prone hills to the west-southwest.

3.07 Site Development History

The 1950 and 1958 photographs in Appendix A show the site area prior to development. The 1959 oblique aerial photograph below shows TLHS site development in progress (approximate Building H site location indicated for georeferencing purposes).

August 1959 Aerial Photograph Facing South

Drawings in Appendix F (GM&P, 1958) show the nearly-level portion of the central TLHS campus was created by cutting and filling. The “Profile at A-A’” on Sheet A1A of the 1958 plans shows less than 10 feet of cut at the upper (southwest) margin of the campus and less than about 5 feet of fill at the lower campus margin of the campus adjacent to Nova Albion Way. The “Profile at A-A’” and the accompanying “Partial Site Plan” on Sheet A1A of the 1958 plans suggest the transition from cut to fill is located north of Building H and in the vicinity of Building Q. Foundation drawings for Building K (formerly Building C) are included in Appendix C, for reference. The 1970 aerial photograph in Appendix A shows Building H, Building K (formerly Building C), and many of the present-day buildings at the Site.

3.08 Existing Building H Foundations

Drawings for the existing Building H (GM&P, 1961) are attached in Appendix G. The Floor & Foundation Plan on Sheet S-1 shows the perimeter walls of the building and two intermediate north-south interior walls supported on continuous spread footings of varying widths. Three isolated column footings are also shown within the interior of the structure. Sheet S-1 includes the note:

> *"Soil pressure does not exceed 2000 lbs. per sq. ft. All footings bear on firm sand or clay. Where necessary lower footings as directed by the Architect to reach firm material."*

The structural sections generally show continuous wall footings bottomed 3 feet below the top of the building's reinforced concrete slab-on-grade, which is overlain by a 3-inch-thick topping slab. The interior partition footing detail on Sheet S-3 show isolated interior footings bottomed 1 foot below the top of reinforced concrete floor slab. In addition, several isolated column footings are shown outside two entrances on the south side of the building that support overhangs.

4. SITE CONDITIONS

4.01 Surface Conditions

The approximate limits of the Site are indicated in the west-facing Google Earth image below. Within the Site limits, only Building K is designated to remain; other surface improvements (including building H, the swimming pool, and exterior flatwork) within the Site limits will be demolished.

Google Earth Image Facing West

The dashed red line in the image above delineates the approximate base of the cut slope made during c.1958 site development. North (to the right) of the dashed line, the ground surface within the Site is relatively level and mostly covered with paving and exterior flatwork; the 100%DD plans (LIONÄKIS, 2023) show ground surface elevations in this area between about 80 and 81 feet (Project datum). South (to the left) of the dashed line the ground slopes up at about 2:1 (Horizontal to Vertical; H:V) to meet the natural predevelopment grade, which is near elevation 90 to 91 feet (Project datum). As shown above, the cut slope includes numerous mature trees and a ramp oriented oblique to the slope facilitating access between the two levels. The Demolition Plan and Demolition Notes on Sheet C-101 of the Project 100%DD plans include additional detail on the existing buildings, surface features and underground utilities that presently exist within the Site.

4.02 Soil Conditions

Generalized descriptions of the soils encountered in the vicinity of planned improvement follow.

Building H Site - The site of Building H is presently occupied by an existing building (also called Building H) that has spread footing foundations designed to extend about 2.5 feet below the existing exterior grade (drawings in Appendix G). Three borings were drilled around the perimeter of the Building H site for this study (A3-23-5, A3-23-6, and A3-23-8). MPEG drilled one boring (B-1) near the western end of the Building H site in 2003. Borings A3-23-5 and A3-23-6, drilled north of Building H, encountered about 14 feet and 17 feet of natural clayey soils overlying rock, respectively. In Boring A3-23-5, adjusted sampler blow counts (approximate N-Values) of 23, 28, 30, and 20 blows per foot were obtained in soil classified as Sandy Lean Clay (CL) to Clayey Sand (SC). In Boring A3-23-6, adjusted sampler blow counts (approximate N-Values) of 14, 8, 12, 23 and 29 were obtained in soil classified as Sandy Lean Clay (CL). The adjusted blow counts of 8 and 12 in Boring A3-23-6 were obtained at approximate depths of 5 and 8 feet, respectively. Boring A3-23-8, drilled south of Building H, encountered about 18 feet of natural clayey soils overlying rock. In Boring A3-23-8, adjusted sampler blow counts (approximate N-Values) of 6, 24, 21, and 22 blows per foot were obtained in soil classified as Sandy Lean Clay (CL) to Clayey Gravel with Sand (GC). The adjusted blow count of 6 was obtained at an approximate depth of 6 feet and the log of Boring A3-23-8 notes very stiff soil was encountered below a depth of 7.7 feet.

Building R Site - The site of Building R is located on level ground adjacent to the east side of Building K (formerly Building C), which has spread footing foundations designed to extend about 3 feet below the existing exterior grade (drawings in Appendix F). The exterior columns of the building are supported on enlarged footings that extend about 3 feet beyond the face of the building's east exterior wall. One boring was drilled north of the Building R site for this study (A3-23-4). Boring A3-23-4 encountered about 14 feet of natural clayey soils and mixed artificial fill overlying rock. The boring is located close to the approximate buried and straightened northeast flowing creek on the southeast margin of the project Site. Adjusted sampler blow counts (approximate N-Value) of 13, 25, 33, and 23 blows per foot were obtained in soil classified as Sandy Lean Clay (CL). The adjusted blow count of 13 was obtained in the one-foot interval between depths of 2 and 3 feet.

Building S Site - The site of Building S straddles the base of the cut slope made during c.1958 site development. One boring was drilled within the Building S site for this study (A3-23-1). Boring A3-23-1 encountered about 6 feet of natural clayey soils overlying rock. Adjusted sampler blow counts (approximate N-Values) of 25 and 27 blows per foot were obtained in two soil layers classified as Sandy Lean Clay (CL) and Clayey Sand (SC), respectively.

Building T Site - The site of Building T is located on level ground near the base of the cut slope made during c.1958 site development. One boring was drilled south of the Building T site for this study (A3-23-2). Boring A3-23-2 encountered about 15.5 feet of natural clayey soils overlying rock (shale). Adjusted sampler blow counts (approximate N-Values) of 19, 25, and 35 blows per foot were obtained in an upper layer of alluvium/colluvium classified as Sandy Lean Clay (CL). An adjusted sampler blow count (approximate N-Value) of 19 blows per foot was obtained in an underlying residual soil layer classified as Sandy Lean Clay with Gravel (CL). Groundwater was measured at a depth of 19 feet in Boring A3-23-2 during drilling.

Building Q Site -The site of Building Q is occupied by an existing single-story relocatable building. One boring was drilled south of the Building Q site for this study (A3-23-4). A3GEO advanced one CPT (CPT-4) north of the Building Q site in 2017. Boring A3-23-4 encountered about 14 feet of natural clayey soils and mixed artificial fill overlying rock. The boring is located close to the approximate buried and straightened northeast flowing creek on the southeast margin of the project Site. Adjusted sampler blow counts (approximate N-Values) of 13, 25, 33, and 23 blows per foot were obtained in soil classified as Sandy Lean Clay (CL). The adjusted blow count of 13 was obtained in the one-foot interval between depths of 2 and 3 feet.

Pool Site - Much of the proposed pool site is occupied by an existing swimming pool that is T-shaped, in plan (see image on preceding page). The top of the T is oriented towards the south and is about 4 feet deep. The deep end of the pool to the north is up to about 11 feet deep. Two borings were drilled in the northern portion of the Pool site for this study (A3-23-7 and A3-23-9). A third planned boring was not able to be drilled due to utility constraints. Borings A3-23-7 and A3-23-9 encountered about 15 feet and 19 feet of natural clayey soils and mixed fill overlying rock, respectively. In Boring A3-23-7, adjusted sampler blow counts (approximate N-Values) of 5 and 21 blows per foot were obtained in soil classified as Sandy Lean Clay (CL) and an adjusted sampler blow count (approximate N-Value) of 41 was obtained in soil classified as Clayey Sand with Gravel. The adjusted blow count of 5 in Boring A3-23-7 was obtained at an approximate depth of 6 feet. In Boring A3-23-9, adjusted sampler blow counts (approximate N-Values) of 10, 23, 26, and 26 blows per foot were obtained in soil classified as Sandy Lean Clay (CL) to clayey sand with gravel. The adjusted blow count of 10 in Boring A3-23-9 was obtained at an approximate depth of 6 feet.

4.03 Rock Conditions

The soils described in the preceding sections are directly underlain by Franciscan Complex rock. The depths and elevations of rock encountered in A3GEO borings drilled for this study are indicated in the following table along with the rock type encountered.

Table 10 - Bedrock Depths, Elevations and Descriptions (this Investigation)

Boring	Surface Elevation (feet)	Bedrock Depth (feet)	Top of Bedrock Elevation (feet)	Rock Type
A3-23-1	80.7	6.0	74.7	Claystone/Shale/Mélange
A3-23-2	82.6	15.5	67.1	Sandstone/Shale/Mélange
A3-23-3	91.0	15.0	76.0	Shale/Mélange
A3-23-4	80.7	14.0	66.7	Sandstone
A3-23-5	80.8	14.0	66.8	Sandstone/Shale/ Clayey Sandstone
A3-23-6	80.7	17.0	63.7	Sandstone
A3-23-7	80.9	15.0	65.9	Sandstone/Sandy Claystone
A3-23-8	80.8	18.0	62.8	Sandstone/Sandy Claystone
A3-23-9	80.8	19.0	61.8	Sandstone

Adjusted sampler blow counts (Approximate N-Values) in rock generally exceeded 50 blows per foot.

4.04 Groundwater Conditions

The following groundwater conditions were noted in borings drilled by A3GEO at the TLHS campus.

Table 11 - Groundwater Elevation Data

Test Boring	Date	Ground Surface Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)
A3-23-1	7/31/2023	80.7	14.0	66.7
A3-23-2	7/31/2023	82.6	18.5	64.1
A3-23-9	8/1/2023	80.9	17.0	63.8
B-4	2/22/2017	81.1	10.0	71.1
A3-17-1	11/22/2017	79.5	7.0	72.5
A3-17-7	11/22/2017	81.0	19.0	62.0

Logs of other A3GEO borings generally indicate groundwater was not observed prior to backfilling with grout. Previous borehole logs MPEG B-1 and MPEG B-2 note "no groundwater was observed during drilling".

We note that groundwater measurements made in open boreholes are not necessarily representative of stabilized groundwater conditions at the time that the measurements were made, which is particularly true for holes drilled in low-permeability clayey soils. It should be anticipated that groundwater levels below the site may vary in response to rainfall or other factors. Groundwater may also be present below the site at times within permeable zones (particularly where such zones coincide with the alignments of the historic creeks or tonal lineaments) and/or due to locally perched conditions.

4.05 Soil Expansion Potential

We screened for the presence of expansive soils by conducting Atterberg Limits determinations on selected samples from the borings. As a guide, we note that soils with a Plasticity Index (PI) no greater than 15 and a Liquid Limit (no greater than 40) are typically considered suitable for re-use as non-expansive fill. Tabular summaries of Atterberg Limits determinations conducted for this investigation and previous investigations at TLHS follow.

Table 12 - Results of Atterberg Limits Determinations (this Investigation)

Boring	Sample Depth (feet)	Plasticity Index (PI)	Liquid Limit (LL)	Expansion Potential
A3-23-1	3.0-3.5	11	31	Low
A3-23-2	2.5-3.0	13	35	Low
A3-23-2	5.0-5.5	18	36	Moderate
A3-23-3	8.0-8.5	12	30	Low
A3-23-4	2.0-2.5	13	31	Low
A3-23-5	5.0-5.5	14	32	Low
A3-23-6	7.0-7.5	16	35	Moderate
A3-23-7	2.0-3.0	15	34	Low
A3-23-8	6.0-6.5	16	32	Moderate
A3-23-8	16.0-16.5	17	32	Moderate
A3-23-9	6.0-6.5	13	29	Low
A3-23-9	11.0-11.5	17	35	Moderate

Table 13 - Results of Atterberg Limits Determinations (previous Investigations)

Boring	Sample Depth (feet)	Plasticity Index (PI)	Liquid Limit (LL)	Expansion Potential
A3-21-1	1.0	20	39	Moderate
A3-21-2	5.5	23	43	Moderate
B-2	1.0	20	37	Moderate
B-3A	4.0	21	37	Moderate
B-4	3.5	16	36	Moderate
B-5	4.0	16	36	Moderate
A3-17-1	12.0 - 12.5	22	40	Moderate
A3-17-1	17.5 - 18.0	10	29	Low
A3-17-2	10.5	17	35	Moderate
A3-17-4	3.0 – 3.5	20	37	Moderate
A3-17-5	2.0	15	33	Low
A3-17-8	6.0 – 6.5	21	39	Moderate
A3-17-9	3.0 – 3.5	17	33	Moderate

4.06 Soil Corrosion Potential

We screened for the presence of corrosive soils by conducting a suite of geochemical laboratory tests on three near-surface samples obtained from the site. The geochemical laboratory test results are presented on the Corrosivity Tests Summary at the end of Appendix E.

Guidelines on the interpretation of the chloride, sulfate and pH test results presented in the following table were obtained from Caltrans (2021), which states that "*for structural elements, the Department considers a site to be corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken* *at the site: Chloride concentration is 500 ppm or greater, sulfate concentration is 1500 ppm or greater, or the pH is 5.5 or less*".

Table 14 - Corrosion Test Data and Caltrans Classifications

Geochemical Test	Corrosion Threshold for Structural Elements	Boring	Depth Interval (feet)	Test Result	Caltrans Classification
Chloride (mg/kg or ppm)	500 ppm or greater	A3-23-4	1.5-2.0	9	Non-corrosive
		A3-23-6	4.5-5.0	69	Non-corrosive
		A3-23-8	2.0-3.0	152	Non-corrosive
Sulfate (mg/kg or ppm)	1,500 ppm or greater	A3-23-4	1.5-2.0	179	Non-corrosive
		A3-23-6	4.5-5.0	9	Non-corrosive
		A3-23-8	2.0-3.0	37	Non-corrosive
pH	5.5 or less	A3-23-4	1.5-2.0	8.2	Non-corrosive
		A3-23-6	4.5-5.0	8.0	Non-corrosive
		A3-23-8	2.0-3.0	8.7	Non-corrosive

The Caltrans guidelines indicate that a minimum resistivity value for soil of less than 1,500 ohm-cm indicates the presence of high quantities of soluble salts and a higher propensity for corrosion and requires testing for chlorides of such soils. The National Association of Corrosion Engineers (NACE) provides guidelines on soil resistivity and soil corrosion classification which are presented in Table 15:

Table 15 - NACE Corrosion Classifications

Soil Resistivity (ohm-cm)	Soil Classification
Below 500	Very Corrosive
500 – 1,000	Corrosive
1,000 – 2,000	Moderately Corrosive
2,000 – 10,000	Mildly Corrosive
Above 10,000	Progressively Less Corrosive

Our soil resistivity test results and corresponding NACE classifications are presented in the following table.

Table 16 - Resistivity Test Data and NACE Classifications

Geochemical Test	NACE Corrosivity Criteria	Boring	Depth Interval (feet)	Test Result	NACE Classification
Soil Resistivity (ohm-cm)	(see above)	A3-23-4	1.5-2.0	2155	Mildly Corrosive
		A3-23-6	4.5-5.0	2794	Mildly Corrosive
		A3-23-8	2.0-3.0	1884	Moderately Corrosive

A qualified corrosion engineer should be consulted if additional interpretations or recommendations pertaining to corrosion are desired.

5. ENGINEERING GEOLOGIC EVALUATIONS

5.01 Site Geologic Map

The Site Geologic Map presented on Figure 10 shows the surficial geologic units we interpret to be present in the vicinity of the TLHS campus. As previously noted, grading to construct the campus involved cutting and filling. We used the Partial Site Plan on Sheet A1A of the 1958 plans for the school (GM&P, 1958; Appendix F) and the 1950 aerial photograph on Figure 5 to interpret the approximate lateral extent of artificial fill (map symbol AF) placed during c. 1958 site development. Outside of the THLS campus, we loosely interpreted the extent of artificial fill based on our review of topographic data and historical aerial photography. The hills that surround the campus are mapped as Franciscan Mélange (Unit fsr), generally consistent with regional geologic mapping (e.g., Figures 6 and 7) and the examination of the borings. Surficial deposits outside of the areas mapped as artificial fill or mélange are mapped as Quaternary alluvium/colluvium (map symbol Qa/Qc).

Fill was also used to bury former creeks and swales in the vicinity of the Site. The Predevelopment Aerial Photograph on Figure 5 shows two prominent creeks, one of which roughly coincides with the eastern boundary of he subject Site. Previous borings drilled north of the Site in the vicinity of the former creek channel (Borings B-4 and A3-17-1) encountered 10 feet and 7 feet of fill (respectively), the lower portion which is interpreted as creek channel backfill. The log of Borings A3-23-4 (this study) drilled near the eastern Site boundary, indicates the presence of fill likely used to bury the realigned creek or swale. Artificial fill was not reported in previous Boring B-5. In general, artificial fill is not mapped within the limits of the Site on Figure 10. The absence of clear and distinct fill contacts in these borings suggests one of more of the following: (1) the former natural creek channel may have been located slightly more east of the Site in areas unexplored by the borings, (2) alluvial fan materials from the site may have been used to fill the channels complicating distinct differences in lithology, and (3) portions of the former channel may have been removed when the Site was cut to grade.

The distribution and lithologic characteristics of the site stratigraphy interpreted from borehole review for this project and other TLHS projects strongly suggest that Holocene and Pleistocene alluvial deposits rest unconformably on Franciscan mélange bedrock. Based on our review of historical aerial photography, topographic maps, site modifications, and site-specific borehole data, we interpret that any Holocene alluvium within the TLHS campus is likely to be relatively thin.

5.02 Geologic Cross Sections

The locations of the five interpretive cross sections developed for this study (Cross Sections F-F' through J-J') are shown on Figures 3, 10, and 11. Figures 10 and 11 also show the locations of the five interpretive cross sections presented in our previous design level geotechnical investigation and geologic hazard study reports (Cross Sections A-A' through E-E').

Cross Sections F-F' through J-J' are presented on Figures 12 through 16. Each figure includes two ground surface profiles: 1) "Existing Grade" is plotted using a solid line based on the Project survey drawing and aerial Lidar basemap presented on Figure 10; and 2) The "Predevelopment Ground Surface is plotted using a dotted line based on the 1958 topographic contours shown on the 1958 plans in Appendix F. All of the cross sections, which are vertically exaggerated two times, depict elevations relative to NAVD88. Generalized descriptions of the interpreted conditions shown on Cross Sections F-F' through J-J' follow.

5.02.1 North-South Cross Sections F-F', G-G-, and H-H'

The cross sections on Figures 12 through 14, which are oriented upslope-downslope, illustrate the depth of cuts made during c.1958 site development. On Cross Sections F-F' and G-G' (Figures 12 and 13), about 2 to 3 feet of artificial fill is shown within the footprint of Building H based on data from Borings A3-23-5 and A3-23-6 and our understanding that the footings supporting existing Building H are at least 30 inches deep. On Cross Section G-G' (Figure 13) deeper fill is loosely interpreted adjacent to the deep end of the existing pool. Cross Section H-H' (Figure 14) only depicts fill south of the Site in the vicinity of a former drainage and assumes boring A3-23-4 lies directly northwest of the former drainage. Throughout the Site, Quaternary alluvium/colluvium is interpreted to directly overlie the rock surface, which slopes down towards the north roughly parallel to the pre-development ground surface.

5.02.2 East-West Cross Sections I-I', and J-J'

The cross sections on Figures 15 and 16 are oriented cross-slope, roughly perpendicular to cross sections F-F', G-G', and H-H'. Cross Sections I-I' loosely depicts artificial fill in the vicinity of the existing swimming pool, based in part on data from Borings A3-23-8 and A3-23-9. Although most of Cross Section I-I' is in an area that was cut to-grade, the ground surface at the far south end of the cross section (near Building R) is very close to the level of the pre-development grade. No fill is shown on Cross Section J-J', which is in the area of deepest cut. Cross Sections I-I' and J-J depict a broadly undulating bedrock surface and with fill locations associated with deep excavations for the existing pool and realignment of previously existing swales.

5.03 Geologic Unit Descriptions

5.03.1 Artificial Fill

Where observed at TLHS, artificial fill typically consists of medium stiff to stiff sandy clay, or medium dense to dense clayey sand, with varying amounts of gravel. The fill materials at TLHS are generally similar to the natural onsite colluvial/alluvial soils from which they were likely derived. Consequently, precise determinations of fill thicknesses and depths at TLHS are not always possible.

Of the nine borings drilled for this study, only four borings (A3-23-5, A3-23-6, A3-23-8, and A3-23-9) are interpreted to have encountered fill that was distinctive enough from reworking of site alluvial fan deposits. The remainder of the borings were typically logged as undifferentiated fill/alluvium in the very shallow subsurface. Borings A3-23-5 and A3-23-6, which were drilled along the north side of Building H, encountered about 2 to 3 feet of fill classified as Clayey Sand with Gravel (SC). Due to the shallowness of this layer, drive samples in the fill layer extended into the underlying natural soils and adjusted sampler blow counts (approximate N-Values) for the fill layer are not available. Borings A3-23-8 and A3-23-9, which were drilled along the north side of the existing pool, encountered about 7 feet of fill classified as Sandy Lean Clay (SC) that we interpret to be fill based on the presence of gravel-size angular rock fragments not seen in other borings and due to their close proximity to the existing pool footprint. Adjusted sampler blow counts (approximate N-Values) of 6 and 10 blows per foot were obtained in fill in Borings A3-23-8 and A3-23-9, respectively.

As discussed previously and shown on the cross sections (Figures 12 through 16) virtually all of the Site was cut to grade with cut depths generally increasing from north to south. The borings where fill was noted are either directly adjacent to existing Building H (Borings A3-23-5 and A3-23-6) or directly adjacent to the deep end of the existing pool (Borings A3-23-8 and A3-23-9). In our opinion, the presence of fill at these isolated locations is likely related to localized excavation and backfilling performed to construct Building H and the pool rather than mass grading performed during site development.

5.03.2 Alluvium/Colluvium

All of the borings drilled at TLHS encountered alluvial/colluvial soils either at the ground surface or below artificial fill, and directly overlying bedrock. In the borings drilled for this study, the bottom of the alluvium/colluvium layer (i.e., top of bedrock) ranged from approximately 6 to 19 feet. Throughout the TLHS campus, logs of borings generally show alluvial/colluvial soils consisting of lean clay and fine- to medium-grained sand that classify as either sandy lean clay (CL) or clayey sand (SC) with trace gravel.

Soil conditions encountered at the site of future buildings and the new pool are summarized in Section 4.2. Sampler blow counts are considered an index of a deposit's degree of consolidation and/or stiffness. Lower blow counts and pocket penetrometer readings in alluvium/colluvium generally suggest younger Holocene alluvium; whereas higher blow counts and pocket penetrometer values suggest older soils possibly Pleistocene in age. In the borings drilled for this study, adjusted sampler blow counts (N Values) in alluvium/colluvium commonly ranged from 19 to 42 suggesting relative antiquity to the alluvial deposits at the site. This is consistent with the interpreted soil development in these deposits from review of borehole samples. Throughout the TLHS campus the presence of well-developed soil colors and mottling, coupled with clay film, iron-oxide and manganese oxide development along soil pedologic fractures suggest that many of the surficial deposits, and certainly the deeper deposits resting on bedrock, consist of late Pleistocene alluvium/colluvium.

5.03.3 Franciscan Complex Rock

The tabular summary in Section 4.03 shows rock was encountered at a depth of 6 feet in Boring A3-23-1, 15.5 feet in Boring A3-23-2 and between depths of 14 feet and 19 feet in Borings A3-23-3 through A2-23-9. As noted in Section 4.02 (Soil Conditions), the 6 feet of Sandy Lean Clay with Gravel (CL) directly overlying shale in Boring A3-23-2 is interpreted as residual soil (completely weathered claystone).

The borings drilled for this study encountered rock materials characterized primarily as Sandstone, Siltstone, Claystone, Shale, or Mélange, consistent with Franciscan Complex rocks depicted on regional geologic maps (Figure 6). In general, adjusted blow counts in rock exceeded 50 blows per foot. In Borings A3-23-5, A3-23-6, and A3-23-9, SPT sampler blow counts of 50 for 0.5 inch were obtained in sandstone at the bottom of the hole (at a depth of 25 feet). The bedrock surfaces indicated on the boring logs prepared for this study represent an abrupt transition between alluvium/colluvium and Franciscan Complex rock.

6. GEOLOGIC HAZARD ASSESSMENT

6.01 Earthquake Ground Shaking

The San Francisco Bay Area is seismically active and it is likely that the Site will experience earthquake ground shaking within the foreseeable life of the future project. For this reason, the planned structures should be designed to resist strong ground shaking in accordance with the requirements of the California Building Code (CBC) and local design practice. The seismic design provisions of the CBC include a methodology by which sites are classified as A through F in order to quantify site-specific ground shaking effects. Based on the available data, we judge that a seismic Site Class C designation (soft rock and very dense soil profile) is appropriate for the Site. Applicable CBC seismic design parameters for the Site are presented in Section 8.01.

6.02 Surface Fault Rupture

Historically, earthquake fault rupture most often occurs along pre-existing active faults. The site is not located within or proximate to an Alquist-Priolo Earthquake Fault Zone and the closest known active fault (the San Andreas fault) is approximately 8.5 miles to the southwest (Section 3.02). The concealed, bedrock fault shown on Figure 6 is mapped northeast of the Project site, and the inferred fault with which it is associated is not considered active. The absence of tectonic-related geomorphology from our review of historical aerial photography of the site prior to development is consistent with the inactive and concealed bedrock fault designation of Blake, Graymer and Jones (2000). In summary, no known fault traces cross or project towards the Site and we conclude that the overall potential for surface fault rupture to affect the Site is very low.

6.03 Liquefaction and Seismic Strength Loss

The Site is mapped by the USGS (Figures 8a and 8b) within an area of “Moderate” liquefaction susceptibility (Knudsen et al., 2000; Witter et al., 2006). Soils that are most likely to experience “classic” liquefaction-type behavior include loose to medium dense (adjusted blow counts less than 20), clean, course-grained soils (i.e., sands and gravels) that are below groundwater. Recent and ongoing research (e.g. Bray and Sancio, 2006; Idriss and Boulanger, 2008) has demonstrated that fine-grained materials (i.e., silts and clays) with very low plasticity that are below groundwater can also experience generally similar cyclic degradation in response to earthquake shaking and are considered susceptible to liquefaction-type behavior if certain criteria are met. At this time, there appears to be a general consensus that cohesive soils with a plasticity index (PI) of 12 or greater can be considered highly resistant to liquefaction.

As shown on the Area Geologic Map (Figure 6), Quaternary Geologic Map (Figure 7), the Site Geologic Map (Figure 10), and the cross sections (Figures 12 through 16), Quaternary alluvium/colluvium is present either at ground surface or below artificial fill, and as discussed in Section 5.03.2, much of the material is interpreted to be relatively old (e.g., early Holocene to late Pleistocene in age) at or near the bedrock geologic contact (e.g., < 20 ft bgs). These deposits are typically clay-rich, moderately plastic, and moderately consolidated (medium dense to very dense and stiff to hard), reducing their susceptibility to earthquake-induced liquefaction.

The presence of groundwater is a prerequisite for liquefaction to occur. The shallowest historical groundwater depth measurement at TLHS was made on 22 November 2017 in Boring A3-17-1 when groundwater was at a depth of 7.0 feet. As shown on Cross Section F-F’, Boring A3-17-1 was drilled north of the Site in an area underlain by fill. The Predevelopment aerial photograph on Figure 5 shows Boring A3-17-1 within a former creek channel. The second shallowest groundwater depth measurement (10 feet deep) was made in Boring B-4, which is located in the same creek channel. These localized conditions are not present at the Site or in other parts of the TLHS campus where groundwater was only noted in four other borings, where it was measured at depths between 14 and 19 feet.

The site-specific boring logs in Appendix B generally show the following:

1. The Site is generally underlain by natural alluvial/colluvial soils consisting predominantly of very stiff sandy lean clay (CL) and dense clayey sand (SC);
2. Atterberg Limits determinations on samples of onsite soils below a depth of 5 feet produced PI values ranging from 12 to 17;
3. Adjusted sampler blow counts (N-Values) obtained in natural alluvium/colluvium below a depth of about 5 feet typically exceeded 20 blows per foot;
4. The geotechnical recommendations in this report require the removal of any/all artificial fill from beneath planned building foundations.

Based on the forgoing, we conclude that the overall potential for liquefaction to affect the Project is very low.

6.04 Landsliding

A USGS map showing the distribution of slides and earth flows (Rice, Smith and Strand, 1976; Figure 9) shows the Project site within a region of “surficial deposits” and void of landslide-related deposits (e.g., “few landslides”). The mapping of “few landslides’ appears to correlate directly with the mapping of Cretaceous/Jurassic (Franciscan) Mélange on the USGS geologic map by Blake, Graymer and Jones (2000; Figure 6); an observation consistent regional mapping based on geologic unit correlations rather than a local assessment of landslide frequency on slopes proximate to the Site. Our evaluation of landslide hazard potential at the subject Site follows.

Landsliding Beneath the Site – Our evaluation of the potential for deep-seated landsliding to extend below the Site is based primarily on evaluations discussed previously in this report, specifically: 1) the Site is approximately level and part of a broad alluvial fan; 2) Franciscan Complex bedrock underlies the Site between 6 and 19 feet deep and lacks distinct changes in elevation across the site; and; 3) the soils that underlie the Site are not susceptible to liquefaction or seismic strength loss. Based on the preceding evaluations, we judge that the overall potential for deep-seated landsliding to occur beneath the Site to be essentially nil.

Cut Slope Failure – Grading of the TLHS campus produced a low (less than about 10 feet high) cut slope within the Site that is presently inclined no steeper than about 2:1 (H:V). Based on our review of historic aerial photography (Appendix A) and site reconnaissance, the cut slope appears to have performed acceptably since it was created 60+ years ago (c. 1958). Additionally, the Project will locally flatten the cut slope in the vicinity of planned buildings S and T to about 3:1 (H:V). Borings A3-23-2, drilled on the cut slope behind planned Building T, encountered very stiff lean clay overlying rock. In our opinion, the overall potential for significant cut slope failures to occur within the Site can be considered very low.

Deep-Seated Landsliding Upslope - We considered the possibility that deep-seated landslides in the adjacent hills might in extreme circumstances extend onto the TLHS campus and affect the Site. In our opinion, the residential neighborhoods that surround the campus likely provide an adequate buffer between the base of the hillslopes and the campus. To our knowledge the hillslopes southwest of the Site do not include deep deposits of materials that would likely experience dramatic reductions in strength following landslide initiation. Accordingly, we would expect deep-seated landsliding triggered by wet weather or an earthquake to have limited runout potential and judge the overall potential for upslope deep-seated landsliding to extend onto the Site to be very low.

Fast-Moving Flow-Type Landslides - We considered the possibility that a fast-moving debris flow or earth flow emanating from the hills upslope could extend onto the TLHS campus and affect the Site. This potential hazard, if it exists, would appear to be greatest within the upper and middle terraces. The proposed Site is located on the lower terrace in a level area surrounded by other buildings. Based on the information currently available, we judge the overall potential for a fast-moving flow-type landslide to extend onto the TLHS campus and impact the proposed Site to be low.

6.05 Inundation

The site is near Elevation +80 feet and is more than a mile inland from the closest tsunami zone shown on the CGS Tsunami Inundation Map (CGS, 2009). The site's location in eastern Marin County would not be directly exposed to a tsunami from the Pacific Ocean, which would necessarily enter San Francisco Bay through the Golden Gate. The valley in which Terra Linda is located drains to the northeast towards San Pablo Bay and not towards the Golden Gate. Accordingly, we judge the overall potential for inundation by tsunami or seiche to be essentially nil.

To our knowledge, there are no significant reservoirs located upslope that could potentially pose a hazard to the TLHS campus. FEMA maps the site within an "Area of Minimal Flood Hazard (Zone X)" (FEMA, 2016). As shown on Figure 5, several historic drainages previously existed in the vicinity prior to the development of the TLHS campus. Presumably, water from nearby upslope areas currently flows below the TLHS campus and adjacent residential neighborhoods in culverts, the condition of which are unknown. Based on the information available at this time, we judge that the overall potential for the TLHS campus to be flooded by water is low, provided that existing drainage facilities in the area continue to function as intended.

7. GEOTECHNICAL EVALUATIONS

7.01 Site Suitability

We judge the proposed Site to be generally suitable from a geotechnical standpoint, provided that the conclusions and recommendations presented in this report are appropriately implemented in the design and construction of the proposed Project. Geotechnical considerations for the Project are discussed in the sections that follow.

7.02 Unsuitable Materials

The Site contains materials that are generally unsuitable for the support of new improvements. From a geotechnical perspective, unsuitable materials include (but are not necessarily limited to) the following:

1. Topsoil, tree roots, and organic-laden soils;
2. Old foundations, abandoned utilities, concrete/brick fragments, and other debris;
3. Existing fill/backfill materials for which there are no records documenting placement under modern; engineering controls (undocumented fill); and
4. Soils disturbed by future demolition-related activities.

In this report, A3GEO recommends all unsuitable materials be removed from below planned improvements.

7.03 Expansive Soils

The results of Atterberg Limits determinations (Section 4.05) indicate moderately expansive soils are present within the Site. Mitigation strategies that are commonly used in the Bay Area to reduce the potentially damaging effects of expansive soils include the following:

Mitigation for Foundations - Expansive soil mitigation alternatives for foundations include: (1) shallow foundations (footings or mats) supported on a layer of engineered non-expansive material; (2) deepened spread footings supported on natural soils below the zone of significant shrink/swell behavior; and (3) true deep foundations (piers/piles) that gain support at significant depths below the zone of shrink/swell behavior.

Mitigation for Slabs-on-Grade and Pavements - Expansive soil mitigation alternatives for slabs-on-grade and pavements include: (1) removal and replacement of expansive subgrade materials with engineered non-expansive fill; and (2) engineered treatment of expansive subgrade materials using lime or cement.

A3GEO's recommendations for expansive soil mitigation require removal and replacement with engineered non-expansive fill. Recommendations are provided in Section 8.10 for lime or cement treatment. Additional out of scope consultation, testing, and analyses may be needed if the lime or cement treatment is planned.

7.04 Foundation Support

The planned buildings can be supported on spread footing foundations, which should be designed and constructed in accordance with the recommendations presented later in this report. Geotechnical considerations associated with spread footing design include the potential presence of moderately expansive soils or near-surface unsuitable soils associated with prior construction and/or demolition activities. Our qualitative assessment of foundation support considerations at the sites of planned buildings follows:

Building H – The existing building that currently occupies the site of Building H was designed to be supported on spread footings that are at least 30 inches deep. Borings A3-23-5 and A3-23-6, drilled directly north of the Building H site encountered about 2 to 3 feet of fill. For design purposes, we recommend assuming that unsuitable soils likely extend to a depth of at least 30 inches at the Building H site.

Buildings Q and R – Building K, directly adjacent to the site of Building R, was designed to be supported spread footings that are at least 3 feet deep. Footings below Building K columns project towards the Building R site. Additionally, the sites of Buildings Q and R are located close a pre-development channel/swale that has been filled in. For design purposes, we recommend assuming that unsuitable soils likely extend to a depth of at least 30 inches at the Building H site.

Building S and T – Buildings S and T are both located in an area of deep cut where there are no prior buildings present. Existing near-surface features include conventional pavements and low retaining walls. Atterberg limits determinations performed on samples from Borings A3-23-1 and A3-23-2 produced Plasticity Index values of 11, and 13, respectively, which correlate to a generally low potential for expansion. For design purposes, we recommend assuming that significant mitigation of unsuitable materials or expansive soil will likely not be necessary at the sites of Buildings S and T.

This report contains site-specific recommendations for the following foundation support alternatives:

Deepened Spread Footings - Buildings H, Q, and R can be supported on deepened spread footings founded on natural undisturbed alluvium/colluvium at a depth of at least 30 inches below lowest adjacent firm finished grade.

Standard Depth Spread Footings Underlain by Engineered Fill - Buildings H, Q, and R can be supported on standard-depth spread footings founded at least 18 inches below lowest adjacent firm finished grade on at least 12 inches of non-expansive engineered fill.

Standard Depth Spread Footings - Buildings S and T can be supported on standard-depth spread footings founded on natural undisturbed alluvium/colluvium at a depth of at least 18 inches below lowest adjacent firm finished grade.

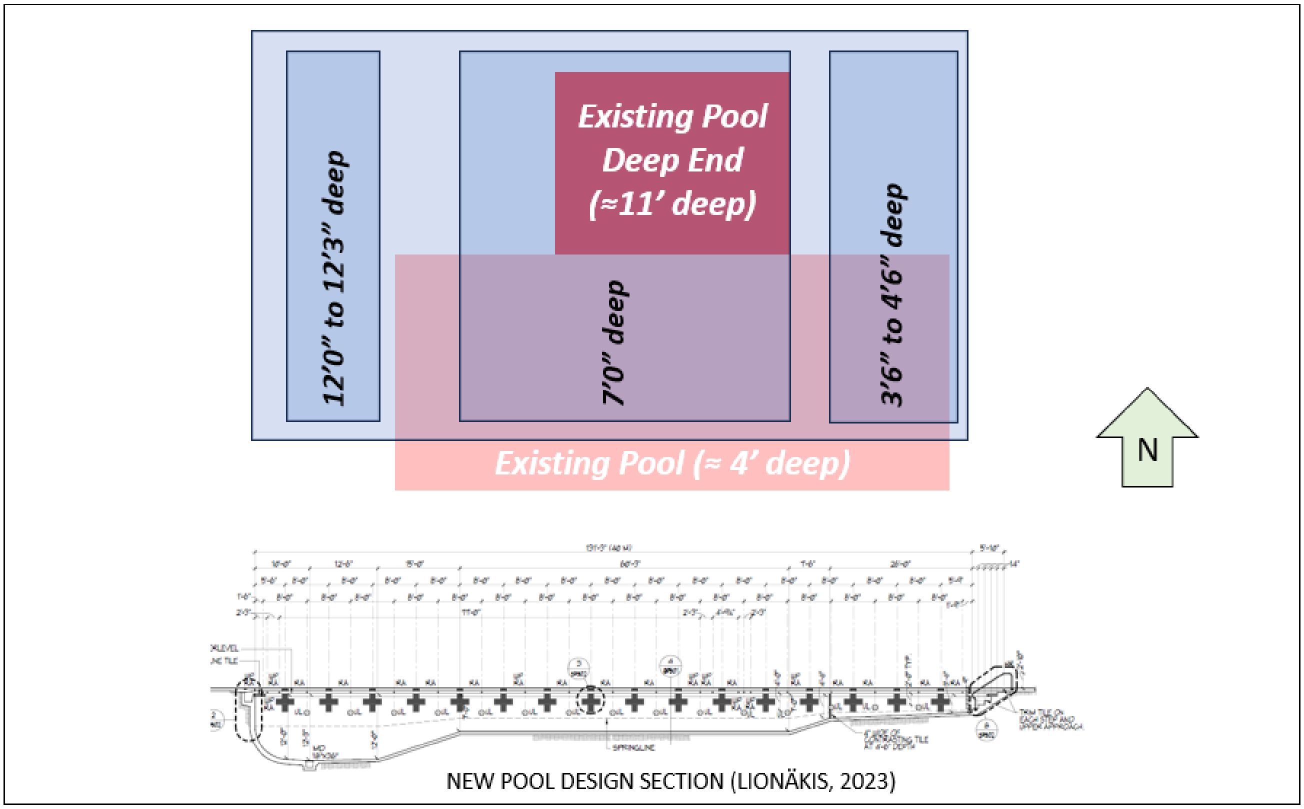
Under static (i.e., non-earthquake) conditions, we estimate that foundations designed and constructed in accordance with the recommendations presented in this report should experience less than about ½ inch of total post-construction settlement and less than about ¼ inch of post-construction differential settlement over a horizontal distance of 30 feet.

7.05 Slab-on-Grade and Pavement Support

A3GEO has developed Project-specific recommendations for the support of slabs-on-grade and pavements. This report recommends slabs-on-grade and pavements be supported on non-expansive engineered material to reduce the potential for adverse expansive soil shrink-swell effects. Additionally, this report recommends any unsuitable materials present below the bottom of planned non-expansive layers be removed and replaced with engineered fill. In cases where undocumented fill below pavement areas is especially deep, the District may choose to waive this requirement based on cost-benefit considerations.

7.06 Swimming Pool Design

The schematic plan view below illustrates differences in depths between the new and existing swimming pool.



Swimming Pool Depth Schematic

Geotechnical considerations related to the design and construction of the new pool include:

Foundation Support – As shown in the preceding schematic plan view, the north end of the existing pool is up to about 4 feet deeper than the new pool. Excavations for the west deep end of the new pool may encountered bedrock materials. Prior to the construction of the new pool, the existing pool and any underlying foundation elements will need to be demolished. Following demolition, the excavation will need to be trimmed to expose undisturbed firm natural soil and backfilled with engineered fill to the bottom of the new pool foundation. The 100%DD drawings (LIONÄKIS, 2023) indicate the design of the new pool will be by others. In this report, we recommend A3GEO observe excavations made during demolition and observe and test the placement of all engineered fill. Recommendations for pool design are provide in Section 8.07 of this report.

Lateral Earth Pressures – This report includes recommended lateral earth pressures for retaining walls that can also be used for the design of the pool shell. This report recommends the lateral earth pressure case for fixed "at rest" conditions be used for the design of the sides of the pool shell.

Hydrostatic Forces on Empty Pool – Groundwater levels in the vicinity of the new pool are likely to vary seasonally and water may also be present below the site due to leakage, surface water infiltration, or other factors. The recommended lateral earth pressures in this report do not account for hydrostatic pressure. Additionally, the bottom of the pool would be subjected to hydrostatic uplift if groundwater is high at times when the pool is empty. Risks associated with hydrostatic forces can be mitigated through the use of pressure relief valves. If the pool designer elects to resist hydrostatic forces by structural means, we should be consulted to provide supplemental recommendations (not in our current scope).

7.07 Construction Considerations

We anticipate onsite soils and rock can likely be excavated with conventional earth-moving equipment. The removal of existing reinforced concrete foundations and other remnants of prior construction will require equipment capable of breaking/cutting concrete and steel. Excavations deeper than 4 feet that will be entered by workers should be shored or sloped for safety in accordance with the California Occupational Safety and Health Administration (Cal-OSHA) standards. Construction means and methods, the protection of adjacent structures and improvements, the stability of temporary excavation slopes, and the design, installation, monitoring, and abandonment of temporary shoring and dewatering systems are the contractor's responsibilities. The contractor should anticipate that there may be environmental and regulatory aspects to the appropriate collection, storage and disposal of onsite water generated by their operations.

The available data suggests that the groundwater may be encountered during deep excavations, such as for the existing pool demolition or construction of the new pool deep end. Temporary construction-phase groundwater control measures at the site could be needed, such as pumping from sumps or low points within site excavations. The design installation, monitoring, and abandonment of temporary site dewatering and discharge systems are the contractor's responsibility. These responsibilities also include any special regulatory or health and safety requirements that may be associated with the disposal and/or discharge of construction water.

Groundwater depths and soil moisture at the site vary seasonally and the onsite soils may include materials that are wet of optimum, from an earthwork compaction standpoint. The contractor should anticipate that soils obtained from site excavations will likely include clayey materials that may need to be processed (e.g., by air drying) prior to being placed as engineered fill. Although it is possible for excavation and/or construction to proceed during or immediately following the wet winter months, a number of geotechnical problems may occur which may increase costs and cause project delays. We advise that wet-weather issues be considered during project scheduling.

8. RECOMMENDATIONS

8.01 California Building Code Seismic Parameters

Strong earthquake shaking is a hazard shared throughout the region and the direct risks posed to structures by ground shaking are mitigated through the structural design provisions of the California Building Code (CBC). It is our understanding that the Project will be subject to the 2022 CBC. The 2022 CBC includes references to ASCE 7-16 for methodology for calculating seismic design parameters. The following criteria are considered appropriate for the site (Latitude 37.99950; Longitude -122.55356).

Table 17 - 2022 CBC Seismic Design Parameters

Parameter	Factor/Coefficient	2022 CBC Value
Soil profile type	Site Class	C
Mapped MCE_R spectral response acceleration parameter at short periods	S_s	1.5
Mapped MCE_R spectral response acceleration parameter at period of 1.0 second	S_1	0.6
MCE_R spectral response acceleration parameter at short periods adjusted for site class effects	S_{MS}	1.54
MCE_R spectral response acceleration parameter at period of 1.0 seconds adjusted for site class effects	S_{M1}	0.86
Design spectral response acceleration parameter at short periods	S_{DS}	1.03
Design spectral response acceleration parameter at period of 1.0 second	S_{D1}	0.57
MCE_G Peak Ground Acceleration adjusted for site effects	PGA_M	0.55

The preceding 2022 CBC Seismic Design Parameters were obtained from https://asce7hazardtool.online/, which we accessed on 31 August 2023 (printout attached as Appendix H).

8.02 Site Preparation

Prior to the start of demolition, site clearing/stripping, and site excavations, all active subsurface utilities within and immediately surrounding the Site limits should be located, marked, and protected or relocated. Drawings are available showing the locations of known underground utilities. Contractors should make their own independent assessments of information shown on the drawings provided (new and existing) and conduct any additional investigations they deem appropriate. The contractor will be responsible for the design, implementation, and safety of all site excavations; this responsibility includes (but is not necessarily limited to) personal safety, temporary shoring, cut slopes, excavation dewatering, and the protection of adjacent improvements to remain. Prior to the start of the onsite work, the contractor should document the condition of adjacent buildings (including Building K), exterior flatwork, pavements, and utilities, as appropriate, and should perform any and all monitoring activities required by the owner.

8.03 Demolition, Stripping, Clearing, and Grubbing

Fill placed in association with demolition activities (backfill of excavations and removals) should be placed, compacted, and tested, in accordance with the recommendations presented in this report or it will be classified as undocumented and be subject to subsequent removal and replacement with engineered fill.

Demolition of the existing Building H should include the removal and offsite disposal of below-grade building elements including foundations, utility pipes, and any other remnants of prior construction. The available plans (Appendix G) show footings that extend up to about 30 inches below adjacent grades but also note that footings may be lowered at the discretion of the Architect based on conditions encountered. Footings should be removed to their full depth along with any underlying and/or adjacent backfill material. At the end of Building H demolition, A3GEO should observe the resulting excavations to check that firm natural soils are exposed and no old fill or remnants of prior construction remain.

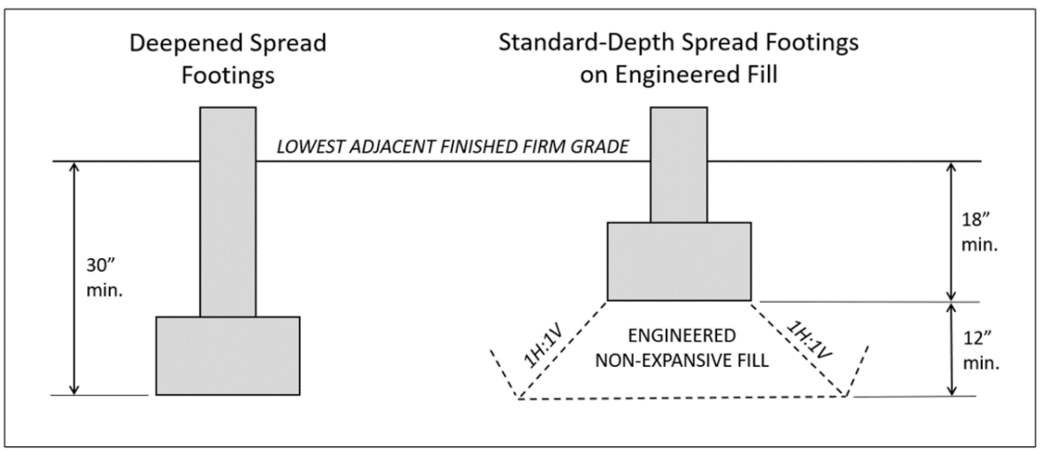
Demolition of the existing swimming pool should include the removal and offsite disposal of the pool shell and foundation(s), as well as the removal of any/all backfill placed during pool construction. At the end of pool demolition, A3GEO should observe the resulting excavation to check that firm natural soils are exposed and no old fill or remnants of the pool structure remain.

Other areas within site limits where new improvements are planned should be cleared of concrete, asphalt concrete, aggregate base, catch basins, storm drains, sewers, utilities, and all other near-surface improvements. Demolition of the existing utilities should include the removal of any utility trench backfill from beneath planned building sites. Trees within the Site that are not designated “to remain” should be cleared and grubbed and any soils containing vegetation and/or organic matter should be stripped.

Remnants of prior construction should be removed from the site unless they are specifically identified as suitable for reuse by the owner and A3GEO. Stripped and grubbed materials are not suitable for re-use as engineered fill and should either be removed from the site or stockpiled for later use as landscaped material (at the District’s discretion).

8.04 Spread Footings

As discussed in Section 7.04, we recommend that Buildings H, Q, and R be supported on either: 1) deepened spread footings designed to bear a minimum of 30 inches below lowest adjacent firm finished grade; or 2) standard-depth spread footings designed to bear a minimum of 18 inches below lowest adjacent firm finished grade that are underlain by at least 12 inches of engineered non-expansive fill (illustrations below).



Spread Footing Design Alternatives - Buildings H, Q, and R

Buildings S and T can be supported on standard-depth spread footings designed to bear a minimum of 18 inches below lowest adjacent firm finished grade.

For Buildings H, Q, and R, continuous spread footings should enclose the entire building perimeter to mitigate the potential for moisture changes beneath the interior ground floor slab-on-grade. In general, we recommend that spread footings be at least 16 inches wide to allow for adequate steel reinforcement. Footings designed and constructed in accordance with the recommendations presented in the report can be evaluated using the bearing pressures in the following table (DL=Dead Loads; LL=Live Loads; Total=DL+LL+ wind or seismic).

Table 18 - Allowable Bearing Pressures for Spread Footings

Load Case	Bearing Pressure (psf)	Minimum Factor of Safety
DL Allowable	2000	3.0
DL+LL Allowable	3000	2.0
Total Allowable	4000	1.5

Application of CBC 1605A 1.1 may limit pressures below the allowable geotechnical capacity values presented in Table 17. The allowable bearing pressures in the preceding table are associated with a conservative "ultimate" bearing pressure value of 6,000 pounds per square foot (psf), derived based on settlement considerations and observation of past TLHS building performance.

Resistance to lateral loads can be provided by passive pressures acting on the vertical faces of below-grade structural elements and by friction along the footing bottoms. Passive resistance can be evaluated using an equivalent fluid weight of 300 pounds per cubic foot (pcf). This value can be increased by one-third for dynamic loading. In calculating lateral resistance, the top one foot of soil should be ignored unless the soil is confined by an adjacent pavement or slab. A friction coefficient of 0.30 can be used to evaluate frictional resistance along the bottoms of footings. The above passive and frictional resistance values include a factor of safety of at least 1.5 and can be fully mobilized with deformations of less than ½ - and ¼ -inch, respectively. Passive and frictional resistance may be combined without reduction.

For spread footings designed to bear on natural alluvial/colluvial soils, A3GEO should check that suitable bearing materials are exposed following excavation to design footing depth. Any soft, weak, disturbed, or otherwise unsuitable materials that remain below design footing bottom elevations should be removed at the direction of A3GEO and replaced with lean or structural concrete prior to the placement of reinforcing steel.

For standard-depth footings underlain by non-expansive engineered fill, A3GEO should check that suitable bearing materials are exposed at the bottom of the engineered fill layer. Any soft, weak, disturbed, or otherwise unsuitable materials that remain below design engineered fill subgrade elevations should be removed at the direction of A3GEO and replaced with engineered fill. The 12 inches of non-expansive material below should meet the requirements for Non-Expansive Fill presented in Section 8.08. A3GEO should also observe completed footing excavations made in engineered fill to check for appropriate bearing and cleanout prior to the placement of reinforcing steel.

8.05 Interior Slabs-on-Grade

Interior slabs-on-grade should be underlain by at least 12 inches of non-expansive material. The exposed subgrade at the bottom of the required non-expansive layer should be checked by A3GEO to confirm that it is uniformly firm and non-yielding prior to fill placement. If weak, unstable, or unsuitable materials are encountered during subgrade compaction or proof-rolling, they should be over-excavated and replaced with engineered fill at the direction of A3GEO.

We recommend that the upper 6 inches of non-expansive material directly below interior slabs-on-grade consist of Caltrans Class 2 Aggregate Base (AB) and be overlain by a heavy-duty impermeable membrane (Stego® wrap 15-mil or an approved equivalent) installed and taped in accordance with the manufacturer's recommendations. The 6 inches of non-expansive material below the 6-inch AB layer can consist of AB or onsite material that meets the requirements for Non-Expansive Fill presented in Section 8.08. Slab reinforcing should be provided in accordance with the anticipated use and loading of the slab. We generally recommend that interior slabs-on-grade be at least 5 inches thick and be reinforced with steel bar or wire reinforcement.

8.06 Retaining Walls

Permanent retaining walls should be designed to resist lateral earth pressures (static and seismic) and any additional lateral loads caused by surcharges on the ground surface behind the top of the wall. The lateral earth pressures presented in this section can be used to design retaining walls that are fully-drained to prevent the build-up of hydrostatic pressures.

The lateral earth pressures that follow are unfactored; earth loads, static surcharge loads and earthquake surcharge loads should be considered in combination using the appropriate load and resistance factors. Recommended lateral pressures for intermediate backslope inclinations can be determined by interpolation.

Static Lateral Earth Pressures on Walls that Are Free-to-Rotate ("Active" Case) - This load case applies to cantilever-type retaining walls that are free-to-rotate at their tops and therefore unrestrained by tiebacks, other structural elements, or wall geometry. The recommended lateral pressure distribution for this case is based on active soil pressures and increases uniformly with depth (triangular distribution).

Table 19 - "Active" Static Lateral Earth Pressures
(for Free-to-Rotate Retaining Walls)

Slope Behind Wall (Horizontal:Vertical)	Horizontal Lateral Pressure (psf[3] per foot of depth)
Level	45
3:1	50
2:1	60

Static Lateral Earth Pressures on Walls Not Free-to-Rotate ("At-Rest" Case) - This load case applies to basement-type walls that not free-to-rotate due to structural restraints or wall geometry. The recommended lateral pressure distribution for this case is based on at-rest soil pressures and increases uniformly with depth (triangular distribution).

Table 20 - "At-Rest" Static Lateral Earth Pressures
(for Structurally Restrained Retaining Walls)

Slope Behind Wall (Horizontal:Vertical)	Horizontal Lateral Pressure (psf per foot of depth)
Level	65
3:1	75
2:1	85

Seismic Lateral Pressure Increases - Increases in lateral wall pressures caused by earthquake shaking can be evaluated using the following uniform seismic increments. The lateral pressure increases shown should be added to the corresponding cantilevered free-to-rotate active lateral pressure distribution.:

Table 21 - Seismic Lateral Pressure Increases
(Additive Seismic Increments)

Slope Behind Wall	Uniform Horizontal Lateral Pressure (psf for wall height in feet)
Level	12H
3:1	14H
2:1	16H

[3] psf = pounds per square foot

Lateral Pressures due to Surcharges - Retaining walls should be designed to account for loads applied within the Surcharge Zone, defined by a surface inclined at 1 horizontal to 1 vertical extending up from the base of the retained soil. Lateral earth pressure increases associated with common surcharge conditions can be approximated using the values in the table that follows; unusually heavy and/or concentrated loads within the Surcharge Zone should be evaluated by A3GEO on an individual basis (not in current scope).

Table 22 - Surcharge Lateral Pressures

Condition	Uniform Lateral Surcharge Pressure
Typical vehicle loads	100 psf (uniform) applied over the top 10 feet of the wall
General surcharge loads	0.5 times the anticipated surcharge pressure (uniform), applied over the full height of the wall

The lateral forces and pressures presented in this Section are based on the requirement that all retaining walls be fully-drained to prevent the build-up of hydrostatic pressure.

Backdrainage should consist of either: (1) prefabricated drainage material (Miradrain or an approved alternative) installed in accordance with the manufacturer's recommendations, or (2) a drain rock layer at least 12 inches thick. Prefabricated drainage material should drain to a perforated plastic pipe or an approved prefabricated drainage conduit. Backdrainage should drain into a perforated plastic pipe installed (with perforations down) along the base of the walls on a 2-inch-thick bed of drain rock. Plastic pipe should be sloped to drain by gravity to a suitable discharge and a cleanout should be provided at the pipe's upslope end. Perforated and non-perforated plastic pipes used in the drainage system should consist of 4-inch diameter Schedule 40 PVC or an approved equivalent. Drain rock should conform to Caltrans specifications for Class 2 permeable material. Alternatively, locally available, clean, ½- to ¾-inch maximum size crushed rock or gravel could be used, provided it is encapsulated in a non-woven geotextile filter fabric, such as Mirafi 140N or an approved alternative. The upper 1-foot of retaining wall backfill (above backdrainage) should be comprised of low-permeability soil to limit surface water infiltration into the retaining wall backdrainage system.

Retaining wall footings can be evaluated using the allowable bearing pressures and passive and frictional resistance values recommended in Section 8.04.

8.07 Swimming Pool

The recommendations provided in this section are based on conceptual drawings of location and depths for the pool. During the pool design (by others), we recommend the opportunity to review the design and provide consultation and updated geotechnical recommendations as necessary.

The design recommendations in this Section are intended for pools equipped with relief valves or other provisions to prevent the buildup of hydrostatic pressure in case the pool is empty when groundwater levels are high. For this case:

1. Pool foundations (bottom) can be designed as a structural slab or mat using an allowable bearing pressure of 2,000 psf.

2. Pool walls should be designed in accordance with the recommendations provided in Section 8.06, Retaining Walls.

A3GEO and the District should be consulted if the designer wishes to consider hydrostatic pressure in the design of the pool. If necessary, A3GEO can provide supplemental recommendations that include hydrostatic pressures tailored to the District's desired level of risk tolerance (not in current scope).

We recommend that the pool shell bottom be underlain by a 12-inch-thick zone of new engineered fill. The 12-

inch-thick zone should consist of either: 1) scarification and compaction of in-place materials; or 2) removal and replacement with new engineered fill, Caltrans Class 2 AB, Caltrans Class 2 permeable, or ¾-inch clean crushed drain rock encapsulated in filter fabric. Subgrade beneath the 12-inch-thick zone should be firm undisturbed natural soil or rock or engineered fill directly underlain by firm undisturbed natural soil or rock. A3GEO should observe during the demolition of the existing pool to confirm that all remnants of prior construction (including undocumented fill) are removed to expose firm undisturbed natural soil or rock. All fill placed below the new pool should be compacted to at least 90 percent relative compaction per ASTM D-1557.

8.08 Engineered Fill Material and Placement

Geotechnical requirements for fill materials are presented below.

> ***General Fill -*** General Fill material should have an organic content of less than 3 percent by volume and should not contain environmental contaminants or rocks or lumps larger than 6 inches in greatest dimension. From a geotechnical standpoint, onsite materials can be reused as General Fill if they meet or can be processed (e.g., by sorting and/or crushing) to meet the above requirements.
>
> ***Non-Expansive Fill -*** Non-Expansive Fill should conform to the requirements for General Fill, have a Plasticity Index no greater than 12, and a Liquid Limit no greater than 40.
>
> ***Imported Fill –*** Imported Fill should conform to the requirements for Non-Expansive Fill and should be evaluated by our firm and the project environmental consultant prior to its importation to the site.

General fill can only be used at locations and depths where non-expansive fill is not a Project requirement (e.g., landscaped areas and below the bottom of non-expansive engineered fill layers). All proposed fill materials should be approved by A3GEO prior to use.

Geotechnical requirements for fill placement and compaction follow (per ASTM D-1557 Test Methods).

- General Fill that is predominantly cohesive (>15 percent passing #200 sieve) should be moisture conditioned, as necessary, to between 3 and 5 percent over optimum moisture content and compacted to at least 90 percent relative compaction.

- General Fill that is predominantly granular (<15 percent passing #200 sieve) should be moisture conditioned, as necessary, to between 2 and 4 percent over optimum moisture content and compacted to at least 95 percent relative compaction.

- Non-Expansive Fill should be moisture conditioned, as necessary, to near optimum moisture content and compacted to at least 95 percent relative compaction.

8.09 Controlled Low Strength Material

Controlled low strength material (CLSM) should have a 28-day compressive strength between 50 and 150 pounds per square inch (psi) and meet the requirements of ACI 229R. CLSM should have a minimum slump of 10 inches. The owner's testing laboratory should field-verify slump and prepare samples appropriate for strength testing. CLSM strength tests should be conducted with a minimum frequency of one test per day.

8.10 Lime or Cement Treatment

The on-site soil may be chemically treated with quicklime to reduce the expansion characteristic of the soil as an alternative to importing select fill to create a zone of low expansion potential. Cement treatment may also be utilized for chemical treatment of the soil. The quicklime should conform with the American Society of Testing and Materials (ASTM) standard C977. On-site materials containing roots or other organic matter are not suitable for chemical treatment and should be stripped from the area at which the treatment is to be performed.

The chemical treatment should be performed by an experienced contractor that specializes in the chemical treatment of soil. The chemical agent should be proportioned and spread with a mechanical spreader and mixed into the soil on a mixing table or in place to produce consistent distribution of the agent within the treated layer. The depth of mixing should not exceed 18 inches per lift or the capacity of the mixer if less. Precautions to reduce the potential for dusting of quicklime or cement, such as scheduling or suspending operations to avoid windy weather, should be taken. Casting or tailgating of the chemical agent should not be permitted. The mixer should be equipped with a rotary cutting/mixing assembly, grade checker, and an automatic water distribution system. Mixing or spreading operations should not be performed during inclement weather or when the ambient temperature is less than 35 degrees Fahrenheit or during foggy or rainy weather. Adjacent passes of the mixer should overlap by 4 inches or more.

The contractor should determine the percentage of chemical treatment needed to achieve a treated soil that results in a plasticity index of 12 or less. For preliminary planning purposes, we anticipate that quicklime mixed into the soil at a rate of about 5 percent (2.5 percent lime and 2.5 percent cement) by dry weight of soil may result in a suitable design. Mixing and pulverizing should continue until the treated soil does not contain untreated soil clods larger than 1 inch and the quantity of untreated soil clods retained on the No. 4 sieve is less than 40 percent of the dry soil mass. Water should be added as needed during the mixing process to achieve a moisture content above the optimum, as evaluated by ASTM D1557, for the lime-soil mixture. The lime-soil mixture should be re-mixed following a 16-hour mellowing period after the initial mixing. The lime-soil mixture should be compacted within 3 days after initial mixing.

Vehicular traffic and heavy construction equipment should not be allowed on the treated material for a 1-hour period after compaction. The treated material should be maintained in a moist condition for a 7-day curing period by routinely sprinkling water, covering the treated material with moist straw, or placing fill over the treated subgrade. Treated subgrade for pavements should be proof-rolled with a loaded water truck to check for yielding conditions. Mitigation of yielding areas by pulverizing and re-mixing with additional stabilizing agent should be anticipated.

8.11 Exterior Flatwork

We recommend exterior slabs-on-grade be supported on a minimum of 12 inches material that meets the requirements for Non-Expansive Fill presented in Section 8.08. Slab reinforcing should be provided in accordance with the anticipated use and loading of the slab. We recommend that exterior slabs-on-grade be at least 4 inches thick and reinforced with steel bar or wire reinforcement. Exterior slabs should be structurally independent from buildings. Concrete slabs that may be subject to vehicle loadings should be designed in accordance with the recommendations for rigid Portland cement concrete pavements.

8.12 Vehicular Pavement

8.12.1 Flexible Asphalt Concrete (AC)

Flexible asphalt concrete (AC) pavements may be used for parking areas and driveways. For flexible pavements, we recommend the pavement section (AC and AB) be underlain by at least 12 inches of material that meets the requirements for Non-Expansive Fill presented in Section 8.08. The non-expansive zone is exclusive of the pavement section (AC and AB) and starts at the bottom of the AB. Where feasible, the non-expansive zone should extend at least 3 feet beyond the outside pavement edge unless a deepened curb or other moisture cutoff (at least 18 inches deep) is provided.

We developed the following recommended pavement sections for various traffic indices using the Caltrans R-value design method for flexible pavements. The pavement sections presented are based on an assumed subgrade R-value of 30 for Non-Expansive Fill.

Table 23 - Flexible Pavement Thickness Design for Subgrade R-Value = 30

Traffic Index	Asphalt Concrete (inches)	Caltrans Class 2 Aggregate Base (inches)	Total Thickness (inches)
4	2	6	8
5	3	6	9
6	3	9	12
7	3	12	15

The project civil engineer should choose the appropriate traffic indices for the pavement areas of the site and then use the given section for that traffic index. The upper 6 inches of subgrade beneath planned pavements should be compacted to at least 95 percent relative compaction per ASTM D-1557. Aggregate base for use in pavements should conform to Caltrans Standard Specifications for Class 2 Aggregate Base. The aggregate base used in pavement sections should be compacted to at least 95 percent relative compaction as determined by ASTM D-1557.

8.12.2 Rigid Portland Cement Concrete (PCC)

Rigid Portland cement concrete (PCC) pavements may also be used in driveway/loading areas. We recommend that PCC pavements be underlain by at least 12 inches of Non-Expansive Fill to reduce the potential for adverse expansive soil effects. The non-expansive zone is exclusive of the concrete pavement section (concrete and AB) and starts at the bottom of the AB. Where feasible, the non-expansive zone should extend at least 3 feet beyond the outside pavement edge unless a deepened curb or other moisture cutoff (at least 18 inches deep) is provided. Concrete pavement sections provided are based on methodologies developed by the Portland Cement Associate (PCA) and the American Concrete Institute (ACI) Guide for the Design and Construction of Concrete Parking Lots (ACI, 2008). Recommended pavement sections are presented in Table 23 for a 20-year design period with appropriate periodic maintenance.

Table 24 - Concrete Pavement Structural Sections

Loading Condition[1]	Design Period	Subgrade Modulus (pci)[2]	Concrete Pavement Section (inches)
ADTT = 10 (Traffic Category A - car parking areas and access lanes)	20 years	100	5 inches PCC[3] 6 inches AB[4]
ADTT = 300 (Traffic Category B - bus parking areas)	20 years	100	6.5 inches PCC[3] 6 inches AB[4]
ADTT = 300 (Traffic Category C - truck parking areas, bus entrance lanes)	20 years	100	7 inches PCC[3] 6 inches AB[4]
ADTT = 700 (Traffic Category D - truck parking areas, entrance lanes)	20 years	100	8 inches PCC[3] 6 inches AB[4]

Notes:
[1] ADTT: Average Daily Truck Traffic. Trucks defined as vehicles with at least six wheels; excludes panel trucks, pickup trucks, and other four-wheel vehicles
[2] pci: pounds per cubic inch
[3] PCC: Portland cement Concrete
[4] AB is Class 2 Aggregate Base complying with Caltrans Standard Specification Section 26 (2018b).

Where pavements will be subjected to heavy loading, such as fire trucks, we recommend the Traffic Category D (ADTT = 700) be used for design. The recommended sections presumes that the concrete will have a 28-day flexural strength of 550 psi or an equivalent compressive strength of about 4,000 psi at 28 days. Aggregate base for pavement should be placed in lifts of no more than 8 inches in loose thickness and compacted to at least 95 percent relative compaction as determined by ASTM D-1557.

Appropriate jointing of concrete pavement can reduce the potential for crack development between joints. Joints should be laid out in a consistent square pattern. Contraction joints formed by premolded inserts, grooving plastic concrete, or saw-cutting at initial hardening, should extend to a depth equivalent to 25 percent of the slab thickness and 1 inch or more for thin slabs. Contraction joints should be reinforced with smooth dowels placed across the joint at mid-slab height. Construction joints subject to traffic loading should be reinforced with smooth dowels as for contraction joints. Construction joints within the middle third of the typical joint spacing pattern should be reinforced with tiebars. Contraction, construction, and isolation joints should be detailed and constructed in accordance with the guidelines of the ACI (ACI, 2008) and/or recommendations for Caltrans specifications for jointed plain concrete pavement (JPCP).

8.13 Future Geotechnical Services

A3GEO should review the geotechnical aspects of Project plans and specifications as they are being developed, to check for conformance with the intent of our geotechnical recommendations and to provide timely input, in the event that revisions are needed. We should perform a general review of the geotechnical aspects of the final plans and specifications, the results of which we should document in a formal plan review letter. A3GEO should also review the geotechnical aspects of plans/specification for the new swimming pool and provide any geotechnical consultation needed to support the pool design.

As Geotechnical Engineer of Record, if is essential that A3GEO provide geotechnical services during construction to check whether geotechnical conditions are as anticipated, provide supplemental recommendations where necessary, and document that the geotechnical aspects of the work substantially conform to the approved Contract Documents and the intent of our geotechnical recommendations. Critical aspects of construction that A3GEO should observe and/or test include excavations completed during demolition, subgrade preparation in areas to receive fill, engineered fill placement/compaction; completed footing excavations, subgrade preparation beneath slabs-on-grade, pavements and the pool, aggregate base placement, general grading and earthwork, underground utility installations, and subsurface drainage installations.

9. LIMITATIONS

This report has been prepared for the exclusive use of the District and their consultants for specific application to proposed TLHS Aquatic Center Project described herein. The opinions presented in this report were developed in accordance with generally accepted geotechnical and engineering geologic principles and practices. In the event that any changes in the nature or design of the project are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified in writing.

The findings of this report are valid as of the present date. However, the passing of time will likely change the conditions of the existing property due to natural processes or the works of man. In addition, due to legislation or the broadening of knowledge, changes in applicable or appropriate standards will occur. Accordingly, this report should not be relied upon after a period of three years without being reviewed by this office.

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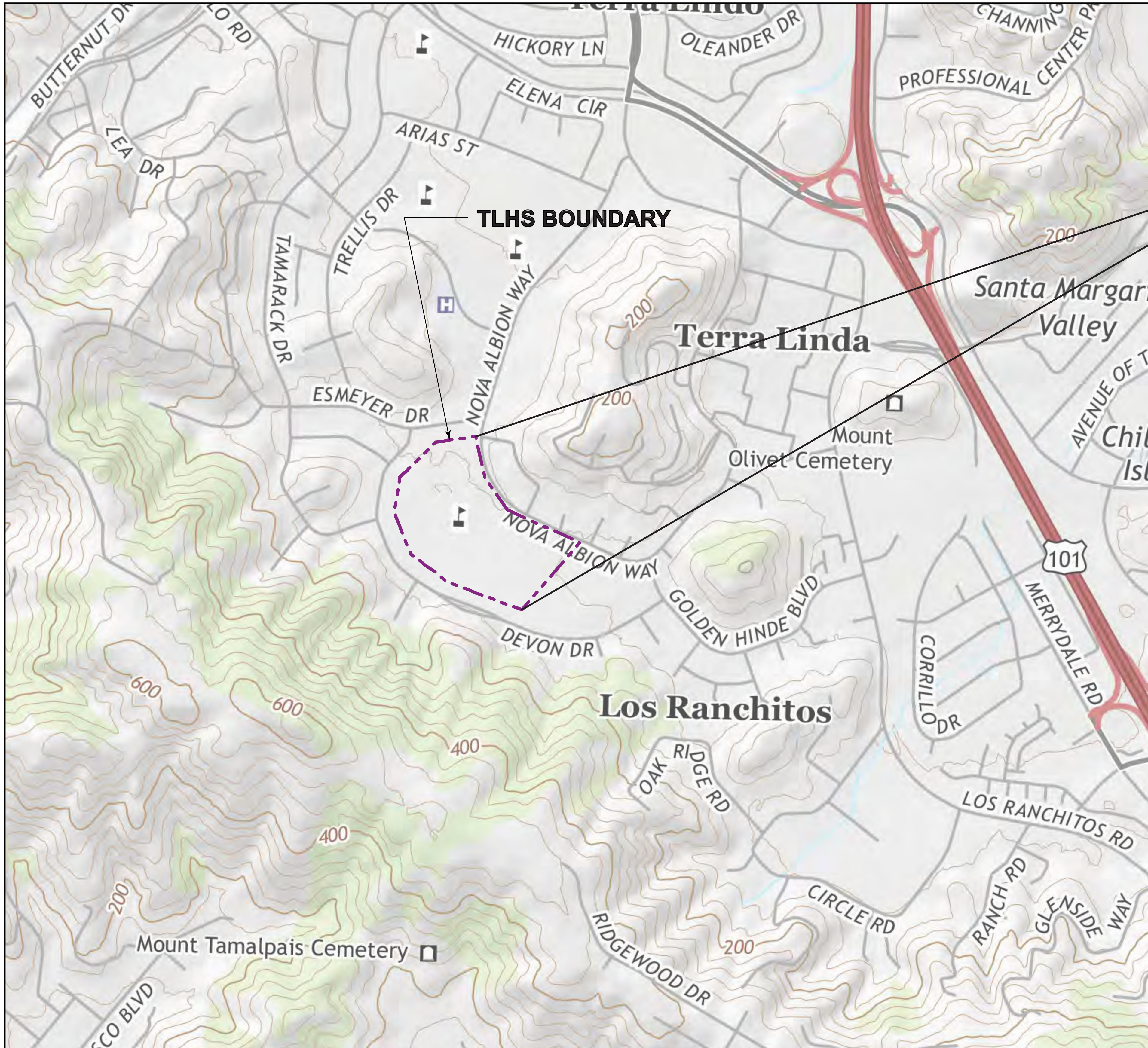
FIGURES

TLHS
AQUATIC CENTER



NOTES:

1. Base map from USGS Novato and San Rafael Quadrangles, California, 7.5-Minute Series, North American Datum of 1983 (NAD83), vertical datum NAVD88. Elevations in feet. Map dated 2015.

(SCALE IN FEET)

0 1,000 2,000

TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

Project No. 1150-1H

CAMPUS LOCATION MAP

A3GEO

FIGURE 1

Date: 9/19/2023

Air Photo Base: Google Earth 7/6/2023

LEGEND:

- PROPOSED BUILDING
- PROPOSED SWIMMING POOL
- APPROXIMATE SITE LIMITS
- A3-23-9 — AQUATIC CENTER TEST BORING (A3GEO, JULY-AUGUST 2023)
- A3-21-2 — KILN ROOM TEST BORING (A3GEO, NOVEMBER 2021)
- A3-17-8 — PHASE 2 TEST BORING (A3GEO, NOVEMBER 2018)
- B-4 — PHASE 1 TEST BORING (A3GEO, FEBRUARY 2018)
- CPT-3 — PHASE 1 CPT (A3GEO, FEBRUARY 2018)
- MP-B2 — TEST BORING (MPEG, AUGUST 2003)
- MP-CPT-1 — CPT (MPEG, AUGUST 2003)
- TLHS BOUNDARY
- 100 — ELEVATION CONTOURS IN FEET

NOTES:

1. Topographic contours from Marin Map, A Geographic Information System for Marin County. Data are in California State Plane coordinates, NAD83 HARN, US Survey feet.
2. Elevations are in feet and reference North American vertical datum of 1988 (NAVD 88).

N

(SCALE IN FEET)
0 200 400

TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

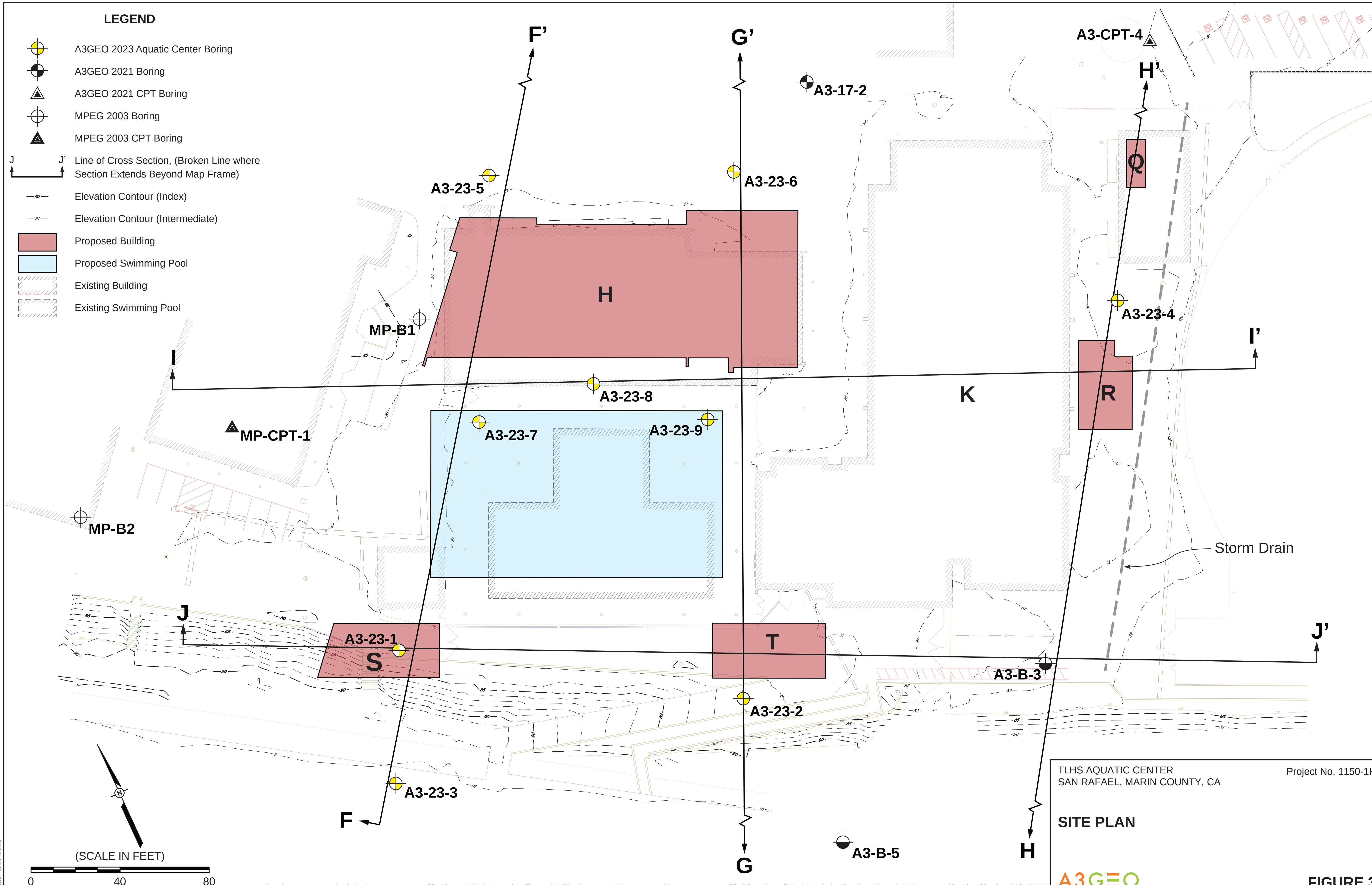
Project No. 1150-1H

CAMPUS AERIAL PHOTOGRAPH

A3GEO

FIGURE 2

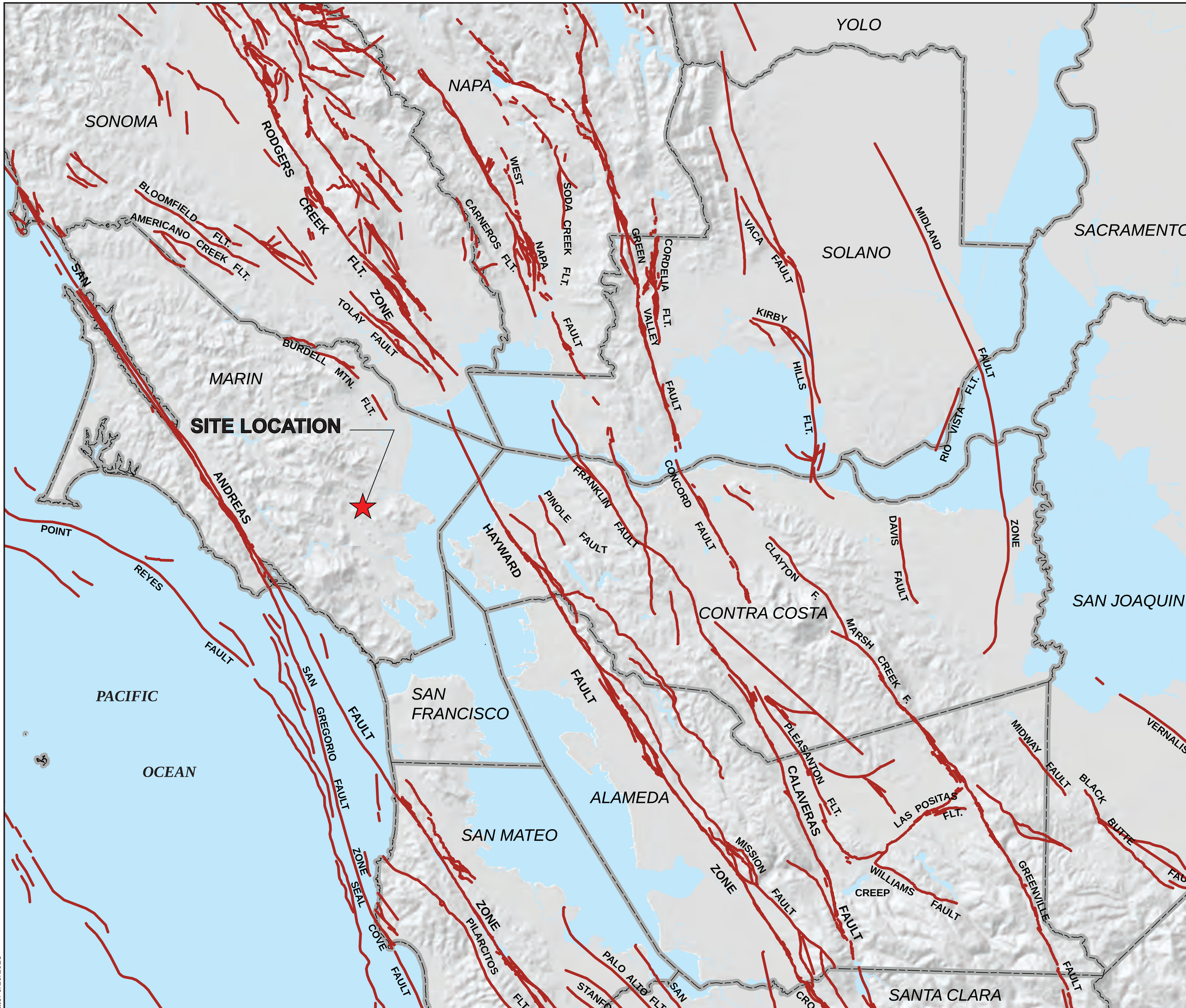
Date: 9/19/2023



Date: 9/19/2023

Elevation contours and existing improvements modified from 2528.17-Topo.dwg file provided by Greystone West. Proposed improvements modified from Overall Code Analysis Site Plan, Sheet GA100, prepared by Lionakis, dated 8/11/2023

TLHS AQUATIC CENTER SAN RAFAEL, MARIN COUNTY, CA	Project No. 1150-1H
SITE PLAN	
A3GEO	**FIGURE 3**



LEGEND:

QUATERNARY FAULT

COUNTY BOUNDARY

NOTES:

1. Base map modified from USGS and California Geological Survey, 2006, Quaternary fault and fold database for the United States, accessed 25 January, 2018, from USGS website: http://earthquake.usgs.gov/hazards/qfaults/

(SCALE IN MILES)

0 8 16

TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

Project No. 1150-1H

QUATERNARY FAULT MAP

FIGURE 4

Date: 9/19/2023

Air Photo Base: 11/8/1950

LEGEND:

- APPROXIMATE SITE LIMITS
- A3-23-9 — AQUATIC CENTER TEST BORING (A3GEO, JULY-AUGUST 2023)
- A3-21-2 — KILN ROOM TEST BORING (A3GEO, NOVEMBER 2021)
- A3-17-8 — PHASE 2 TEST BORING (A3GEO, NOVEMBER 2018)
- B-4 — PHASE 1 TEST BORING (A3GEO, FEBRUARY 2018)
- CPT-3 — PHASE 1 CPT (A3GEO, FEBRUARY 2018)
- MP-B2 — TEST BORING (MPEG, AUGUST 2003)
- MP-CPT-1 — CPT (MPEG, AUGUST 2003)
- TLHS BOUNDARY

N

(SCALE IN FEET)

0 200 400

TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

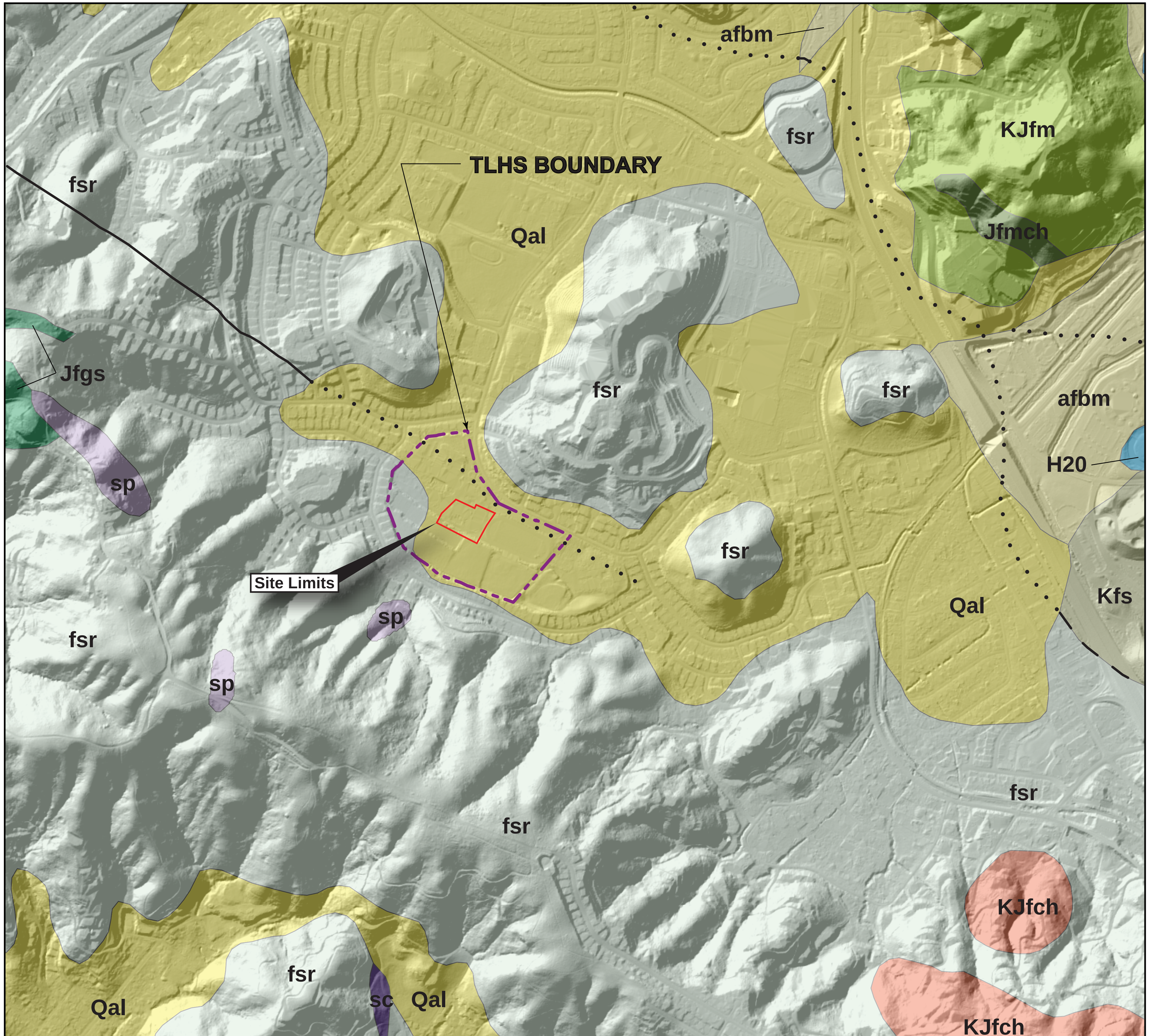
Project No. 1150-1H

PREDEVELOPMENT AERIAL PHOTOGRAPH

A3GEO

FIGURE 5

Date: 9/19/2023



LEGEND:

afbm	QUATERNARY ARTIFICIAL FILL OVER BAY MUD
Qal	QUATERNARY ALLUVIUM
	FRANCISCAN COMPLEX
Kfs	CRETACEOUS SANDSTONE AND SHALE
KJfm	CRETACEOUS/JURASSIC METAMORPHIC ROCK
KJfch	CRETACEOUS/JURASSIC CHERT
Jfmch	JURASSIC METACHERT
Jfgs	JURASSIC GREENSTONE
sp	JURASSIC SERPENTINITE
sc	JURASSIC SILICA-CARBONATE ROCK
fsr	CRETACEOUS/JURASSIC MÉLANGE

FAULT, DASHED WHERE APPROX. LOCATED, DOTTED WHERE CONCEALED

TLHS BOUNDARY

NOTES:

1. Base map modified from Blake, M.C., Graymer, R.W., and Jones, D.L., 2000, "Geologic Map and Map Database of Parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California," U.S. Geological Survey Miscellaneous Field Study MF 2337, Online Version 1.0.

N

(SCALE IN FEET)

0 1,000 2,000

TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

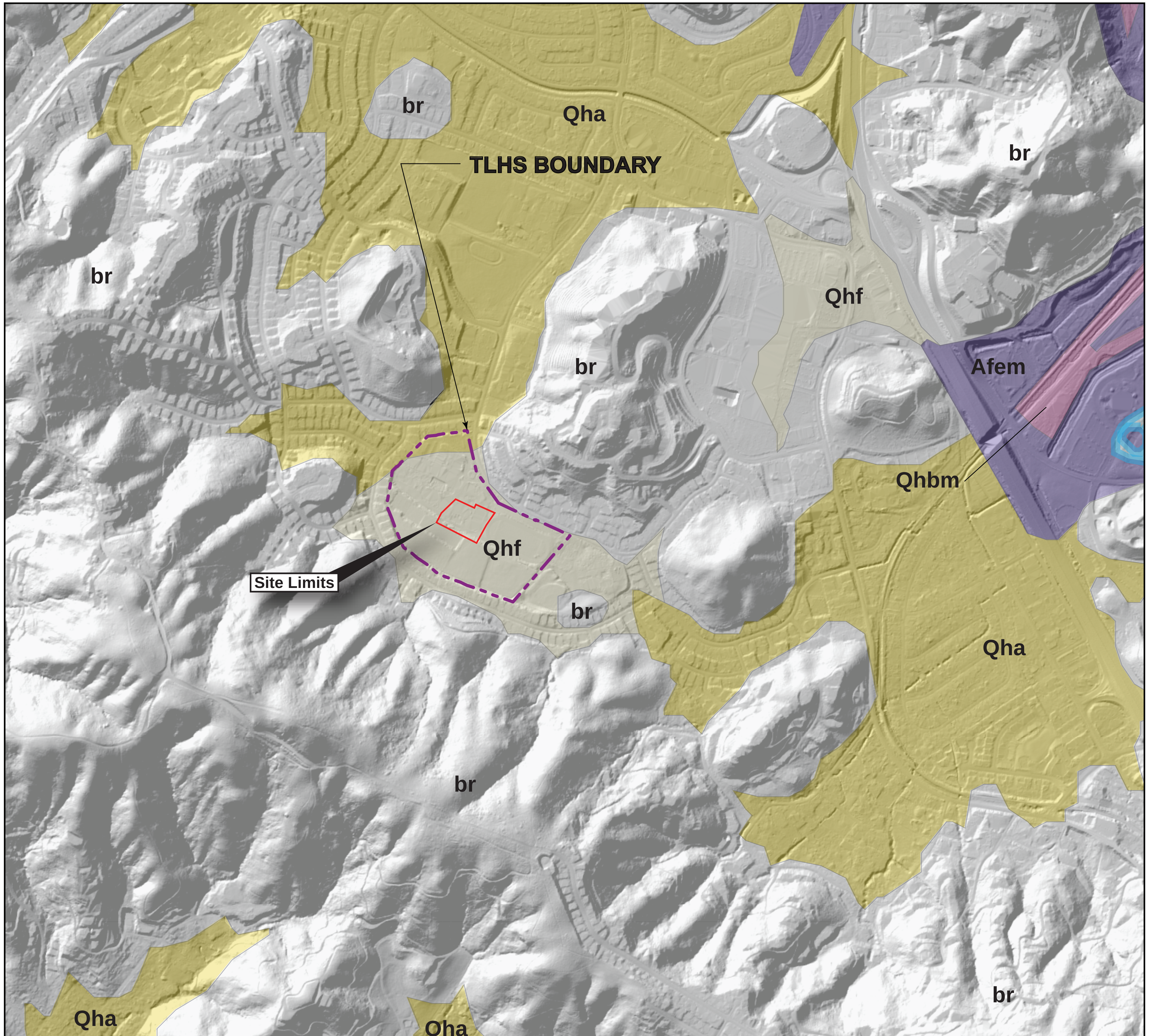
Project No. 1150-1H

GEOLOGIC MAP

A3GEO

FIGURE 6

Date: 9/17/2023



LEGEND:

Afem	HISTORICAL ARTIFICIAL FILL OVER LEVEE MUD
Qhbm	HOLOCENE SAN FRANCISCO BAY MUD
Qhf	HOLOCENE ALLUVIAL FAN DEPOSITS
Qha	HOLOCENE ALLUVIAL DEPOSITS, UNDIFFERENTIATED
br	EARLY QUATERNARY AND OLDER - OLDER DEPOSITS AND BEDROCK
	TLHS BOUNDARY

NOTES:

1. Base map modified from Witter et. al., 2006, "Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California," USGS Open-File Report 2006-1037.

N

(SCALE IN FEET)

0 1,000 2,000

TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

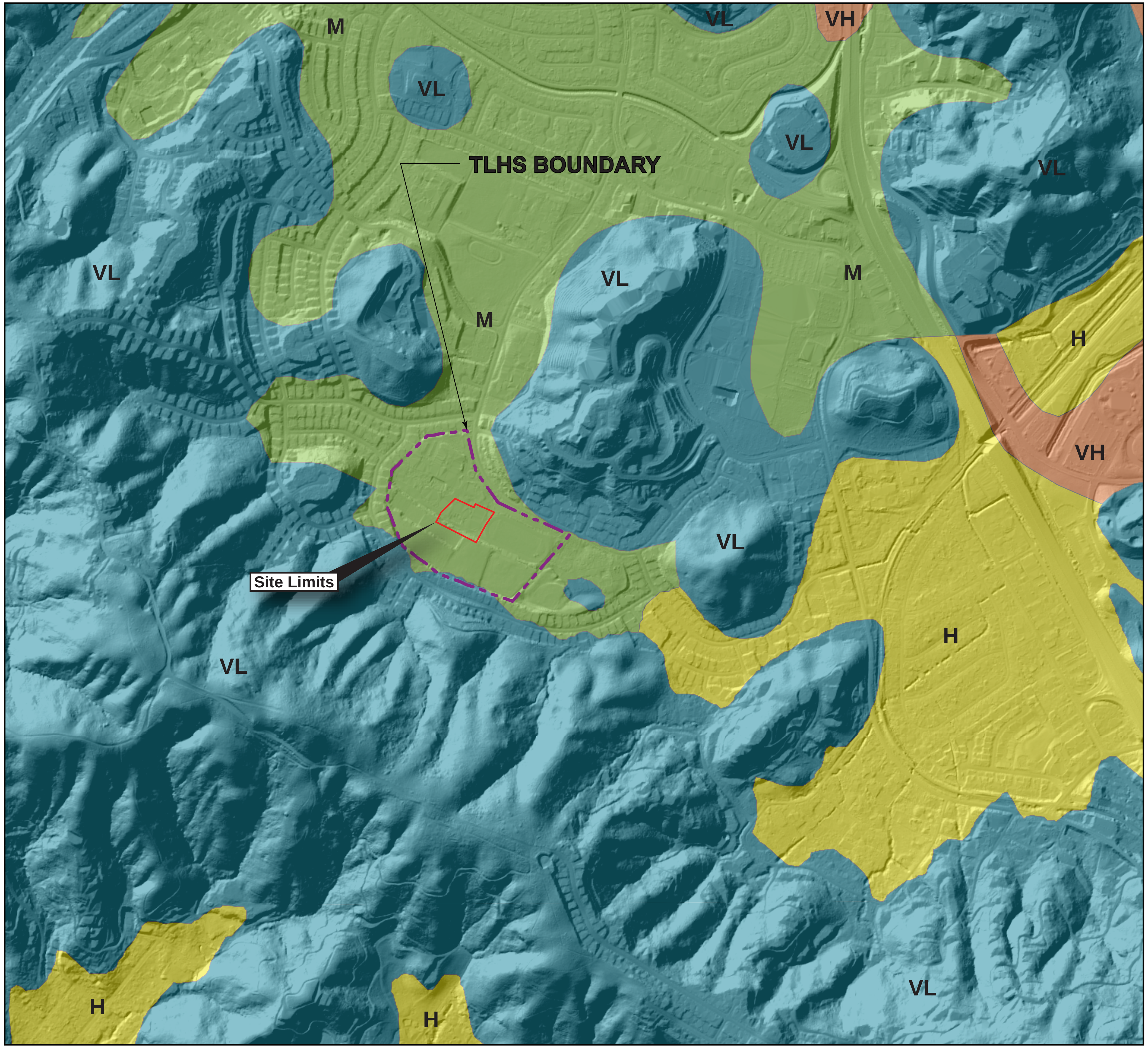
Project No. 1150-1H

QUATERNARY GEOLOGIC MAP

A3GEO

FIGURE 7

Date: 9/19/2023



LEGEND:

LIQUEFACTION POTENTIAL

VL	VERY LOW
M	MODERATE
H	HIGH
VH	VERY HIGH
- - -	TLHS BOUNDARY

NOTES:

1. Base map modified from Knudsen et. al., 2000, "Description of Quaternary Deposits and Liquefaction Susceptibility, Nine-County San Francisco Bay Region, California," U.S. Geological Survey, Part 3 of Open-File Report 00-444.

N

(SCALE IN FEET)

0 1,000 2,000

TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

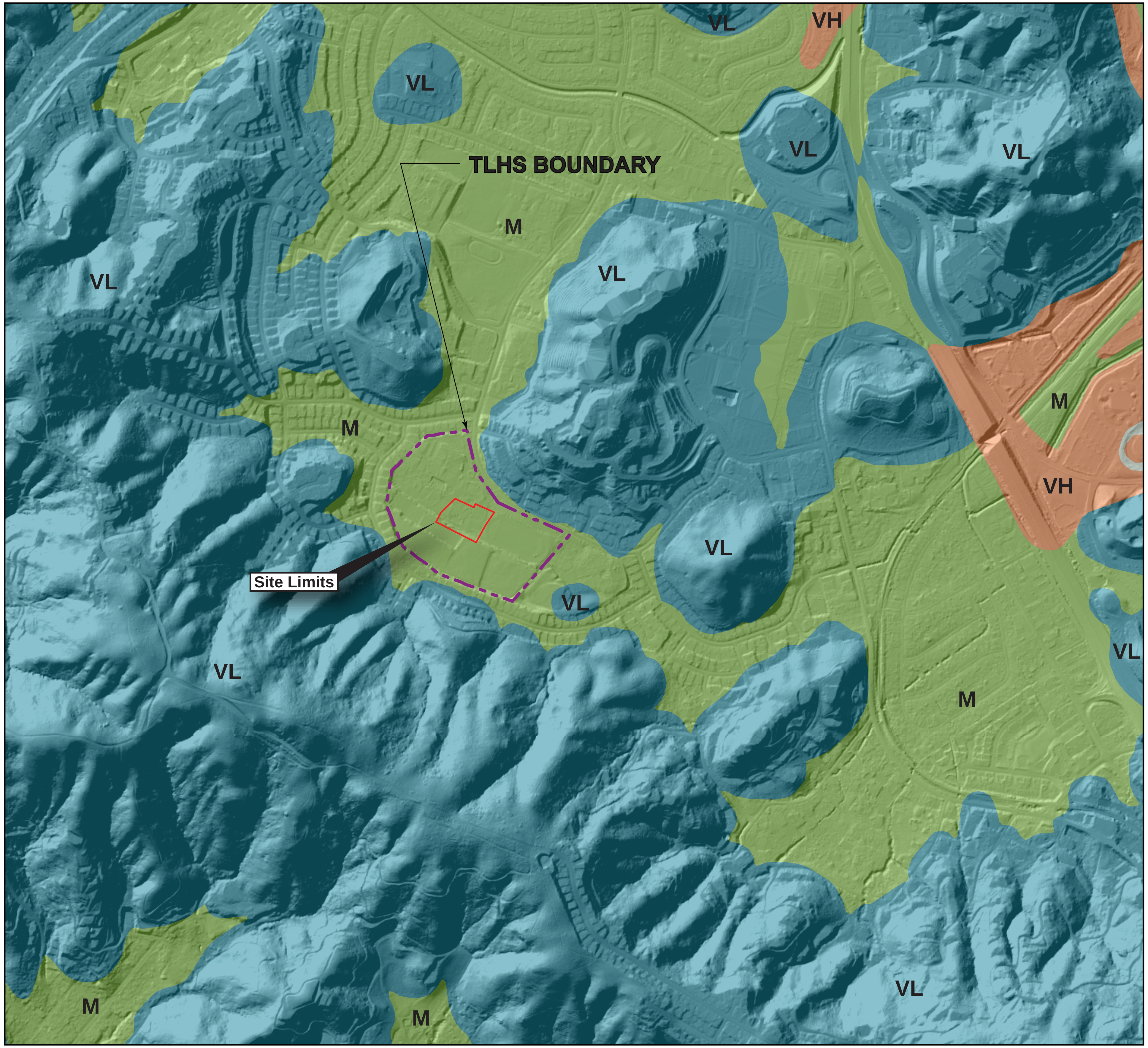
Project No. 1150-1H

LIQUEFACTION POTENTIAL MAP

A3GEO

FIGURE 8a

Date: 9/19/2023



LEGEND:

LIQUEFACTION POTENTIAL

VL	VERY LOW
M	MODERATE
VH	VERY HIGH
- - - -	TLHS BOUNDARY

NOTES:

1. Base map modified from Witter et. al., 2006, "Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California," USGS Open-File Report 2006-1037.

N

(SCALE IN FEET)

0 1,000 2,000

TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

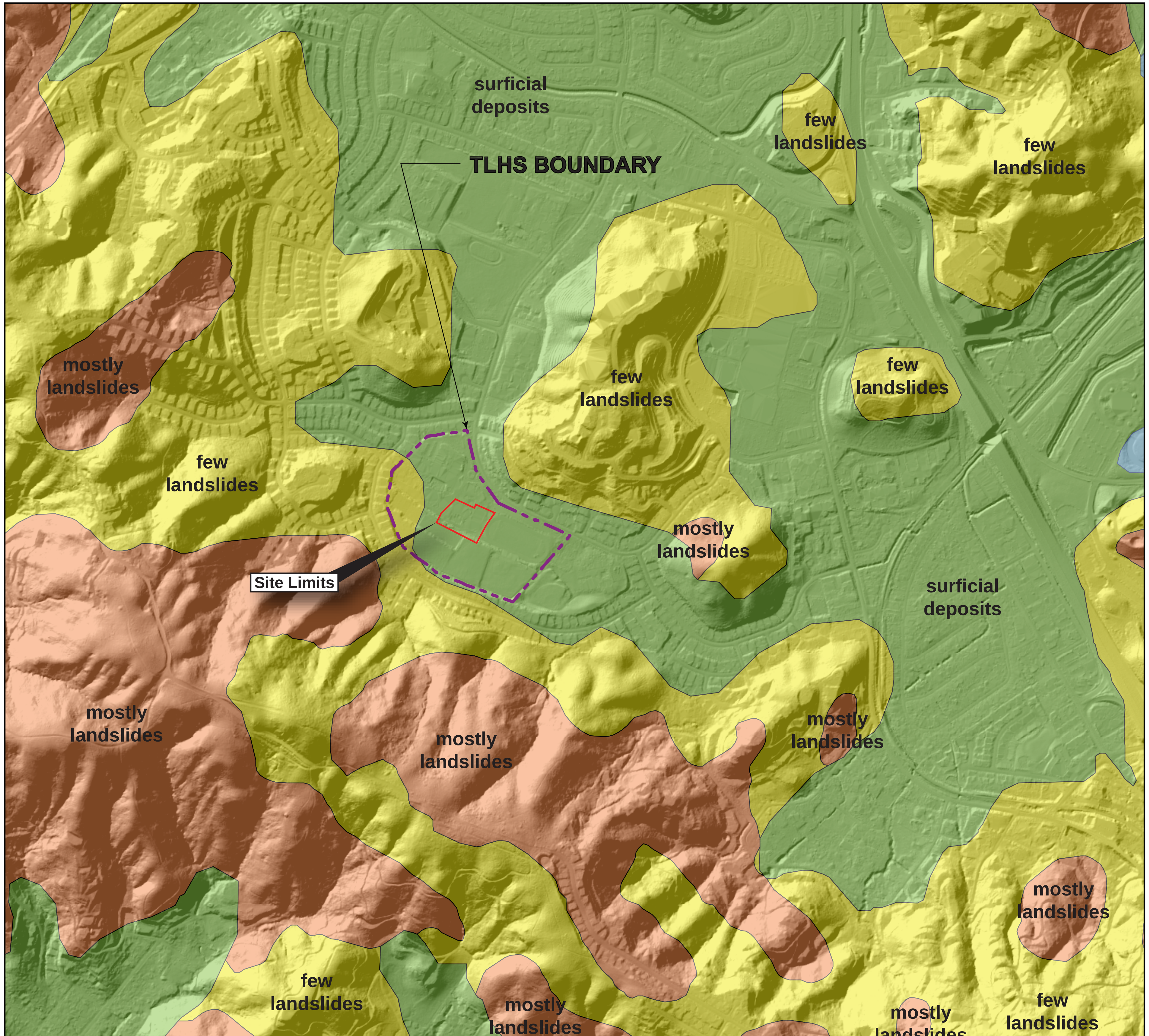
Project No. 1150-1H

LIQUEFACTION POTENTIAL MAP

A3GEO

FIGURE 8b

Date: 9/17/2023



LEGEND:

LANDSLIDE HAZARD

- SURFICIAL DEPOSITS
- FEW LANDSLIDES
- MOSTLY LANDSLIDES
- TLHS BOUNDARY

NOTES:

1. Base map modified from Wentworth, et. al., 1997, "Summary Distribution of Slides and Earth Flows in the San Francisco Bay Region, California," U.S. Geological Survey Open-File Report 97-745C

(SCALE IN FEET)

0 1,000 2,000

TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

Project No. 1150-1H

LANDSLIDE HAZARD MAP

A3GEO

FIGURE 9

Date: 9/19/2023

LEGEND:

AF	ARTIFICIAL FILL
Qa/Qc	ALLUVIUM/COLLUVIUM (QUATERNARY)
fsr	CRETACEOUS/JURASSIC FRANCISCAN MÉLANGE
	GEOLOGIC CONTACT APPROXIMATELY LOCATED
	FAULT CONTACT CONCEALED
J J'	LINE OF CROSS SECTION (A3GEO, 2023)
E E'	LINE OF CROSS SECTION (A3GEO, 2018)
A3-23-9	AQUATIC CENTER TEST BORING (A3GEO, JULY-AUGUST 2023)
A3-21-2	KILN BUILDING TEST BORING (A3GEO, NOVEMBER 2021)
A3-17-8	PHASE 2 TEST BORING (A3GEO, NOVEMBER 2018)
B-4	PHASE 1 TEST BORING (A3GEO, FEBRUARY 2018)
CPT-3	PHASE 1 CPT (A3GEO, FEBRUARY 2018)
MP-B2	TEST BORING (MPEG, AUGUST 2003)
MP-CPT-1	CPT (MPEG, AUGUST 2003)
	PROPOSED BUILDING (THIS STUDY)
	PROPOSED SWIMMING POOL
	APPROXIMATE SITE LIMITS
	TLHS BOUNDARY

NOTES:

1. Geology from Marin Map, A Geographic Information System for Marin County. Data are in California State Plane coordinates, NAD83 HARN, US Survey feet.
2. Qaf and Qa/Qc contact based on conditions observed in test borings, and drawing A1A, dated 16 December 1958, prepared by Grommé Mulvin & Priestly Architects of San Rafael, CA for the New High School, San Rafael High School District for the Terra Linda Area, Marin County, California.
3. Fault location from USGS Miscellaneous Field Study MF-2337 for parts of Marin, San Francisco, and Contra Costa Counties, 2000.

(SCALE IN FEET)
0 200 400

TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

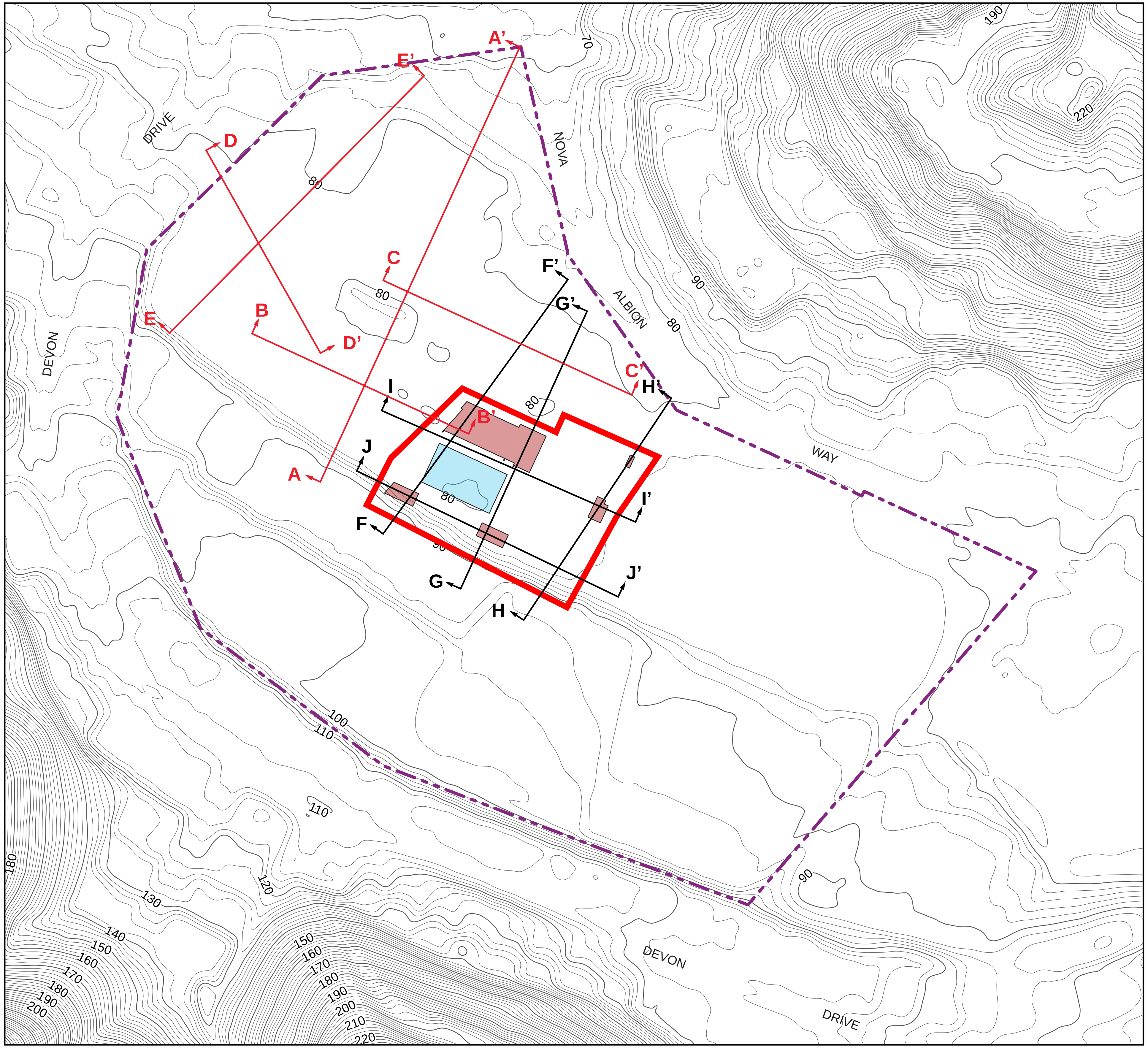
Project No. 1150-1H

SITE GEOLOGIC MAP

A3GEO

FIGURE 10

Date: 9/17/2023



LEGEND:

PROPOSED BUILDING

PROPOSED SWIMMING POOL

APPROXIMATE SITE LIMITS

LINE OF CROSS SECTION (A3GEO, 2023)

LINE OF CROSS SECTION (A3GEO, 2018)

TLHS BOUNDARY

100 ELEVATION CONTOURS IN FEET

NOTES:

1. Topographic contours from Marin Map, A Geographic Information System for Marin County. Data are in California State Plane coordinates, NAD83 HARN, US Survey feet.
2. Elevations are in feet and reference North American vertical datum of 1988 (NAVD 88).

(SCALE IN FEET)

0 200 400

TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

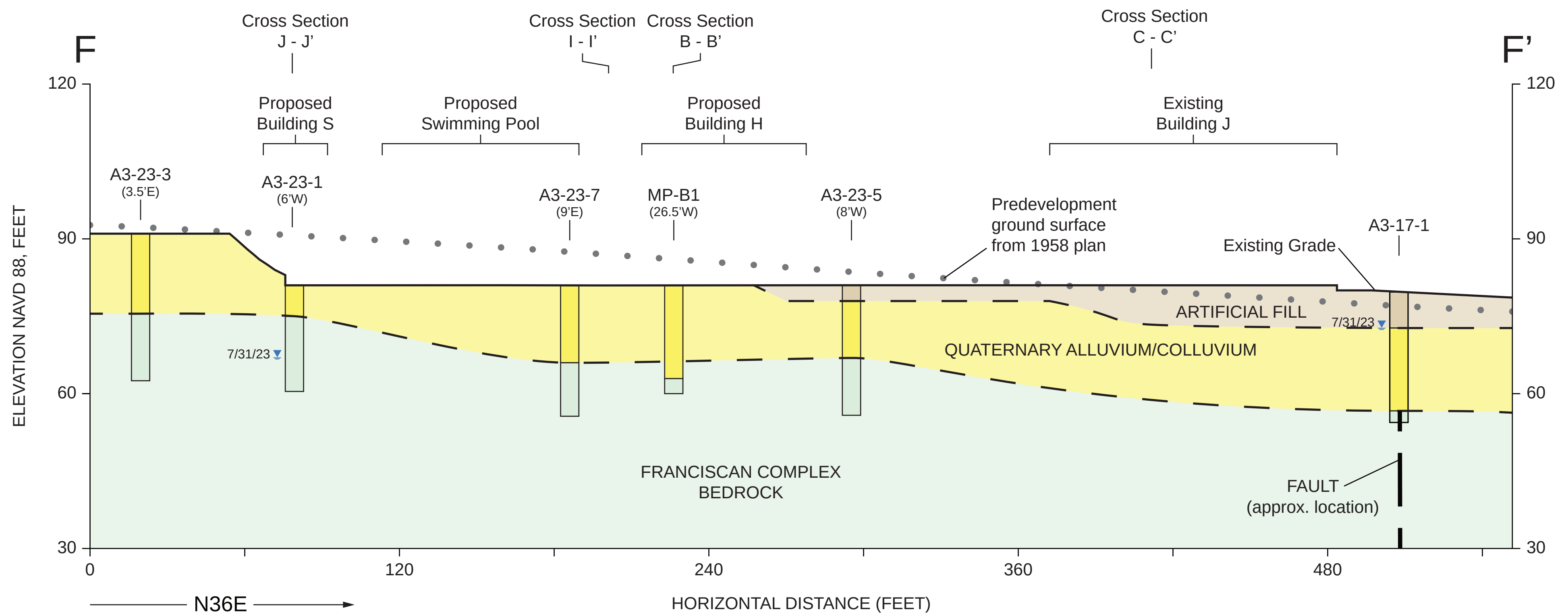
Project No. 1150-1H

CROSS SECTION LOCATION MAP

A3GEO

FIGURE 11

Date: 9/19/2023



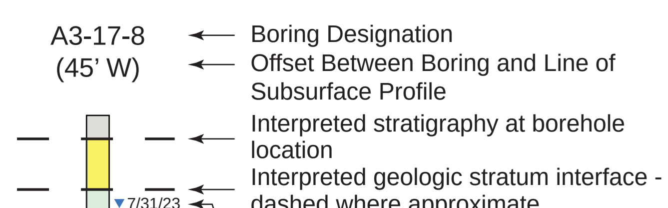
2:1 Horizontal to Vertical

NOTES:

1. Refer to Figure 10 for plan location designation and orientation of subsurface sections and as-drilled exploration locations.

2. Subsurface profile depict the general geologic conditions at the site and are based on interpretation of data encountered in explorations. Lines representing the interfaces between strata on the profile are based on interpolation between adjacent borings. Test boring sticks show the interpreted sequence of strata at each location. Actual soil conditions and interfaces between explorations may vary significantly from those indicated on profiles.

3. Refer to test boring logs for more detailed soil and rock conditions.



TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

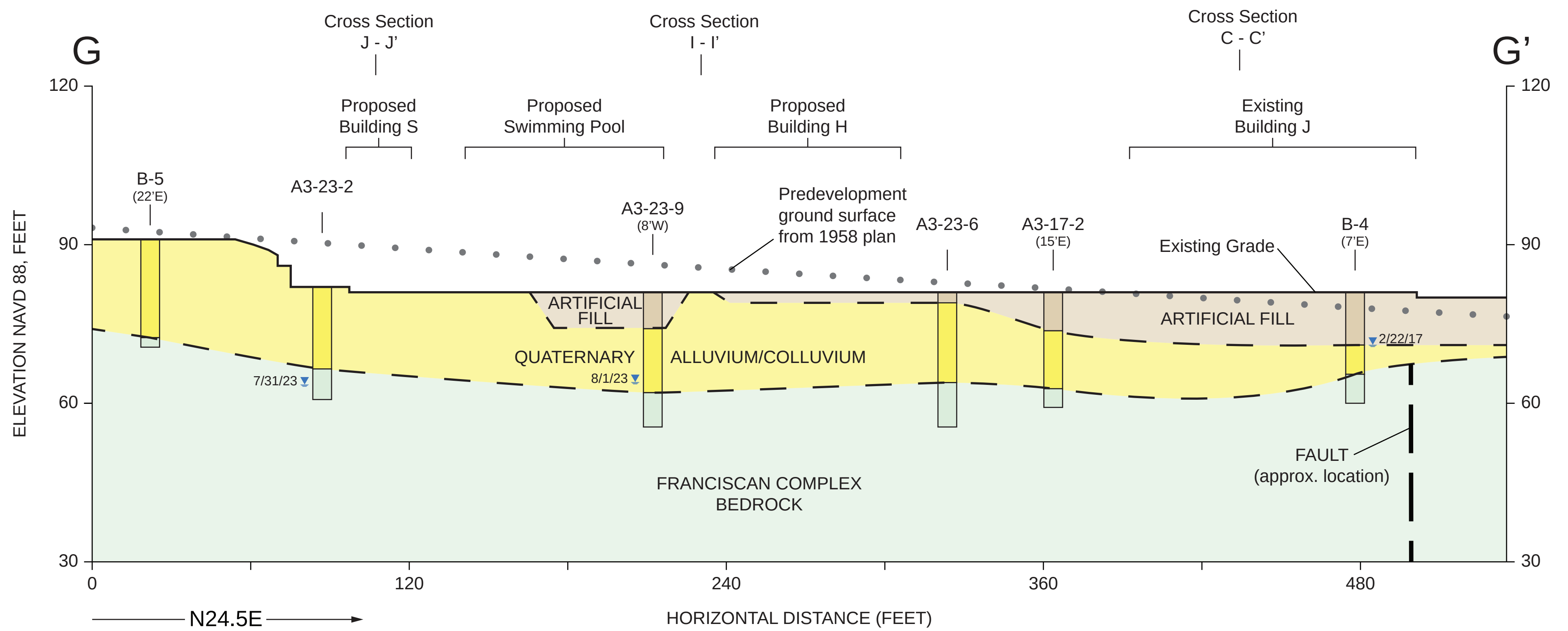
Project No. 1150-1H

CROSS SECTION F - F'

A3GEO

FIGURE 12

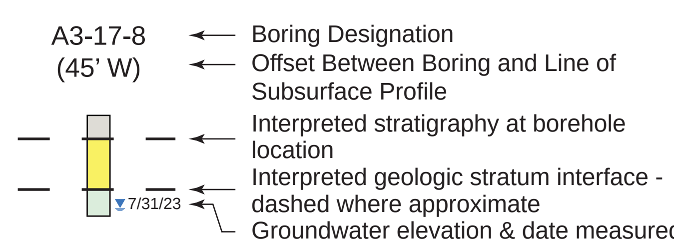
Date: 9/19/2023



2:1 Horizontal to Vertical

NOTES:

1. Refer to Figure 10 for plan location designation and orientation of subsurface sections and as-drilled exploration locations.
2. Subsurface profile depict the general geologic conditions at the site and are based on interpretation of data encountered in explorations. Lines representing the interfaces between strata on the profile are based on interpolation between adjacent borings. Test boring sticks show the interpreted sequence of strata at each location. Actual soil conditions and interfaces between explorations may vary significantly from those indicated on profiles.
3. Refer to test boring logs for more detailed soil and rock conditions.



TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

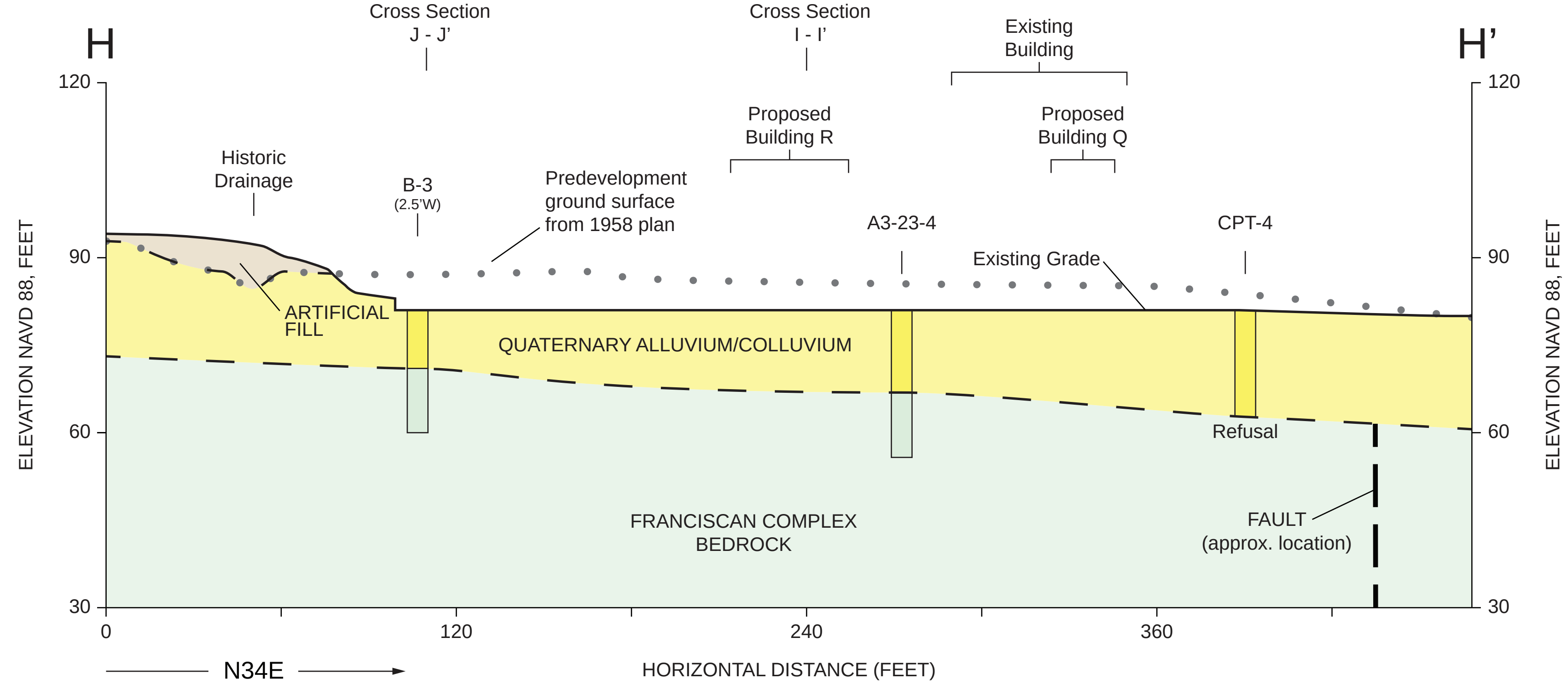
Project No. 1150-1H

CROSS SECTION G - G'

A3GEO

FIGURE 13

Date: 9/19/2023



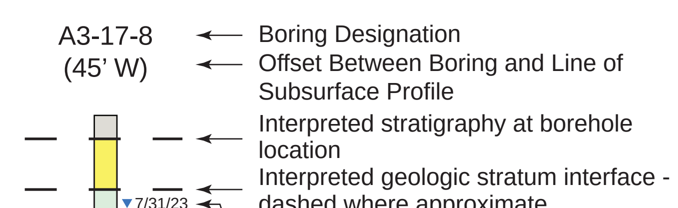
2:1 Horizontal to Vertical

NOTES:

1. Refer to Figure 10 for plan location designation and orientation of subsurface sections and as-drilled exploration locations.

2. Subsurface profile depict the general geologic conditions at the site and are based on interpretation of data encountered in explorations. Lines representing the interfaces between strata on the profile are based on interpolation between adjacent borings. Test boring sticks show the interpreted sequence of strata at each location. Actual soil conditions and interfaces between explorations may vary significantly from those indicated on profiles.

3. Refer to test boring logs for more detailed soil and rock conditions.



TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

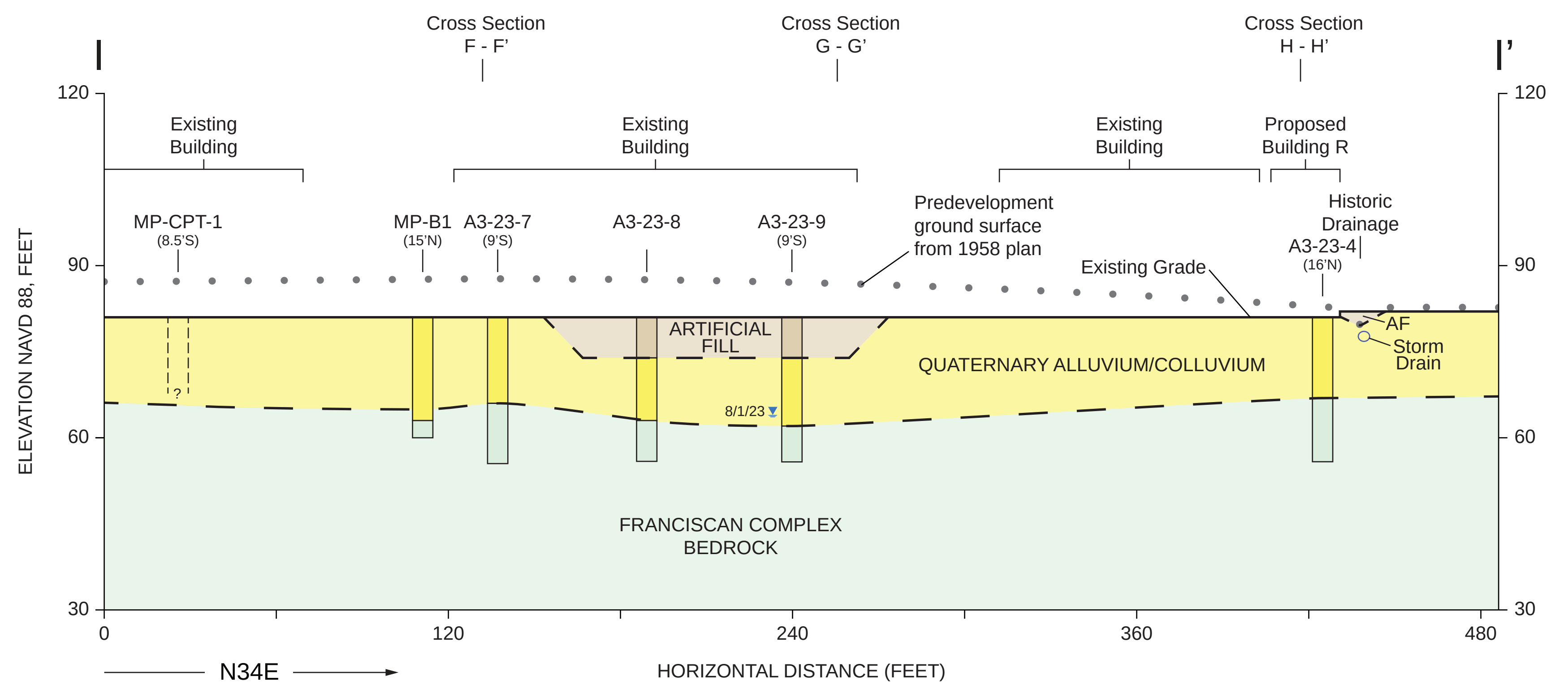
Project No. 1150-1H

CROSS SECTION H - H'

A3GEO

FIGURE 14

Date: 9/19/2023



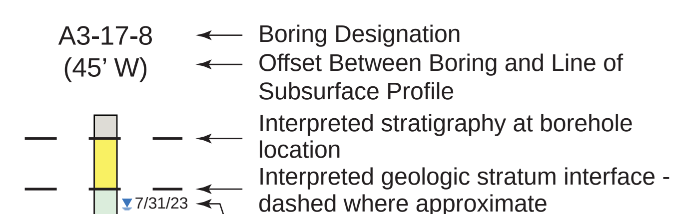
2:1 Horizontal to Vertical

NOTES:

1. Refer to Figure 10 for plan location designation and orientation of subsurface sections and as-drilled exploration locations.

2. Subsurface profile depict the general geologic conditions at the site and are based on interpretation of data encountered in explorations. Lines representing the interfaces between strata on the profile are based on interpolation between adjacent borings. Test boring sticks show the interpreted sequence of strata at each location. Actual soil conditions and interfaces between explorations may vary significantly from those indicated on profiles.

3. Refer to test boring logs for more detailed soil and rock conditions.



Date: 9/19/2023

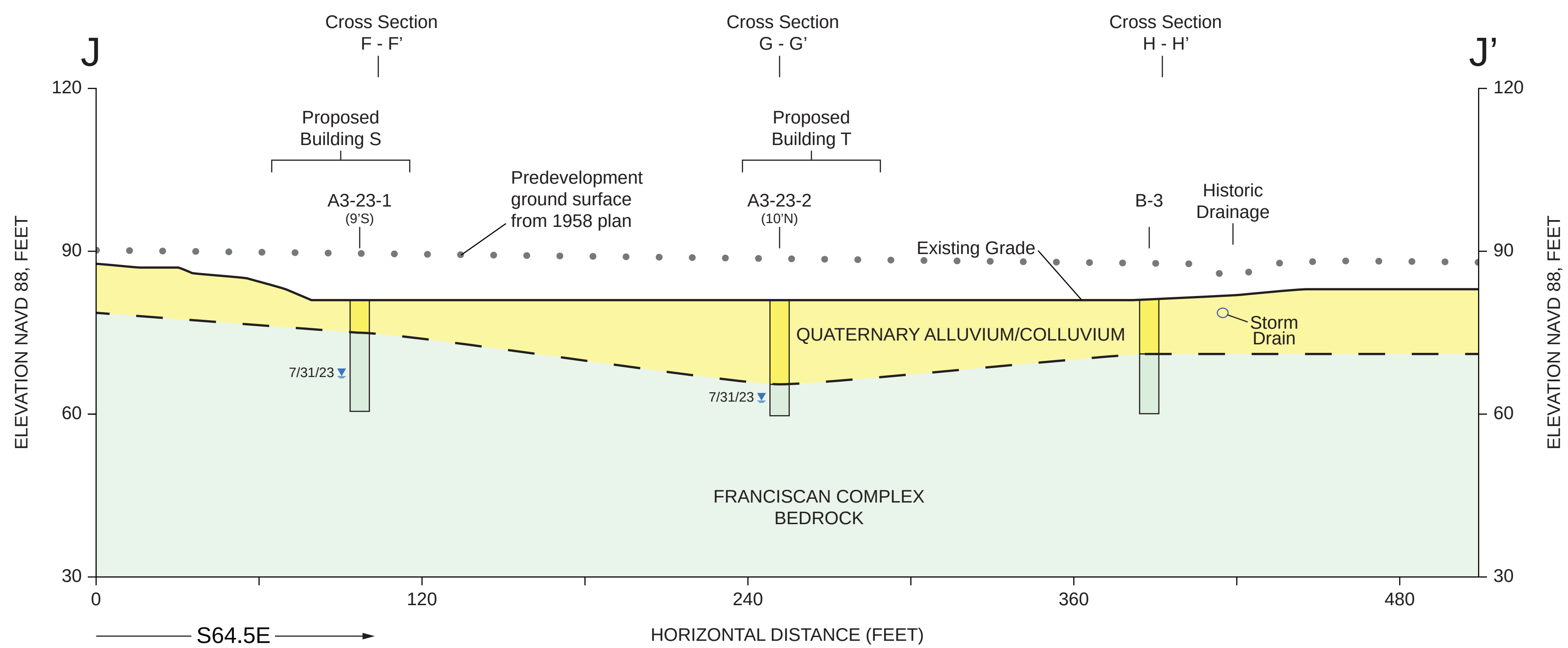
TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

Project No. 1150-1H

CROSS SECTION I - I'

A3GEO

FIGURE 15



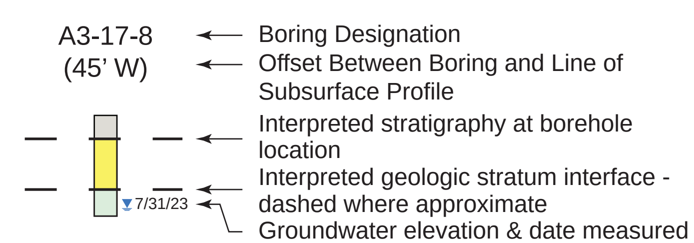
2:1 Horizontal to Vertical

NOTES:

1. Refer to Figure 10 for plan location designation and orientation of subsurface sections and as-drilled exploration locations.

2. Subsurface profile depict the general geologic conditions at the site and are based on interpretation of data encountered in explorations. Lines representing the interfaces between strata on the profile are based on interpolation between adjacent borings. Test boring sticks show the interpreted sequence of strata at each location. Actual soil conditions and interfaces between explorations may vary significantly from those indicated on profiles.

3. Refer to test boring logs for more detailed soil and rock conditions.



TLHS AQUATIC CENTER
SAN RAFAEL, MARIN COUNTY, CA

Project No. 1150-1H

CROSS SECTION J - J'

A3GEO

FIGURE 16

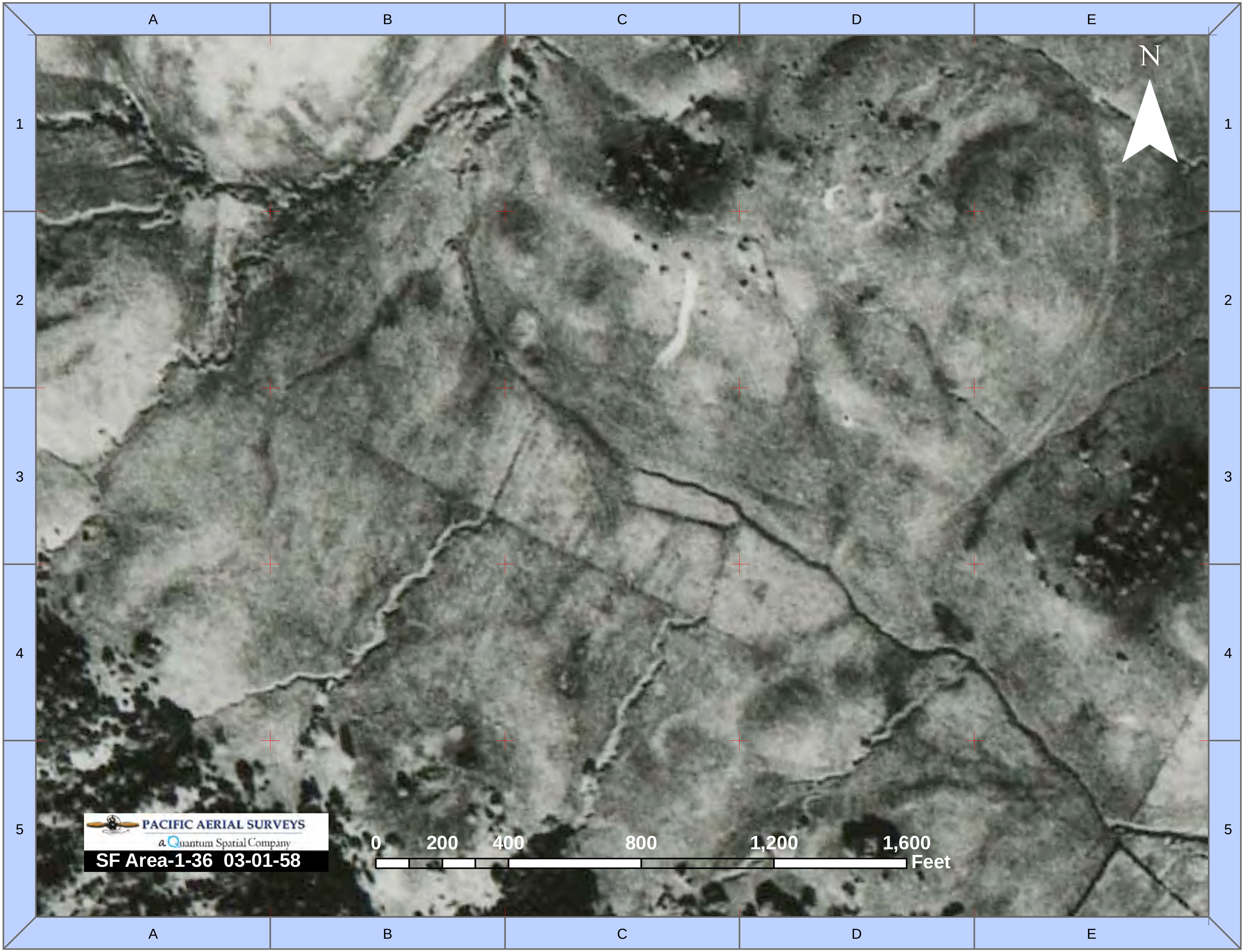
Date: 9/19/2023

APPENDIX A

Historic Aerial Photographs

TLHS
AQUATIC CENTER

A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV41-06-22 11-08-50
0
200
400
800
1,200
1,600
Feet


A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
SF Area-1-36 03-01-58
0
200
400
800
1,200
1,600
Feet

A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV957-04-20 07-02-70
0
200
400
800
1,200
1,600
Feet


A
B
C
D
E
1
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3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV1187-04-20 04-17-75
0
200
400
800
1,200
1,600
Feet


A
B
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D
E
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N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV2140-04-21 05-03-82
0
200
400
800
1,200
1,600
Feet

A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV2860-11-14 04-19-86
0
200
400
800
1,200
1,600
Feet

A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV4252-29-57 04-27-92
0
200
400
800
1,200
1,600
Feet

A
B
C
D
E
1
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N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV5036-03-13 01-11-96
0
200
400
800
1,200
1,600
Feet

A
B
C
D
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1
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5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV6540-124-55 05-03-00
0
200
400
800
1,200
1,600
Feet

A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
Terra Linda HS 2015
0
200
400
800
1,200
1,600
Feet

APPENDIX B

Logs of Borings from this Study

(A3-23-1 through A3-23-9)

TLHS
AQUATIC CENTER

A3GEO, Inc
821 Bancroft Way
Berkeley, CA 94710

BORING NUMBER A3-23-1

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School - Aquatic Center
PROJECT NUMBER 1150-1K
PROJECT LOCATION San Rafael, CA
DATE STARTED 7/31/23 **COMPLETED** 7/31/23
GROUND ELEVATION 80.7 ft NAVD88 **HOLE SIZE** 4-inch
DRILLING CONTRACTOR Clearheart Drilling
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
∇ **AT TIME OF DRILLING** 14.0 ft / Elev 66.7 ft
LOGGED BY DB **CHECKED BY** JB
▼ **AT END OF DRILLING** 14.0 ft / Elev 66.7 ft
NOTES Latitude: 37.999203° ; Longitude: -122.554104°
AFTER DRILLING --- Not measured

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0	Asphalt / Aggregate Base (2" AC over 3" AB)							
	CLAYEY GRAVEL WITH SAND (GC) - dark yellowish brown (10YR 4/6), some gray and reddish brown mottling, medium dense, moist, trace angular gravel, fine to coarse sand (Alluvium)	MC 1	25	119		15	100	Gravel = 41% Sand = 33% - #200 = 26% LL=31, PI=11
5	SANDY LEAN CLAY (CL) - dark brown (10YR 4/3), mottled FeO2 and light brown (10YR 5/3), very stiff, moist, trace gravel (Alluvium)	MC 2	27	107		17	72	Gravel = 9% Sand = 32% - #200 = 59%
	CLAYSTONE - dark brown (10YR 4/3), deeply weathered, friable, low hardness, dry (Franciscan Complex)							
	SANDSTONE - yellowish brown (10YR 4/4), deeply weathered, friable, low hardness; fine grained cemented sandstone (Franciscan Complex)	MC 3	50/3.5"				86	
10	SHALE - dark grayish brown (10YR 3/2), deeply weathered, weak, low hardness, dry; shale with calcite veins; intensely fractured with clay fillings (Franciscan Complex)	SPT 4	50/2"				100	
15	SHALEY MELANGE - gray, deeply weathered, friable, low hardness, moist, intensely fractured; platy fractures (Franciscan Complex)	SPT 5	67				100	
20		MC 6	50/5"				100	

Bottom of borehole at 20.5 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Modified California (MC) blow counts were adjusted by mutiplying field blow counts by a factor of 0.63.
3. Borehole was backfilled with cement grout upon completion.
4. Boring location coordinates were estimated using a Google Earth application from a mobile smartphone and should be considered approximate.
5. Ground surface elevations were estimated using a topographic drawing provided by Greystone West.

A3GEO, Inc
821 Bancroft Way
Berkeley, CA 94710

BORING NUMBER A3-23-2

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School - Aquatic Center
PROJECT NUMBER 1150-1K
PROJECT LOCATION San Rafael, CA
DATE STARTED 7/31/23 **COMPLETED** 7/31/23
GROUND ELEVATION 82.6 ft NAVD88 **HOLE SIZE** 4-inch
DRILLING CONTRACTOR Clearheart Drilling
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
∇ **AT TIME OF DRILLING** 19.0 ft / Elev 63.6 ft
LOGGED BY DB **CHECKED BY** JB
AT END OF DRILLING --- Not measured
NOTES Latitude: 37.998978° ; Longitude: -122.553640°
▼ **AFTER DRILLING** 18.5 ft / Elev 64.1 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		Asphalt / Aggregate Base							
		CLAYEY SAND (SC) - dark yellowish brown (10YR 4/4), some gray and reddish brown mottling, medium dense, moist, fine sand; some gravel consisting of claystone, shale, and sandstone (Alluvium)	MC 1	19	113		18	100	Gravel = 9% Sand = 47% - #200 = 44% LL=35, PI=13
5		SANDY LEAN CLAY (CL) - dark yellowish brown (10YR 4/4), some gray and reddish brown mottling, very stiff, moist, fine sand; some gravel consisting of claystone, shale, and sandstone (Alluvium)	MC 2	25	112	4.0	18	100	TXUU Shear Strength = 5116 psf LL=36, PI=18
		- hard at 7 feet	MC 3	35		4.0		100	
10		CLAYSTONE - dark brown (10YR 3/3), deeply weathered, friable, low hardness; clay with angular blocks of weathered claystone; some sandstone; FeO2 stained, strong mottling and soil development; vertical lined clay fractures (Franciscan Complex)	MC 4	30	117		16	94	
15		SILTY SANDSTONE - gray, deeply weathered, friable, low hardness, intensely fractured, shaly/platy structure; with MnO2 lined fractures; angular blocks with pockets of clay lined fractures (Franciscan Complex)	MC 5	32/5"				100	
20		MELANGE / SHALE - very dark grayish brown (10YR 3/2), deeply weathered, low hardness, intensely fractured; clay lined fractures; weak and shaly structure (Franciscan Complex)	MC 6	56/10"				69	

Bottom of borehole at 21.3 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Modified California (MC) blow counts were adjusted by mutiplying field blow counts by a factor of 0.63.
3. Borehole was backfilled with cement grout upon completion.
4. Boring location coordinates were estimated using a Google Earth application from a mobile smartphone and should be considered approximate.
5. Ground surface elevations were estimated using a topographic drawing provided by Greystone West.

A3GEO, Inc
821 Bancroft Way
Berkeley, CA 94710

BORING NUMBER A3-23-3

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School - Aquatic Center
PROJECT NUMBER 1150-1K
PROJECT LOCATION San Rafael, CA
DATE STARTED 7/31/23 **COMPLETED** 7/31/23
GROUND ELEVATION 91 ft NAVD88 **HOLE SIZE** 4-inch
DRILLING CONTRACTOR Clearheart Drilling
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING --- Not Encountered
LOGGED BY DB **CHECKED BY** JB
AT END OF DRILLING --- Not Encountered
NOTES Latitude: 37.999094° ; Longitude: -122.554157°
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		Asphalt / Aggregate Base (2" AC / 2" AB)							
		SANDY LEAN CLAY (CL) - dark yellowish brown (10YR 4/4) to strong brown (7.5YR 4/6), very stiff, dry, fine sand (Fill / Alluvium)	MC 1	25	109		12	83	Gravel = 7% Sand = 41% - #200 = 52%
5			MC 2	25		max (4.5+)		100	
		CLAYEY SAND (SC) - dark yellowish brown (10YR 4/4) to strong brown (7.5YR 4/6), some gray and reddish brown mottling, dense, moist, fine to medium sand; some fine angular rock clasts (Alluvium)	MC 3	41				100	Gravel = 4% Sand = 46% - #200 = 50% LL=30, PI=12 TXCU Test
10		- increased sand and gravel content at 10 feet; clay with fine angular gravel consisting of weathered sandstone and shale	MC 4	37				100	
15		SHALE / MELANGE - gray and dark brown (10YR 3/2), deeply weathered, friable, low hardness, intensely fractured; platy structure; clay lined fractures; MnO2 stained angular clasts (Franciscan Complex)	MC 5	42				100	
20		- at 20 feet, with some yellowish brown clasts of fine to medium grained sandstone	MC 6	62/10"				61	
25		- at 25 feet, dark brown shaly melange, with calcite lined fractures	SPT 7	50/3"				100	

Bottom of borehole at 25.8 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Modified California (MC) blow counts were adjusted by mutiplying field blow counts by a factor of 0.63.
3. Borehole was backfilled with cement grout upon completion.
4. Boring location coordinates were estimated using a Google Earth application from a mobile smartphone and should be considered approximate.
5. Ground surface elevations were estimated using a topographic drawing provided by Greystone West.

A3GEO STANDARD BH LOG - SOIL ONLY - A3GEO DATA TEMPLATE.GDT - 9/22/23 08:01 - F:\A3GEO PROJECTS\1150 - SAN RAFAEL CITY SCHOOLS\1150-1K TLHS AQUATIC CENTER\4. INVESTIGATION\BORING LOGS GINT\BORELOGS_1150-1K.GPJ

A3GEO, Inc
821 Bancroft Way
Berkeley, CA 94710

BORING NUMBER A3-23-4

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School - Aquatic Center
PROJECT NUMBER 1150-1K
PROJECT LOCATION San Rafael, CA
DATE STARTED 8/1/23 **COMPLETED** 8/1/23
GROUND ELEVATION 80.7 ft NAVD88 **HOLE SIZE** 4-inch
DRILLING CONTRACTOR Clearheart Drilling
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING --- Not Encountered
LOGGED BY DB **CHECKED BY** JB
AT END OF DRILLING --- Not Encountered
NOTES Latitude: 37.999351° ; Longitude: -122.552826°
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		Asphalt / Aggregate Base (2" AC / 5" AB)							
		SANDY LEAN CLAY (CL) - dark yellowish brown (10YR 4/6), some gray and reddish brown mottling, stiff, moist, trace gravel, mostly fine sand (Fill / Alluvium)	MC 1	13	99	2.0	16	83	Corrosivity Test Gravel = 3% Sand = 39% - #200 = 58% LL=31, PI=13 TXUU Shear Strength = 1167 psf
5		CLAYEY SAND WITH GRAVEL (SC) - dark brown (10YR 3/3), some gray and reddish brown mottling, medium dense, moist, mostly fine sand; few gravel consisting of subrounded to angular sandstone clasts, up to 1.5-inch diameter (Fill / Alluvium)	MC 2	25				83	
		- at 7.5 feet, dense, dark yellowish brown (10YR 4/6), with MnO2 stained fine angular gravel and shale	MC 3	33	122		14	100	Gravel = 15% Sand = 58% - #200 = 27%
10		SANDY LEAN CLAY (CL) - dark brown (10YR 3/3), some gray and reddish brown mottling, very stiff, moist, trace fine gravel, fine to coarse sand (Alluvium)	MC 4	23		3.0		100	
		- at 11.5 feet, increased clay content, dark yellowish brown (7.5YR 4/6) to strong brown (10YR 4/4)							
15		SILTY SANDSTONE - yellowish brown (10YR 5/4), deeply weathered, friable, low hardness, dry; fractured with occasional CaCO3 lined fractures (Franciscan Complex)	MC 5	32/2"				100	
20		- at 20 feet, with FeO2 and MnO2 stained fractures	MC 6	32/1"				100	
25			SPT	50/1"				0	

Bottom of borehole at 25.1 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Modified California (MC) blow counts were adjusted by mutiplying field blow counts by a factor of 0.63.
3. Borehole was backfilled with cement grout upon completion.
4. Boring location coordinates were estimated using a Google Earth application from a mobile smartphone and should be considered approximate.
5. Ground surface elevations were estimated using a topographic drawing provided by Greystone West.

BORING NUMBER A3-23-5

A3GEO, Inc
821 Bancroft Way
Berkeley, CA 94710

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School - Aquatic Center
PROJECT NUMBER 1150-1K
PROJECT LOCATION San Rafael, CA
DATE STARTED 8/3/23 **COMPLETED** 8/3/23
GROUND ELEVATION 80.8 ft NAVD88 **HOLE SIZE** 4-inch
DRILLING CONTRACTOR Clearheart Drilling
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING --- Not Encountered
LOGGED BY DB **CHECKED BY** JB
AT END OF DRILLING --- Not Encountered
NOTES Latitude: 37.999717° ; Longitude: -122.553646°
AFTER DRILLING --- Not Encountered

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0	Concrete (7")							
	CLAYEY SAND WITH GRAVEL (SC) - dark yellowish brown (10YR 3/4), medium dense, moist, mostly fine gravel (Fill)	MC 1	23				83	
	CLAYEY SAND (SC) - dark yellowish brown (10YR 4/6), some gray and reddish brown mottling, medium dense, moist, mostly fine sand, trace gravel consisting of sandstone and shale (Alluvium)							
5		MC 2	28	114		18	100	Gravel = 4% Sand = 53% - #200 = 43% LL=32, PI=14
	- at 7 feet, increased sand and gravel content	MC 3	30				94	
10	SANDY LEAN CLAY (CL) - strong brown (7.5YR 4/6), some gray and reddish brown mottling, very stiff, moist, mostly fine sand, few gravel (Alluvium)	MC 4	20	108	2.5	22	100	Gravel = 0% Sand = 31% - #200 = 69%
15	SANDSTONE - dark yellowish brown (10YR 4/4), deeply weathered, friable to weak strength, low hardness; FeO2 and MnO2 staining; light gray lined soil fractures; fine to medium grained sandstone (Franciscan Complex)	MC 5	32/4"				100	
20	SHALE / MELANGE - dark grayish brown (10YR 4/2), deeply weathered, friable, low hardness, shaly/platy structure, intensely fractured (Franciscan Complex)	SPT 6	50/5"				100	
25	CLAYEY SANDSTONE - brownish gray, moderately weathered, friable to weak strength, low hardness, crushed (Franciscan Complex)	SPT 7	50/0.5"				100	

Bottom of borehole at 25.1 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Modified California (MC) blow counts were adjusted by mutiplying field blow counts by a factor of 0.63.
3. Borehole was backfilled with cement grout upon completion.
4. Boring location coordinates were estimated using a Google Earth application from a mobile smartphone and should be considered approximate.
5. Ground surface elevations were estimated using a topographic drawing provided by Greystone West.

A3GEO, Inc
821 Bancroft Way
Berkeley, CA 94710

BORING NUMBER A3-23-6

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School - Aquatic Center
PROJECT NUMBER 1150-1K
PROJECT LOCATION San Rafael, CA
DATE STARTED 8/3/23 **COMPLETED** 8/3/23
GROUND ELEVATION 80.7 ft NAVD88 **HOLE SIZE** 4-inch
DRILLING CONTRACTOR Clearheart Drilling
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING --- Not Encountered
LOGGED BY DB **CHECKED BY** JB
AT END OF DRILLING --- Not Encountered
NOTES Latitude: 37.999634° ; Longitude: -122.553256°
AFTER DRILLING --- Not Encountered

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0	Concrete (6")							
	CLAYEY SAND WITH GRAVEL (SC) - very dark brown (10YR 3/2), medium dense, moist, mostly fine gravel; mixed material (Topsoil and Fill)	MC 1	14				78	
	SANDY LEAN CLAY (CL) - very dark gray (10YR 3/1), some gray and reddish brown mottling, stiff, moist, mostly fine sand, few gravel sandstone clasts (Alluvium)							
5		MC 2	8	112	1.5	19	100	Corrosivity Test TXUU Shear Strength = 1287 psf
	SANDY LEAN CLAY WITH GRAVEL (CL) - dark yellowish brown (10YR 4/4), some gray and reddish brown mottling, stiff, moist, mostly fine sand, few gravel consisting of sandstone and shale fragments (Alluvium)	MC 3	12		1.0		100	Gravel = 16% Sand = 30% - #200 = 54% LL=35, PI=16 Consolidation Test
10	SANDY LEAN CLAY (CL) - dark yellowish brown (10YR 4/4), some gray and reddish brown mottling, very stiff, moist, mostly fine sand, few gravel consisting of sandstone and shale fragments with FeO2 and MnO2 staining (Alluvium)	MC 4	23		2.5		100	
15		MC 5	29	116	2.5	17	100	Gravel = 4% Sand = 41% - #200 = 55%
	SANDSTONE - yellowish brown (10YR 5/4), deeply weathered, friable, low hardness; fine to medium grained sandstone; clay lined fractures (Franciscan Complex)							
20		MC 6	32/5"				100	
25		SPT	50/0.5"				0	

Bottom of borehole at 25.1 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Modified California (MC) blow counts were adjusted by mutiplying field blow counts by a factor of 0.63.
3. Borehole was backfilled with cement grout upon completion.
4. Boring location coordinates were estimated using a Google Earth application from a mobile smartphone and should be considered approximate.
5. Ground surface elevations were estimated using a topographic drawing provided by Greystone West.

BORING NUMBER A3-23-7

A3GEO, Inc
821 Bancroft Way
Berkeley, CA 94710

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School - Aquatic Center
PROJECT NUMBER 1150-1K
PROJECT LOCATION San Rafael, CA
DATE STARTED 8/2/23 **COMPLETED** 8/2/23
GROUND ELEVATION 80.9 ft NAVD88 **HOLE SIZE** 4-inch
DRILLING CONTRACTOR Clearheart Drilling
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING --- Not Encountered
LOGGED BY DB **CHECKED BY** JB
AT END OF DRILLING --- Not Encountered
NOTES Latitude: 37.999386° ; Longitude: -122.553806°
AFTER DRILLING --- Not Encountered

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0	Concrete (8")							Hand Auger to 5 feet
	SANDY LEAN CLAY (CL) - dark yellowish brown (10YR 5/3), some gray and reddish brown mottling, medium stiff, trace gravel, mostly fine sand (Alluvium)	GB 1				19	100	Gravel = 6% Sand = 40% - #200 = 54% LL=34, PI=15
5		MC 2	5		1.5		44	
	- below 7.5 feet, very stiff, increased sand and gravel content consisting of fine angular sandstone and shale clasts	MC 3	21		2.5		100	
10	CLAYEY SAND (SC) - dark yellowish brown (10YR 5/3), some gray and reddish brown mottling, dense, moist, fine to medium sand; some gravel consisting of angular sandstone and shale clasts; shows some signs of rock structure and clay developing within fractures (Alluvium)	MC 4	41	122		15	100	Gravel = 11% Sand = 53% - #200 = 36%
15	SANDSTONE - grayish brown, deeply weathered, friable, low hardness; fine grained sandstone with strong FeO2 and MnO2 staining; clay along fractures (Franciscan Complex)	MC 5	32/5"				100	
20	SANDY CLAYSTONE - brownish gray, deeply weathered, friable, low hardness, crushed, dry (Franciscan Complex)	MC 6	32/3"				100	
25	SILTY SANDSTONE - gray (10YR 6/1), deeply weathered, friable, low hardness, dry (Franciscan Complex)	SPT 7	50/5"				100	

Bottom of borehole at 25.4 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Modified California (MC) blow counts were adjusted by mutiplying field blow counts by a factor of 0.63.
3. Borehole was backfilled with cement grout upon completion.
4. Boring location coordinates were estimated using a Google Earth application from a mobile smartphone and should be considered approximate.
5. Ground surface elevations were estimated using a topographic drawing provided by Greystone West.

A3GEO
A3GEO, Inc
821 Bancroft Way
Berkeley, CA 94710

BORING NUMBER A3-23-8

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School - Aquatic Center
PROJECT NUMBER 1150-1K
PROJECT LOCATION San Rafael, CA
DATE STARTED 8/2/23 **COMPLETED** 8/2/23
GROUND ELEVATION 80.8 ft NAVD88 **HOLE SIZE** 4-inch
DRILLING CONTRACTOR Clearheart Drilling
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING --- Not Encountered
LOGGED BY DB **CHECKED BY** JB
AT END OF DRILLING --- Not Encountered
NOTES Latitude: 37.999387° ; Longitude: -122.553584°
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		Concrete (8")							
		SANDY LEAN CLAY (CL) - dark yellowish brown (10YR 3/4), some gray and reddish brown mottling, medium stiff, moist, few angular gravel, mostly fine sand (Fill)							Hand Auger to 5 feet
			GB 1					100	Corrosivity Test
5		- at 5 feet, some gravel up to 1.5-inch diameter	MC 2	6	112	1.0	19	72	Gravel = 5% Sand = 40% - #200 = 55% LL=32, PI=16
		SANDY LEAN CLAY WITH GRAVEL (CL) - dark yellowish brown (10YR 3/4 to 7.5YR 4/3), some gray and reddish brown mottling, very stiff, moist, fine angular gravel consisting of sandstone and shale (Alluvium)	MC 3	24		3.0		83	TXCU Test
10		- below 7.5 feet, very stiff							
		- at 11 feet, with FeO2 and MnO2 staining; highly mottled and strong soil development	MC 4	21		2.5		100	
15		CLAYEY GRAVEL WITH SAND (GC) - dark brown (10YR 4/4), some gray and reddish brown mottling, medium dense, moist, gravel consiting of sandstone clasts; FeO2 and MnO2 staining; shows some rock structure with clay lined fractures (Alluvium)	MC 5	22	124		11	100	Gravel = 41% Sand = 33% - #200 = 26% LL=32, PI=17
		SILTY SANDSTONE - yellowish brown (10YR 5/4), deeply weathered, friable to weak strength, low hardness; with FeO2 and MnO2 stained fractures (Franciscan Complex)							
20			MC 6	32/5"				100	
		SANDY CLAYSTONE - brownish gray, deeply weathered, friable, low hardness, crushed; fine grained sand (Franciscan Complex)							
25			SPT 7	50/1"				100	

Bottom of borehole at 25.1 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Modified California (MC) blow counts were adjusted by mutiplying field blow counts by a factor of 0.63.
3. Borehole was backfilled with cement grout upon completion.
4. Boring location coordinates were estimated using a Google Earth application from a mobile smartphone and should be considered approximate.
5. Ground surface elevations were estimated using a topographic drawing provided by Greystone West.

BORING NUMBER A3-23-9

A3GEO, Inc
821 Bancroft Way
Berkeley, CA 94710

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School - Aquatic Center
PROJECT NUMBER 1150-1K
PROJECT LOCATION San Rafael, CA
DATE STARTED 8/1/23 **COMPLETED** 8/1/23
GROUND ELEVATION 80.8 ft NAVD88 **HOLE SIZE** 4-inch
DRILLING CONTRACTOR Clearheart Drilling
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 20.0 ft / Elev 60.8 ft
LOGGED BY DB **CHECKED BY** JB
▼ **AT END OF DRILLING** 17.0 ft / Elev 63.8 ft
NOTES Latitude: 37.999289° ; Longitude: -122.553561°
AFTER DRILLING --- Not measured

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		Concrete (8")							
		CLAYEY SAND (SC) - very dark grayish brown (10YR 3/2), medium dense, moist, fine sand, trace gravel (Fill)	GB 1					100	Hand Auger to 5 feet
		SANDY LEAN CLAY(CL) - dark yellowish brown (10YR 3/4), soft to medium stiff, fine sand, few fine angular gravel (Fill)	GB 2					100	
5		- at 5 feet, soft, increased clay content				0.5			
		CLAYEY SAND WITH GRAVEL (SC) - dark yellowish brown (10YR 3/4), medium dense, moist, fine sand, angular gravel clasts up to 2-inch diameter (Fill)	MC 3	10	113		15	100	Gravel = 35% Sand = 44% - #200 = 21% LL=29, PI=13
		SANDY LEAN CLAY (CL) - yellowish brown (10YR 4/3 to 7.5YR 4/3), some gray and reddish brown mottling, very stiff, moist, mostly fine sand, few gravel consisting of sandstone clasts (Alluvium)	MC 4	23		4.0		100	
10		- at 10 feet, increase in angular gravel sandstone clasts with clay filled fractures	MC 5	26	113	3.0	18	100	Gravel = 4% Sand = 42% - #200 = 54% LL=35, PI=17
15		SANDY LEAN CLAY WITH GRAVEL (CL) - dark brown (10YR 4/4), some gray and reddish brown mottling, very stiff, moist, gravel consiting of sandstone clasts; FeO2 and MnO2 staining; shows some rock structure with clay lined fractures (Alluvium) ▼	MC 6	26		2.5		100	
20		SANDSTONE - dark yellowish brown (10YR 4/4), deeply weathered, ▽ friable to weak strength, low hardness to moderately hard; fine to medium grained sandstone; MnO2 staining (Franciscan Complex)	MC 7	32/3"				100	
25			SPT	50/0.5"				0	

Bottom of borehole at 25.1 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Modified California (MC) blow counts were adjusted by mutiplying field blow counts by a factor of 0.63.
3. Borehole was backfilled with cement grout upon completion.
4. Boring location coordinates were estimated using a Google Earth application from a mobile smartphone and should be considered approximate.
5. Ground surface elevations were estimated using a topographic drawing provided by Greystone West.

UNIFIED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS: more than 50% retained on No. 200 sieve	COARSE GRAINED SOILS: 50% or more of coarse fraction on No. 4 sieve	CLEAN GRAVELS	GW	Well graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH SAND	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS: more than 50% passing on No. 4 sieve	CLEAN SANDS	SW	Well graded sands and gravelly sand, little or no fines
			SP	Poorly graded sands and gravelly sand, little or no fines
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS: 50% or more passing No. 200 sieve	SILTS AND CLAY: Liquid Limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays or low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAY: Liquid Limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic clays
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS			PT	Peat, muck, and other highly organic soils

BOUNDARY CLASSIFICATION AND GRAIN SIZES

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

U.S. Standard Sieve Sizes: No. 200 (0.075 mm), No. 40 (0.425 mm), No. 10 (2 mm), No. 4 (3/16"), 3/4", 3", 12"

SYMBOLS

Modified California (MC) Sampler (3" O.D.)	HQ ROCK CORE (RC)	101 Barrel (SS)
Standard Penetration Test: SPT (2" O.D.)	Pitcher Tube (ST)	Water Levels At time of drilling At end of drilling After drilling

ABBREVIATIONS

Item	Meaning
LL	Liquid Limit (%) (ASTM D 4318)
PI	Plasticity Index (%) (ASTM D 4318)
-200	Passing No. 200 (%) (ASTM D 1140)
TXCU	Laboratory consolidated undrained triaxial test of undrained shear strength (psf) (ASTM D 4767)
TXUU	Laboratory unconsolidated, undrained triaxial test of undrained shear strength (psf) (ASTM D 2850)
psf/tsf	pounds per square foot / tons per square foot
psi	pounds per square inch
OD	Outside Diameter
ID	Inside Diameter

NOTES

1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Modified California (MC) blow counts were adjusted by multiplying field blow counts by a factor of 0.63.
3. Recorded blow counts have not been adjusted for hammer energy.

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BEDDING OF SEDIMENTARY ROCK		
SPLITTING PROPERTY	THICKNESS	STRATIFICATION
Massive	Greater than 4.0 feet	Very Thick-Bedded
Blocky	2.0 to 4.0 feet	Thick-Bedded
Slabby	0.2 to 2.0 feet	Thin-Bedded
Flaggy	0.05 to 0.2 feet	Very Thin-Bedded
Shaly or Platy	0.01 to 0.05 feet	Laminated
Papery	Less than 0.01 feet	Thinly Laminated

FRACTURING	
INTENSITY	SIZE OF PIECES IN FEET
Very Little Fractured	Greater than 4.0 feet
Occasionally Fractured	1.0 to 4.0 feet
Moderately Fractured	0.5 to 1.0 feet
Closely Fractured	0.1 to 0.5 feet
Intensely Fractured	0.05 to 0.1 feet
Crushed	Less than 0.05 feet

HARDNESS	
Soft	Reserved for plastic material alone
Low Hardness	Can be gouged deeply or carved easily by a knife blade
Moderately Hard	Can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and is readily visible after the powder has been blown away
Hard	Can be scratched by a knife blade with difficulty; scratch produces little powder and is often faintly visible
Very Hard	Cannot be scratched by a knife blade; leaves a metallic streak

STRENGTH	
Plastic	Very low strength
Friable	Crumbles easily by rubbing with fingers
Weak	An unfractured specimen of such material will crumble under light hammer blows
Moderately Strong	Specimen will withstand a few heavy hammer blows before breaking
Strong	Specimen will withstand a few heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments
Very Strong	Specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments

WEATHERING:	
	— the physical and chemical disintegration and decomposition of rocks and minerals by natural processes such as oxidation, reduction, hydration, solution, carbonation, and freezing and thawing
Deep	Moderate to complete mineral decomposition; extensive disintegration; deep and thorough discoloration; many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt.
Moderate	Slight change or partial decomposition of minerals; little disintegration; cementation little to unaffected. Moderate to occasionally intense discoloration. Moderately coated fractures.
Little	No megascopic decomposition of minerals; little or no effect on normal cementation. Slight and intermittent, or localized discoloration. Few stains on fracture surfaces.
Fresh	Unaffected by weathering agents. No discoloration or disintegration. Fractures usually less numerous than joints.

APPENDIX C

Laboratory Test Data
(this study)

TLHS
AQUATIC CENTER

B. HILLEBRANDT SOILS TESTING, INC.

29 Sugarloaf Terrace, Alamo, CA 94507 - Tel: (510) 409-2816 - Fax: (925) 891-9267 - Email: soiltesting@aol.com

LAB RESULTS SUMMARY FORM

Project Number: 1150-1K **Project Name:** Terra Linda High School - Aquatic Center
Requested By: DB **Request Date:** 8/17/23 **Throw Samples Out On:**

					Atterberg			-200			Compaction				
Boring #	Sample Depth (feet)	Dry Density (pcf)	Moisture Content (%)	TxUU Shear Strength (psf)	Liquid Limit	Plastic Limit	Plasicity Index	Passing #4 Sieve (%)	Passing #40 sieve (%)	Passing #200 sieve (%)	Maximum Dry Density (pcf)	Optimum Moisture (%)	Pocket Penetrometer (tsf)	Torvane (tsf)	Remarks
A3-23-1	3.0 - 3.5	119	15.1		31	20	11	59	41	26					
A3-23-1	5.5 - 6.0	107	17.3					91	74	59					
A3-23-2	2.5 - 3.0	113	18.4		35	22	13	91	71	44					
A3-23-2	10.5 - 11.0	117	16.0					62	43	29					
A3-23-3	2.5 - 3.0	109	11.5					93	73	52					
A3-23-4	8.0 - 8.5	122	13.9					85	54	27					
A3-23-5	5.0 - 5.5	114	17.6		32	18	14	96	73	43					
A3-23-5	11.0 - 11.5	108	22.2					100	95	69					
A3-23-6	16.0 - 16.5	116	17.3					96	82	55					
A3-23-7	2.0 - 3.0		18.7		34	19	15	94	79	54					
A3-23-7	11.0 - 11.5	122	15.4					89	59	36					
A3-23-8	6.0 - 6.5	112	19.0		32	16	16	95	83	55					
A3-23-8	16.0 - 16.5	124	11.3		32	15	17	59	41	26					
A3-23-9	6.0 - 6.5	113	14.9		29	16	13	65	38	21					
A3-23-9	11.0 - 11.5	113	18.0		35	18	17	96	81	54					

B. HILLEBRANDT SOILS TESTING, INC.

29 Sugarloaf Terrace, Alamo, CA 94507 - Tel: (510) 409-2916 - Fax: (925) 891-9267 - Email: soiltesting@aol.com

MOISTURE CONTENT/DRY DENSITY

Job #: 1150-1K
Job Name: Terra Linda High School - Aquatic Center
Date: 8/17/23
Tested by: Brad Hillebrandt

Additional Tests:	PI, FS	FS	PI, FS	FS	FS	FS
Boring #:	A3-23-1	A3-23-1	A3-23-2	A3-23-2	A3-23-3	A3-23-4
Depth:	3.0 - 3.5	5.5 - 6.0	2.5 - 3.0	10.5 - 11.0	2.5 - 3.0	8.0 - 8.5
Sample Description:	Olive brown and dark yellowish brown clayey GRAVEL with sand	Olive brown sandy CLAY	Reddish brown clayey SAND	Olive brown clayey GRAVEL with sand	Olive brown sandy CLAY	Olive brown clayey SAND with gravel
Can #:	385	406	362	356	400	360
Wet Sample + can	302.9	300.7	274.1	289.2	240.4	314.8
Dry Sample + can	267.4	261.2	236.7	253.8	218.9	280.5
Weight can	33.0	32.8	33.0	32.6	32.7	32.9
Weight water	35.5	39.5	37.4	35.4	21.5	34.3
Weight Dry Sample	234.4	228.4	203.7	221.2	186.2	247.6
WATER CONTENT (%)	**15.1%**	**17.3%**	**18.4%**	**16.0%**	**11.5%**	**13.9%**
Weight Sample + Liner	1192.7	1122.4	1219.1	1062.7	1130.8	1233.8
Weight Liner	227.7	251.7	275.4	250.5	283.6	254.5
Sample Length	6.0	5.9	6.0	5.1	5.9	6.0
Sample Diameter	2.39	2.39	2.39	2.39	2.39	2.39
DRY DENSITY (pcf)	**118.6**	**106.8**	**112.8**	**116.6**	**109.3**	**121.7**

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MOISTURE CONTENT/DRY DENSITY

Job #: 1150-1K
Job Name: Terra Linda High School - Aquatic Center
Date: 8/17/23
Tested by: Brad Hillebrandt

Additional Tests:	PI, FS	FS	FS	FS	PI, FS	PI, FS
Boring #:	A3-23-5	A3-23-5	A3-23-6	A3-23-7	A3-23-8	A3-23-8
Depth:	5.0 - 5.5	11.0 - 11.5	16.0 - 16.5	11.0 - 11.5	6.0 - 6.5	16.0 - 16.5
Sample Description:	Dark yellowish brown clayey SAND	Dark yellowish brown and gray sandy CLAY	Olive brown sandy CLAY	Brown clayey SAND	Dark yellowish brown and gray sandy lean CLAY	Dark olive brown clayey GRAVEL with sand
Can #:	353	355	405	725	350	403
Wet Sample + can	261.6	178.6	275.3	353.1	271.7	314.5
Dry Sample + can	227.4	152.0	239.7	310.5	233.4	285.9
Weight can	32.7	32.3	33.5	33.9	32.2	32.8
Weight water	34.2	26.6	35.6	42.6	38.3	28.6
Weight Dry Sample	194.7	119.7	206.2	276.6	201.2	253.1
WATER CONTENT (%)	**17.6%**	**22.2%**	**17.3%**	**15.4%**	**19.0%**	**11.3%**
Weight Sample + Liner	1222.9	1187.2	1192.1	1221.2	1190.1	1228.8
Weight Liner	277.6	253.7	228.7	230.2	248.4	253.8
Sample Length	6.0	6.0	6.0	6.0	6.0	6.0
Sample Diameter	2.39	2.39	2.39	2.39	2.39	2.39
DRY DENSITY (pcf)	**113.8**	**108.1**	**116.3**	**121.5**	**112.0**	**124.0**

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MOISTURE CONTENT/DRY DENSITY

Job #: 1150-1K
Job Name: Terra Linda High School - Aquatic Center
Date: 8/17/23
Tested by: Brad Hillebrandt

Additional Tests:	PI, FS	PI, FS				
Boring #:	A3-23-9	A3-23-9				
Depth:	6.0 - 6.5	11.0 - 11.5				
Sample Description:	Dark olive brown clayey SAND with gravel	Dark yellowish brown sandy lean CLAY				
Can #:	427	412				
Wet Sample + can	332.5	212.9				
Dry Sample + can	293.7	185.5				
Weight can	32.7	33.1				
Weight water	38.8	27.4				
Weight Dry Sample	261	152.4				
WATER CONTENT (%)	**14.9%**	**18.0%**				
Weight Sample + Liner	1104.1	1217.5				
Weight Liner	239.1	277.9				
Sample Length	5.65	6.0				
Sample Diameter	2.39	2.39				
DRY DENSITY (pcf)	**113.2**	**112.7**				

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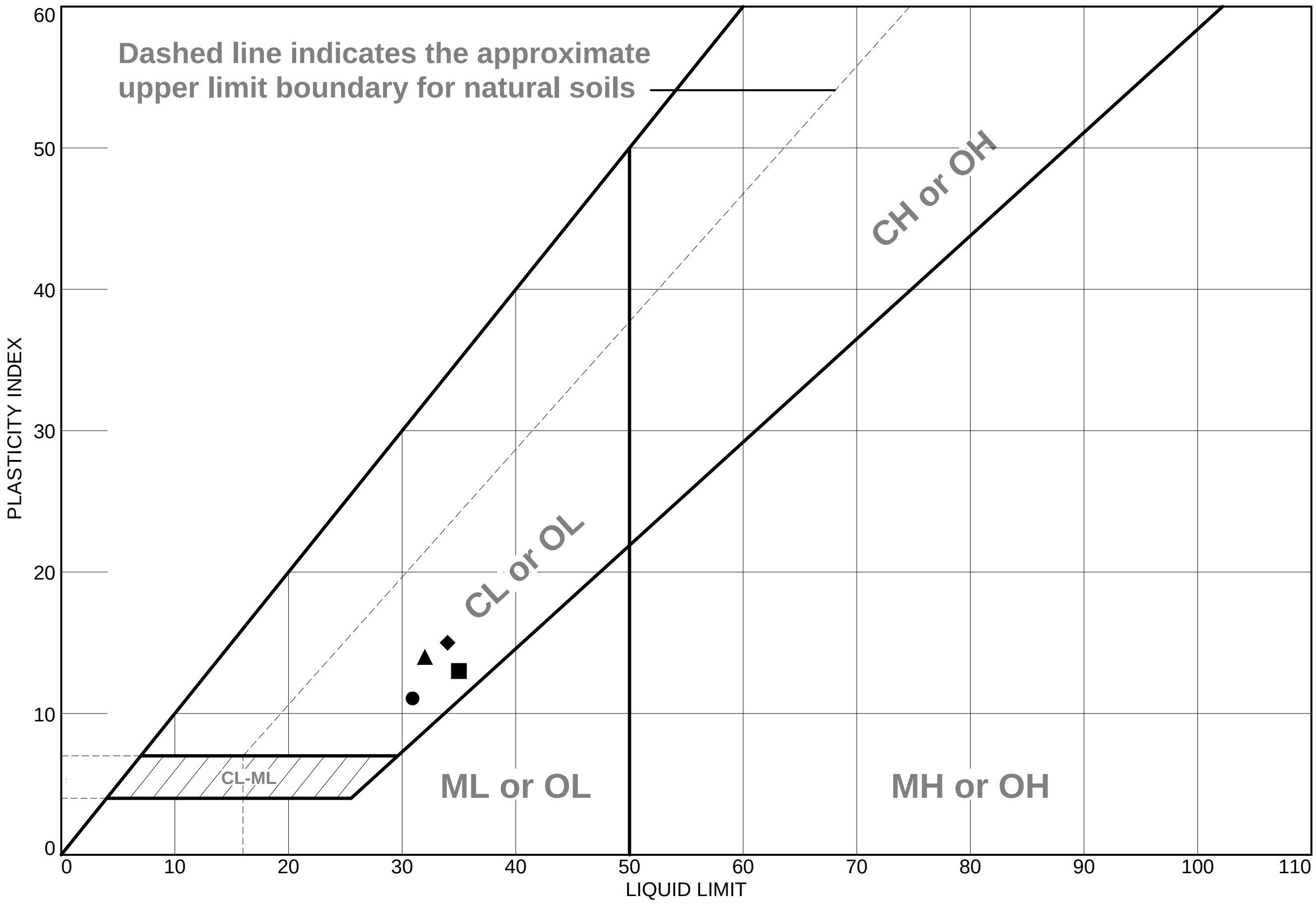
29 Sugarloaf Terrace, Alamo, CA 94507 - Tel: (510) 409-2916 - Fax: (925) 891-9267 - Email: soiltesting@aol.com

MOISTURE CONTENT WORKSHEET

Job #: 1150-1K
Job Name: Terra Linda High School - Aquatic Center
Date: 8/17/23
Tested by: B. Hillebrandt

Additional Tests:	PI, -200								
Boring #:	A3-23-7								
Depth:	2.0 - 3.0								
Sample Description:	Dark yellowish brown sandy lean CLAY								
Can #:	349								
Wet Sample + can	265.4								
Dry Sample + can	228.8								
Weight can	32.6								
Weight water	36.6								
Weight Dry Sample	196.2								
WATER CONTENT (%)	**18.7%**								

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive brown and dark yellowish brown clayey GRAVEL with sand	31	20	11	40.9	26.1	GC
■	Reddish brown clayey SAND	35	22	13	70.7	44.2	SC
▲	Dark yellowish brown clayey SAND	32	18	14	73.0	43.4	SC
◆	Dark yellowish brown sandy lean CLAY	34	19	15	79.1	54.4	CL

Project No. 1150-1K **Client:** A3Geo

Project: Terra Linda High School - Aquatic Center

●**Source of Sample:** A-23-1 **Depth:** 3.0 - 3.5' **Sample Number:** 1B
■**Source of Sample:** A3-23-2 **Depth:** 2.5 - 3.0' **Sample Number:** 1C
▲**Source of Sample:** A3-23-5 **Depth:** 5.0 - 5.5' **Sample Number:** 2C
◆**Source of Sample:** A3-23-7 **Depth:** 2.0 - 3.0' **Sample Number:** 1

Remarks:

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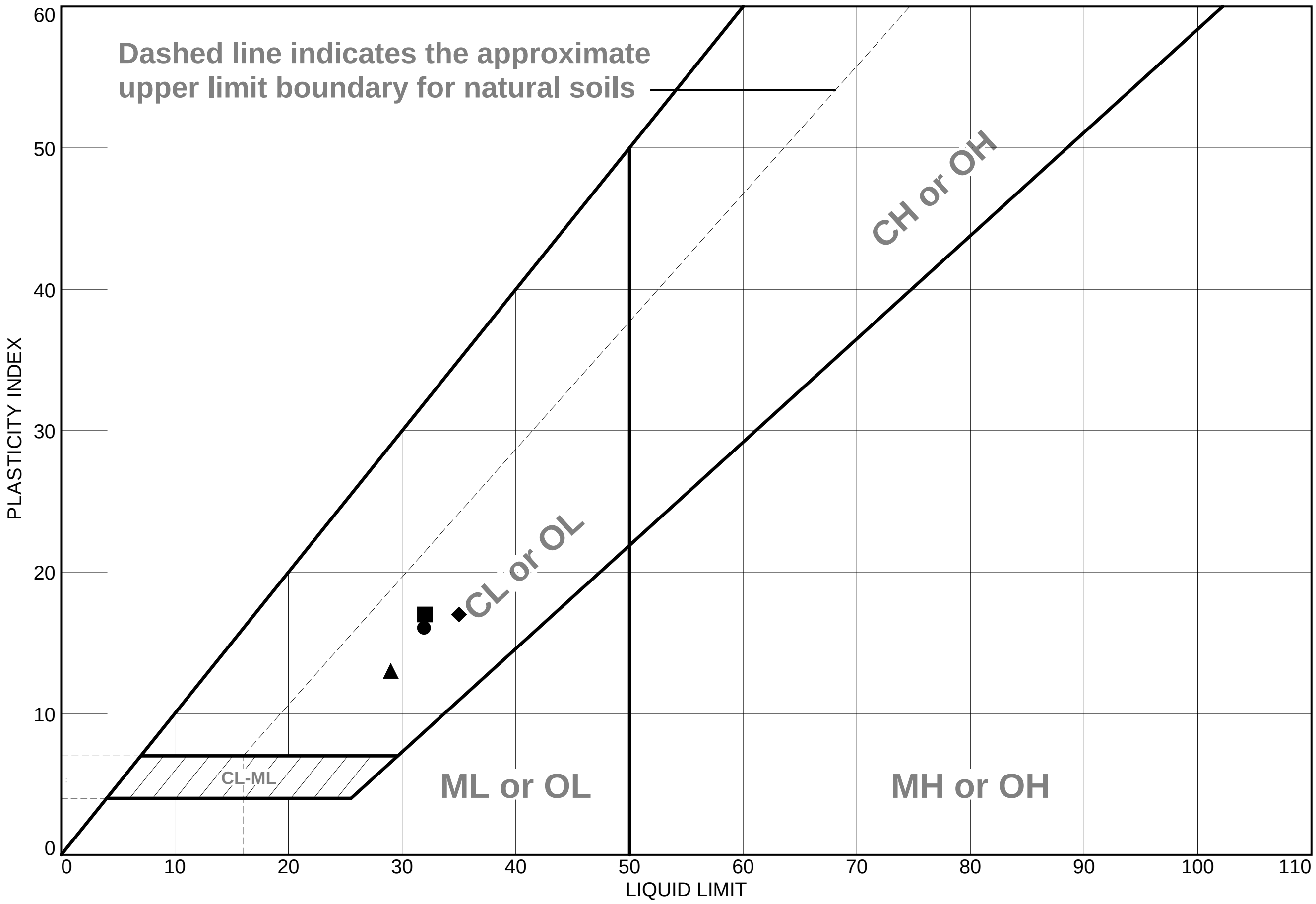
Figure

Tested By: BH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark yellowish brown and gray sandy lean CLAY	32	16	16	82.7	55.0	CL
■	Olive brown clayey GRAVEL with sand	32	15	17	40.9	26.1	GC
▲	Dark olive brown clayey SAND with gravel	29	16	13	38.0	21.3	SC
◆	Dark yellowish brown sandy lean CLAY	35	18	17	81.4	54.4	CL

Project No. 1150-1K **Client:** A3Geo

Project: Terra Linda High School - Aquatic Center

●**Source of Sample:** A3-23-8 **Depth:** 6.0 - 6.5' **Sample Number:** 2B
■**Source of Sample:** A3-23-8 **Depth:** 16.0 - 16.5' **Sample Number:** 5C
▲**Source of Sample:** A3-23-9 **Depth:** 6.0 - 6.5' **Sample Number:** 3C
◆**Source of Sample:** A3-23-9 **Depth:** 11.0 - 11.5' **Sample Number:** 5C

Remarks:

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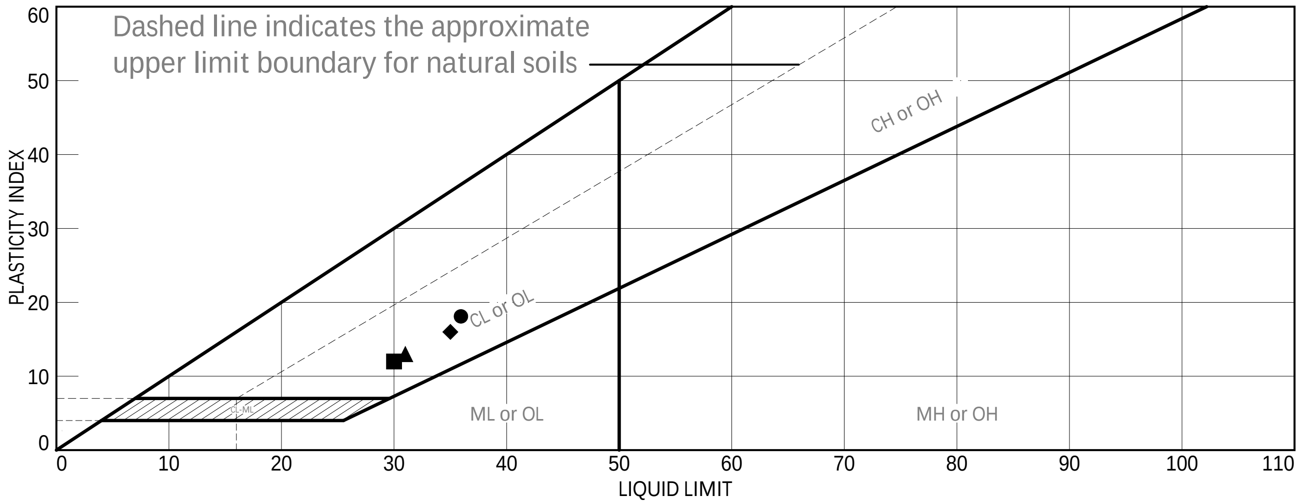
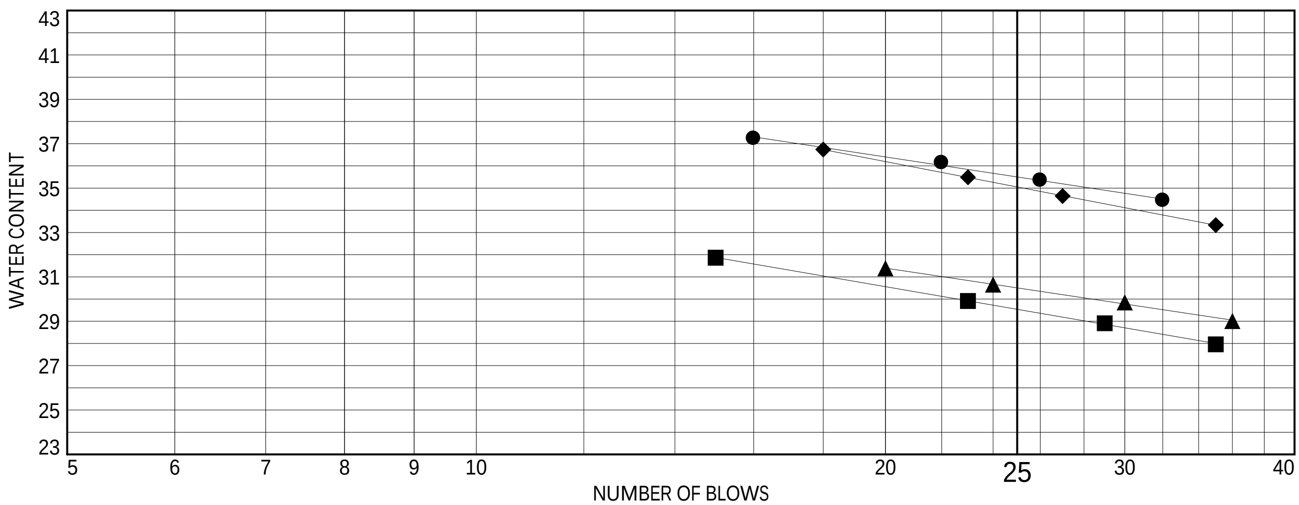
Figure

Tested By: BH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Yellowish Brown Sandy Lean CLAY	36	18	18			
■	Yellowish Brown Lean Clayey SAND	30	18	12	74.8	49.9	SC
▲	Dark Brown Sandy Lean CLAY	31	18	13	80.0	58.0	CL
◆	Dark Brown Sandy Lean CLAY w/ Gravel	35	19	16	70.9	53.8	CL

Project No. 748-060 Client: A3GEO

Project: Terra Linda High School-Aquatic Center - 1150-1K

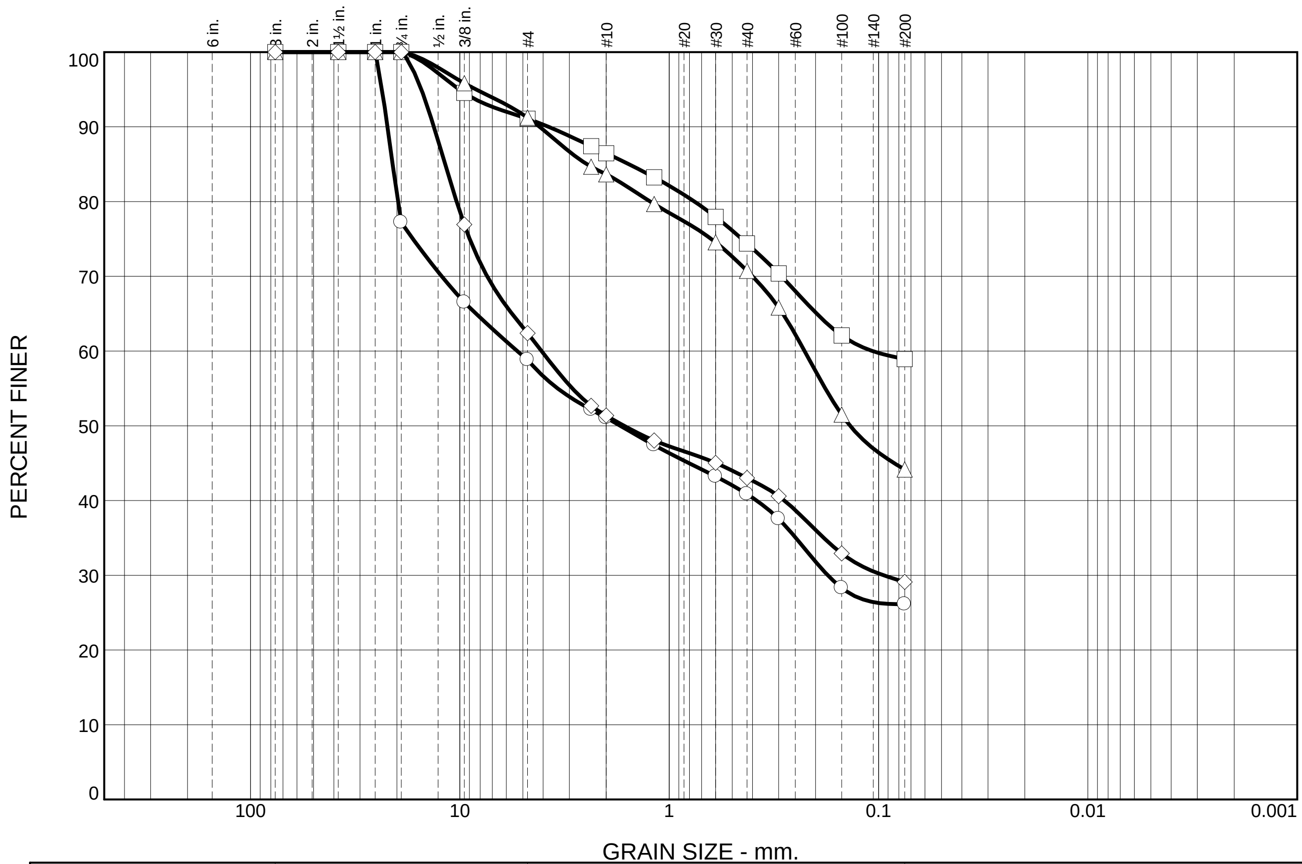
● Source of Sample: A3-23-2 Depth: 5-5.5' Sample Number: 2C
■ Source of Sample: A3-23-3 Depth: 8-8.5' Sample Number: 3C
▲ Source of Sample: A3-23-4 Depth: 2-2.5' Sample Number: 1B
◆ Source of Sample: A3-23-6 Depth: 7-7.5' Sample Number: 3A

Remarks:

COOPER TESTING LABORATORY

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	22.8	18.4	7.7	10.2	14.8	26.1	
□	0.0	0.0	8.9	4.6	12.1	15.5	58.9	
△	0.0	0.0	8.8	7.6	12.9	26.5	44.2	
◇	0.0	0.0	37.6	11.0	8.4	13.9	29.1	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	A-23-1	1B	3.0 - 3.5'	Olive brown and dark yellowish brown clayey GRAVEL with sand	GC
□	A-23-1	2A	5.5 - 6.0'	Olive brown sandy CLAY	CL
△	A3-23-2	1C	2.5 - 3.0'	Reddish brown clayey SAND	SC
◇	A3-23-2	4B	10.5 - 11.0'	Olive brown clayey GRAVEL with sand	GC

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+1 510-409-2816
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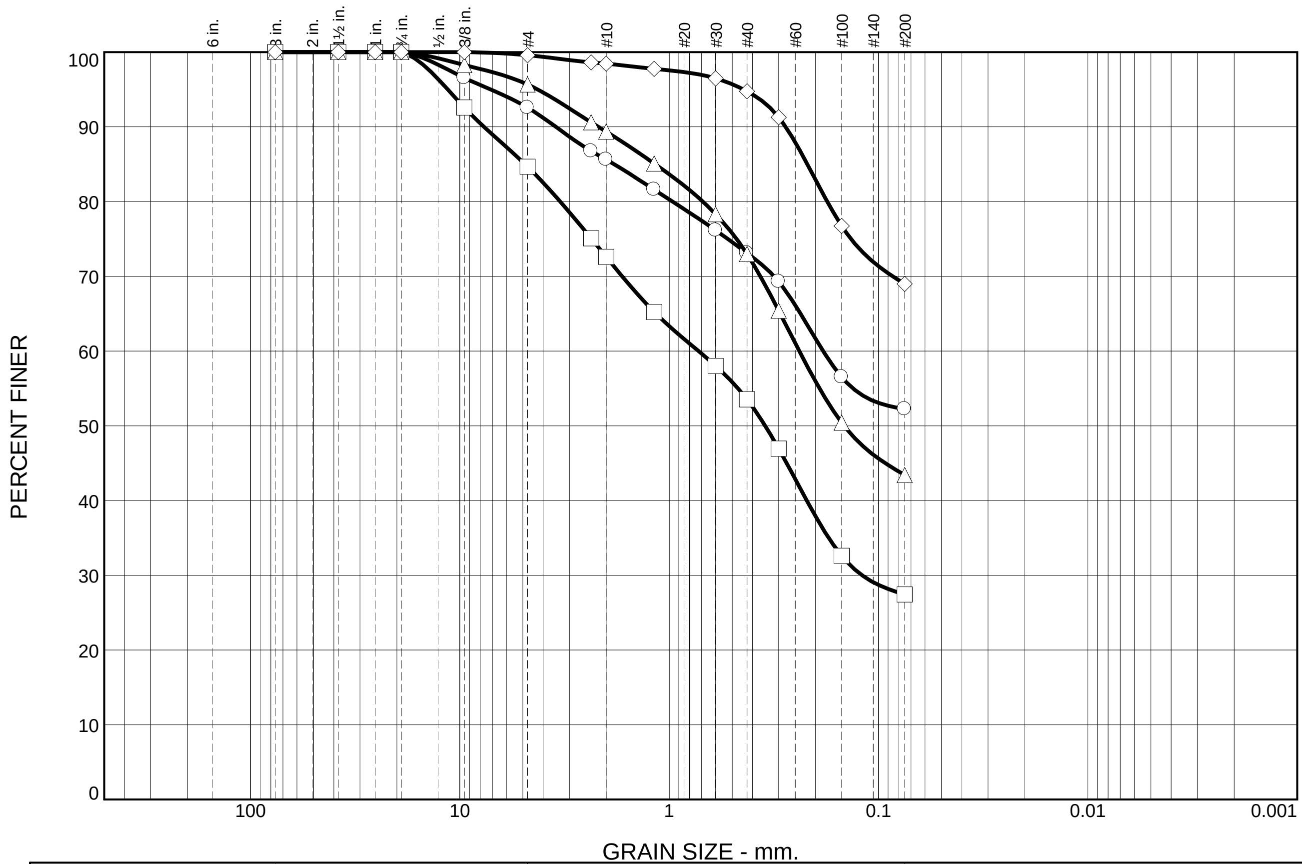
Client: A3Geo
Project: Terra Linda High School - Aquatic Center
Project No.: 1150-1K **Figure**

Tested By: BH

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	7.4	7.0	12.5	20.9	52.2	
□	0.0	0.0	15.3	12.1	19.1	26.1	27.4	
△	0.0	0.0	4.3	6.3	16.4	29.6	43.4	
◇	0.0	0.0	0.4	1.2	3.6	25.8	69.0	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	A3-23-3	1C	2.5 - 3.0'	Olive brown sandy CLAY	CL
□	A3-23-4	3C	8.0 - 8.5'	Olive brown clayey SAND with gravel	SC
△	A3-23-5	2C	5.0 - 5.5'	Dark yellowish brown clayey SAND	SC
◇	A3-23-5	4C	11.0 - 11.5'	Dark yellowish brown and gray sandy CLAY	CL

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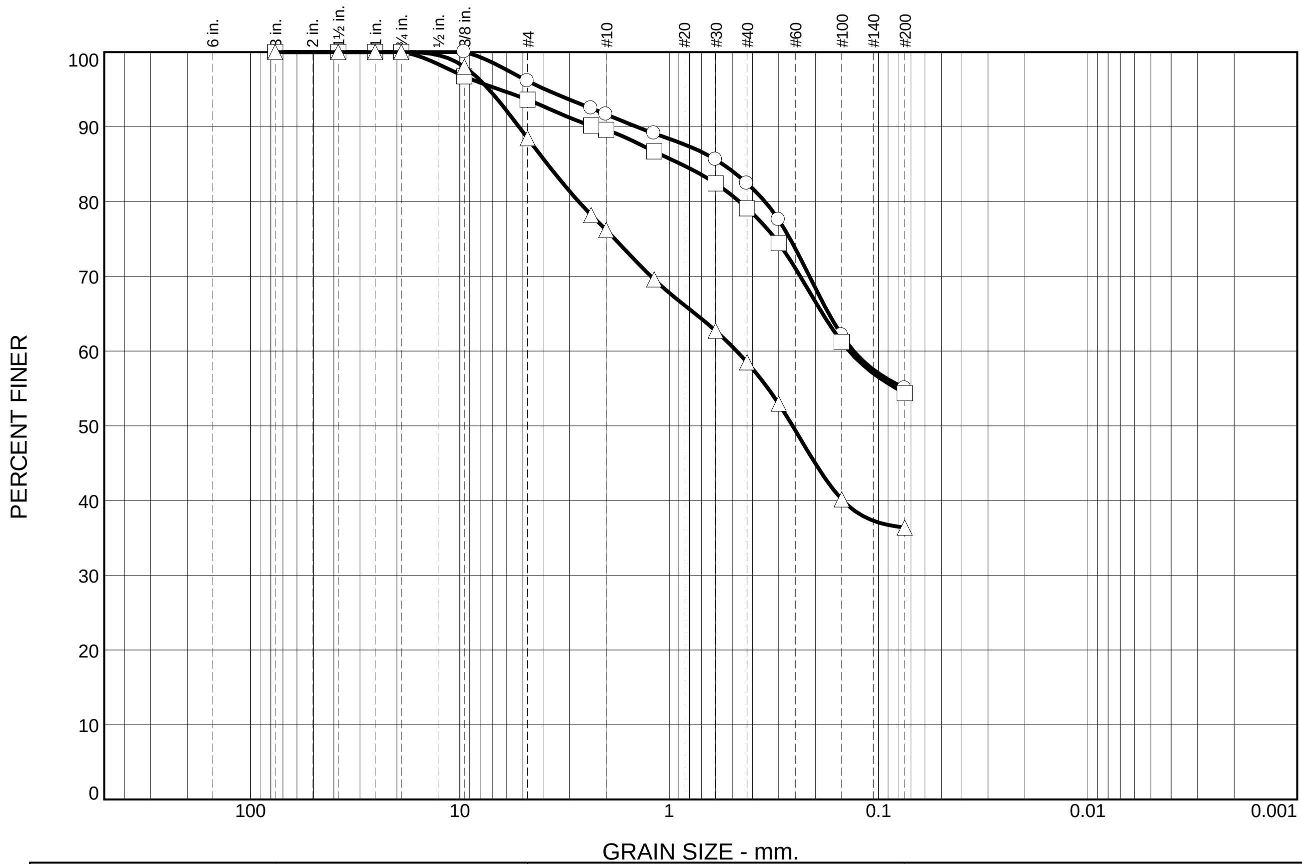
Client: A3Geo
Project: Terra Linda High School - Aquatic Center

Project No.: 1150-1K **Figure**

Tested By: BH

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.9	4.4	9.3	27.4	55.0	
□	0.0	0.0	6.4	4.0	10.5	24.7	54.4	
△	0.0	0.0	11.5	12.3	17.7	22.1	36.4	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	A3-23-6	5C	16.0 - 16.5	Olive brown sandy CLAY	CL
□	A3-23-7	1	2.0 - 3.0'	Dark yellowish brown sandy lean CLAY	CL
△	A3-23-7	4C	11.0 - 11.5'	Brown clayey SAND	SC

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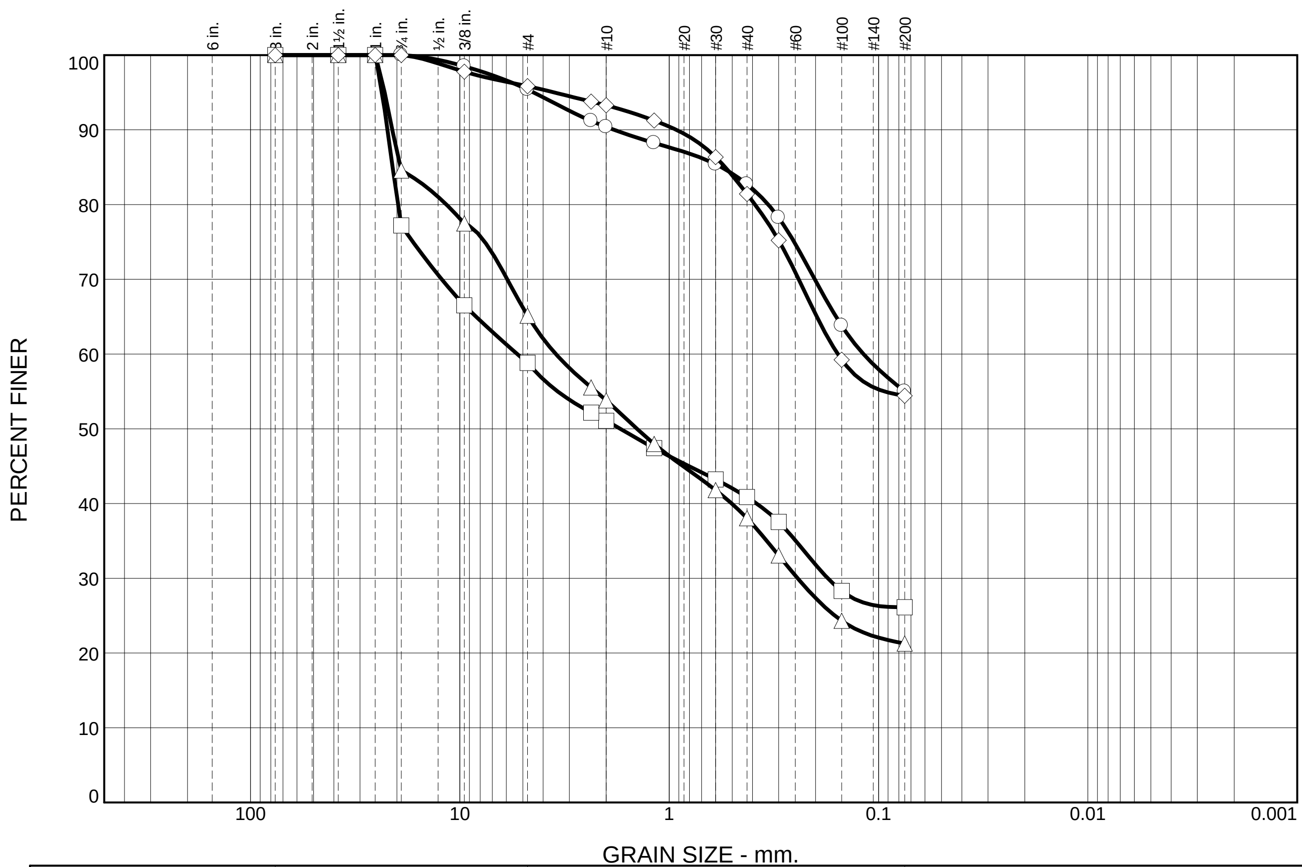
SoilTesting@aol.com

Client: A3Geo
Project: Terra Linda High School - Aquatic Center
Project No.: 1150-1K **Figure**

Tested By: BH

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	4.6	5.0	7.7	27.7	55.0	
□	0.0	22.8	18.4	7.7	10.2	14.8	26.1	
△	0.0	15.4	19.5	11.3	15.8	16.7	21.3	
◇	0.0	0.0	4.2	2.5	11.9	27.0	54.4	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	A3-23-8	2B	6.0 - 6.5'	Dark yellowish brown and gray sandy lean CLAY	CL
□	A3-23-8	5C	16.0 - 16.5'	Olive brown clayey GRAVEL with sand	GC
△	A3-23-9	3C	6.0 - 6.5'	Dark olive brown clayey SAND with gravel	SC
◇	A3-23-9	5C	11.0 - 11.5'	Dark yellowish brown sandy lean CLAY	CL

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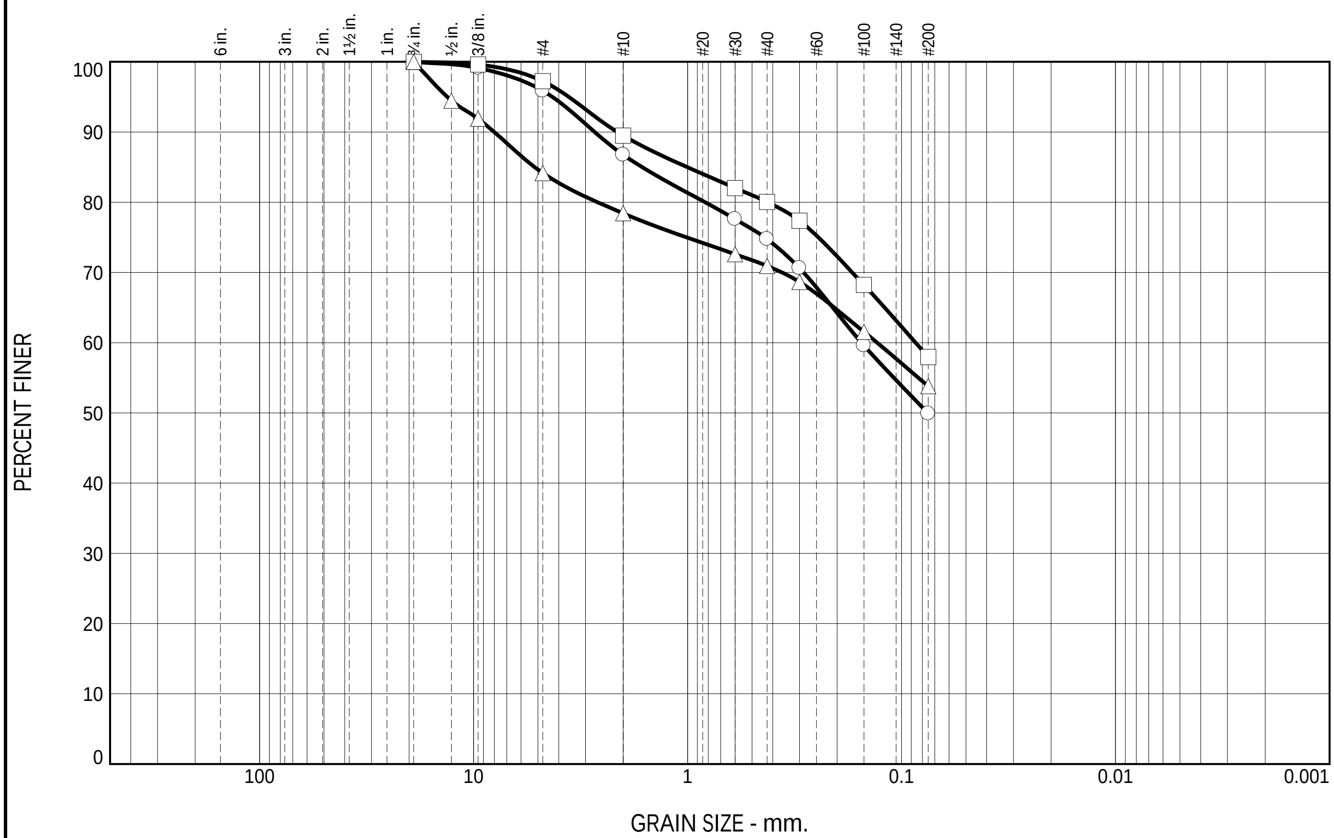
SoilTesting@aol.com

Client: A3Geo
Project: Terra Linda High School - Aquatic Center
Project No.: 1150-1K **Figure**

Tested By: BH

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	4.1	46.0	49.9		SC	30	18	12
□	0.0	2.8	39.2	58.0		CL	31	18	13
△	0.0	15.8	30.4	53.8		CL	35	19	16

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	PERCENT FINER △
3/4"	100.0	100.0	100.0
1/2"			94.5
3/8"	99.1	99.6	91.9
	GRAIN SIZE		
D_{60}	0.1540	0.0860	0.1301
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	PERCENT FINER △
#4	95.9	97.2	84.2
#10	86.8	89.5	78.4
#30	77.6	82.0	72.6
#40	74.8	80.0	70.9
#50	70.6	77.4	68.7
#100	59.6	68.2	61.5
#200	49.9	58.0	53.8

Material Description

○ Yellowish Brown Lean Clayey SAND

□ Dark Brown Sandy Lean CLAY

△ Dark Brown Sandy Lean CLAY w/ Gravel

REMARKS:

○

□

△

○ Source of Sample: A3-23-3 Depth: 8-8.5' Sample Number: 3C

□ Source of Sample: A3-23-4 Depth: 2-2.5' Sample Number: 1B

△ Source of Sample: A3-23-6 Depth: 7-7.5' Sample Number: 3A

COOPER TESTING LABORATORY

Client: A3GEO

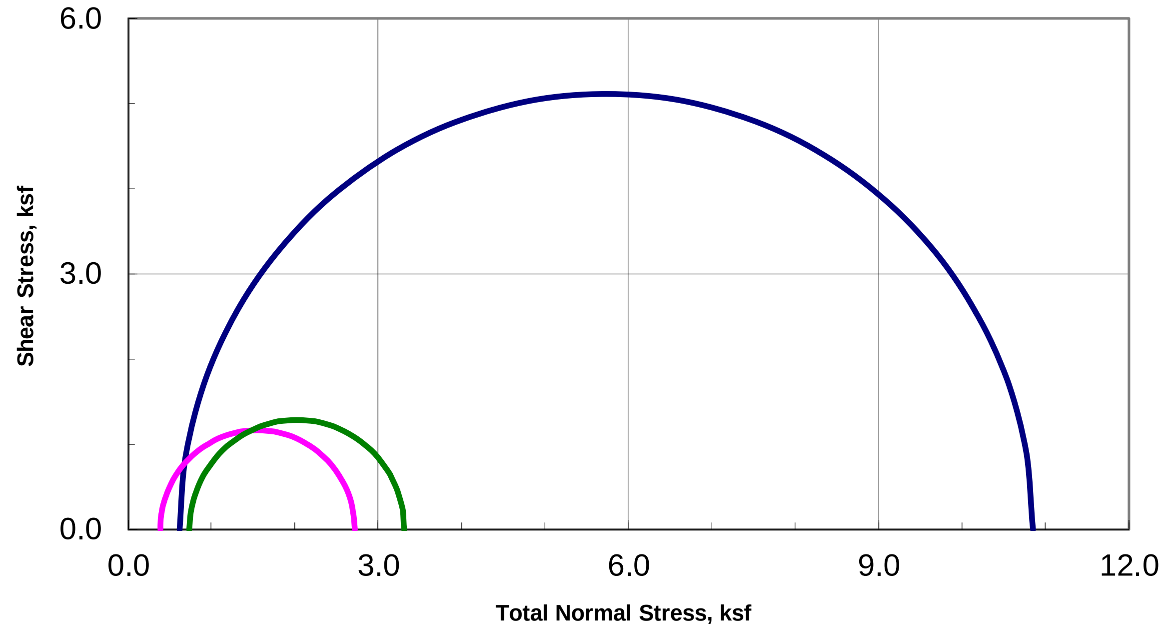
Project: Terra Linda High School-Aquatic Center - 1150-1K

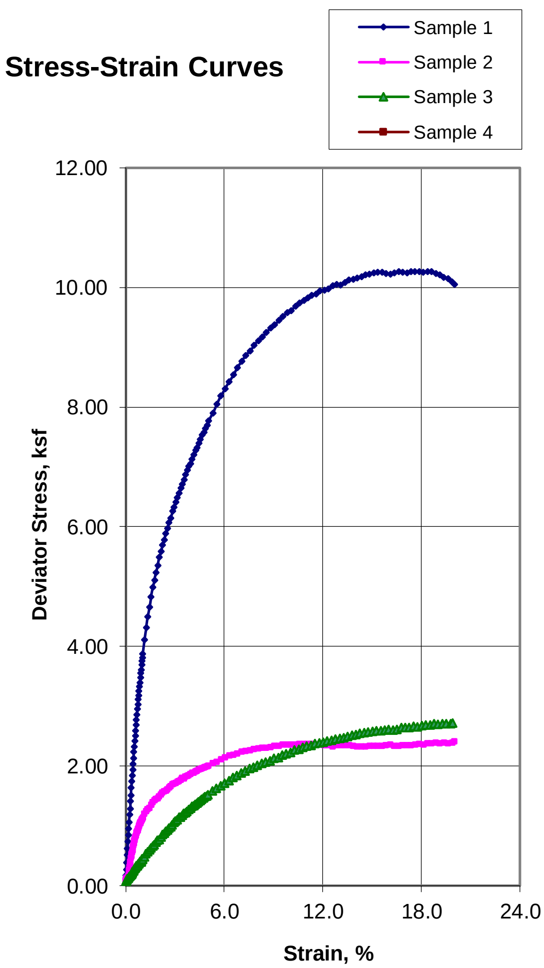
Project No.: 748-060

Figure

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data	1	2	3	4
Moisture %	18.3	16.2	18.9	
Dry Den,pcf	111.9	99.1	111.6	
Void Ratio	0.506	0.701	0.510	
Saturation %	97.8	62.3	99.9	
Height in	5.01	4.99	5.01	
Diameter in	2.42	2.45	2.42	
Cell psi	4.3	2.7	5.1	
Strain %	15.00	15.00	15.00	
Deviator, ksf	10.231	2.333	2.574	
Rate %/min	1.00	1.00	0.99	
in/min	0.050	0.050	0.050	
Job No.:	748-060			
Client:	A3GEO			
Project:	1150-1K			
Boring:	A3-23-2	A3-23-4	A3-23-6	
Sample:	2C	1C	2C	
Depth ft:	5-5.5	2.5-3	5-5.5	

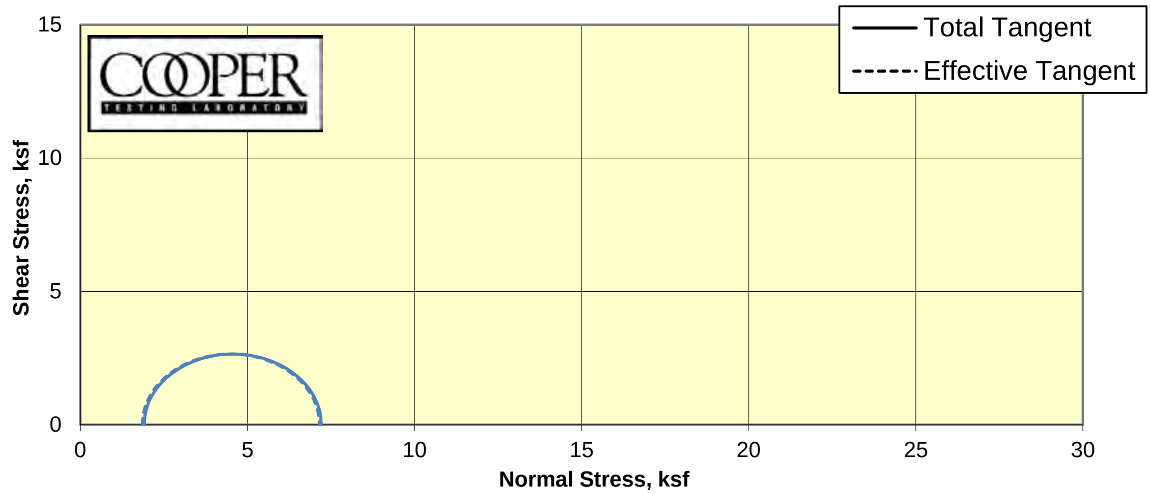
Visual Soil Description

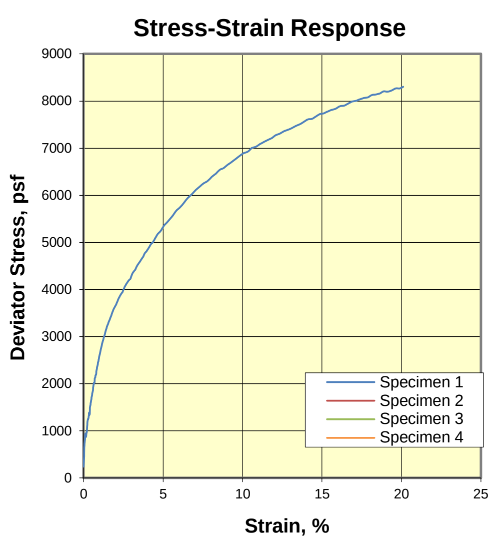
Sample #	
1	Yellowish Brown Sandy Lean CLAY
2	Dark Yellowish Brown Sandy CLAY
3	Dark Yellowish Brown Sandy CLAY
4	

Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767

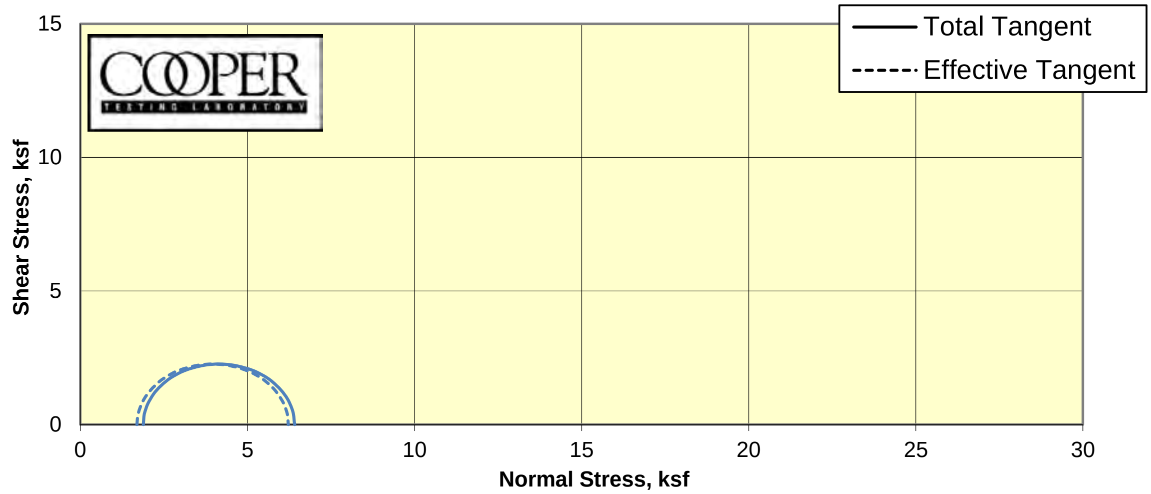


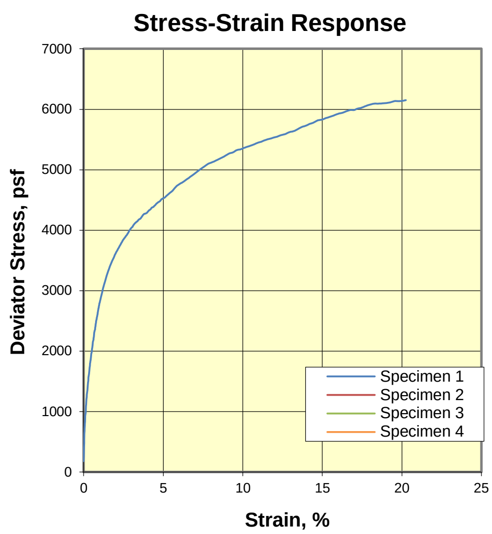


Specimen	1	2	3	4
Boring	A3-23-3			
Sample	3B			
Depth	7.5-8			
Visual Description	Reddish Yellow Sandy CLAY			
MC (%)	16.0			
Dry Density (pcf)	116.6			
Saturation (%)	89.8			
Void Ratio	0.499			
Diameter (in)	2.39			
Height (in)	5.01			
	Final			
MC (%)	17.8			
Dry Density (pcf)	116.6			
Saturation (%)	100.0			
Void Ratio	0.499			
Diameter (in)	2.40			
Height (in)	4.98			
Cell Pressure (psi)	93.7			
Back Pressure (psi)	80.4			
	Effective Stresses At:			
Strain (%)	5.0			
Deviator (ksf)	5.299			
Excess PP (psi)	0.4			
Sigma 1 (ksf)	7.158			
Sigma 3 (ksf)	1.859			
P (ksf)	4.509			
Q (ksf)	2.650			
Stress Ratio	3.850			
Rate (in/min)	0.0004			

CTL Number:	748-060		
Client Name:	A3GEO		
Project Name:	Terra Linda High School- Aquatic Center		
Project Number:	1150-1K		
Date:	8/30/2023	By:	MD/DC
Total C	#DIV/0!	ksf	
Total phi	#DIV/0!	degrees	
Eff. C	#DIV/0!	ksf	
Eff. Phi	#DIV/0!	degrees	©

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767





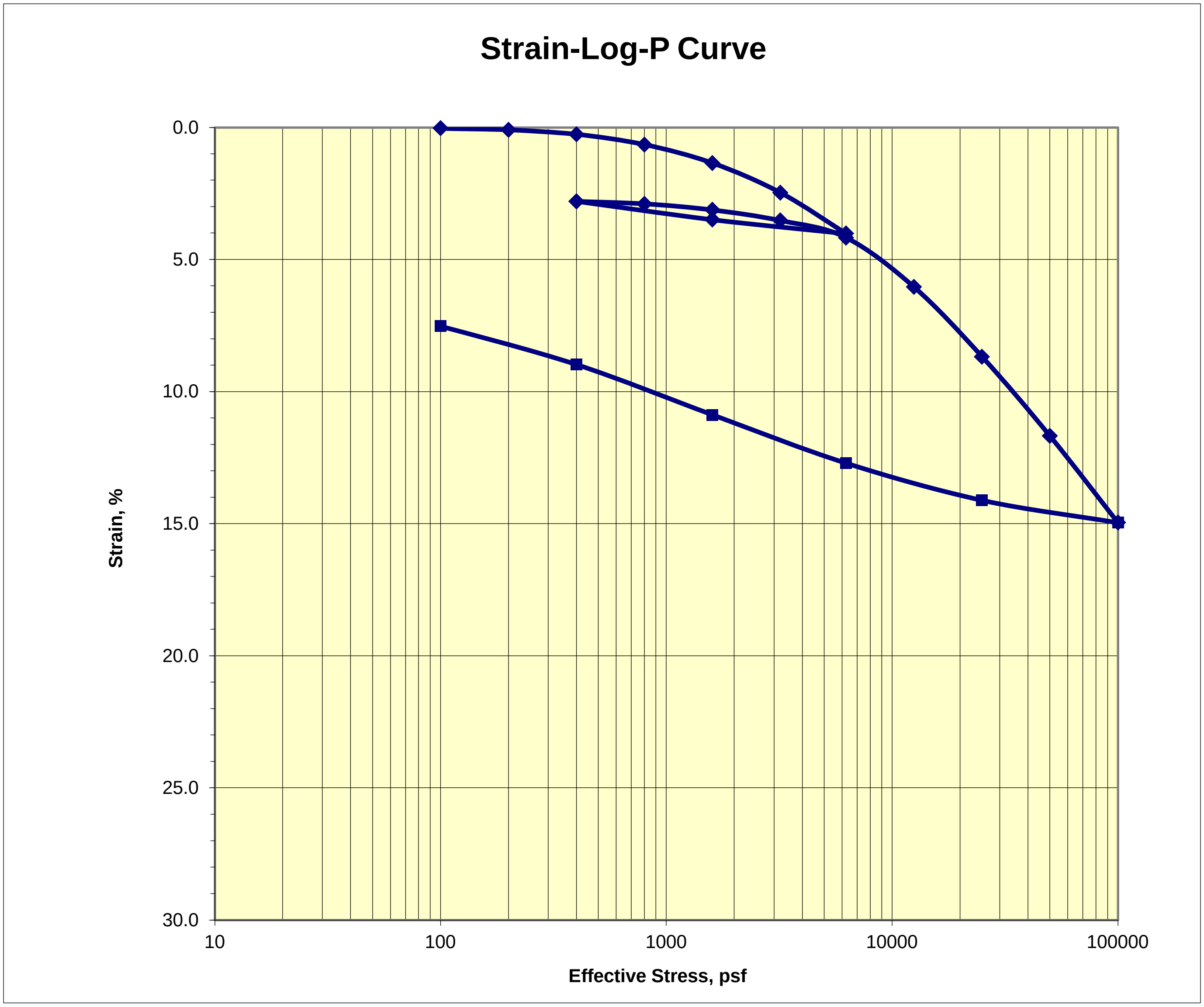
CTL Number:	748-060
Client Name:	A3GEO
Project Name:	Terra Linda High School-Aquatic Center
Project Number:	1150-1K
Date:	8/30/2023 By: MD/DC
Total C	#DIV/0! ksf
Total phi	#DIV/0! degrees
Eff. C	#DIV/0! ksf
Eff. Phi	#DIV/0! degrees

©

Specimen	1	2	3	4
Boring	A3-23-8			
Sample	3C			
Depth	8.5-9			
Visual Description	Reddish Brown Mottled Gray CLAY w/ Sand/ Sandy CLAY			
MC (%)	16.9			
Dry Density (pcf)	114.4			
Saturation (%)	89.6			
Void Ratio	0.528			
Diameter (in)	2.40			
Height (in)	5.02			
	Final			
MC (%)	18.8			
Dry Density (pcf)	114.5			
Saturation (%)	100.0			
Void Ratio	0.527			
Diameter (in)	2.42			
Height (in)	4.95			
Cell Pressure (psi)	93.7			
Back Pressure (psi)	80.6			
	Effective Stresses At:			
Strain (%)	5.0			
Deviator (ksf)	4.528			
Excess PP (psi)	1.3			
Sigma 1 (ksf)	6.226			
Sigma 3 (ksf)	1.699			
P (ksf)	3.962			
Q (ksf)	2.264			
Stress Ratio	3.666			
Rate (in/min)	0.0004			

Consolidation Test
ASTM D2435

Job No.:	748-060	**Boring:**	A3-23-6	**Run By:**	HM
Client:	A3GEO	**Sample:**	3C	**Reduced:**	RU
Project:	1150-1K	**Depth, ft.:**	8-8.5	**Checked:**	PJ
Soil Type:	Yellowish Brown Sandy CLAY w/ Gravel			**Date:**	9/19/2023



Assumed Gs 2.8	Initial	Final
Moisture %:	19.5	17.1
Dry Density, pcf:	109.8	118.2
Void Ratio:	0.591	0.479
% Saturation:	92.2	100.0

Remarks:

Corrosivity Test Summary

CTL # 748-060 **Date:** 9/1/2023 **Tested By:** PJ **Checked:** PJ
Client: A3GEO **Project:** Terra Linda High School- Aquatic Center **Proj. No:** 1150-1K
Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP	Moisture	Soil Visual Description
Boring	Sample, No.	Depth, ft.	As Rec.	Minimum	Saturated	mg/kg	mg/kg	%		(Redox)	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		mv	%	
			ASTM G57	Cal 643	ASTM G57	Cal 422-mod.	Cal 417-mod.	Cal 417-mod.	Cal 643	SM 2580B	ASTM D2216	
A3-23-4	1a	1.5-2.0	-	2155	-	9	179	0.0179	8.2	-	3.4	Brown CLAY w/ Sand
A3-23-6	2b	4.5-5.0	-	2794	-	69	9	0.0009	8.0	-	3.3	Brown CLAY w/ Sand
A3-23-8	1	2.0-3.0	-	1884	-	152	37	0.0037	8.7	-	3.6	Brown CLAY w/ Gravel

APPENDIX D

Previous Borings and CPTs By A3GEO

TLHS
AQUATIC CENTER

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APPENDIX D

Previous Borings and CPTs By A3GEO

February 2017 Borings
(B-1 through B-5)

TLHS
AQUATIC CENTER

A3GEO

A3GEO, Inc.
1331 7th Street; Unit E
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER B-1

CLIENT San Rafael City School District
PROJECT NAME Terra Linda High School - Preliminary Investigation
PROJECT NUMBER 1150-1A
PROJECT LOCATION San Rafael, CA
DATE STARTED 2/22/17 **COMPLETED** 2/22/17
GROUND ELEVATION 81.1 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY RES **CHECKED BY** WM
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		ASPHALTIC CONCRETE [3"]							
		AGGREGATE BASE [6"]							
		LEAN CLAY WITH SAND (CL): reddish brown, medium stiff to stiff, moderate plasticity, fine-medium sand , moist	GB						
		between 3'-4.25': some angular gravels, up to 3/4"	MC	20	>4.5	121	14	83%	32% Gravel 39% Sand -200 = 29%
5		CLAYEY SAND WITH GRAVEL (SC): olive brown, dense, well-graded sand, moist							
			MC	34	4.5 >4.5			83%	
10		CLAYEY SANDSTONE: reddish brown, friable, very deeply weathered, low hardness, fine-medium grained, moist	SPT	53				100%	
15		at 15': increased fine sand and silt content	SPT	81/10"				88%	

Bottom of borehole at 16.3 feet.
1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
3. Ground surface elevation taken from county-provided LiDAR data (NAVD88 datum).
4. Groundwater was not encountered during drilling; hole was backfilled immediately after drilling.

A3GEO, Inc.
1331 7th Street; Unit E
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER B-2

CLIENT San Rafael City School District
PROJECT NAME Terra Linda High School - Preliminary Investigation
PROJECT NUMBER 1150-1A
PROJECT LOCATION San Rafael, CA
DATE STARTED 2/22/17 **COMPLETED** 2/22/17
GROUND ELEVATION 81.2 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY RES **CHECKED BY** WM
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		ASPHALTIC CONCRETE [3"]							
		AGGREGATE BASE [6"]							
		LEAN CLAY WITH SAND (CL): reddish brown, medium stiff, moderate plasticity, fine-medium sand, moist	GB				14		LL = 37 PI = 20
		SANDY LEAN CLAY (CL): reddish brown and dark grey, very stiff, low-moderate plasticity, fine-medium sand, heavy iron staining, moist	MC	20	>4.5 4.5	111	21	94%	1% Gravel 36% Sand -200 = 63%
5		at 7': dark olive brown and reddish brown with grey streaks - decreasing clay content with depth	MC	23				83%	
10		CLAYEY SAND (SC): yellowish brown, dense to very dense, well-graded, primarily fine-medium sand, low plasticity fines, moist at 12': very dense	MC	50/5"	3.5 >4.5			100%	
		SHALE: light olive brown, friable-weak, deeply weathered, low hardness, papery bedding, dry	SPT	50/5"				100%	

Bottom of borehole at 13.3 feet.
1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
3. Ground surface elevation taken from county-provided LiDAR data (NAVD88 datum).
4. Groundwater was not encountered during drilling; hole was backfilled immediately after drilling.

A3GEO, Inc.
1331 7th Street; Unit E
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER B-3

CLIENT San Rafael City School District
PROJECT NAME Terra Linda High School - Preliminary Investigation
PROJECT NUMBER 1150-1A
PROJECT LOCATION San Rafael, CA
DATE STARTED 2/22/17 **COMPLETED** 2/22/17
GROUND ELEVATION 81 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY RES **CHECKED BY** WM
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0	ASPHALTIC CONCRETE [4"]							
	AGGREGATE BASE [3"]							
	LEAN CLAY WITH SAND (CL): olive brown and reddish brown, medium stiff, low-moderate plasticity, fine-medium sand, moist	GB						
	CLAYEY SAND (SC): olive brown, medium dense, low-moderate plasticity, fine-medium sand, some iron staining, some fine-coarse gravel, moist	MC	19		124	14	94%	LL = 37 PI = 21 14% Gravel 40% Sand -200 = 46%
5								
		MC	19	3.0			78%	
	CLAYSTONE: soft to low hardness, friable, deeply weathered, moist							
10	SHALE: dark olive brown, friable to weak, deeply weathered, low hardness, papery to platy bedding, dry	SPT	34				100%	
15		SPT	52				78%	
20		SPT	50/6"				100%	

Bottom of borehole at 21.0 feet.
1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
3. Ground surface elevation taken from county-provided LiDAR data (NAVD88 datum).
4. Groundwater was not encountered during drilling; hole was backfilled immediately after drilling.

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A3GEO, Inc.
1331 7th Street; Unit E
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER B-4

CLIENT San Rafael City School District
PROJECT NAME Terra Linda High School - Preliminary Investigation
PROJECT NUMBER 1150-1A
PROJECT LOCATION San Rafael, CA
DATE STARTED 2/22/17 **COMPLETED** 2/22/17
GROUND ELEVATION 81.1 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 20.00 ft / Elev 61.10 ft
LOGGED BY RES **CHECKED BY** WM
AT END OF DRILLING ---
NOTES
AFTER DRILLING 10.00 ft / Elev 71.10 ft

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0	ASPHALTIC CONCRETE [5"]							
	AGGREGATE BASE [6"]							
	SANDY LEAN CLAY (CL): very dark brown to black with brown sand, medium stiff, low-moderate plasticity, primarily fine-medium sand, some construction debris (nail, staple), moist [FILL]	GB						
	LEAN CLAY WITH SAND (CL): dark grey to black with light grey streaks, medium stiff, low-moderate plasticity, fine-medium sand, some gravel, up to 2", moist (FILL)	MC	7	1.0 1.25	104	22		LL = 36 PI = 16
5								
	at 6.5': stiff, dark olive brown with some iron staining	MC	9	0.75 0.75				
	at 7': some subangular gravel in shoe of sampler, up to 1"							
10								
	LEAN CLAY WITH SAND (CL): yellowish brown with dark brown streaks, stiff, some iron staining, moist	MC	18	>4.5 >4.5	111	18		
15								
	SANDY LEAN CLAY (CL): reddish brown and olive brown, some grey streaks, very stiff, primarily fine-medium sand, high sand content, moist	MC	19	4.25 >4.5				
	SANDSTONE: reddish brown and olive brown, friable-weak, deeply weathered, low hardness, crushed, dry							
20		MC	50/3"					
		SPT	50/3"					

Bottom of borehole at 21.0 feet.
1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
3. Ground surface elevation taken from county-provided LiDAR data (NAVD88 datum).
4. See report for discussion regarding groundwater; hole backfilled shortly after drilling complete.

A3GEO, Inc.
1331 7th Street; Unit E
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER B-5

CLIENT San Rafael City School District
PROJECT NAME Terra Linda High School - Preliminary Investigation
PROJECT NUMBER 1150-1A
PROJECT LOCATION San Rafael, CA
DATE STARTED 2/22/17 **COMPLETED** 2/22/17
GROUND ELEVATION 91.4 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY RES **CHECKED BY** WM
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		SANDY SILT (ML): dark brown, soft, low plasticity, fine-medium sand, moist							
			GB						
		at 3': medium stiff	MC	6	1.5 1.5	107	21		LL = 36 PI = 16
5		SANDY LEAN CLAY (CL): dark olive brown with olive brown and reddish brown spots, stiff, low-moderate plasticity, fine-medium sand, trace coarse sand, moist							
			MC	10	1.5 2.0	110	19		
		- increasing sand content with depth							
10		at 10': very stiff, increased sand content	MC	14	>4.5 >4.5 >4.5				
15		at 15': very stiff, slightly more sand	MC	24	>4.5 >4.5 >4.5				
		SHALE: dark brown, soft-weak, very deeply weathered, soft-low hardness, papery to platey bedding, crushed, some iron staining, damp							
20			SPT	50/5"					

Bottom of borehole at 20.4 feet.
1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
3. Ground surface elevation taken from county-provided LiDAR data (NAVD88 datum).
4. Groundwater was not encountered during drilling; hole was backfilled immediately after drilling.

A3GEO

APPENDIX D

Previous Borings and CPTs By A3GEO

November 2017 Borings
(A3-17-1 through A3-17-9)

TLHS
AQUATIC CENTER

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

BORING NUMBER A3-17-1

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 79.5 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 7.0 ft / Elev 72.5 ft
LOGGED BY DKM **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		3" ASPHALT CONCRETE							
		6" ASPAHALT BASE							
		FAT CLAY (CH) - very dark brown, medium stiff, some fine sand, trace coarse sand, moist to wet [FILL]	GB						
			MC	7	.5				
5		FAT CLAY (CH) - similar to above, except black, brown weathered sandstone clasts present in sample [FILL]							
		SANDY TO GRAVELLY FAT CLAY (CH) - mottled yellowish brown and reddish brown, medium stiff, contains angular decomposed to weathered sandstone and shale clasts, moist to wet [ALLUVIUM/COLLUVIUM]	MC	9	1.0				
10		SILTY SAND (SM) - mottled yellowish brown and reddish brown, trace gravel [ALLUVIUM/COLLUVIUM]							
		CLAYEY SAND (SC) - mottled reddish brown, dark brown and yellowish brown; medium dense; medium to coarse sand; some gravel, and rock fragments [ALLUVIUM/COLLUVIUM]							
		-Lens of light gray FAT CLAY (CH) -Gradual transition to CLAYEY GRAVEL (GC) similiar to SC above	MC	17	2.0 3.0				9% Gravel 46% Sand 45% -200 PI = 22 LL = 40
15		CLAYEY SAND WITH GRAVEL (SC) - mottled reddish brown, dark brown and yellowish brown; medium dense; 15-20% angular to subrounded rock fragments [ALLUVIUM/COLLUVIUM]							
			MC	15					25% Gravel 54% Sand 21% -200 PI = 10 LL = 29
20		-Decreasing gravel/rock size							
		GRAVELLY CLAY WITH SAND (CL) - mottled reddish brown, dark brown and yellowish brown; very stiff [ALLUVIUM/COLLUVIUM]	SPT	29					
		SANDSTONE - yellowish brown, weathered, fine grained, with light grey vertical clay seams along fractures [WEATHERED BEDROCK]							
25			SPT	50/3.0"					

Bottom of borehole at 25.3 feet.
1. Split spoon refusal at 25.3'
2. Borehole was backfilled with cement grout immediately after drilling.
3. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
4. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

GEOTECH BH COLUMN TERM LEFT ALIGNED (2) - A3GEO DATA TEMPLATE.GDT - 1/29/18 11:16 - A:\A3GEO PROJECTS\1150 - SAN RAFAEL CITY SCHOOLS\1150-1B TERRA LINDA HS\BORING LOGS\GINT LOGS\1150-1B TLHS BORING LOGS.GPJ

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

BORING NUMBER A3-17-2

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 80.5 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY EA/LB **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		3" Concrete							
		SANDY CLAY (CL) - very dark gray, stiff, some gravel, contains approximately 10% sandstone clasts, trace rootlets, organic odor, dry [FILL]							
			MC	14	>4.0 3.5				LL = 35 PI = 17
5			MC	10	2.0 1.0				
		FAT CLAY (CH) - dark yellowish brown, dry [FILL]							
		CLAYEY SAND (SC) - mottled light brown to dark brown, medium dense, contains clay seams/tongues and manganese & iron nodules [ALLUVIUM/COLLUVIUM]	MC	20	4.0 4.0				
10		CLAYEY SAND WITH GRAVEL (SC) - brown; dense; pockets of sandy clay with gravel; clasts of sandstone, greenstone, and shale; dry [ALLUVIUM/COLLUVIUM]	MC	33	4.0	124	15		18% Gravel 51% Sand 31% -200
15			MC	27	>4.5				
		SANDY CLAY (CL) / CLAYEY SAND (SC) - mottled olive gray and yellowish brown, very stiff, dry [ALLUVIUM/COLLUVIUM]							
		CLAYEY GRAVEL WITH SAND (GC) - gray to green, very dense, shale and sandstone with clay lined fractures [WEATHERED BEDROCK]	MC	32/5.0"					
20			SPT	50/5.0"					

Bottom of borehole at 21.5 feet.
1. Split spoon refusal at 21.5'
2. No groundwater encountered.
3. Borehole was backfilled with cement grout immediately after drilling.
4. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
5. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

BORING NUMBER A3-17-3

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY DKM **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		2" ASPHALT CONCRETE							
		4" AGGREGATE BASE							
		SANDY CLAY (CL) - gray brown to yellowish brown, stiff, fine to medium grained sand, moist [FILL]	MC	13	4.0				
		SANDY CLAY (CL) - mottled reddish brown, yellowish brown, and dark brown; very stiff; fine to medium grained sand; moist [POSSIBLE FILL]							
5		CLAYEY SAND WITH GRAVEL (SC) - dark yellowish brown, medium dense [POSSIBLE ALLUVIUM/COLLUVIUM]	MC	16	>4.0	112	17		12% Gravel 25% Sand 63% -200
		SANDY LEAN CLAY (CL) - reddish brown to yellowish brown, very stiff, some weathered rock fragments [ALLUVIUM/COLLUVIUM]	MC	12	3.0				
		FAT CLAY WITH SILT (CH) - light gray and yellowish brown, very stiff [ALLUVIUM/COLLUVIUM]							
10		CLAYEY SAND (SC) - yellowish brown and light gray, medium dense, fine to medium grained [ALLUVIUM/COLLUVIUM]							
		CLAYEY SAND (SC) - yellowish brown and gray, high plasticity fines [WEATHERED BEDROCK]	MC	44					
15		WEATHERED SANDSTONE - yellowish brown, medium strong to weak, moderately fractured, with clay filled fractures [WEATHERED BEDROCK] -Shale fragments at 15'	SPT	50/3.0"					

Bottom of borehole at 15.8 feet.
1. Split spoon refusal at 15.8'
2. No groundwater encountered.
3. Borehole was backfilled with cement grout immediately after drilling.
4. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
5. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

BORING NUMBER A3-17-4

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 80.5 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY EA/LB **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		3" CONCRETE							
		SANDY LEAN CLAY (CL) - brown, hard, trace gravel, dry [FILL]							
		SANDY LEAN CLAY (CL) - olive brown, trace gravel, dry [ALLUVIUM/COLLUVIUM]	MC	38	>4.0	120	15		6% Gravel 41% Sand 53% -200 LL = 37 PI = 20 TX UU Su = 8536psf
5		-Increasing sand and gravel. Gravel consists of sandstone clasts.	MC	21	>4.0				
		SANDY CLAY WITH GRAVEL (CL-CH) - dark yellowish brown, very stiff, gravel consists of clasts of greenstone and shale [ALLUVIUM/COLLUVIUM]							
		CLAYEY SAND WITH GRAVEl (SC) - olive brown, reddish brown, yellowish brown, dark gray; dense; gravel consists of shale fragments [ALLUVIUM/COLLUVIUM]	MC	38					
10		CLAYEY GRAVEL WITH SAND AND SANDY FAT CLAY (GC-CH) - olive brown, reddish brown, yellowish brown; hard/dense; white/pale green quartzite present in sample [ALLUVIUM/COLLUVIUM]	MC	37					
15									

Bottom of borehole at 15.0 feet.
1. Exploration terminated at 15' due to hammer winch breakdown.
2. No groundwater encountered.
3. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
4. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
5. Borehole was backfilled with cement grout immediately after drilling.

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

BORING NUMBER A3-17-5

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY DKM **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		4" ASPHALT CONCRETE							
		4" AGGREGATE BASE							
		CLAYEY SAND WITH GRAVEL (SC) - reddish brown, dark brown, yellowish brown; dense; gravel includes rock fragments, moist [FILL] -Blow counts artificially high due to piece of asphalt stuck in spoon	MC	31		112	16		16% Gravel 48% Sand 36% -200 LL = 33 PI = 15
5		SANDY LEAN CLAY WITH SILT (CL) - yellowish brown, very stiff, fine to coarse sand, iron staining, greenstone fragments, moist [ALLUVIUM/COLLUVIUM]	MC	22	3.5				
		-Color change to strong brown -Angular to subrounded sandstone and greenstone clasts at 8'	MC	22					
10		Note: contact estimated SHALE - gray brown, moderately fractured, with clay filled fractures, slightly to moderately weathered, weak to very weak, dry [BEDROCK]	MC	32/5.0"					
15		SHALE, SILTSTONE AND FINE-GRAINED SANDSTONE - gray brown, low hardness, friable, little weathering, intensely fractured [BEDROCK]	SPT	50/5.5"					

Bottom of borehole at 16.0 feet.
1. Split spoon refusal at 16'
2. No groundwater encountered.
3. Borehole was backfilled with cement grout immediately after drilling.
4. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
5. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

BORING NUMBER A3-17-6

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY DKM **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		4" ASPHALT CONCRETE							
		SILTY CLAY (CL) - light brown to reddish yellow, very stiff, some fine to medium grain sand, trace gravel and weathered rock fragments up to 1" diameter, pockets of light grey fat clay, moist [ALLUVIUM/COLLUVIUM]							
5			MC	17	4.0	118	14		
		CLAYEY SAND (SC) - yellowish brown, dense, fine to medium grained, cemented, with seams of light gray fat clay, moist [ALLUVIUM]	MC	55					
10		WEATHERED SANDSTONE - yellowish brown, fine to medium grained, friable to weak with discolored fractures filled with dark brown clay and silt, iron staining [WEATHERED BEDROCK]	SPT	50/5.0"					

Bottom of borehole at 11.4 feet.
1. Split spoon refusal at 11.4'
2. No groundwater encountered.
3. Borehole was backfilled with cement grout immediately after drilling.
4. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
5. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

GEOTECH BH COLUMN TERM LEFT ALIGNED (2) - A3GEO DATA TEMPLATE.GDT - 1/29/18 11:16 - A:\A3GEO PROJECTS\1150 - SAN RAFAEL CITY SCHOOLS\1150-1B TERRA LINDA HS\BORING LOGS\GINT LOGS\1150-1B TLHS BORING LOGS.GPJ

BORING NUMBER A3-17-7

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
∇ **AT TIME OF DRILLING** 19.0 ft / Elev 62.0 ft
LOGGED BY DKM **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		4" CONCRETE							
		2" AGGREGATE BASE							
		SANDY LEAN CLAY (CL) - dark gray brown, fine-medium grained sand, moist [FILL]							
		SANDY LEAN CLAY (CL) - mottled reddish brown, yellowish brown, gray, and dark grey; very stiff; fine-medium sand, some fine gravel, and rock fragments; moist [ALLUVIUM/COLLUVIUM]	MC	22	>4.5				
5									
		CLAYEY SAND WITH GRAVEL (SC) - mottled reddish brown, yellowish brown, gray, and dark grey; medium dense; fine-medium sand; moist [ALLUVIUM/COLLUVIUM]	MC	25	4.0	112	19		
		CLAYEY SAND WITH GRAVEL (SC) - reddish brown, medium dense, rock fragments present, moist [ALLUVIUM/COLLUVIUM]							
10			MC	25	3.0				
15		SHALE - gray brown, moderately hard, weak, moderately weathered, moderately fractured with clay lined fractures [WEATHERED BEDROCK]	MC	30					
	∇		SPT	50/5.0"					

Bottom of borehole at 19.9 feet.
1. Split spoon refusal at 19.9'
2. Borehole was backfilled with cement grout immediately after drilling.
3. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
4. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

BORING NUMBER A3-17-8

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY EA/LB **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		3" CONCRETE							
		CLAYEY SAND (SC) - brown, medium dense, some gravel, dry [ALLUVIUM/COLLUVIUM]							
			MC	20	>4.0				
5		-Similar to above, but with increased gravel content and greenstone fragments up to 1" in diameter	MC	24	3.0				20% Gravel 38% Sand 42% -200 LL = 39 PI = 21
		-Similar to above, except: color change to olive brown, fine to coarse sand, gravel no longer present	MC	32/5.0"	>4.0				
10		SILTY SAND (SM) - brown to strong brown, very dense, highly weathered fine sandstone with minor shale [WEATHERED BEDROCK]							
			SPT	50/3.0"					

Bottom of borehole at 13.3 feet.
1. Split spoon refusal at 13.3'
2. No groundwater encountered.
3. Borehole was backfilled with cement grout immediately after drilling.
4. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
5. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

BORING NUMBER A3-17-9

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY EA/LB **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		3" CONCRETE							
		SANDY CLAY (CL) - gray brown to brown, stiff, trace gravel, slight organic odor, dry [FILL]	MC	11					LL = 33 PI = 16
		SANDY CLAY (CL) - strong brown, stiff, dry [ALLUVIUM/COLLUVIUM]							
5		-Same as above except: yellowish brown, with trace gravel	MC	26	4.0 3.0				
			MC	28		110	20		2% Gravel 42% Sand 56% -200 TX UU Su = 3963psf
10		CLAYEY SAND (SC) - brown to strong brown, medium dense, contains well developed soil tongues and clay along fractures, dry [ALLUVIUM/COLLUVIUM]	MC	23	3.0				
15		CLAYEY/SILTY SAND WITH GRAVEL (SC/SM) - green gray, very dense, friable, highly weathered sandstone, dry [WEATHERED BEDROCK]	MC	32/2.0"					
		-Similar to above except: mottled olive grey with iron staining, blocky greenstone, and clay lined fractures	SPT	50/2.0"					
			SPT	50/3.0"					

Bottom of borehole at 19.3 feet.
1. Split spoon refusal at 19.3'
2. No groundwater encountered.
2. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
3. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
4. Borehole was backfilled with cement grout immediately after drilling.

A3GEO

APPENDIX D

Previous Borings and CPTs By A3GEO

November 2017 CPTs
(CPT-1 through CPT-4)

TLHS
AQUATIC CENTER

February 24, 2017

A3GEO
Attn: Wayne Magnusen

Subject: CPT Site Investigation
SRCS/Terra Linda High School
San Rafael, California
GREGG Project Number: 17-026MA

Dear Mr. Magnusen:

The following report presents the results of GREGG Drilling & Testing's Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☒
2	Pore Pressure Dissipation Tests	(PPD)	☒
3	Seismic Cone Penetration Tests	(SCPTU)	☐
4	UVOST Laser Induced Fluorescence	(UVOST)	☐
5	Groundwater Sampling	(GWS)	☐
6	Soil Sampling	(SS)	☐
7	Vapor Sampling	(VS)	☐
8	Membrane Interface Probe	(MIP)	☐
9	Vane Shear Testing	(VST)	☐
10	Dilatometer Testing	(DMT)	☐

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact our office at (925) 313-5800.

Sincerely,
GREGG Drilling & Testing, Inc.

Mary Walden

Mary Walden
Operations Manager

Cone Penetration Test Sounding Summary

-Table 1-

CPT Sounding Identification	Date	Termination Depth (feet)	Depth of Groundwater Samples (feet)	Depth of Soil Samples (feet)	Depth of Pore Pressure Dissipation Tests (feet)
CPT-01	2/22/17	25	-	-	24.6
CPT-02	2/22/17	21	-	-	-
CPT-03	2/22/17	23	-	-	-
CPT-04	2/22/17	18	-	-	17.7

Bibliography

Lunne, T., Robertson, P.K. and Powell, J.J.M., "Cone Penetration Testing in Geotechnical Practice" E & FN Spon. ISBN 0 419 23750, 1997

Roberston, P.K., "Soil Classification using the Cone Penetration Test", Canadian Geotechnical Journal, Vol. 27, 1990 pp. 151-158.

Mayne, P.W., "NHI (2002) Manual on Subsurface Investigations: Geotechnical Site Characterization", available through www.ce.gatech.edu/~geosys/Faculty/Mayne/papers/index.html, Section 5.3, pp. 107-112.

Robertson, P.K., R.G. Campanella, D. Gillespie and A. Rice, "Seismic CPT to Measure In-Situ Shear Wave Velocity", Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8, 1986 pp. 791-803.

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Robertson, P.K., T. Lunne and J.J.M. Powell, "Geo-Environmental Application of Penetration Testing", Geotechnical Site Characterization, Robertson & Mayne (editors), 1998 Balkema, Rotterdam, ISBN 90 5410 939 4 pp 35-47.

Campanella, R.G. and I. Weemees, "Development and Use of An Electrical Resistivity Cone for Groundwater Contamination Studies", Canadian Geotechnical Journal, Vol. 27 No. 5, 1990 pp. 557-567.

DeGroot, D.J. and A.J. Lutenegger, "Reliability of Soil Gas Sampling and Characterization Techniques", International Site Characterization Conference - Atlanta, 1998.

Woeller, D.J., P.K. Robertson, T.J. Boyd and Dave Thomas, "Detection of Polyaromatic Hydrocarbon Contaminants Using the UVIF-CPT", 53rd Canadian Geotechnical Conference Montreal, QC October pp. 733-739, 2000.

Zemo, D.A., T.A. Delfino, J.D. Gallinatti, V.A. Baker and L.R. Hilpert, "Field Comparison of Analytical Results from Discrete-Depth Groundwater Samplers" BAT EnviroProbe and QED HydroPunch, Sixth national Outdoor Action Conference, Las Vegas, Nevada Proceedings, 1992, pp 299-312.

Copies of ASTM Standards are available through www.astm.org

Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*.

The cone takes measurements of tip resistance (q_c), sleeve resistance (f_s), and penetration pore water pressure (u_2). Measurements are taken at either 2.5 or 5 cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (*PPDT*). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

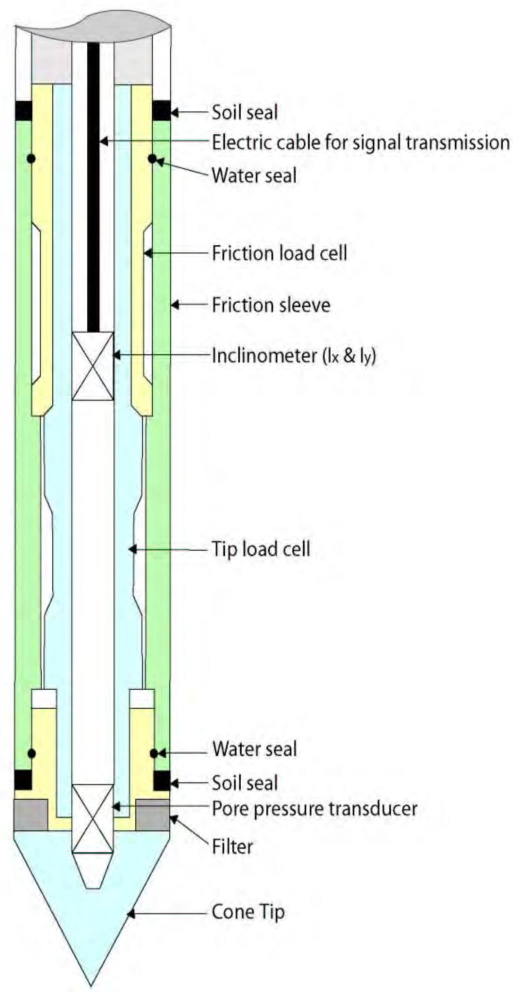


Figure CPT

Gregg 15cm^2 Standard Cone Specifications

Dimensions	
Cone base area	15 cm^2
Sleeve surface area	225 cm^2
Cone net area ratio	0.80
Specifications	
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

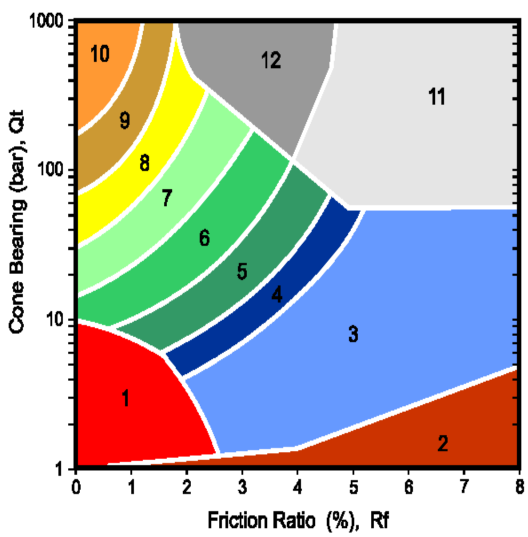
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.



ZONE		SBT
1		Sensitive, fine grained
2		Organic materials
3		Clay
4		Silty clay to clay
5		Clayey silt to silty clay
6		Sandy silt to clayey silt
7		Silty sand to sandy silt
8		Sand to silty sand
9		Sand
10		Gravely sand to sand
11		Very stiff fine grained*
12		Sand to clayey sand*

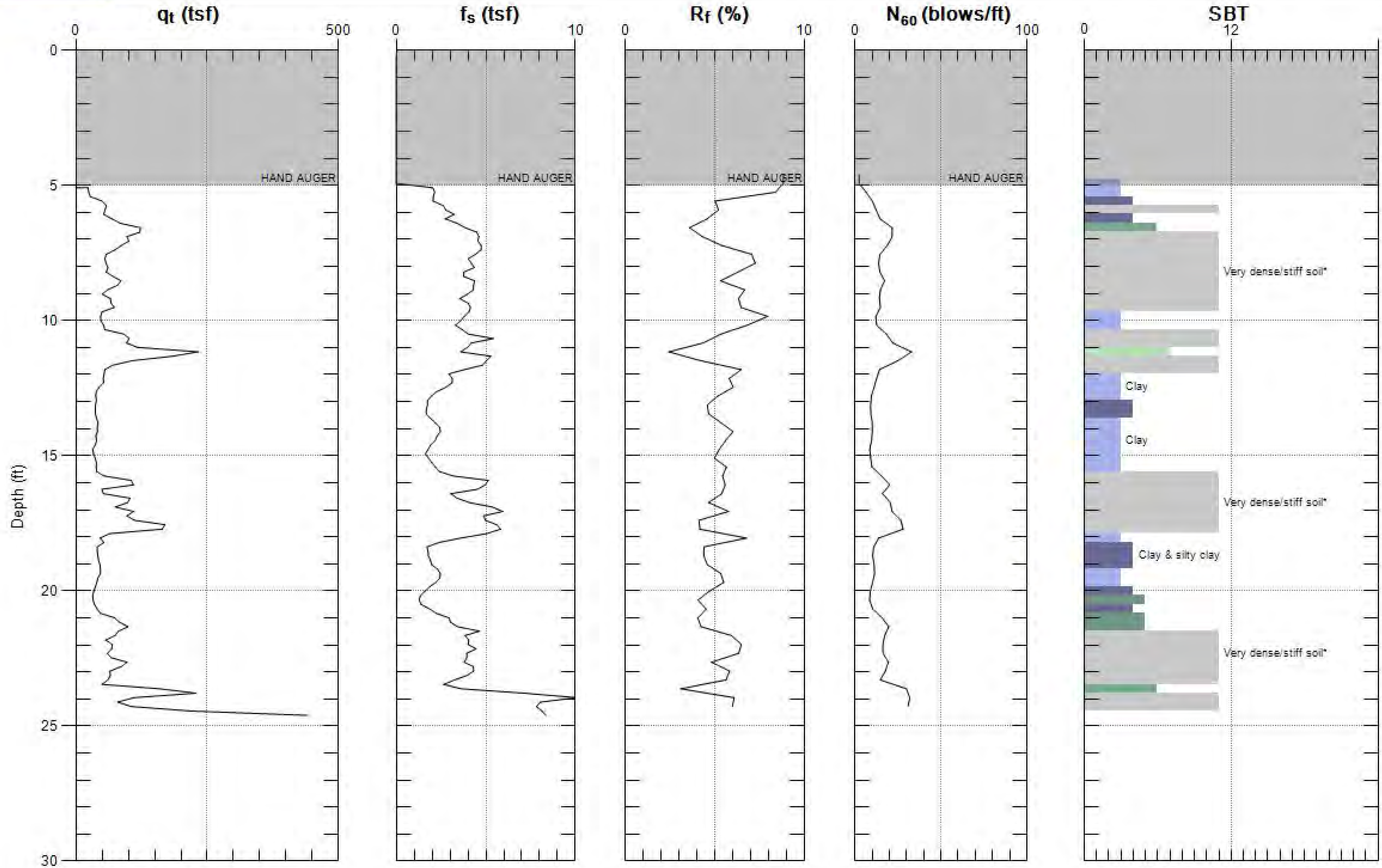
*over consolidated or cemented

Figure SBT (After Robertson et al., 1986) – Note: Colors may vary slightly compared to plots

GREGG **A3GEO**

Site: TERRA LINDA H.S.
Sounding: CPT-1A

Engineer: J.VAN DEN BERG
Date: 2/22/17 09:24



Max. Depth: 24.606 (ft)
Avg. Interval: 0.328 (ft)

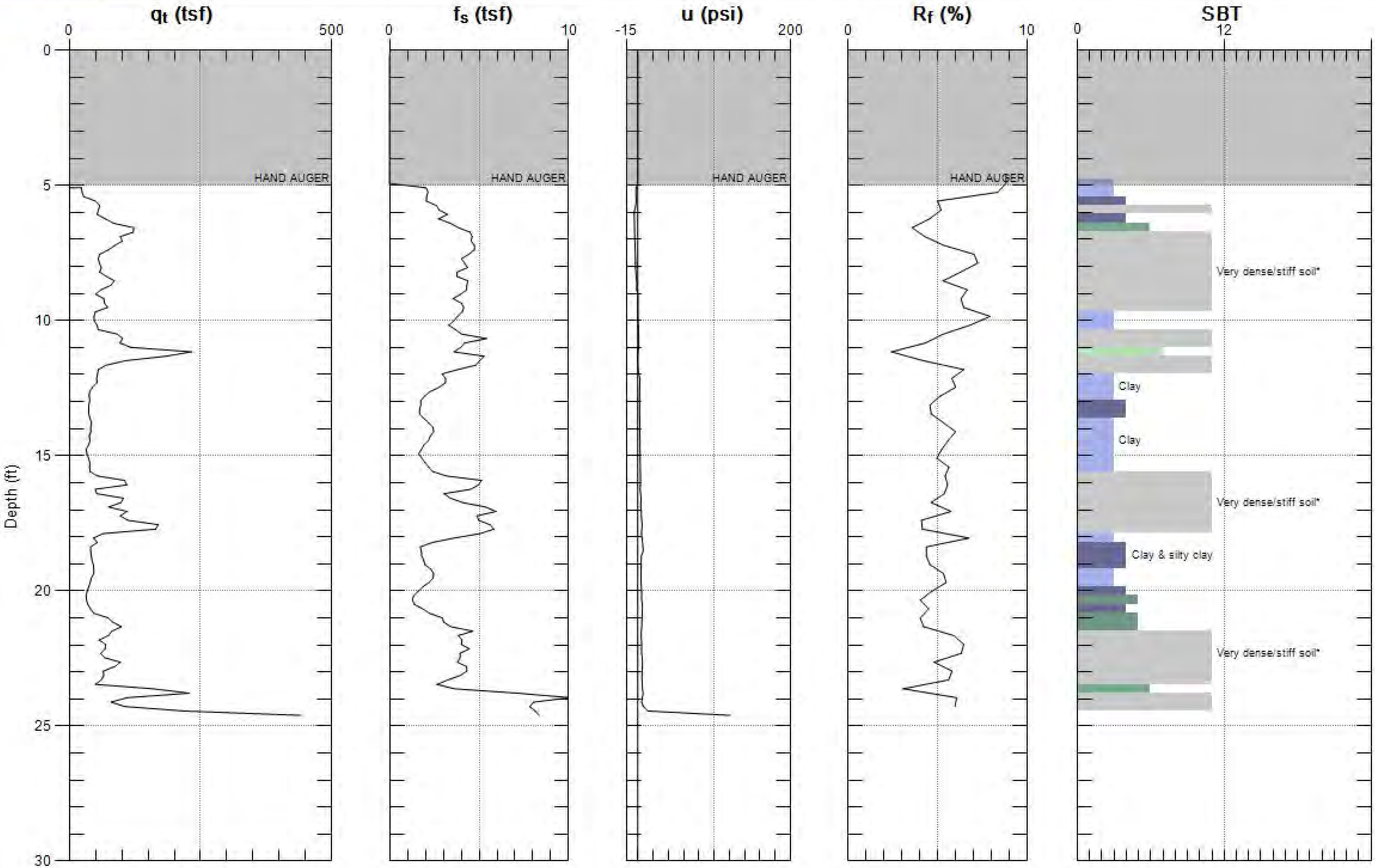
SBT: Soil Behavior Type (Robertson 1990)

GREGG

A3GEO

Site: TERRA LINDA H.S.
Sounding: CPT-1A

Engineer: J.VAN DEN BERG
Date: 2/22/17 09:24



Max. Depth: 24.606 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

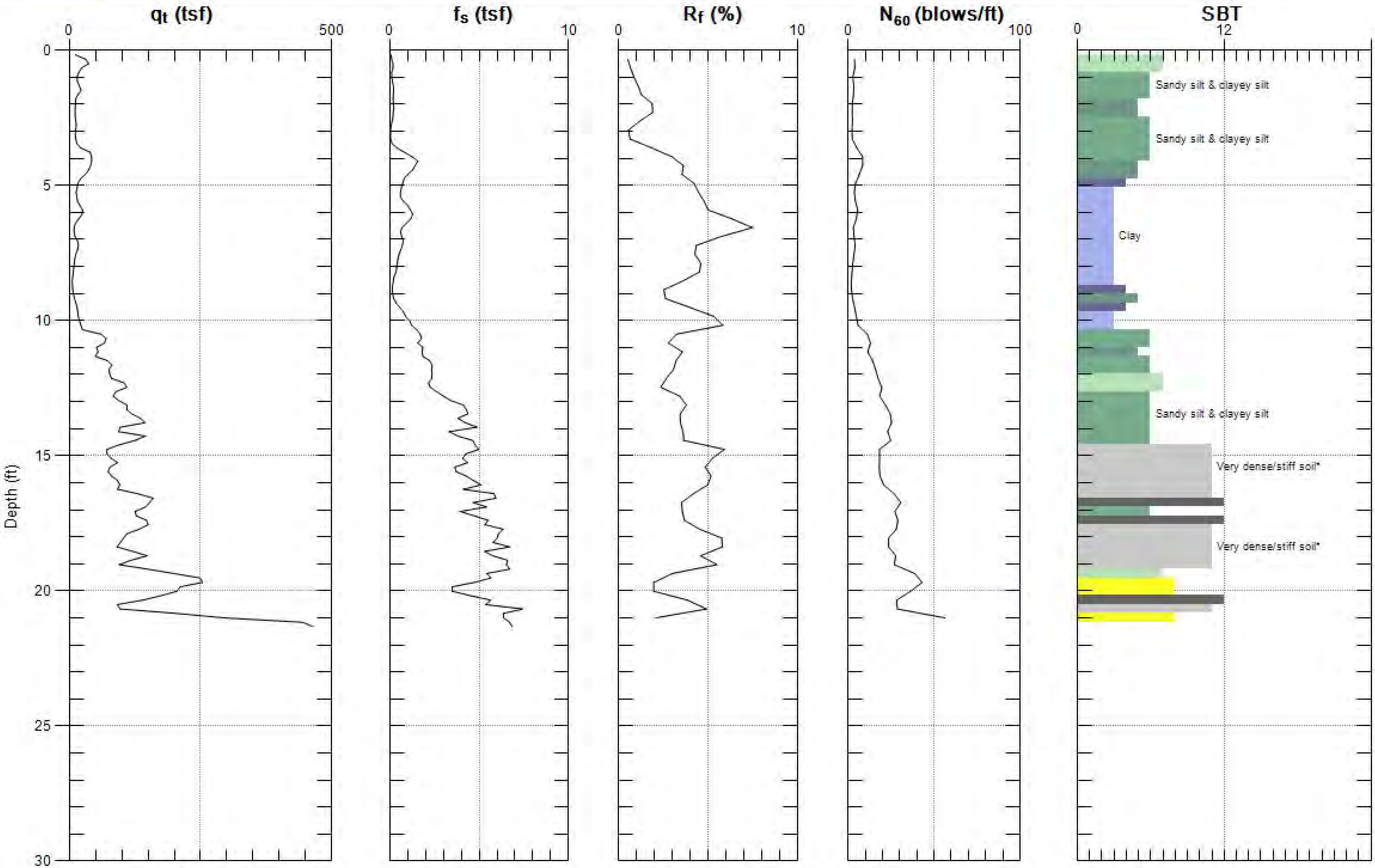
A3GEO

Site: TERRA LINDA H.S.

Sounding: CPT-02

Engineer: J.VAN DEN BERG

Date: 2/22/17 08:08



Max. Depth: 21.325 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

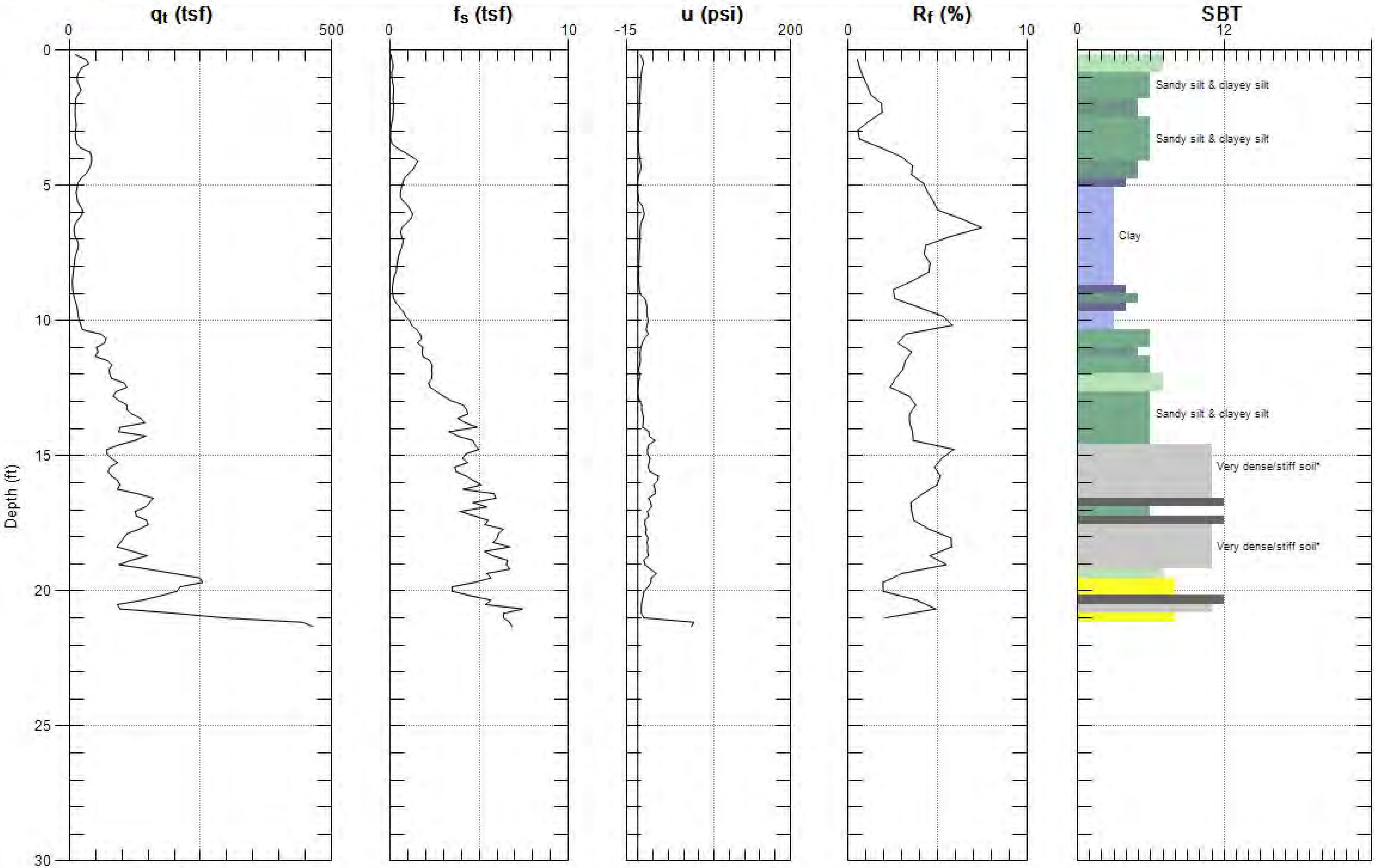
A3GEO

Site: TERRA LINDA H.S.

Sounding: CPT-02

Engineer: J.VAN DEN BERG

Date: 2/22/17 08:08



Max. Depth: 21.325 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

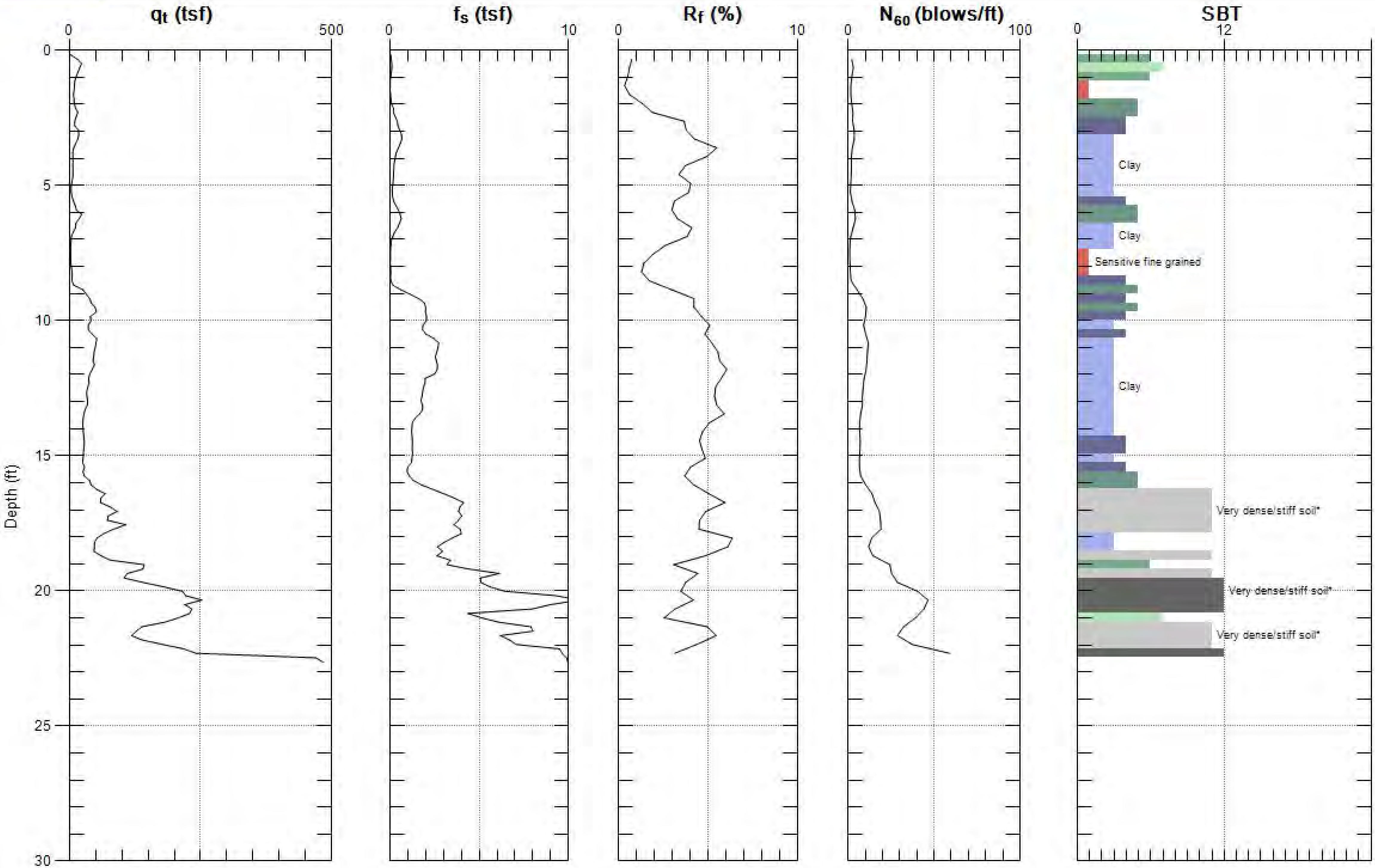
A3GEO

Site: TERRA LINDA H.S.

Engineer: J.VAN DEN BERG

Sounding: CPT-03

Date: 2/22/17 10:38



Max. Depth: 22.638 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

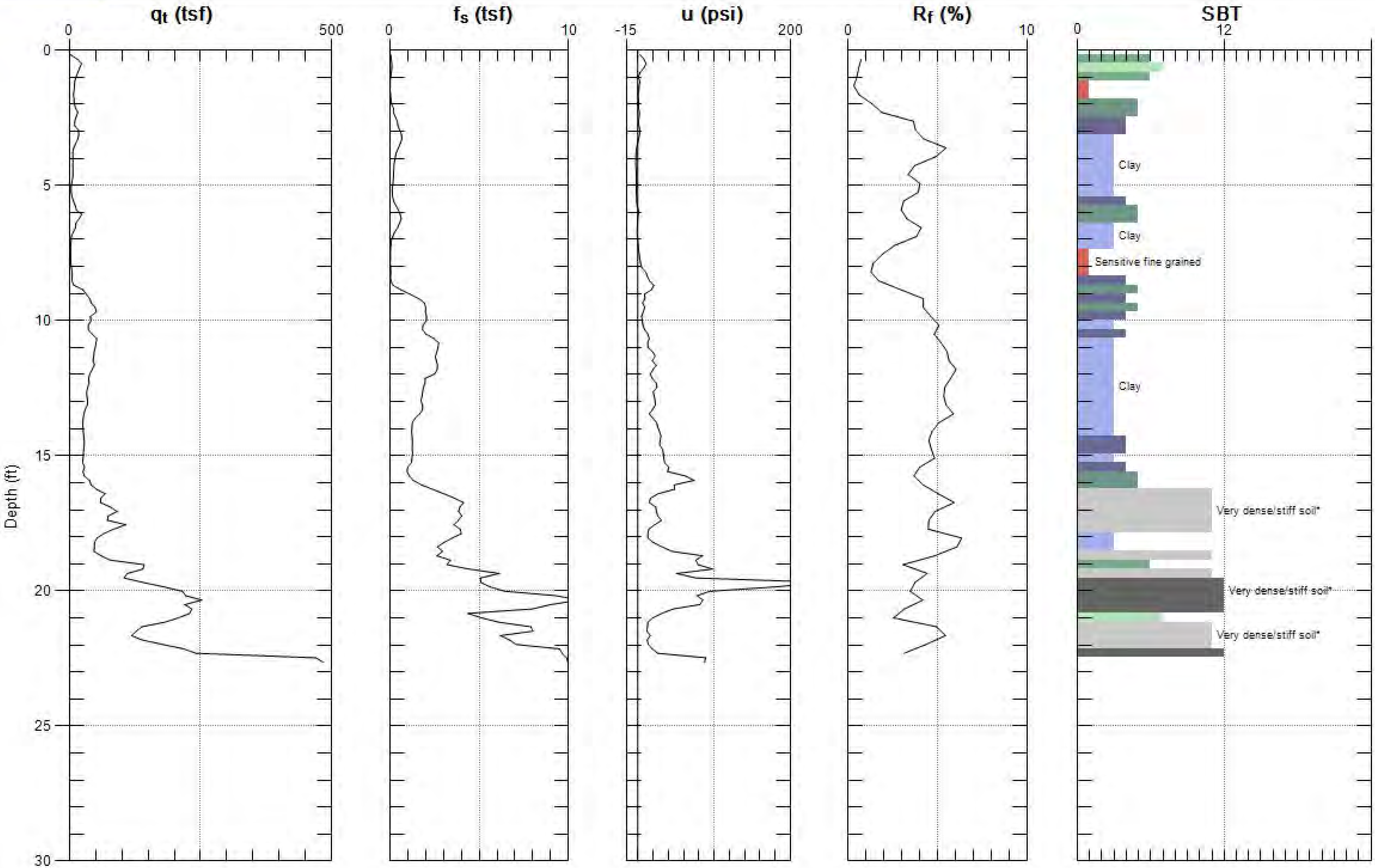
A3GEO

Site: TERRA LINDA H.S.

Sounding: CPT-03

Engineer: J.VAN DEN BERG

Date: 2/22/17 10:38



Max. Depth: 22.638 (ft)
Avg. Interval: 0.328 (ft)

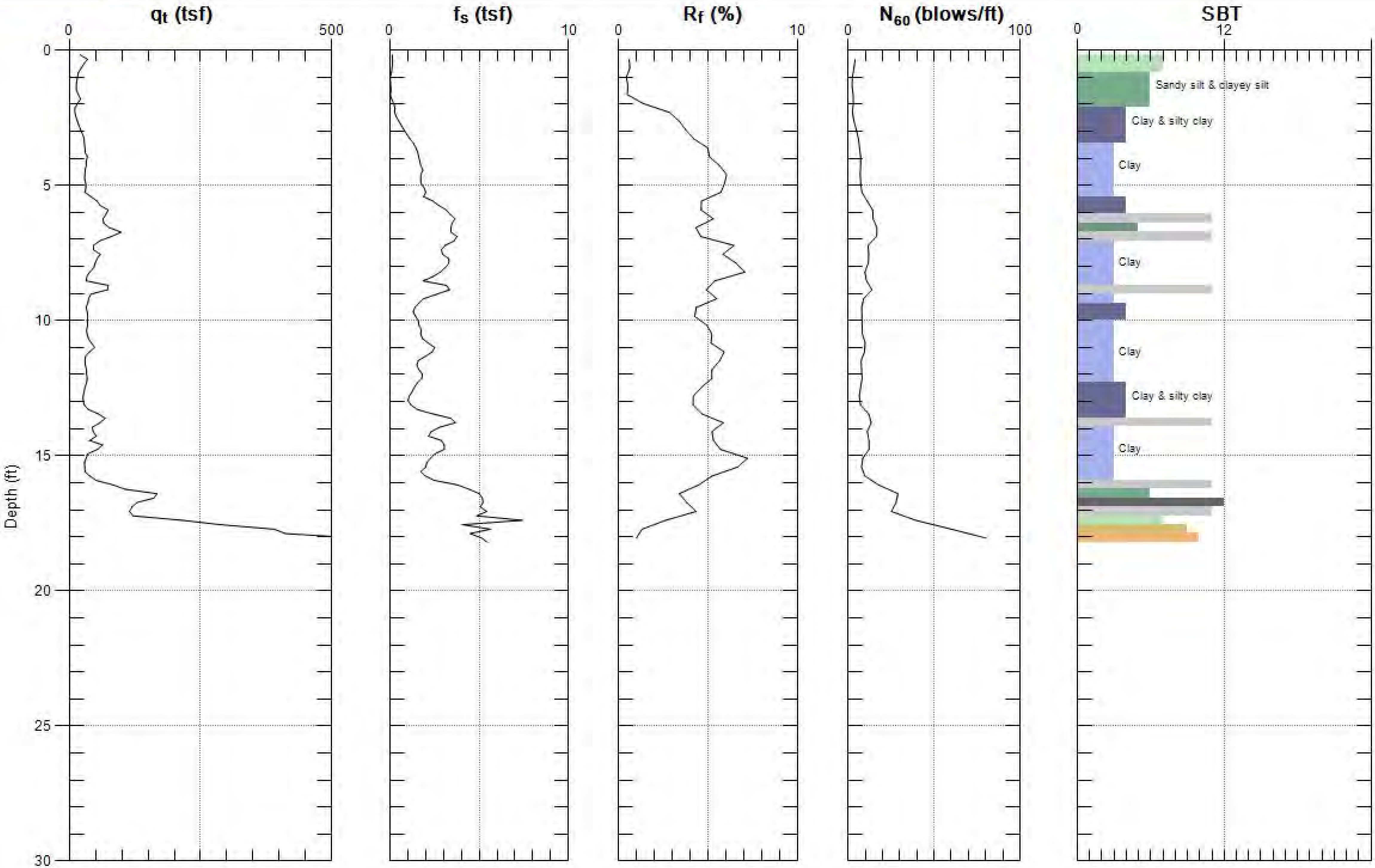
SBT: Soil Behavior Type (Robertson 1990)

GREGG

A3GEO

Site: TERRA LINDA H.S.
Sounding: CPT-04

Engineer: J.VAN DEN BERG
Date: 2/22/17 11:34



Max. Depth: 18.209 (ft)
Avg. Interval: 0.328 (ft)

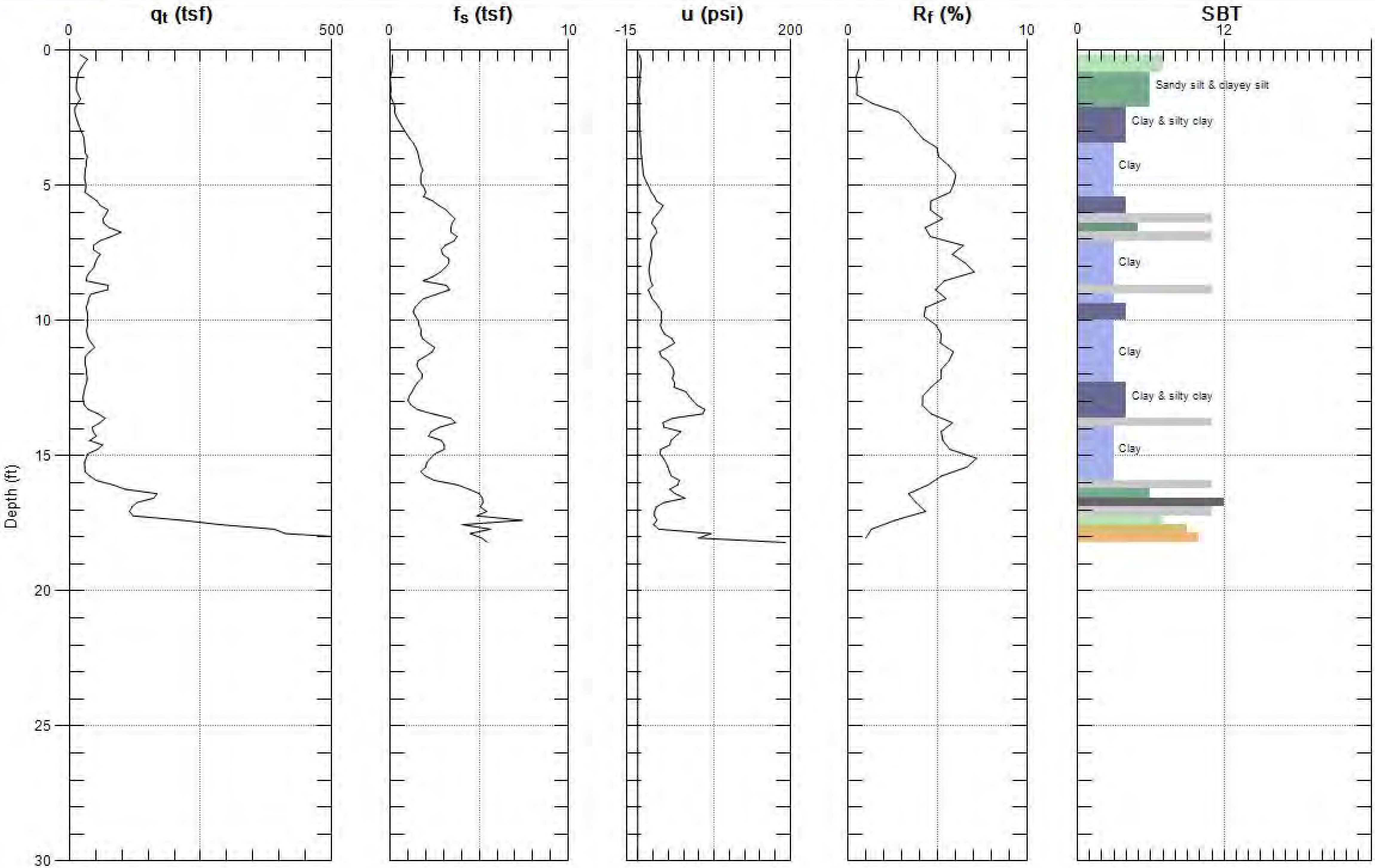
SBT: Soil Behavior Type (Robertson 1990)

GREGG

A3GEO

Site: TERRA LINDA H.S.
Sounding: CPT-04

Engineer: J.VAN DEN BERG
Date: 2/22/17 11:34



Max. Depth: 18.209 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

A3GEO

APPENDIX D

Previous Borings and CPTs By A3GEO

November 2021 Borings
(A3-21-1 and A3-21-2)

TLHS
AQUATIC CENTER

A3GEO, Inc.
821 Bancroft Way
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER A3-21-1

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Ceramics Building
PROJECT NUMBER 1150-1H
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/23/21 **COMPLETED** 11/23/21
GROUND ELEVATION 81 ft NAVD88 **HOLE SIZE** 4
DRILLING CONTRACTOR Taber Drilling Co.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING --- Not Encountered
LOGGED BY AW **CHECKED BY** DB/JB
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		Grass, Roots, and Topsoil							
		LEAN CLAY WITH SAND (CL) - stiff, very dark grayish brown (10YR 3/2), moist, fine to medium grained sand, low to moderate plasticity, trace root fragments (Probable Fill / Mixed Alluvium)	GB 1						Corrosion Test LL=39, PI=20
5		SANDY LEAN CLAY (CL) - very stiff, dark yellowish brown (10YR 4/4 to 4/6), some red and gray mottling, moist, fine to medium grained sand, moderate plasticity, gravel is angular to subrounded up to 0.5" diameter; sandstone and greenstone clasts; clay matrix with clay films (Alluvium)	MC 2	29	107	4.5+	18	100	Gravel=10% Sand=37% -#200=53%
		SANDY LEAN CLAY (CL) - very stiff, yellowish brown to brown (10YR 5/4 to 7.5YR 4/3), some red and gray mottling, moist, fine to medium grained sand, moderate plasticity; clay matrix bridges sand grains and gravel clasts; gravel clasts are subrounded to rounded and less than 1-inch; highly weathered sandstone with some greenstone; FeO2 and MnO2 staining (Alluvium)							driller noted harder at 9 ft
10			MC 3	39	123		14	89	Gravel=19% Sand=51% -#200=30%
		CLAYEY SAND WITH GRAVEL (SC) - dense, brown (7.5YR 5/4 to 5/5), some red and gray mottling, moist, low plasticity, fine to medium grained sand, some FeO2 staining; sandstone and greenstone clasts up to 2-inch diameter (Alluvium) - increase in medium to coarse grained sand with depth							driller noted harder at 12 ft
15		SANDSTONE - pale brown to slight yellowish brown (10YR 6/3 to 6/4), deeply weathered, weak, low to moderately hard, slightly moist (Franciscan Complex) - at 15 feet, fine-grained sandstone, weathered, tight fractures that are FeO2 stained	SPT 4	50/3"				100	
20		- at 20 feet, light gray, very fine grained sandstone with shale	SPT 5	50/0.5"				50	
25		- at 25 feet, gray, very fine-grained sandstone with shale/siltstone	SPT 6	50/0.5"				50	

Bottom of borehole at 25.1 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Elevations were estimated using the 'Terra Linda High School Topographic Map' from BKF dated 2017 and reference North American Vertical Datum of 1988.
3. Modified California (MC) blowcounts adjusted by multiplying field blowcounts by a factor 0.63.
4. Borehole was backfilled with cement grout upon completion. Free groundwater was not encountered within the borehole.
5. Average hammer efficiency = 76%.

A3GEO

A3GEO, Inc.
821 Bancroft Way
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER A3-21-2

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Ceramics Building
PROJECT NUMBER 1150-1H
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/23/21 **COMPLETED** 11/23/21
GROUND ELEVATION 81 ft NAVD88 **HOLE SIZE** 8
DRILLING CONTRACTOR Taber Drilling Co.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- Not Encountered
LOGGED BY AW **CHECKED BY** DB/JB
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0	Grass, Roots, and Topsoil							
	CLAYEY SAND (SC) - very stiff, very dark grayish brown to very dark brown (2YR 2/2) moist, fine to medium grained sand, low plasticity, with roots, some organics and root fragments; classic topsoil with organics (Probable Fill / Mixed Alluvium)	GB 1						
5	SANDY LEAN CLAY (CL) - very stiff, very dark grayish brown (10YR 3/2), fine grained sand, moderate to high plasticity, some rootlets and wood fragments (Probable Fill or Alluvium)	MC 2	25	97	2.75	23	78	Gravel=0% Sand=32% -#200=68% LL=43, PI=23
	SANDY LEAN CLAY (CL) - very stiff, brown to dark brown (10YR 5/3 to 7.5YR 3/2), some red and gray mottling, moist, fine to medium grained sand, moderate plasticity; clay matrix bridges sand grains and gravel clasts; gravel clasts are weathered angular sandstone; FeO2 and MnO2 staining (Alluvium)							
10	- layer of brown lean clay with sand from 10.5 - 10.75 ft	MC 3	37		4.5+		67	
	CLAYEY SAND WITH GRAVEL (SC) - dense, dark brown (10YR 3/3 to 7.5YR 3/3), some red and gray mottling, moist, fine to medium grained sand, gravel clasts are weathered sandstone, greenstone and shale up to 0.5-inch diameter; subangular to subrounded; clay matrix and clay films (Alluvium)							Gravel=25% Sand=48% -#200=27%
15	SANDSTONE - yellowish brown (10YR 5/4 to 5/6), deeply weathered, weak, low hardness, moist; fine to medium grained; fractures healed with clay and MnO2 (Franciscan Complex)	SPT 4	57				100	
	SHALE / MELANGE - gray to dark gray, deeply weathered, low hardness, friable, intensely fractured, slightly moist, some FeO2 staining along fractures (Franciscan Complex)							driller noted harder at 18 ft
20		SPT 5	50/5.5"				108	
25	- at 25 feet, dark gray, melange fabric with less weatehred shale as fine clasts	SPT 6	50/5.5"				100	

Bottom of borehole at 26.0 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Elevations were estimated using the 'Terra Linda High School Topographic Map' from BKF dated 2017 and reference North American Vertical Datum of 1988.
3. Modified California (MC) blowcounts adjusted by multiplying field blowcounts by a factor 0.63.
4. Borehole was backfilled with cement grout upon completion. Free groundwater was not encountered within the borehole.
5. Average hammer efficiency = 76%.

A3GEO

APPENDIX E

Previous Borings and CPTs By MPEG

August 2003 Borings and CPTs
(B-1, B-2 and CPT-1)

BORING 1

EQUIPMENT: CME 75 - 8" Hollow Stem Auger
DATE: 8/14/03
ELEVATION: 79.6 feet*
*REFERENCE: City of San Rafael Topo Map used for Elevation

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)
	1600	42	15.2	112.0
	1100	50	12.3	116.0
	1100	29	14.9	110.0
		50/1"	9.9	

DEPTH: meters 0 – 6; feet 0 – 20

2.5" ASPHALT CONCRETE
2" AGGREGATE BASE

SILTY SANDY CLAY (CL) (COLLUVIUM)
mottled orange-red to brown, dry, stiff to very stiff, low plasticity, 15% - 20% fine to medium grained sands

SILTY SANDY CLAY WITH GRAVEL (CL)
light brown to brown, dry, very stiff, low plasticity, 15% - 20% fine to coarse grained sands, 5% - 10% fine to medium graded gravel to 3/4"

Grades brown to dark brown

SANDSTONE (SS)
moderately weathered, light brown to brown, fine to medium grained sands

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: Boring Logs 779-12.dwg

Miller Pacific ENGINEERING GROUP

BORING LOG
San Rafael City Schools - Terra Linda High
San Rafael, California

A-3

Project No. 779.12 Date 09/03/03 Approved By: [signature]

Figure

BORING 1 (CONTINUED)

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (3)	DESCRIPTION
						20			SANDSTONE (SS) moderately weathered, light brown to brown, fine to medium grained sands
					7				
									grades to slightly weathered, light gray to gray, fine to medium grained sands
		50/0"				25	☒		
									Bottom of boring at 25.3' No groundwater observed during drilling
					8				
					9				
						30			
					10				
						35			
					11				
					12				
						40			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: Boring Logs 779-12.dwg

Miller Pacific
ENGINEERING GROUP

BORING LOG
San Rafael City Schools - Terra Linda High
San Rafael, California

A-4

Project No. 779.12 | Date 09/03/03 | Approved By: [signature] | Figure

BORING 2

EQUIPMENT: CME 75 - 8" Hollow Stem Continuous Flight Auger
DATE: 8/14/03
ELEVATION: 79.6 feet*
*REFERENCE: City of San Rafael Topo Map, DPW, 1998

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters / feet	SAMPLE	SYMBOL (3)	DESCRIPTION
					0 - 0			2.5" ASPHALT CONCRETE
								2" AGGREGATE BASE
								SILTY SANDY CLAY (CL) (COLLUVIUM) mottled orange-red to brown, dry, stiff to very stiff, low plasticity, 15% - 20% fine to medium grained sands
	1400	34	19.9	103.0	1			
					5			
					2			
	2200	61	13.8	119.0				SILTY SANDY CLAY w/ GRAVEL (CL) light brown to brown, dry, very stiff, low plasticity, 15% - 20% fine to coarse grained sands, 5% - 10% fine to medium graded gravel to 3/4"
					3 - 10			
		50/5"	12.7					SANDSTONE (SS) moderately weathered, light brown to brown, fine to medium grained sands
					4			
					15			
					5			Bottom of boring at 16' No groundwater observed during drilling
					6 - 20			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

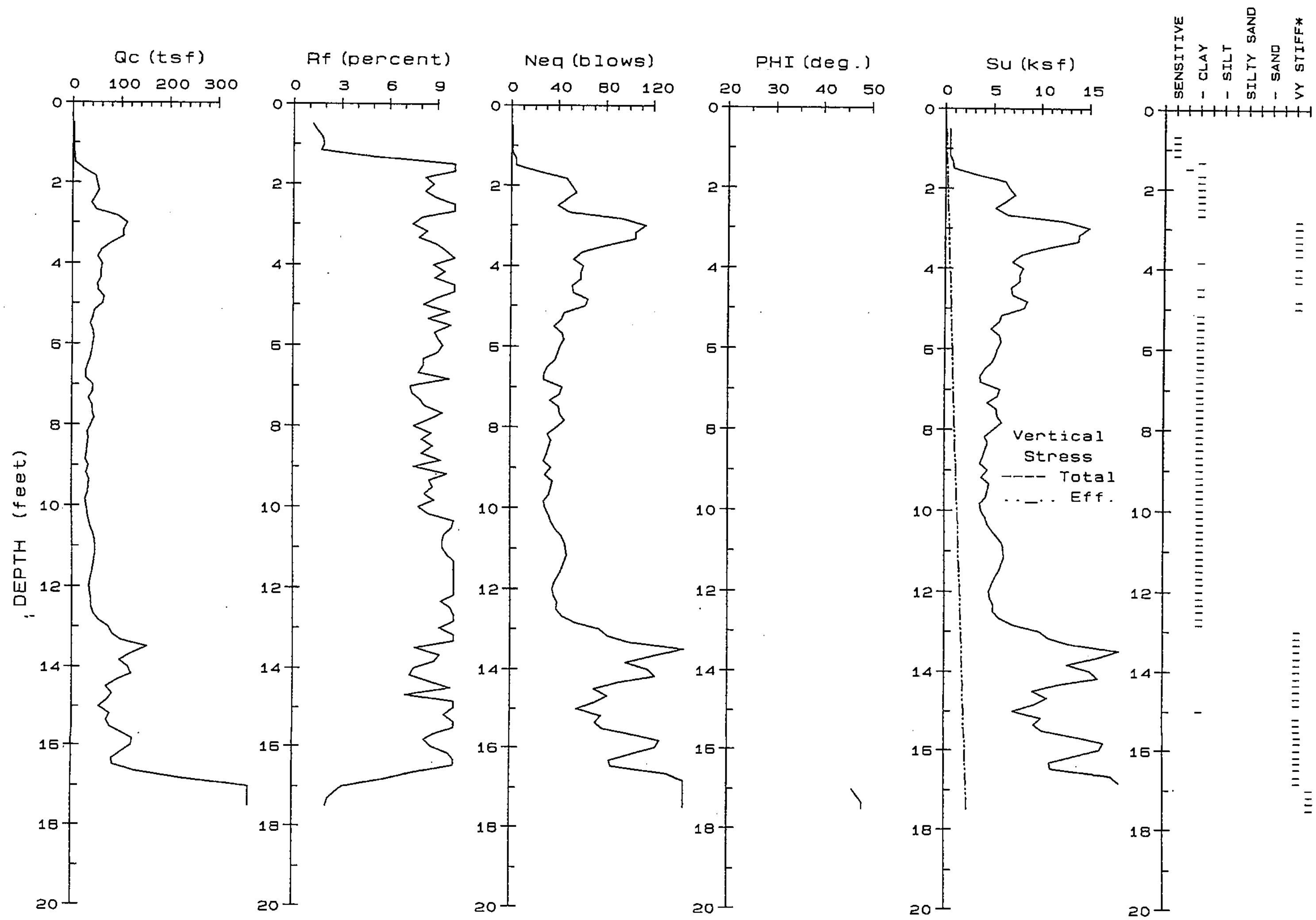
FILE: Boring Logs 779-12.dwg

Miller Pacific
ENGINEERING GROUP

BORING LOG
San Rafael City Schools - Terra Linda High
San Rafael, California

A-5

Project No. 779.12 | Date 09/03/03 | Approved By: [signature] | Figure



Terminated at 17.5 feet

Groundwater not encountered

PROJECT: SAN RAFAEL CITY SCHOOLS - TERRA LINDA
LOCATION: San Rafael CA
PROJ. NO.: 779.12 (MPE-09)

CPT NO.: CPT-1
DATE : 08-19-2003

John Sarmiento & Associates
Cone Penetration Testing Service

FILE: CPT LOGS 779.12TL.dwg

Miller Pacific
ENGINEERING GROUP

CONE PENETRATION TEST LOG
San Rafael City Schools - Terra Linda High
San Rafael, California

Project No. 779.12 | Date 10/29/03 | Approved By:

Figure A-8

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS		SYMBOL	DESCRIPTION
COARSE GRAINED SOILS over 50% sand and gravel	CLEAN GRAVEL	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
	GRAVEL with fines	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	CLEAN SAND	SW	Well-graded sands or gravely sands, little or no fines
		SP	Poorly-graded sands or gravely sands, little or no fines
	SAND with fines	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS over 50% silt and clay	SILT AND CLAY liquid limit <50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	SILT AND CLAY liquid limit >50%	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS		PT	Peat, muck, and other highly organic soils
ROCK			Undifferentiated as to type or composition

KEY TO BORING AND TEST PIT SYMBOLS

CLASSIFICATION TESTS

AL	ATTERBERG LIMITS TEST
SA	SIEVE ANALYSIS
HYD	HYDROMETER ANALYSIS
P200	PERCENT PASSING NO. 200 SIEVE
P4	PERCENT PASSING NO. 4 SIEVE

STRENGTH TESTS

TV	FIELD TORVANE (UNDRAINED SHEAR)
UC	LABORATORY UNCONFINED COMPRESSION
TXCU	CONSOLIDATED UNDRAINED TRIAXIAL
TXUU	UNCONSOLIDATED UNDRAINED TRIAXIAL
	UC, CU, UU = 1/2 Deviator Stress

SAMPLER TYPE

UNDISTURBED CORE SAMPLE: MODIFIED CALIFORNIA OR HYDRAULIC PISTON SAMPLE

STANDARD PENETRATION TEST SAMPLE

X DISTURBED OR BULK SAMPLE

ROCK OR CORE SAMPLE

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the location and time of exploration. Subsurface rock, soil and water conditions may differ in locations and with the passage of time. Lines defining interface between differing soil or rock description are approximate and may indicate a gradual transition.

FILE: Soil Class 779-12.dwg

Miller Pacific
ENGINEERING GROUP

SOIL CLASSIFICATION CHART
San Rafael City Schools - Terra Linda High
San Rafael, California

A-1

Project No. 779.12 Date 09/03/03 Approved By:

Figure

FRACTURING AND BEDDING

Fracture Classification	Spacing	Bedding Classification
Crushed	less than 3/4 inch	Laminated
Intensely fractured	3/4 to 2-1/2 inches	Very thinly bedded
Closely fractured	2-1/2 to 8 inches	Thinly bedded
Moderately fractured	8 to 24 inches	Medium bedded
Widely fractured	2 to 6 feet	Thickly bedded
Very widely fractured	greater than 6 feet	Very thickly bedded

HARDNESS

Low	Carved or gouged with a knife
Moderate	Easily scratched with a knife, friable
Hard	Difficult to scratch, knife scratch leaves dust trace
Very hard	Rock scratches metal

STRENGTH

Friable	Crumbles by rubbing with fingers
Weak	Crumbles under light hammer blows
Moderate	Indentations <1/8 inch with moderate blow with pick end of rock hammer
Strong	Withstands few heavy hammer blows, yields large fragments
Very strong	Withstands many heavy hammer blows, yields dust, small fragments

WEATHERING

Complete	Minerals decomposed to soil, but fabric and structure preserved
High	Rock decomposition, thorough discoloration, all fractures are extensively coated with clay, oxides or carbonates
Moderate	Fracture surfaces coated with weathering minerals, moderate or localized discoloration
Slight	A few stained fractures, slight discoloration, no mineral decomposition, no affect on cementation
Fresh	Rock unaffected by weathering, no change with depth, rings under hammer impact

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the location and time of exploration. Subsurface rock, soil and water conditions may differ in other locations and with the passage of time.

FILE: Rock Class.dwg

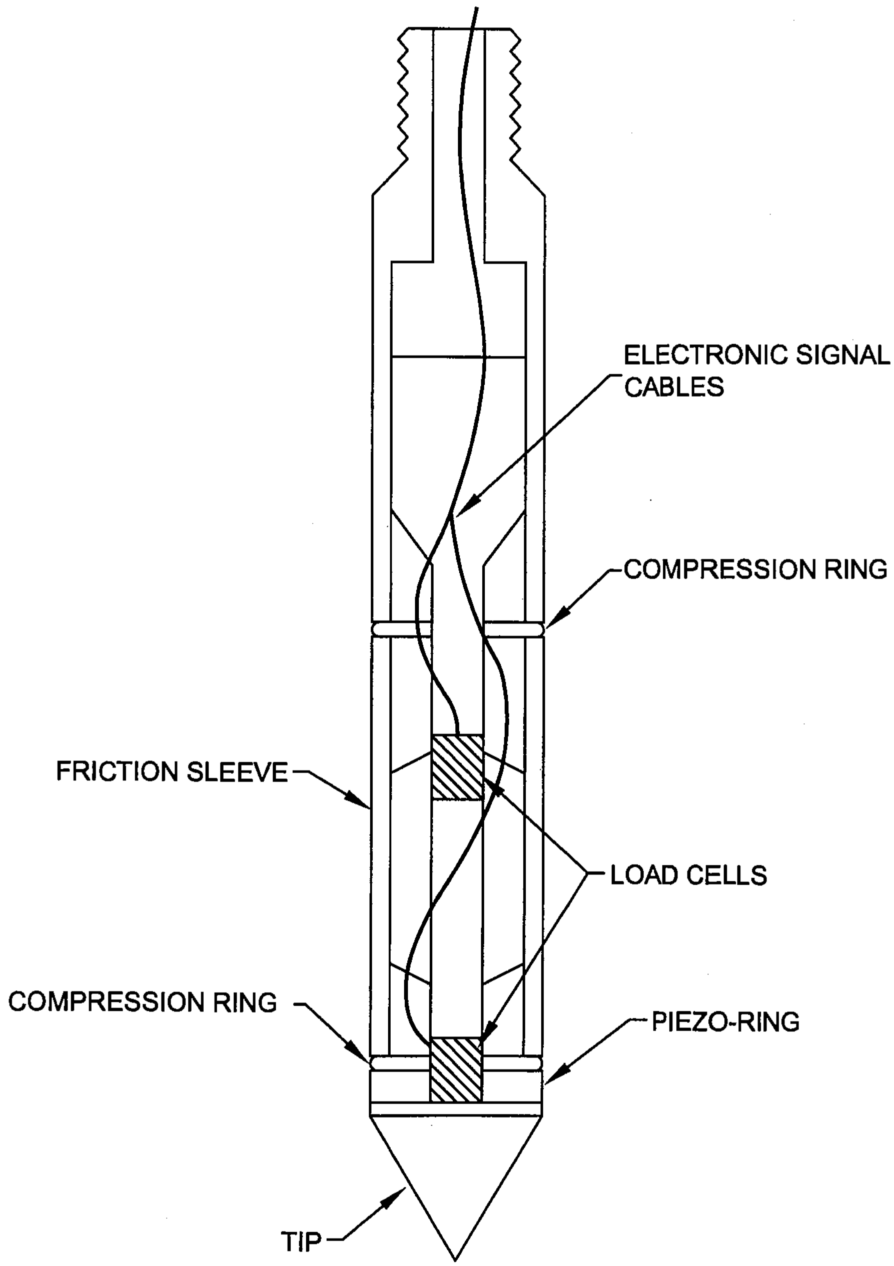
Miller Pacific
ENGINEERING GROUP

ROCK CLASSIFICATION CHART
San Rafael City Schools - Terra Linda High
San Rafael, California

A-2

Project No. 779.12 Date 09/03/03 Approved By: MM

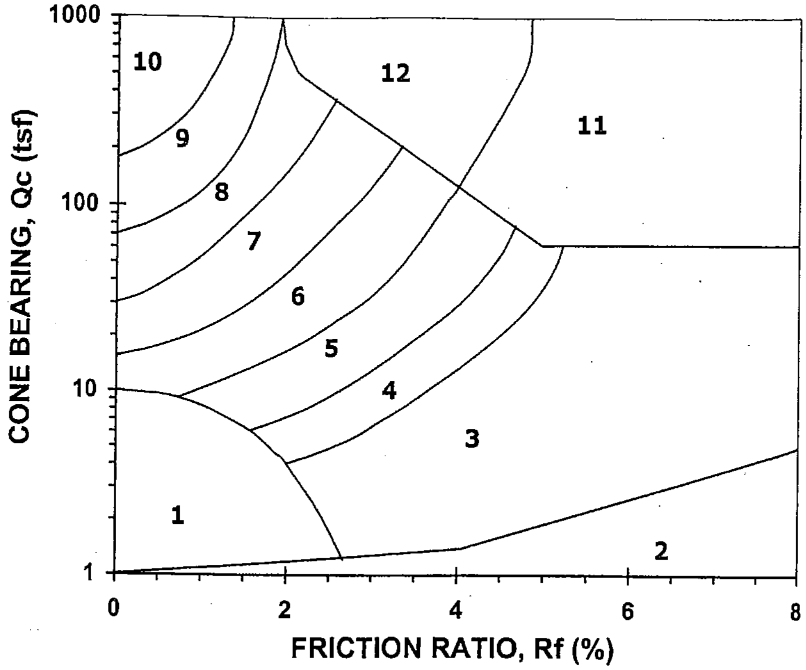
Figure



CONE PENETROMETER

(NO SCALE)

SIMPLIFIED SOIL BEHAVIOR TYPE CLASSIFICATION FOR STANDARD ELECTRONIC CONE PENETROMETER



ZONE	Qc/N[1]	Su Factor (Nk)[2]	SOIL BEHAVIOR TYPE[1]
1	2		Sensitive Fine Grained
2	1	for Zones 1 to 6	Organic Material
3	1	10 for Qc <= 9 tsf	CLAY
4	1.5	12 for Qc = 9 to 12 tsf	Silty CLAY to CLAY
5	2	15 for Qc > 12 tsf	Clayey SILT to Silty CLAY
6	2.5		Sandy SILT to Clayey SILT
7	3	---	Silty SAND to Sandy SILT
8	4	---	SAND to Silty SAND
9	5	---	SAND
10	6	---	Gravelly SAND to SAND
11	1	15	Very Stiff Fine Grained (*)
12	2	---	SAND to Clayey SAND (*)

(*) Overconsolidated or Cemented

Qc = Tip Bearing
Fs = Sleeve Friction
Rf = Fs/Qc*100 = Friction Ratio

References: [1]Robertson, 1986, Olsen, 1988
[2]Bonaparte & Mitchell, 1979 (young bay mud Qc <= 9)
[2]Estimated from local experience (fine grained soils Qc > 9)

Note: Testing performed in accordance with ASTM D3441

John Sarmiento & Associates
Cone Penetrometer Testing Services

FILE: STD-075 cone 779.12TL.dwt

Miller Pacific
ENGINEERING GROUP

CPT SOIL INTERPRETATION CHART
San Rafael City Schools - Terra Linda High
San Rafael, California

A-7

Project No. 779.12 Date 10/29/03 Approved By: [signature]

Figure

A3GEO

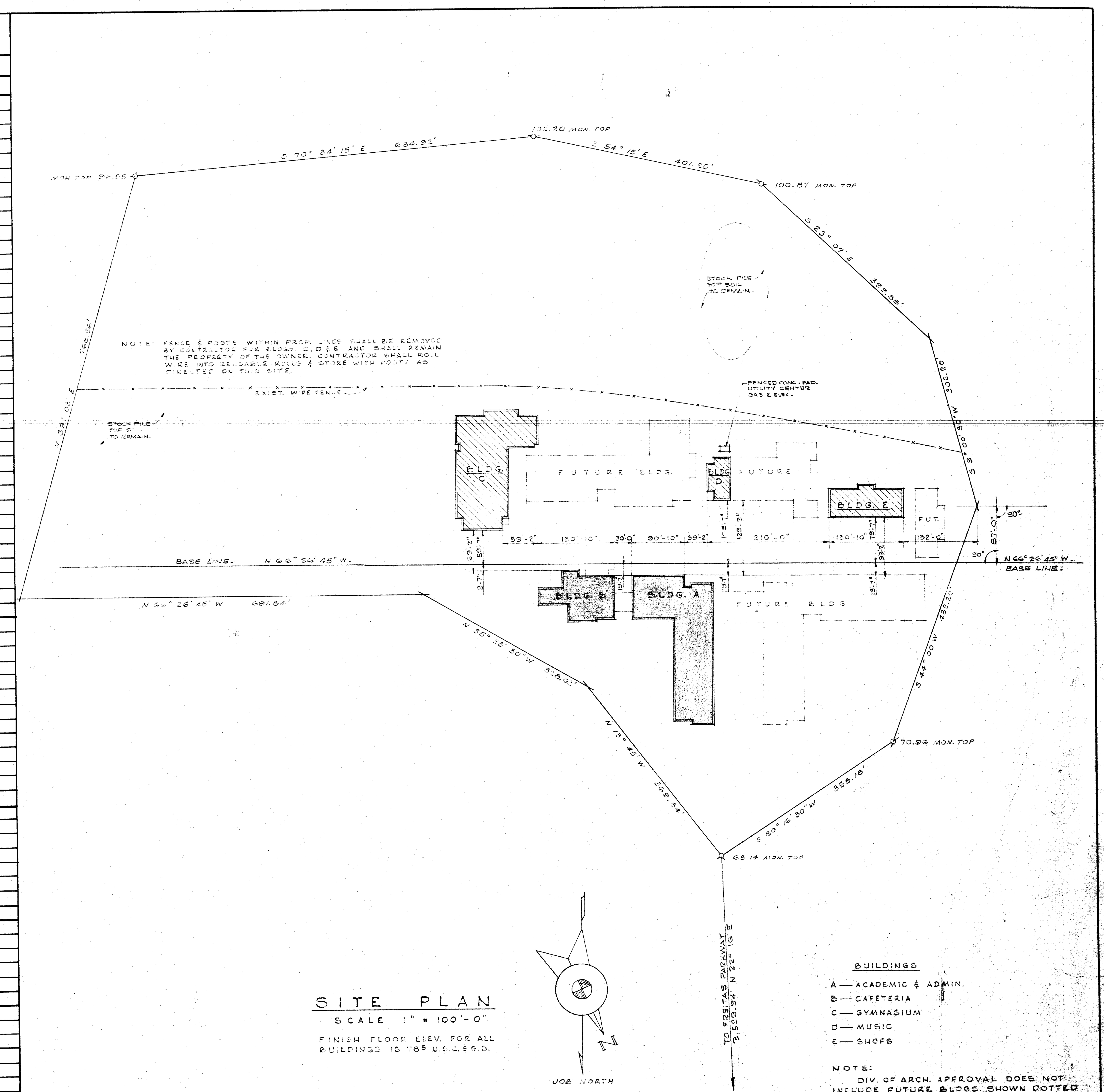
APPENDIX F

Selected Drawings from 1958 Plans for the School

(GM&P, 1958)

SCHEDULE OF DRAWINGS

BUILDINGS A & B			BUILDINGS C, D & E		
SHT. NO.	BLDG.				
ARCHITECTURAL					
A1	AB CDE	SITE PLAN, SCHEDULE OF DRAWINGS, & ABBREVIATIONS	A1	AB CDE	SITE PLAN, SCHEDULE OF DRAWINGS, & ABBREVIATIONS
A1A	AB CDE	DETAIL SITE PLAN	A1A	AB CDE	DETAIL SITE PLAN.
A1B	AB CDE	COVERED WALK PLAN & DETAILS	A1B	AB CDE	COVERED WALK PLAN & DETAILS
A2	A	1/8" FLOOR PLAN - 1ST. FLOOR ACADEMIC & ADMINISTRATION WING.	A2	C	1/8" FLOOR PLAN. GYMNASIUM BLDG.
A3	A	1/8" FLOOR PLAN 2ND. FLOOR ACADEMIC WING.	A3	C	1/8" ROOF PLAN & DETAILS GYM. BLDG.
A4	A	1/8" ROOF PLAN AND DETAILS ACADEMIC & ADMINISTRATION WING.	A4	C	1/8" EXTERIOR ELEVATIONS GYM. BLDG.
A5	A	1/8" EXTERIOR ELEVATIONS ACADEMIC & ADMINISTRATION WING.	A5	C	GYM. SECTIONS.
A6	A	SECTIONS - ADMINISTRATION WING.	A6	C	LOCKER ROOM SECTIONS.
A7	A	TYPICAL ACADEMIC WING SECTION & CORRIDOR DETAILS.	A7	C	INTERIOR ELEVATIONS - LOCKER ROOMS.
A8	A	INTERIOR ELEVATIONS - CORRIDORS & ADMINISTRATION AREA.	A8	C	MISC. DETAILS.
A9	A	INTERIOR ELEVATIONS & DETAILS. TOILET RMS ETC.	A9	C	GYMNASIUM COURT PLAN & DETAILS.
A10	A	1/4" DETAIL FLOOR PLAN. ADMINISTRATION WING & STAIR "B"	A10	C	1/4" DETAIL PLAN. GYMNASIUM ENTRANCE
A11	A	1/4" DETAIL PLAN STAIRS A & B.	A11	C	1/4" DETAIL PLAN. LOCKER ROOMS.
A12	A	EXTERIOR & INTERIOR ELEVATIONS STAIRS 'A' & 'B'	A12	CDE	FINISH SCHEDULE
A13	A	INTERIOR ELEVATIONS STAIRS 'A' & 'B'	A13	CDE	DOOR SCHEDULE & DETAILS
A14	A	INTERIOR ELEVATIONS STAIR 'A' & STAIR DETAILS.	A14	CDE	DOOR DETAILS.
A15	A	1/4" PLAN & ELEVATIONS - TYPICAL CLASSROOM & BUSINESS C.R.	A15	CDE	DOOR DETAILS BLDG. D&E. WINDOW SCHEDULE & DETAILS (ALUM)
A16	A	1/4" PLAN & ELEVATIONS - ARTS & CRAFTS & HOMEMAKING C.R.	A16	D	1/4" FLOOR PLAN - 1/8" ROOF PLAN & DETAILS - MUSIC BLDG.
A17	A	1/4" PLAN & ELEVATIONS - CHEMISTRY CLASSROOMS.	A17	D	EXTERIOR & INTERIOR ELEVATIONS - DETAILS.
A18	A	1/4" PLAN & ELEVATIONS - LIBRARY AREA & CUSTODIAN RM.	A18	E	1/4" FLOOR PLAN SHOP BLDG.
A19	A-B	FINISH SCHEDULE.	A19	E	ROOF PLAN & MEZZANINE PLAN.
A20	A-B	DOOR SCHEDULE & DETAILS	A20	E	EXTERIOR ELEVATIONS & SECTIONS
A21	A-B	DOOR & WINDOW DETAILS (STEEL)	A21	E	INTERIOR ELEVATIONS
A22	A-B	WINDOW SCHEDULE & DETAILS (ALUMINUM)	A22	E	MISC. DETAILS.
A23	A-B	DOOR & WINDOW DETAILS (ALUMINUM)			
A24	B	1/8" FLOOR PLAN CAFETERIA BLDG.			
A25	B	1/8" ROOF PLAN CAFETERIA BLDG.			
A26	B	ROOF DETAILS CAFETERIA BLDG.			
A27	B	1/8" EXTERIOR ELEVATIONS. CAFE. BLDG.			
A28	B	1/4" DETAIL FLOOR PLAN CAFE. BLDG.			
A29	B	CROSS SECTIONS. CAFE. BLDG.			
A30	B	INTERIOR ELEVATIONS CAFE. BLDG.			
A31	B	KITCHEN & CANTEEN EQUIPMENT ELEVATIONS & DETAILS.			
STRUCTURAL					
S1	A	FIRST FLOOR & FOUNDATION PLAN	S1	C	FLOOR & FOUNDATION PLAN
S2	A	SECOND FLOOR PLAN	S2	C	ROOF FRAMING PLAN
S3	A	ROOF FRAMING PLAN	S3	C	ARCH DETAILS, TYPICAL DETAILS & NOTES
S4	A	TYPICAL DETAILS & NOTES	S4	C	SECTIONS
S5	A	SECTIONS & TYPICAL DETAILS	S5	C	SECTIONS
S6	A	SECTIONS	S6	C	SECTIONS. COVERED WALK DETAILS.
S7	A	SECTIONS	S1	D	FLOOR AND ROOF PLANS. SECTIONS & DETAILS
S8	A	SECTIONS	S1	E	FLOOR & ROOF PLANS. SECTIONS & DETAILS.
S9	B	FLOOR & FOUNDATION PLAN, SECTIONS & DETAILS	S2	E	SECTIONS, DETAILS & NOTES
S10	B	ROOF FRAMING PLAN, SECTIONS & DETAILS			
PLUMBING					
PAB	AB	PLUMBING SITE PLAN AND DETAILS, SCHEDULES.	PCDE	CDE	SITE PLAN - DETAILS & SCHEDULES
P1A	A	FIRST FLOOR ACADEMIC & ADMINISTRATION WING. - DETAILS.	P1C	C	LOCKER ROOM FLOOR PLAN & DETAILS
P2A	A	SECOND FLOOR - ACADEMIC WING.	P2C	C	GYMNASIUM FLOOR PLAN & DETAILS
P1B	B	CAFETERIA FLOOR PLAN & DETAILS	P1D	D	MUSIC BLDG. FLOOR PLAN & DETAILS
L-1	AB CDE	LANDSCAPE PLAN - STORM SEWER LINES	P1E	E	SHOP BLDG FLOOR PLAN & DETAILS.
HEATING & VENTILATING					
HAB	AB	CONTROL DIAGRAMS & DETAILS	HCDE	CDE	SCHEDULES & CONTROL DIAGRAMS
H1A	A	FIRST FLOOR PLAN & DETAILS ADMINISTRATIO & ACADEMIC WING.	H1C	C	GYMNASIUM LOCKER RM. PLAN & DETAILS
H2A	A	SECOND FLOOR PLAN & DETAILS ACADEMIC WING	H2C	C	GYMNASIUM PLAN & DETAILS.
H1B	B	CAFETERIA FLOOR PLAN & DETAILS	H1D	D	MUSIC BUILDING PLAN & DETAILS
			H1E	E	SHOP BUILDING PLAN & DETAILS
ELECTRICAL					
E1	AB CDE	SCHEDULES, SYMBOLS & ABBREVIATIONS	E1	AB CDE	SCHEDULES, SYMBOLS, & ABBREVIATIONS
E2	AB	PLOT PLAN, SCHEDULES & DETAILS	E1C	C	GYM. LOCKER ROOM PLAN & DETAILS
E1A	A	ADMINISTRATION PLAN & DETAILS	E2C	C	GYM. PLAN & DETAILS
E2A	A	FIRST FLOOR PLAN ACADEMIC WING.	E1D	D	MUSIC BUILDING PLAN & DETAILS.
E3A	A	SECOND FLOOR PLAN ACADEMIC WING.	E1E	E	SHOP BUILDING PLAN & DETAILS.
E1B	B	CAFETERIA FLOOR PLAN.	E2E	E	SHOP BUILDING PLAN & DETAILS



BUILDINGS
A — ACADEMIC & ADMIN.
B — CAFETERIA
C — GYMNASIUM
D — MUSIC
E — SHOPS

NOTE:
DIV. OF ARCH. APPROVAL DOES NOT INCLUDE FUTURE BLDGS. SHOWN DOTTED

LEGEND

NUMBER / ROOM NUMBER / BUILDING

NUMBER / DOOR / BUILDING

NUMBER / DETAIL / SHEET NO.

COLUMN No.

NUMBER / SECTION / SHEET NO.

x 8.36 FINISHED GRADES

8.36 EXISTING

TYPE / WINDOW / BUILDING

CONCRETE

METAL STUDS

ABBREVIATIONS

A.B.	ANCHOR BOLTS	DEPT.	DEPARTMENT	FND.	FOUNDATION	MFG.	MANUFACTURER	SM.	SMOOTH
AC.T.	ACOUSTICAL TILE	D.F.	DRINKING FOUNTAIN	F.S.D.	FULL SIZE DETAIL	M.O.	MASONRY OPENING	SPEC.	SPECIFICATION
AL.	ALUMINUM	DET.	DETAIL	F.PRF.	FIREPROOF	N.I.C.	NOT IN CONTRACT	S.P.	SUGAR PINE
ASPH.	ASPHALT	D.S.	DOWNSPOUT	F.T.	FLUSH THRESHOLD	No.	NUMBER	S.S.	SERVICE SINK
ASPH.T	ASPHALT TILE	DWG.	DRAWING	GALV.	GALVANIZED	O.G.	OBSCURE GLASS	STR.	STRUCTURAL
A.T.B.	ASPHALT TILE BASE	ENT.	ENTRANCE	GA.	GAUGE	O.W.G.	OBSCURE WIRE GLASS	ST.CL.	STORAGE CLOSET
B.M.	BEAM	E.P.	ELECTRIC PANEL	G.I.	GALVANIZED IRON	D.S.	DOUBLE STRENGTH	T.	TOILET
BL.	BLOCKING	EQUIP.	EQUIPMENT	GL.	GLASS	W.G.	WINDOW 'B' QUALITY, D.S.	T.B.	TRASH BIN
CAB.	CABINET	EXC.	EXCAVATE	GL.CER.TILE	GLAZED CERAMIC TILE	S.G.	HEAVY SHEET GLASS 3/16"	T.C.	TERRA COTTA
C.A.R.	COLD AIR RETURN	EXIST.	EXISTING	P.P.GL.	GLASS, POLISHED PLATE	OFF.	OFFICE	TH.	THRESHOLD
C.B.	CHALKBOARD	EXP.	EXPOSED	T.G.	GLASS, TEMPERED	P.B.	PANIC BOLTS	T.B.	TACKBOARD
C.C.	CENTER TO CENTER	EXP.B.	EXPANSION BOLT	G.S.	GALVANIZED STEEL	O.C.	ON CENTER	U.V.	UNIT VENTILATOR
CEIL.	CEILING	EXT.	EXTERIOR	GYP.	GYPSUM	PLAS.	PLASTER	UR.	URINAL
CEM.	CEMENT	E.J.	EXPANSION JOINT	HWD.	HARDWOOD	PLAS.AC.	ACOUSTICAL PLASTER	VEST.	VESTIBULE
C.I.	CAST IRON	F.C.	FURRED CEILING	I BM	I BEAM	PLAS.C	CEMENT PLASTER	V.G.D.F.	VERTICAL GRAIN DOUGLAS FIR
C.I.P.	CAST IRON PIPE	F.D.	FLOOR DRAIN	I.D.	INSIDE DIAMETER	PLAS.K	KEENES CEM. PLASTER	VINYL T.	VINYL TILE
CL.	CLASS	F.DR.	FIRE DOOR	INS.	INSULATION	PLAS.S.	STUCCO	V.T.R.	VENT THRU ROOF
CONC.	CONCRETE	F.E.C.	FIRE EXTINGUISHER CAB.	K.D.	KALAMEIN DOOR	PLWD.	PLYWOOD	W.	WINDOW
CONV.	CONVECTOR	F.EXT.	FIRE EXTINGUISHER	LAB.	LABORATORY	PLMB.	PLUMBING	W.D.	WINDOW DIMENSION
CONC.F.	CONCRETE FLOOR	F.H.	FIRE HOSE	LAV.	LAVATORY	PROP.	PROPOSED	W.C.	WATER CLOSET
CORR.	CORRIDOR	F.H.C.	FIRE HOSE CABINET	LKR.	LOCKER	R.	RADIUS	W.F.	WIDE FLANGE
C.G.	COLORED GLASS	F.HY.	FIRE HYDRANT	MA.TH.	MARBLE THRESHOLD	PL.	STEEL PLATE	W.P.	WATERPROOF
C.T.	CORK TILE	FIN.	FINISH	MAX.	MAXIMUM	RAD.	RADIATOR	Y.D.	YARD DRAIN
C.W.	COLD WATER	F.B.	FLAT BAR	MET.	METAL	R.C.	TOPSET RUBBER BASE	DIAG.SH.	DIAGONAL SHEATHING
C.W.G.	CLEAR WIRE GLASS	FL.	FLOOR	MIN.	MINIMUM	RM.	ROOM	ELEV.	ELEVATION
C.B.	CATCH BASIN	FLG.	FLOORING	M.L.	METAL LATH	REINF.	REINFORCING	P.S.	PAINT SPECIFICATION
℄	CENTER LINE	FIN.FL.	FINISHED FLOOR	M.PART.	METAL PARTITION	RWD.	REDWOOD	D.F.	DOUGLAS FIR
[	CHANNEL	FLOUR.	FLOURESCENT	M.S.	METAL STUD	SEC.	SECTION		
D.	DIAMETER	F.M.T.	FLUSH METAL THRESHOLD	M.T.	METAL THRESHOLD	SHT.	SHEET		

STATE DIVISION OF ARCHITECTURE

COUNTY SUPT. OF SCHOOLS

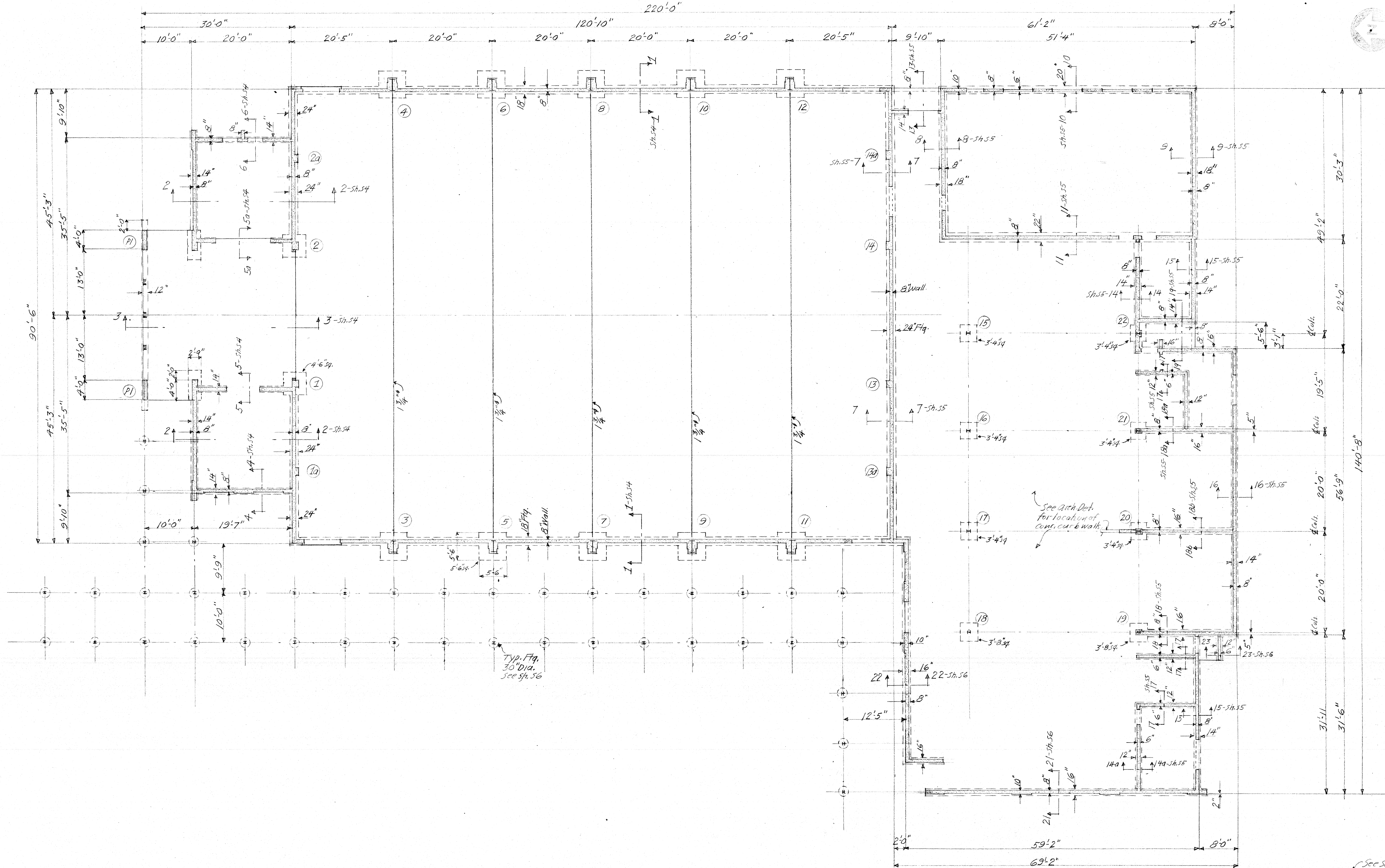
BOARD OF EDUCATION

GROMMÉ MULVIN & PRIESTLEY
ARCHITECTS
1539 FOURTH STREET
SAN RAFAEL, CAL. GL. 3-3925

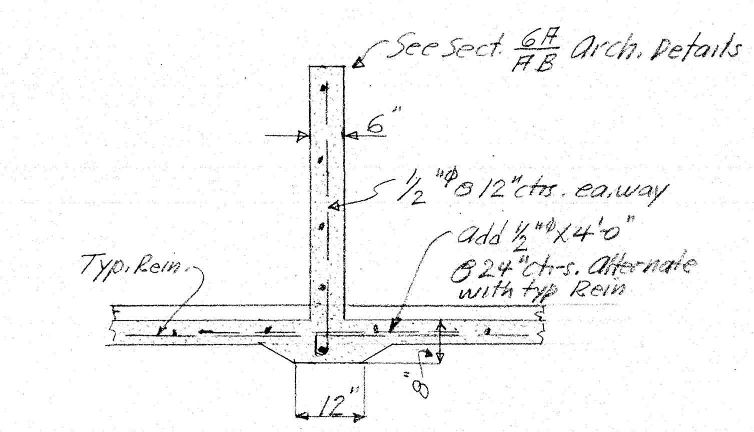
NEW HIGH SCHOOL
SAN RAFAEL HIGH SCHOOL DISTRICT
FOR THE TERRA LINDA AREA
MARIN COUNTY CALIFORNIA

JOB NO.	DATE: DEC. 16, 1958		DRAWING NO.
502-26	DRAWN BY D. SCHNELL J.W	CHECKED BY J. WINNIE	A1 BLDGS. A,B,C,D,E
SET.	APPROVED		OF SHEETS

STATE DIVISION OF ARCHITECTURE	COUNTY SUPT. OF SCHOOLS						
APPROVED ... 16 1959	BOARD OF EDUCATION	H. M. ENGLE CIVIL & STRUCTURAL ENGINEER 1539 4TH ST. SAN RAFAEL LICENSE NO.	GROMMÉ MULVIN & PRIESTLEY ARCHITECTS 1539 FOURTH STREET SAN RAFAEL, CAL. GL. 3-3925	NEW HIGH SCHOOL SAN RAFAEL HIGH SCHOOL DISTRICT FOR THE TERRA LINDA AREA MARIN COUNTY CALIFORNIA	JOB NO. 602-26	DATE: DEC. 16, 1958 DRAWN BY D. SCHNELL CHECKED BY J. WINNIE APPROVED	DRAWING NO. A1A BLDGS. A,B,C,D,E,F OF SHEETS

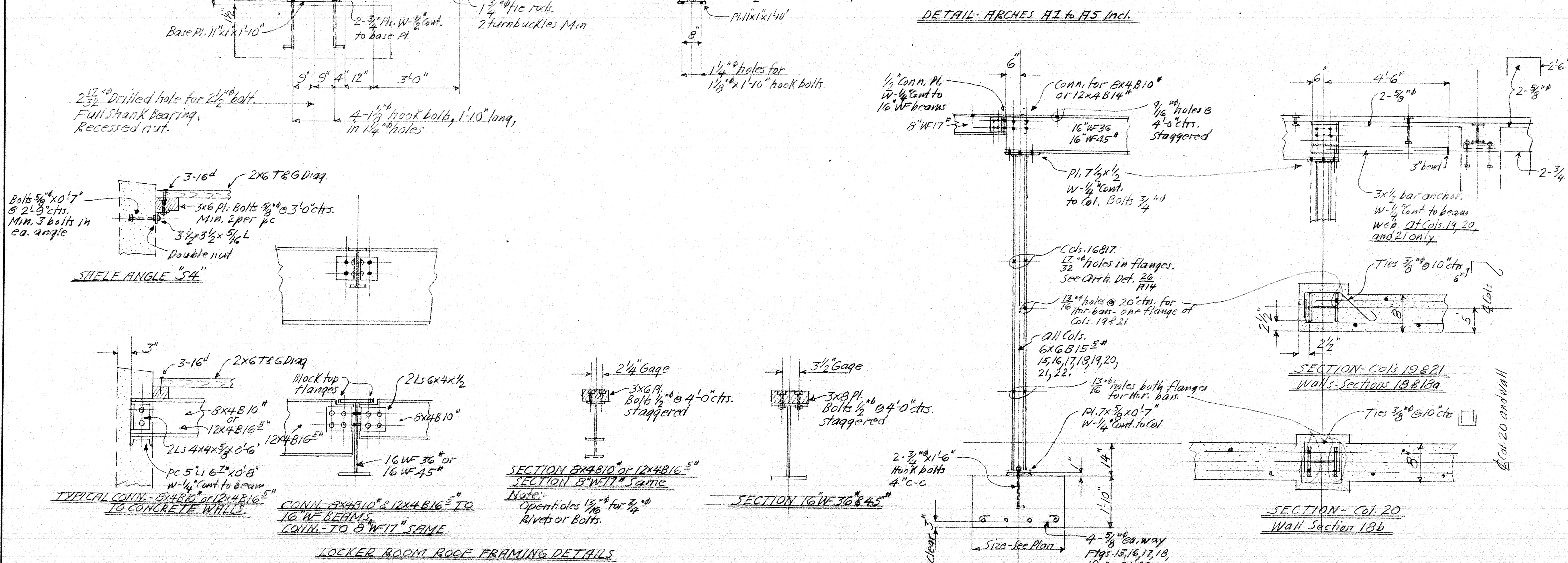


FLOOR AND FOUNDATION PLAN
Scale: 1/8" = 1'-0"



DETAIL LOCKER ROOM CURB WALLS
See Sect. 6A/A8

STATE DIVISION OF ARCHITECTURE	COUNTY SUPT. OF SCHOOLS	ROBERT D. RITTER	H. M. ENGLE	GROMMÉ, MULVIN & PRIESTLEY ARCHITECTS	NEW HIGH SCHOOL	JOB NO. 502-56	DATE: DEC. 16, 1958	DRAWING NO.
APPROVED MAR 16 1959	BOARD OF EDUCATION			1539 FOURTH STREET SAN RAFAEL, CAL. GL. 3-3925	SAN RAFAEL HIGH SCHOOL DISTRICT FOR THE TERRA LINDA AREA MARIN COUNTY CALIFORNIA	SET.	DRAWN BY H.E. CHECKED BY APPROVED	S1 BLDG. C OF SHEETS



FOUNDATION NOTE:
Soil pressure does not exceed 2000 lbs per sq. ft. All footings bear on firm sand or clay. Where necessary lower footings as directed to reach firm material. Soil Report by R. S. Harding. (Oct. 24, 1958)

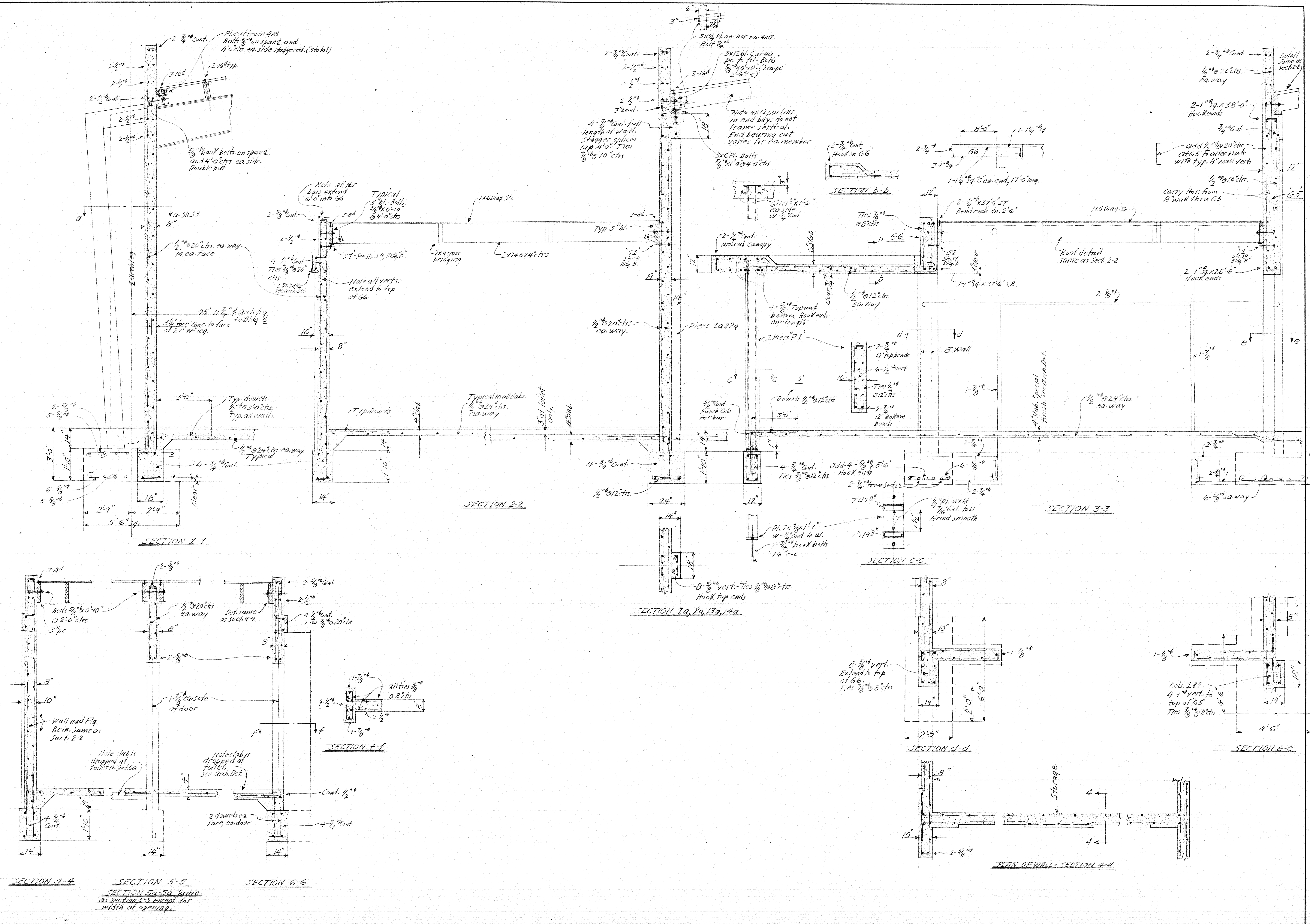
CONCRETE & REINFORCING NOTE:-
All bars to be deformed - Structural Grade. Bars to lap 48 Dia. at splices except as otherwise called for. All Structural Concrete to have a minimum strength in compression of 2500# per sq. inch at 28 days. Bars marked as continuous (Cont.) to be in as long lengths as possible.

NAILING & FRAMING NOTE:-
All nails to be common wire nails.
Double top plates: 2-20d lower plate to each stud, 16d @ 18" ctrs., upper to lower plate.
Stagger splices 4'-0" Min. or as called for, with 8-16d each side each cut.
Lap plates at corners, with 3-16d upper to lower plate.
Multiple studs: 16d @ 12" ctrs. - stagger for widths over 4". Frame corners and junctions solid.
Structural Roof sheathing to be laid diagonal at 45° to supports.
For 2x6 use 2-16d min. at all bearings, including blocking, except as other wise called for.
For 1x6 " 2-8d " " " " , " " " " " " ".
Cut joints on a diagonal, over and parallel to a bearing. For 2" sheathing leave one bearing between joints in adjoining boards, and one pc. uncut between joints on same bearing.
For 1" sheathing, end joints in adjacent boards shall be separated by at least two joist or stud spaces. Leave two boards uncut between joints on same support.
Joists or rafters to sides of studs: 2x8, 3-16d; 2x12, 4-16d; 2x14, 5-16d
Joists or rafters at all bearings: - 2-10d toes each side.
Studs to bearings: - 2-10d toes each side, Min., or as called for.
Blocking between joists or rafters: 2-10d toes ea. side ea. end. Two 10d toes each side to bearing, except as noted.
Cross Bridging: - 2-8d toes each end.
Ceiling strips: 2x3, 2-16d to under side, one slant, one straight; 1x4, 2-8d, one slant, one straight.
For plastered ceilings, strips to be tied with 16 ga. galv. wire ties to supports @ 4'-0" ctrs. (Saddle ties)

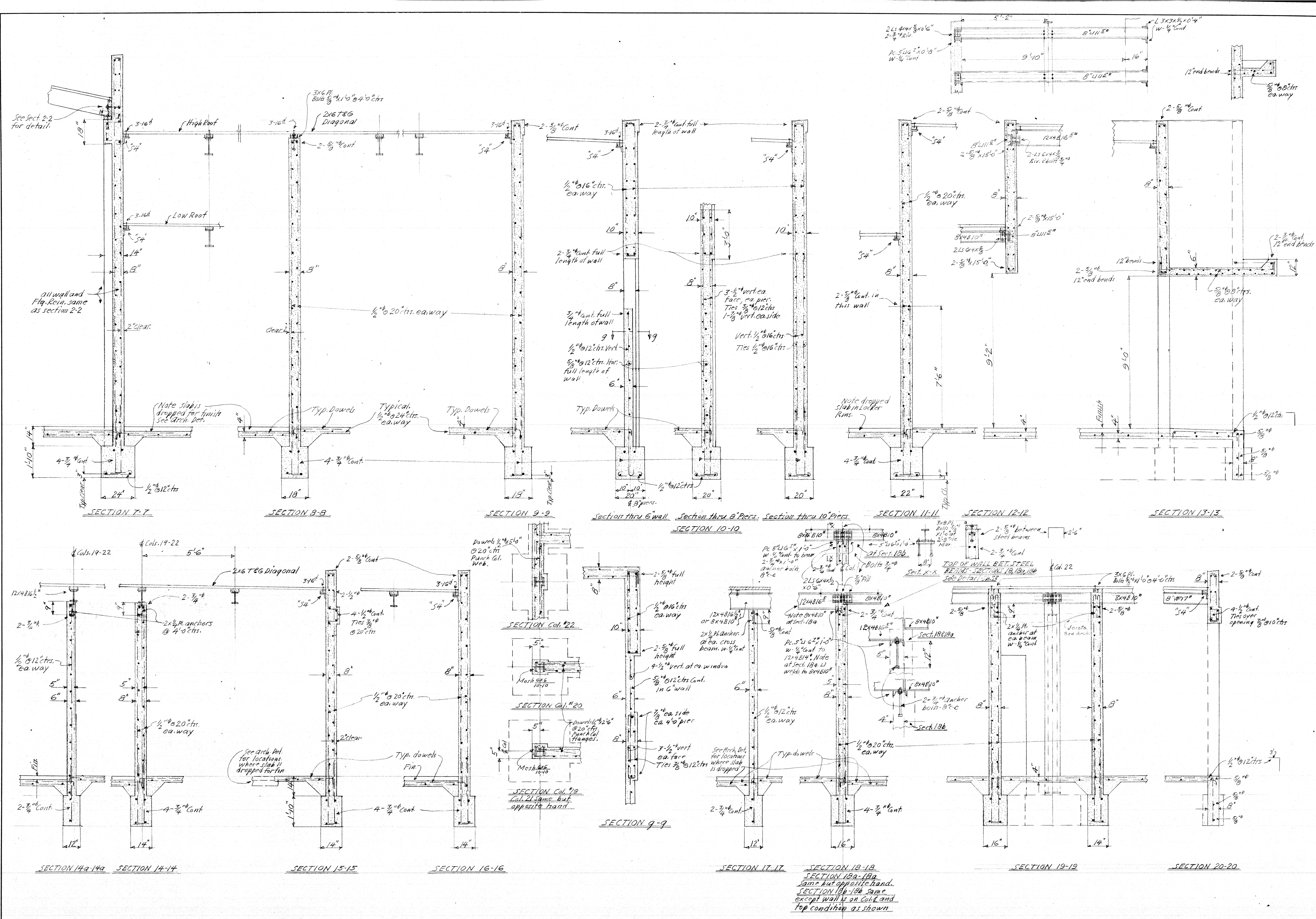
Ribbons to studs: - 1x4, 2-8d ea. bearing. 2" ribbons nailing as called for.
Built up Beams: 8" or less, 16d @ 12" ctrs. staggered. Over 8", 1/2"⌀ bolts @ 2'-0" ctrs. staggered.
Double joists under partitions - 16d @ 12" ctrs. staggered.
Where nailing tends to cause splitting, sub drill.

BOLT & LAG SCREW NOTE:
Bolt holes to be bored to same diameter as nominal size of bolt.
Use Malleable Iron Washers (M.I.W.) under all heads and nuts bearing on wood.
Washers to have thickness of not less than 1/2 bolt diameter, and an area 16 times nomial area of bolt. Tighten all bolts at time of installation, check, retighten before covering up. Check and retighten all accessable nuts before final acceptance.
All Bolts to be Machine Bolts.
Lag Screws shall be screwed into place. Bore hole to same diameter and depth as shank. For the threaded portion, bore hole with a bit not larger in diameter than screw diameter at the base of the thread.

STATE DIVISION OF ARCHITECTURE	COUNTY SUPT. OF SCHOOLS						
	BOARD OF EDUCATION	ROBERT P. RITTER	H. M. ENGLE, CIVIL & STRUCTURAL ENGINEER	GROMMÉ, MULVIN & PRIESTLEY ARCHITECTS, 1539 FOURTH STREET, SAN RAFAEL, CAL. GL. 3-3925	NEW HIGH SCHOOL, SAN RAFAEL HIGH SCHOOL DISTRICT, FOR THE TERRA LINDA AREA, MARIN COUNTY, CALIFORNIA	JOB NO. 502-26 / DATE: DEC. 16. 1958 / DRAWN BY H.B. / CHECKED BY / APPROVED / SET	DRAWING NO. S3, BLDG. C



STATE DIVISION OF ARCHITECTURE	COUNTY SUPT. OF SCHOOLS / BOARD OF EDUCATION	ROBERT P. RITTER	H. M. ENGLE, CIVIL & STRUCTURAL ENGINEER, SAN RAFAEL	GROMMÉ MULVIN & PRIESTLEY ARCHITECTS 1539 FOURTH STREET SAN RAFAEL, CAL. GL. 3-3925	NEW HIGH SCHOOL SAN RAFAEL HIGH SCHOOL DISTRICT. FOR THE TERRA LINDA AREA MARIN COUNTY CALIFORNIA	JOB NO. 502-26; DATE: DEC. 16, 1958; DRAWN BY H.E.; CHECKED BY; SET; APPROVED; DRAWING NO. S4 BLDG. "C" OF SHEETS



STATE DIVISION OF ARCHITECTURE

APPROVED MAR 18 1959

COUNTY SUPT. OF SCHOOLS

BOARD OF EDUCATION

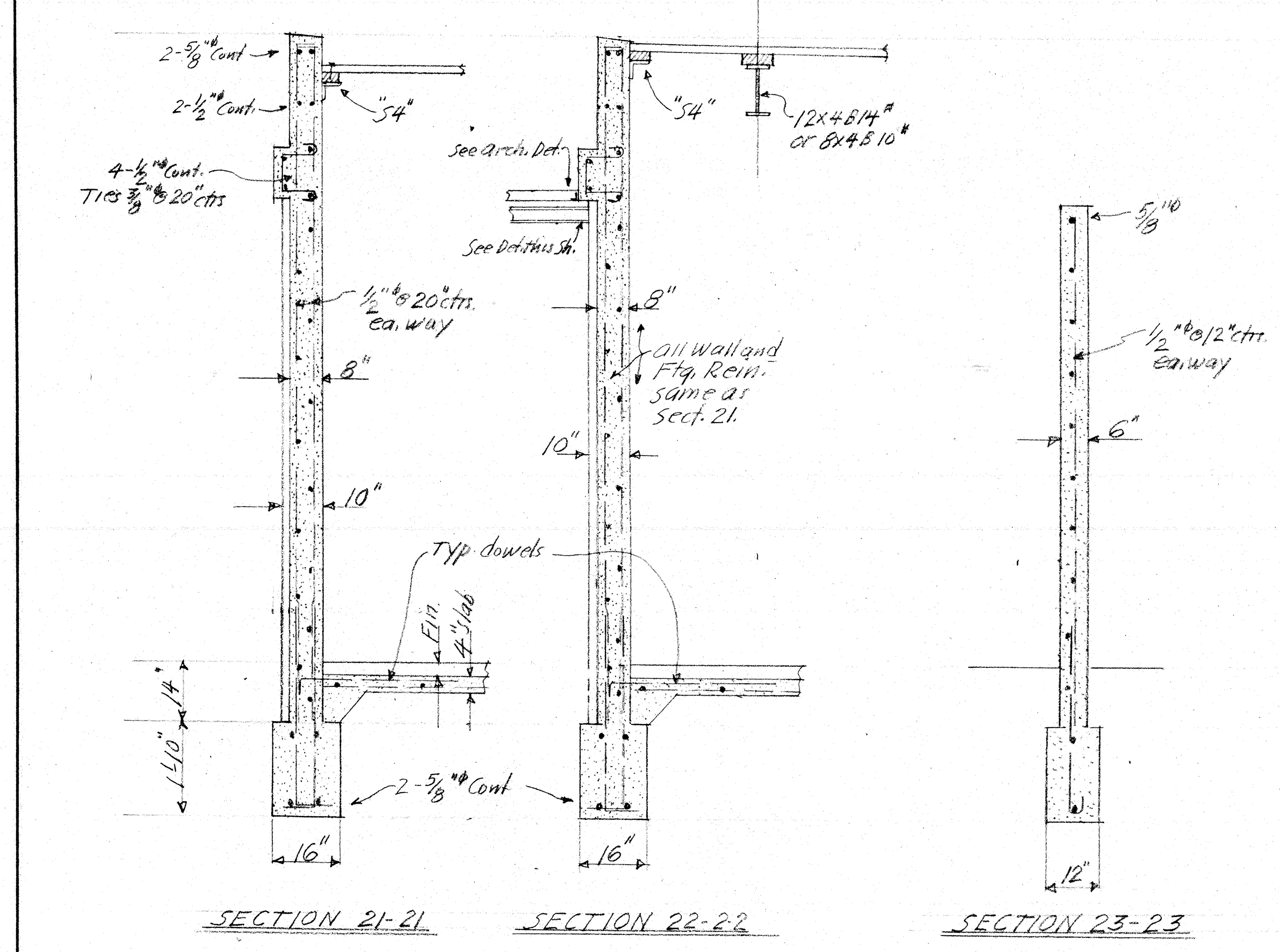
ROBERT P. RITTER
CONSULTING ENGINEER
SAN RAFAEL, CALIF.

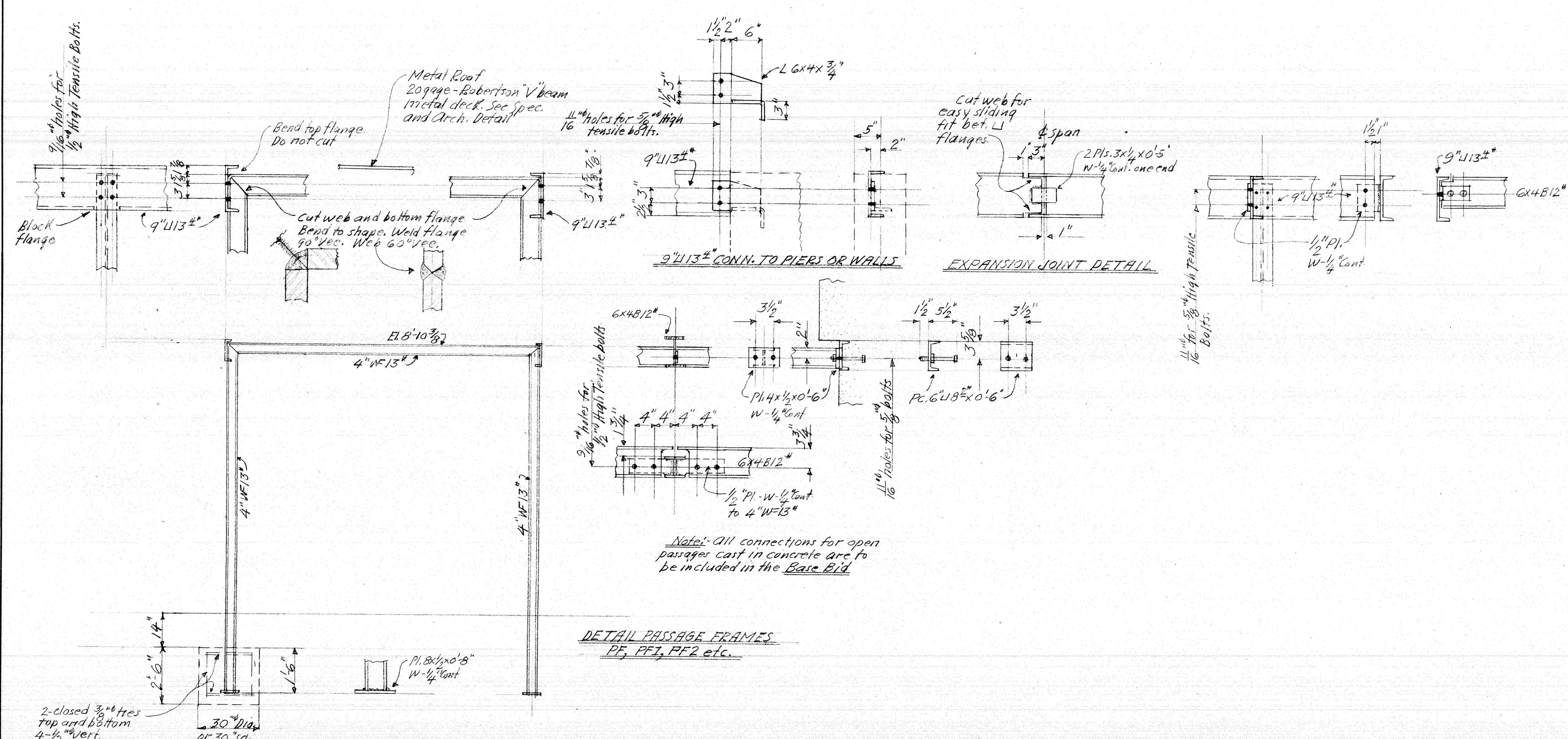
H. M. ENGLE
CIVIL & STRUCTURAL ENGINEERS
SAN RAFAEL
LICENSE NO.

GROMMÉ, MULVIN & PRIESTLEY
ARCHITECTS
1539 FOURTH STREET
SAN RAFAEL, CAL. GL. 3-3925

NEW HIGH SCHOOL
SAN RAFAEL HIGH SCHOOL DISTRICT
FOR THE TERRA LINDA AREA.
MARIN COUNTY CALIFORNIA.

JOB NO.	DATE: DEC. 19, 1958		DRAWING NO.
502-26	DRAWN BY H.B.	CHECKED BY	S5
SET	APPROVED		BLDG. C
			OF SHEETS





STATE DIVISION OF ARCHITECTURE	COUNTY SUPT. OF SCHOOLS	ROBERT P. RITTER CONSULTING ENGINEER 1539 FOURTH STREET SAN RAFAEL, CALIF.	H. M. ENGLE CIVIL & STRUCTURAL ENGINEER 1539-4th ST. SAN RAFAEL LICENSE No.	GROMMÉ, MULVIN & PRIESTLEY ARCHITECTS 1539 FOURTH STREET SAN RAFAEL, CAL. GL. 3-3925	NEW HIGH SCHOOL SAN RAFAEL HIGH SCHOOL DISTRICT FOR THE TERRA LINDA AREA MARIN COUNTY CALIFORNIA	JOB NO. 502-36	DATE: DEC. 16, 1958	DRAWING NO. S6
APPROVED MAR 16 1959 M.W. Sahlberg	BOARD OF EDUCATION		H. M. Engle			SET	DRAWN BY H.E. CHECKED BY	BLDG "C"
							APPROVED	OF SHEETS

APPENDIX G

Selected Drawings from 1961 Building H Plans

(GM&P, 1961)

SCHEDULE OF DRAWINGS

ARCHITECTURAL

A1	ABBREVIATIONS, LEGEND & SITE PLAN
A2	PLAN OF BUILDING 'H'
A3	PLAN OF GIRLS LOCKER ROOM BUILDING 'H'
A4	PLAN OF ROOF BUILDING 'H'
A5	PLAN OF COVERED WALKS & DETAILS
A6	EXTERIOR ELEVATIONS & SECTIONS
A7	INTERIOR ELEVATIONS & ROOM FINISH SCHEDULE
A8	DOOR SCHEDULE & DETAILS
A9	MISCELLANEOUS DETAILS
A10	MISCELLANEOUS DETAILS & ALTERATIONS TO EXIST'G BOYS LKR RM.

STRUCTURAL

S1	FOUNDATION PLAN & DETAILS
S2	ROOF PLAN & DETAILS
S3	DETAILS

PLUMBING

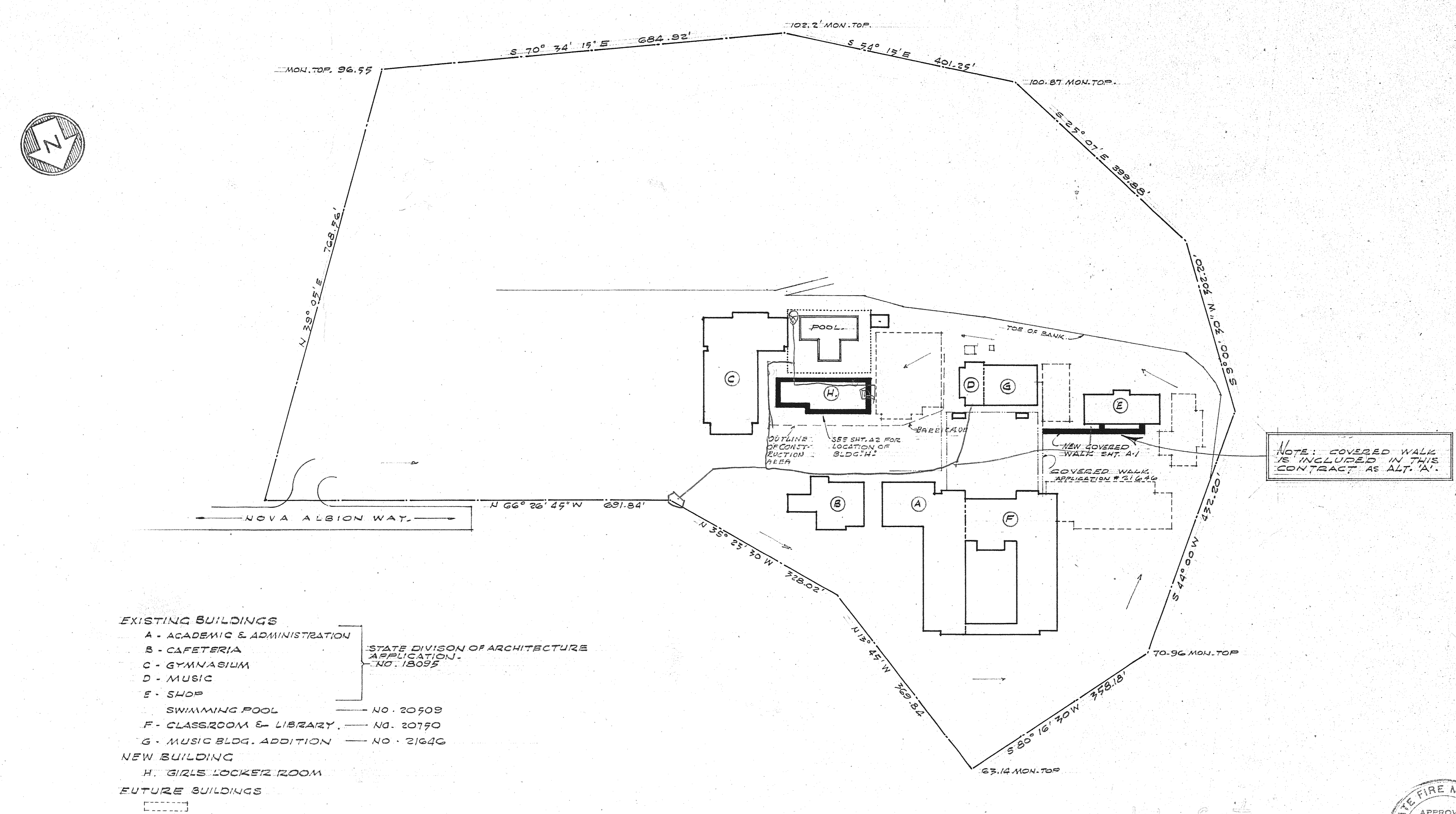
P1	PLUMBING SCHEDULE & DETAILS
P2	PLAN OF BUILDING 'H'

ELECTRICAL

E1	ELECTRICAL SCHEDULE & DETAILS
E2	PLAN OF BUILDING 'H'

HEATING

H1	HEATING SCHEDULE & DETAILS
H2	PLAN OF BUILDING 'H'



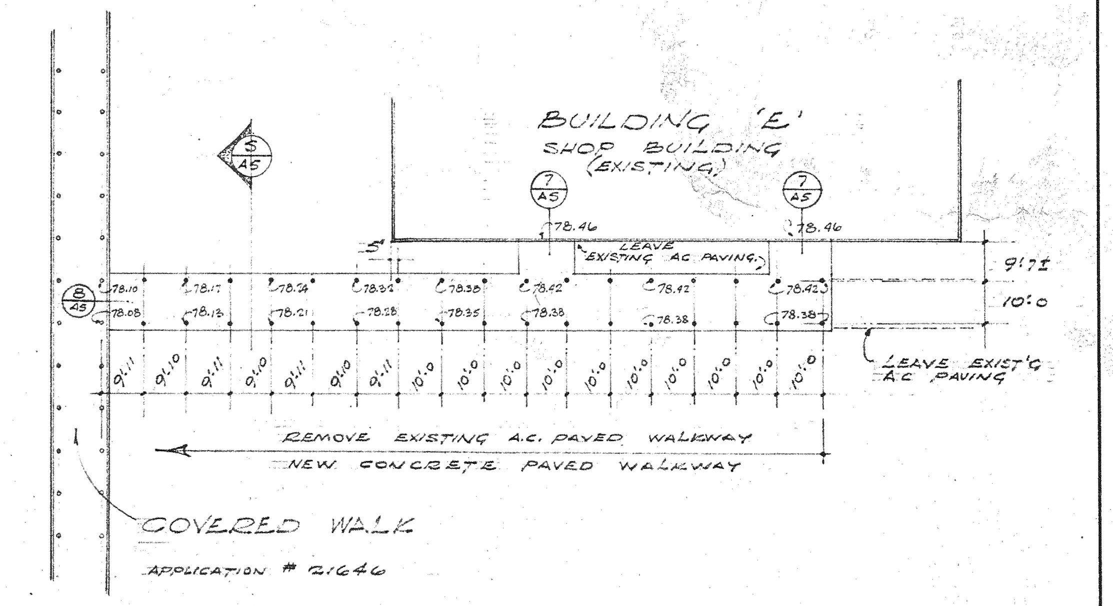
SITE PLAN

SCALE 1" = 100'-0"

FINISH FLOOR ELEV. FOR ALL BUILDINGS 78.5'

NOTE:
DIVISION OF ARCHITECTURAL APPROVAL DOES NOT INCLUDE FUTURE BUILDINGS SHOWN DOTTED.

Complete Set 1/23/12



PLAN of COVERED WALK @ SHOP BUILDING 'E'

SCALE 1" = 20'-0

"ALTERNATE A" TO INCLUDE ALL WORK ON COVERED WALK, AFFECTING; CONCRETE WORK, CONCRETE SLABS & GRADING FOR SAME, STEEL WORK, DECKING WORK, SHEETMETAL WORK, ELECTRICAL WORK & PAINTING.

LEGEND

NUMBER / ROOM № / BUILDING	DOOR
NUMBER / DETAIL / SHEET NUMBER	COLUMN №
NUMBER / SECTION. / SHEET NUMBER	8.36 FINISHED GRADE
	8.36 EXISTING GRADE
WINDOW TYPE	CONCRETE
	METAL STUD

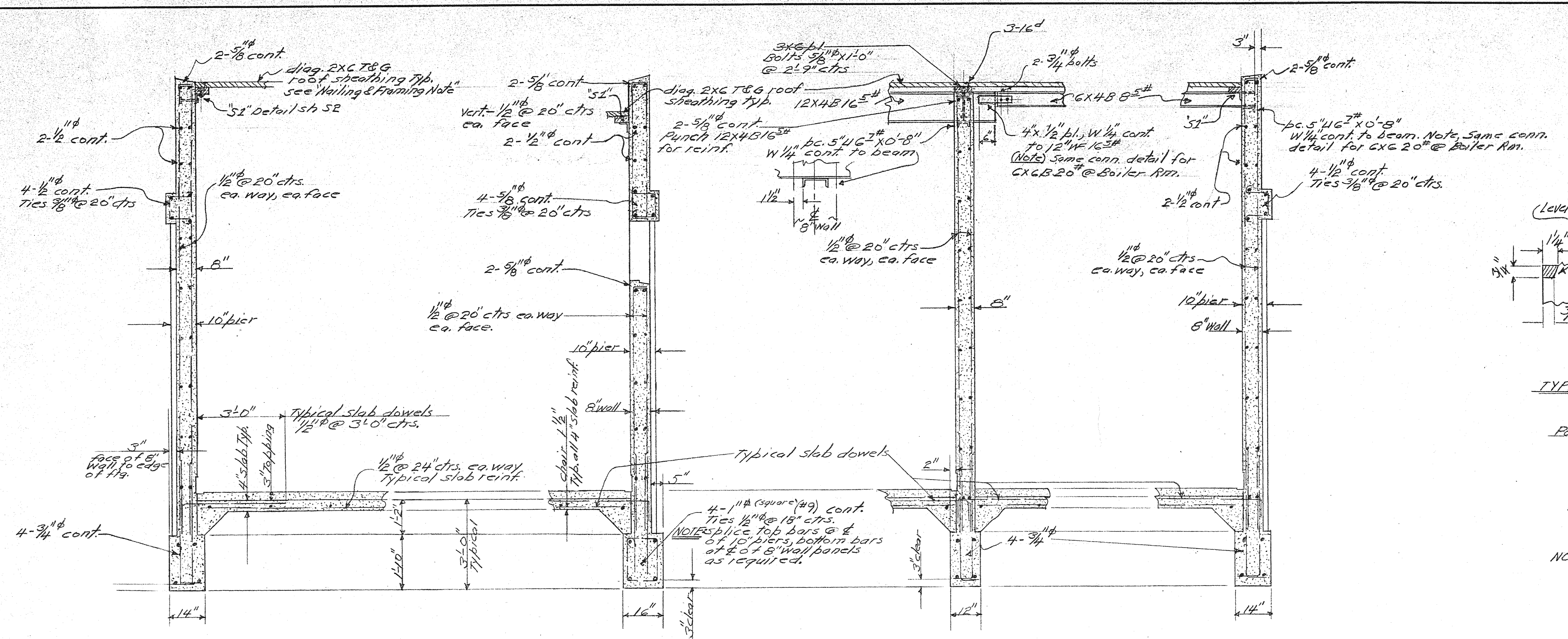
ABBREVIATIONS

A.B.	ANCHOR BOLTS	DEPT.	DEPARTMENT.	F.B.	FLAT BAR	MET.	METAL.	R.B.	TOP SET RUBBER BASE
AC.T.	ACOUSTICAL TILE	D.F.	DRINKING FOUNTAIN	FND.	FOUNDATION.	MFG.	MANUFACTURER	SM.	SMOOTH.
AL.	ALUMINUM	DET.	DETAIL	F.S.D.	FULL SIZE DETAIL	M.O.	MASONRY OPENING	SPEC.	SPECIFICATION
ASPH.	ASPHALT.	DIAG.SH	DIAGONAL SHEATHING	F.PRF.	FIREPROOF.	N.I.C.	NOT IN CONTRACT.	S.P.	SUGAR PINE
ASPH.T.	ASPHALT TILE	D.S.	DOWNSPOUT	F.T.	FLUSH THRESHOLD	NO.	NUMBER	S.S.	SERVICE SINK
A.T.B.	ASPHALT TILE BASE	DWG.	DRAWING	GALV.	GALVANIZED	O.G.	OBSCURE GLASS	STR.	STRUCTURAL
BM.	BEAM	ENT.	ENTRANCE	GA.	GAUGE	O.W.G.	OBSCURE WIRE GLASS	ST.CL.	STORAGE CLOSET.
BL.	BLOCKING.	E.P.	ELECTRIC PANEL	G.I.	GALVANIZED IRON	D.S.	DOUBLE STRENGTH	T.	TOILET.
CAB.	CABINET.	EQUIP.	EQUIPMENT	GL.	GLASS	W.G.	WINDOW "B" QUALITY D.S. GL.	T.B.	TRASH BIN
C.A.R.	COLD AIR RETURN	EXC.	EXCAVATE	GL.CER.T.	GLAZED CERAMIC TILE	S.G.	HEAVY SHEET GLASS 3/16"	T.C.	TERRA COTTA
C.B.	CHALKBOARD	EXIST.	EXISTING	P.P.GL.	POLISHED PLATE GLASS	OFF.	OFFICE	TH.	THRESHOLD.
C.C.	CENTER TO CENTER	EXP.	EXPOSED	T.G.	TEMPERED GLASS	P.B	PANIC BOLT	T.B.	TACKBOARD
CEIL.	CEILING..	EXP.B.	EXPANSION BOLT.	G.S.	GALVANIZED STEEL	O.C.	ON CENTER	U.V.	UNIT VENTILATOR
CEM.	CEMENT	EXT.	EXTERIOR	GYP.	GYPSUM	PLAS.	PLASTER	U.	URINAL
C.I.	CAST IRON	E.J.	EXPANSION JOINT.	HWD.	HARDWOOD	PLAS.AC.	ACOUSTICAL PLASTER	VEST.	VESTIBULE
C.I.P.	CAST IRON PIPE	F.C.	FURRED CEILING	I.BM.	I. BEAM	PLAS.C.	CEMENT PLASTER	V.G.D.F.	VERTICAL GRAIN D.F
GL.	GLASS	F.D.	FLOOR DRAIN	I.D.	INSIDE DIAMETER	PLAS.K.	KEENS CEM. PLASTER	V.T.	VINYL TILE
CONC.	CONCRETE	F.DR.	FIRE DOOR	INS.	INSULATION	PLAS.S	STUCCO.	V.T.R.	VENT THRU ROOF
CONV.	CONVECTOR	F.E.C.	FIRE EXTINGUSHER CAB.	K.D.	KALAMEIN DOOR	PLWD.	PLYWOOD	W.	WINDOW
CONC.F.	CONCRETE FLOOR	F.EXT.	FIRE EXTINGUSHER	LAB.	LABATORY	PLMB.	PLUMBING	W.D.	WINDOW DIMENSION
CORR.	CORRIDOR	F.H.	FIRE HOSE	LAV.	LAVATORY	PROP.	PROPOSED	W.C.	WATER CLOSET
C.G.	COLORED GLASS	F.H.C.	FIRE HOSE CABINET	LKR.	LOCKER	R.	RADIUS	W.F.	WIDE FLANGE
C.T.	CORK TILE	F.HY.	FIRE HYDRANT	MA.TH.	MARBLE THRESHOLD	PL.	PLATE	W.P.	WATERPROOF
C.W.	COLD WATER	FIN.	FINISH.	MAX.	MAXIUM.	RAD.	RADIATER	Y.D.	YARD DRAIN
								P.T.	PLASTIC THRESHOLD.

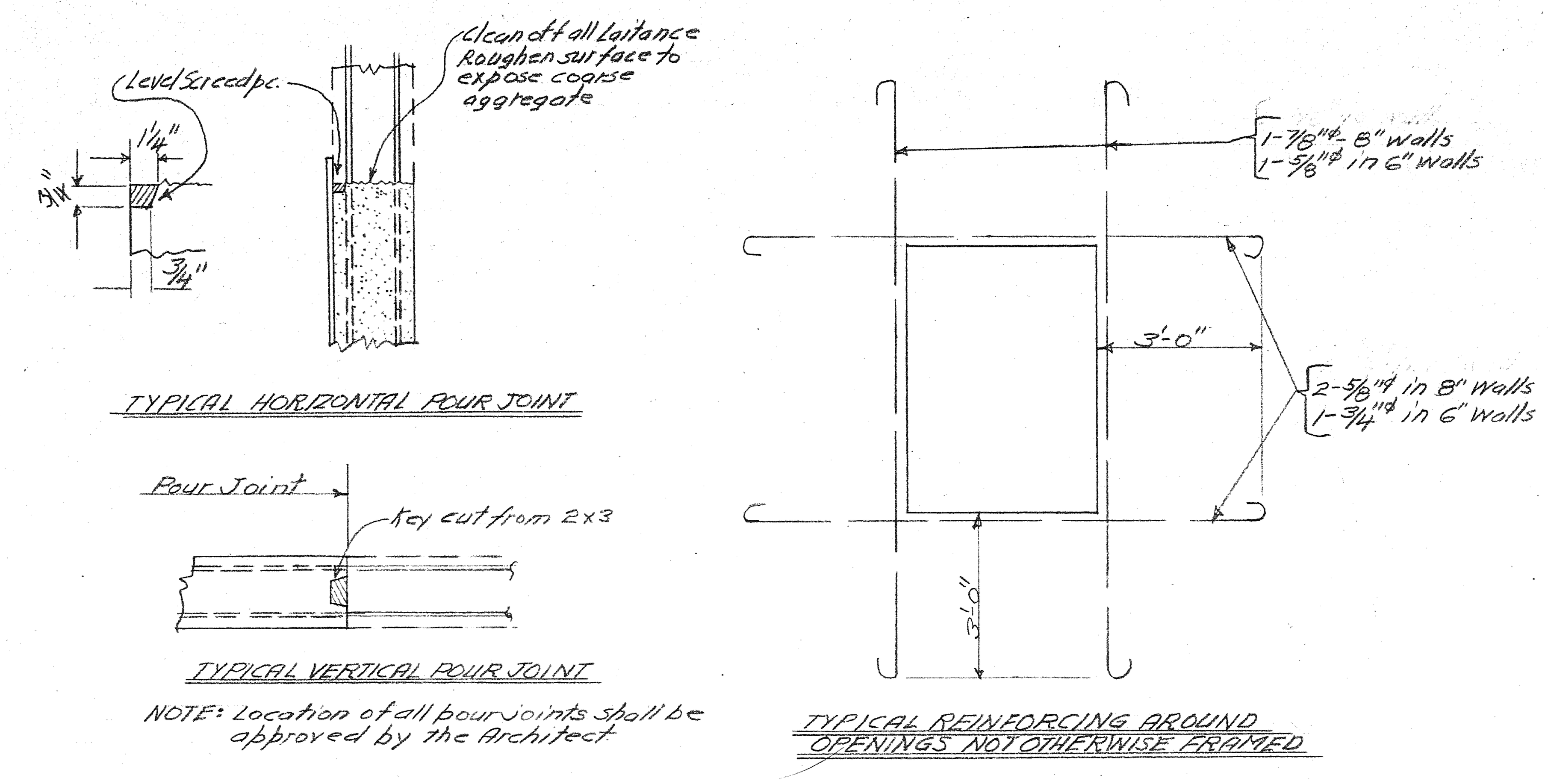
CARL F. GROMMÉ & RALPH B. PRIESTLEY
ARCHITECTS
1539 FOURTH STREET
SAN RAFAEL, CAL. GL. 3-3925

ADD'N IV · GIRLS' P.E. LOCKER ROOM
TERRA LINDA HIGH SCHOOL
NOVA ALBION WAY — SAN RAFAEL, CALIF.
SAN RAFAEL SCHOOL DISTRICT · MARIN COUNTY, — CALIF.

JOB NO.	DATE: 11/6/61		DRAWING NO
60242 E	DRAWN BY JV	CHECKED BY JV	A-1
SET.	APPROVED		OF 10 SHEETS



SECTION W1-W1 SECTION W2-W2 SECTION W3-W3 SECTION W4-W4



TYPICAL HORIZONTAL POUR JOINT

TYPICAL VERTICAL POUR JOINT

NOTE: Location of all pour joints shall be approved by the Architect

TYPICAL REINFORCING AROUND OPENINGS NOT OTHERWISE FRAMED

TYPICAL WALL REINFORCING

6" Wall — — — — 1/2"φ @ 12" ctrs ea. way. in center
8" Wall — — — — 1/2"φ @ 20" ctrs ea. way, ea. face

FOUNDATION NOTE:

Soil pressure does not exceed 2000 lbs. per sq. ft. All footings bear on firm sand or clay. Where necessary lower footings as directed by the Architect to reach firm material. Soil Report by R.S. Harding (Oct. 24 1958)

CONCRETE & REINFORCING NOTE:

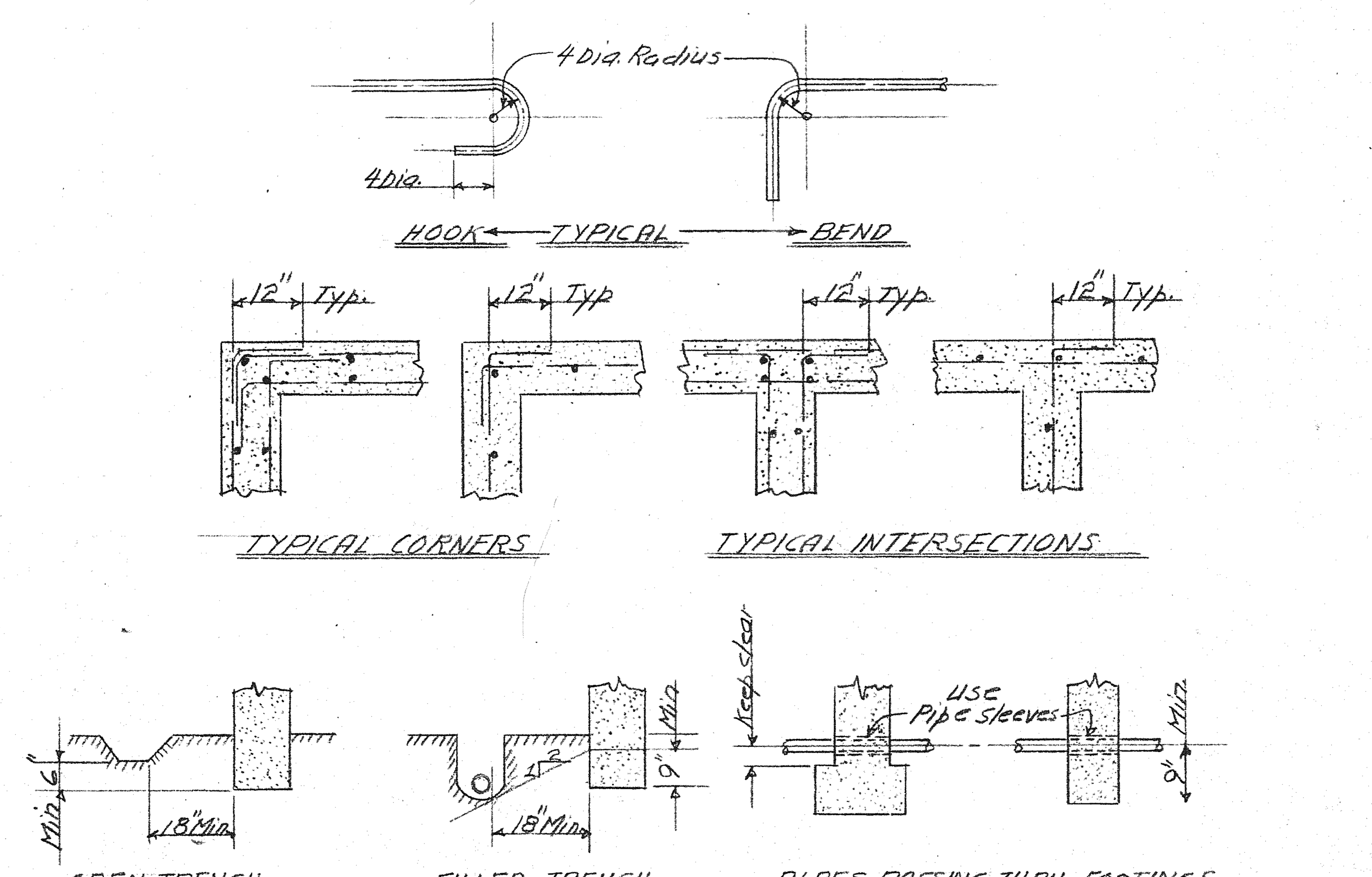
All bars to be deformed-structural Grade. Bars to lap 48 diameters at splices except as otherwise called for. Splices to be staggered. All structural concrete shall have a minimum strength in compression of 2500 psi. at 28 days. Bars marked as continuous (cont.) shall be in as long lengths as possible.

NAILING & FRAMING NOTE:

Structural roof sheathing to be laid diagonal at 45° to supports.
For 2X6 use 2-16d min at all bearings, including blocking, except as otherwise called for.
Cut joints on a diagonal over & parallel to a bearing. For 2" sheathing leave one bearing between joints in adjoining boards, and one board uncut between joints on the same bearing.
All nails shall be common wire nails.

BOLT NOTE:

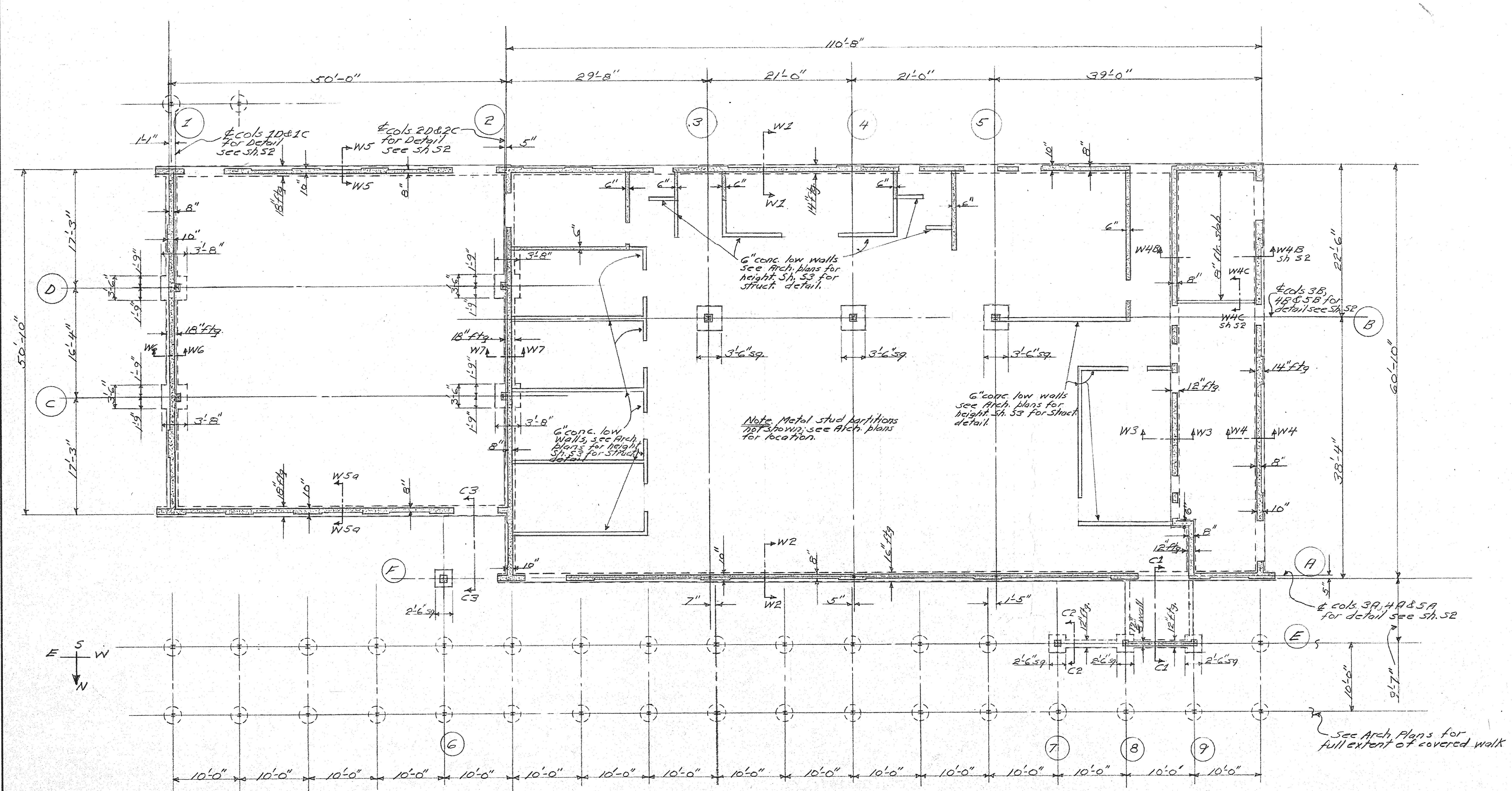
Bolt holes to be bored to same diameter as nominal size of bolt.
Use Malleable Iron Washers (M.I.W.) under all bolt heads and nuts bearing on wood. Washers shall have a thickness of not less than 1/2 bolt diameter and an area 16 times nominal area of bolt.
Tighten all bolts at time of installation, check, retighten before covering up. Check and retighten all accessible nuts before final acceptance.
All bolts shall be Machine Bolts, except as otherwise called for.



HOOK — TYPICAL — BEND

TYPICAL CORNERS TYPICAL INTERSECTIONS

OPEN TRENCH FILLED TRENCH PIPES PASSING THRU FOOTINGS



FLOOR & FOUNDATION PLAN
Scale 1/8"=1'-0"

STATE OF CALIFORNIA — DEPARTMENT OF PUBLIC WORKS
DIVISION OF ARCHITECTURE
21924 APPROVED DEC 18 1961
APPLICATION No. Per F.W. Chesebrough
PRINCIPAL STRUCTURAL ENGINEER

H. M. ENGLE
CIVIL & STRUCTURAL ENGINEER
1539-4TH ST. SAN RAFAEL
LICENSE No.
H. M. Engle

CARL F. GROMMÉ & RALPH B. PRIESTLEY
ARCHITECTS
1539 FOURTH STREET
SAN RAFAEL, CAL. GL. 3-3925

ADD'N. IV · GIRLS' P.E. LOCKER ROOM
TERRA LINDA HIGH SCHOOL
NOVA ALBION WAY — SAN RAFAEL, CALIF.
SAN RAFAEL SCHOOL DISTRICT · MARIN COUNTY — CALIF.

JOB NO.	DATE: 11/6/61		DRAWING NO
5024E	DRAWN BY	CHECKED BY	S-1
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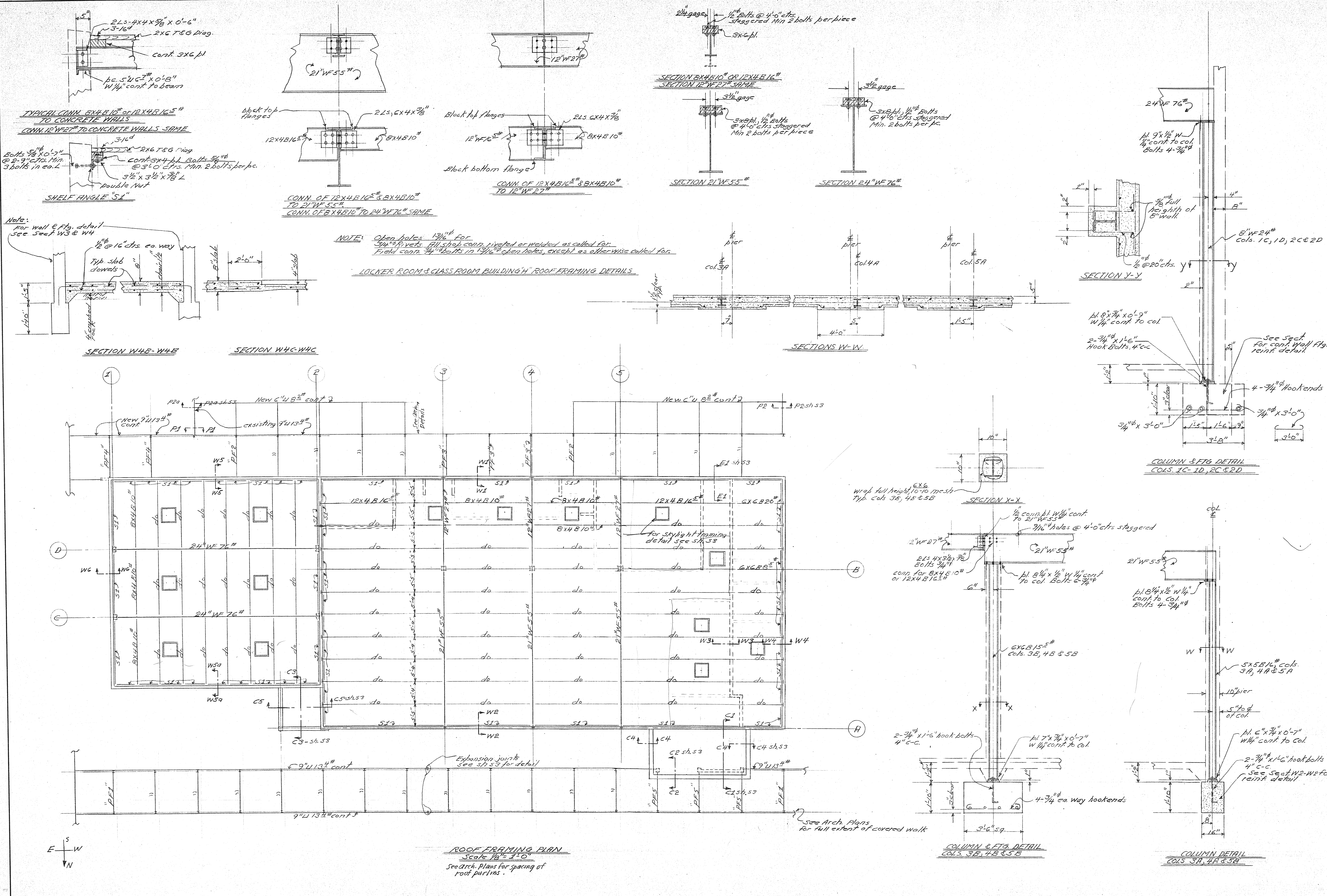


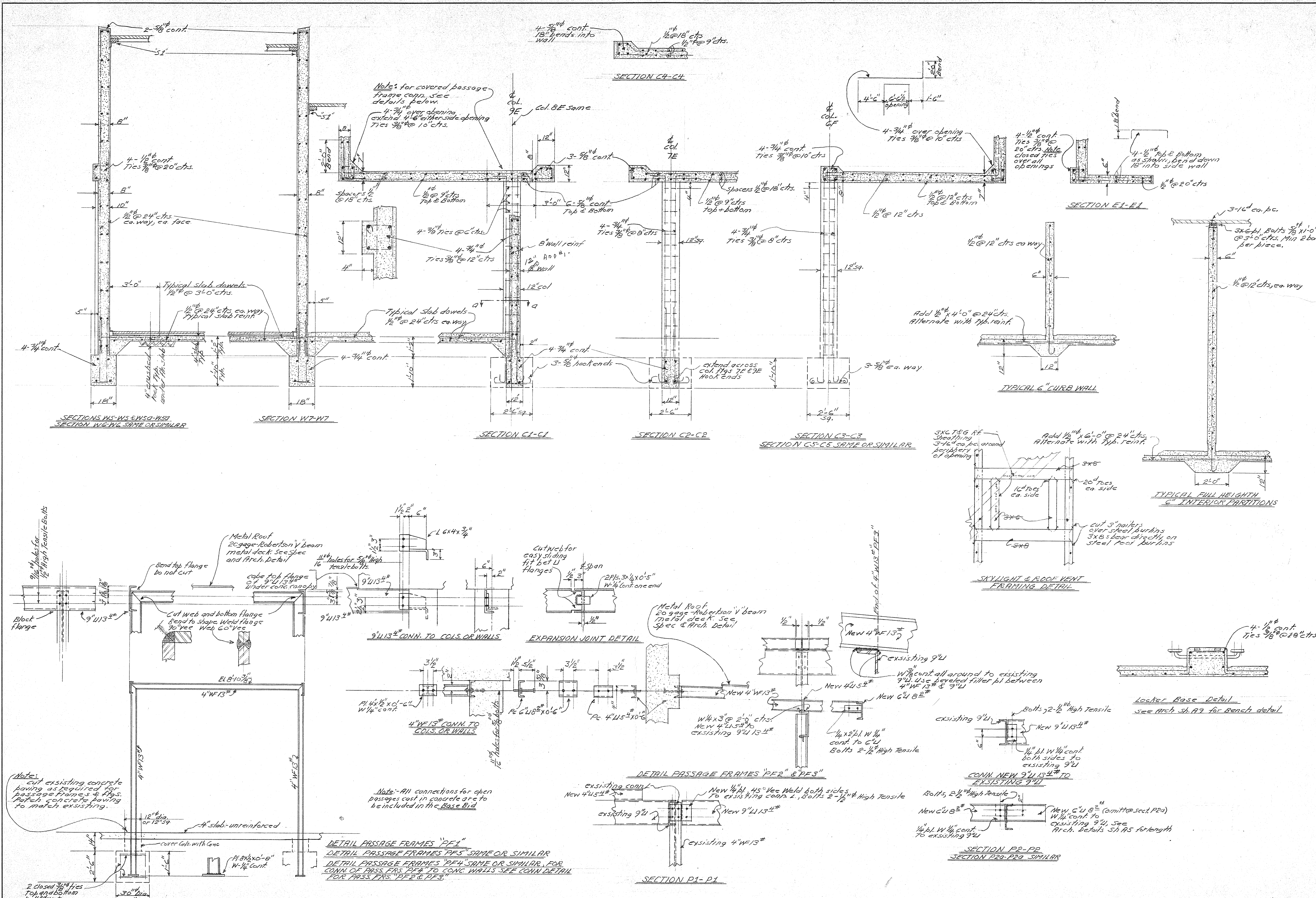
STATE OF CALIFORNIA DEPARTMENT OF PUBLIC WORKS DIVISION OF ARCHITECTURE
21924 APPROVED DEC 18 1961
APPLICATION NO. Per F W Cheseb[illegible]

H. M. ENGLE
CIVIL & STRUCTURAL ENGINEER
1539 - 4TH ST. SAN RAFAEL
LICENSE No.
H. M. Engle

CARL F. GROMMÉ & RALPH B. PRIESTLEY
ARCHITECTS
1539 FOURTH STREET
SAN RAFAEL, CAL. GL. 3-3925

ADD'N. IV · GIRLS' P. E. LOCKER ROOM
TERRA LINDA HIGH SCHOOL
NOVA ALBION WAY — SAN RAFAEL, CALIF.
SAN RAFAEL SCHOOL DISTRICT · MARIN COUNTY — CALIF.

JOB NO.	DATE: 11/6/61		DRAWING NO
5924-2E	DRAWN BY	CHECKED BY	S-2
SET.	APPROVED		OF 3 SHEETS



STATE OF CALIFORNIA DEPARTMENT OF PUBLIC WORKS DIVISION OF ARCHITECTURE
21924 APPROVED DEC 18 1961
APPLICATION No. — By F.W. Chesebrough — PRINCIPAL STRUCTURAL ENGINEER

H. M. ENGLE
CIVIL & STRUCTURAL ENGINEER
1539 - 4TH ST. SAN RAFAEL
LICENSE NO. —
H. M. Engle

CARL F. GROMMÉ & RALPH B. PRIESTLEY
ARCHITECTS
1539 FOURTH STREET
SAN RAFAEL, CAL. GL. 3-3925

ADD'N. IV · GIRLS' P.E. LOCKER ROOM
TERRA LINDA HIGH SCHOOL
NOVA ALBION WAY — SAN RAFAEL, CALIF.
SAN RAFAEL SCHOOL DISTRICT · MARIN COUNTY — CALIF.

JOB NO.	DATE: 11/6/61		DRAWING NO.
602422	DRAWN BY	CHECKED BY	S-3
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A3GEO

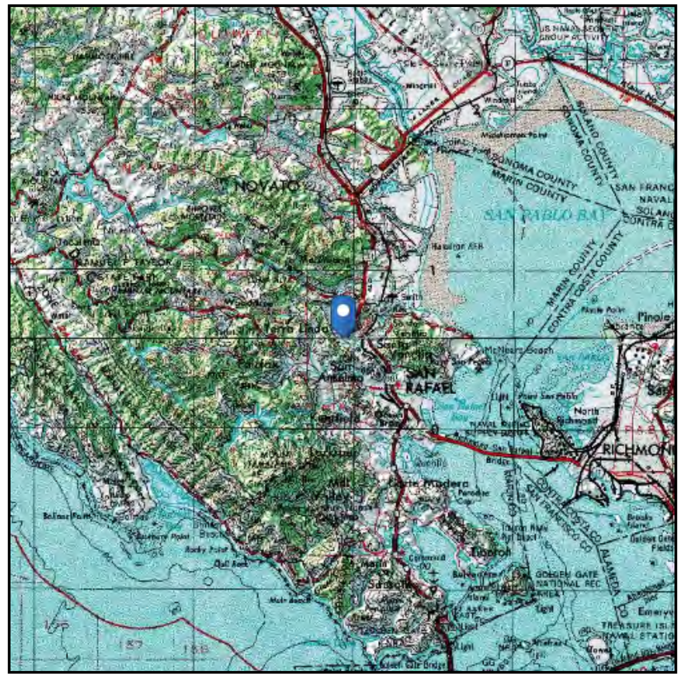
APPENDIX H

USGS Ground Motion Reports

TLHS
AQUATIC CENTER

ASCE 7 Hazards Report

Address:	**Standard:**	ASCE/SEI 7-22	**Latitude:**	37.9995
No Address at This Location	**Risk Category:**	III	**Longitude:**	-122.55356
	Soil Class:	C - Very Dense Soil and Soft Rock	**Elevation:**	81.0327455720504 ft (NAVD 88)



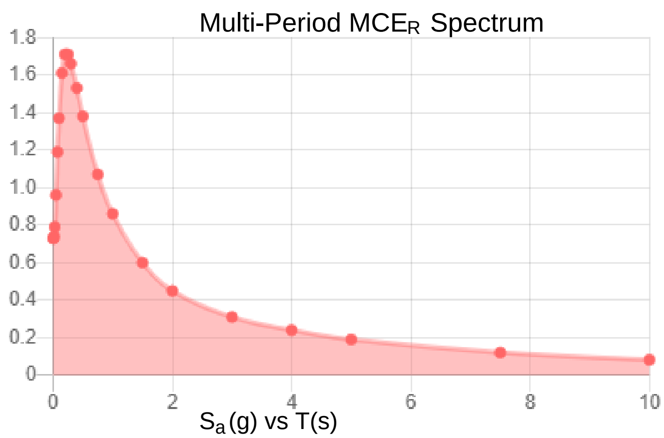
Seismic C - Very Dense Soil and Soft Rock

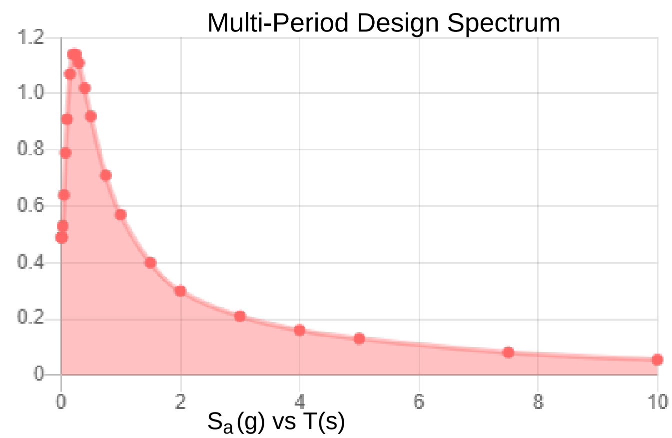
Site Soil Class:

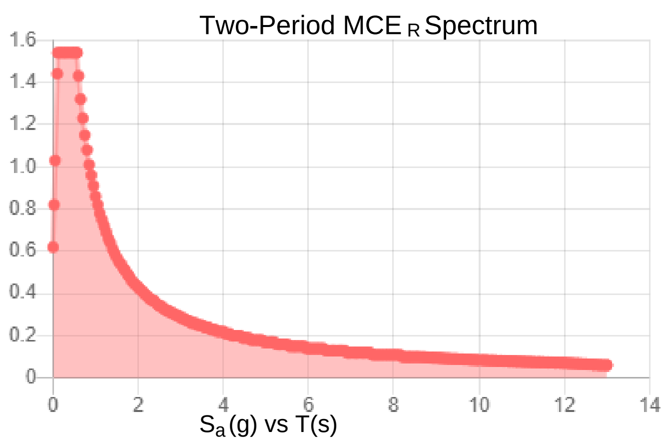
Results:

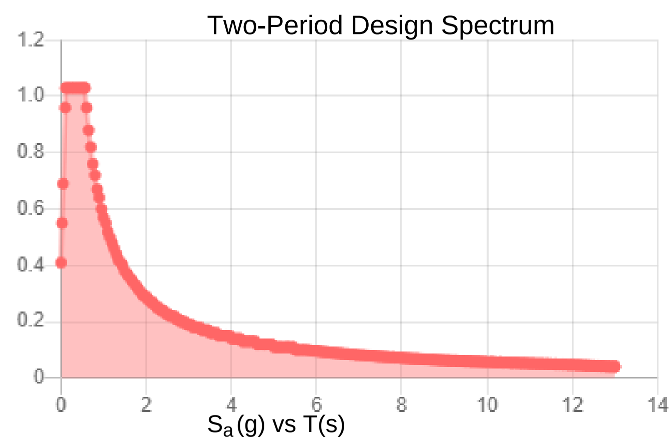
PGA_M :	0.55	T_L :	12
S_{MS} :	1.54	S_S :	1.5
S_{M1} :	0.86	S_1 :	0.6
S_{DS} :	1.03	V_{S30} :	530
S_{D1} :	0.57		

Seismic Design Category: D









MCE$_R$ Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.

Data Accessed: **Thu Aug 31 2023**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

END OF REPORT

APPENDIX G

Geotechnical Investigation & Geologic Hazards Study Report for the Terra Linda High School – Kiln Room Addition

Geotechnical Investigation and Geologic Hazards Study Report

Terra Linda High School - Kiln Room Addition

320 Nova Albion Way

San Rafael, Marin County, California

August 1959 Aerial Photograph (looking southwest)

November 2021 Field Investigation (looking north)

SUBMITTED TO:

Dan Zaich, Ed.D.
Senior Director – Capital Improvements, Sustainability and Construction
San Rafael City Schools
310 Nova Albion Way
San Rafael, CA 94903

December 22, 2021

A3GEO

A3GEO, Inc. 821 Bancroft Way, Berkeley CA 94710 A3GEO

December 22, 2021

Dan Zaich, Ed.D.
Senior Director – Capital Improvements, Sustainability and Construction
San Rafael City Schools
310 Nova Albion Way
San Rafael, CA 94903

RE: Design Level Geotechnical Investigation and Geologic Hazards Study Report
Terra Linda High School (TLHS) Kiln Room Addition
320 Nova Albion Way
San Rafael, Marin County, California

Dear Mr. Zaich,

This report presents the results of a design level geotechnical investigation and geologic hazard study by A3GEO, Inc. (A3GEO), and Lettis Consultants International, Inc. (LCI) for the planned kiln room addition at Terra Linda High School (TLHS) in San Rafael, California. The improvements discussed in this report and shown on the attached figures are based on information obtained from a drawing we received from Greystone West on 4 November 2021[1].

A3GEO and LCI previously prepared a design-level geotechnical investigation and geologic hazards study report for the TLHS campus that focused on the sites of three new buildings, the closest of which is about 130 feet southeast of the planned kiln room addition. The geotechnical and geologic study described in the attached report includes two new borings, which we used to characterize geotechnical and geologic conditions at the planned kiln room addition site in a manner consistent with the applicable California Geological Survey Note 48 guidelines.

The attached report provides information on geotechnical, geologic and seismic conditions, presents our assessment of potential site hazards and constraints, and includes design level geotechnical recommendations for the kiln room addition project. The conclusions and recommendations presented in this report were developed in accordance with generally-accepted geotechnical principles and practices at the time that the report was prepared. Should you have questions or comments concerning our findings, the design concepts discussed, or our recommendations, please do not hesitate to call.

Sincerely,

A3GEO, Inc.

Wayne Magnusen, PE, GE
Principal Engineer
Cell: (510) 325-5724

REGISTERED PROFESSIONAL ENGINEER WAYNE DAVID MAGNUSEN No 2705 Exp. 6/30/2022 GEOTECHNICAL STATE OF CALIFORNIA

Lettis Consultants, International, Inc.

John N. Baldwin, CEG
Principal Geologist
(925) 482-0360

REGISTERED GEOLOGIST JOHN N. BALDWIN No. 2167 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

[1] Filename: *TLHS Kiln Room Addition Site Plan 10_21_2021.pdf*

REPORT

1. INTRODUCTION

1.01 Overview

This report presents the results of a design level geotechnical investigation and geologic hazard study by A3GEO, Inc. (A3GEO), and Lettis Consultants International, Inc. (LCI), for a kiln room addition at Terra Linda High School (TLHS) in San Rafael, California. Our services were authorized by San Rafael City Schools (District) under Modification #8, dated 22 November 2021, to an Independent Consultant Agreement for Professional Services originally entered on 3 January 2017. The location of Terra Linda High School (TLHS) is shown on the Site Location Map (Figure 1). The school address is 320 Nova Albion Way, San Rafael, California.

The proposed kiln room addition site (Site) is located in the western portion of the TLHS campus at the approximate location indicated on Figure 2. Approximate coordinates of the Site are Latitude 38.00035 and Longitude -122.55490.

This geotechnical and geologic study includes two new borings (A3-21-1 and A3-21-2), the locations of which are shown on Figure 2. A3GEO and LCI previously prepared a design-level geotechnical investigation and geologic hazards study report for the TLHS campus (A3GEO, 2018) that included borings and cone penetration tests (CPTs) conducted in two phases coupled with a review of existing boring logs developed previously by others (MPEG, 2003). The locations of previous TLHS borings and CPTs are also indicated on Figure 2.

The improvements discussed in this report and shown on the attached figures are based on information obtained from a drawing we received from Greystone West on 4 November 2021[1]. The Exploration Location Plan on Figure 3 shows the planned configuration of the Project, which includes the kiln room addition, an outdoor courtyard, a driveway, and a walkway. The kiln room addition shown on Figure 3 has a total footprint area that is less than 1,000 square feet.

Although detailed project information is not available to us at this time, we understand that the new kiln room building will involve conventional framed construction and that structural foundation loads will be relatively light. We anticipate that the floor of the new addition and at least some of the exterior flatwork will consist of reinforced concrete slabs cast on-grade. At this time, we anticipate that the proposed driveway may include asphalt concrete (AC) paving.

1.02 Purpose and Scope

The primary purposes of this study were to (1) evaluate site conditions and geologic hazards in a manner consistent with current California Geological Survey Note 48 guidelines (CGS, 2019b); and 2) develop design-level geotechnical conclusions and recommendations for the proposed kiln addition project (Project). The scope of this design level geotechnical investigation and geologic hazard study consisted of:

- Reviewing existing data;
- Performing site reconnaissance;
- Drilling two borings at the proposed Project site
- Performing geotechnical and geochemical laboratory tests;
- Characterizing geotechnical and geologic conditions; and
- Preparing this design-level report in accordance with CGS Note 48.

Our scope of services did not include an environmental assessment or investigation of the site for the presence of toxic material in the soil, groundwater, or air.

[1] Filename: *TLHS Kiln Room Addition Site Plan 10_21_2021.pdf*

1.03 This Report

This report includes information, data and interpretations from our previous design level geotechnical investigation and geologic study for the TLHS campus (A3GEO, 2018), which was reviewed and approved by the CGS in May 2018. Relevant sections from our 2018 report are included in this report for completeness. New or substantially revised sections were prepared where previous sections were deemed less than relevant or outdated.

The remainder of this report is organized as follows:

Section 2.00 describes our methods of investigation;
Section 3.00 describes the geologic, seismic, and historical setting of the site;
Section 4.00 describes site-specific geotechnical and geologic conditions;
Section 5.00 presents our assessment of site geologic hazards;
Section 6.00 discusses geotechnical considerations for the proposed improvements;
Section 7.00 presents our recommendations for the proposed improvements;
Section 8.00 outlines the limitations of our study;
Section 9.00 presents a list of selected references.

2. METHODS OF INVESTIGATION

2.01 Review of Geologic, Seismic, and Historical Information

We reviewed a variety of published and unpublished references containing information on geologic, seismic and historical conditions. Selected references are described below; a list of references used in preparing this report is presented in Section 9.00.

The geologic references that we reviewed included maps prepared by Rice, Smith and Strand (1976); Blake, Graymer and Jones (2000); and Graymer, and others (2006). There are no zoned active faults within the USGS San Rafael 7.5 minute quadrangle so there is no official Alquist-Priolo Earthquake Fault Zones Map (A-P Map) for the site area. CGS also prepares Seismic Hazard Zone maps delineating zones of required investigation for earthquake-induced landsliding and liquefaction, but no map has yet been issued for the site area.

Geologic hazard maps prepared for the local General Plan are contained in California Division of Mines and Geology (CDMG) Open-File Report 76-2 (Rice, Smith and Strand, 1976); we reviewed the Slope Stability Map from this publication as well as the more recent map of Slides and Earth Flows in USGS Open-File Report 97-745C (Wentworth and others, 1997). The latest version of the Marin General Plan references the Liquefaction Susceptibility Map in USGS Open-File Report 00-444 (Knudsen et al., 2000), which we reviewed together with the accompanying Quaternary Deposits Map. We also reviewed the more recent liquefaction susceptibility and quaternary deposit maps by Witter and others (2006).

To evaluate flood hazards, we reviewed the Tsunami Inundation Map for Emergency Planning (CGS, 2009) and online flood maps prepared by the Federal Emergency Management Agency (FEMA) (FEMA, 2016).

The earliest historic map that we reviewed showing the site area was an 1873 map of Marin County (Austin, 1873). We also obtained historic aerial photographs of the TLHS campus area from Pacific Aerial Surveys (a Quantum Spatial Company) in Novato, California. In all, Pacific Aerial Surveys provided 10 vintages of geo-referenced aerial photographs taken between 1950 and 2016. The complete set of georeferenced aerial photographs with identifying information is attached in Appendix A. The 1950 aerial photograph is also reproduced on Figure 5. A 1959 aerial photograph of the school site during construction (Bradley, 1959) is presented on the cover of this report.

2.02 A3GEO Borings

2.02.1 Drilling and Logging Procedures

In November 2021, A3GEO advanced two borings (A3-21-1 and A3-21-2) at the proposed kiln addition Project site per CGS Note 48 requirements (at least two borings, per building). Data from the new kiln addition borings augment existing data from previous A3GEO borings and cone penetration tests (CPTs), as well as previous borings and CPTs advanced by Miller Pacific Engineering Group (MPEG). The locations of new and previous borings are indicated on Figure 2. The locations of kiln addition borings and the closest previous boring to the kiln addition site are indicated on Figure 3.

During drilling, an A3GEO engineer visually/manually classified the soil in general accordance with ASTM D2488 classifications, which are based on the Unified Soil Classification System (USCS). Soil samples were obtained using a 2-inch outside diameter Standard Penetration Test (SPT) sampler without liners and a 3-inch outside diameter Modified California (MC) sampler with liners. The samplers were driven using a standard 140-pound automatic hammer with an approximate 30-inch fall. The hammer blows required to drive the sampler the final 12 inches of each 18-inch drive are presented on the boring logs. Sampler blow counts obtained using the MC sampler were adjusted to approximate SPT N-values using a factor of 0.63 to account for differences in sampler end area. Where a full 12-inch drive could not be achieved, the number of blows and corresponding amount of sampler penetration are indicated on the logs.

Preserved samples were transported to A3GEO's laboratory for further review by California-licensed professionals from A3GEO (Professional Engineer) and LCI (Certified Engineering Geologist). Field logs were checked and revised, where appropriate, based on laboratory test data and detailed observations of the sampled materials. The logs of the 2021 kiln addition borings are attached in Appendix B preceded by: 1) a Key to Exploratory Boring Logs that describes the USCS and the symbols used on the logs; and 2) a Key to Rock Descriptions. Logs of A3GEO borings drilled in February and November of 2017 (A3GEO, 2018) are contained in Appendix C. Groundwater depth measurements made during and after drilling are shown on the logs. Following our groundwater depth measurements, the boreholes were backfilled with grout.

The boring logs in Appendix B and Appendix C represent our interpretation of the subsurface materials at the boring locations at the time of drilling and the passage of time may result in changes in the subsurface conditions. The A3GEO boring locations indicated on the attached figures were determined by measuring from existing improvements and should be considered approximate.

2.02.2 Kiln Addition Borings (This Study)

On 23 November 2021, two borings were advanced at the kiln addition Project site using a track-mounted drill rig equipped with 4-inch-diameter continuous flight augers. The approximate locations of the borings (designated A3-21-1 and A3-21-2) are shown on Figures 2 and 3; the logs of Borings A3-21-1 and A3-21-2 are included in Appendix B. Information on the depths of the borings follows (elevations shown were estimated from the recent site survey reproduced on Figure 3).

Summary of Kiln Addition Borings (This Study)

Location	Surface Elevation (feet)	Boring Depth (feet)	Bottom of Boring Elevation (feet)
A3-21-1	81.0	25.1	55.9
A3-21-2	81.0	26.0	55.0

Borings A3-21-1 and A3-21-2 extended approximately 13.1 feet and 10.2 feet into bedrock, respectively.

2.02.3 February 2017 Borings (A3GEO, 2018)

On 22 February 2017, borings were advanced at five locations within the TLHS campus using a truck-mounted drill rig. The approximate locations of the borings (designated B1 through B-5) are shown on Figure 2; the logs of our February 2017 borings are included in Appendix C. Information on the depths of the borings follows (elevations shown derived from the available County-provided LiDAR dataset).

Summary of February 2017 TLHS Borings (A3GEO, 2018)

Location	Surface Elevation (feet)	Boring Depth (feet)	Bottom of Boring Elevation (feet)
B-1	81.1	16.3	64.8
B-2	81.2	13.3	67.9
B-3	81.0	21.0	60.0
B-4	81.1	21.0	60.1
B-5	91.4	20.4	71.0

All five of our February 2017 borings terminated in bedrock.

2.02.4 November 2017 Borings (A3GEO, 2018)

On 22 November 2017, borings were advanced at nine locations within the TLHS campus using two drill rigs.

Borings A3-17-1, A3-17-3, A3-17-5, A3-17-6, and A3-17-7 were advanced with a Mobile B61 truck-mounted hollow stem auger rig. Borings A3-17-2, A3-17-4, A3-17-8, and A3-17-9 were advanced using a Rhino M5T limited access track rig, equipped with hollow stem augers. The approximate locations of our November 2017 borings are shown on Figure 2 and the logs of the borings are included in Appendix C. Information on the depths of the borings follows (elevations shown estimated from the site survey drawing (HED , 2017).

Summary of November 2017 TLHS Borings (A3GEO, 2018)

Location	Surface Elevation (feet)	Boring Depth (feet)	Bottom of Boring Elevation (feet)
A3-17-1	79.5	25.3	54.2
A3-17-2	80.5	21.5	59.0
A3-17-3	81.0	15.8	65.2
A3-17-4	80.5	15.0	65.5
A3-17-5	81.0	16.0	65.0
A3-17-6	81.0	11.4	69.6
A3-17-7	81.0	19.9	61.1
A3-17-8	81.0	13.3	67.7
A3-17-9	81.0	19.3	61.7

Each of the November 2017 borings, with the exception of A3-17-4, terminated in bedrock. A3-17-4 was terminated in soil at a depth of 15 feet after the hammer winch on the drill rig broke down.

2.03 A3GEO February 2017 CPTs

On February 22, 2017, A3GEO advanced four cone penetration tests (CPT-1 through CPT-4) at the approximate locations shown on Figure 2. All four CPTs were advanced to practical refusal under the weight of a 30-ton truck. Plots of measured cone tip resistance (q_t), sleeve friction (f_s) and pore water pressure (u) are presented on CPT logs attached in Appendix D. Information on the depths of the CPTs follows (elevations shown derived from the available County-provided LiDAR dataset).

Summary of CPTs (A3GEO, 2017)

Location	Surface Elevation (feet)	CPT Depth (feet)	Bottom of CPT Elevation (feet)
CPT-1	80.7	24.6	56.1
CPT-2	76.8	21.3	55.5
CPT-3	79.1	22.6	56.5
CPT-4	80.6	18.2	62.4

The CPT logs in Appendix D include geotechnical material descriptions interpreted based on the normalized soil behavior type (SBT_N) as prescribed by Robertson, 1990. The CPT logs present data and interpretations pertaining to subsurface conditions at the indicated locations at the time that the CPTs were performed; the passage of time may result in changes in the subsurface conditions. The CPT locations shown on the attached figures were determined by measuring from existing improvements and should be considered approximate. At the conclusion of the CPT investigation, the CPT holes were backfilled with grout.

2.04 A3GEO Laboratory Tests

Samples from A3GEO borings were examined in our laboratory to check field classifications and assign laboratory tests. Our geotechnical laboratory testing program was directed toward a quantitative and qualitative evaluation of the physical properties of the soils that underlie the site. The following geotechnical laboratory tests were performed:

- Moisture content per ASTM D-2216;
- Dry density per ASTM D-2937;
- Atterberg limits per ASTM D-4318;
- Particle size distribution per ASTM D422; and
- Unconsolidated-Undrained Triaxial Compression per ASTM D2850.

The results of geotechnical laboratory tests are presented on the boring logs in Appendix B and Appendix C at the corresponding sample depths. Laboratory data sheets for the kiln addition borings are attached as Appendix E, and laboratory data sheets for Phase 1 and 2 borings are attached as Appendix F.

We screened for naturally-occurring corrosive materials at the proposed kiln room addition site by conducting a suite of geochemical laboratory tests on a sample of soil obtained from a depth of 1 to 2 feet in Boring A3-21-1. The geochemical laboratory tests were performed by Cooper Testing Labs, Inc. and included measurements of:

- Resistivity (100% saturated) per Caltrans 643;
- Chloride ion concentration per Caltrans 422 (modified);
- Sulfate ion concentration per Caltrans 417 (modified);
- pH per Caltrans 643; and
- Moisture per ASTM D2216.

The corrosivity test results are included at the end of Appendix E.

2.05 Previous Geotechnical Report

We reviewed the following geotechnical/geologic report provided to us by Miller Pacific Engineering Group (MPEG):

> ***MPEG, 2003 -*** Miller Pacific Engineering Group, 2003, “Geotechnical Investigation and Geologic Hazards Evaluation, Terra Linda High School, San Rafael, California,” consulting report dated October 31, 2003, MPEG Project 779.12.

The referenced report includes the logs of borings and CPTs performed at the approximate locations shown on the attached figures. The logs of MPEG’s borings and CPTs are attached in Appendix G.

MPEG’s boring logs state that ground surface elevations refer to “City of San Rafael Topo Map, DPW, 1998”, however the datum for this map is not specified. A3GEO contacted the City of San Rafael Department of Public Works to inquire about this map but were unsuccessful in learning what vertical datum the elevations on DPW topo map utilized. Based on the elevations shown on the logs, we believe it is likely that the elevations shown on the MPEG, 2003 logs refer to NGVD 29, which we converted to NAVD 88 when developing our cross sections.

2.06 Existing School Plans

We reviewed the following set of plans obtained from the District’s archives:

> ***GM&P, 1958*** - Grommé Mulvin & Priestley (GM&P), 1958, *“New High School, San Rafael High School District for the Terra Linda Area, Marin County, California,”* 48-sheet plan set dated December 16, 1958.

The following two sheets from the 1958 drawings are attached in Appendix H:

- Sheet A1 includes a Site Plan showing the locations of five proposed buildings identified as Buildings A through E. The proposed kiln room addition site is located west of Building A adjacent to an outline identified as a “Future Bldg.” The Schedule of Drawings on Sheet A1 generally indicates the complete 1958 plan set includes Architectural and Structural drawings for Buildings A through E, but not future buildings.

- Sheet A1A includes a more detailed Partial Site Plan that includes predevelopment “original” topographic contours and spot elevations in planned building areas that are identified as “existing grade”. Sheet 1A also includes a Profile at A-A’, which is oriented upslope-downslope relative to the original topography and passes through planned Buildings A and D. This cross section was used as a partial basis for the Cross Section A-A’ presented in our 2018 report for the TLHS campus, which is presented in this report on Figure 11.

Sheet A1A includes the locations “original grade test holes”, the logs of which have not been located.

Elevations on the 1958 plans are relative to U. S. C. & G. S. datum, which we understand is equivalent to the National Geodetic Vertical Datum of 1929 (NGVD 29) with respect to elevations. NVGD 29 elevations can be converted to NAVD 88 elevations by adding 2.67 feet (NOAA, 2018).

3. GEOLOGIC, SEISMIC, AND HISTORICAL INFORMATION

3.01 Regional Geologic Setting

The geology of the San Francisco Bay Region includes three “basement” rock complexes; the Great Valley complex, the Franciscan Complex and the Salinian complex all of which are Mesozoic in age (225 to 65 million years old). Within the region, the Mesozoic basement rocks are locally overlain by a diverse sequence of Cenozoic Era (younger than 65 million years) sedimentary and volcanic rocks. Since their deposition, the Mesozoic and Cenozoic rocks have been extensively deformed by repeated episodes of folding and faulting. Significantly, the Bay Area experienced several episodes of uplift and faulting during the late Tertiary Period (about 25 million to 2 million years ago) that produced the region’s characteristic northwest-trending mountain ranges and valleys.

World-wide climate fluctuations during the Pleistocene (about 1.8 million to 11 thousand years ago) resulted in several distinct glacial periods. A lowering of sea level accompanied each glacial advance as water became stored in vast ice sheets. Melting of the ice during warm intervals caused corresponding rises in sea level. High sea levels favored rapid and widespread deposition in the bay and surrounding floodplains. Low sea levels during glacial advances steepened the gradients of streams and rivers draining to the sea thereby encouraging erosional down cutting. The most recent glacial interval ended about 15,000 years ago. Evidence suggests that during the maximum extent of this latest glaciation, sea level was 300 to 400 feet below its present elevation and the valley now occupied by San Francisco Bay drained to the Pacific Ocean more than 30 miles west of the Golden Gate. Near the beginning of the Holocene age (about 11 thousand years ago) the rising sea re-entered the Golden Gate, and sediments accumulated rapidly beneath the rising San Francisco Bay and on the surrounding floodplains. The Holocene-age surface deposits are generally less dense and weaker than Pleistocene-age soils that predate the last sea level rise.

3.02 Regional Active Faults

Within the San Francisco Bay Region, the relative motion of the Pacific and North American crustal plates is presently accommodated by a series of northwest-trending active faults that exist over a width of more than 50 miles. Approximate distances and directions from the site to Bay Area active faults follow and are also shown on Figure 4:

Approximate Distances and Directions to Bay Area Active Faults (Jennings and Bryant, 2010)

Fault System	Approximate Distance from Site	Approximate Direction from Site
San Andreas	8.5 miles	West-southwest
San Gregorio	9.0 miles	West-southwest
Hayward	10.0 miles	East-northeast
Rodgers Creek	12.5 miles	East-northeast
West Napa[2]	21.0 miles	East-northeast
Concord-Green Valley	26.5 miles	East-northeast
Calaveras	31.0 miles	Southeast
Greenville – Clayton - Marsh Creek	33.0 miles	East-southeast

[2] In 2014, a Magnitude 6.0 earthquake occurred on the West Napa fault and as a consequence the southern extent of this feature is presently being reevaluated.

Faults that are defined as active typically exhibit: 1) evidence of Holocene-age (younger than 11,000 years) displacement, 2) measurable aseismic fault creep, 3) close proximity to linear concentrations or trends of earthquake epicenters, and/or 4) prominent tectonic-related geomorphology. The major faults listed in the preceding table are near-vertical and generally exhibit right-lateral strike-slip movement (which means that the movement is predominantly horizontal and when viewed from one side of the fault, the opposite side of the fault is observed as being displaced to the right).

3.03 Regional Seismicity

Since 1836, six earthquakes of magnitude 6.5 or greater have occurred in the Bay Area (Bakun, 1999); the dates, magnitudes (M) and epicentral locations of these six large earthquakes are summarized in the table that follows.

Magnitude 6.5 or Greater Earthquakes; 1836-1998
(Bakun, 1999; Tuttle and Sykes, 1992)

Date	Magnitude	Epicenter Location
June 10, 1836	6.5	East of Monterey Bay
June 1838	6.8 – 7.2	Peninsula section of the San Andreas fault
October 8, 1865	6.5	Southwest of San Jose
October 21, 1868	6.8	Southern Hayward fault (Hayward Earthquake)
April 18, 1906	7.8	San Andreas fault (San Francisco Earthquake)
October 18, 1989	6.9	Santa Cruz Mountains (Loma Prieta Earthquake)

The Working Group on California Earthquake Probabilities (WGCEP) has developed authoritative estimates of the magnitude, location, and frequency of future earthquakes in California, which are published in Uniform California Earthquake Forecast (UCERF) reports. The most recent forecast (UCERF3) indicates the following likelihoods for one or more earthquake events of the specified magnitude occurring within the San Francisco region in the next 30 years (starting in 2014).

San Francisco Region UCERF3 Forecast
(WGCEP, 2013)

Earthquake Magnitude (greater than or equal to)	30-year Likelihood of one or more earthquake events
≥ 5.0	100%
≥ 6.0	98%
≥ 6.7	72%
≥ 7.0	51%
≥ 7.5	20%
≥ 8.0	4%

The WGCEP has also made estimates of the likelihood of earthquakes with magnitude greater than or equal to 6.7 occurring on specific faults; these probabilities are summarized in the table that follows.

San Francisco Region UCERF3 Forecast (Aagaard et al., 2016)

Earthquake Fault	30-year Likelihood of one or more earthquake events with M≥6.7
Hayward - Rodgers Creek	33%
Calaveras	26%
San Andreas	22%
Hunting Creek, Berryessa, Green Valley, Concord, Greenville	16%
Maacama	8%
San Gregorio	6%

Compared to the previous forecast (UCERF 2; WGCEP, 2008) the likelihoods of moderate-sized earthquakes (magnitude 6.5 to 7.5) are generally lower whereas those of larger events are higher. This change reflects a better understanding of the regional fault system and the potential for multi-fault ruptures on many faults.

3.04 Local Geology

The TLHS campus is situated on a gentle, northeast-sloping alluvial fan bounded by lower hills of Mount Tamalpais to the south and a set of northwest-trending hills to the northeast. The hills in the direct vicinity of the site are comprised of Franciscan bedrock. The hills southwest of the site are part of a continuous range extending northwest from downtown San Rafael with localized peaks at elevations above +600 feet (Figure 1; USGS, 2015). To the northeast of the site are smaller isolated hills the closest of which to the campus rises to above elevation +200 feet.

The Predevelopment Aerial Photograph on Figure 5 shows the alluvial fan upon which the school is presently located was once incised by several creeks emanating from the hills to the southwest and an unnamed northwesterly-flowing creek along the northeastern property boundary. The 1950 photograph on Figure 5 shows the kiln room addition site about 200 feet east-southeast of a prominent erosional gully that existed outside the northwest limit of the TLHS property in 1950. The 1950 photograph on Figure 5 also shows a subtle southwest-northeast trending tonal lineament about 150 feet east-southeast of the kiln room addition site aligned with Borings B-2 and A-17-3. This tonal is interpreted as fluvial-related. Notably, none of the creeks or tonal seen on predevelopment aerial photographs (Figure 5; Appendix A) are proximate to the kiln room addition site.

A recent USGS geologic map[3] (Blake, Graymer and Jones, 2000) showing the site area is presented on Figure 6. Blake, Graymer and Jones (2000) map the hills that surround the TLHS campus predominantly as Franciscan Complex Mélange described as follows:

> ***Mélange (map symbol fsr) -*** *A tectonic mixture of variably sheared shale and sandstone containing (1) hard tectonic inclusions largely of greenstone, chert, graywacke, and their metamorphosed equivalents, plus exotic high-grade metamorphic rocks and serpentinite and (2) variably resistant masses of graywacke, greenstone, and serpentinite up to several miles in longest dimension, and including minor discrete masses of limestone too small to be shown. Blocks and resistant masses have survived the extensive shearing evident in the mélange's matrix, and range in abundance from less than 1 to 50 percent or more of the rock mass. The degree of shearing in the unit ranges from gouge to unsheared rock, with resistant masses relatively unsheared and matrix sheared. Severely sheared shale is abundant in areas where blocks are abundant. Fresh, relatively unsheared rock is hard, the larger resistant masses are pervasively fractured, and blocks are commonly tough and relatively unfractured. Sandstone is graywacke, grayish green where fresh, weathering to brown, commonly medium to coarse*

[3] Geologic maps generally show materials interpreted to be present at or near the ground surface.

> *grained, containing abundant angular lithic grains and no detrital potassium feldspar, except rarely as much as 5 percent. Graywacke is locally veined with quartz and carbonate, and usually contains microscopic secondary pumpellyite. Topography of coherent masses resembles that of unit Kfs, whereas highly sheared matrix typically yields subdued, gently-rounded topography.*

As shown on Figure 6, Blake, Graymer and Jones (2000) map Franciscan Complex Mélange extending onto the far western corner of the TLHS campus to near the location of the proposed kiln room addition site. The remainder of the TLHS campus is mapped by Blake, Graymer and Jones as Quaternary (less than about 2.6 million year old) alluvium described as follows:

> ***Alluvium, Quaternary (map symbol Qal)****—Sand, gravel, silt, and clay; loose to soft and friable*

As shown on Figure 6, Blake, Graymer and Jones (2000) also map a northwest-trending inferred fault concealed by alluvium below the front (northeast) part of the campus passing near Nova Albion Way and the creek bounding the northeastern property boundary. This inferred fault is the projection of a fault mapped in the hills farther to the northwest and is not considered active.

An earlier geologic map by Rice, Smith and Strand (1976) shows the TLHS campus underlain by Quaternary alluvium and colluvium; alluvium refers to deposits that have been deposited by streams whereas colluvium refers to soils that have moved downslope by gravity. Witter et al., 2006, (Figure 7) describe the surficial geology at the site as Holocene alluvial fan deposits (Witter et al., 2006). The alluvium projects to the northeast where it merges with Holocene bay mud over several thousand feet to the northeast of the site.

3.05 Liquefaction Mapping

Liquefaction is a phenomenon by which certain types of soils that are below groundwater can lose strength (liquefy), compress (settle) and gain mobility (flow) in response to earthquake groundshaking. Liquefaction is considered a geologic hazard and CGS has issued official seismic hazard maps showing “zones of require investigation” for liquefaction for many parts of California; however, no such maps have yet been issued for Marin County.

The U. S. Geological Survey (USGS) has published maps of liquefaction susceptibility for the central San Francisco Bay Region (Knudsen et al., 2000; Witter et al., 2006). As shown on Figures 8a and 8b, both USGS maps show all of the TLHS campus within an area of “Moderate” liquefaction susceptibility. The main differences between the two maps pertains to the region east of the site where locations of previously mapped “High” liquefaction susceptibility were reduced to “Moderate” liquefaction susceptibility following completion of more detailed Quaternary mapping. The summary description for this liquefaction susceptibility category (from Witter et al., 2006) follows.

> *Expect about 20 to 30 percent of future liquefaction effects to occur within geologic units assigned MODERATE susceptibility (with about 1 occurrence for every 50 square kilometers). Geologic map units within this category include latest Pleistocene to Holocene deposits from a variety of environments. Gravel quarries and percolation ponds (historical) are also assigned to this category. Together, units assigned MODERATE susceptibility cover 2,314 square kilometers of the central San Francisco Bay region. About 25 percent of historical liquefaction occurrences fall within map units assigned MODERATE susceptibility (about 0.02 occurrences per square kilometer).*

The referenced liquefaction susceptibility mapping by the USGS is based on accompanying regional-level maps of Quaternary deposits coupled with groundwater depth estimates, earthquake ground motion estimates, and documented historical accounts of liquefaction occurrence. As such, the USGS susceptibility maps (Figures 8a and 8b) are not “site-specific” as no onsite data was used in their development.

3.06 Landslide Mapping

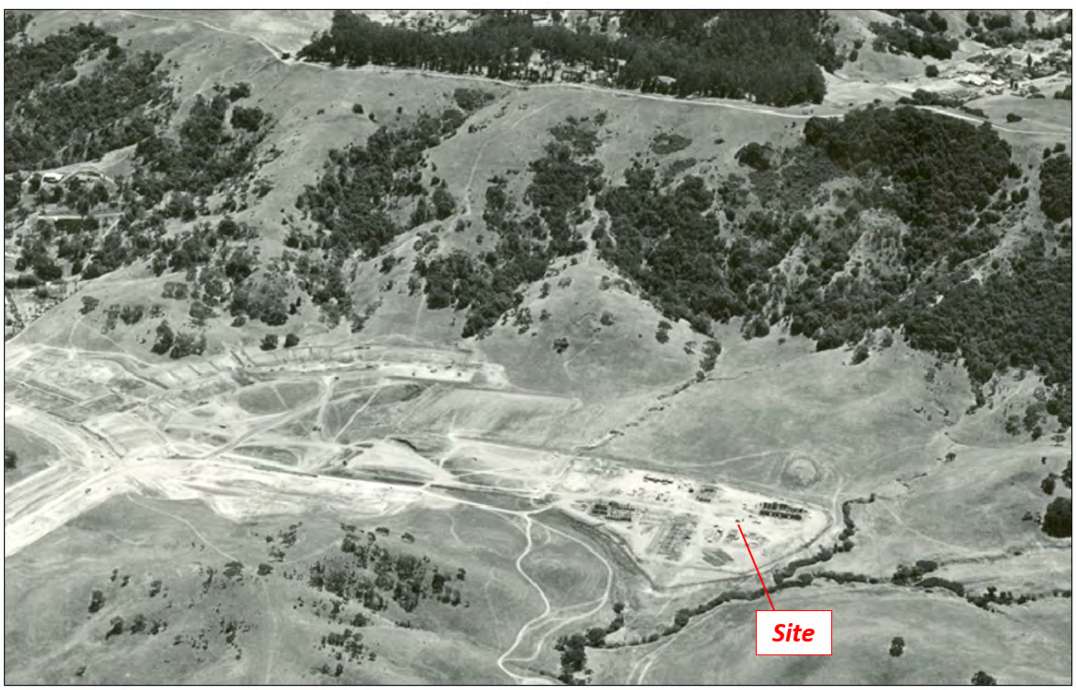
Landsliding is considered a geologic hazard and CGS has issued official seismic hazard maps showing "zones of required investigation" for earthquake-induced landsliding for many parts of California; however no such maps have yet been issued for Marin County. The landslide map on Figure 9 (Wentworth et al., 1997) shows areas of "mostly landslides" at higher elevations in the hills southeast of the TLHS campus and areas of "few landslides" extending into adjacent residential neighborhoods and onto the far western portion of the TLHS campus. Generalized explanations of the mapping shown on Figure 9 follow.

> ***Mostly Landslides -*** *consists of mapped landslides, intervening areas typically narrower than 1500 feet, and narrow borders around landslides.*
>
> ***Few Landslides -*** *contains few, if any, large, mapped landslides, but locally contains scattered small landslides and questionably identified larger landslides.*
>
> ***Surficial Deposits -*** *Slides and earth flows do not occur on nearly flat ground -- they require slopes that are steep and long enough to permit failure. We can thus exclude gently sloping ground from principal consideration. This boundary typically occurs at a slope of about 15 percent.*

Comparisons between Figure 9 (Landslide Hazard Map) and Figure 6 (Geologic Map) suggest that the mapped area of "few landslides" within the TLHS campus correlates to the geologic mapping of Franciscan Mélange in the same area. An earlier geologic map that includes landslides (Rice, Smith and Strand, 1976) generally shows the TLHS campus as free of landslide deposits. This is consistent with the site reconnaissance that shows the kiln room addition located within alluvial fan deposits and well outboard of the steep and potentially more landslide-prone hills to the west-southwest.

3.07 Site Development History

The 1950 and 1958 photographs in Appendix A show the site area prior to development. The 1959 oblique aerial photograph below shows TLHS site development in progress.



August 1959 Aerial Photograph Facing South

Available plans (GM&P, 1958) show the nearly-level portion of the central TLHS campus was created by cutting and filling. The "Profile at A-A'" on Sheet A1A of the 1958 plans (Appendix H) shows less than 10 feet of cut at the upper (southwest) margin of the campus and less than about 5 feet of fill at the lower campus margin of the campus adjacent to Nova Albion Way. The "Profile at A-A'" and the accompanying "Partial Site Plan" on Sheet A1A of the 1958 plans suggest the transition from cut to fill is very close to the location of the proposed kiln room addition site. The post-1958 vertical aerial photographs in Appendix A generally show the existing buildings that surround the planned kiln room addition site were all built prior to 1970.

Although the date of the existing building directly adjacent to the kiln room addition building is poorly constrained, the available data suggests that it was built in the 1960s. The available 1958 drawings generally show Buildings A through E with concrete slab-on-grade floors and spread footing foundations typically extending to depths of 3 to 3-½ feet below the top-of-slab elevation. Drawings and details pertaining to the various future buildings shown on the 1958 plans (Appendix H) are not available to us at this time. To our knowledge, newer (2003 or later) buildings at TLHS are mostly founded on spread footing foundations; the notable exception being the new Gymnasium, which includes drilled pier foundations that extend into rock.

4. SITE CONDITIONS

4.01 Surface Conditions

The proposed kiln room addition site is located in a nearly-level portion of the TLHS campus directly adjacent to the existing two-story classroom building shown on the right-hand side of the photograph below. The site is traversed by a walkway paved in asphalt concrete. To the south of the walkway is a grassy lawn with several trees. To the north of the walkway is a small single-story fenced-in addition with mechanical equipment.

October 2021 Site Photograph Facing West-Northwest

The site is traversed by various underground utilities, the locations of which are indicated on the Civil drawing used as a background on Figure 3. During our reconnaissance, we observed the existing improvements in and around the site to be in relatively good condition with no obvious indications of geotechnical or geologic concern.

4.02 Site Geologic Map

The Site Geologic Map presented on Figure 10 shows the surficial geologic units we interpret to be present within the TLHS campus. As discussed in Section 3.07, grading to construct the campus involved cutting and filling. We used the Partial Site Plan on Sheet A1A of the 1958 plans for the school (GM&P, 1958; Appendix H) and the 1950 aerial photograph on Figure 5 to interpret the approximate lateral extent of artificial fill (map symbol AF) placed in those areas of lower topographic relief to develop level building pads. Fill was also used to bury the pre-existing creeks and swales cutting across the site. Within the campus, the +80-foot predevelopment elevation contour was used to approximate the southwestern lateral extent of the fill. The location of the artificial fill / natural alluvium and colluvium contact was then modified slightly based on observations in the test borings.

Outside of the campus, we loosely interpreted the extent of artificial fill based on our review of topographic data and historical aerial photography. The hills that surround the campus are mapped as Franciscan Mélange, generally consistent with regional geologic mapping (e.g. Figures 6 and 7). Surficial deposits outside of the areas mapped as artificial fill or mélange are mapped as Quaternary alluvium/colluvium (map symbol Qa/Qc). Based on our review of historical aerial photography and topographic maps, the site is likely covered by a thin layer of Holocene alluvium associated with fan development and is mapped within the narrow creek channels intersecting the site. The aerial distribution and lithologic characteristics of the site stratigraphy strongly suggest that Pleistocene alluvial deposits and soils underlie the Holocene alluvium and rest unconformably on the Franciscan mélange bedrock.

4.03 Geologic Cross Sections

The Site Geologic Map presented on Figure 10 shows the locations of the five interpretive cross sections presented in this report. Cross Sections A-A' through C-C' (Figures 11 and 12) were included in our previous design level geotechnical investigation and geologic hazard study report for the TLHS campus and are not discussed further here. Cross Sections D-D' and E-E' (Figure 13), prepared specifically for this study, pass through the proposed kiln room addition site. The cross sections on the attached figures are vertically exaggerated two times and include graphic representations of the subsurface geologic conditions encountered in the exploratory borings and CPTs. Generalized descriptions of the interpreted stratigraphy depicted on Cross Sections D-D' and E-E' (Figure 13) follow.

> ***D-D' -*** Cross Section D-D' is oriented oblique to subparallel to the slope (approximately northwest to southeast) and passes through the proposed kiln room addition site. As shown on Figure 13, the alluvial/bedrock surface within the kiln room addition site (Site) is interpreted to dip gently towards the northwest with an inferred slight inset northwest of the Site. Northwest of the Site, the alluvium/colluvium layer is interpreted to be about 15 to 20 feet thick. To the southeast of the Site, the alluvium/colluvium layer is interpreted to thin to about 10 ft thick. Along this alignment artificial fill is interpreted as about 3 to 6 feet thick, noting that the precise thickness of fill encountered in CPT-1 and in borings where "possible fill" is noted are uncertain and likely consists of a combination of fill and disturbed alluvium.

> ***E-E' -*** Cross Section E-E' is oriented oblique to the slope (approximately southwest to northeast) and passes through the proposed kiln room addition site. As shown on Figure 13, the bedrock surface along this alignment generally slopes down from southwest to northeast. The interpreted thickness of alluvium/colluvium along this alignment varies from about 10 to 25 feet with the alluvium thickening to the northeast in the central part of the valley. Artificial fill is interpreted to be about 5 feet thick along much of the alignment, generally thinning to the southwest of the Site, and as absent at the location of Boring B-1.

Descriptions of the geologic units shown on the cross sections (artificial fill, alluvium/colluvium, and Franciscan Complex bedrock) are presented in Section 4.04.

4.04 Geologic Unit Descriptions

The Geologic Cross Sections of Figures 11 through 13 depict three primary geologic units (artificial fill, alluvium/colluvium, and Franciscan Complex bedrock), which are discussed in this section.

4.04.1 <u>Artificial Fill</u>

Where observed, artificial fill typically consisted of medium stiff to stiff sandy clay, or medium dense to dense clayey sand, with varying amounts of gravel. In the area of the planned kiln room addition the artificial fill layer is interpreted to be about 5 feet thick; however, a precise determination of fill thickness could not be made due to the general similarity of the onsite fill materials to natural materials from which they were likely derived. The deposits interpreted as fill likely include a mixed component of native alluvium. The log of Boring A3-21-2, which was drilled within the proposed kiln room addition site, notes the presence of organics and root fragments within the fill. Organic materials and topsoil were also noted in previous borings drilled in other parts of TLHS. Artificial fill materials encountered in new and previous borings general contained fine-grained materials of low to moderate plasticity. Laboratory evaluations of Plasticity Index (PI), Liquid Limit (LL) and fines content (percent passing a #200 sieve) are tabulated below for key nearby borings.

Laboratory Tests on Artificial Fill

Boring	Sample Depth (feet)	USCS	% Passing No. 200	PI	LL
A3-21-1	**1.0**	**CL**	**--**	**20**	**39**
B-4	3.5	CL	--	16	36
A3-17-2	10.5	CL	82	17	35
A3-17-5	2.0	CL	84	15	33

The PI values in the preceding table are generally indicative of soil with a low to moderate expansion potential[4]. Fill soils with different characteristics are interpreted to be present in other areas of the site; notably, a surficial layer of fat clay was encountered in Boring A3-17-1 directly below the asphalt cover that is not reflected in the preceding data (fat clay generally has a high potential for expansion).

With the exception of the former creeks and swales, fill was either observed as a thin layer (up to approximately 5 feet in thickness) or was absent from previous studies. Based on the historic grading plan (GM&P, 1958), several of the borings where shallow fill was observed lie within a portion of the site that was supposedly either cut or experienced limited grade change during site construction in the late 1950s. The presence of fill at these locations may be related to general earthwork of the near-surface alluvial deposits during site grading, foundation construction, or underground utility installations.

4.04.2 Alluvium/Colluvium

All of the borings drilled at TLHS encountered alluvial/colluvial soils either at the ground surface or below artificial fill, and directly overlying bedrock. In the area of the planned kiln room addition, the bottom of the alluvium/colluvium layer (i.e., top of bedrock) ranged from approximately 12 to 16 feet. Throughout the TLHS campus, logs of borings generally show alluvial/colluvial soils consisting of lean clay and fine- to medium-grained sand that classify as either sandy lean clay (CL) or clayey sand (SC) with trace gravel. Results of geotechnical laboratory tests performed on samples characterized as alluvium/colluvium are tabulated below.

Laboratory Tests on Alluvium/Colluvium

Boring	Sample Depth (feet)	USCS	% Passing No. 200	PI	LL
A3-21-2	**5.5**	**CL**	**68**	**23**	**43**
B-2	1.0	CL	--	20	37
B-3A	4.0	SC	46	21	37
B-5	4.0	CL	--	16	36
A3-17-1	12.0 - 12.5	CL/SC	45	22	40
A3-17-1	17.5 - 18.0	SC	21	10	29
A3-17-4	3.0 – 3.5	CL	53	20	37
A3-17-8	6.0 – 6.5	SC	42	21	39
A3-17-9	3.0 – 3.5	CL	--	17	33

[4] Expansive soils are prone to shrinking/swelling with changes in moisture content and have the potential to overlying or adjacent improvements with which they are in contact. Soils with a PI of 15 or less and a LL of 40 or less are commonly considered suitable for use as non-expansive fill.

The PI values in the preceding table are generally indicative of soil with a low to moderate expansion potential. None of the near-surface soils tested meet generally-accepted criteria applied to non-expansive fill (a PI of 15 or less and a LL of 40 or less).

Logs of borings drilled at the proposed kiln room addition site (Borings A3-21-1 and A3-21-2; Appendix B) show adjusted sampler blow counts in the alluvium/colluvium ranging from 25 to 57 blows per foot and pocket penetrometer unconfined compressive strength readings ranging from 2.75 to greater than 4.5 tons per square foot (tsf). In other parts of the TLHS campus, adjusted sampler blow counts in the alluvium/colluvium typically ranged from 9 to 38 blows per foot, with pocket penetrometer unconfined compressive strength readings ranging from 1.0 to greater than 4.5 tons per square foot (tsf).

Blow counts and pocket penetrometer readings are representative of a deposit's degree of consolidation or stiffness, and typically increase with depth. Lower blow counts and pocket penetrometer readings in alluvium/colluvium generally suggest younger Holocene alluvium; whereas higher blow counts and pocket penetrometer values suggest older soils that are more likely Pleistocene in age. Throughout the TLHS campus, these observations are consistent with the presence of well-developed soil colors (7.5 YR), clay film development, and iron-oxide development, suggesting that most surficial deposits (e.g., certainly the deeper deposits resting on bedrock) within the campus consist of late Pleistocene alluvium/colluvium. The exceptions are likely where the historic creeks and swales traversed the site located northwest and southeast of the proposed kiln room addition site .

4.04.3 Franciscan Complex Bedrock

Logs of borings drilled at the proposed kiln room addition site (Borings A3-21-1 and A3-21-2; Appendix B) show the surface of bedrock at depths of approximately 12 feet and 16 feet, respectively. For these two borings, adjusted sampler blow counts recorded in rock generally indicate less than 12 inches for 50 blows (i.e., greater than 50 blows per foot). The bedrock surface indicated on the log of Boring A3-21-1 (12 feet deep) represents an abrupt transition between alluvium/colluvium and fine-grained Franciscan Complex sandstone. The bedrock surface indicated on the log of Boring A3-21-2 (approx.16 feet deep) represents a transition from weathered Franciscan Complex sandstone into Franciscan Complex shale mélange to the total depth explored of 26 ft. The upper part of the bedrock contact is interpreted as sandstone bedrock weathered completely to soil unconformably overlain by Pleistocene alluvial sand and gravel. The bedrock materials encountered in previous borings are typically described as weathered near the contact with the overlying alluvium/colluvium with adjusted sampler blow counts in bedrock generally increasing with depth. All but one A3GEO boring (A3-17-4) extended into bedrock comprised of sandstone and/or shale, which is consistent with Franciscan Complex mélange described in Section 3.04.

All four A3GEO CPTs are interpreted[5] to have met practical refusal on or in bedrock at the depths/elevations shown in the following table.

Interpreted Bedrock Depths and Elevations based on CPTs

Location	Surface Elevation (feet)	Bedrock Depth (feet)	Bedrock Elevation (feet)
CPT-1	80.7	24.6	56.1
CPT-2	76.8	21.3	55.5
CPT-3	79.1	22.6	56.5
CPT-4	80.6	18.2	62.4

Soil encountered at the CPT locations is interpreted to range from about 18.2 to 24.6 feet deep. The 24.6-foot interpreted soil thickness at the location of CPT-1 is the deepest soil encountered in any of the A3GEO borings

[5] CPTs generally cannot distinguish between stiff/dense alluvium/colluvium and deeply-weathered bedrock materials.

or CPTs advanced on the TLHS property. The depths and elevations of rock encountered in A3GEO borings are indicated in the following table along with the rock type encountered.

Bedrock Depths, Elevations and Descriptions from Borings

Boring	Source	Surface Elevation (feet)	Bedrock Depth (feet)	Top of Bedrock Elevation (feet)	Rock Type
A3-21-1	This Study	81.0	12.0	69.0	Sandstone
A3-21-2	This Study	81.0	15.8	65.2	Sandstone/Shale
A3-17-1	A3GEO Phase 2	79.5	23.0	56.5	Sandstone
A3-17-2	A3GEO Phase 2	80.5	18.2	62.3	Shale/Sandstone
A3-17-3	A3GEO Phase 2	81.0	12.5	68.5	Sandstone
A3-17-4	A3GEO Phase 2	80.5	NE[6]	Below El. 65.5	--
A3-17-5	A3GEO Phase 2	81.0	15.0	66.0	Shale/Siltstone/Sandstone
A3-17-6	A3GEO Phase 2	81.0	9.0	72.0	Sandstone
A3-17-7	A3GEO Phase 2	81.0	14.3	66.7	Shale
A3-17-8	A3GEO Phase 2	81.0	9.0	72.0	Sandstone/Shale
A3-17-9	A3GEO Phase 2	81.0	14.2	66.8	Sandstone
B-1	A3GEO Phase 1	81.1	10.0	71.1	Clayey Sandstone
B-2	A3GEO Phase 1	81.2	12.5	68.7	Shale
B-3	A3GEO Phase 1	81.0	7.0	74.0	Claystone/Shale
B-4	A3GEO Phase 1	81.1	18.5	62.6	Sandstone
B-5	A3GEO Phase 1	91.4	18.5	72.9	Shale
B-1	MPEG, 2003	82.3	18.0	62.2	Sandstone
B-2	MPEG, 2003	82.3	12.0	69.2	Sandstone

4.05 Groundwater Conditions

Groundwater was not encountered in borings (Borings A3-21-1 and A3-21-2) drilled at the proposed kiln addition site in November 2021, which extended to depths of approximately 25 feet and 26 feet, respectively. Groundwater was observed in only one of the five borings drilled at the site in February 2017 as part of the Phase 1 investigation (Boring B-4), and in two of the borings drilled in November 2017 as part of the Phase 2 investigation (A3-17-1, and A3-17-7). The following groundwater conditions were noted in previous A2GEO borings:

Groundwater Elevation Data (2017)

Test Boring	Date	Ground Surface Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Top of Bedrock Elevation (feet)
B-4	2/22/2017	81.1	20.0 / 10.0	61.1 / 71.1	62.6
A3-17-1	11/22/2017	79.5	7.0	72.5	56.5
A3-17-7	11/22/2017	81.0	19.0	62.0	66.7

In Boring B-4, groundwater was measured at a depth of 20 feet (approximate Elevation +61.1 feet) immediately after drilling that rose to a depth of 10 feet (approximate Elevation +71.1 feet) before the hole was backfilled with grout. Boring A3-17-1, which is located in the vicinity of Boring B-4, encountered groundwater at a depth of about 7 feet. Groundwater conditions in these two borings may be related to their location within an historic

[6] NE = Not Encountered; Boring terminated above bedrock due to a problem with the drill rig.

creek channel seen on pre-development aerial photographs (Figure 5; Appendix A), which runs along the northeast property boundary.

In Boring A3-17-7, groundwater was encountered at a depth of 19 feet, approximately 5 feet below the top of bedrock. Other A3GEO test borings advanced during Phases 1 and 2 were observed to be free of groundwater shortly before they were backfilled with grout. Previous borehole logs MPEG B-1 and MPEG B-2 (MPEG, 2003; Appendix G) note "no groundwater was observed during drilling". MPEG B-1 and MPEG B-2 were terminated in bedrock at depths of 23.5 and 16.0 feet, respectively.

We note that groundwater measurements made in open boreholes are not necessarily representative of stabilized groundwater conditions at the time that the measurements were made, which is particularly true for holes drilled in low-permeability clayey soils. It should be anticipated that groundwater levels below the site may vary in response to rainfall or other factors. Groundwater may also be present below the site at times within permeable zones (particularly where such zones coincide with the alignments of the historic creeks or tonal lineaments) and/or due to locally perched conditions.

4.06 Corrosion Potential

We screened for the presence of corrosive soils by conducting a suite of geochemical laboratory tests on one near-surface sample obtained from the site (from Boring A3-21-1 at 1-2 feet). The geochemical laboratory test results are presented on the Corrosivity Tests Summary at the end of Appendix E.

Guidelines on the interpretation of the chloride, sulfate and pH test results presented in the following table were obtained from Caltrans (2003), which states that "for structural elements, the Department considers a site to be corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less.

Corrosion Test Data and Caltrans Guidelines

Geochemical Test	Test Result	Corrosion Threshold for Structural Elements	Caltrans Classification
Chloride (mg/kg or ppm)	12	500 ppm or greater	Non-corrosive
Sulfate (mg/kg or ppm)	50	2,000 ppm or greater	Non-corrosive
pH	7.6	5.5 or less	Non-corrosive

As indicated in the preceding table, the tested sample would not be considered corrosive per Caltrans corrosivity guidelines.

A resistivity measurement of 2,613 ohm-cm was also obtained on the sample submitted for testing. The Caltrans guidelines do not include corrosivity criteria based on soil resistivity; the following resistivity guidelines are from the National Association of Corrosion Engineers (NACE):

Soil Resistivity (ohm-cm)	Soil Classification
Below 500	Very Corrosive
500 – 1,000	Corrosive
1,000 – 2,000	Moderately Corrosive
2,000 – 10,000	Mildly Corrosive
Above 10,000	Progressively Less Corrosive

Based on the NACE criteria, this sample would classify as only "Mildly Corrosive". A qualified corrosion engineer should be consulted if additional interpretations or recommendations pertaining to corrosion are desired.

5. GEOLOGIC HAZARD ASSESSMENT

The following assessment of potential geologic hazards pertains specifically to the planned kiln addition site (Site).

5.01 Earthquake Ground Shaking

The San Francisco Bay Area is seismically active and it is likely that the Site will experience earthquake ground shaking within the foreseeable life of the future project. For this reason, the proposed kiln room addition should be designed to resist strong ground shaking in accordance with the requirements of the California Building Code (CBC) and local design practice. The seismic design provisions of the CBC include a methodology by which sites are classified as A through F in order to quantify site-specific ground shaking effects. Based on the available data, we judge that a seismic Site Class C designation (soft rock and very dense soil profile) is appropriate for the proposed kiln room addition[7]. Applicable CBC seismic design parameters for the proposed kiln room addition are presented in Section 7.01 for

5.02 Surface Fault Rupture

Historically, earthquake fault rupture most often occurs along pre-existing active faults. The site is not located within or proximate to an Alquist-Priolo Earthquake Fault Zone and the closest known active fault (the San Andreas fault) is approximately 8.5 miles to the southwest (Section 3.02). The concealed fault trace shown on Figures 6 and 10 is not proximate to the Site and the inferred fault with which it is associated is not considered active. The absence of tectonic-related geomorphology from our review of historical aerial photography of the site prior to development is consistent with the inactive and concealed bedrock fault designation of Graymer et al. (2000). In summary, no known fault traces cross or project towards the proposed kiln room addition site (Site) and we conclude that the overall potential for surface fault rupture to affect the Site is very low to negligible.

5.03 Liquefaction and Seismic Strength Loss

The Site is mapped by the USGS (Figures 8a and 8b) within an area of “Moderate” liquefaction susceptibility (Knudsen et al., 2000; Witter et al., 2006). Soils that are most likely to experience “classic” liquefaction-type behavior include loose to medium dense (adjusted blow counts less than 20), clean, course-grained soils (i.e., sands and gravels) that are below groundwater. Recent and ongoing research (e.g. Bray and Sancio, 2006; Idriss and Boulanger, 2008) has demonstrated that fine-grained materials (i.e., silts and clays) with very low plasticity that are below groundwater can also experience generally similar cyclic degradation in response to earthquake shaking and are considered susceptible to liquefaction-type behavior if certain criteria are met. At this time, there appears to be a general consensus that cohesive soils with a plasticity index (PI) of 12 or greater can be considered highly resistant to liquefaction.

Relative to this background information, the site-specific boring logs in Appendix B generally show the following:

- Below a relatively thin layer of clayey fill, the Site is underlain by natural alluvial/colluvial soils consisting predominantly of very stiff sandy lean clay (CL) and dense clayey sand (SC);
- Adjusted blow counts in predominantly granular (SC) soils exceeded 30 blows per foot;
- Atterberg Limits determinations on samples of onsite soils produced PI values of 20 and 23; and
- Groundwater was not encountered in either boring.

Based on the forgoing, we conclude that the potential for liquefaction at the proposed kiln room addition site is essentially nil.

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[7] Site Class C also is consistent with our previous analyses and recommendations for the nearby student commons and art building sites where subsurface conditions are similar (A3GEO, 2018).

5.04 Landsliding

The USGS topographic quadrangle map on Figure 1 shows the entire TLHS campus in an area of relatively level terrain. A USGS map showing the distribution of slides and earth flows (Rice, Smith and Strand, 1976; Figure 9) shows the kiln room addition site at or near an interpreted transition between "few landslides" and "surficial deposits". As noted in Section 3.06, the mapping of "few landslides' appears to correlate directly with the mapping of Cretaceous/Jurassic (Franciscan) Mélange on the USGS geologic map by Blake, Graymer and Jones (2000; Figure 6); an observation consistent regional mapping based on geologic unit correlations rather than a local assessment of landslide frequency on slopes proximate to the Site. Our evaluation of landslide hazard potential for the proposed kiln room addition follows.

> ***Landsliding Beneath the Site –*** Our evaluation of the potential for deep-seated landsliding to extend below the site is based primarily on evaluations discussed previously in this report, specifically: 1) the Site is approximately level and surrounded by existing buildings; 2) the Franciscan Complex bedrock that underlies the Site is between 12 and 18 feet deep; and; 3) the soils that underlie the Site are not susceptible to liquefaction or seismic strength loss. Based on the preceding evaluations, we judge that the overall potential for deep-seated landsliding to occur beneath the Site to be essentially nil.
>
> ***Cut Slope Failure –*** Grading of the TLHS campus has produced low (less than about 10 feet high) cut slopes that may be susceptible to shallow sliding, sloughing and/or surface erosion. Based on our review of historic aerial photography (Appendix A) and site reconnaissance, it appears to us that the cut slopes within and surrounding the TLHS campus have performed relatively well since they were created 60+ years ago (c. 1958). A future failure in these cut slopes would likely be very limited in lateral extent and we judge the overall potential for cut slope failures to affect the Site to be essentially nil.
>
> ***Deep-Seated Landsliding Upslope -*** We considered the possibility that deep-seated landslides in the adjacent hills might in extreme circumstances extend onto the TLHS campus and affect the Site. In our opinion, the residential neighborhoods that surround the campus likely provide an adequate buffer between the base of the hillslopes and the campus. To our knowledge the hillslopes southwest of the Site do not include deep deposits of materials that would likely experience dramatic reductions in strength following landslide initiation. Accordingly, we would expect deep-seated landsliding triggered by wet weather or an earthquake to have limited runout potential and judge the overall potential for upslope deep-seated landsliding to extend onto the Site to be very low.
>
> ***Fast-Moving Flow-Type Landslides*** - We considered the possibility that a fast-moving debris flow or earth flow emanating from the hills upslope could extend onto the TLHS campus and affect the Site. This potential hazard, if it exists, would appear to be greatest within the upper and middle terraces. The proposed Site is located on the lower terrace in a level area surrounded by other buildings. Based on the information currently available, we judge the overall potential for a fast-moving flow-type landslide to extend onto the TLHS campus and impact the proposed Site to be low.

5.05 Inundation

The site is near Elevation +80 feet and is more than a mile inland from the closest tsunami zone shown on the CGS Tsunami Inundation Map (CGS, 2009). The site's location in eastern Marin County would not be directly exposed to a tsunami from the Pacific Ocean, which would necessarily enter San Francisco Bay through the Golden Gate. The valley in which Terra Linda is located drains to the northeast towards San Pablo Bay and not towards the Golden Gate. Accordingly, we judge that inundation by tsunami or seiche is not a concern.

To our knowledge, there are no significant reservoirs located upslope that could potentially pose a hazard to the TLHS campus. FEMA maps the site within an "Area of Minimal Flood Hazard (Zone X)" (FEMA, 2016). As shown on Figure 5, several historic drainages previously existed in the vicinity prior to the development of the TLHS campus. Presumably, water from nearby upslope areas currently flows below the TLHS campus and adjacent residential neighborhoods in culverts, the condition of which are unknown. Based on the information available at this time, we judge that the overall potential for the TLHS campus to be flooded by water is low provided that existing drainage facilities in the area continue to function as intended.

6. GEOTECHNICAL EVALUATIONS AND CONCLUSIONS

6.01 Site Suitability

We judge the proposed Site to be generally suitable from a geotechnical standpoint, provided that the conclusions and recommendations presented in this report are appropriately implemented in the design and construction of the proposed Project. Geotechnical considerations for the Project are discussed in the sections that follow.

6.02 Unsuitable Near-Surface Materials

The Site is located in a landscaped area that includes trees and near-surface soils that in the borings encountered organic topsoil, roots, and other organic matter. Roots and organic-laden soils are generally unsuitable for the support of foundations, slabs, pavements, and types of near-surface improvements, and will require clearing, grubbing, stripping and removal areas where such improvements are planned.

The Site is traversed by underground utilities and near surface soils and fill. Backfill is also likely to be present next to foundations that support the adjacent existing building, which extend to unknown depth(s). Within the Site, the depth and characteristics of existing fill and backfill likely varies, and all of the fill and backfill materials at the Site are considered undocumented in that there is no record showing that they were placed under modern engineering controls. Undocumented fill is generally unsuitable for the support of new buildings, a consideration that is addressed in the recommendations section of this report. The District may elect to not remove all undocumented fill from beneath future slabs-on-grade and pavements; in this report, we recommend that excavated subgrades below slabs-on-grade and pavements be checked to verify that they are capable of providing adequate support.

The near-surface soils at the Site includes moderately expansive materials that have the potential to damage overlying improvements unless mitigated. Alternative foundation types that are commonly used in the Bay Area to mitigate the potentially damaging effects of expansive soils on structures include: (1) shallow foundations (footings or mats) supported on a layer of compacted Non-Expansive Fill; (2) deepened spread footings supported on natural soils below the zone of significant shrink/swell behavior; and (3) true deep foundations (piers/piles) that gain support at significant depths below the zone of shrink/swell behavior. As discussed in the following section, this report provides recommendations for deepened spread footings similar to those used previously to support buildings at TLHS (see A3GEO, 2018). New slabs-on-grade and pavements would also best be underlain by a layer of engineered Non-Expansive Fill to reduce the potential for excessive movement and distress caused by expansive soils.

6.03 Foundation Support

The kiln room addition can be supported on deepened spread footings founded on natural undisturbed alluvium/colluvium below the zone of potentially significant shrink/swell behavior. In this report we recommend that spread footings extend at least 30 inches below adjacent firm finished grade in order to mitigate the potential for adverse expansive soil effects.

As noted in Section 4.04.1, it is difficult to distinguish between artificial fill and underlying alluvium/colluvium based on solely on observations during drilling and samples obtained from small-diameter boreholes. The logs in Appendix B generally indicate that fill at the site may be up to about 5 feet deep; however, the actual depth of fill at the locations of future spread footings is uncertain. In the event that natural undisturbed alluvium/colluvium is deeper than “design” footing bottom elevations, footing excavations may need to be deepened to expose suitable bearing materials. Section 7.03 of this report presents geotechnical recommendations for the design and construction of deepened spread footings based on this approach.

Under static (i.e., non-earthquake) conditions, we estimate that foundations designed and constructed in accordance with the recommendations presented in this report should experience less than about ½ inch of total post-construction settlement and less than about ¼ inch of post-construction differential settlement over a horizontal distance of 30 feet.

6.04 Slab-on-Grade and Pavement Support

As discussed in Section 6.02: 1) we anticipate that the District will likely elect to not remove all undocumented fill material beneath slabs-on-grade and pavements; and 2) slabs-on-grade and pavements would best be underlain by a layer of Non-Expansive fill to mitigate the potential for adverse expansive soil effects. Recommendations for the design and construction of the interior slab-on-grade for the kiln room addition are presented in Section 7.04 of this report. Recommendations for the design and construction of exterior slabs and pavements are presented in Section 7.06.

6.05 Construction Considerations

We anticipate onsite soils can be excavated with conventional earth-moving equipment. It is possible that excavations could encounter obstructions that would require jackhammering, hoe-ramming or equipment capable of cutting steel to excavate. Excavations deeper than 4 feet that will be entered by workers should be shored or sloped for safety in accordance with the California Occupational Safety and Health Administration (Cal-OSHA) standards. The near-surface materials may contain debris, roots, wood, and organic-laden materials unsuitable suitable for onsite re-use.

The contractor should anticipate that site excavations may need to be dewatered and that there may be environmental and regulatory aspects to the appropriate collection, storage and disposal of onsite water. The design, permitting, installation, monitoring, and abandonment of site dewatering and discharge systems are the contractor's responsibility; this includes whatever systems may be needed to handle water displaced or pumped from pier holes. The onsite soils may include materials that are wet of optimum, from an earthwork compaction standpoint. The contractor should anticipate that soils obtained from site excavations will likely include clayey materials that may need to be processed (e.g., by air drying) prior to being placed as engineered fill.

Although it is possible for excavation and/or construction to proceed during or immediately following the wet winter months, a number of geotechnical problems may occur which may increase costs and cause project delays. We advise that wet-weather issues be considered during project scheduling, noting that the contractor's responsibilities include onsite safety and construction means and methods.

7. RECOMMENDATIONS

7.01 California Building Code Seismic Parameters

Structures at the site should be designed to resist strong ground shaking in accordance with the applicable building code(s) and local design practice. This section provides mapped seismic design parameters per the 2019 CBC (Risk Category I/II/III).

Site Class
C = Soft Rock and Very Dense Soil

Latitude and Longitude
Latitude: 38.00035°N
Longitude: 122.55490°W

Maximum Considered Earthquake Spectral Response Accelerations (for Site Class C)
(Mapped Acceleration × Site Coefficient)
S_{MS} = 1.8g (MCE spectral acceleration at short periods)
S_{M1} = 0.84g (MCE spectral acceleration at 1-second period)

Design Spectral Response Acceleration (for Site Class C)
(Maximum Considered Earthquake Spectral Acceleration × 2/3)
S_{DS} = 1.2g (design spectral acceleration at short periods)
S_{D1} = 0.56g (design spectral acceleration at 1-second period)

The spectral accelerations above were obtained from https://seismicmaps.org/, which we accessed on December 9, 2021 (printout attached as Appendix I).

7.02 Site Preparation

Prior to demolition and site clearing, all active subsurface utilities within and immediately surrounding the pre-defined site limits should be located, marked, and protected or relocated. Demolition of the existing utilities should include the removal of all utility trench backfill within and adjacent to the planned kiln room addition footprint. Plans are available showing the locations of known underground improvements. The design team and contractors should make their own independent assessments of information shown on existing plans and conduct any additional investigations they deem appropriate.

Areas within site limits where new improvements are planned should be cleared of concrete, asphalt concrete, aggregate base, catch basins, storm drains, sewers, utilities, and all other near-surface improvements. Any trees present should be cleared and grubbed and any soils containing vegetation and/or organic matter should be stripped. Cleared materials should be removed from the site unless they are specifically identified as suitable for reuse by the owner and A3GEO. Site strippings and grubbed materials not suitable for re-use as engineered fill should be removed from the site and stockpiled for later use as landscaped material (at the District's discretion). The contractor should document the condition of existing improvements located outside of the site limits and should perform any and all monitoring activities required by the owner.

Excavation will be required to remove existing below-grade improvements, undocumented fill, and to allow for the placement of Non-Expansive Fill beneath footings, slabs, and pavements. The contractor is responsible for the design, implementation, and safety of all site excavations; this responsibility includes (but is not necessarily limited to) temporary shoring, cut slopes, and excavation dewatering.

7.03 Deepened Spread Footings

The kiln room addition can be founded on deepened spread footings designed to bear a minimum of 30 inches below lowest adjacent firm finished grade. This minimum depth requirement is intended to mitigate the potential for adverse effects that might otherwise be caused by expansive soils. Continuous deepened spread footings should enclose the entire building perimeter to mitigate the potential for moisture changes beneath the interior ground floor slab-on-grade. We recommend that deepened spread footings be at least 16 inches wide to allow for adequate steel reinforcement.

Deepened spread footings can be evaluated using the bearing pressures in the following table (DL=Dead Loads; LL=Live Loads; Total=DL+LL+ wind or seismic).

Foundation Allowable Bearing Pressures

Load Case	Bearing Pressure (psf)	Minimum Factor of Safety
DL Allowable	3000	3.0
DL+LL Allowable	4500	2.0
Total Allowable	6000	1.5

Resistance to lateral loads can be provided by passive pressures acting on the vertical faces of below-grade structural elements and by friction along the footing bottoms. Passive resistance can be evaluated using an equivalent fluid weight of 300 pounds per cubic foot (pcf). This value can be increased by one-third for dynamic loading. A friction coefficient of 0.30 can be used to evaluate frictional resistance along the bottoms of footings. The above passive and frictional resistance values include a factor of safety of at least 1.5 and can be fully mobilized with deformations of less than ½ - and ¼ -inch, respectively.

Following excavation to design footing depth, A3GEO should check that suitable bearing materials are exposed. Any soft, weak, or otherwise unsuitable materials that remain below design footing bottom elevations should be removed at the direction of A3GEO and replaced with lean or structural concrete prior to the placement of reinforcing steel.

7.04 Kiln Room Addition Slab-on-Grade

The ground-level floor slab for the kiln room addition can be conventional slab-on-grade, provided that it is underlain by at least 18 inches of non-expansive material. We recommend that the upper 6 inches of non-expansive material directly below the slab consist of Caltrans Class 2 Aggregate Base (AB) and that the AB layer be overlain by a heavy-duty impermeable membrane (Stego® wrap 15-mil or an approved equivalent), installed and taped in accordance with the manufacturer's recommendations. The 12 inches of non-expansive material below the 6-inch AB layer can consist of AB or another type of material that meets the requirements for Non-Expansive Fill presented in Section 7.05. Slab reinforcing should be provided in accordance with the anticipated use and loading of the slab. We recommend that interior slabs-on-grade be at least 5 inches thick and be reinforced with steel bar reinforcement.

The exposed subgrade at the bottom of the non-expansive layer (at least 18 inches below the bottom of the slab-on-grade) should be compacted to at least 90% relative compaction per ASTM D-1557 and checked by A3GEO to confirm that it is uniformly firm and non-yielding. If weak, unstable, or unsuitable materials are encountered during subgrade compaction or proof-rolling, they should be over-excavated and replaced with engineered fill at the direction of A3GEO.

7.05 Engineered Fill

Geotechnical requirements for fill materials are presented below.

> ***General Fill -*** General Fill material should have an organic content of less than 3 percent by volume and should not contain environmental contaminants or rocks or lumps larger than 6 inches in greatest

dimension. From a geotechnical standpoint, onsite materials can be reused as General Fill if they meet or can be processed (e.g. by sorting and/or crushing) to meet the above requirements. General Fill can be used anywhere except where Non-Expansive Fill is required.

Non-Expansive Fill - Non-Expansive Fill should conform to the requirements for General Fill, have a Plasticity Index no greater than 12, and a Liquid Limit no greater than 40.

Imported Fill – Imported Fill should conform to the requirements for Non-Expansive Fill and should be evaluated by our firm and the project environmental consultant prior to its importation to the site.

Geotechnical requirements for fill placement and compaction are presented below (per ASTM D-1557 Test Methods):

- General Fill that is predominantly cohesive (>15 percent passing #200 sieve) should be moisture conditioned, as necessary, to between 3 and 5 percent over optimum moisture content and compacted to at least 90 percent relative compaction.

- General Fill that is predominantly granular (<15 percent passing #200 sieve) should be moisture conditioned, as necessary, to between 2 and 4 percent over optimum moisture content and compacted to at least 95 percent relative compaction.

- Non-Expansive Fill should be moisture conditioned, as necessary, to near optimum moisture content and compacted to at least 95 percent relative compaction.

All proposed fill materials should be approved by A3GEO and the project environmental consultant prior to use.

7.06 Exterior Flatwork

We recommend exterior slabs-on-grade be supported on a minimum of 12 inches of Non-Expansive Fill. Slab reinforcing should be provided in accordance with the anticipated use and loading of the slab. We recommend that exterior slabs-on-grade be at least 4 inches thick and reinforced with steel bar reinforcement. Exterior slabs should be structurally independent from buildings. Concrete slabs that may be subject to vehicle loadings should be designed in accordance with the recommendations for rigid Portland cement concrete pavements.

Flexible asphalt concrete (AC) pavements may be used for parking areas and driveways. We developed the following recommended pavement sections for various traffic indices using the Caltrans R-value design method for flexible pavements. The pavement sections presented are based on an assumed subgrade R-value of 30 for Non-Expansive Fill.

Flexible Pavement Thickness Design for Subgrade R-Value = 30

Traffic Index	Asphalt Concrete (inches)	Caltrans Class 2 Aggregate Base (inches)	Total Thickness (inches)
4	2	6	8
5	3	6	9
6	3	9	12
7	3	12	15

For pavements, we recommend that the aggregate base be underlain by at least 12 inches of Non-Expansive Fill and that this layer extend at least 3 feet beyond the outside pavement edge unless a deepened curb or other moisture cutoff (at least 24 inches deep) is provided. The project civil engineer should choose the appropriate traffic indices for the pavement areas of the site and then use the given section for that traffic index.

The upper 6 inches of subgrade beneath planned pavements should be compacted to at least 95 percent relative compaction per ASTM D-1557. Aggregate base for use in pavements should conform to Caltrans Standard Specifications for Class 2 Aggregate Base. The aggregate base used in pavement sections should be compacted to at least 95 percent relative compaction as determined by ASTM D-1557.

Rigid Portland cement concrete (PCC) pavements may also be used in driveway/loading areas. This section provides recommendations for Caltrans jointed plain concrete pavement (JPCP), which is engineered with longitudinal and transverse joints to control where cracking occurs. JPCPs do not contain steel reinforcement, other than tie bars and dowel bars. The project civil engineer should design and detail the JPCP per Caltrans specifications. We developed the following pavement thickness design using the Caltrans R-value design method for rigid pavements and an assumed traffic index. The PCC design that follows is appropriate for subgrade soils with an R-value between 10 and 40.

Portland Cement Concrete Pavement Thickness Design

Traffic Index	Portland Cement Concrete (inches)	Caltrans Class 2 Aggregate Base (inches)	Total Thickness (inches)
< 9	9	12	21

We recommend that PCC pavements be underlain by at least 12 inches of Non-Expansive Fill designed in accordance with the recommendations to this section to reduce the potential for adverse expansive soil effects.

7.07 Future Geotechnical Services

A3GEO should review the geotechnical aspects of project plans and specifications as they are being developed, to check for conformance with the intent of our geotechnical recommendations and to provide timely input, in the event that revisions are needed. We should perform a general review of the geotechnical aspects of the final plans and specifications, the results of which we should document in a formal plan review letter.

As Geotechnical Engineer of Record, if is essential that A3GEO provide geotechnical services during construction to check whether geotechnical conditions are as anticipated, provide supplemental recommendations where necessary, and document that the geotechnical aspects of the work substantially conform to the approved Contract Documents and the intent of our geotechnical recommendations. Critical aspects of construction that A3GEO should observe and/or test include: over-excavation and re-compaction beneath structures, subgrade preparation for pavements, installation of drilled piers, and placement and compaction of aggregate base for pavements.

8. LIMITATIONS

This report has been prepared for the exclusive use of the District and their consultants for specific application to proposed TLHS kiln room addition project described herein. The opinions presented in this report were developed in accordance with generally-accepted geotechnical and engineering geologic principles and practices. No other warranty, expressed or implied, is made. In the event that any changes in the nature or design of the project are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified in writing.

The findings of this report are valid as of the present date. However, the passing of time will likely change the conditions of the existing property due to natural processes or the works of man. In addition, due to legislation or the broadening of knowledge, changes in applicable or appropriate standards will occur. Accordingly, this report should not be relied upon after a period of three years without being reviewed by this office.

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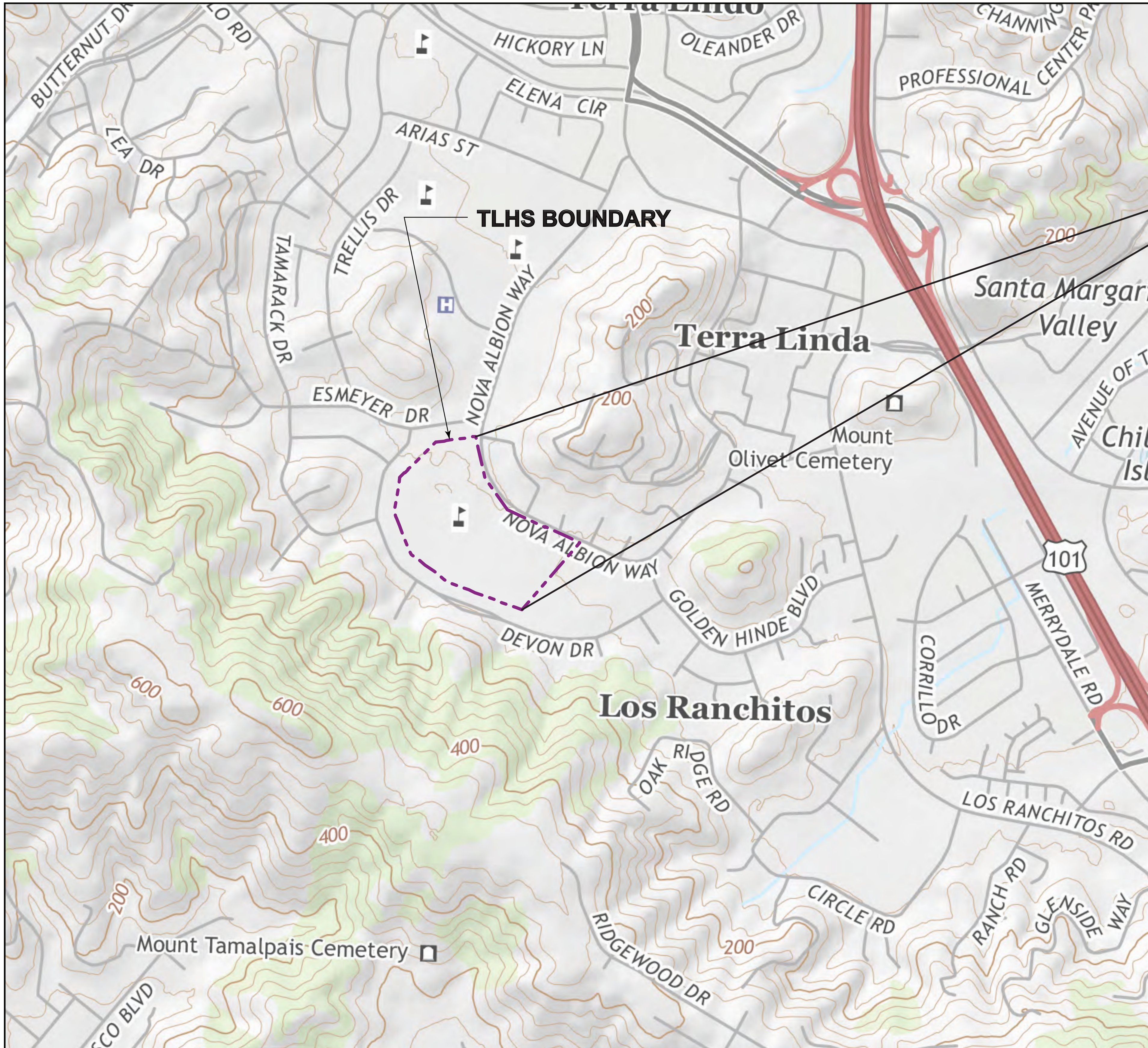
FIGURES



NOTES:

1. Base map from USGS Novato and San Rafael Quadrangles, California, 7.5-Minute Series, North American Datum of 1983 (NAD83), vertical datum NAVD88. Elevations in feet. Map dated 2015.

N

(SCALE IN FEET)

0 1,000 2,000

TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

Project No. 1150-1H

SITE LOCATION MAP

A3GEO

FIGURE 1

Date: 11/30/2021

LEGEND:

PROPOSED BUILDING

A3-21-2 KILN ROOM TEST BORING (A3GEO, NOVEMBER 2021)

A3-17-8 PHASE 2 TEST BORING (A3GEO, NOVEMBER 2017)

B-4 PHASE 1 TEST BORING (A3GEO, FEBRUARY 2017)

CPT-3 PHASE 1 CPT (A3GEO, FEBRUARY 2017)

B-2 TEST BORING (MPEG, AUGUST 2003)

CPT-1 CPT (MPEG, AUGUST 2003)

TLHS BOUNDARY

100 ELEVATION CONTOURS IN FEET

NOTES:

1. Topographic contours from Marin Map, A Geographic Information System for Marin County. Data are in California State Plane coordinates, NAD83 HARN, US Survey feet.
2. Base plan taken from a file titled "TLHS Kiln Room Addition Site Plan 10_21_2021.pdf" provided to A3GEO via email on 4 November 2021.
3. Elevations are in feet and reference North American vertical datum of 1988 (NAVD 88).

N

(SCALE IN FEET)

0 200 400

TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

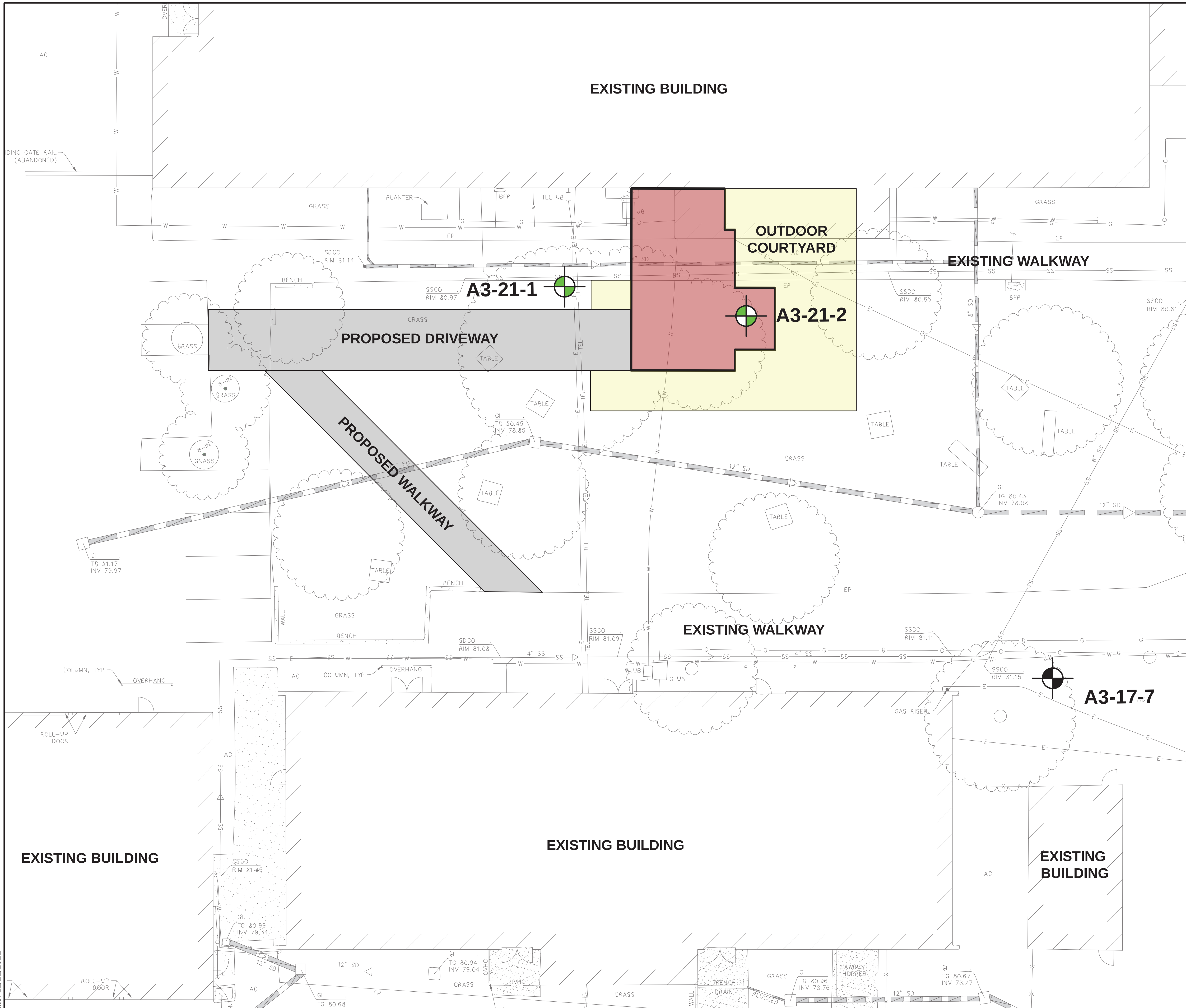
Project No. 1150-1H

SITE PLAN

A3GEO

FIGURE 2

Date: 12/21/2021



LEGEND:

PROPOSED BUILDING

A3-21-2 KILN BUILDING TEST BORING (A3GEO, NOVEMBER 2021)

A3-17-8 PHASE 2 TEST BORING (A3GEO, NOVEMBER 2017)

NOTES:

1. Base plan taken from a file titled "TLHS Kiln Room Addition Site Plan 10_21_2021.pdf" provided to A3GEO via email on 4 November 2021.
2. Elevations are in feet and reference North American vertical datum of 1988 (NAVD 88).

(SCALE IN FEET)

0 20 40

TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

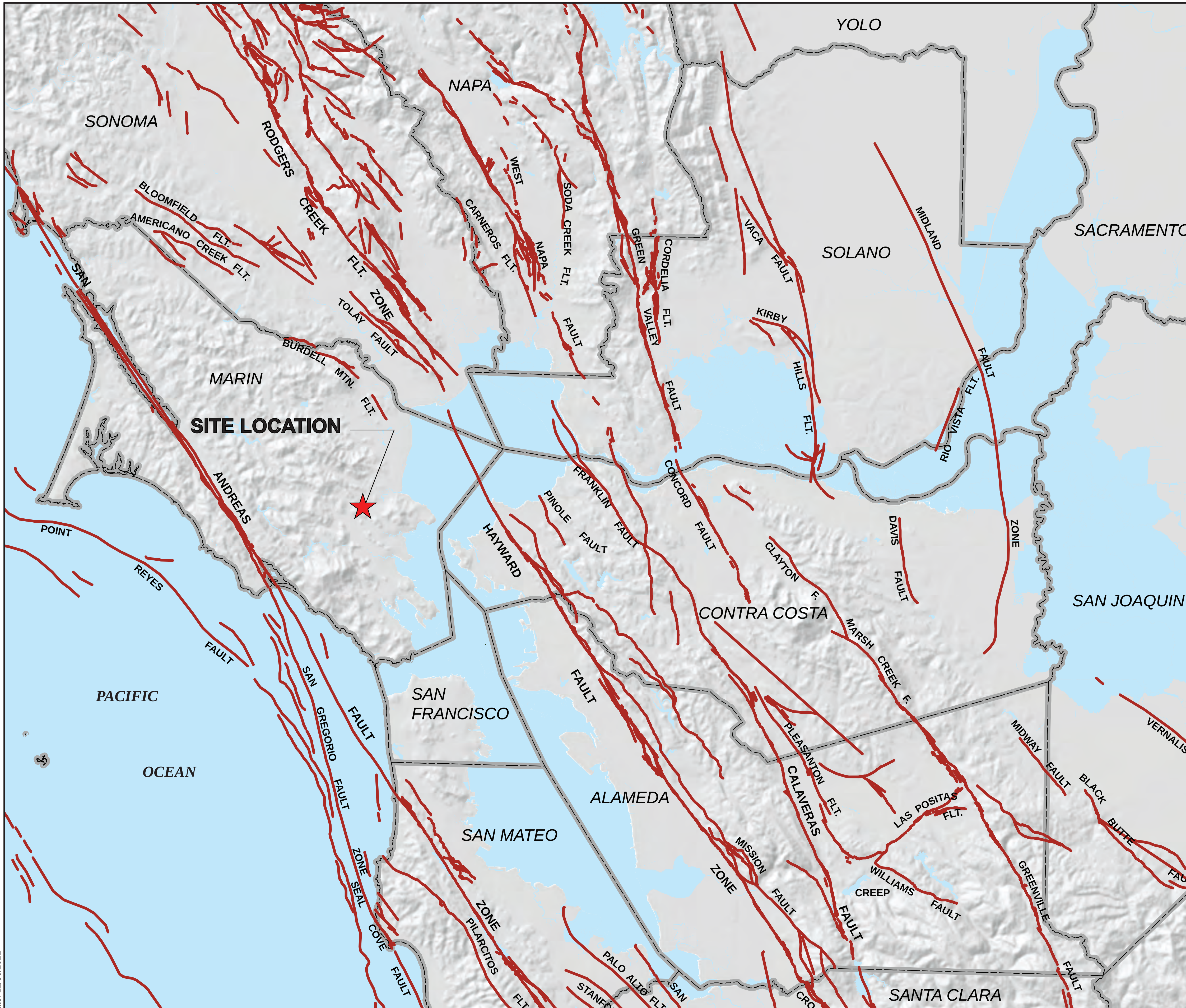
Project No. 1150-1H

EXPLORATION LOCATION PLAN

A3GEO

FIGURE 3

Date: 12/21/2021



Date: 11/30/2021

LEGEND:

- QUATERNARY FAULT
- COUNTY BOUNDARY

NOTES:

1. Base map modified from USGS and California Geological Survey, 2006, Quaternary fault and fold database for the United States, accessed 25 January, 2018, from USGS website: http://earthquake.usgs.gov/hazards/qfaults/

N

(SCALE IN MILES)

0 8 16

TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

Project No. 1150-1H

QUATERNARY FAULT MAP

A3GEO

FIGURE 4

Air Photo Base: 11/8/1950

LEGEND:

PROPOSED BUILDING

A3-21-2 KILN BUILDING TEST BORING (A3GEO, NOVEMBER 2021)

A3-17-8 PHASE 2 TEST BORING (A3GEO, NOVEMBER 2017)

B-4 PHASE 1 TEST BORING (A3GEO, FEBRUARY 2017)

CPT-3 PHASE 1 CPT (A3GEO, FEBRUARY 2017)

B-2 TEST BORING (MPEG, AUGUST 2003)

CPT-1 CPT (MPEG, AUGUST 2003)

TLHS BOUNDARY

N

(SCALE IN FEET)

0 200 400

TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

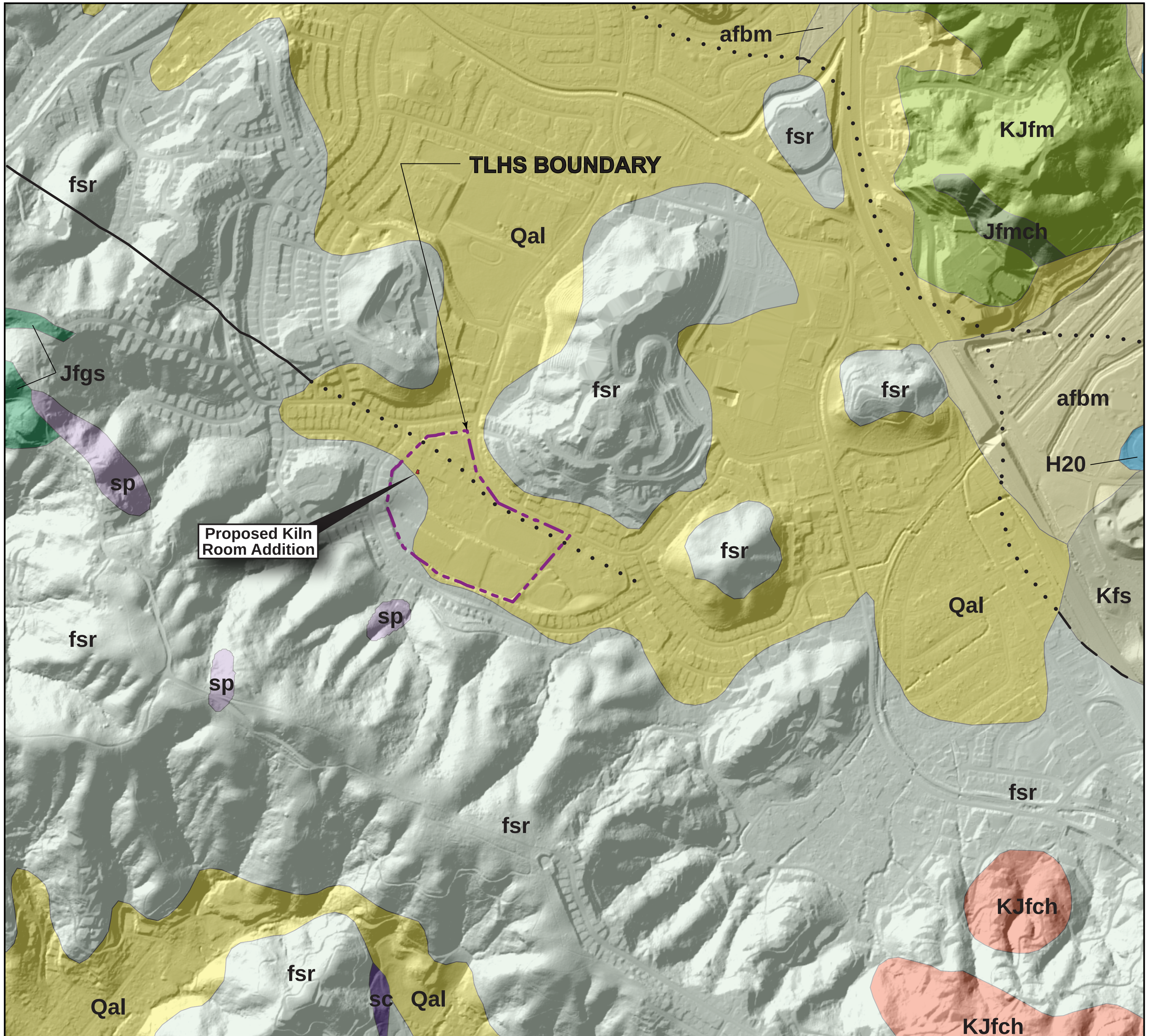
Project No. 1150-1H

PREDEVELOPMENT AERIAL PHOTOGRAPH

A3GEO

FIGURE 5

Date: 11/30/2021



LEGEND:

afbm	QUATERNARY ARTIFICIAL FILL OVER BAY MUD
Qal	QUATERNARY ALLUVIUM
	FRANCISCAN COMPLEX
Kfs	CRETACEOUS SANDSTONE AND SHALE
KJfm	CRETACEOUS/JURASSIC METAMORPHIC ROCK
KJfch	CRETACEOUS/JURASSIC CHERT
Jfmch	JURASSIC METACHERT
Jfgs	JURASSIC GREENSTONE
sp	JURASSIC SERPENTINITE
sc	JURASSIC SILICA-CARBONATE ROCK
fsr	CRETACEOUS/JURASSIC MÉLANGE

FAULT, DASHED WHERE APPROX. LOCATED, DOTTED WHERE CONCEALED

TLHS BOUNDARY

NOTES:

1. Base map modified from Blake, M.C., Graymer, R.W., and Jones, D.L., 2000, "Geologic Map and Map Database of Parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California, " U.S. Geological Survey Miscellaneous Field Study MF 2337, Online Version 1.0.

N

(SCALE IN FEET)

0 1,000 2,000

TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

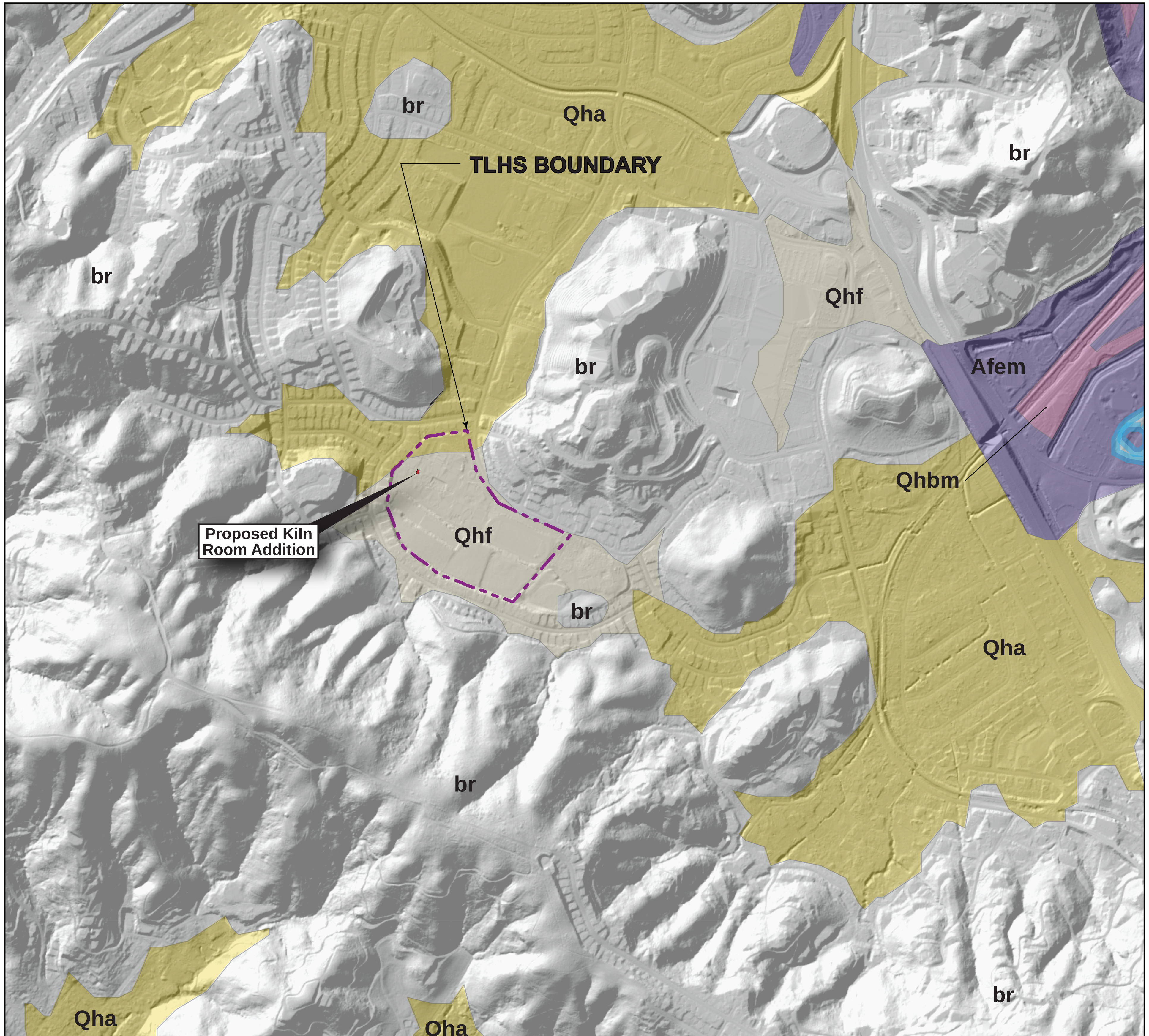
Project No. 1150-1H

GEOLOGIC MAP

A3GEO

FIGURE 6

Date: 11/30/2021



LEGEND:

Afem	HISTORICAL ARTIFICIAL FILL OVER LEVEE MUD
Qhbm	HOLOCENE SAN FRANCISCO BAY MUD
Qhf	HOLOCENE ALLUVIAL FAN DEPOSITS
Qha	HOLOCENE ALLUVIAL DEPOSITS, UNDIFFERENTIATED
br	EARLY QUATERNARY AND OLDER - OLDER DEPOSITS AND BEDROCK
- - -	TLHS BOUNDARY

NOTES:

1. Base map modified from Witter et. al., 2006, "Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California," USGS Open-File Report 2006-1037.

(SCALE IN FEET)

0 1,000 2,000

TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

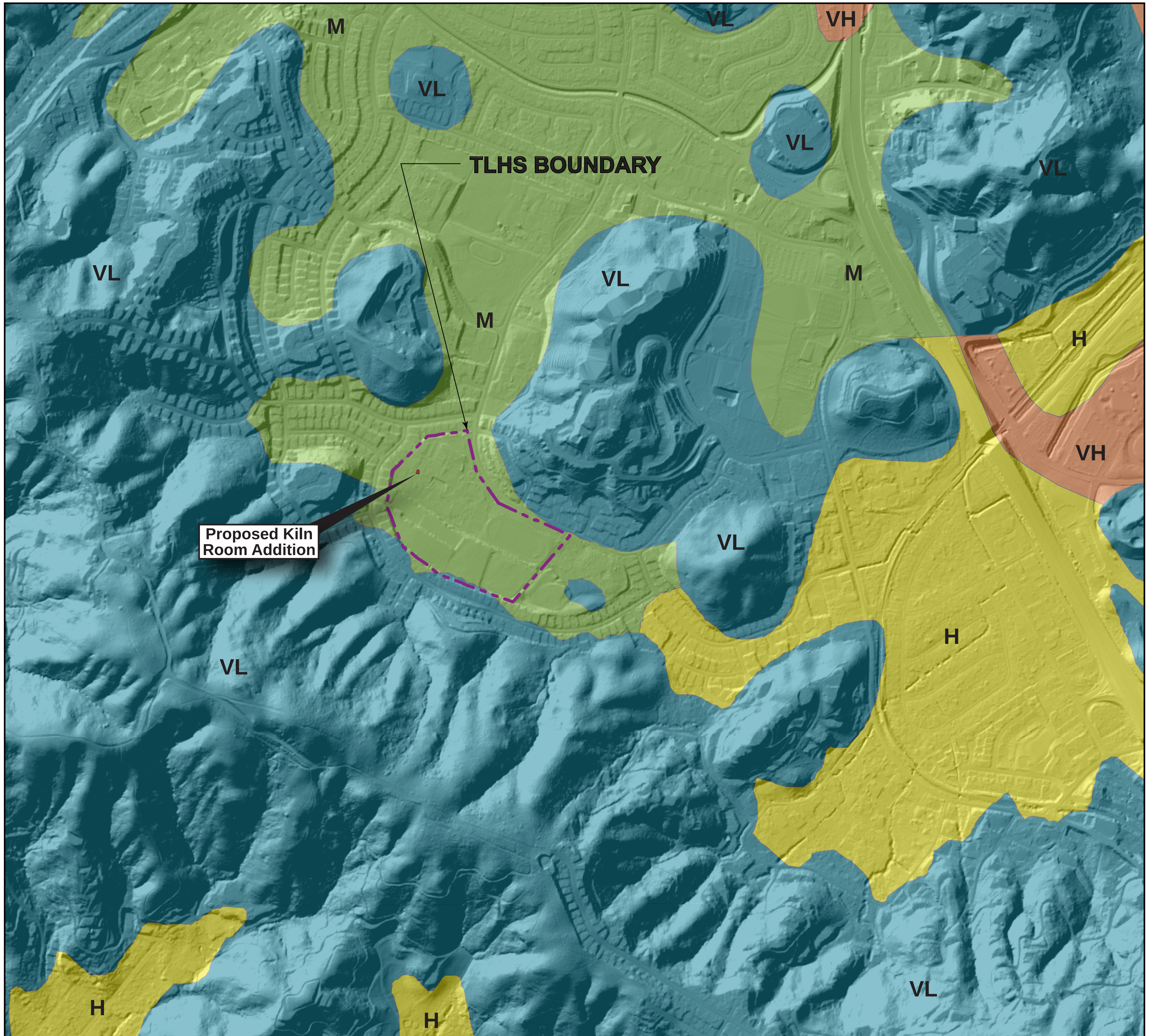
Project No. 1150-1H

QUATERNARY GEOLOGIC MAP

A3GEO

FIGURE 7

Date: 11/30/2021



LEGEND:

LIQUEFACTION POTENTIAL

VL	VERY LOW
M	MODERATE
H	HIGH
VH	VERY HIGH
	TLHS BOUNDARY

NOTES:

1. Base map modified from Knudsen et. al., 2000, "Description of Quaternary Deposits and Liquefaction Susceptibility, Nine-County San Francisco Bay Region, California," U.S. Geological Survey, Part 3 of Open-File Report 00-444.

N

(SCALE IN FEET)

0 1,000 2,000

TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

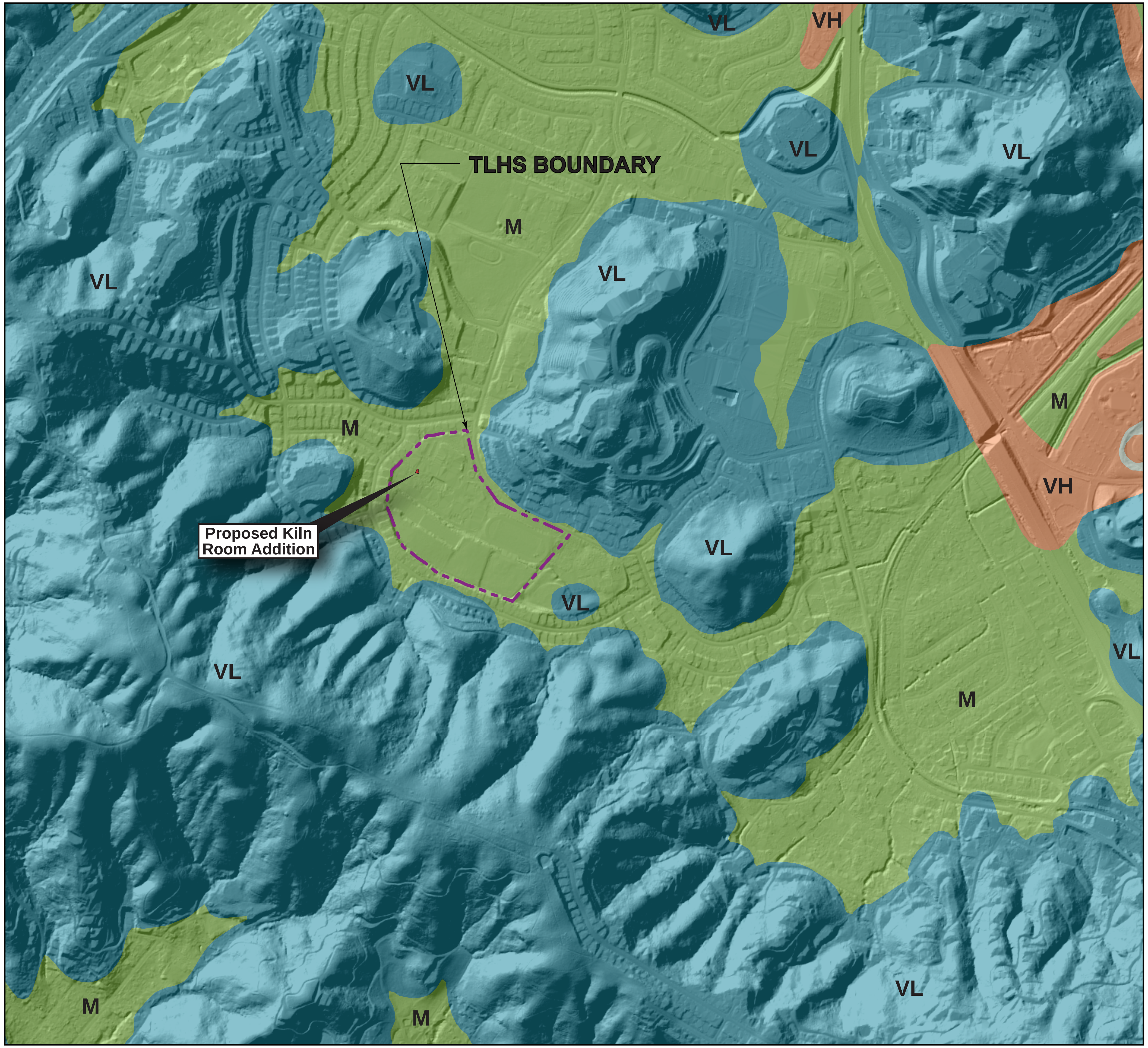
Project No. 1150-1H

LIQUEFACTION POTENTIAL MAP

A3GEO

FIGURE 8a

Date: 01/26/2018



LEGEND:

LIQUEFACTION POTENTIAL

VL	VERY LOW
M	MODERATE
VH	VERY HIGH
- - - -	TLHS BOUNDARY

NOTES:

1. Base map modified from Witter et. al., 2006, "Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California," USGS Open-File Report 2006-1037.

N

(SCALE IN FEET)

0 1,000 2,000

TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

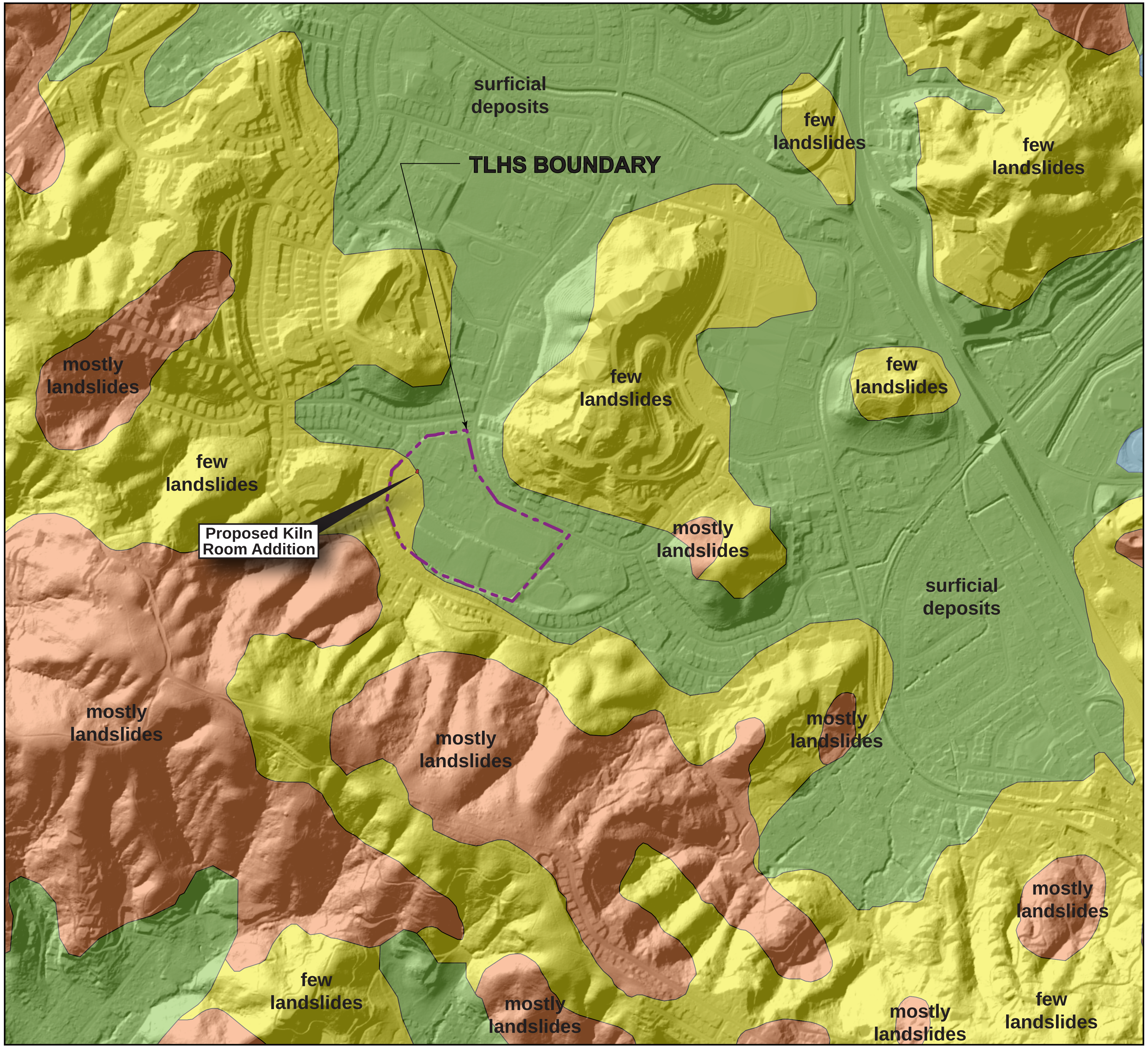
Project No. 1150-1H

LIQUEFACTION POTENTIAL MAP

A3GEO

FIGURE 8b

Date: 11/30/2021



LEGEND:

LANDSLIDE HAZARD

SURFICIAL DEPOSITS

FEW LANDSLIDES

MOSTLY LANDSLIDES

TLHS BOUNDARY

NOTES:

1. Base map modified from Wentworth, et. al., 1997, "Summary Distribution of Slides and Earth Flows in the San Francisco Bay Region, California," U.S. Geological Survey Open-File Report 97-745C

N

(SCALE IN FEET)

0 1,000 2,000

TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

Project No. 1150-1H

LANDSLIDE HAZARD MAP

A3GEO

FIGURE 9

Date: 11/30/2021

LEGEND:

AF	ARTIFICIAL FILL
Qa/Qc	ALLUVIUM/COLLUVIUM (QUATERNARY)
fsr	CRETACEOUS/JURASSIC FRANCISCAN MÉLANGE
	GEOLOGIC CONTACT APPROXIMATELY LOCATED
	FAULT CONTACT CONCEALED
C C'	LINE OF CROSS SECTION (A3GEO, 2018)
E E'	LINE OF CROSS SECTION
A3-21-2	KILN BUILDING TEST BORING (A3GEO, NOVEMBER 2021)
A3-17-8	PHASE 2 TEST BORING (A3GEO, NOVEMBER 2017)
B-4	PHASE 1 TEST BORING (A3GEO, FEBRUARY 2017)
CPT-3	PHASE 1 CPT (A3GEO, FEBRUARY 2017)
B-2	TEST BORING (MPEG, AUGUST 2003)
CPT-1	CPT (MPEG, AUGUST 2003)
	PROPOSED BUILDING (THIS STUDY)
	TLHS BOUNDARY

NOTES:

1. Geology from Marin Map, A Geographic Information System for Marin County. Data are in California State Plane coordinates, NAD83 HARN, US Survey feet.
2. Qaf and Qa/Qc contact based on conditions observed in test borings, and drawing A1A, dated 16 December 1958, prepared by Grommé Mulvin & Priestly Architects of San Rafael, CA for the New High School, San Rafael High School District for the Terra Linda Area, Marin County, California.
3. Fault location from USGS Miscellaneous Field Study MF-2337 for parts of Marin, San Francisco, and Contra Costa Counties, 2000.

(SCALE IN FEET)
0 200 400

N

TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

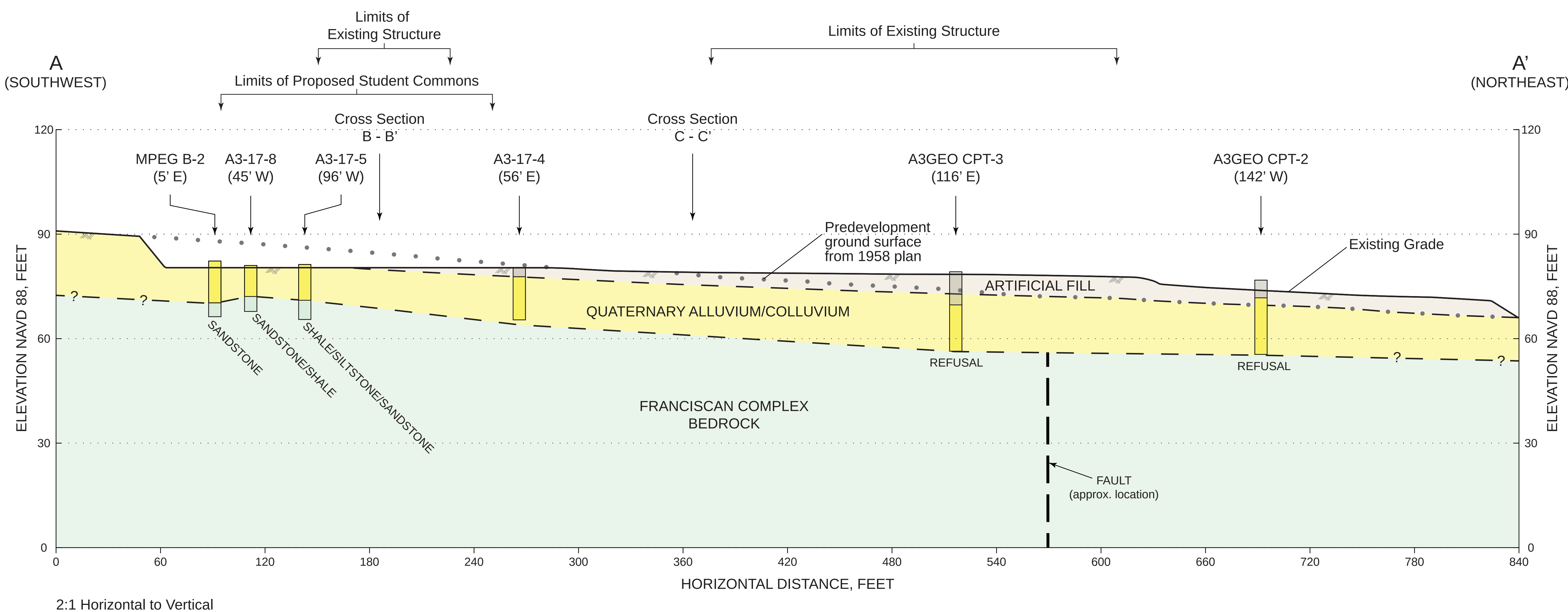
Project No. 1150-1H

SITE GEOLOGIC MAP

A3GEO

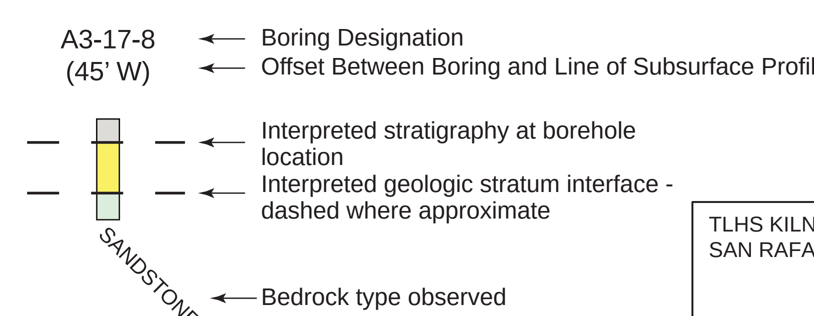
FIGURE 10

Date: 12/21/2021



NOTES:

1. Refer to Figure 10 for plan location designation and orientation of subsurface sections and as-drilled exploration locations.
2. Ground surface profiles shown were interpreted from profile A-A' on Sheet A1A of the 1958 plans for the school and are approximate.
3. Elevations for MPEG borings were assumed to be based on National Geodetic Vertical Datum of 1929 (NGVD 29). Elevations were converted to NAVD 88 by adding 2.67 feet.
4. Subsurface profile depict the general geologic conditions at the site and are based on interpretation of data encountered in explorations. Lines representing the interfaces between strata on the profile are based on interpolation between adjacent borings. Test boring sticks show the interpreted sequence of strata at each location. Actual soil conditions and interfaces between explorations may vary significantly from those indicated on profiles.
5. Refer to test boring logs for more detailed soil and rock conditions.
6. Fault location based on USGS Miscellaneous Field Study MF-2337 for Parts of Marin, San Francisco, and Contra Costa Counties, 2000.



TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

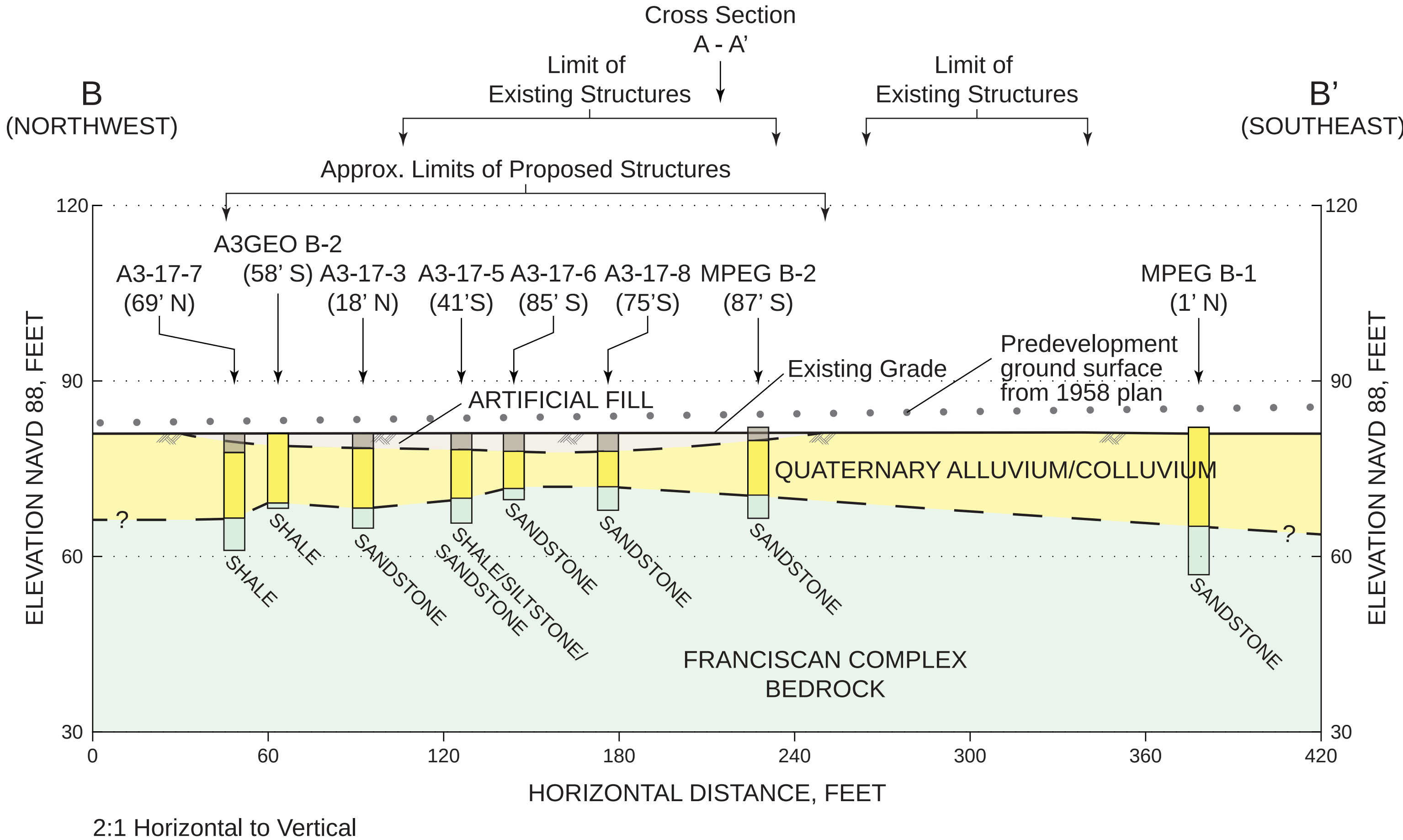
Project No. 1150-1H

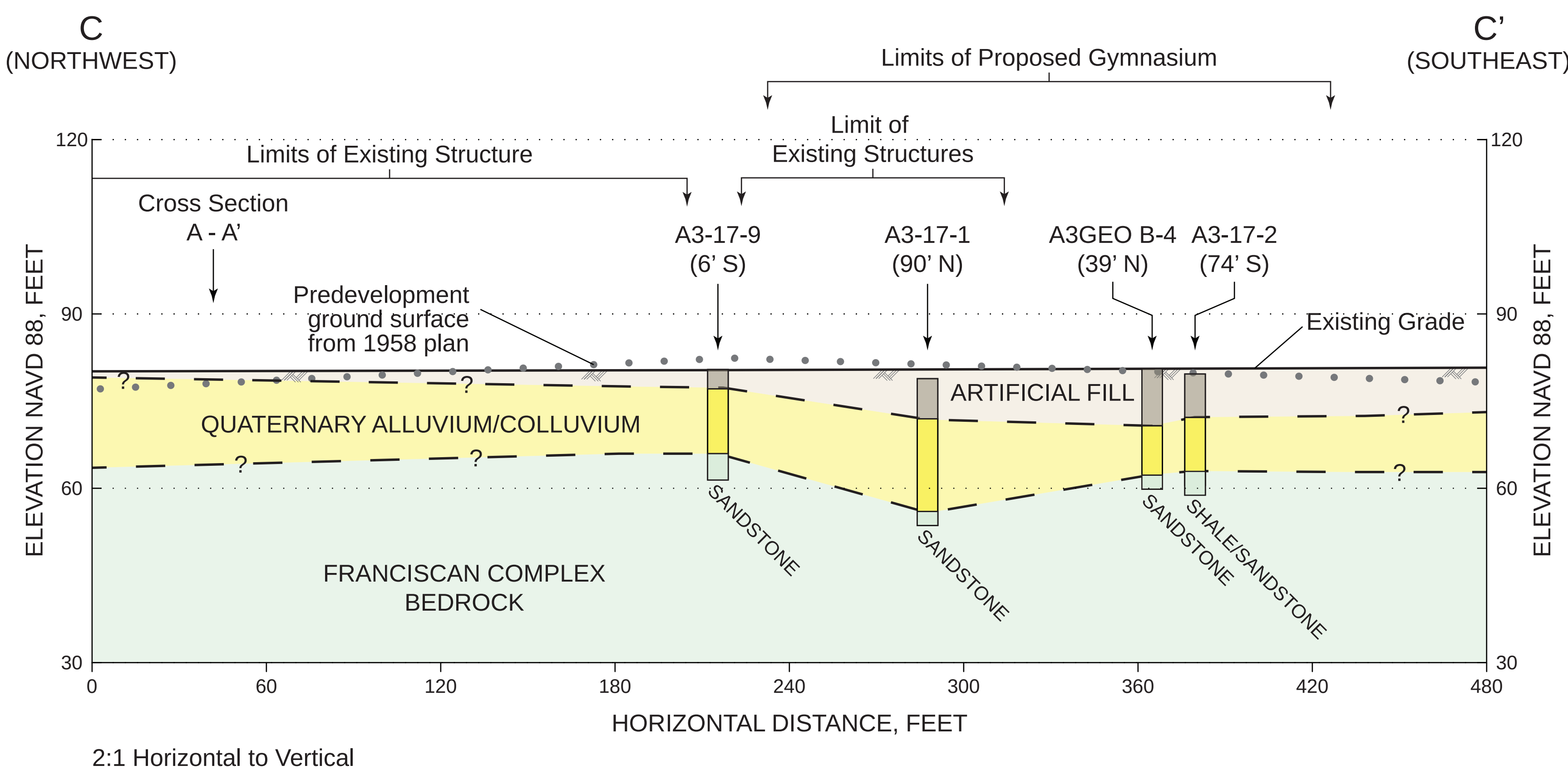
CROSS SECTION A - A'

A3GEO

FIGURE 11

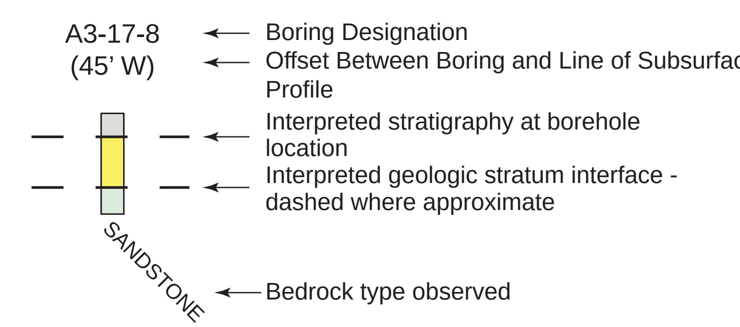
Date: 12/21/2021





NOTES:

1. Refer to Figure 10 for plan location designation and orientation of subsurface sections and as-drilled exploration locations.
2. Elevations for MPEG borings were assumed to be based on National Geodetic Vertical Datum of 1929 (NGVD 29). Elevations were converted to NAVD 88 by adding 2.67 feet.
3. Subsurface profile depict the general geologic conditions at the site and are based on interpretation of data encountered in explorations. Lines representing the interfaces between strata on the profile are based on interpolation between adjacent borings. Test boring sticks show the interpreted sequence of strata at each location. Actual soil conditions and interfaces between explorations may vary significantly from those indicated on profiles.
4. Refer to test boring logs for more detailed soil and rock conditions.



TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

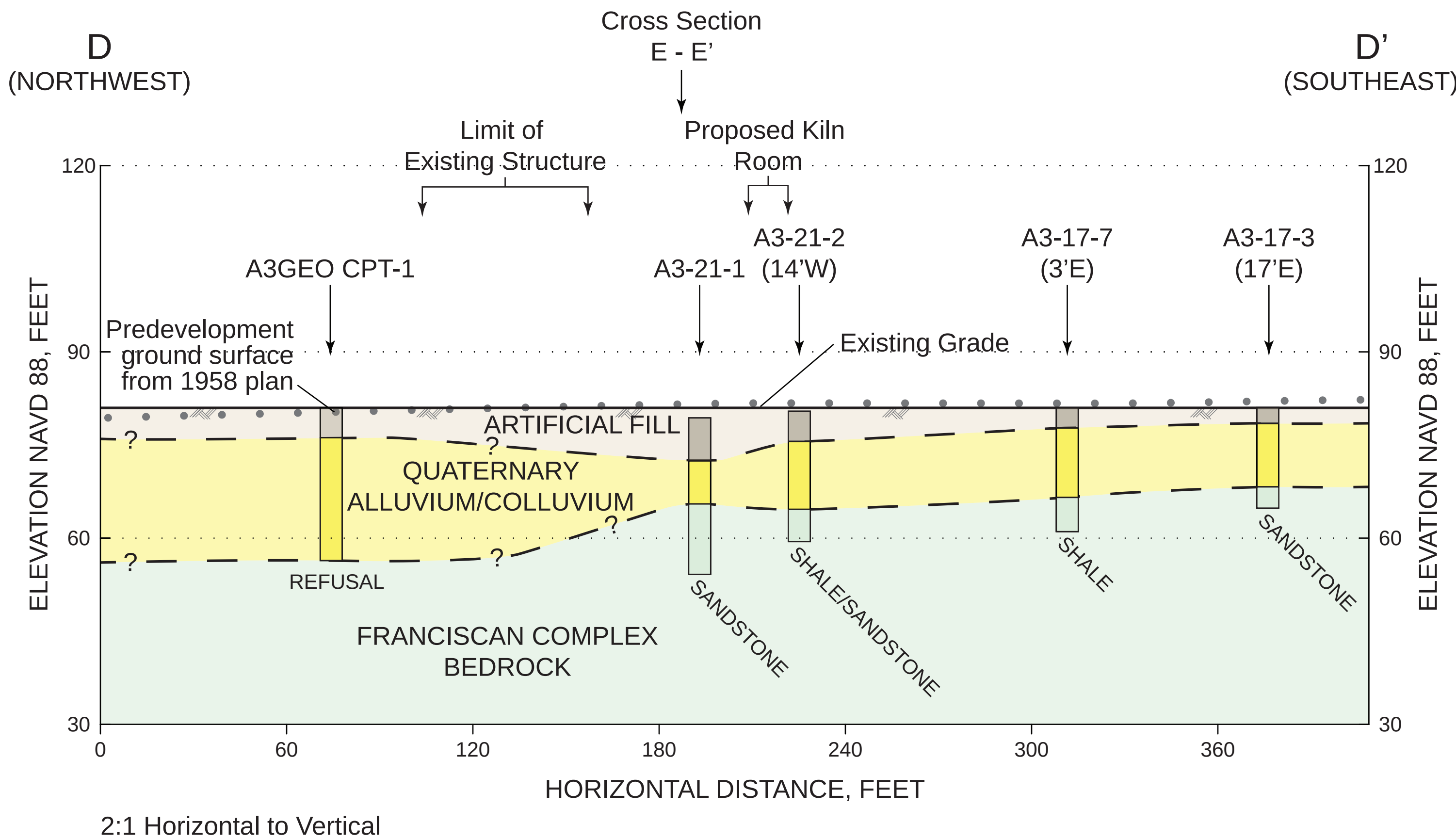
Project No. 1150-1H

CROSS SECTIONS B - B' & C - C'

A3GEO

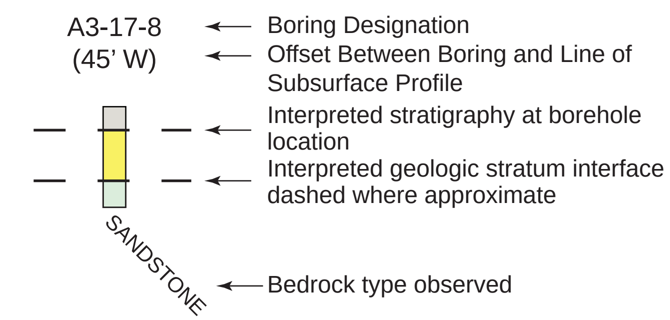
FIGURE 12

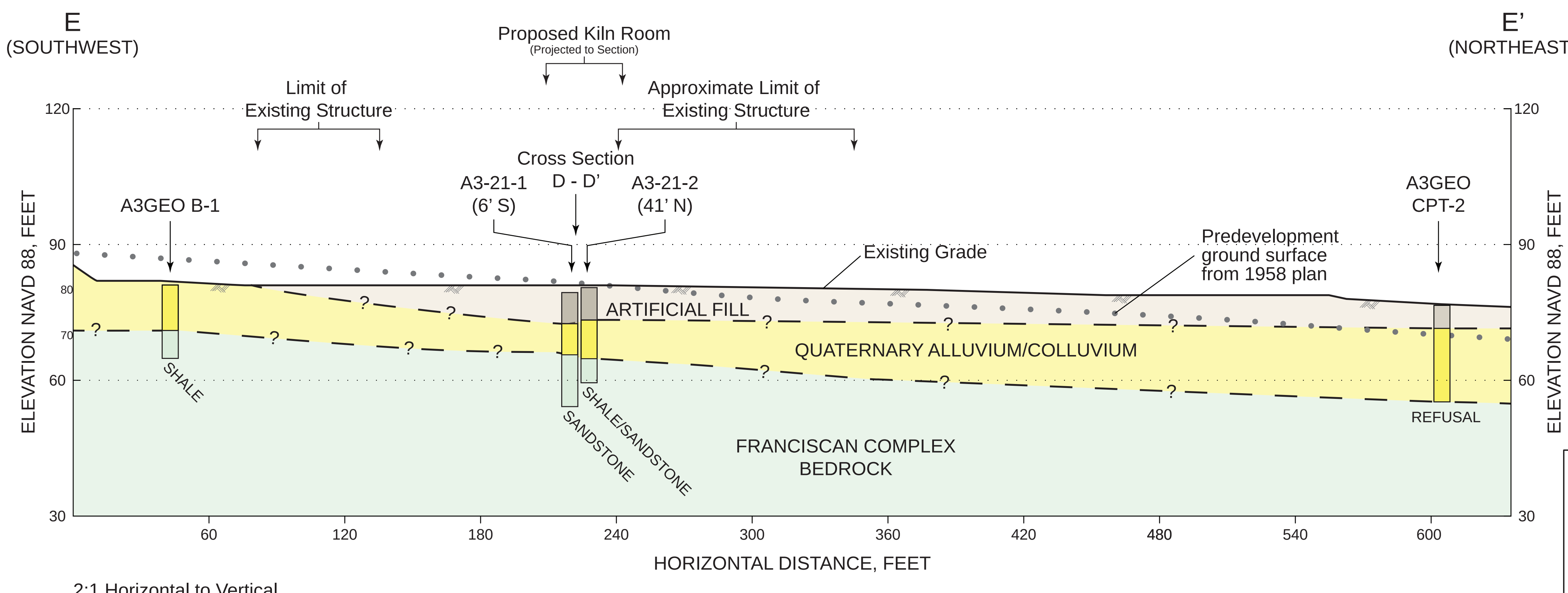
Date: 12/21/2021



NOTES:

1. Refer to Figure 10 for plan location designation and orientation of subsurface sections and as-drilled exploration locations.
2. Subsurface profile depict the general geologic conditions at the site and are based on interpretation of data encountered in explorations. Lines representing the interfaces between strata on the profile are based on interpolation between adjacent borings. Test boring sticks show the interpreted sequence of strata at each location. Actual soil conditions and interfaces between explorations may vary significantly from those indicated on profiles.
3. Refer to test boring logs for more detailed soil and rock conditions.





TLHS KILN ROOM ADDITION
SAN RAFAEL, MARIN COUNTY, CA

Project No. 1150-1H

CROSS SECTIONS D - D' & E - E'

A3GEO

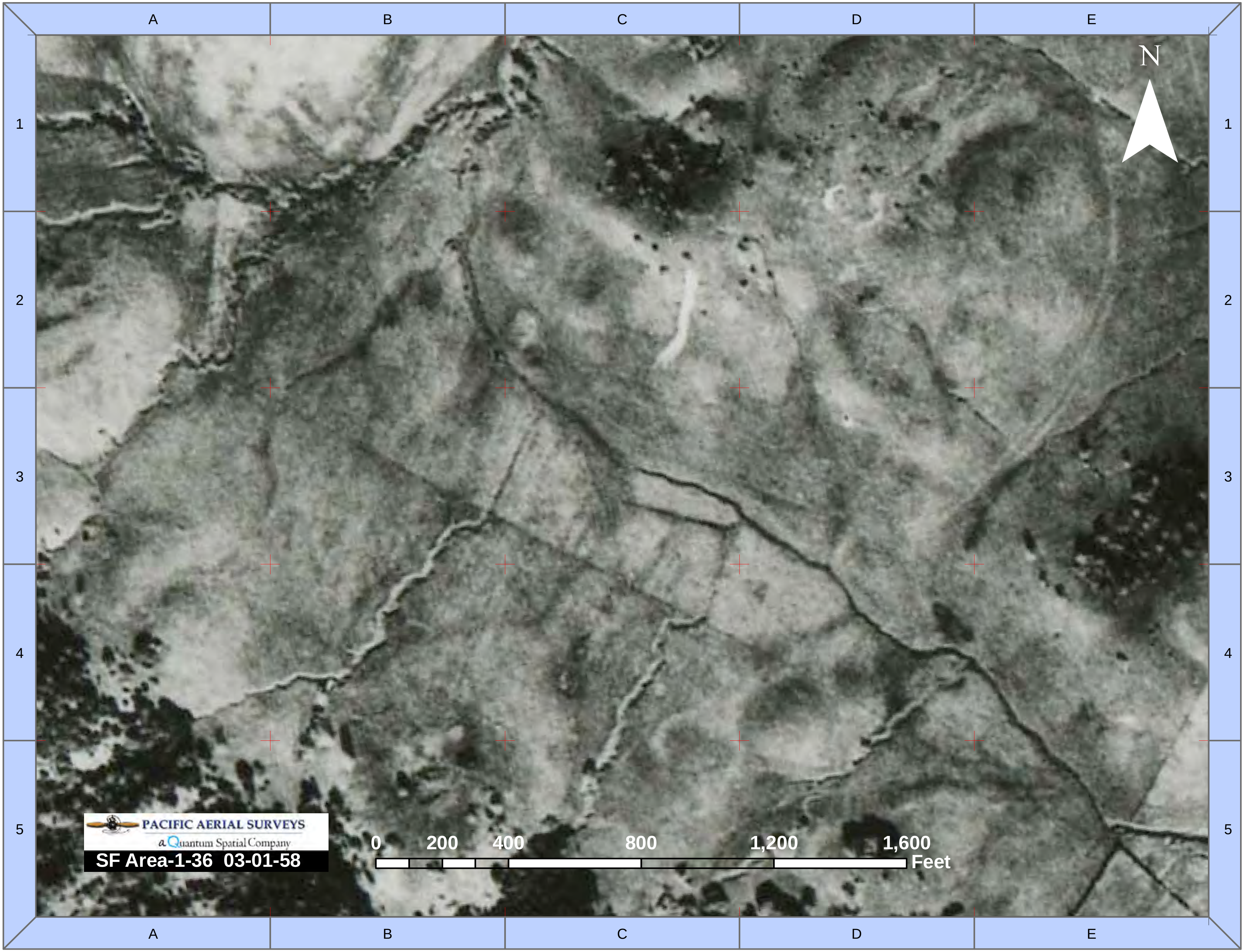
FIGURE 13

Date: 12/21/2021

APPENDIX A

Historic Aerial Photographs

A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV41-06-22 11-08-50
0
200
400
800
1,200
1,600
Feet


A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
SF Area-1-36 03-01-58
0
200
400
800
1,200
1,600
Feet


A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV957-04-20 07-02-70
0
200
400
800
1,200
1,600
Feet

A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV1187-04-20 04-17-75
0
200
400
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1,200
1,600
Feet

A
B
C
D
E
1
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4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV2140-04-21 05-03-82
0
200
400
800
1,200
1,600
Feet


A
B
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D
E
1
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3
4
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N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV2860-11-14 04-19-86
0
200
400
800
1,200
1,600
Feet

A
B
C
D
E
1
2
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4
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N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV4252-29-57 04-27-92
0
200
400
800
1,200
1,600
Feet

A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV5036-03-13 01-11-96
0
200
400
800
1,200
1,600
Feet


A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
AV6540-124-55 05-03-00
0
200
400
800
1,200
1,600
Feet

A
B
C
D
E
1
2
3
4
5
N
PACIFIC AERIAL SURVEYS
a Quantum Spatial Company
Terra Linda HS 2015
0
200
400
800
1,200
1,600
Feet

APPENDIX B

A3GEO Boring Logs

(This Study)

UNIFIED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS: more than 50% retained on No. 200 sieve	COARSE GRAINED SOILS: 50% or more of coarse fraction on No. 4 sieve	CLEAN GRAVELS	GW	Well graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH SAND	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS: more than 50% passing on No. 4 sieve	CLEAN SANDS	SW	Well graded sands and gravelly sand, little or no fines
			SP	Poorly graded sands and gravelly sand, little or no fines
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS: 50% or more passing No. 200 sieve	SILTS AND CLAY: Liquid Limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays or low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAY: Liquid Limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic clays
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS			PT	Peat, muck, and other highly organic soils

BOUNDARY CLASSIFICATION AND GRAIN SIZES

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

U.S. Standard Sieve Sizes: No. 200 (0.075 mm) — No. 40 (0.425 mm) — No. 10 (2 mm) — No. 4 (3/16") — 3/4" — 3" — 12"

SYMBOLS

Modified California (MC) Sampler (3" O.D.)	HQ ROCK CORE (RC)	101 Barrel (SS)
Standard Penetration Test: SPT (2" O.D.)	Pitcher Tube (ST)	<u>Water Levels</u> At time of drilling At end of drilling After drilling

ABBREVIATIONS

Item	Meaning
LL	Liquid Limit (%) (ASTM D 4318)
PI	Plasticity Index (%) (ASTM D 4318)
-200	Passing No. 200 (%) (ASTM D 1140)
TXCU	Laboratory consolidated undrained triaxial test of undrained shear strength (psf) (ASTM D 4767)
TXUU	Laboratory unconsolidated, undrained triaxial test of undrained shear strength (psf) (ASTM D 2850)
psf/tsf	pounds per square foot / tons per square foot
psi	pounds per square inch
OD	Outside Diameter
ID	Inside Diameter

NOTES

1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Modified California (MC) blow counts were adjusted by multiplying field blow counts by a factor of 0.63.
3. Recorded blow counts have not been adjusted for hammer energy.

A3GEO

KEY TO EXPLORATORY BORING LOGS

A3GEO

BEDDING OF SEDIMENTARY ROCK		
SPLITTING PROPERTY	THICKNESS	STRATIFICATION
Massive	Greater than 4.0 feet	Very Thick-Bedded
Blocky	2.0 to 4.0 feet	Thick-Bedded
Slabby	0.2 to 2.0 feet	Thin-Bedded
Flaggy	0.05 to 0.2 feet	Very Thin-Bedded
Shaly or Platy	0.01 to 0.05 feet	Laminated
Papery	Less than 0.01 feet	Thinly Laminated

FRACTURING	
INTENSITY	SIZE OF PIECES IN FEET
Very Little Fractured	Greater than 4.0 feet
Occasionally Fractured	1.0 to 4.0 feet
Moderately Fractured	0.5 to 1.0 feet
Closely Fractured	0.1 to 0.5 feet
Intensely Fractured	0.05 to 0.1 feet
Crushed	Less than 0.05 feet

HARDNESS	
Soft	Reserved for plastic material alone
Low Hardness	Can be gouged deeply or carved easily by a knife blade
Moderately Hard	Can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and is readily visible after the powder has been blown away
Hard	Can be scratched by a knife blade with difficulty; scratch produces little powder and is often faintly visible
Very Hard	Cannot be scratched by a knife blade; leaves a metallic streak

STRENGTH	
Plastic	Very low strength
Friable	Crumbles easily by rubbing with fingers
Weak	An unfractured specimen of such material will crumble under light hammer blows
Moderately Strong	Specimen will withstand a few heavy hammer blows before breaking
Strong	Specimen will withstand a few heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments
Very Strong	Specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments

WEATHERING:	
	— the physical and chemical disintegration and decomposition of rocks and minerals by natural processes such as oxidation, reduction, hydration, solution, carbonation, and freezing and thawing
Deep	Moderate to complete mineral decomposition; extensive disintegration; deep and thorough discoloration; many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt.
Moderate	Slight change or partial decomposition of minerals; little disintegration; cementation little to unaffected. Moderate to occasionally intense discoloration. Moderately coated fractures.
Little	No megascopic decomposition of minerals; little or no effect on normal cementation. Slight and intermittent, or localized discoloration. Few stains on fracture surfaces.
Fresh	Unaffected by weathering agents. No discoloration or disintegration. Fractures usually less numerous than joints.

KEY TO ROCK DESCRIPTIONS

A3GEO, Inc.
821 Bancroft Way
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER A3-21-1

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Ceramics Building
PROJECT NUMBER 1150-1H
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/23/21 **COMPLETED** 11/23/21
GROUND ELEVATION 81 ft NAVD88 **HOLE SIZE** 4
DRILLING CONTRACTOR Taber Drilling Co.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING --- Not Encountered
LOGGED BY AW **CHECKED BY** DB/JB
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0	Grass, Roots, and Topsoil							
	LEAN CLAY WITH SAND (CL) - stiff, very dark grayish brown (10YR 3/2), moist, fine to medium grained sand, low to moderate plasticity, trace root fragments (Probable Fill / Mixed Alluvium)	GB 1						Corrosion Test LL=39, PI=20
5	SANDY LEAN CLAY (CL) - very stiff, dark yellowish brown (10YR 4/4 to 4/6), some red and gray mottling, moist, fine to medium grained sand, moderate plasticity, gravel is angular to subrounded up to 0.5" diameter; sandstone and greenstone clasts; clay matrix with clay films (Alluvium)	MC 2	29	107	4.5+	18	100	Gravel=10% Sand=37% -#200=53%
	SANDY LEAN CLAY (CL) - very stiff, yellowish brown to brown (10YR 5/4 to 7.5YR 4/3), some red and gray mottling, moist, fine to medium grained sand, moderate plasticity; clay matrix bridges sand grains and gravel clasts; gravel clasts are subrounded to rounded and less than 1-inch; highly weathered sandstone with some greenstone; FeO2 and MnO2 staining (Alluvium)							driller noted harder at 9 ft
10		MC 3	39	123		14	89	Gravel=19% Sand=51% -#200=30% driller noted harder at 12 ft
	CLAYEY SAND WITH GRAVEL (SC) - dense, brown (7.5YR 5/4 to 5/5), some red and gray mottling, moist, low plasticity, fine to medium grained sand, some FeO2 staining; sandstone and greenstone clasts up to 2-inch diameter (Alluvium) - increase in medium to coarse grained sand with depth							
15	SANDSTONE - pale brown to slight yellowish brown (10YR 6/3 to 6/4), deeply weathered, weak, low to moderately hard, slightly moist (Franciscan Complex) - at 15 feet, fine-grained sandstone, weathered, tight fractures that are FeO2 stained	SPT 4	50/3"				100	
20	- at 20 feet, light gray, very fine grained sandstone with shale	SPT 5	50/0.5"				50	
25	- at 25 feet, gray, very fine-grained sandstone with shale/siltstone	SPT 6	50/0.5"				50	

Bottom of borehole at 25.1 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Elevations were estimated using the 'Terra Linda High School Topographic Map' from BKF dated 2017 and reference North American Vertical Datum of 1988.
3. Modified California (MC) blowcounts adjusted by multiplying field blowcounts by a factor 0.63.
4. Borehole was backfilled with cement grout upon completion. Free groundwater was not encountered within the borehole.
5. Average hammer efficiency = 76%.

A3GEO, Inc.
821 Bancroft Way
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER A3-21-2

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Ceramics Building
PROJECT NUMBER 1150-1H
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/23/21 **COMPLETED** 11/23/21
GROUND ELEVATION 81 ft NAVD88 **HOLE SIZE** 8
DRILLING CONTRACTOR Taber Drilling Co.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING --- Not Encountered
LOGGED BY AW **CHECKED BY** DB/JB
AT END OF DRILLING --- Not Encountered
NOTES
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		Grass, Roots, and Topsoil							
		CLAYEY SAND (SC) - very stiff, very dark grayish brown to very dark brown (2YR 2/2) moist, fine to medium grained sand, low plasticity, with roots, some organics and root fragments; classic topsoil with organics (Probable Fill / Mixed Alluvium)	GB 1						
5		SANDY LEAN CLAY (CL) - very stiff, very dark grayish brown (10YR 3/2), fine grained sand, moderate to high plasticity, some rootlets and wood fragments (Probable Fill or Alluvium)	MC 2	25	97	2.75	23	78	Gravel=0% Sand=32% -#200=68% LL=43, PI=23
		SANDY LEAN CLAY (CL) - very stiff, brown to dark brown (10YR 5/3 to 7.5YR 3/2), some red and gray mottling, moist, fine to medium grained sand, moderate plasticity; clay matrix bridges sand grains and gravel clasts; gravel clasts are weathered angular sandstone; FeO2 and MnO2 staining (Alluvium)							
10		- layer of brown lean clay with sand from 10.5 - 10.75 ft	MC 3	37		4.5+		67	
		CLAYEY SAND WITH GRAVEL (SC) - dense, dark brown (10YR 3/3 to 7.5YR 3/3), some red and gray mottling, moist, fine to medium grained sand, gravel clasts are weathered sandstone, greenstone and shale up to 0.5-inch diameter; subangular to subrounded; clay matrix and clay films (Alluvium)							Gravel=25% Sand=48% -#200=27%
15		SANDSTONE - yellowish brown (10YR 5/4 to 5/6), deeply weathered, weak, low hardness, moist; fine to medium grained; fractures healed with clay and MnO2 (Franciscan Complex)	SPT 4	57				100	
		SHALE / MELANGE - gray to dark gray, deeply weathered, low hardness, friable, intensely fractured, slightly moist, some FeO2 staining along fractures (Franciscan Complex)							driller noted harder at 18 ft
20			SPT 5	50/5.5"				108	
25		- at 25 feet, dark gray, melange fabric with less weatehred shale as fine clasts	SPT 6	50/5.5"				100	

Bottom of borehole at 26.0 feet.
1. Stratification lines represent the approximate boundaries between the material types and the transitions may be gradual.
2. Elevations were estimated using the 'Terra Linda High School Topographic Map' from BKF dated 2017 and reference North American Vertical Datum of 1988.
3. Modified California (MC) blowcounts adjusted by multiplying field blowcounts by a factor 0.63.
4. Borehole was backfilled with cement grout upon completion. Free groundwater was not encountered within the borehole.
5. Average hammer efficiency = 76%.

APPENDIX C

A3GEO Boring Logs

(Previous Phase 1 and Phase 2 Studies)

A3GEO, Inc.
1331 7th Street; Unit E
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER B-1

CLIENT San Rafael City School District
PROJECT NAME Terra Linda High School - Preliminary Investigation
PROJECT NUMBER 1150-1A
PROJECT LOCATION San Rafael, CA
DATE STARTED 2/22/17 **COMPLETED** 2/22/17
GROUND ELEVATION 81.1 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY RES **CHECKED BY** WM
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		ASPHALTIC CONCRETE [3"]							
		AGGREGATE BASE [6"]							
		LEAN CLAY WITH SAND (CL): reddish brown, medium stiff to stiff, moderate plasticity, fine-medium sand , moist	GB						
		between 3'-4.25': some angular gravels, up to 3/4"	MC	20	>4.5	121	14	83%	32% Gravel 39% Sand -200 = 29%
5		CLAYEY SAND WITH GRAVEL (SC): olive brown, dense, well-graded sand, moist							
			MC	34	4.5 >4.5			83%	
10		CLAYEY SANDSTONE: reddish brown, friable, very deeply weathered, low hardness, fine-medium grained, moist	SPT	53				100%	
15		at 15': increased fine sand and silt content	SPT	81/10"				88%	

Bottom of borehole at 16.3 feet.
1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
3. Ground surface elevation taken from county-provided LiDAR data (NAVD88 datum).
4. Groundwater was not encountered during drilling; hole was backfilled immediately after drilling.

A3GEO, Inc.
1331 7th Street; Unit E
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER B-2

CLIENT San Rafael City School District

PROJECT NAME Terra Linda High School - Preliminary Investigation

PROJECT NUMBER 1150-1A

PROJECT LOCATION San Rafael, CA

DATE STARTED 2/22/17 **COMPLETED** 2/22/17

GROUND ELEVATION 81.2 ft **HOLE SIZE** 6"

DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.

GROUND WATER LEVELS:

DRILLING METHOD Hollow Stem Auger

AT TIME OF DRILLING ---

LOGGED BY RES **CHECKED BY** WM

AT END OF DRILLING ---

NOTES

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		ASPHALTIC CONCRETE [3"]							
		AGGREGATE BASE [6"]							
		LEAN CLAY WITH SAND (CL): reddish brown, medium stiff, moderate plasticity, fine-medium sand, moist	GB				14		LL = 37 PI = 20
		SANDY LEAN CLAY (CL): reddish brown and dark grey, very stiff, low-moderate plasticity, fine-medium sand, heavy iron staining, moist	MC	20	>4.5 4.5	111	21	94%	1% Gravel 36% Sand -200 = 63%
5									
		at 7': dark olive brown and reddish brown with grey streaks - decreasing clay content with depth	MC	23				83%	
10		CLAYEY SAND (SC): yellowish brown, dense to very dense, well-graded, primarily fine-medium sand, low plasticity fines, moist at 12': very dense	MC	50/5"	3.5 >4.5			100%	
		SHALE: light olive brown, friable-weak, deeply weathered, low hardness, papery bedding, dry	SPT	50/5"				100%	

Bottom of borehole at 13.3 feet.

1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
3. Ground surface elevation taken from county-provided LiDAR data (NAVD88 datum).
4. Groundwater was not encountered during drilling; hole was backfilled immediately after drilling.

A3GEO, Inc.
1331 7th Street; Unit E
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER B-3

CLIENT San Rafael City School District
PROJECT NAME Terra Linda High School - Preliminary Investigation
PROJECT NUMBER 1150-1A
PROJECT LOCATION San Rafael, CA
DATE STARTED 2/22/17 **COMPLETED** 2/22/17
GROUND ELEVATION 81 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY RES **CHECKED BY** WM
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0	ASPHALTIC CONCRETE [4"]							
	AGGREGATE BASE [3"]							
	LEAN CLAY WITH SAND (CL): olive brown and reddish brown, medium stiff, low-moderate plasticity, fine-medium sand, moist	GB						
	CLAYEY SAND (SC): olive brown, medium dense, low-moderate plasticity, fine-medium sand, some iron staining, some fine-coarse gravel, moist	MC	19		124	14	94%	LL = 37 PI = 21 14% Gravel 40% Sand -200 = 46%
5		MC	19	3.0			78%	
	CLAYSTONE: soft to low hardness, friable, deeply weathered, moist							
10	SHALE: dark olive brown, friable to weak, deeply weathered, low hardness, papery to platy bedding, dry	SPT	34				100%	
15		SPT	52				78%	
20		SPT	50/6"				100%	

Bottom of borehole at 21.0 feet.
1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
3. Ground surface elevation taken from county-provided LiDAR data (NAVD88 datum).
4. Groundwater was not encountered during drilling; hole was backfilled immediately after drilling.

A3GEO, Inc.
1331 7th Street; Unit E
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER B-4

CLIENT San Rafael City School District
PROJECT NAME Terra Linda High School - Preliminary Investigation
PROJECT NUMBER 1150-1A
PROJECT LOCATION San Rafael, CA
DATE STARTED 2/22/17 **COMPLETED** 2/22/17
GROUND ELEVATION 81.1 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
▽ **AT TIME OF DRILLING** 20.00 ft / Elev 61.10 ft
LOGGED BY RES **CHECKED BY** WM
AT END OF DRILLING ---
NOTES
▼ **AFTER DRILLING** 10.00 ft / Elev 71.10 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		ASPHALTIC CONCRETE [5"]							
		AGGREGATE BASE [6"]							
		SANDY LEAN CLAY (CL): very dark brown to black with brown sand, medium stiff, low-moderate plasticity, primarily fine-medium sand, some construction debris (nail, staple), moist [FILL]	GB						
		LEAN CLAY WITH SAND (CL): dark grey to black with light grey streaks, medium stiff, low-moderate plasticity, fine-medium sand, some gravel, up to 2", moist (FILL)	MC	7	1.0 1.25	104	22		LL = 36 PI = 16
5									
		at 6.5': stiff, dark olive brown with some iron staining	MC	9	0.75 0.75				
		at 7': some subangular gravel in shoe of sampler, up to 1"							
10		▼							
		LEAN CLAY WITH SAND (CL): yellowish brown with dark brown streaks, stiff, some iron staining, moist	MC	18	>4.5 >4.5	111	18		
15		SANDY LEAN CLAY (CL): reddish brown and olive brown, some grey streaks, very stiff, primarily fine-medium sand, high sand content, moist	MC	19	4.25 >4.5				
		SANDSTONE: reddish brown and olive brown, friable-weak, deeply weathered, low hardness, crushed, dry							
20		▽							
			MC	50/3"					
			SPT	50/3"					

Bottom of borehole at 21.0 feet.
1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
3. Ground surface elevation taken from county-provided LiDAR data (NAVD88 datum).
4. See report for discussion regarding groundwater; hole backfilled shortly after drilling complete.

A3GEO, Inc.
1331 7th Street; Unit E
Berkeley, CA 94710
Telephone: 510-705-1664

BORING NUMBER B-5

CLIENT	San Rafael City School District	**PROJECT NAME**	Terra Linda High School - Preliminary Investigation
PROJECT NUMBER	1150-1A	**PROJECT LOCATION**	San Rafael, CA
DATE STARTED	2/22/17 **COMPLETED** 2/22/17	**GROUND ELEVATION**	91.4 ft **HOLE SIZE** 6"
DRILLING CONTRACTOR	Gregg Drilling and Testing, Inc.	**GROUND WATER LEVELS:**	
DRILLING METHOD	Hollow Stem Auger	**AT TIME OF DRILLING**	---
LOGGED BY	RES **CHECKED BY** WM	**AT END OF DRILLING**	---
NOTES		**AFTER DRILLING**	---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	% RECOVERED	OTHER LAB TESTS / NOTES
0		SANDY SILT (ML): dark brown, soft, low plasticity, fine-medium sand, moist							
			GB						
		at 3': medium stiff	MC	6	1.5 1.5	107	21		LL = 36 PI = 16
5		SANDY LEAN CLAY (CL): dark olive brown with olive brown and reddish brown spots, stiff, low-moderate plasticity, fine-medium sand, trace coarse sand, moist							
			MC	10	1.5 2.0	110	19		
		- increasing sand content with depth							
10		at 10': very stiff, increased sand content	MC	14	>4.5 >4.5 >4.5				
15		at 15': very stiff, slightly more sand	MC	24	>4.5 >4.5 >4.5				
		SHALE: dark brown, soft-weak, very deeply weathered, soft-low hardness, papery to platey bedding, crushed, some iron staining, damp							
20			SPT	50/5"					

Bottom of borehole at 20.4 feet.
1. Stratification lines represent the approximate boundaries between material types and the transitions may be gradual.
2. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
3. Ground surface elevation taken from county-provided LiDAR data (NAVD88 datum).
4. Groundwater was not encountered during drilling; hole was backfilled immediately after drilling.

BORING NUMBER A3-17-1

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 79.5 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
▽ **AT TIME OF DRILLING** 7.0 ft / Elev 72.5 ft
LOGGED BY DKM **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0	3" ASPHALT CONCRETE							
	6" ASPAHALT BASE							
	FAT CLAY (CH) - very dark brown, medium stiff, some fine sand, trace coarse sand, moist to wet [FILL]	GB						
		MC	7	.5				
5	FAT CLAY (CH) - similar to above, except black, brown weathered sandstone clasts present in sample [FILL]							
	▽ SANDY TO GRAVELLY FAT CLAY (CH) - mottled yellowish brown and reddish brown, medium stiff, contains angular decomposed to weathered sandstone and shale clasts, moist to wet [ALLUVIUM/COLLUVIUM]	MC	9	1.0				
10	SILTY SAND (SM) - mottled yellowish brown and reddish brown, trace gravel [ALLUVIUM/COLLUVIUM]							
	CLAYEY SAND (SC) - mottled reddish brown, dark brown and yellowish brown; medium dense; medium to coarse sand; some gravel, and rock fragments [ALLUVIUM/COLLUVIUM]							
	-Lens of light gray FAT CLAY (CH) -Gradual transition to CLAYEY GRAVEL (GC) similiar to SC above	MC	17	2.0 3.0				9% Gravel 46% Sand 45% -200 PI = 22 LL = 40
15	CLAYEY SAND WITH GRAVEL (SC) - mottled reddish brown, dark brown and yellowish brown; medium dense; 15-20% angular to subrounded rock fragments [ALLUVIUM/COLLUVIUM]							
		MC	15					25% Gravel 54% Sand 21% -200 PI = 10 LL = 29
	-Decreasing gravel/rock size							
20	GRAVELLY CLAY WITH SAND (CL) - mottled reddish brown, dark brown and yellowish brown; very stiff [ALLUVIUM/COLLUVIUM]	SPT	29					
	SANDSTONE - yellowish brown, weathered, fine grained, with light grey vertical clay seams along fractures [WEATHERED BEDROCK]							
25		SPT	50/3.0"					

Bottom of borehole at 25.3 feet.
1. Split spoon refusal at 25.3'
2. Borehole was backfilled with cement grout immediately after drilling.
3. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
4. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

BORING NUMBER A3-17-2

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 80.5 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY EA/LB **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		3" Concrete							
		SANDY CLAY (CL) - very dark gray, stiff, some gravel, contains approximately 10% sandstone clasts, trace rootlets, organic odor, dry [FILL]							
			MC	14	>4.0 3.5				LL = 35 PI = 17
5			MC	10	2.0 1.0				
		FAT CLAY (CH) - dark yellowish brown, dry [FILL]							
		CLAYEY SAND (SC) - mottled light brown to dark brown, medium dense, contains clay seams/tongues and manganese & iron nodules [ALLUVIUM/COLLUVIUM]	MC	20	4.0 4.0				
10		CLAYEY SAND WITH GRAVEL (SC) - brown; dense; pockets of sandy clay with gravel; clasts of sandstone, greenstone, and shale; dry [ALLUVIUM/COLLUVIUM]	MC	33	4.0	124	15		18% Gravel 51% Sand 31% -200
15			MC	27	>4.5				
		SANDY CLAY (CL) / CLAYEY SAND (SC) - mottled olive gray and yellowish brown, very stiff, dry [ALLUVIUM/COLLUVIUM]							
		CLAYEY GRAVEL WITH SAND (GC) - gray to green, very dense, shale and sandstone with clay lined fractures [WEATHERED BEDROCK]	MC	32/5.0"					
20			SPT	50/5.0"					

Bottom of borehole at 21.5 feet.
1. Split spoon refusal at 21.5'
2. No groundwater encountered.
3. Borehole was backfilled with cement grout immediately after drilling.
4. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
5. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

BORING NUMBER A3-17-3

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY DKM **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0	2" ASPHALT CONCRETE							
	4" AGGREGATE BASE							
	SANDY CLAY (CL) - gray brown to yellowish brown, stiff, fine to medium grained sand, moist [FILL]	MC	13	4.0				
	SANDY CLAY (CL) - mottled reddish brown, yellowish brown, and dark brown; very stiff; fine to medium grained sand; moist [POSSIBLE FILL]							
5	CLAYEY SAND WITH GRAVEL (SC) - dark yellowish brown, medium dense [POSSIBLE ALLUVIUM/COLLUVIUM]	MC	16	>4.0	112	17		12% Gravel 25% Sand 63% -200
	SANDY LEAN CLAY (CL) - reddish brown to yellowish brown, very stiff, some weathered rock fragments [ALLUVIUM/COLLUVIUM]	MC	12	3.0				
	FAT CLAY WITH SILT (CH) - light gray and yellowish brown, very stiff [ALLUVIUM/COLLUVIUM]							
10	CLAYEY SAND (SC) - yellowish brown and light gray, medium dense, fine to medium grained [ALLUVIUM/COLLUVIUM]							
	CLAYEY SAND (SC) - yellowish brown and gray, high plasticity fines [WEATHERED BEDROCK]	MC	44					
15	WEATHERED SANDSTONE - yellowish brown, medium strong to weak, moderately fractured, with clay filled fractures [WEATHERED BEDROCK] -Shale fragments at 15'	SPT	50/3.0"					

Bottom of borehole at 15.8 feet.
1. Split spoon refusal at 15.8'
2. No groundwater encountered.
3. Borehole was backfilled with cement grout immediately after drilling.
4. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
5. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

BORING NUMBER A3-17-4

A3GEO, Inc.
1331 Seventh Ave, Suite E
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Telephone: 510-705-1664

CLIENT	San Rafael City Schools	**PROJECT NAME**	Terra Linda High School Design Level Investigation
PROJECT NUMBER	1150-1B	**PROJECT LOCATION**	San Rafael, CA
DATE STARTED	11/22/17 **COMPLETED** 11/22/17	**GROUND ELEVATION**	80.5 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR	Gregg Drilling and Testing, Inc.	**GROUND WATER LEVELS:**	
DRILLING METHOD	Hollow Stem Auger	**AT TIME OF DRILLING**	---
LOGGED BY	EA/LB **CHECKED BY** LB	**AT END OF DRILLING**	---
NOTES		**AFTER DRILLING**	---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		3" CONCRETE							
		SANDY LEAN CLAY (CL) - brown, hard, trace gravel, dry [FILL]							
		SANDY LEAN CLAY (CL) - olive brown, trace gravel, dry [ALLUVIUM/COLLUVIUM]	MC	38	>4.0	120	15		6% Gravel 41% Sand 53% -200 LL = 37 PI = 20 TX UU Su = 8536psf
5		-Increasing sand and gravel. Gravel consists of sandstone clasts.	MC	21	>4.0				
		SANDY CLAY WITH GRAVEL (CL-CH) - dark yellowish brown, very stiff, gravel consists of clasts of greenstone and shale [ALLUVIUM/COLLUVIUM]							
		CLAYEY SAND WITH GRAVEl (SC) - olive brown, reddish brown, yellowish brown, dark gray; dense; gravel consists of shale fragments [ALLUVIUM/COLLUVIUM]	MC	38					
10		CLAYEY GRAVEL WITH SAND AND SANDY FAT CLAY (GC-CH) - olive brown, reddish brown, yellowish brown; hard/dense; white/pale green quartzite present in sample [ALLUVIUM/COLLUVIUM]	MC	37					
15									

Bottom of borehole at 15.0 feet.
1. Exploration terminated at 15' due to hammer winch breakdown.
2. No groundwater encountered.
3. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
4. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
5. Borehole was backfilled with cement grout immediately after drilling.

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BORING NUMBER A3-17-5

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY DKM **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		4" ASPHALT CONCRETE							
		4" AGGREGATE BASE							
		CLAYEY SAND WITH GRAVEL (SC) - reddish brown, dark brown, yellowish brown; dense; gravel includes rock fragments, moist [FILL] -Blow counts artificially high due to piece of asphalt stuck in spoon	MC	31		112	16		16% Gravel 48% Sand 36% -200 LL = 33 PI = 15
5		SANDY LEAN CLAY WITH SILT (CL) - yellowish brown, very stiff, fine to coarse sand, iron staining, greenstone fragments, moist [ALLUVIUM/COLLUVIUM]	MC	22	3.5				
		-Color change to strong brown -Angular to subrounded sandstone and greenstone clasts at 8'	MC	22					
10									
		Note: contact estimated SHALE - gray brown, moderately fractured, with clay filled fractures, slightly to moderatly weathered, weak to very weak, dry [BEDROCK]	MC	32/5.0"					
15		SHALE, SILTSTONE AND FINE-GRAINED SANDSTONE - gray brown, low hardness, friable, little weathering, intensely fractured [BEDROCK]	SPT	50/5.5"					

Bottom of borehole at 16.0 feet.
1. Split spoon refusal at 16'
2. No groundwater encountered.
3. Borehole was backfilled with cement grout immediately after drilling.
4. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
5. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

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BORING NUMBER A3-17-6

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY DKM **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		4" ASPHALT CONCRETE							
		SILTY CLAY (CL) - light brown to reddish yellow, very stiff, some fine to medium grain sand, trace gravel and weathered rock fragments up to 1" diameter, pockets of light grey fat clay, moist [ALLUVIUM/COLLUVIUM]							
5			MC	17	4.0	118	14		
		CLAYEY SAND (SC) - yellowish brown, dense, fine to medium grained, cemented, with seams of light gray fat clay, moist [ALLUVIUM]	MC	55					
10		WEATHERED SANDSTONE - yellowish brown, fine to medium grained, friable to weak with discolored fractures filled with dark brown clay and silt, iron staining [WEATHERED BEDROCK]							
			SPT	50/5.0"					

Bottom of borehole at 11.4 feet.
1. Split spoon refusal at 11.4'
2. No groundwater encountered.
3. Borehole was backfilled with cement grout immediately after drilling.
4. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
5. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

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Telephone: 510-705-1664

BORING NUMBER A3-17-7

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
▽ **AT TIME OF DRILLING** 19.0 ft / Elev 62.0 ft
LOGGED BY DKM **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		4" CONCRETE							
		2" AGGREGATE BASE							
		SANDY LEAN CLAY (CL) - dark gray brown, fine-medium grained sand, moist [FILL]							
		SANDY LEAN CLAY (CL) - mottled reddish brown, yellowish brown, gray, and dark grey; very stiff; fine-medium sand, some fine gravel, and rock fragments; moist [ALLUVIUM/COLLUVIUM]	MC	22	>4.5				
5									
		CLAYEY SAND WITH GRAVEL (SC) - mottled reddish brown, yellowish brown, gray, and dark grey; medium dense; fine-medium sand; moist [ALLUVIUM/COLLUVIUM]	MC	25	4.0	112	19		
		CLAYEY SAND WITH GRAVEL (SC) - reddish brown, medium dense, rock fragments present, moist [ALLUVIUM/COLLUVIUM]							
10			MC	25	3.0				
15		SHALE - gray brown, moderately hard, weak, moderately weathered, moderately fractured with clay lined fractures [WEATHERED BEDROCK]	MC	30					
	▽		SPT	50/5.0"					

Bottom of borehole at 19.9 feet.
1. Split spoon refusal at 19.9'
2. Borehole was backfilled with cement grout immediately after drilling.
3. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
4. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

GEOTECH BH COLUMN TERM LEFT ALIGNED (2) - A3GEO DATA TEMPLATE.GDT - 1/29/18 11:16 - A:\A3GEO PROJECTS\1150 - SAN RAFAEL CITY SCHOOLS\1150-1B TERRA LINDA HS\BORING LOGS\GINT LOGS\1150-1B TLHS BORING LOGS.GPJ

A3GEO, Inc.
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BORING NUMBER A3-17-8

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY EA/LB **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0		3" CONCRETE							
		CLAYEY SAND (SC) - brown, medium dense, some gravel, dry [ALLUVIUM/COLLUVIUM]							
			MC	20	>4.0				
5		-Similar to above, but with increased gravel content and greenstone fragments up to 1" in diameter	MC	24	3.0				20% Gravel 38% Sand 42% -200 LL = 39 PI = 21
		-Similar to above, except: color change to olive brown, fine to coarse sand, gravel no longer present	MC	32/5.0"	>4.0				
10		SILTY SAND (SM) - brown to strong brown, very dense, highly weathered fine sandstone with minor shale [WEATHERED BEDROCK]							
			SPT	50/3.0"					

Bottom of borehole at 13.3 feet.
1. Split spoon refusal at 13.3'
2. No groundwater encountered.
3. Borehole was backfilled with cement grout immediately after drilling.
4. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
5. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.

A3GEO, Inc.
1331 Seventh Ave, Suite E
Berkeley, CA, 94710
Telephone: 510-705-1664

BORING NUMBER A3-17-9

CLIENT San Rafael City Schools
PROJECT NAME Terra Linda High School Design Level Investigation
PROJECT NUMBER 1150-1B
PROJECT LOCATION San Rafael, CA
DATE STARTED 11/22/17 **COMPLETED** 11/22/17
GROUND ELEVATION 81 ft NAVD 88 **HOLE SIZE** 4.5
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY EA/LB **CHECKED BY** LB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	ADJUSTED BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	RECOVERY % (RQD)	OTHER LAB TESTS / NOTES
0	3" CONCRETE							
	SANDY CLAY (CL) - gray brown to brown, stiff, trace gravel, slight organic odor, dry [FILL]	MC	11					LL = 33 PI = 16
	SANDY CLAY (CL) - strong brown, stiff, dry [ALLUVIUM/COLLUVIUM]							
5	-Same as above except: yellowish brown, with trace gravel	MC	26	4.0 3.0				
		MC	28		110	20		2% Gravel 42% Sand 56% -200 TX UU Su = 3963psf
10	CLAYEY SAND (SC) - brown to strong brown, medium dense, contains well developed soil tongues and clay along fractures, dry [ALLUVIUM/COLLUVIUM]	MC	23	3.0				
15	CLAYEY/SILTY SAND WITH GRAVEL (SC/SM) - green gray, very dense, friable, highly weathered sandstone, dry [WEATHERED BEDROCK]	MC	32/2.0"					
	-Similar to above except: mottled olive grey with iron staining, blocky greenstone, and clay lined fractures	SPT	50/2.0"					
		SPT	50/3.0"					

Bottom of borehole at 19.3 feet.
1. Split spoon refusal at 19.3'
2. No groundwater encountered.
2. Stratification lines represent the approximate boundaries between material types. Transitions may be gradual.
3. Blow counts shown here for MC samples have been adjusted to SPT values by multiplying field blow counts by a factor of 0.63.
4. Borehole was backfilled with cement grout immediately after drilling.

APPENDIX D

A3GEO CPT Logs

(Previous Phase 2 Study Study)

February 24, 2017

A3GEO
Attn: Wayne Magnusen

Subject: CPT Site Investigation
SRCS/Terra Linda High School
San Rafael, California
GREGG Project Number: 17-026MA

Dear Mr. Magnusen:

The following report presents the results of GREGG Drilling & Testing's Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☒
2	Pore Pressure Dissipation Tests	(PPD)	☒
3	Seismic Cone Penetration Tests	(SCPTU)	☐
4	UVOST Laser Induced Fluorescence	(UVOST)	☐
5	Groundwater Sampling	(GWS)	☐
6	Soil Sampling	(SS)	☐
7	Vapor Sampling	(VS)	☐
8	Membrane Interface Probe	(MIP)	☐
9	Vane Shear Testing	(VST)	☐
10	Dilatometer Testing	(DMT)	☐

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact our office at (925) 313-5800.

Sincerely,
GREGG Drilling & Testing, Inc.

Mary Walden

Mary Walden
Operations Manager

Cone Penetration Test Sounding Summary

-Table 1-

CPT Sounding Identification	Date	Termination Depth (feet)	Depth of Groundwater Samples (feet)	Depth of Soil Samples (feet)	Depth of Pore Pressure Dissipation Tests (feet)
CPT-01	2/22/17	25	-	-	24.6
CPT-02	2/22/17	21	-	-	-
CPT-03	2/22/17	23	-	-	-
CPT-04	2/22/17	18	-	-	17.7

Bibliography

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DeGroot, D.J. and A.J. Lutenegger, "Reliability of Soil Gas Sampling and Characterization Techniques", International Site Characterization Conference - Atlanta, 1998.

Woeller, D.J., P.K. Robertson, T.J. Boyd and Dave Thomas, "Detection of Polyaromatic Hydrocarbon Contaminants Using the UVIF-CPT", 53rd Canadian Geotechnical Conference Montreal, QC October pp. 733-739, 2000.

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Copies of ASTM Standards are available through www.astm.org

Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*.

The cone takes measurements of tip resistance (q_c), sleeve resistance (f_s), and penetration pore water pressure (u_2). Measurements are taken at either 2.5 or 5 cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (*PPDT*). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a “knock out” plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

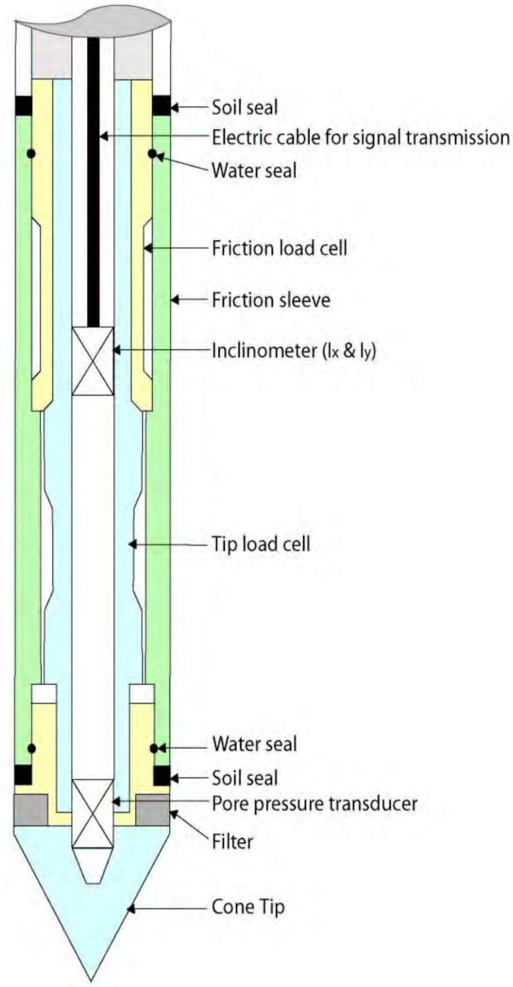


Figure CPT

Gregg 15cm^2 Standard Cone Specifications

Dimensions	
Cone base area	15 cm^2
Sleeve surface area	225 cm^2
Cone net area ratio	0.80
Specifications	
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

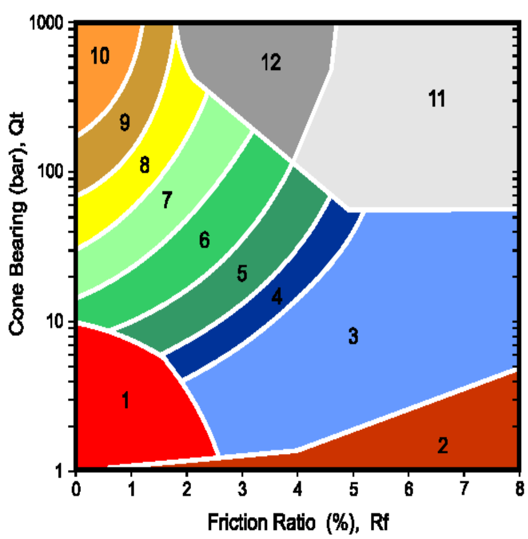
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.



ZONE		SBT
1		Sensitive, fine grained
2		Organic materials
3		Clay
4		Silty clay to clay
5		Clayey silt to silty clay
6		Sandy silt to clayey silt
7		Silty sand to sandy silt
8		Sand to silty sand
9		Sand
10		Gravely sand to sand
11		Very stiff fine grained*
12		Sand to clayey sand*

*over consolidated or cemented

Figure SBT (After Robertson et al., 1986) – Note: Colors may vary slightly compared to plots

GREGG

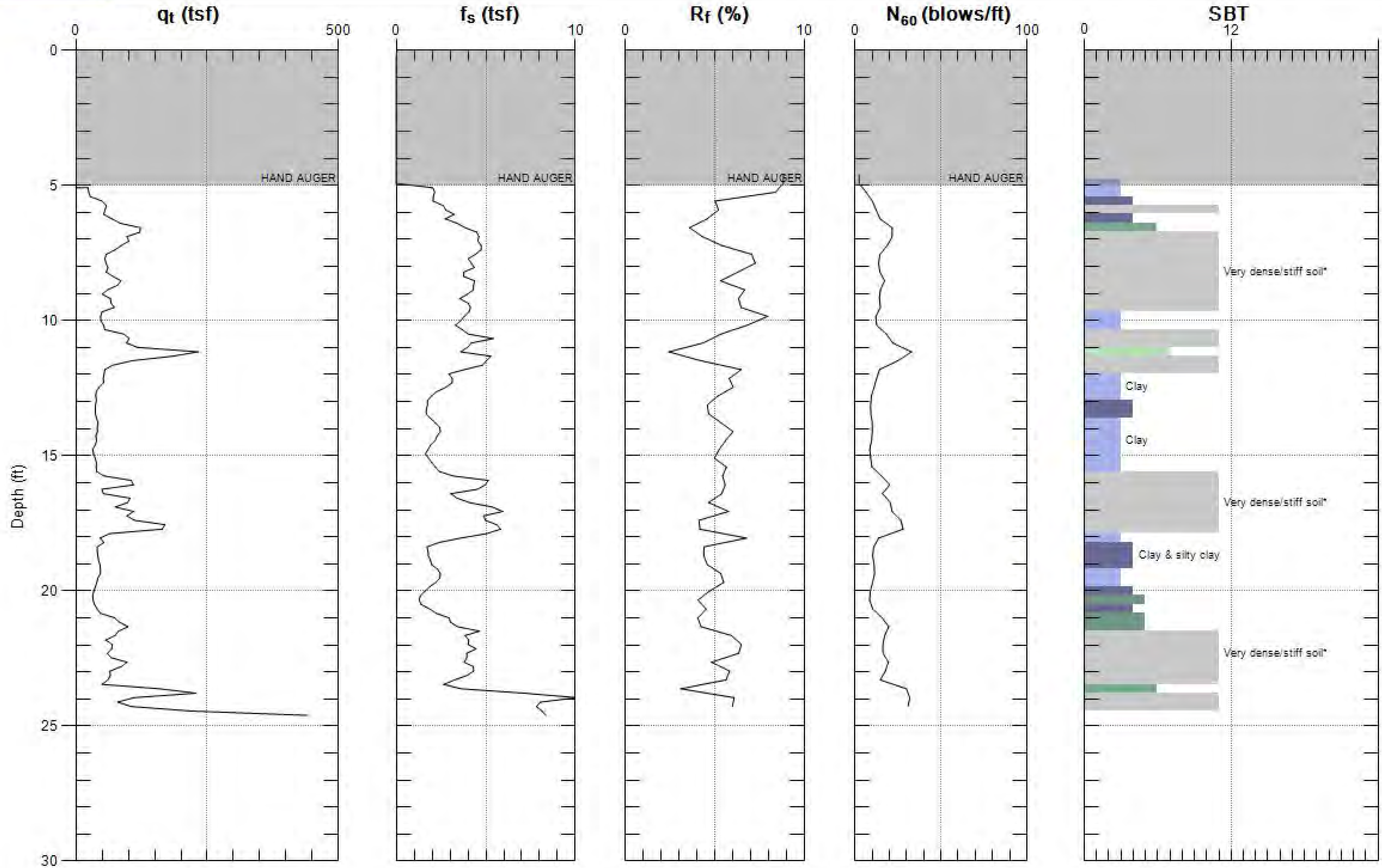
A3GEO

Site: TERRA LINDA H.S.

Sounding: CPT-1A

Engineer: J.VAN DEN BERG

Date: 2/22/17 09:24



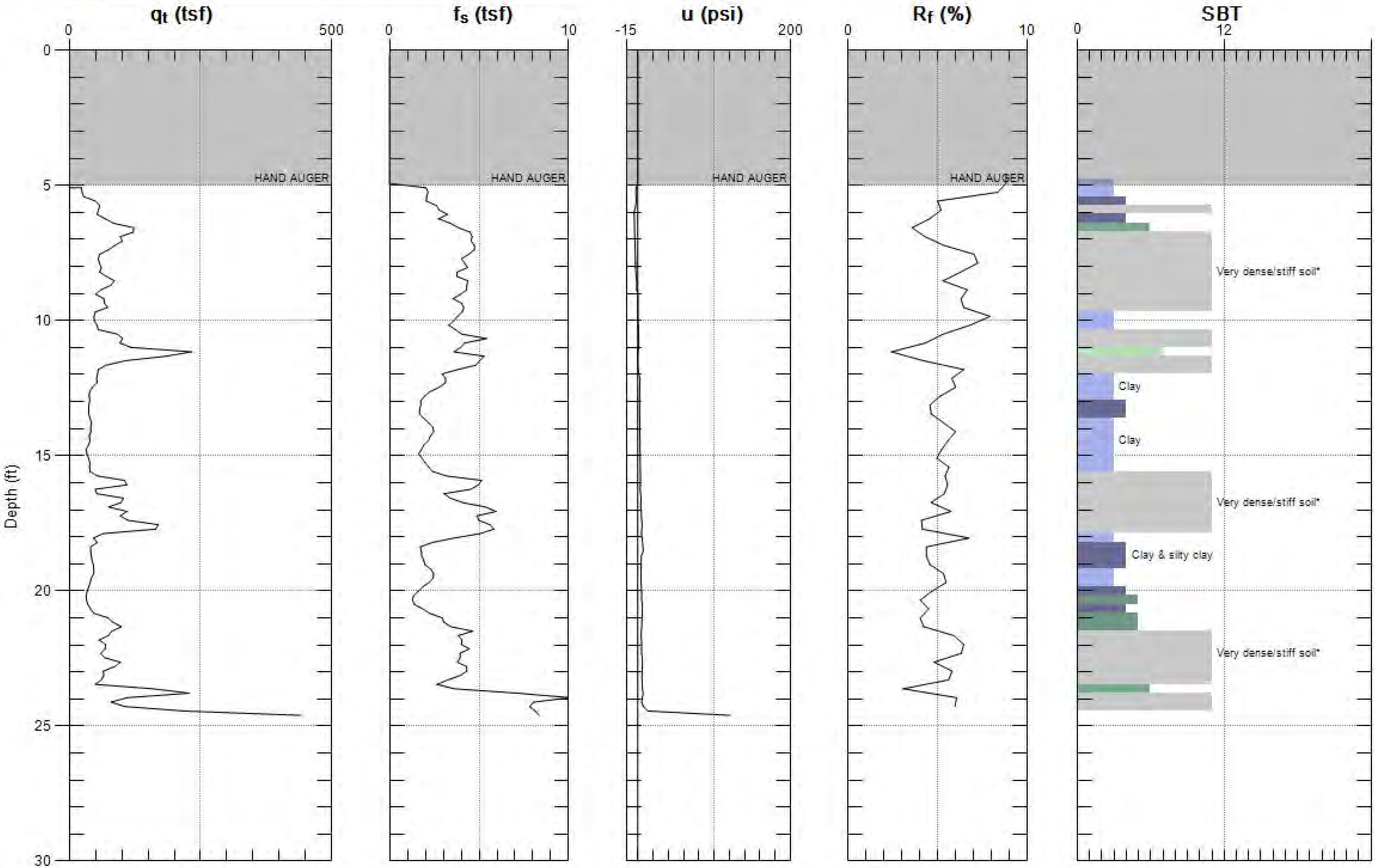
Max. Depth: 24.606 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG A3GEO

Site: TERRA LINDA H.S.
Sounding: CPT-1A

Engineer: J.VAN DEN BERG
Date: 2/22/17 09:24



Max. Depth: 24.606 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

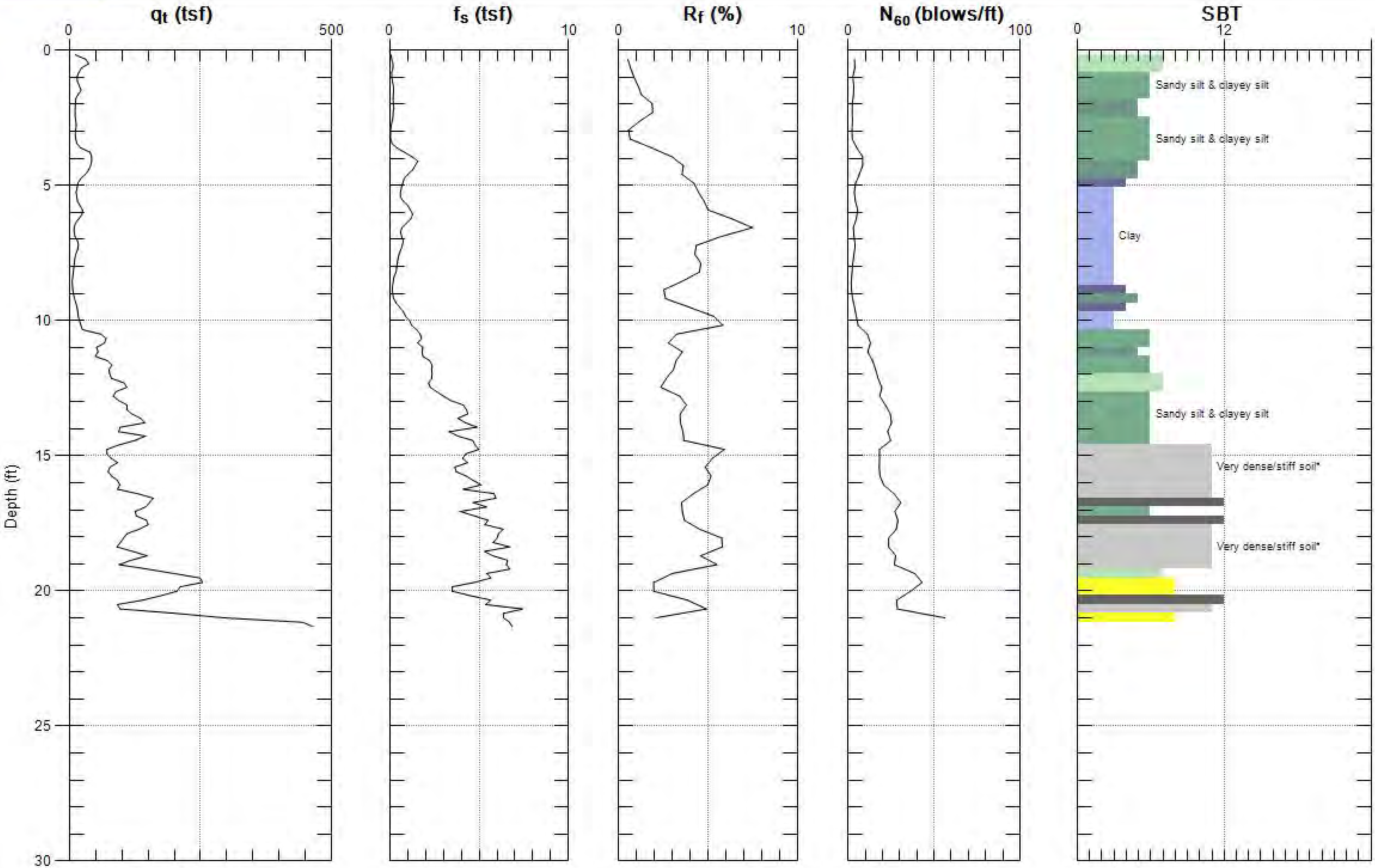
A3GEO

Site: TERRA LINDA H.S.

Sounding: CPT-02

Engineer: J.VAN DEN BERG

Date: 2/22/17 08:08



Max. Depth: 21.325 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

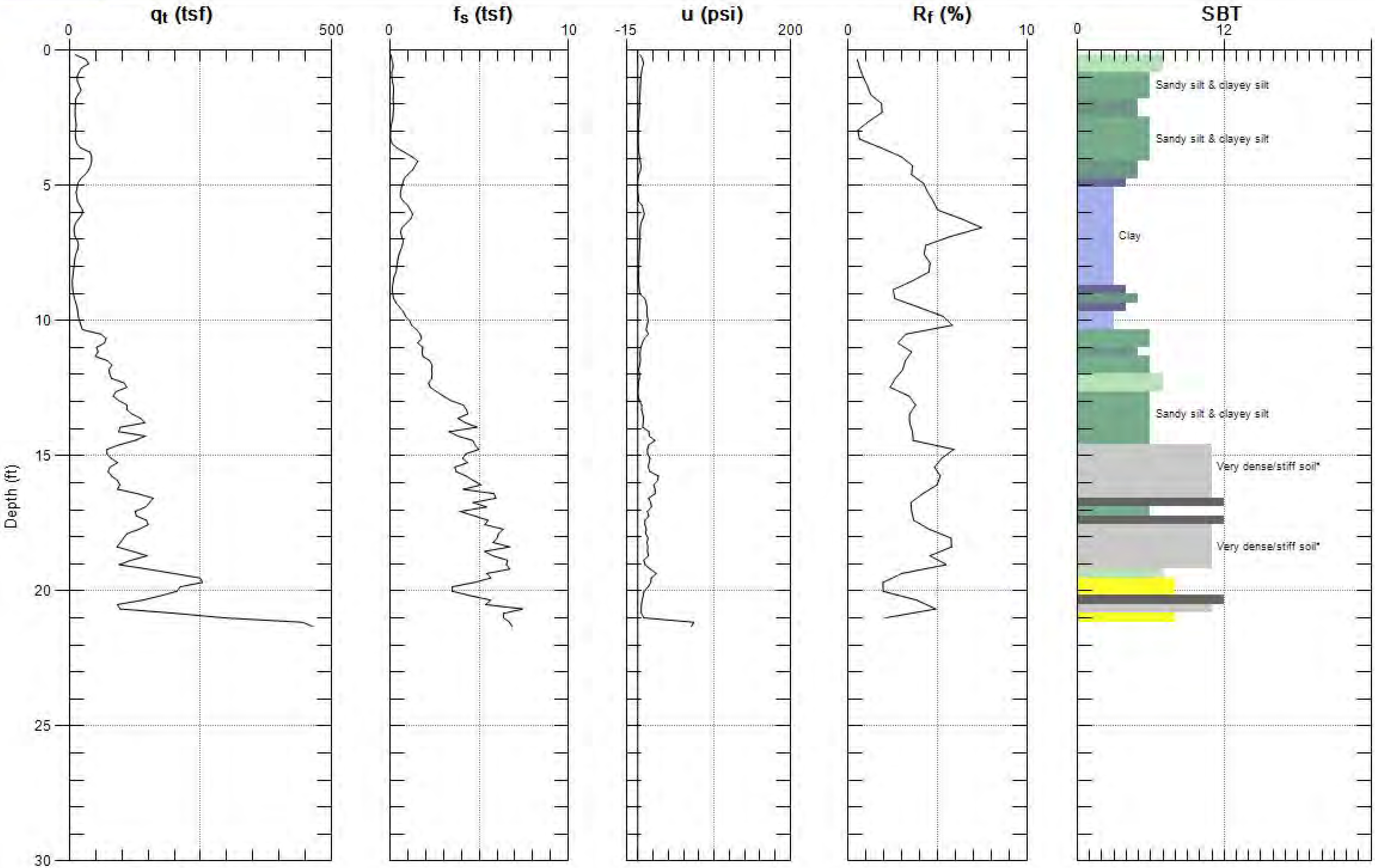
A3GEO

Site: TERRA LINDA H.S.

Sounding: CPT-02

Engineer: J.VAN DEN BERG

Date: 2/22/17 08:08



Max. Depth: 21.325 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

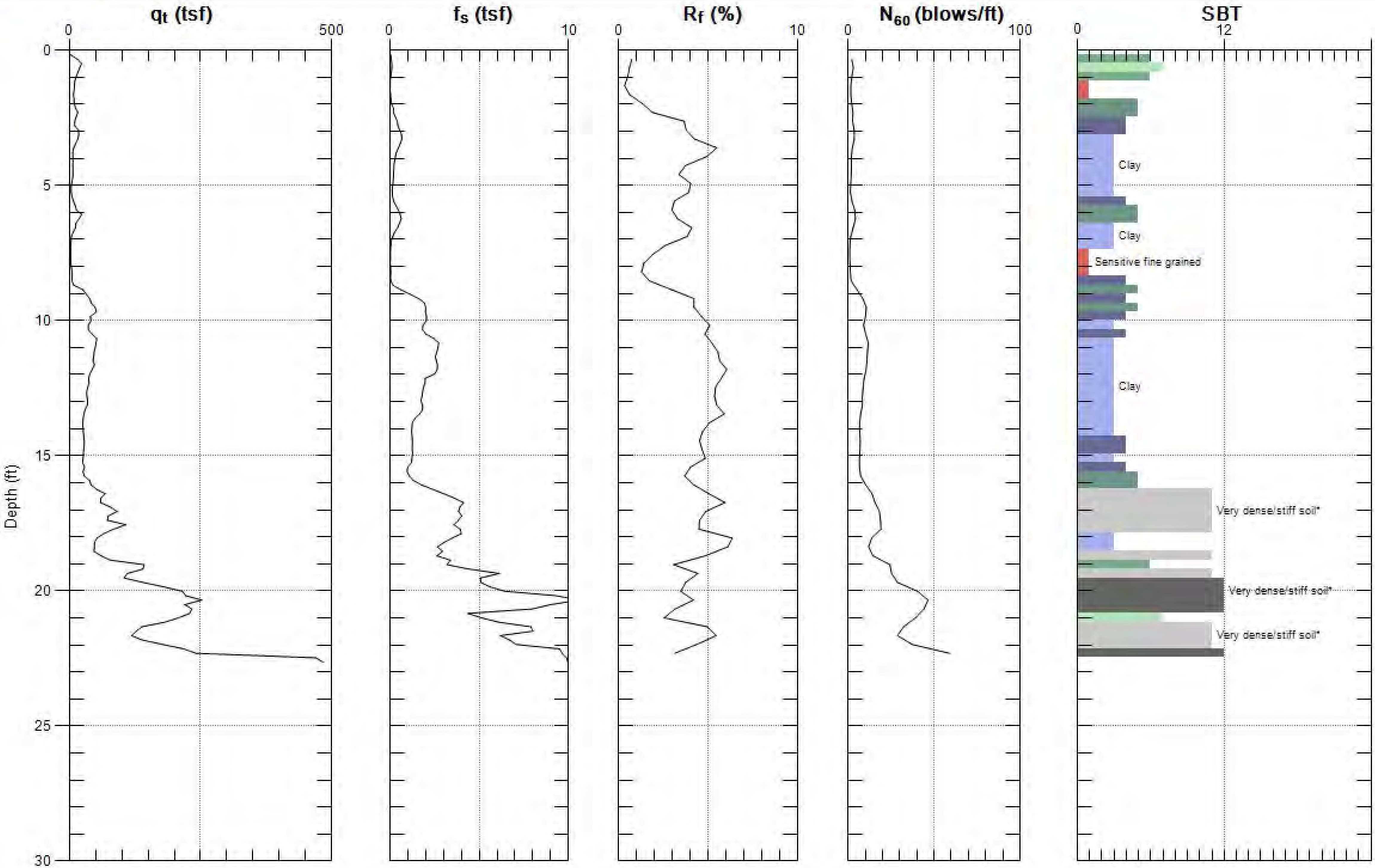
A3GEO

Site: TERRA LINDA H.S.

Sounding: CPT-03

Engineer: J.VAN DEN BERG

Date: 2/22/17 10:38



Max. Depth: 22.638 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

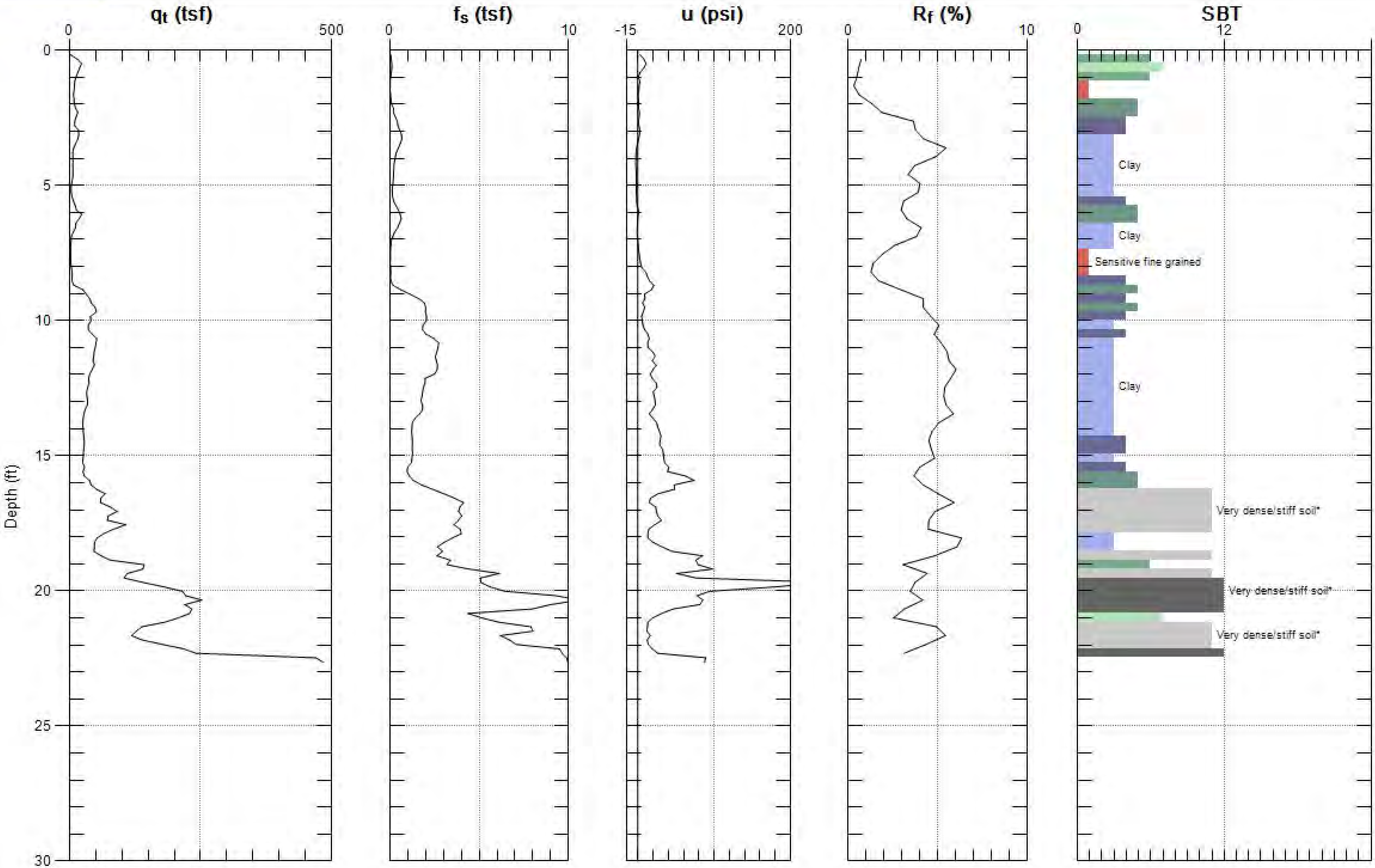
A3GEO

Site: TERRA LINDA H.S.

Sounding: CPT-03

Engineer: J.VAN DEN BERG

Date: 2/22/17 10:38



Max. Depth: 22.638 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

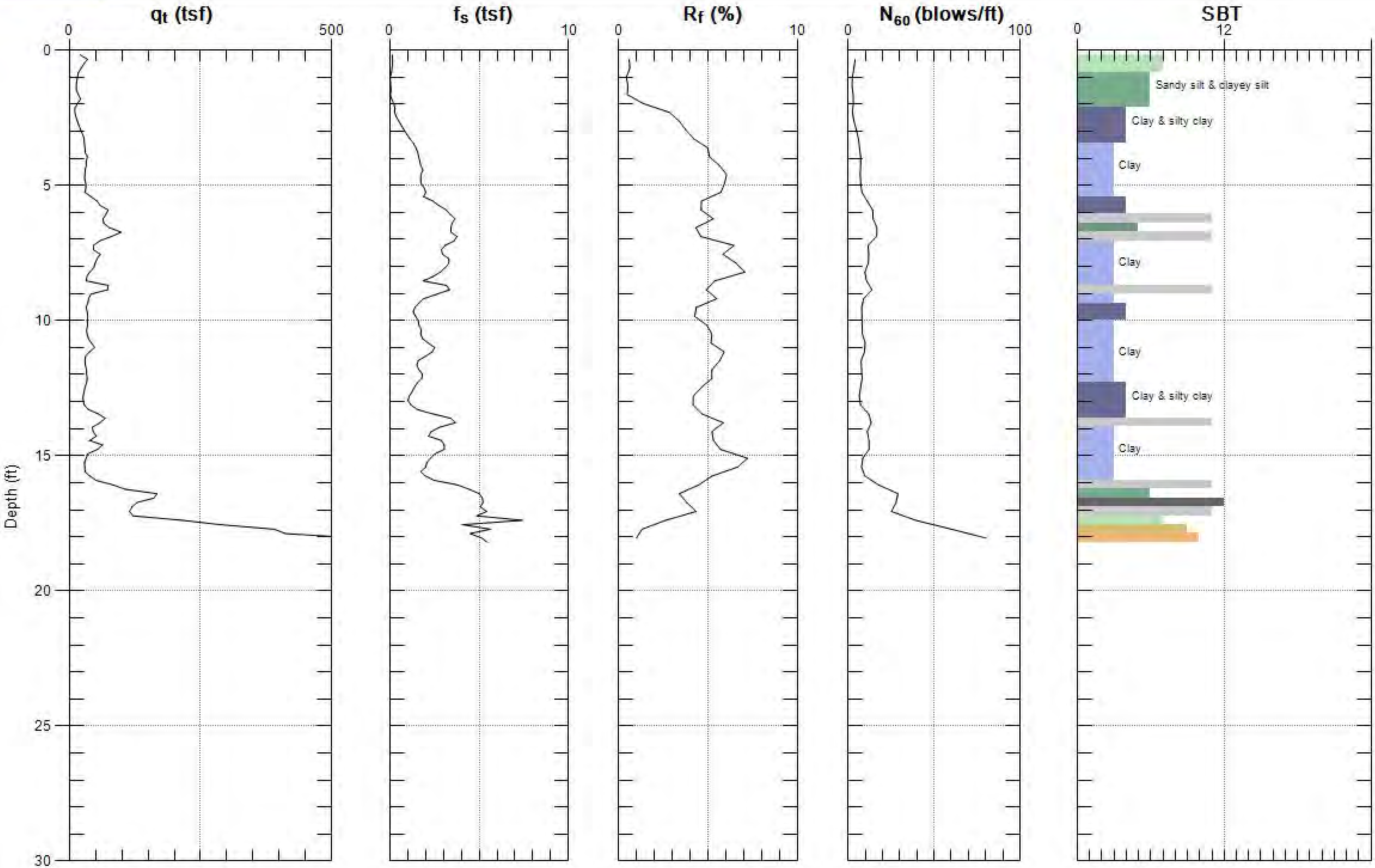
A3GEO

Site: TERRA LINDA H.S.

Sounding: CPT-04

Engineer: J.VAN DEN BERG

Date: 2/22/17 11:34



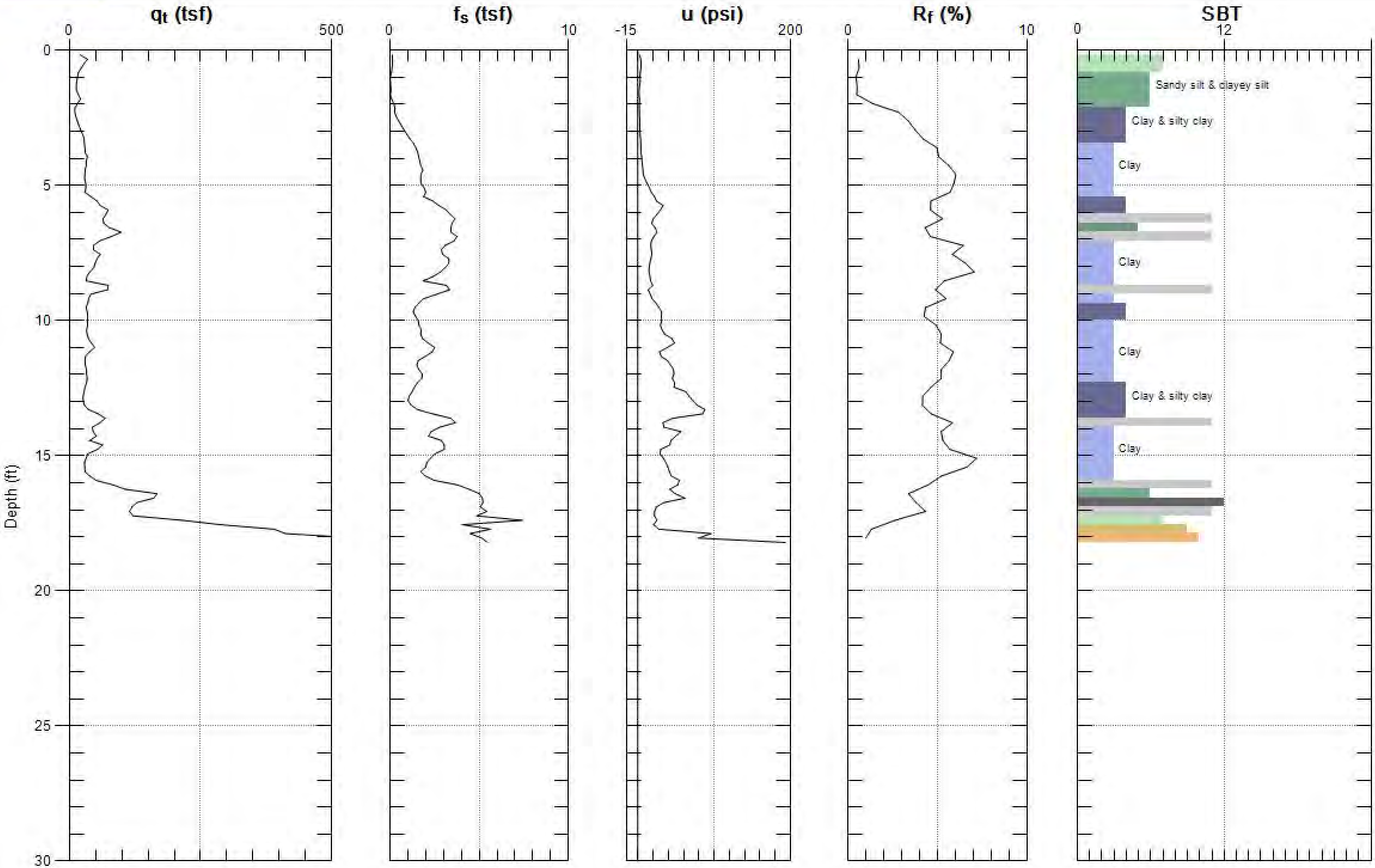
Max. Depth: 18.209 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

A3GEO

Site: TERRA LINDA H.S.
Sounding: CPT-04

Engineer: J.VAN DEN BERG
Date: 2/22/17 11:34



Max. Depth: 18.209 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

APPENDIX E

A3GEO Laboratory Test Data Sheets
(This Study)

A3GEO

B. HILLEBRANDT SOILS TESTING, INC.

29 Sugarloaf Terrace, Alamo, CA 94507 - Tel: (510) 409-2816 - Fax: (925) 891-9267 - Email: soiltesting@aol.com

LAB RESULTS SUMMARY FORM

Project Number: 1150 **Project Name:** Terra Linda High School - Ceramics Building
Requested By: DB **Request Date:** 11/30/21 **Throw Samples Out On:**

					Atterberg			-200			Compaction				
Boring #	Sample Depth (feet)	Dry Density (pcf)	Moisture Content (%)	TxUU Shear Strength (psf)	Liquid Limit	Plastic Limit	Plasicity Index	Passing #4 Sieve (%)	Passing #40 sieve (%)	Passing #200 sieve (%)	Maximum Dry Density (pcf)	Optimum Moisture (%)	Pocket Penetrometer (tsf)	Torvane (tsf)	Remarks
A3-21-1	1.0 - 2.0				39	19	20								
A3-21-1	5.5 - 6.0	107	17.8					90	75	53					
A3-21-1	11.0 - 11.5	123	14.4					81	49	30					
A3-21-2	5.5 - 6.0	97	22.8		43	20	23	100	90	68					
A3-21-2	15.0 - 15.75							75	49	27					

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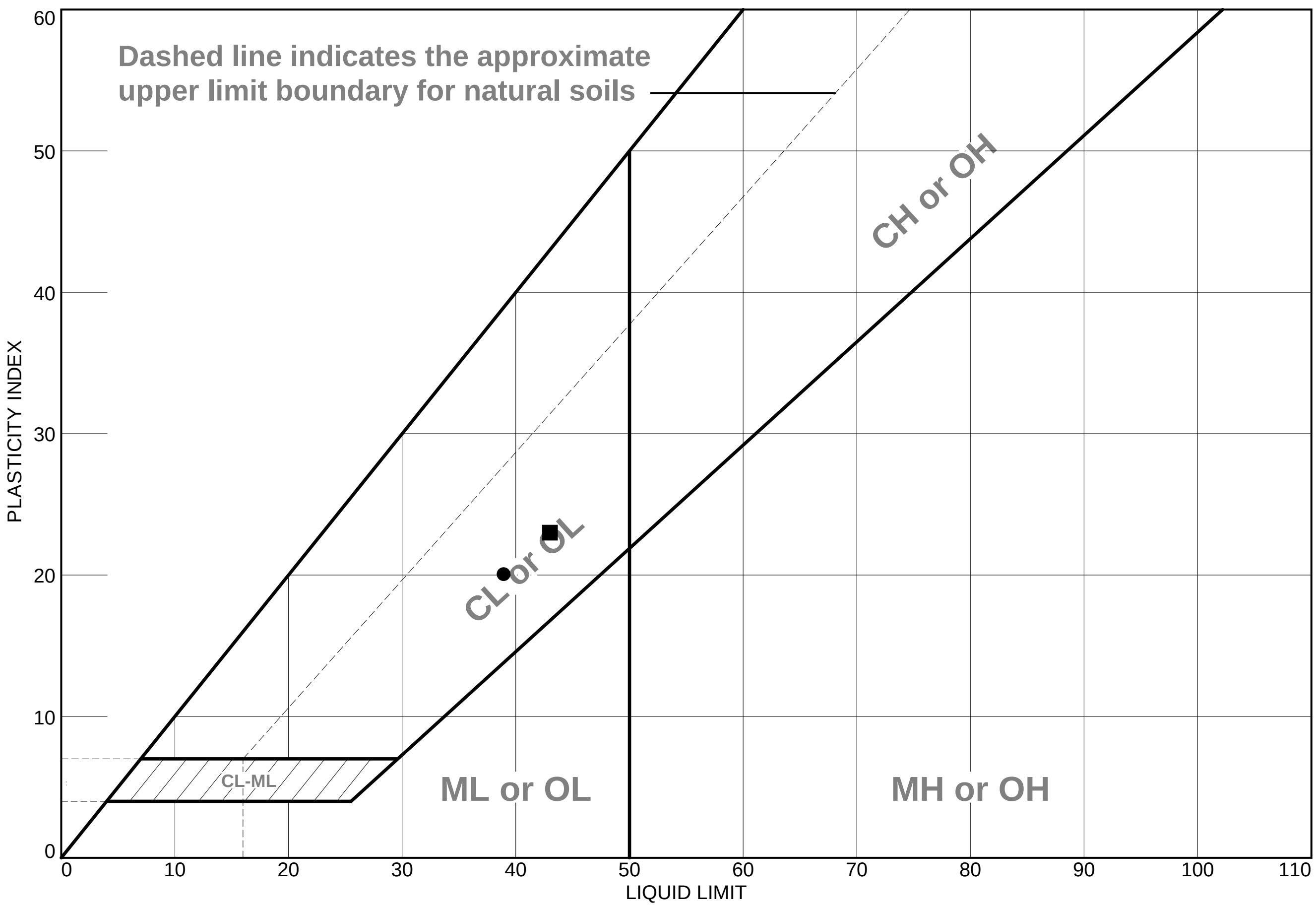
29 Sugarloaf Terrace, Alamo, CA 94507 - Tel: (510) 409-2916 - Fax: (925) 891-9267 - Email: soiltesting@aol.com

MOISTURE CONTENT/DRY DENSITY

Job #: **1150**
Job Name: **Terra Linda High School - Ceramics Building**
Date: **11/30/21**
Tested by: **Brad Hillebrandt**

Additional Tests:	FS	FS	PI, -200			
Boring #:	A3-21-1	A3-21-1	A3-21-2			
Depth:	5.5 - 6.0	11.0 - 11.5	5.5 - 6.0			
Sample Description:	Olive brown sandy CLAY	Yellowish brown clayey SAND with gravel	Olive brown sandy lean CLAY			
Can #:	328	705	424			
Wet Sample + can	339.7	393.5	200.5			
Dry Sample + can	294.1	348.2	169.4			
Weight can	38.1	33.3	32.7			
Weight water	45.6	45.3	31.1			
Weight Dry Sample	256	314.9	136.7			
WATER CONTENT (%)	**17.8%**	**14.4%**	**22.8%**			
Weight Sample + Liner	1081.2	968.6	1060.4			
Weight Liner	224.3	255.1	271.2			
Sample Length	5.8	4.3	5.65			
Sample Diameter	2.39	2.39	2.39			
DRY DENSITY (pcf)	**106.5**	**123.2**	**96.6**			

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown sandy lean CLAY	39	19	20			CL
■	Olive brown sandy lean CLAY	43	20	23	90.3	67.6	CL

Project No. 1150-1H **Client:** A3Geo

Project: Terra Linda High School - Ceramics Building

●**Source of Sample:** A3-21-1 **Depth:** 1.0 - 2.0' **Sample Number:** 1

■**Source of Sample:** A3-21-2 **Depth:** 5.5 - 6.0' **Sample Number:** 2B

Remarks:

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SoilTesting@aol.com

Figure

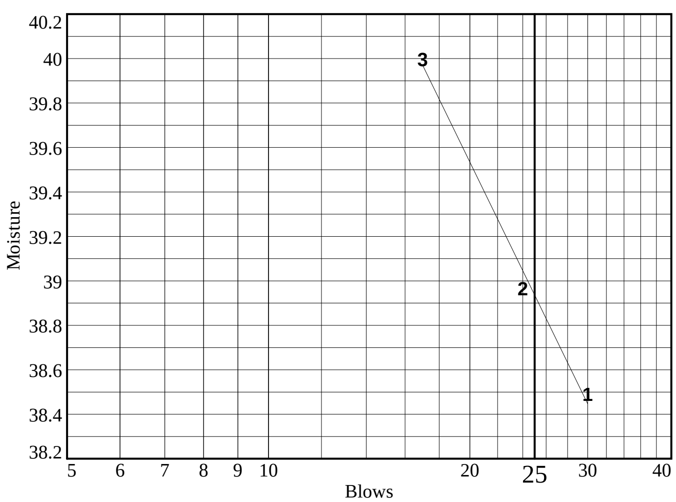
Tested By: BH

LIQUID AND PLASTIC LIMIT TEST DATA **12/8/2021**

Client: A3Geo
Project: Terra Linda High School - Ceramics Building
Project Number: 1150-1H
Location: A3-21-1
Depth: 1.0 - 2.0' **Sample Number:** 1
Material Description: Brown sandy lean CLAY
USCS: CL
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	24.69	26.84	28.05			
Dry+Tare	20.91	22.46	23.21			
Tare	11.09	11.22	11.11			
# Blows	30	24	17			
Moisture	38.5	39.0	40.0			



Liquid Limit= 39
Plastic Limit= 19
Plasticity Index= 20
Natural Moisture= 17.8
Liquidity Index= -0.1

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	21.84	19.41		
Dry+Tare	20.05	18.12		
Tare	11.07	11.35		
Moisture	19.9	19.1		

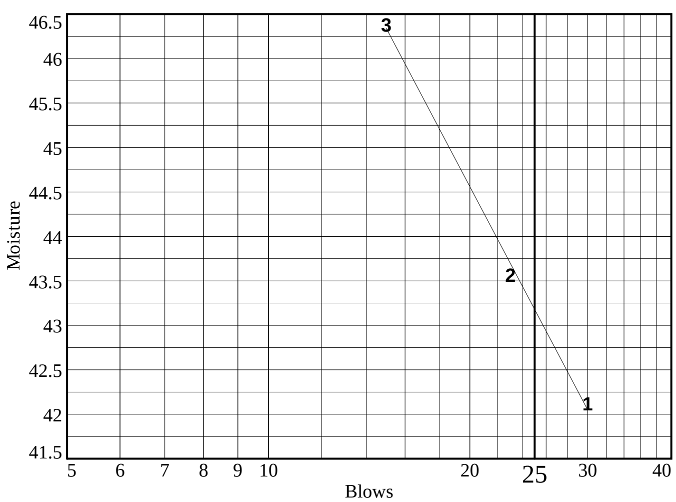
LIQUID AND PLASTIC LIMIT TEST DATA

12/8/2021

Client: A3Geo
Project: Terra Linda High School - Ceramics Building
Project Number: 1150-1H
Location: A3-21-2
Depth: 5.5 - 6.0' **Sample Number:** 2B
Material Description: Olive brown sandy lean CLAY
%<#40: 90.3 **%<#200:** 67.6 **USCS:** CL **AASHTO:** A-7-6(14)
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	27.42	28.84	30.65			
Dry+Tare	22.66	23.52	24.55			
Tare	11.36	11.31	11.40			
# Blows	30	23	15			
Moisture	42.1	43.6	46.4			

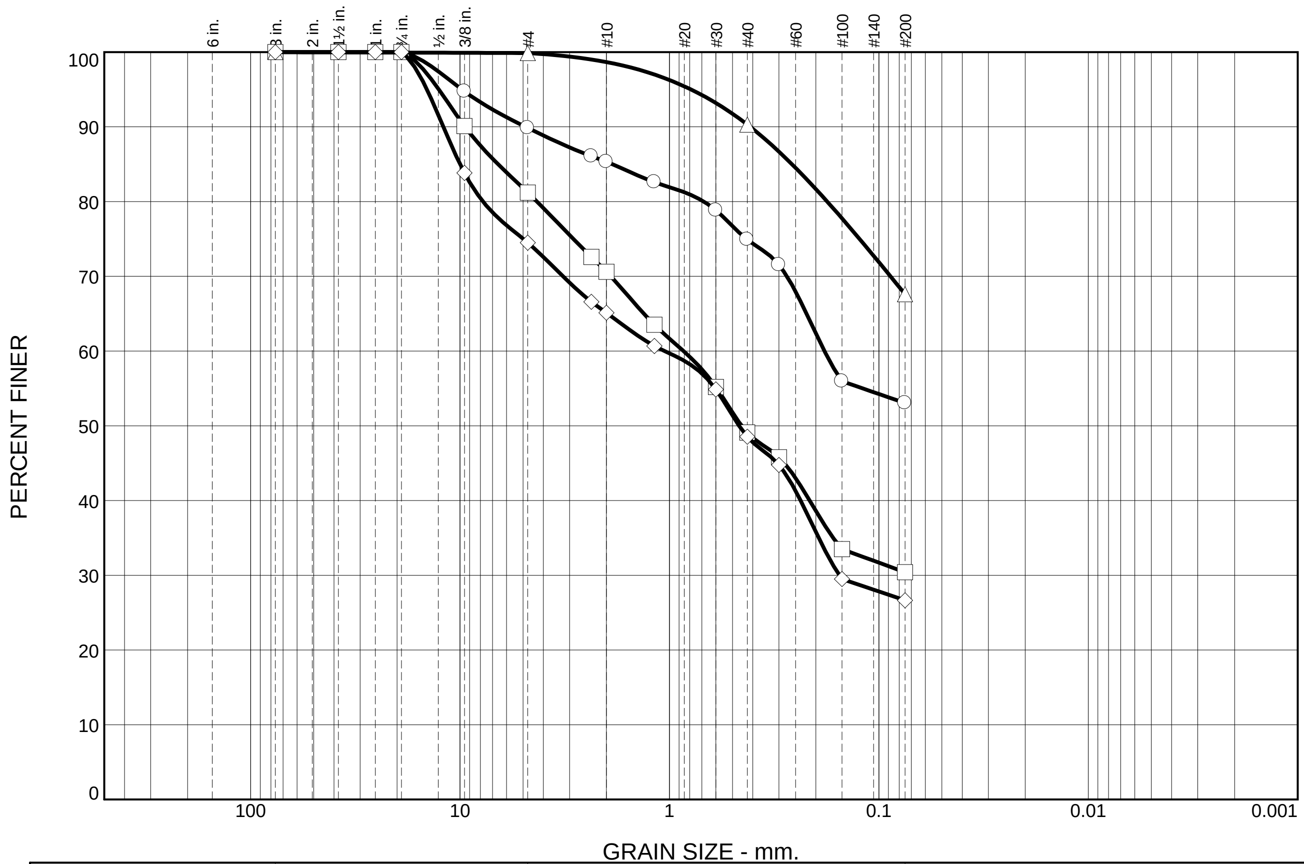


Liquid Limit= 43
Plastic Limit= 20
Plasticity Index= 23
Natural Moisture= 22.8
Liquidity Index= 0.1

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	19.01	18.22			
Dry+Tare	17.66	17.02			
Tare	11.19	11.06			
Moisture	20.9	20.1			

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	10.1	4.6	10.4	21.9	53.0	
□	0.0	0.0	18.8	10.6	21.5	18.7	30.4	
△	0.0	0.1	0.0	1.2	8.4	22.7	67.6	
◇	0.0	0.0	25.5	9.4	16.6	21.9	26.6	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	A3-21-1	2B	5.5 - 6.0'	Olive brown sandy CLAY	CL
□	A3-21-1	3C	11.0 - 11.5'	Yellowish brown clayey SAND with gravel	SC
△	A3-21-2	2B	5.5 - 6.0'	Olive brown sandy lean CLAY	CL
◇	A3-21-2	4B	15.0 - 15.75'	Brown clayey SAND with gravel	SC

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Client: A3Geo
Project: Terra Linda High School - Ceramics Building
Project No.: 1150-1H **Figure**

Tested By: BH

GRAIN SIZE DISTRIBUTION TEST DATA

12/8/2021

Client: A3Geo
Project: Terra Linda High School - Ceramics Building
Project Number: 1150-1H
Location: A3-21-1
Depth: 5.5 - 6.0' **Sample Number:** 2B
Material Description: Olive brown sandy CLAY
USCS: CL
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
294.10	38.10	0.00	3"	0.00	100.0
			1.5"	0.00	100.0
			1.0"	0.00	100.0
			3/4"	0.00	100.0
			3/8"	13.46	94.7
			#4	25.97	89.9
			#8	35.65	86.1
			#10	37.58	85.3
			#16	44.56	82.6
			#30	54.19	78.8
			#40	64.22	74.9
			#50	72.90	71.5
			#100	112.73	56.0
			#200	120.21	53.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	10.1	10.1	4.6	10.4	21.9	36.9			53.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.1818	0.6859	1.8747	4.8665	9.8017

Fineness Modulus
1.40

GRAIN SIZE DISTRIBUTION TEST DATA

12/8/2021

Client: A3Geo
Project: Terra Linda High School - Ceramics Building
Project Number: 1150-1H
Location: A3-21-1
Depth: 11.0 - 11.5' **Sample Number:** 3C
Material Description: Yellowish brown clayey SAND with gravel
USCS: SC
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
348.20	33.30	0.00	3"	0.00	100.0
			1.5"	0.00	100.0
			1.0"	0.00	100.0
			3/4"	0.00	100.0
			3/8"	31.17	90.1
			#4	59.20	81.2
			#8	86.30	72.6
			#10	92.56	70.6
			#16	114.87	63.5
			#30	141.10	55.2
			#40	160.28	49.1
			#50	170.71	45.8
			#100	209.42	33.5
			#200	219.15	30.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	18.8	18.8	10.6	21.5	18.7	50.8			30.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.2140	0.4519	0.8562	4.2967	6.5833	9.4655	12.6284

Fineness Modulus
2.58

GRAIN SIZE DISTRIBUTION TEST DATA

12/8/2021

Client: A3Geo
Project: Terra Linda High School - Ceramics Building
Project Number: 1150-1H
Location: A3-21-2
Depth: 5.5 - 6.0' **Sample Number:** 2B
Material Description: Olive brown sandy lean CLAY
USCS: CL
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
169.40	32.70	0.00	3"	0.00	100.0
			#4	0.17	99.9
			#40	13.25	90.3
			#200	44.27	67.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.1	0.0	0.1	1.2	8.4	22.7	32.3			67.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.1765	0.2602	0.4115	0.7894

Fineness Modulus
0.47

GRAIN SIZE DISTRIBUTION TEST DATA

12/8/2021

Client: A3Geo
Project: Terra Linda High School - Ceramics Building
Project Number: 1150-1H
Location: A3-21-2
Depth: 15.0 - 15.75' **Sample Number:** 4B
Material Description: Brown clayey SAND with gravel
USCS: SC
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
303.20	38.30	0.00	3"	0.00	100.0
			1.5"	0.00	100.0
			1.0"	0.00	100.0
			3/4"	0.00	100.0
			3/8"	42.83	83.8
			#4	67.54	74.5
			#8	88.50	66.6
			#10	92.38	65.1
			#16	104.16	60.7
			#30	119.57	54.9
			#40	136.32	48.5
			#50	146.34	44.8
			#100	186.76	29.5
			#200	194.31	26.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	25.5	25.5	9.4	16.6	21.9	47.9			26.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1544	0.2365	0.4648	1.0556	7.7723	9.9986	12.0050	14.3989

Fineness Modulus
2.85

APPENDIX F

A3GEO Laboratory Test Data Sheets

(Previous Phase 1 and Phase 2 Studies)

B. HILLEBRANDT SOILS TESTING, INC.

29 Sugarloaf Terrace, Alamo, CA 94507 - Tel: (510) 409-2916 - Fax: (925) 891-9267 - Email: soiltesting@aol.com

LAB RESULTS SUMMARY FORM

Project Number:	1150-1A	**Project Name:**	Terra Linda High School	**Results Due By:**	
Requested By:	DM	**Request Date:**	2/28/17	**Throw Samples Out On:**	

					Atterberg			-200			Compaction				
Boring #	Sample Depth (feet)	Dry Density (pcf)	Moisture Content (%)	Unconfined Compressive (ksf)	Liquid Limit	Plastic Limit	Plasicity Index	Passing #4 Sieve (%)	Passing #40 sieve (%)	Passing #200 sieve (%)	Maximum Dry Density (pcf)	Optimum Moisture (%)	Pocket Penetrometer (tsf)	Torvane (tsf)	Remarks
B-1	4.0	121	14.1					68	48	29					
B-2	1.0		14.1		37	17	20								
B-2	4.0	111	20.7					99	89	63					
B-3A	4.0	124	14.4		37	16	21	86	68	46					
B-4	3.5	104	21.9		36	20	16								
B-4	10.5	111	18.1												
B-5	4.0	107	20.8		36	20	16								
B-5	6.5	110	18.8												

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MOISTURE CONTENT/DRY DENSITY

Job #: 1150-1A
Job Name: Terra Linda High School
Date: 2/28/17
Tested by: Brad Hillebrandt

Additional Tests:	FS	-200	PI, -200	PI		PI
Boring #:	B-1	B-2	B-3A	B-4	B-4	B-5
Depth:	4.0	4.0	4.0	3.5	10.5	4.0
Sample Description:	Yellowish brown clayey SAND with gravel	Dark yellowish brown and olive brown sandy CLAY	Dark yellowish brown and olive brown sandy CLAY with some gravel	Very dark gray lean CLAY with sand	Olive brown sandy CLAY	Dark brown sandy CLAY
Can #:	202	348	361	327	313	502
Wet Sample + can	1079.4	286.8	440.4	344.4	347.5	327.2
Dry Sample + can	979.2	244.2	389.4	289.3	300.2	276.7
Weight can	271.0	38.1	34.0	38.2	39.5	33.7
Weight water	100.2	42.6	51	55.1	47.3	50.5
Weight Dry Sample	708.2	206.1	355.4	251.1	260.7	243
WATER CONTENT (%)	**14.1%**	**20.7%**	**14.4%**	**21.9%**	**18.1%**	**20.8%**
Weight Sample + Liner	1221.8	1167.1	1210.5	1163.3	1127.7	1190.3
Weight Liner	249.4	254.5	211.1	274.2	262.2	274.6
Sample Length	6.0	5.8	6.0	5.95	5.6	6.0
Sample Diameter	2.39	2.39	2.39	2.39	2.39	2.39
DRY DENSITY (pcf)	**120.6**	**110.7**	**123.7**	**104.1**	**111.1**	**107.3**

B. HILLEBRANDT SOILS TESTING, INC.

29 Sugarloaf Terrace, Alamo, CA 94507 - Tel: (510) 409-2916 - Fax: (925) 891-9267 - Email: soiltesting@aol.com

MOISTURE CONTENT/DRY DENSITY

Job #: 1150-1A
Job Name: Terra Linda High School
Date: 2/28/17
Tested by: Brad Hillebrandt

Additional Tests:						
Boring #:	B-5					
Depth:	6.5					
Sample Description:	Dark brown sandy CLAY					
Can #:	363					
Wet Sample + can	331.7					
Dry Sample + can	284.5					
Weight can	33.6					
Weight water	47.2					
Weight Dry Sample	250.9					
WATER CONTENT (%)	**18.8%**					
Weight Sample + Liner	1180.9					
Weight Liner	259.2					
Sample Length	6.0					
Sample Diameter	2.39	2.39	2.39	2.39	2.39	
DRY DENSITY (pcf)	**109.8**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	

B. HILLEBRANDT SOILS TESTING, INC.

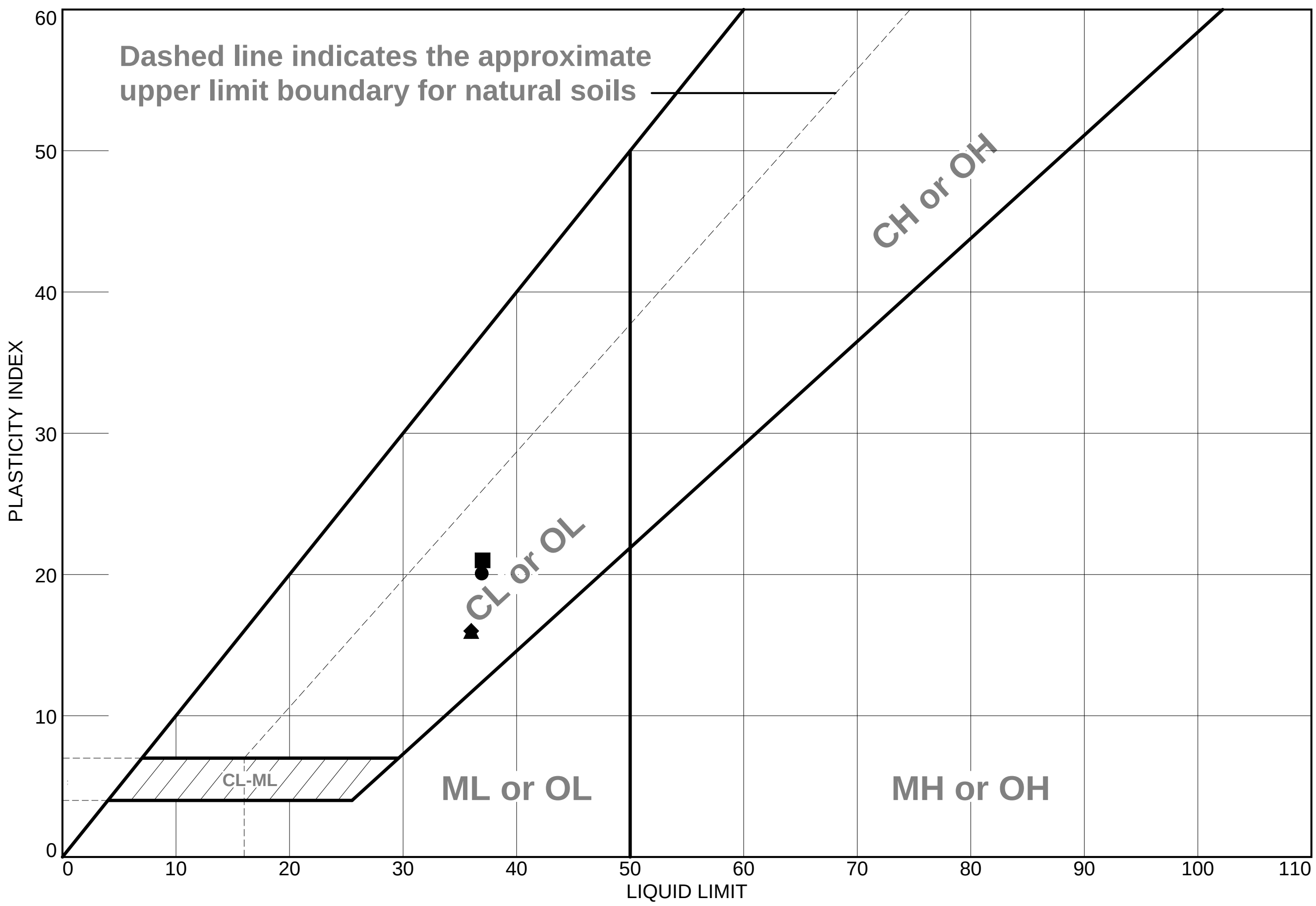
29 Sugarloaf Terrace, Alamo, CA 94507 - Tel: (510) 409-2916 - Fax: (925) 891-9267 - Email: soiltesting@aol.com

MOISTURE CONTENT WORKSHEET

Job #: 1150-1A
Job Name: Terra Linda High School
Date: 2/28/17
Tested by: B. Hillebrandt

Additional Tests:	PI								
Boring #:	B-2								
Depth:	1.0								
Sample Description:	Dark yellowish brown clayey SAND with some gravel								
Can #:	501								
Wet Sample + can	349.4								
Dry Sample + can	310.4								
Weight can	34.0								
Weight water	39								
Weight Dry Sample	276.4								
WATER CONTENT (%)	**14.1%**								

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark yellowish brown clayey SAND with some gravel	37	17	20			
■	Dark yellowish brown and olive brown sandy CLAY with some gravel	37	16	21	67.7	45.5	SC
▲	Very dark gray lean CLAY with sand	36	20	16			
◆	Dark brown sandy CLAY	36	20	16			

Project No. 1150-1A **Client:** A3Geo

Project: Terra Linda High School

●**Source of Sample:** B-2 **Depth:** 1.0 - 2.0'
■**Source of Sample:** B-3A **Depth:** 4.0'
▲**Source of Sample:** B-4 **Depth:** 3.5'
◆**Source of Sample:** B-5 **Depth:** 4.0'

Remarks:

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Figure

Tested By: BH

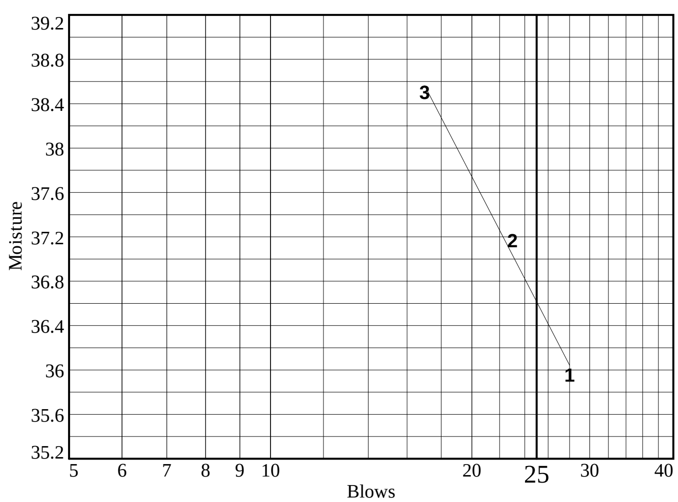
LIQUID AND PLASTIC LIMIT TEST DATA

3/3/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1A
Location: B-2
Depth: 1.0 - 2.0'
Material Description: Dark yellowish brown clayey SAND with some gravel
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	30.18	30.26	27.05			
Dry+Tare	25.16	25.13	22.66			
Tare	11.20	11.33	11.26			
# Blows	28	23	17			
Moisture	36.0	37.2	38.5			



Liquid Limit= 37
Plastic Limit= 17
Plasticity Index= 20
Natural Moisture= 14.1
Liquidity Index= -0.1

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.59	17.36		
Dry+Tare	16.67	16.47		
Tare	11.12	11.31		
Moisture	16.6	17.2		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
349.4	310.4	34.0	14.1

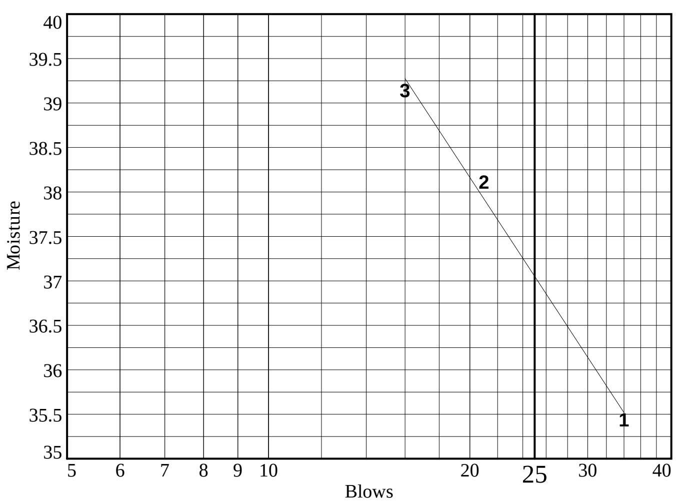
LIQUID AND PLASTIC LIMIT TEST DATA

3/3/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1A
Location: B-3A
Depth: 4.0'
Material Description: Dark yellowish brown and olive brown sandy CLAY with some gravel
%<#40: 67.7 **%<#200:** 45.5 **USCS:** SC **AASHTO:** A-6(5)
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	26.87	30.50	27.73			
Dry+Tare	22.79	25.19	23.04			
Tare	11.28	11.26	11.06			
# Blows	34	21	16			
Moisture	35.4	38.1	39.1			



Liquid Limit= 37
Plastic Limit= 16
Plasticity Index= 21
Natural Moisture= 14.4
Liquidity Index= -0.1

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	18.27	17.21		
Dry+Tare	17.3	16.36		
Tare	11.08	11.26		
Moisture	15.6	16.7		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
440.4	389.4	34	14.4

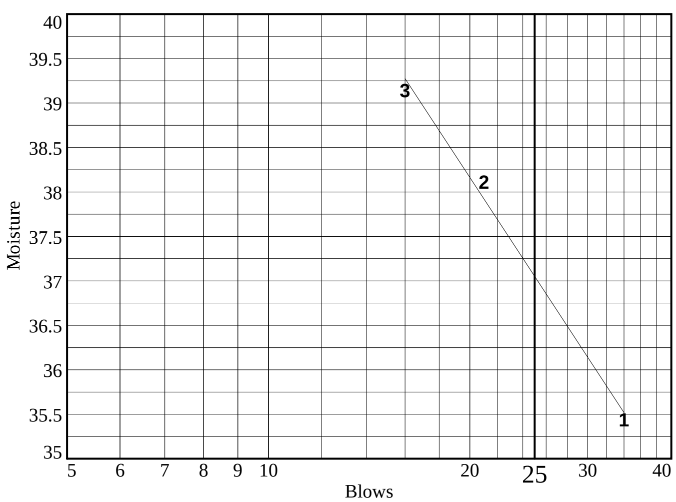
LIQUID AND PLASTIC LIMIT TEST DATA

3/3/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1A
Location: B-3A
Depth: 4.0'
Material Description: Dark yellowish brown and olive brown sandy CLAY with some gravel
%<#40: 67.7 **%<#200:** 45.5 **USCS:** SC **AASHTO:** A-6(5)
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	26.87	30.50	27.73			
Dry+Tare	22.79	25.19	23.04			
Tare	11.28	11.26	11.06			
# Blows	34	21	16			
Moisture	35.4	38.1	39.1			



Liquid Limit= 37
Plastic Limit= 16
Plasticity Index= 21
Natural Moisture= 14.4
Liquidity Index= -0.1

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	18.27	17.21		
Dry+Tare	17.3	16.36		
Tare	11.08	11.26		
Moisture	15.6	16.7		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
440.4	389.4	34	14.4

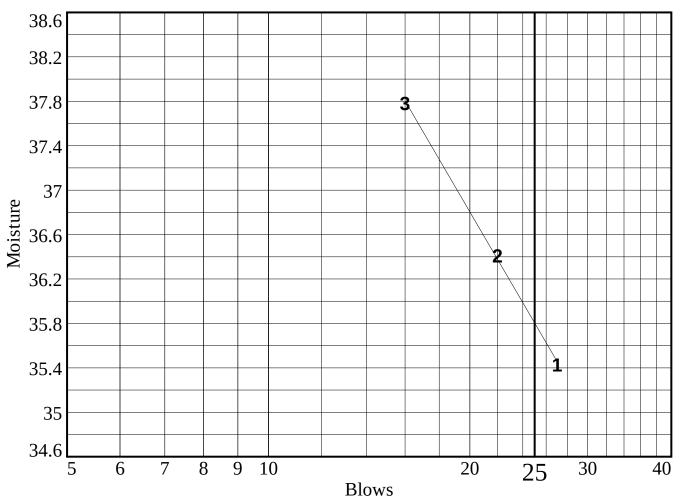
LIQUID AND PLASTIC LIMIT TEST DATA

3/3/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1A
Location: B-4
Depth: 3.5'
Material Description: Very dark gray lean CLAY with sand
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	29.99	27.58	28.61			
Dry+Tare	25.10	23.17	23.86			
Tare	11.30	11.06	11.29			
# Blows	27	22	16			
Moisture	35.4	36.4	37.8			



Liquid Limit= 36
Plastic Limit= 20
Plasticity Index= 16
Natural Moisture= 21.9
Liquidity Index= 0.1

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.48	17.05		
Dry+Tare	16.43	16.06		
Tare	11.21	11.27		
Moisture	20.1	20.7		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
344.4	289.3	38.2	21.9

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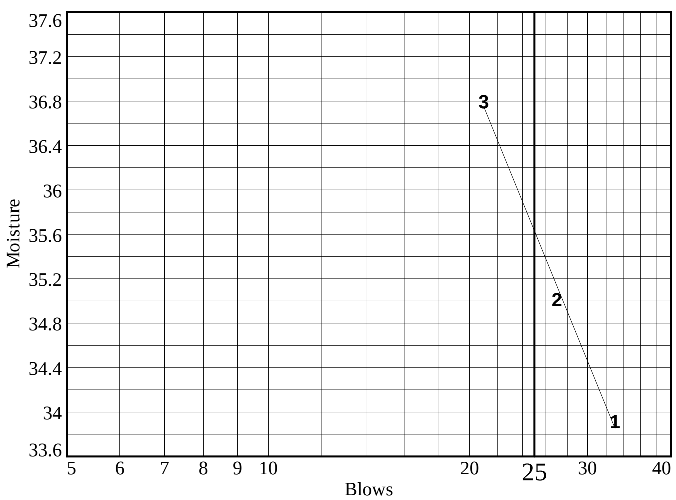
LIQUID AND PLASTIC LIMIT TEST DATA

3/3/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1A
Location: B-5
Depth: 4.0'
Material Description: Dark brown sandy CLAY
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	24.05	26.27	29.78			
Dry+Tare	20.76	22.39	24.76			
Tare	11.06	11.31	11.12			
# Blows	33	27	21			
Moisture	33.9	35.0	36.8			



Liquid Limit= 36
Plastic Limit= 20
Plasticity Index= 16
Natural Moisture= 20.8
Liquidity Index= 0.1

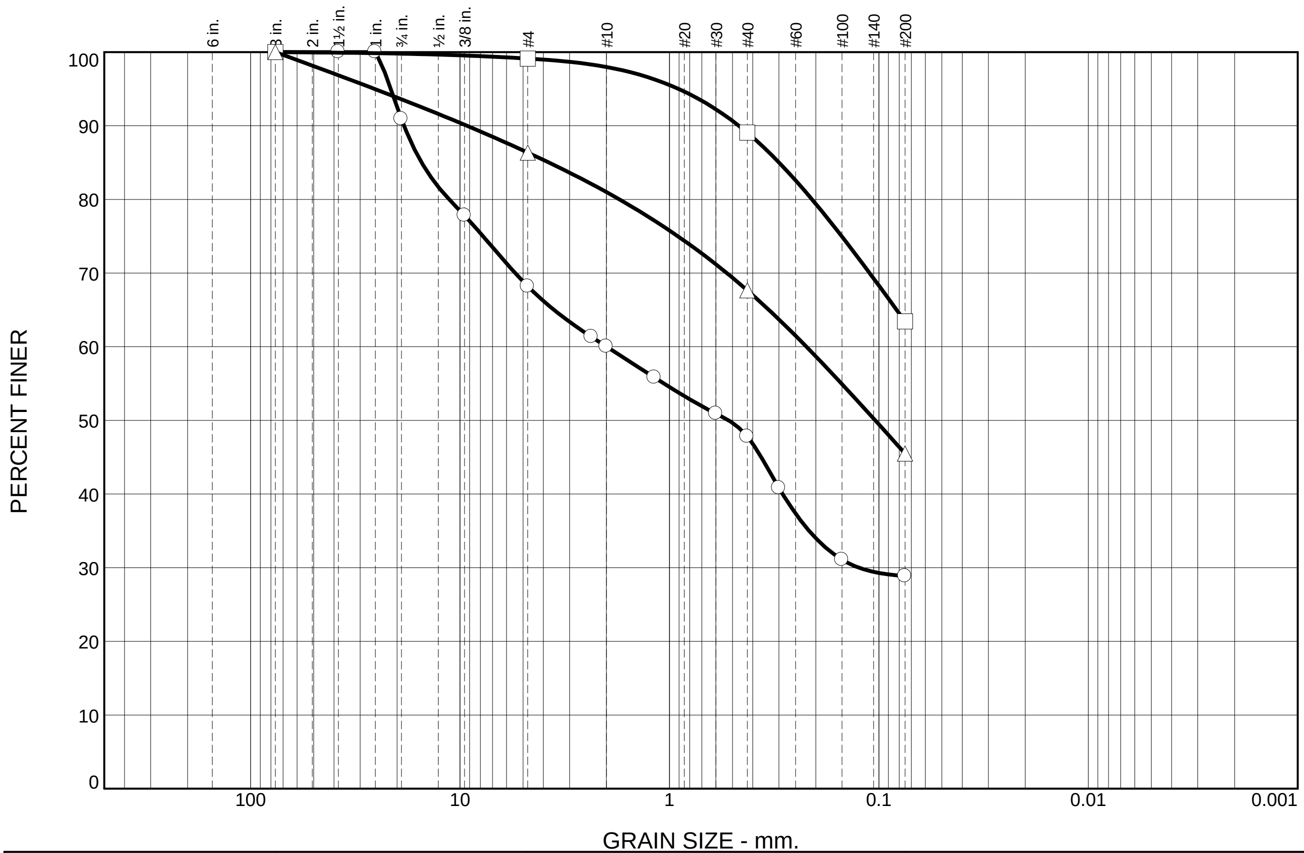
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.27	17.79		
Dry+Tare	16.28	16.74		
Tare	11.33	11.28		
Moisture	20.0	19.2		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
327.2	276.7	33.7	20.8

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

MATERIAL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-1		4.0'	Yelowish brown clayey SAND with gravel	
□	B-2		4.0'	Dark yellowish brown and olive brown sandy CLAY	
△	B-3A		4.0'	Dark yellowish brown and olive brown sandy CLAY with some gravel	SC

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Client: A3Geo
Project: Terra Linda High School

Project No.: 1150-1A **Figure**

Tested By: BH

GRAIN SIZE DISTRIBUTION TEST DATA

3/3/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1A
Location: B-1
Depth: 4.0'
Material Description: Yelowish brown clayey SAND with gravel
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
979.20	271.00	0.00	3"	0.00	100.0
			1.5"	0.00	100.0
			1"	0.00	100.0
			3/4"	64.37	90.9
			3/8"	157.12	77.8
			#4	225.16	68.2
			#8	273.74	61.3
			#10	283.08	60.0
			#16	312.84	55.8
			#30	347.62	50.9
			#40	369.53	47.8
			#50	419.08	40.8
			#100	487.98	31.1
			#200	503.84	28.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	9.1	22.7	31.8	8.2	12.2	18.9	39.3			28.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1246	0.2881	0.5221	1.9929	11.2655	15.2616	18.5168	21.4103

Fineness Modulus
3.23

GRAIN SIZE DISTRIBUTION TEST DATA

3/3/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1A
Location: B-2
Depth: 4.0'
Material Description: Dark yellowish brown and olive brown sandy CLAY
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
244.20	38.10	0.00	3"	0.00	100.0
			#4	1.81	99.1
			#40	22.53	89.1
			#200	75.34	63.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.2	0.7	0.9	1.1	8.9	25.7	35.7			63.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.2085	0.2997	0.4662	0.9050

Fineness Modulus
0.55

GRAIN SIZE DISTRIBUTION TEST DATA

3/3/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1A
Location: B-3A
Depth: 4.0'
Material Description: Dark yellowish brown and olive brown sandy CLAY with some gravel
USCS: SC
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
389.40	34.00	0.00	3"	0.00	100.0
			#4	48.48	86.4
			#40	114.96	67.7
			#200	193.68	45.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	6.4	7.2	13.6	5.4	13.3	22.2	40.9			45.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.1041	0.2219	1.7339	3.7597	9.2747	25.5894

Fineness Modulus
1.84

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LAB RESULTS SUMMARY FORM

Project Number: 1150-1B **Project Name:** Terra Linda High School **Results Due By:**
Requested By: LB **Request Date:** 12/19/17 **Throw Samples Out On:**

					Atterberg			-200			Compaction				
Boring #	Sample Depth (feet)	Dry Density (pcf)	Moisture Content (%)	TxUU Shear Strength (psf)	Liquid Limit	Plastic Limit	Plasicity Index	Passing #4 Sieve (%)	Passing #40 sieve (%)	Passing #200 sieve (%)	Maximum Dry Density (pcf)	Optimum Moisture (%)	Pocket Penetrometer (tsf)	Torvane (tsf)	Remarks
A3-17-1	12.5							91	72	45					
A3-17-2	3.0				35	18	17								
A3-17-2	10.5	124	15.1					82	57	31					
A3-17-3	5.0	112	17.3					88	76	63					
A3-17-4	3.0	120	14.6	8536	37	17	20	94	76	53					
A3-17-5	2.0	112	16.4		33	18	15	84	57	36					
A3-17-6	4.5	118	14.3												
A3-17-7	6.5	112	18.7												
A3-17-8	6.0				39	18	21	80	62	42					
A3-17-9	3.0				33	16	17								
A3-17-9	9.0	110	20.4	3963				98	79	56					

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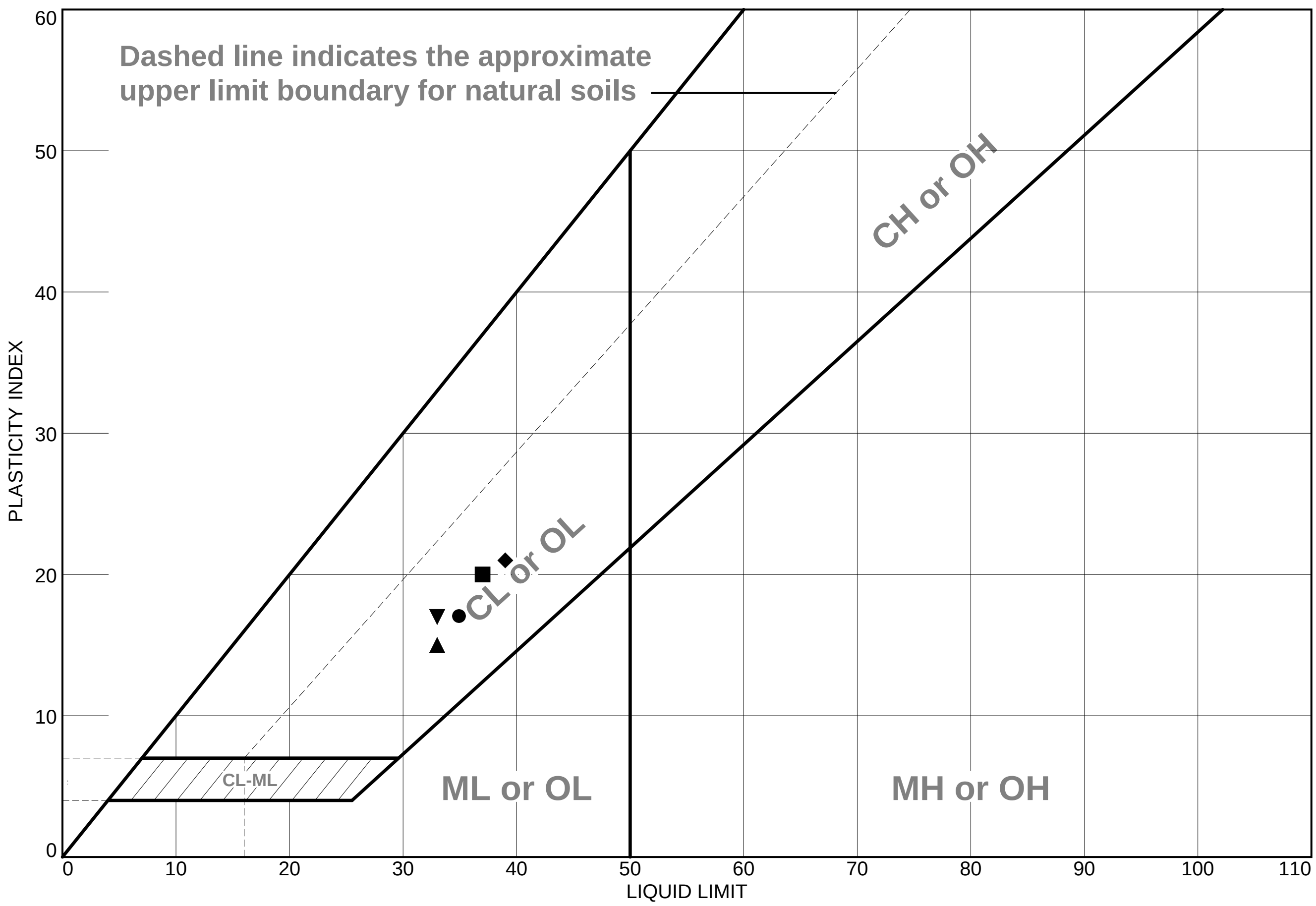
MOISTURE CONTENT/DRY DENSITY

Job #: 1150-1B
Job Name: Terra Linda High School
Date: 12/19/17
Tested by: Brad Hillebrandt

Additional Tests:	-200	-200	PI, -200			
Boring #:	A3-17-2	A3-17-3	A3-17-5	A3-17-6	A3-17-7	
Depth:	10.5	5.0	2.0	4.5	6.5	
Sample Description:	Dark yellowish brown and gray clayey SAND with gravel gravel	Dark yellowish brown and gray sandy CLAY	Yellowish brown clayey SAND with gravel	Dark yellowish brown and gray sandy CLAY with some gravel	Dark yellowish brown sandy CLAY	
Can #:	324	504	362	303	326	
Wet Sample + can	414.0	400.3	236.3	358.2	338.6	
Dry Sample + can	364.8	346.2	207.8	318.2	291.5	
Weight can	38.7	34.3	33.8	37.7	39.0	
Weight water	49.2	54.1	28.5	40	47.1	
Weight Dry Sample	326.1	311.9	174	280.5	252.5	
WATER CONTENT (%)	**15.1%**	**17.3%**	**16.4%**	**14.3%**	**18.7%**	
Weight Sample + Liner	1214.1	1113.8	1124.8	1106.9	1139.0	
Weight Liner	210.2	202.3	204.3	274.8	198.7	
Sample Length	6.0	5.9	6.0	5.25	6.0	
Sample Diameter	2.39	2.39	2.39	2.39	2.39	
DRY DENSITY (pcf)	**123.5**	**111.8**	**111.9**	**117.8**	**112.2**	

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown sandy lean CLAY with some gravel	35	18	17			CL
■	Brown sandy lean CLAY	37	17	20	75.7	52.5	CL
▲	Yellowish brown clayey SAND with gravel	33	18	15	57.2	35.8	SC
◆	Dark yellowish brown and gray clayey SAND with gravel	39	18	21	61.5	41.7	SC
▼	Dark yellowish brown sandy lean CLAY	33	16	17			CL

Project No. 1150-1B **Client:** A3Geo

Project: Terra Linda High School

●**Source of Sample:** A3-17-2 **Depth:** 3.0'
■**Source of Sample:** A3-17-4 **Depth:** 3.0'
▲**Source of Sample:** A3-17-5 **Depth:** 2.0'
◆**Source of Sample:** A3-17-8 **Depth:** 6.0'
▼**Source of Sample:** A3-17-9 **Depth:** 3.0'

Remarks:

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Figure

Tested By: BH

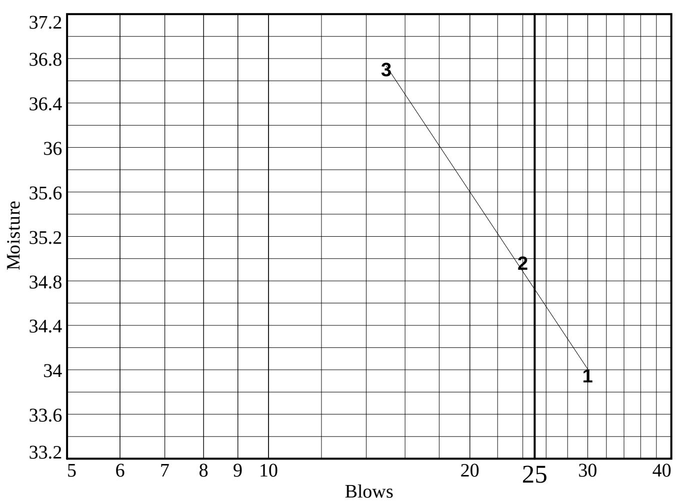
LIQUID AND PLASTIC LIMIT TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-2
Depth: 3.0'
Material Description: Brown sandy lean CLAY with some gravel
USCS: CL
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	24.08	27.28	30.80			
Dry+Tare	20.78	23.14	25.54			
Tare	11.06	11.30	11.21			
# Blows	30	24	15			
Moisture	34.0	35.0	36.7			



Liquid Limit= 35
Plastic Limit= 18
Plasticity Index= 17

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.53	17.16		
Dry+Tare	16.59	16.27		
Tare	11.12	11.31		
Moisture	17.2	17.9		

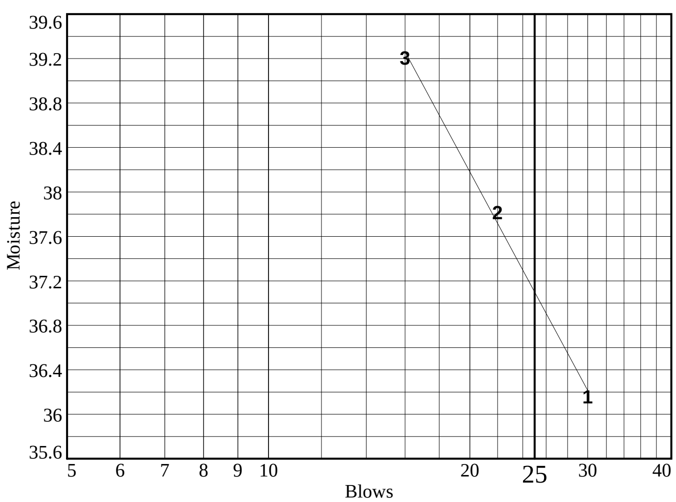
LIQUID AND PLASTIC LIMIT TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-4
Depth: 3.0'
Material Description: Brown sandy lean CLAY
%<#40: 75.7 **%<#200:** 52.5 **USCS:** CL **AASHTO:** A-6(7)
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.83	27.85	31.65			
Dry+Tare	21.91	23.27	25.89			
Tare	11.07	11.16	11.20			
# Blows	30	22	16			
Moisture	36.2	37.8	39.2			



Liquid Limit= 37
Plastic Limit= 17
Plasticity Index= 20
Natural Moisture= 14.6
Liquidity Index= -0.1

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.03	17.63		
Dry+Tare	16.16	16.67		
Tare	11.27	11.05		
Moisture	17.8	17.1		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
271.6	241.9	37.8	14.6

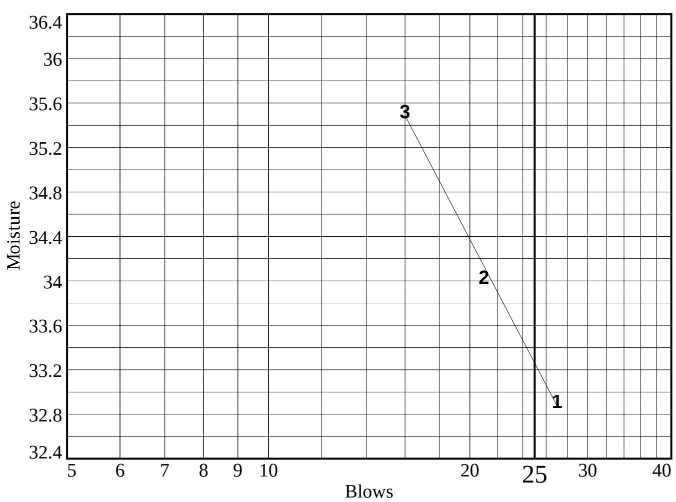
LIQUID AND PLASTIC LIMIT TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-5
Depth: 2.0'
Material Description: Yellowish brown clayey SAND with gravel
%<#40: 57.2 **%<#200:** 35.8 **USCS:** SC **AASHTO:** A-6(1)
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	26.47	32.06	30.38			
Dry+Tare	22.72	26.75	25.37			
Tare	11.33	11.15	11.27			
# Blows	27	21	16			
Moisture	32.9	34.0	35.5			



Liquid Limit= 33
Plastic Limit= 18
Plasticity Index= 15
Natural Moisture= 16.4
Liquidity Index= -0.1

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.93	17.48		
Dry+Tare	16.91	16.51		
Tare	11.25	11.11		
Moisture	18.0	18.0		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
236.3	207.8	33.8	16.4

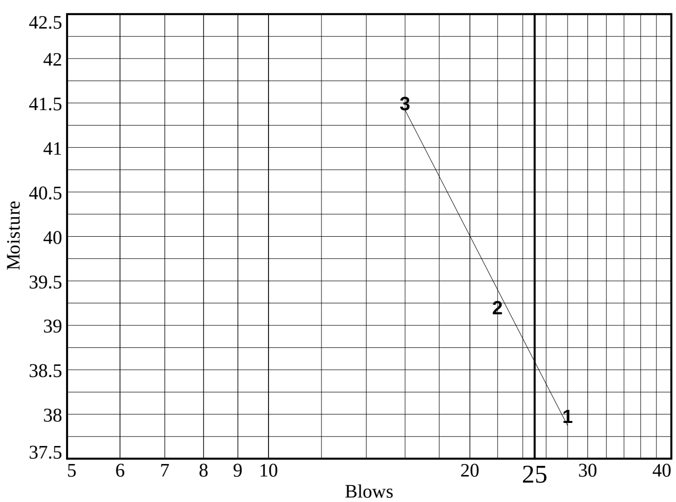
LIQUID AND PLASTIC LIMIT TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-8
Depth: 6.0'
Material Description: Dark yellowish brown and gray clayey SAND with gravel
%<#40: 61.5 **%<#200:** 41.7 **USCS:** SC **AASHTO:** A-6(4)
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.58	27.95	29.53			
Dry+Tare	21.66	23.21	24.18			
Tare	11.34	11.12	11.29			
# Blows	28	22	16			
Moisture	38.0	39.2	41.5			



Liquid Limit= 39
Plastic Limit= 18
Plasticity Index= 21
Natural Moisture= 16.7
Liquidity Index= -0.1

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.40	18.16		
Dry+Tare	16.49	17.11		
Tare	11.29	11.33		
Moisture	17.5	18.2		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
358.6	312.8	37.8	16.7

B. Hillebrandt Soils Testing, Inc.

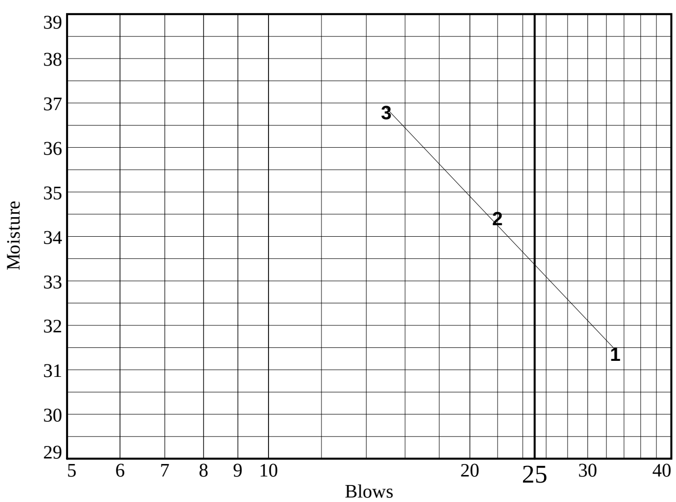
LIQUID AND PLASTIC LIMIT TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-9
Depth: 3.0'
Material Description: Dark yellowish brown sandy lean CLAY
USCS: CL
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.73	31.34	31.05			
Dry+Tare	22.27	26.15	25.74			
Tare	11.24	11.07	11.31			
# Blows	33	22	15			
Moisture	31.4	34.4	36.8			



Liquid Limit= 33
Plastic Limit= 16
Plasticity Index= 17
Natural Moisture= 20.4
Liquidity Index= 0.3

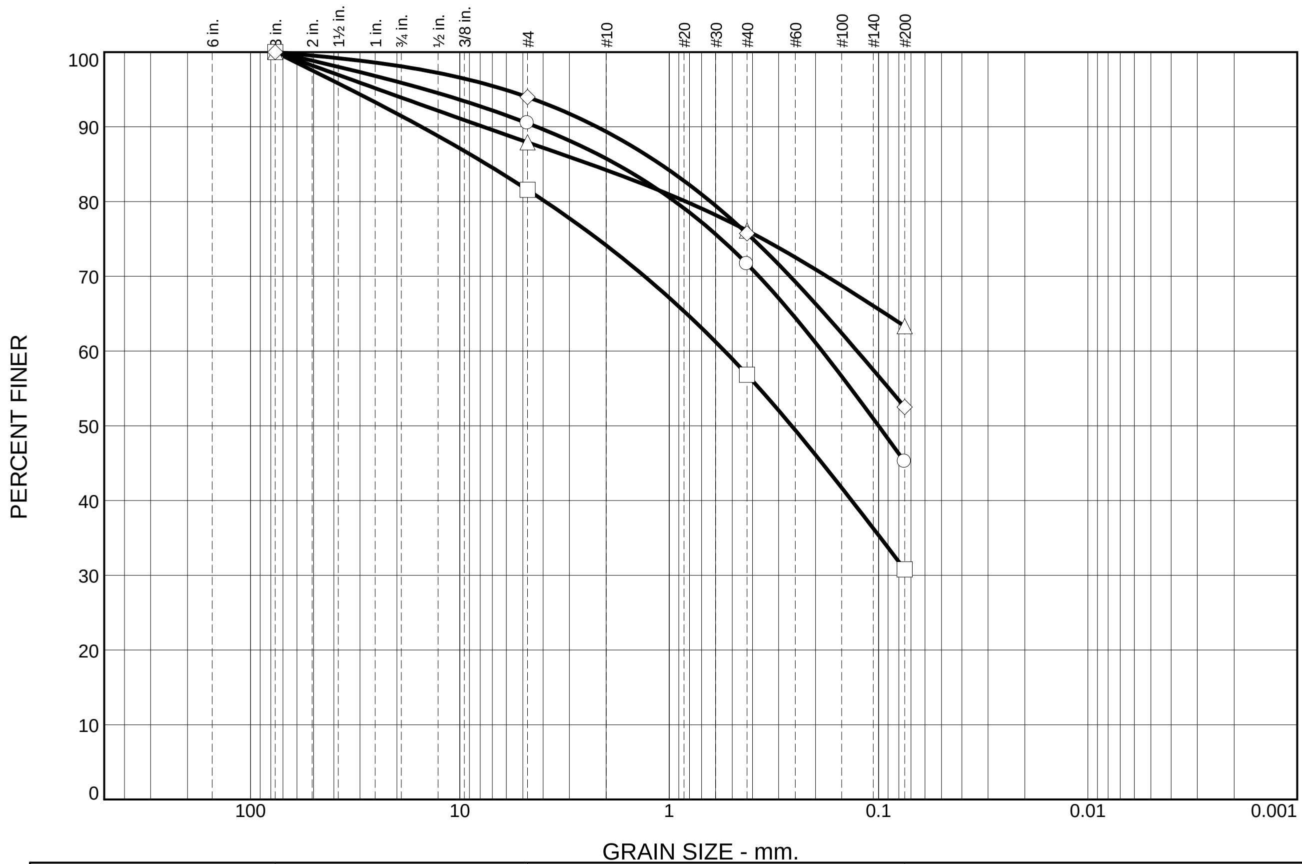
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.12	17.25		
Dry+Tare	16.25	16.40		
Tare	11.04	11.16		
Moisture	16.7	16.2		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
304.49	259.29	37.67	20.4

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	4.1	5.4	4.8	14.0	26.5	45.2	
□	0.0	8.5	9.9	7.5	17.3	26.0	30.8	
△	0.0	6.1	6.0	3.7	8.1	12.8	63.3	
◇	0.0	1.9	4.1	4.6	13.7	23.2	52.5	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	A3-17-1		12.5'	Yellowish brown and gray clayey SAND	
□	A3-17-2		10.5'	Dark yellowish brown and gray clayey SAND with gravel	
△	A3-17-3		5.0'	Dark yellowish brown and gray sandy CLAY	
◇	A3-17-4		3.0'	Brown sandy lean CLAY	CL

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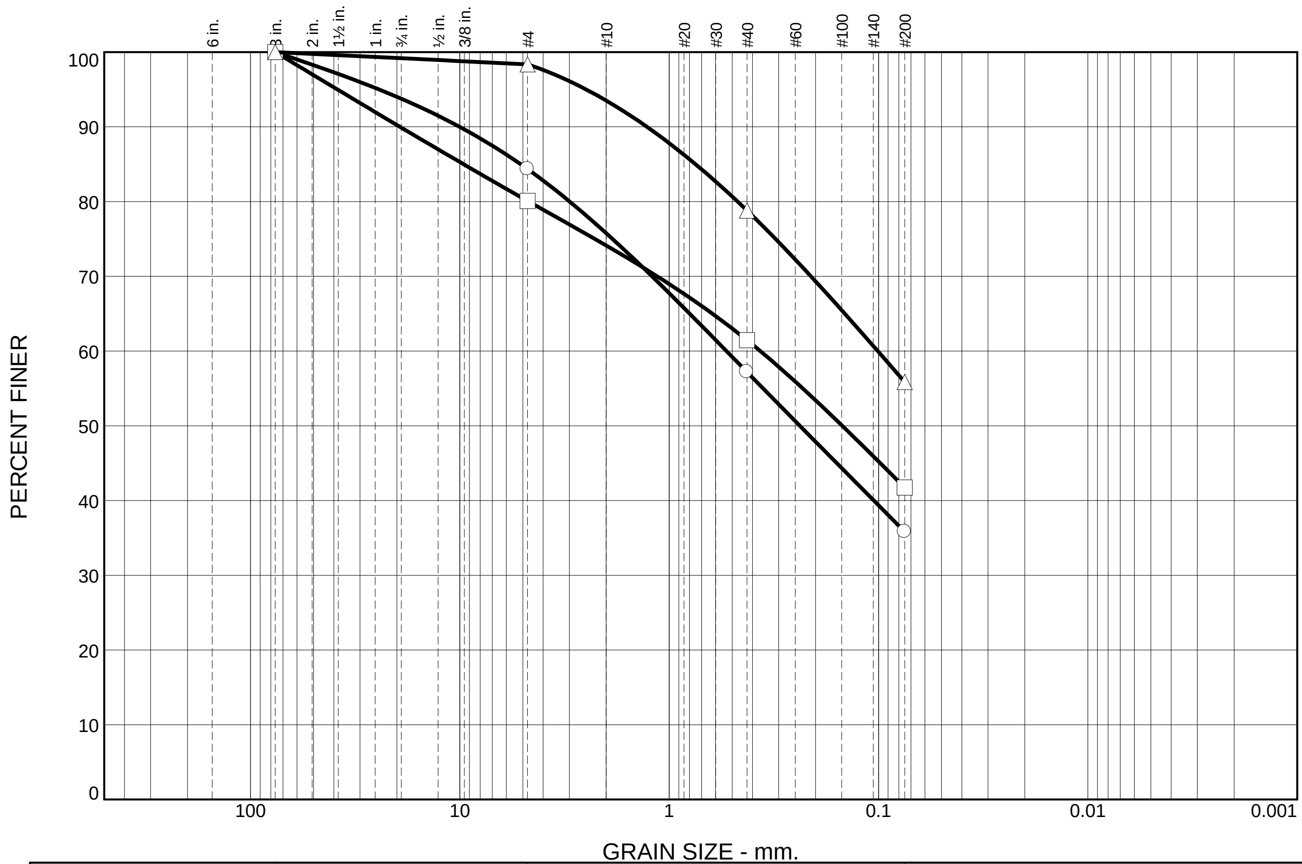
SoilTesting@aol.com

Client: A3Geo
Project: Terra Linda High School
Project No.: 1150-1B **Figure**

Tested By: BH

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	6.2	9.4	8.6	18.6	21.4	35.8	
□	0.0	10.1	9.8	6.0	12.6	19.8	41.7	
△	0.0	0.8	0.8	4.9	14.7	22.9	55.9	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	A3-17-5		2.0'	Yellowish brown clayey SAND with gravel	SC
□	A3-17-8		6.0'	Dark yellowish brown and gray clayey SAND with gravel	SC
△	A3-17-9		9.0'	Brown sandy CLAY	

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Project: Terra Linda High School

Project No.: 1150-1B **Figure**

Tested By: BH

GRAIN SIZE DISTRIBUTION TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-1
Depth: 12.5'
Material Description: Yellowish brown and gray clayey SAND
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
332.10	36.40	0.00	3"	0.00	100.0
			#4	28.15	90.5
			#40	83.81	71.7
			#200	162.04	45.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	4.1	5.4	9.5	4.8	14.0	26.5	45.3			45.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.1000	0.1859	0.9375	1.7850	4.2945	14.5798

Fineness Modulus
1.54

GRAIN SIZE DISTRIBUTION TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-2
Depth: 10.5'
Material Description: Dark yellowish brown and gray clayey SAND with gravel
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
364.80	38.70	0.00	3"	0.00	100.0
			#4	60.10	81.6
			#40	140.76	56.8
			#200	225.69	30.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	8.5	9.9	18.4	7.5	17.3	26.0	50.8			30.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.1344	0.2602	0.5433	3.9085	7.4499	15.2588	33.3935

Fineness Modulus
2.45

GRAIN SIZE DISTRIBUTION TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-3
Depth: 5.0'
Material Description: Dark yellowish brown and gray sandy CLAY
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
346.20	34.30	0.00	3"	0.00	100.0
			#4	37.65	87.9
			#40	74.46	76.1
			#200	114.38	63.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	6.1	6.0	12.1	3.7	8.1	12.8	24.6			63.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.8322	2.3914	7.7153	24.4190

Fineness Modulus
1.43

GRAIN SIZE DISTRIBUTION TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-4
Depth: 3.0'
Material Description: Brown sandy lean CLAY
USCS: CL
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
241.90	37.80	0.00	3"	0.00	100.0
			#4	12.29	94.0
			#40	49.52	75.7
			#200	96.93	52.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	1.9	4.1	6.0	4.6	13.7	23.2	41.5			52.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.1265	0.6344	1.1018	2.2136	6.1308

Fineness Modulus
1.23

GRAIN SIZE DISTRIBUTION TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-5
Depth: 2.0'
Material Description: Yellowish brown clayey SAND with gravel
USCS: SC
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
207.80	33.80	0.00	3"	0.00	100.0
			#4	27.23	84.4
			#40	74.48	57.2
			#200	111.66	35.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	6.2	9.4	15.6	8.6	18.6	21.4	48.6			35.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.1054	0.2376	0.5325	2.9886	5.1246	10.0267	24.3100

Fineness Modulus
2.29

GRAIN SIZE DISTRIBUTION TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-8
Depth: 6.0'
Material Description: Dark yellowish brown and gray clayey SAND with gravel
USCS: SC
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
312.80	37.80	0.00	3"	0.00	100.0
			#4	54.76	80.1
			#40	105.99	61.5
			#200	160.22	41.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	10.1	9.8	19.9	6.0	12.6	19.8	38.4			41.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.1490	0.3672	4.6901	9.6011	19.3213	38.4690

Fineness Modulus
2.32

GRAIN SIZE DISTRIBUTION TEST DATA

12/28/2017

Client: A3Geo
Project: Terra Linda High School
Project Number: 1150-1B
Location: A3-17-9
Depth: 9.0'
Material Description: Brown sandy CLAY
Tested by: BH

Sieve Test Data

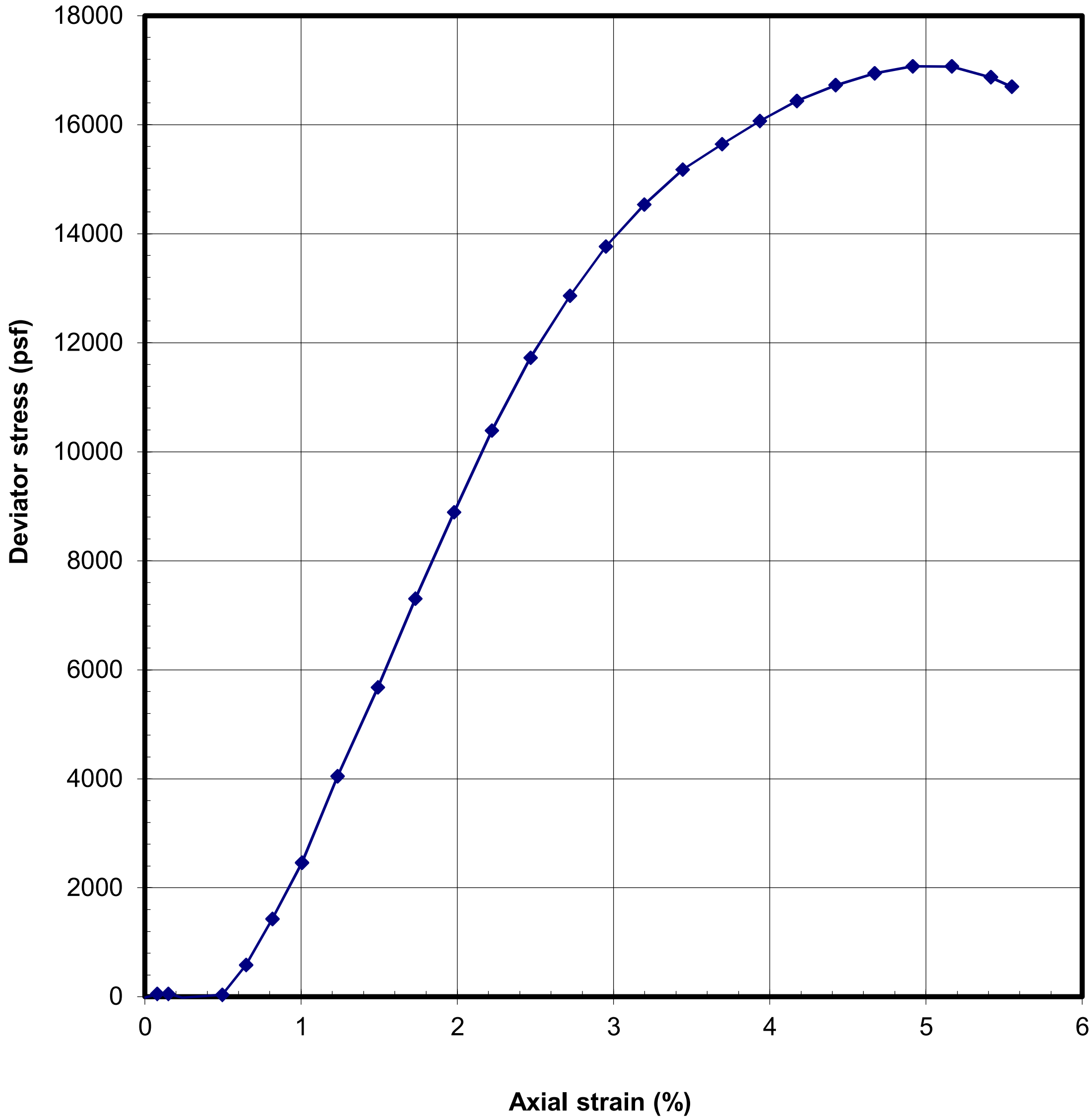
Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
259.30	37.70	0.00	3"	0.00	100.0
			#4	3.64	98.4
			#40	46.97	78.8
			#200	97.80	55.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.8	0.8	1.6	4.9	14.7	22.9	42.5			55.9

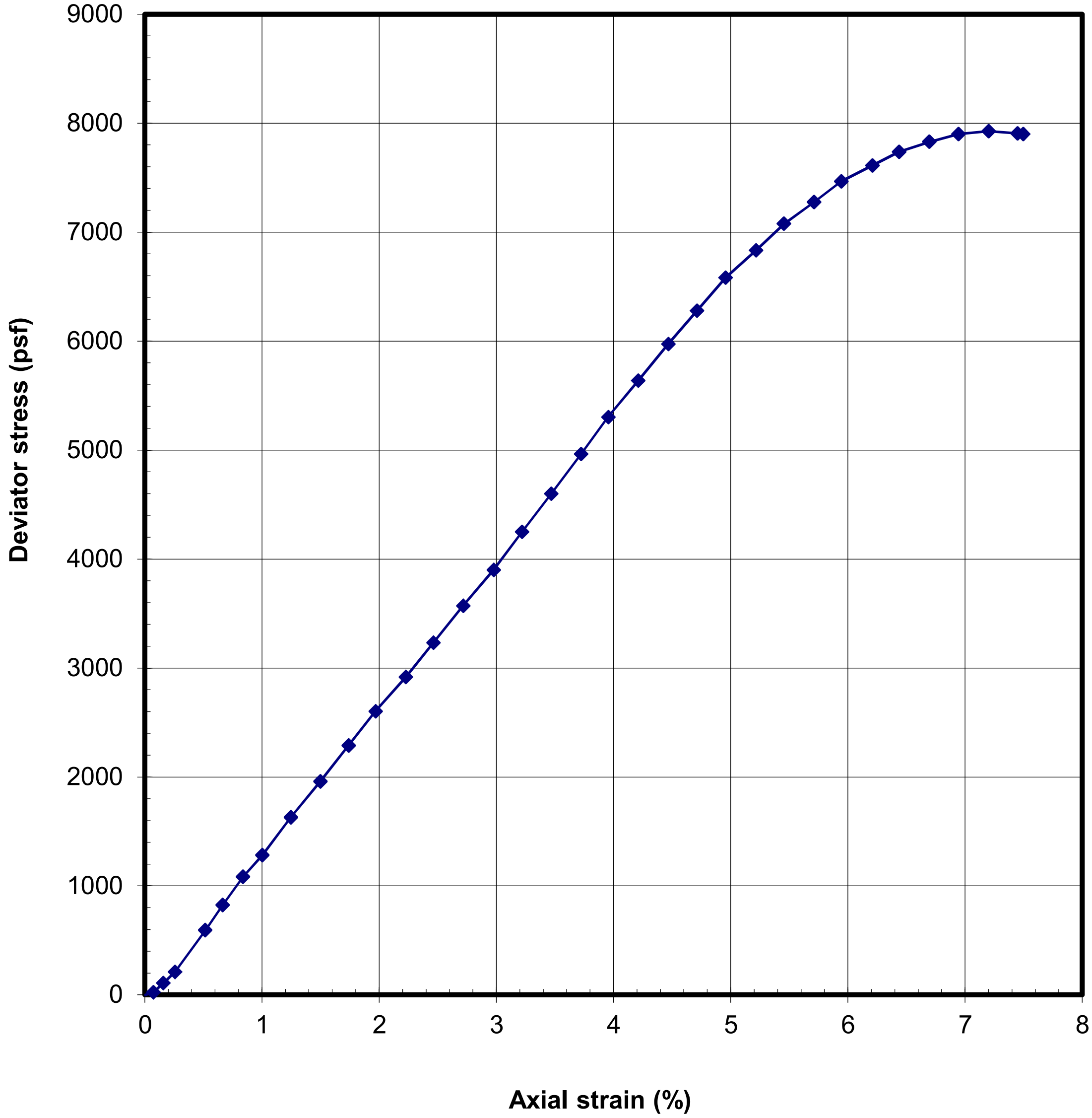
D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.1008	0.4713	0.7487	1.2771	2.4948

Fineness Modulus
0.97



Sampler Type Mod Cal		Shear Strength:	8536 psf
Diameter (in): 2.39	Height (in): 5.81	Strain at Failure:	5.2%
Moisture Content:	14.6 %	Confining Pressure:	375 psf
Dry Density:	120 pcf	Strain Rate:	1%/min
Source:	A3-17-4 @ 3.0 feet		
Description:	Brown sandy lean CLAY (CL)		

TERRA LINDA HIGH SCHOOL	**UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST**		
B. HILLEBRANDT SOILS TESTING, INC	Date: 12/22/17	Project #: 1150-1B	Figure



Sampler Type Mod Cal		Shear Strength:	3963 psf
Diameter (in): 2.39	Height (in): 5.81	Strain at Failure:	7.2%
Moisture Content:	20.4 %	Confining Pressure:	1000 psf
Dry Density:	110 pcf	Strain Rate:	1%/min
Source:	A3-17-9 @ 9.0 feet		
Description:	Brown sandy lean CLAY (CL)		

TERRA LINDA HIGH SCHOOL	**UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST**
B. HILLEBRANDT SOILS TESTING, INC	Date: 12/22/17 | Project #: 1150-1B | Figure

Corrosivity Tests Summary

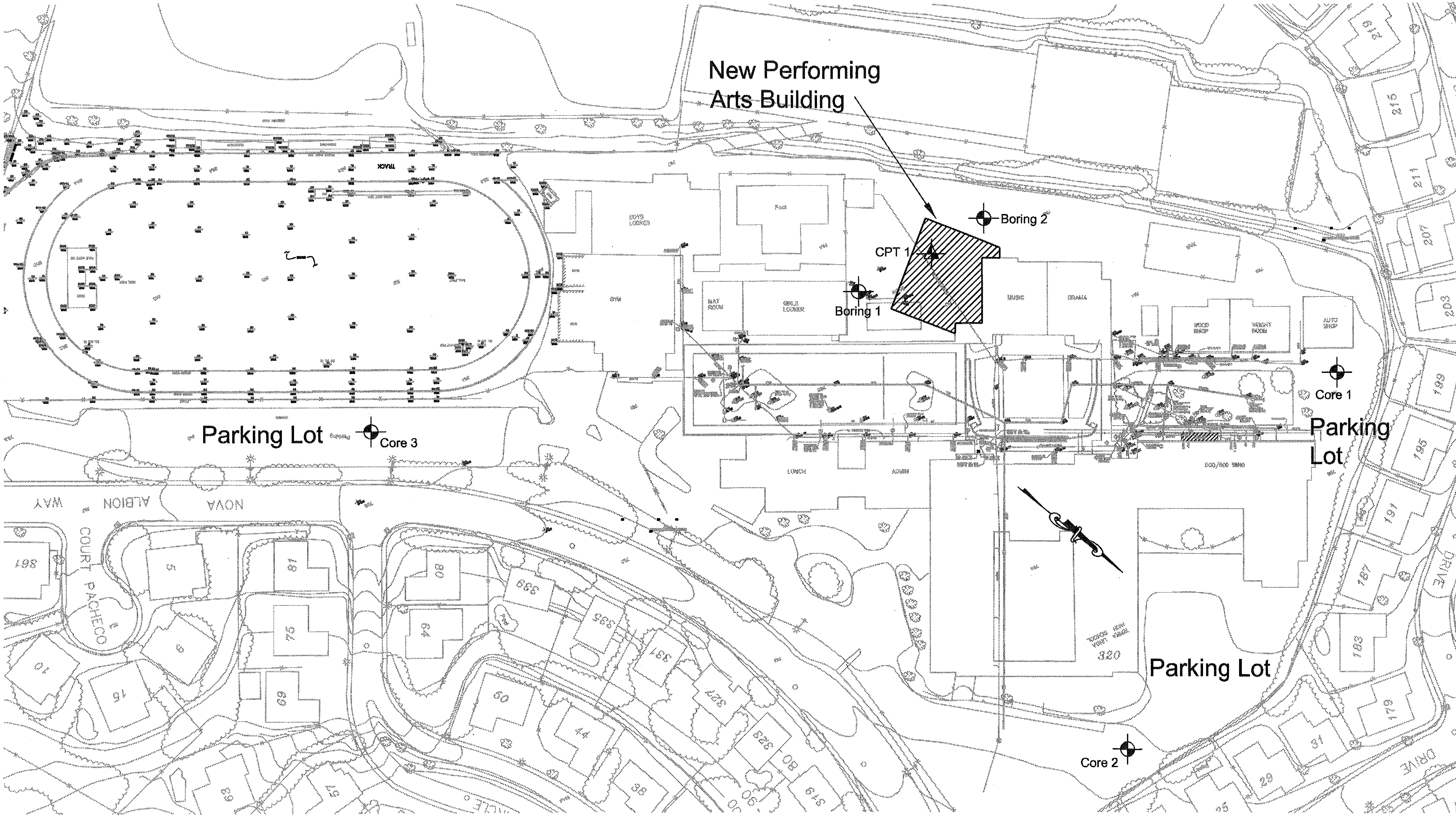
COOPER TESTING LABORATORY

CTL # 748-052 **Date:** 12/9/2021 **Tested By:** PJ **Checked:** PJ
Client: A3GEO, Inc. **Project:** Terra Linda High School- Ceramics Building **Proj. No:** 1150-1H
Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP		Sulfide	Moisture	Soil Visual Description
			As Rec.	Min	Sat.	mg/kg	mg/kg	%		(Redox)		Qualitative	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		E_H (mv)	At Test	by Lead	%	
Boring	Sample, No.	Depth, ft.	ASTM G57	Cal 643	ASTM G57	ASTM D4327	ASTM D4327	ASTM D4327	ASTM G51	ASTM G200	Temp °C	Acetate Paper	ASTM D2216	
A3-21-1	1	1.0-2.0	-	-	2,613	12	50	0.0050	7.6	526	19	-	20.1	Reddish Brown CLAY w/ Sand & organics

APPENDIX G

Data from Previous Investigation by Others
(MPEG, 2003)



Boring Or Core By MPEG, August 2003

Boring By MPEG, August 2003

SCALE

0 50 100 200 FEET

FILE: 779.12/terralindasiteplan.dwg

Miller Pacific
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SITE PLAN
San Rafael Schools - Terra Linda High
San Rafael, California

2

Project No. 779.12 | Date 09/03/03 | Approved By: | Figure

APPENDIX A

SUBSURFACE EXPLORATION AND LABORATORY TESTING

1.0 Subsurface Exploration - Borings

We explored subsurface conditions at the site by drilling 2 test borings and 3 pavement cores on August 14, 2003 at the locations shown on Figure 2. Test borings were drilled to depths between 16 and 25.5 feet using a hollow-stem auger with a diameter of 8 inches. The pavement cores were shallow and terminated in natural soils below the existing pavement section.

The soils encountered were logged and identified by our Engineer in general accordance with ASTM Standard D 2487, "Field Identification and Description of Soils (Visual-Manual Procedure)." This standard is briefly explained on Figure A-1, Soil Classification Chart and Key to Log Symbols and Figure A-2 Rock Classification Chart. The Boring Logs are presented on Figures A-3 to A-5.

We obtained "undisturbed" samples using a 3-inch diameter, split-barrel modified California sampler with 2.5 by 6-inch brass tube liners or with a 2-inch diameter, split-barrel Standard Penetration Test (SPT) sampler. The sampler was driven with a 140-pound hammer falling 30 inches. The number of blows required to drive the samplers 18 inches was recorded and is reported on the boring logs as blows per foot for the last 12 inches of driving. The samples obtained were examined in the field, sealed to prevent moisture loss, and transported to our laboratory.

2.0 Subsurface Exploration – Cone Penetration Testing

The Cone Penetration Test (CPT) is a special exploration technique that provides a continuous profile of data throughout the depth of exploration. It is particularly useful in defining stratigraphy, relative soil strength and in assessing liquefaction potential. We performed 1 CPT on August 20, 2003 at the locations shown on the Site Plan, Figure 2. The CPT equipment was mounted in a large rubber-tired van.

The CPT is a cylindrical probe, 35 mm in diameter, which is pushed into the ground at a constant rate of 2 cm/sec. The device is illustrated on Figure A-6. It is instrumented to obtain continuous measurements of cone bearing (tip resistance), sleeve friction and pore water pressure. The data is sensed by strain gages and load cells inside the instrument. Electronic signals from the instrument are continuously recorded by an on-board computer at the surface, which permits an initial evaluation of subsurface conditions during the exploration.

The recorded data is transferred to an in-office computer for reduction and analysis. The analysis of cone bearing and sleeve friction (i.e. friction ratio) indicates the soil type, the cone bearing alone indicates soil density or strength, and the pore pressure indicates the presence of clay. Variations in the data profile indicate changes in stratigraphy. This test method has been standardized and is described in detail by the ASTM Standard Test Method D3441 "Deep, Quasi-Static Cone and Friction Cone Penetration Tests of Soil." The interpretation of CPT data is illustrated on Figure A-7, and the CPT data log is presented on Figure A-8.

3.0 Laboratory Testing

We conducted laboratory tests on selected intact samples to verify field identifications and to evaluate engineering properties. The following laboratory tests were conducted in accordance with the ASTM standard test method cited:

- Laboratory Determination of Water (Moisture Content) of Soil, Rock, and Soil-Aggregate Mixtures, ASTM D 2216;
- Density of Soil in Place by the Drive-Cylinder Method, ASTM D 2937;
- Unconfined Compressive Strength of Cohesive Soil, ASTM D 2166;
- Liquid Limit, Plastic Limit, and Plasticity Index of Soils, ASTM D 4318;
- Resistance (R)-value/expansion pressure of untreated laboratory compacted soils/aggregates, D 2844.

The moisture content, dry density, and unconfined compression test results are shown on the exploratory Boring Logs, Figures A-3 through A-5. The R-value test is summarized on Figure A-9 and the Plasticity Index Test is summarized on Figure A-10.

The exploratory boring logs, description of soils encountered and the laboratory test data reflect conditions only at the location of the boring at the time they were excavated or retrieved. Conditions may differ at other locations and may change with the passage of time due to a variety of causes including natural weathering, climate and changes in surface and subsurface drainage.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS		SYMBOL	DESCRIPTION
COARSE GRAINED SOILS over 50% sand and gravel	CLEAN GRAVEL	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
	GRAVEL with fines	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	CLEAN SAND	SW	Well-graded sands or gravely sands, little or no fines
		SP	Poorly-graded sands or gravely sands, little or no fines
	SAND with fines	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS over 50% silt and clay	SILT AND CLAY liquid limit <50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	SILT AND CLAY liquid limit >50%	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS		PT	Peat, muck, and other highly organic soils
ROCK			Undifferentiated as to type or composition

KEY TO BORING AND TEST PIT SYMBOLS

CLASSIFICATION TESTS

AL ATTERBERG LIMITS TEST
SA SIEVE ANALYSIS
HYD HYDROMETER ANALYSIS
P200 PERCENT PASSING NO. 200 SIEVE
P4 PERCENT PASSING NO. 4 SIEVE

STRENGTH TESTS

TV FIELD TORVANE (UNDRAINED SHEAR)
UC LABORATORY UNCONFINED COMPRESSION
TXCU CONSOLIDATED UNDRAINED TRIAXIAL
TXUU UNCONSOLIDATED UNDRAINED TRIAXIAL
UC, CU, UU = 1/2 Deviator Stress

SAMPLER TYPE

UNDISTURBED CORE SAMPLE: MODIFIED CALIFORNIA OR HYDRAULIC PISTON SAMPLE

STANDARD PENETRATION TEST SAMPLE

X DISTURBED OR BULK SAMPLE

ROCK OR CORE SAMPLE

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the location and time of exploration. Subsurface rock, soil and water conditions may differ in locations and with the passage of time. Lines defining interface between differing soil or rock description are approximate and may indicate a gradual transition.

FILE: Soil Class 779-12.dwg

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SOIL CLASSIFICATION CHART
San Rafael City Schools - Terra Linda High
San Rafael, California

A-1

Project No. 779.12 Date 09/03/03 Approved By: [signature]

Figure

FRACTURING AND BEDDING

Fracture Classification	Spacing	Bedding Classification
Crushed	less than 3/4 inch	Laminated
Intensely fractured	3/4 to 2-1/2 inches	Very thinly bedded
Closely fractured	2-1/2 to 8 inches	Thinly bedded
Moderately fractured	8 to 24 inches	Medium bedded
Widely fractured	2 to 6 feet	Thickly bedded
Very widely fractured	greater than 6 feet	Very thickly bedded

HARDNESS

Low	Carved or gouged with a knife
Moderate	Easily scratched with a knife, friable
Hard	Difficult to scratch, knife scratch leaves dust trace
Very hard	Rock scratches metal

STRENGTH

Friable	Crumbles by rubbing with fingers
Weak	Crumbles under light hammer blows
Moderate	Indentations <1/8 inch with moderate blow with pick end of rock hammer
Strong	Withstands few heavy hammer blows, yields large fragments
Very strong	Withstands many heavy hammer blows, yields dust, small fragments

WEATHERING

Complete	Minerals decomposed to soil, but fabric and structure preserved
High	Rock decomposition, thorough discoloration, all fractures are extensively coated with clay, oxides or carbonates
Moderate	Fracture surfaces coated with weathering minerals, moderate or localized discoloration
Slight	A few stained fractures, slight discoloration, no mineral decomposition, no affect on cementation
Fresh	Rock unaffected by weathering, no change with depth, rings under hammer impact

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the location and time of exploration. Subsurface rock, soil and water conditions may differ in other locations and with the passage of time.

FILE: Rock Class.dwg

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ROCK CLASSIFICATION CHART
San Rafael City Schools - Terra Linda High
San Rafael, California

A-2

Project No. 779.12 Date 09/03/03 Approved By: MMM

Figure

BORING 1

EQUIPMENT: CME 75 - 8" Hollow Stem Auger
DATE: 8/14/03
ELEVATION: 79.6 feet*
*REFERENCE: City of San Rafael Topo Map used for Elevation

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters / feet	DESCRIPTION
					0 - 0	2.5" ASPHALT CONCRETE 2" AGGREGATE BASE SILTY SANDY CLAY (CL) (COLLUVIUM) mottled orange-red to brown, dry, stiff to very stiff, low plasticity, 15% - 20% fine to medium grained sands
	1600	42	15.2	112.0		
					1 / 5	SILTY SANDY CLAY WITH GRAVEL (CL) light brown to brown, dry, very stiff, low plasticity, 15% - 20% fine to coarse grained sands, 5% - 10% fine to medium graded gravel to 3/4"
	1100	50	12.3	116.0	2	
					3 / 10	Grades brown to dark brown
	1100	29	14.9	110.0		
					4 / 15 / 5	
		50/1"	9.9			SANDSTONE (SS) moderately weathered, light brown to brown, fine to medium grained sands
					6 / 20	

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: Boring Logs 779-12.dwg

Miller Pacific
ENGINEERING GROUP

BORING LOG
San Rafael City Schools - Terra Linda High
San Rafael, California

A-3

Project No. 779.12 | Date 09/03/03 | Approved By: [signature]

Figure

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (3)	BORING 1 (CONTINUED)
						20			SANDSTONE (SS) moderately weathered, light brown to brown, fine to medium grained sands
					7				
									grades to slightly weathered, light gray to gray, fine to medium grained sands
		50/0"				25			Bottom of boring at 25.3' No groundwater observed during drilling
					8				
					9				
						30			
					10				
						35			
					11				
					12				
						40			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m^3 = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: Boring Logs 779-12.dwg

Miller Pacific
ENGINEERING GROUP

BORING LOG
San Rafael City Schools - Terra Linda High
San Rafael, California

A-4

Project No. 779.12 | Date 09/03/03 | Approved By: | Figure

BORING 2

EQUIPMENT: CME 75 - 8" Hollow Stem Continuous Flight Auger
DATE: 8/14/03
ELEVATION: 79.6 feet*
*REFERENCE: City of San Rafael Topo Map, DPW, 1998

OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters	DEPTH feet	SAMPLE	SYMBOL (3)	DESCRIPTION
					0	0			2.5" ASPHALT CONCRETE
									2" AGGREGATE BASE
									SILTY SANDY CLAY (CL) (COLLUVIUM) mottled orange-red to brown, dry, stiff to very stiff, low plasticity, 15% - 20% fine to medium grained sands
	1400	34	19.9	103.0	1		■		
						5			
	2200	61	13.8	119.0	2		■		SILTY SANDY CLAY w/ GRAVEL (CL) light brown to brown, dry, very stiff, low plasticity, 15% - 20% fine to coarse grained sands, 5% - 10% fine to medium graded gravel to 3/4"
					3	10			
		50/5"	12.7		4		■		SANDSTONE (SS) moderately weathered, light brown to brown, fine to medium grained sands
						15			
					5				Bottom of boring at 16' No groundwater observed during drilling
					6	20			

NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf)
(2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m³ = 0.1571 x DRY UNIT WEIGHT (pcf)
(3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY

FILE: Boring Logs 779-12.dwg

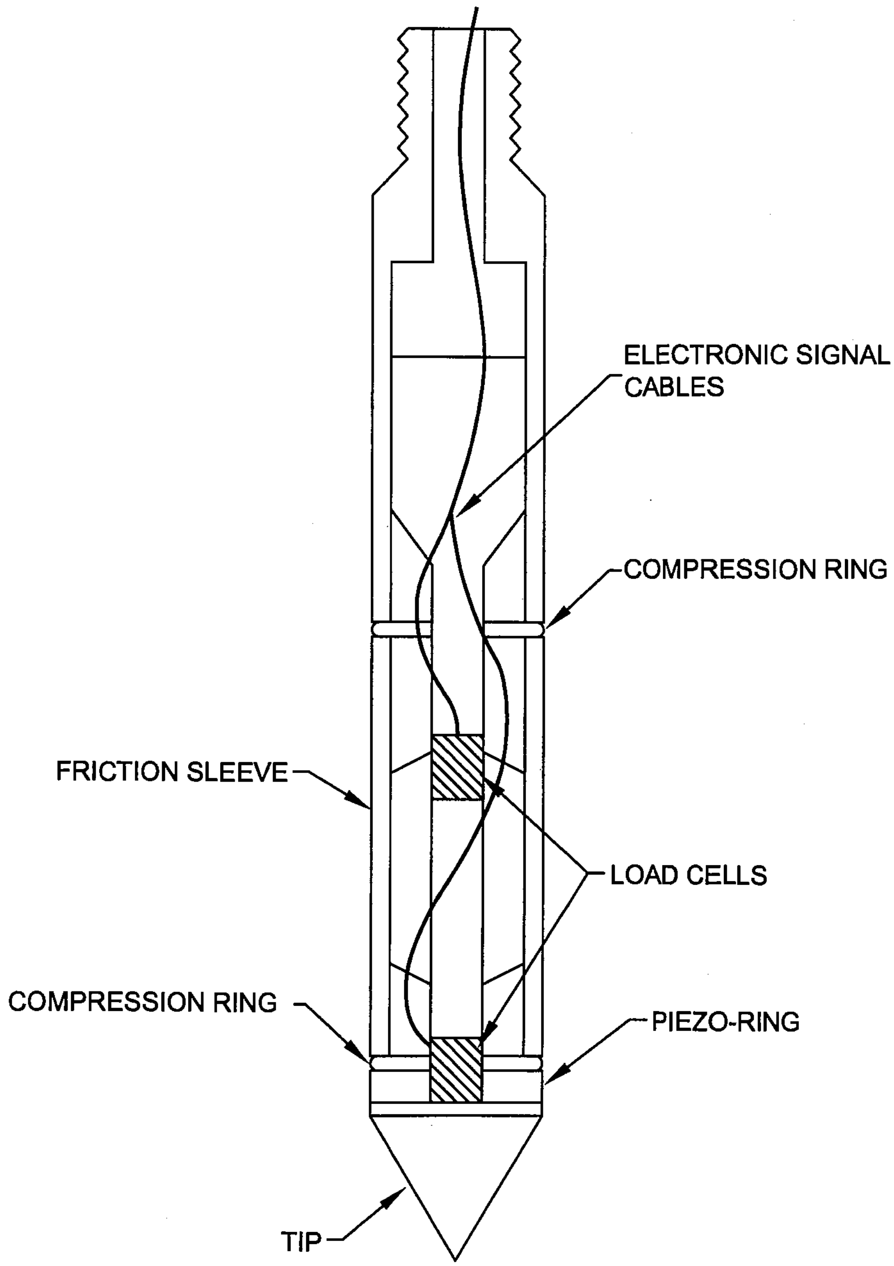
Miller Pacific
ENGINEERING GROUP

BORING LOG
San Rafael City Schools - Terra Linda High
San Rafael, California

A-5

Project No. 779.12 | Date 09/03/03 | Approved By: [signature]

Figure



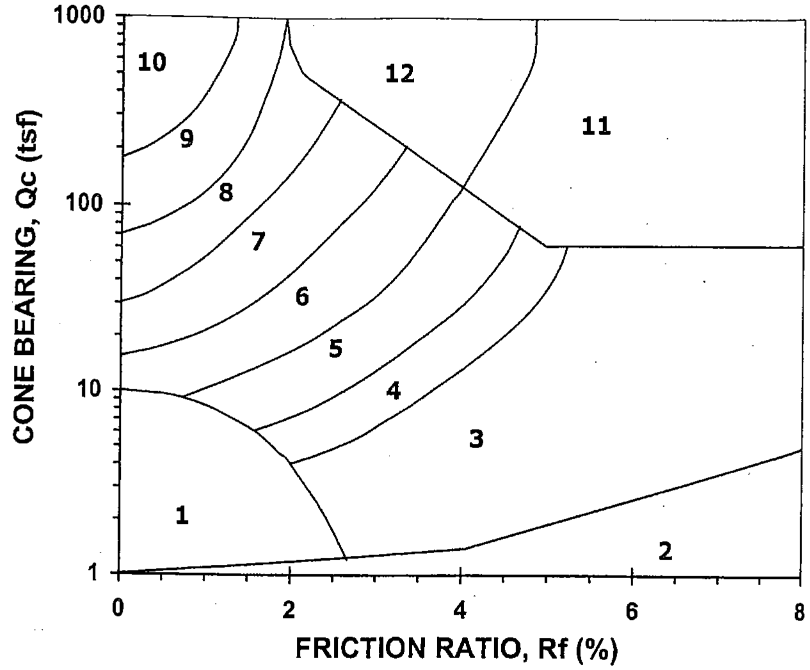
CONE PENETROMETER

(NO SCALE)

FILE: STD-075.779.12TL.dwt

Miller Pacific ENGINEERING GROUP	CONE PENETROMETER San Rafael City Schools - Terra Linda High San Rafael, California		A-6
Project No. 779.12	Date 10/29/03	Approved By:	Figure

SIMPLIFIED SOIL BEHAVIOR TYPE CLASSIFICATION FOR STANDARD ELECTRONIC CONE PENETROMETER



ZONE	Qc/N[1]	Su Factor (Nk)[2]	SOIL BEHAVIOR TYPE[1]
1	2		Sensitive Fine Grained
2	1	for Zones 1 to 6	Organic Material
3	1	10 for Qc <= 9 tsf	CLAY
4	1.5	12 for Qc = 9 to 12 tsf	Silty CLAY to CLAY
5	2	15 for Qc > 12 tsf	Clayey SILT to Silty CLAY
6	2.5		Sandy SILT to Clayey SILT
7	3	---	Silty SAND to Sandy SILT
8	4	---	SAND to Silty SAND
9	5	---	SAND
10	6	---	Gravelly SAND to SAND
11	1	15	Very Stiff Fine Grained (*)
12	2	---	SAND to Clayey SAND (*)

(*) Overconsolidated or Cemented

Qc = Tip Bearing
Fs = Sleeve Friction
Rf = Fs/Qc*100 = Friction Ratio

References: [1]Robertson, 1986, Olsen, 1988
[2]Bonaparte & Mitchell, 1979 (young bay mud Qc <= 9)
[2]Estimated from local experience (fine grained soils Qc > 9)
Note: Testing performed in accordance with ASTM D3441

John Sarmiento & Associates
Cone Penetrometer Testing Services

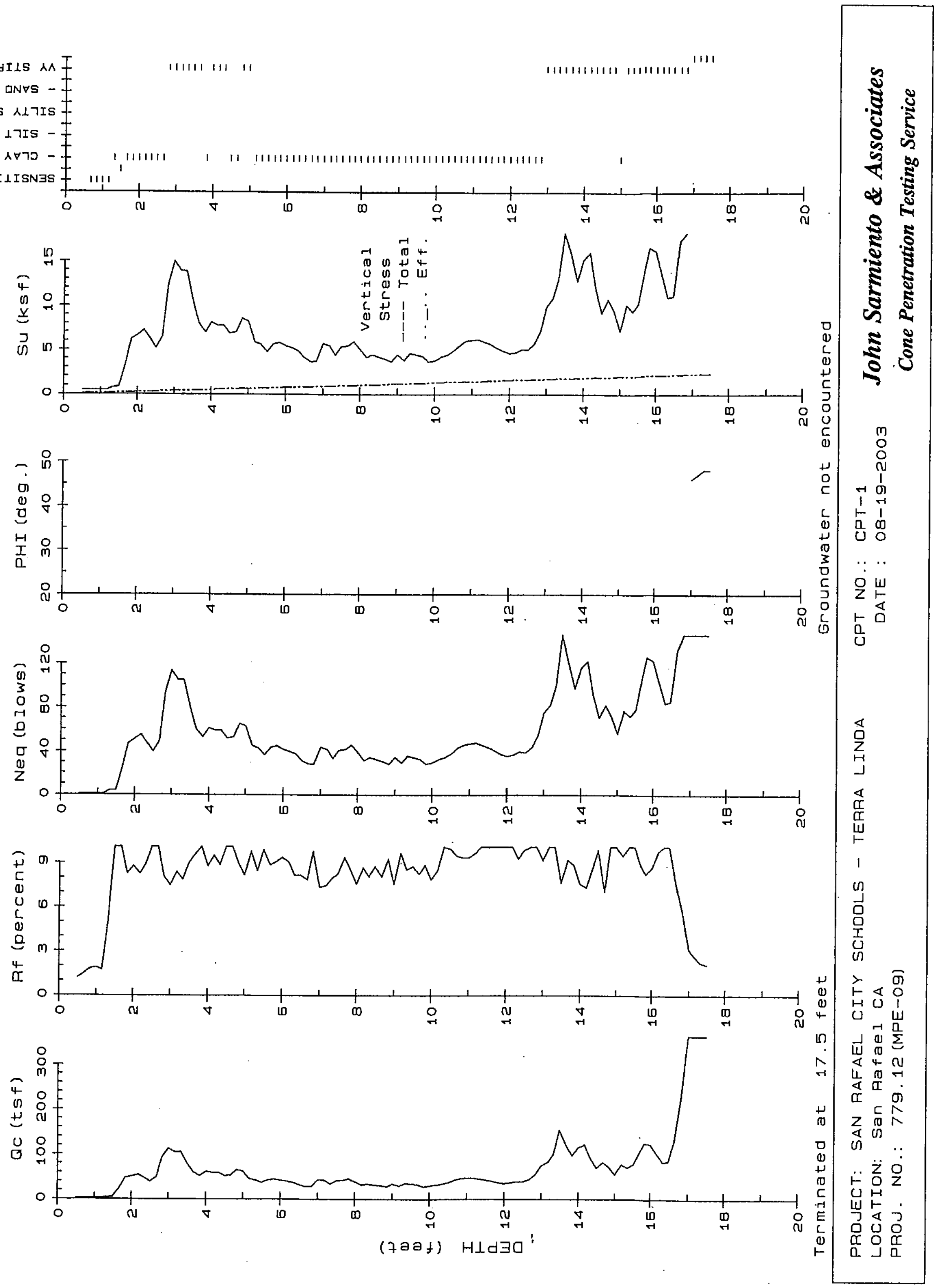
FILE: STD-075 cone 779.12TL.dwt

Miller Pacific
ENGINEERING GROUP

CPT SOIL INTERPRETATION CHART
San Rafael City Schools - Terra Linda High
San Rafael, California

A-7

Project No. 779.12 | Date 10/29/03 | Approved By: [signature] | Figure



FILE: CPT LOGS 779.12TL.dwg

Miller Pacific
ENGINEERING GROUP

CONE PENETRATION TEST LOG
San Rafael City Schools - Terra Linda High
San Rafael, California

A-8

Project No. 779.12 | Date 10/29/03 | Approved By: [signature]

Figure

APPENDIX H

Selected Drawings from 1958 Plans for the School

(GM&P, 1958)

· SCHEDULE OF DRAWINGS ·

ARCHITECTURAL

SHT. NO	BLDG.	BUILDINGS A & B.	SHT. NO	BLDG.	BUILDINGS C, D & E.
A1	AB CDE	SITE PLAN, SCHEDULE OF DRAWINGS, & ABBREVIATIONS	A1	AB CDE	SITE PLAN, SCHEDULE OF DRAWGINGS, & ABBREVIATIONS
A1A	AB CDE	DETAIL SITE PLAN	A1A	AB CDE	DETAIL SITE PLAN.
A1B	AB CDE	COVERED WALK PLAN & DETAILS	A1B	AB CDE	COVERED WALK PLAN & DETAILS
A2	A.	1/8" FLOOR PLAN - 1ST. FLOOR ACADEMIC & ADMINISTRATION WING.	A2	C.	1/8" FLOOR PLAN. GYMNASIUM BLDG.
A3	A.	1/8" FLOOR PLAN 2ND. FLOOR ACADEMIC WING.	A3	C	1/8" ROOF PLAN & DETAILS GYM. BLDG.
A4	A.	1/8" ROOF PLAN AND DETAILS ACADEMIC & ADMINISTRATION WING.	A4	C.	1/8" EXTERIOR ELEVATIONS GYM. BLDG.
A5	A.	1/8" EXTERIOR ELEVATIONS ACADEMIC & ADMINISTRATION WING.	A5	C	GYM. SECTIONS.
A6	A.	SECTIONS - ADMINISTRATION WING.	A6	C	LOCKER ROOM SECTIONS.
A7	A.	TYPICAL ACADEMIC WING SECTION & CORRIDOR DETAILS.	A7	C	INTERIOR ELEVATIONS - LOCKER ROOMS.
A8	A.	INTERIOR ELEVATIONS - CORRIDORS & ADMINISTRATION AREA.	A8	C	MISC. DETAILS.
A9	A.	INTERIOR ELEVATIONS & DETAILS. TOILET RMS ETC.	A9	C	GYMNASIUM COURT PLAN & DETAILS.
A10	A.	1/4" DETAIL FLOOR PLAN. ADMINISTRATION WING & STAIR "B"	A10	C	1/4" DETAIL PLAN. GYMNASIUM ENTRANCE
A11	A.	1/4" DETAIL PLAN STAIRS A & B.	A11	C	1/4" DETAIL PLAN - LOCKER ROOMS.
A12	A.	EXTERIOR & INTERIOR ELEVATIONS STAIRS "A" & "B"	A12	CDE	FINISH SCHEDULE
A13	A.	INTERIOR ELEVATIONS STAIRS "A" & "B"	A13	CDE	DOOR SCHEDULE & DETAILS
A14	A.	INTERIOR ELEVATIONS STAIR "A" & STAIR DETAILS.	A14	CDE	DOOR DETAILS.
A15	A.	1/4" PLAN & ELEVATIONS. TYPICAL CLASSROOM & BUSINESS C.R.	A15	CDE	DOOR DETAILS BLDG. D&E. WINDOW SCHEDULE & DETAILS (ALUM)
A16	A.	1/4" PLAN & ELEVATIONS. ARTS & CRAFTS & HOMEMAKING C.R.	A16	D	1/4" FLOOR PLAN - 1/8" ROOF PLAN & DETAILS - MUSIC BLDG.
A17	A	1/4" PLAN & ELEVATIONS. CHEMISTRY CLASSROOMS.	A17	D	EXTERIOR & INTERIOR ELEVATIONS - DETAILS.
A18	A	1/4" PLAN & ELEVATIONS - LIBRARY AREA & CUSTODIAN RM.	A18	E.	1/4" FLOOR PLAN SHOP BLDG.
A19	A-B	FINISH SCHEDULE.	A19	E	ROOF PLAN & MEZZANINE PLAN.
A20	A-B	DOOR SCHEDULE & DETAILS	A20	E	EXTERIOR ELEVATIONS & SECTIONS
A21	A-B	DOOR & WINDOW DETAILS (STEEL)	A21	E	INTERIOR ELEVATIONS
A22	A-B	WINDOW SCHEDULE & DETAILS (ALUMINUM)	A22	E	MISC. DETAILS.
A23	A-B	DOOR & WINDOW DETAILS (ALUMINUM)			
A24	B	1/8" FLOOR PLAN CAFETERIA BLDG.			
A25	B	1/8" ROOF PLAN CAFETERIA BLDG.			
A26	B	ROOF DETAILS CAFETERIA BLDG.			
A27	B	1/8" EXTERIOR ELEVATIONS. CAFE. BLDG.			
A28	B	1/4" DETAIL FLOOR PLAN CAFE. BLDG.			
A29	B	CROSS SECTIONS - CAFE. BLDG.			
A30	B	INTERIOR ELEVATIONS CAFE. BLDG.			
A31	B	KITCHEN & CANTEEN EQUIPMENT ELEVATIONS & DETAILS.			

STRUCTURAL

SHT. NO	BLDG.	BUILDINGS A & B.	SHT. NO	BLDG.	BUILDINGS C, D & E.
S1	A	FIRST FLOOR & FOUNDATION PLAN	S1	C	FLOOR & FOUNDATION PLAN
S2	A	SECOND FLOOR PLAN	S2	C	ROOF FRAMING PLAN
S3	A	ROOF FRAMING PLAN	S3	C	ARCH DETAILS, TYPICAL DETAILS & NOTES
S4	A	TYPICAL DETAILS & NOTES	S4	C	SECTIONS
S5	A	SECTIONS & TYPICAL DETAILS	S5	C	SECTIONS
S6	A	SECTIONS	S6	C	SECTIONS. COVERED WALK DETAILS.
S7	A	SECTIONS	S1	D	FLOOR AND ROOF PLANS - SECTIONS & DETAILS
S8	A	SECTIONS	S1	E	FLOOR & ROOF PLANS - SECTIONS & DETAILS.
S9	B	FLOOR & FOUNDATION PLAN, SECTIONS & DETAILS	S2	E	SECTIONS, DETAILS & NOTES
S10	B	ROOF FRAMING PLAN, SECTIONS & DETAILS			

PLUMBING

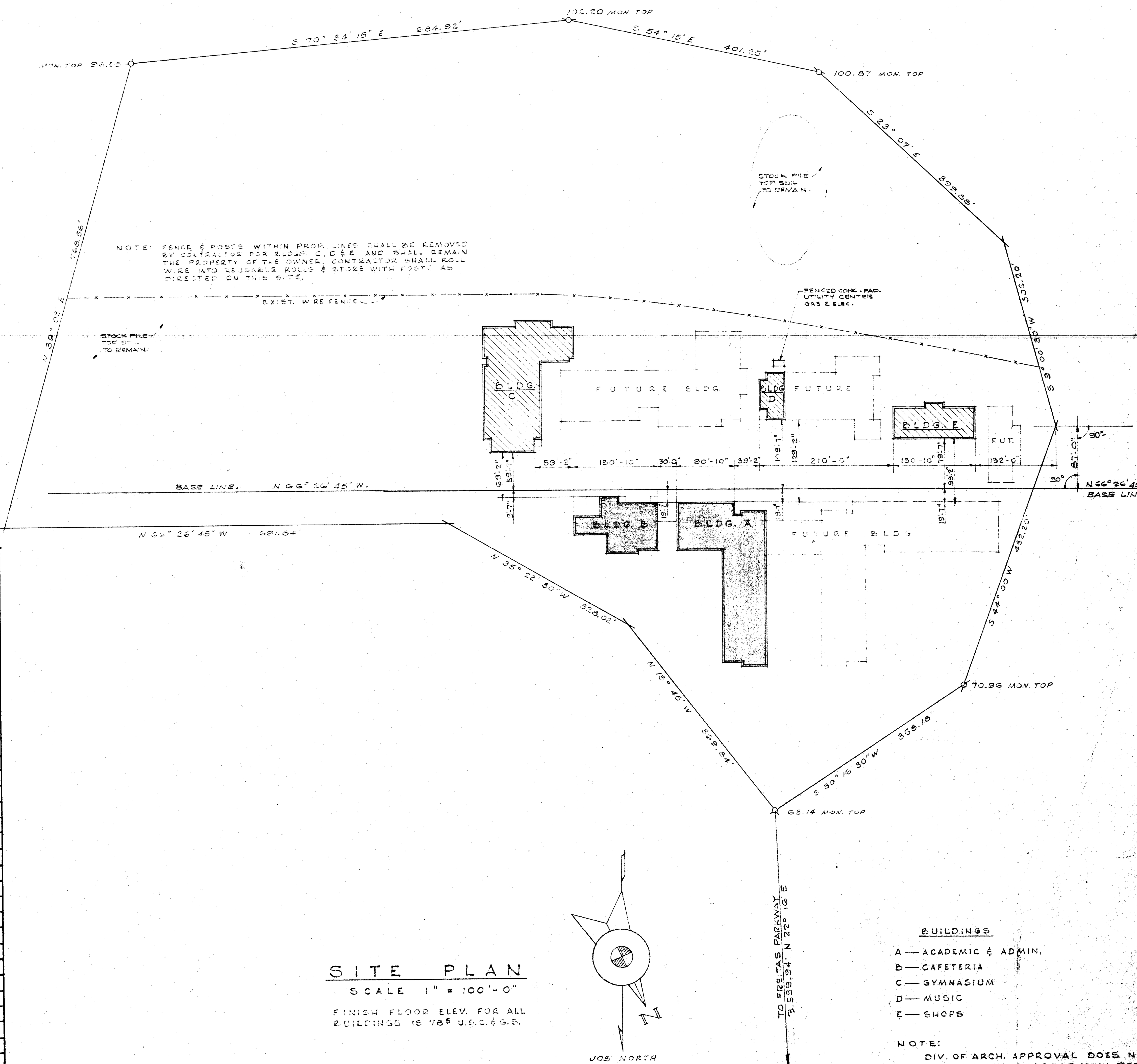
SHT. NO	BLDG.	BUILDINGS A & B.	SHT. NO	BLDG.	BUILDINGS C, D & E.
PAB	AB	PLUMBING SITE PLAN AND DETAILS, SCHEDULES.	PCDE	CDE	SITE PLAN - DETAILS & SCHEDULES
P1A	A	FIRST FLOOR ACADEMIC & ADMINISTRATION WING. - DETAILS.	P1C	C	LOCKER ROOM FLOOR PLAN & DETAILS
P2A	A	SECOND FLOOR - ACADEMIC WING.	P2C	C	GYMNASIUM FLOOR PLAN & DETAILS
P1B	B	CAFETERIA FLOOR PLAN & DETAILS	P1D	D	MUSIC BLDG. FLOOR PLAN & DETAILS
L-1	A.B CD.E	LANDSCAPE PLAN - STORM SEWER LINES	P1E	E	SHOP BLDG FLOOR PLAN & DETAILS.

HEATING & VENTILATING

SHT. NO	BLDG.	BUILDINGS A & B.	SHT. NO	BLDG.	BUILDINGS C, D & E.
HAB	AB	CONTROL DIAGRAMS & DETAILS	HCDE	CDE	SCHEDULES & CONTROL DIAGRAMS
H1A	A.	FIRST FLOOR PLAN & DETAILS ADMINISTRATIO & ACADEMIC WING.	H1C	C	GYMNASIUM LOCKER RM. PLAN & DETAILS
H2A	A.	SECOND FLOOR PLAN & DETAILS ACADEMIC WING	H2C	C	GYMNASIUM PLAN & DETAILS.
H1B	B.	CAFETERIA FLOOR PLAN & DETAILS	H1D	D	MUSIC BUILDING PLAN & DETAILS
			H1E	E	SHOP BUILDING PLAN & DETAILS

ELECTRICAL

SHT. NO	BLDG.	BUILDINGS A & B.	SHT. NO	BLDG.	BUILDINGS C, D & E.
E.1.	AB CDE.	SCHEDULES, SYMBOLS & ABBREVIATIONS	E.1.	AB CDE	SCHEDULES, SYMBOLS, & ABBREVIATIONS
E2	AB	PLOT PLAN, SCHEDULES & DETAILS	E1C	C.	GYM. LOCKER ROOM PLAN & DETAILS
E1A	A.	ADMINISTRATION PLAN & DETAILS	E2C	C.	GYM. PLAN & DETAILS
E2A	A.	FIRST FLOOR PLAN ACADEMIC WING.	E1D	D	MUSIC BUILDING PLAN & DETAILS.
E3A	A.	SECOND FLOOR PLAN ACADEMIC WING.	E1E	E	SHOP BUILDING PLAN & DETAILS.
E1B	B.	CAFETERIA FLOOR PLAN.	E2E	E	SHOP BUILDING PLAN & DETAILS



SITE PLAN
SCALE 1" = 100'-0"
FINISH FLOOR ELEV. FOR ALL BUILDINGS IS 78.5 U.S.C.&G.S.

NOTE:
DIV. OF ARCH. APPROVAL DOES NOT INCLUDE FUTURE BLDGS. SHOWN DOTTED

LEGEND

- NUMBER / ROOM NUMBER / BUILDING
- NUMBER / DOOR / BUILDING
- NUMBER / DETAIL / SHEET NO.
- 14 — COLUMN №
- NUMBER / SECTION / SHEET NO.
- x 8.36 FINISHED / GRADES / 8.36 EXISTING
- TYPE / WINDOW / BUILDING
- CONCRETE
- METAL STUDS

ABBREVIATIONS

A.B.	ANCHOR BOLTS	DEPT.	DEPARTMENT	FND.	FOUNDATION	MFG.	MANUFACTURER	SM.	SMOOTH
AC.T.	ACOUSTICAL TILE	D.F.	DRINKING FOUNTAIN	F.S.D.	FULL SIZE DETAIL	M.O.	MASONRY OPENING	SPEC.	SPECIFICATION
AL.	ALUMINUM	DET.	DETAIL	F.PRE.	FIREPROOF	N.I.C.	NOT IN CONTRACT	S.P.	SUGAR PINE
ASPH.	ASPHALT	D.S.	DOWNSPOUT	F.T.	FLUSH THRESHOLD	No.	NUMBER	S.S.	SERVICE SINK
ASPH.T	ASPHALT TILE	DWG.	DRAWING	GALV.	GALVANIZED	O.G.	OBSCURE GLASS	STR.	STRUCTURAL
A.T.B.	ASPHALT TILE BASE	ENT.	ENTRANCE	GA.	GAUGE	O.W.G.	OBSCURE WIRE GLASS	ST. CL.	STORAGE CLOSET
BM.	BEAM	E.P.	ELECTRIC PANEL	G.I.	GALVANIZED IRON	D.S.	DOUBLE STRENGTH	T.	TOILET
BL.	BLOCKING	EQUIP.	EQUIPMENT	GL.	GLASS	W.G.	WINDOW 'B' QUALITY, D.S.	T.B.	TRASH BIN
CAB.	CABINET	EXC.	EXCAVATE	GL.CER.TILE	GLAZED CERAMIC TILE	S.G.	HEAVY SHEET GLASS 3/16"	T.C.	TERRA COTTA
C.A.R.	COLD AIR RETURN	EXIST.	EXISTING	P.P. GL.	GLASS, POLISHED PLATE	OFF.	OFFICE	TH.	THRESHOLD
C.B.	CHALKBOARD	EXP.	EXPOSED	T.G.	GLASS, TEMPERED	P.B.	PANIC BOLTS	T.B.	TACKBOARD
C.C.	CENTER TO CENTER	EXP. B.	EXPANSION BOLT	G.S.	GALVANIZED STEEL	O.C.	ON CENTER	U.V.	UNIT VENTILATOR
CEIL.	CEILING	EXT.	EXTERIOR	GYP.	GYPSUM	PLAS.	PLASTER	UR.	URINAL
CEM.	CEMENT	E.J.	EXPANSION JOINT	HWD.	HARDWOOD	PLAS.AC.	ACOUSTICAL PLASTER	VEST.	VESTIBULE
C.I.	CAST IRON	F.C.	FURRED CEILING	I. BM	I BEAM	PLAS. C	CEMENT PLASTER	V.G.D.F.	VERTICAL GRAIN DOUGLAS FIR
C.I.P.	CAST IRON PIPE	F.D.	FLOOR DRAIN	I.D.	INSIDE DIAMETER	PLAS. K	KEENES CEM. PLASTER	VINYL T.	VINYL TILE
CL.	CLASS	F.DR.	FIRE DOOR	INS.	INSULATION	PLAS. S.	STUCCO	V.T.R.	VENT THRU ROOF
CONC.	CONCRETE	F.E.C.	FIRE EXTINGUISHER CAB.	K.D.	KALAMEIN DOOR	PLWD.	PLYWOOD	W.	WINDOW
CONV.	CONVECTOR	F.EXT.	FIRE EXTINGUISHER	LAB.	LABORATORY	PLMB.	PLUMBING	W.D.	WINDOW DIMENSION
CONC. F.	CONCRETE FLOOR	F.H.	FIRE HOSE	LAV.	LAVATORY	PROP.	PROPOSED	W.C.	WATER CLOSET
CORR.	CORRIDOR	F.H.C.	FIRE HOSE CABINET	LKR.	LOCKER	R.	RADIUS	W.F.	WIDE FLANGE
C.G.	COLORED GLASS	F.HY.	FIRE HYDRANT	MA.TH.	MARBLE THRESHOLD	PL.	STEEL PLATE	W.P.	WATERPROOF
C.T.	CORK TILE	FIN.	FINISH	MAX.	MAXIMUM	RAD.	RADIATOR	Y.D.	YARD DRAIN
C.W.	COLD WATER	F.B.	FLAT BAR	MET.	METAL	R.C.	TOPSET RUBBER BASE	DIAG. SH.	DIAGONAL SHEATHING
C.W.G.	CLEAR WIRE GLASS	FL.	FLOOR	MIN.	MINIMUM	RM.	ROOM	ELEV.	ELEVATION
C.B.	CATCH BASIN	FLG.	FLOORING	M.L.	METAL LATH	REINF.	REINFORCING	P.S	PAINT SPECIFICATION
℄	CENTER LINE	FIN. FL.	FINISHED FLOOR	M. PART.	METAL PARTITION	RWD.	REDWOOD	D.F.	DOUGLAS FIR
[	CHANNEL	FLOUR.	FLOURESCENT	M.S.	METAL STUD	SEC.	SECTION		
D.	DIAMETER	F.M.T.	FLUSH METAL THRESHOLD	M.T.	METAL THRESHOLD	SHT.	SHEET		

STATE DIVISION OF ARCHITECTURE
STATE OF CALIFORNIA DEPARTMENT OF PUBLIC WORKS DIVISION OF ARCHITECTURE
APPROVED MAR 16 1959
M.W. Sohlberg

COUNTY SUPT. OF SCHOOLS

BOARD OF EDUCATION
Victor W. Jones Secy.

GROMMÉ MULVIN & PRIESTLEY
ARCHITECTS
1539 FOURTH STREET
SAN RAFAEL, CAL. GL. 3-3925

NEW HIGH SCHOOL
SAN RAFAEL HIGH SCHOOL DISTRICT
FOR THE TERRA LINDA AREA
MARIN COUNTY CALIFORNIA

JOB NO.	DATE: DEC. 16, 1958		DRAWING NO.
502-26	DRAWN BY: D. SCHNELL J.W.	CHECKED BY: J. WINNIE	A1 BLDGS. A,B,C,D,E
SET.	APPROVED		OF SHEETS

STATE DIVISION OF ARCHITECTURE	COUNTY SUPT. OF SCHOOLS		H. M. ENGLE CIVIL & STRUCTURAL ENGINEER 1539 4TH ST. SAN RAFAEL LICENSE NO.	GROMMÉ MULVIN & PRIESTLEY ARCHITECTS 1539 FOURTH STREET SAN RAFAEL, CAL. GL. 3-3925	NEW HIGH SCHOOL SAN RAFAEL HIGH SCHOOL DISTRICT FOR THE TERRA LINDA AREA MARIN COUNTY CALIFORNIA	JOB NO. 502-26	DATE: DEC. 16, 1958	DRAWING NO. A1A
APPROVED JAN 16 1959 M. W. Schlenger	BOARD OF EDUCATION Walter W. Jones Secy.			Carl F. Gromme		SET.	DRAWN BY D. SCHNELL / CHECKED BY J. WINNIE / APPROVED	BLDGS. A,B,C,D&E OF SHEETS

APPENDIX I

ASCE 7-16 Seismic Design Parameters

A3GEO

TLHS Kiln Room Addition

Latitude, Longitude: 38.00035, -122.55490

Date	12/9/2021, 2:19:39 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	C - Very Dense Soil and Soft Rock

Type	Value	Description
S_S	1.5	MCE_R ground motion. (for 0.2 second period)
S_1	0.6	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.8	Site-modified spectral acceleration value
S_{M1}	0.84	Site-modified spectral acceleration value
S_{DS}	1.2	Numeric seismic design value at 0.2 second SA
S_{D1}	0.56	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	D	Seismic design category

Type	Value	Description
F_a	1.2	Site amplification factor at 0.2 second
F_v	1.4	Site amplification factor at 1.0 second
PGA	0.52	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.624	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
SsRT	1.703	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.853	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.679	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.75	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.52	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.919	Mapped value of the risk coefficient at short periods
C_{R1}	0.906	Mapped value of the risk coefficient at a period of 1 s

DISCLAIMER

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END OF REPORT

APPENDIX H

Results of the Paleontological Records Search

From:	Patricia A Holroyd
To:	Kloess, Peter
Cc:	Heyman, Barbara; Beherec, Marc; Nayyar, Margo
Subject:	EXTERNAL: Re: Paleo records search request- Terra Linda HS
Date:	Monday, July 31, 2023 10:59:10 AM

Dear Dr. Kloess,

I have conducted a review of the University of California Museum of Paleontology records for paleontological resources in or near your project area, which appears to be in rocks mapped as Quaternary alluvium or Franciscan. We have no records of prior finds in the project area or nearby in similar rock units.

Billing will arrive separately from our campus business office.

Thank you, Pat Holroyd

Patricia A. Holroyd, Ph.D.
Senior Museum Scientist
Museum of Paleontology
University of California
Berkeley, CA 94720

Patricia A. Holroyd, Ph.D.
Senior Museum Scientist
Museum of Paleontology
University of California
Berkeley, CA 94720

On Mon, Jul 24, 2023 at 3:50 PM Kloess, Peter <Peter.Kloess@mbakerintl.com> wrote:

> Dear UC Museum of Paleontology staff,
>
> Michael Baker International is conducting a paleontological resources study supporting the Terra Linda High School Capital Improvements Project (project) in San Rafael, California. The San Rafael School District is conducting an environmental review on plans to improve and modernize existing facilities at Terra Linda High School. The project site is located at 320 Nova Albion Way between Devon Drive and Nova Albion Way in Marin County, as shown in the attached maps, and can be located on the Novato and San Rafael Mtn. 7.5" quadrangle maps.
>
> We are contacting you to request a paleontological records search of the UCMP database to

identify any paleontological resources that the proposed project may impact. Invoices for this records search can be emailed to me and I will forward it to our billing department for payment. If you have any questions or comments, please contact me at peter.kloess@mbakerintl.com. Thank you for your time and assistance.

Sincerely,

Peter A. Kloess, Ph.D. | Senior Paleontologist/Principal Investigator
3536 Concours, Suite 100 | Ontario, CA 91764 | [O] 510-213-7912
peter.kloess@mbakerintl.com | www.mbakerintl.com

APPENDIX I

Noise Impact Assessment

Noise Impact Assessment for the Terra Linda High School Capital Improvements Project

City of San Rafael, California

Prepared For:

Michael Baker International
9755 Clairemont Mesa Blvd, Suite 100
San Diego, CA 92124

Prepared By:

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS
55 Hanover Lane, Suite A
Chico, CA 95973

February 2024

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities Act
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CIF	California Interscholastic Federation
City	City of San Rafel
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	Decibel is A-weighted
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
L_{dn}	Day-night average sound level
L_{eq}	Measure of ambient noise
L_{max}	The maximum A-weighted noise level during the measurement period.
L_{min}	The minimum A-weighted noise level during the measurement period.
OPR	Office of Planning and Research
OSHA	Federal Occupational Safety and Health Administration
PPV	Peak particle velocity
Project	Terra Linda High School Modernization Project
RCNM	Roadway Construction Noise Model
RMS	Root mean square
STC	Sound Transmission Class
VdB	Vibration Velocity Level

1.0 INTRODUCTION

This report documents the results of a Noise Impact Assessment completed for the Terra Linda High School Modernization Project (Project), which proposes various improvements at the existing Terra Linda High School campus to modernize and/or replace existing outdated and aging academic and physical education facilities and to improve access in compliance with the Americans with Disabilities Act (ADA). The purpose of this report is to estimate Project-generated noise and to determine the level of impact the Project would have on the environment.

1.1 Project Location and Description

The Project is located in the City of San Rafael (City) on the existing Terra Linda High School campus at 320 Nova Albion Way. The Project proposes improvements that are needed to modernize and/or replace existing academic and physical education facilities at the campus to serve the existing student population and to improve access in compliance with the ADA. Table 1-1 provides a detailed description of the proposed improvements and construction timing.

Table 1-1. Proposed Improvements
Phase 1: June 2024 – November 2025
Rehabilitation of Aquatics Center: The existing outdoor swimming pool facilities (including the 25-meter by 25-yard pool) would be demolished, and a new competition- level aquatics center (with a 25-meter by 40-yard pool) would be constructed to support the existing swimming and water polo programs. The facility would meet California Interscholastic Federation (CIF) standards, which would allow the school to host CIF-level competitions. The existing pool lights would be replaced with new low-level MUSCO lighting on 50-foot poles. The existing pool deck would be removed and replaced with a larger one. A new scoreboard and LED display would be installed at the perimeter of the pool. A new concrete 5- to 6-level bleacher with a cantilever shade structure would be installed on the south side of the aquatic facility; the bleachers would require the installation of a retaining wall. The existing ancillary gym building and pump room would be demolished and replaced with a new ancillary gym building and pool house. Additionally, a new pump house building would be constructed. New lockers as well as restroom facilities would be a part of the ancillary gym building to better serve the pool. **Modernization of Physical Education Support Spaces:** The existing locker rooms, bathrooms, team rooms, and other support spaces in the gym building would be modernized. The spaces, including the bathrooms and lockers, would be reconfigured to add a new team room and an all-gender locker room. There would be new lighting, painting, finishes, and fixtures. The exterior doors would be replaced, as would mechanical equipment. The roof would either be coated or replaced, and the existing natural gas lines servicing the building would be upsized and rerouted. Mechanical equipment serving these spaces may also be replaced.
Phase 2: April 2024 – August 2028
Modernization of Main Classroom Buildings: The interior of the main school buildings, including classrooms, labs, restrooms, and corridors, would be modernized to be more resilient to physical damage and compliance with ADA standards. The facilities would be improved with new LED lighting, flooring, counters, fixtures, painting and finishes, and technology. The restroom toilets would be improved to high-security, full-height partitions. The fire alarm system would be upgraded. Room configurations at select areas would be changed to better serve more modern functions; as an example, existing book storage rooms would be converted into a wellness center.
Phase 3: May 2027 – August 2029
Stadium Upgrades: A new concessions and restroom facility would be constructed between the stadium and gymnasium, as would a new ticket booth building. The existing scoreboard would be replaced, and the track surface would be replaced with an in-kind rubberized surface. ADA-compliant paths of travel would be provided, and two existing portable structures (each approximately 1,000 square feet) would be removed. Existing flatwork, fencing, grades, landscaping, and site lighting between the practice gym and the track would also be improved as part of the stadium upgrades. One fire hydrant would need to be relocated slightly. The existing concession stand, a 40-foot converted storage container, would be removed. **New Artificial** Turf at Baseball and Softball fields: Approximately 200,000 square feet of natural turf would be replaced with artificial turf. No "crumb rubber" materials would be present in the synthetic turf. The new fields may include other improvements, including dugouts, shot put throw station, irrigation line upgrades to adjacent landscaping, new scoreboards, and improved ADA-compliant paths of travel. No lighting is proposed for the ballfields as part of the Proposed Project. **Tennis Court Improvements:** The existing tennis courts would be replaced, walkways would be improved to meet ADA standards, and the drinking fountain would be replaced with a new ADA-compliant fountain. The existing fencing around the tennis courts would be replaced. No lighting is proposed for the tennis courts as part of the Proposed Project.

Implementation of the Proposed Project would not require off-site improvements. The Project would be phased to limit interruptions to existing campus operations and to avoid the need for temporary student classroom facilities during construction. Additionally, construction activities would be scheduled to minimize disruptions to campus programs and important testing days. The new facilities would tie into existing underground utilities located within the campus. The Project would comply with the California Building Standards Code (Title 24, California Code of Regulations) and include sustainability improvements as required by the California Green Building Standards Code (California Code of Regulations Part 11, Title 24), such as water conservation features (e.g., low-flow, water-efficient plumbing fixtures for toilets and sinks, tankless water heater systems, drought-tolerant plants and low-water irrigation systems with smart sensor controls). Improvements to the aquatic center, tennis courts, turf fields, and ADA-compliant paths of travel may require the removal of existing trees.

The Proposed Project would not increase the student seating capacity of the campus. However, the proposed competitive-level aquatic center and the proposed artificial turf at the ballfields would allow extended use of the facilities by the high school and community. Expanded activity may include CIF tournaments at the aquatic center, early morning water polo and swim team practices, and expanded use of the ballfields.

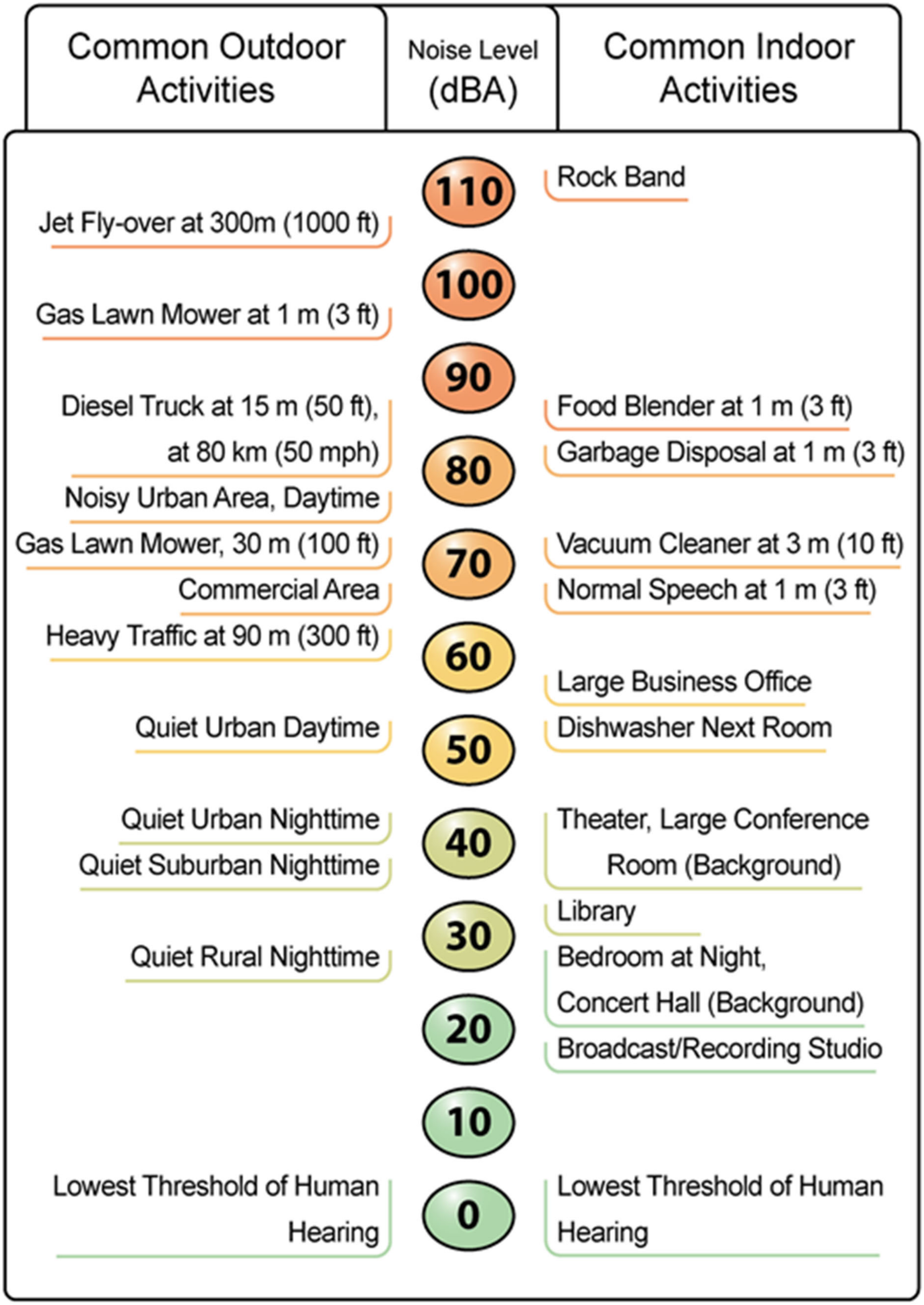
2.0 ENVIRONMENTAL NOISE AND GROUNDBORNE VIBRATION ANALYSIS

2.1 Fundamentals of Noise and Environmental Sound

2.1.1 Addition of Decibels

The decibel (dB) scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted (dBA), an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be three dB higher than one source under the same conditions (Federal Transit Administration [FTA] 2018). For example, a 65-dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by three dB). Under the decibel scale, three sources of equal loudness together would produce an increase of five dB.

Typical noise levels associated with common noise sources are depicted in Figure 2-1. Common Noise Levels.



Source: California Department of Transportation (Caltrans) 2020a

Figure 2-1. Common Noise Levels

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

2.1.2 Sound Propagation and Attenuation

Noise can be generated by a number of sources, including mobile sources such as automobiles, trucks and airplanes, and stationary sources such as construction sites, machinery, and industrial operations. Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB (dBA) for each doubling of distance from a stationary or point source (FHWA 2017). Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 dBA for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics (Federal Highway Administration [FHWA] 2017). No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dBA per doubling of distance is normally assumed. For line sources, an overall attenuation rate of three dB per doubling of distance is assumed (FHWA 2011).

Noise levels may also be reduced by intervening structures; generally, a single row of detached buildings between the receptor and the noise source reduces the noise level by about five dBA (FHWA 2006), while a solid wall or berm generally reduces noise levels by 10 to 20 dBA (FHWA 2011). However, noise barriers or enclosures specifically designed to reduce site-specific construction noise can provide a sound reduction of 35 dBA or greater (Western Electro-Acoustic Laboratory, Inc. 2013). To achieve the most potent noise-reducing effect, a noise enclosure/barrier must physically fit in the available space, must completely break the “line of sight” between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source and extend lengthwise and vertically as far as feasibly possible to be most effective. The limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of sight" between the source and the receiver.

The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows (Caltrans 2002). The exterior-to-interior reduction of newer residential units is generally 30 dBA or more (Harris Miller, Miller & Hanson Inc. 2006). Generally, in exterior noise environments ranging from 60 dBA Community Noise Equivalent Level (CNEL) to 65 dBA CNEL, interior noise levels can typically be maintained below 45 dBA, a typical residential interior noise standard, with the incorporation of an adequate forced air mechanical ventilation system in each residential building, and standard thermal-pane residential windows/doors with a minimum rating of Sound Transmission Class (STC) 28. (STC is an integer rating of how well a building partition attenuates airborne sound. In the U.S., it is widely used to rate interior partitions, ceilings, floors, doors, windows, and exterior wall configurations). In exterior noise environments of 65 dBA CNEL or greater, a combination of forced-air mechanical ventilation and sound-rated construction methods is often required to meet the interior noise level limit. Attaining the necessary noise reduction from exterior to interior spaces is readily achievable in noise environments less than 75 dBA CNEL with proper wall construction techniques following California Building Code methods, the selections of proper windows and doors, and the incorporation of forced-air mechanical ventilation systems.

2.1.3 Noise Descriptors

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise include the average hourly noise level (in L_{eq}) and the average daily noise levels/community noise equivalent level (in L_{dn}/CNEL). The L_{eq} is a measure of ambient noise, while the L_{dn} and CNEL are measures of community noise. Each is applicable to this analysis and defined as follows:

- **Equivalent Noise Level (L_{eq})** is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
- **Day-Night Average (L_{dn})** is a 24-hour average L_{eq} with a 10-dBA "weighting" added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
- **Community Noise Equivalent Level (CNEL)** is a 24-hour average L_{eq} with a 5-dBA weighting during the hours of 7:00 pm to 10:00 pm and a 10-dBA weighting added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the evening and nighttime, respectively.

Table 2-1 provides a list of other common acoustical descriptors.

Table 2-1. Common Acoustical Descriptors

Descriptor	Definition
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micropascals (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micropascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sounds are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	A 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level, CNEL	A 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level.
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.

The A-weighted decibel sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about ±1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source. Close to the noise source, the models are accurate to within about ±1 to 2 dBA.

2.1.4 Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL or L_{dn} is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in A-weighted noise levels (dBA), the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A change in level of at least 5 dBA is required before any noticeable change in community response would be expected. An increase of 5 dBA is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

2.1.5 Effects of Noise on People

2.1.5.1 Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

2.1.5.2 Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources.

2.2 Fundamentals of Environmental Groundborne Vibration

2.2.1 Vibration Sources and Characteristics

Sources of earthborne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or manmade causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions).

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

PPV is generally accepted as the most appropriate descriptor for evaluating the potential for building damage. For human response, however, an average vibration amplitude is more appropriate because it takes time for the human body to respond to the excitation (the human body responds to an average vibration amplitude, not a peak amplitude). Because the average particle velocity over time is zero, the RMS amplitude is typically used to assess human response. The RMS value is the average of the amplitude squared over time, typically a 1- sec. period (FTA 2018).

Table 2-2 displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high-noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. For instance, heavy-duty trucks generally generate groundborne vibration velocity levels of 0.006 PPV at 50 feet under typical circumstances, which as identified in Table 2-2 is considered very unlikely to cause damage to buildings of any type. Common sources for groundborne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment.

Table 2-2. Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibration Levels			
Peak Particle Velocity (inches/second)	**Approximate Vibration Velocity Level (VdB)**	**Human Reaction**	**Effect on Buildings**
0.006–0.019	64–74	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	87	Vibrations readily perceptible	Threshold at which there is a risk of architectural damage to extremely fragile historic buildings, ruins, ancient monuments
0.1	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Threshold at which there is a risk of architectural damage to fragile buildings. Virtually no risk of architectural damage to normal buildings
0.25	94	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to historic and some old buildings
0.3	96	Vibrations may begin to feel severe to people in buildings	Threshold at which there is a risk of architectural damage to older residential structures
0.5	103	Vibrations considered unpleasant by people subjected to continuous vibrations	Threshold at which there is a risk of architectural damage to new residential structures and Modern industrial/commercial buildings

Source: Caltrans 2020b

3.0 EXISTING ENVIRONMENTAL NOISE SETTING

3.1 Noise Sensitive Land Uses

Noise sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as hospitals, historic sites, and certain recreation areas are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise sensitive land uses.

The Project Site is the existing Terra Linda High School campus. As stated above, schools are classified as noise-sensitive land uses and therefore the Project Site itself is considered noise-sensitive. The nearest off-site noise sensitive receptors are residences fronting Nova Albion Way located north of the Project Site, residences fronting Devon Drive located south and west of the Project Site, and Miss Nicky's Preschool located east of the Project Site.

3.1.1 Existing Ambient Noise Environment

The improvements proposed by the Project would all take place within the existing Terra Linda High School campus. The Project Site is surrounded mainly by residential land uses and other educational facilities. The most common and significant source of noise in the Project Area, as well as the City, is traffic noise generated from vehicles traveling on area roadways. Vehicular noise varies with the volume, speed, and type of traffic. Slower traffic produces less noise than fast-moving traffic. Trucks typically generate more noise than cars. Infrequent or intermittent noise also is associated with vehicles including sirens, vehicle alarms, slamming of doors, garbage collection and construction vehicle activity, and honking of horns. These noises add to urban noise and are regulated by a variety of agencies. As shown in Table 3-1 below, the ambient recorded noise levels range from 43.6 to 57.8 dBA L_{eq} in the vicinity of the Project Site.

3.1.2 Existing Ambient Noise Measurements

The Project Site is the existing Terra Linda High School campus and is surrounded mainly by residential land uses. In order to quantify existing ambient noise levels in the Project Area, ECORP Consulting, Inc. conducted nine short-term noise measurements on the afternoon of October 3, 2023. These short-term noise measurements are representative of typical existing noise exposure within and immediately adjacent to the Project Site during the daytime (see Attachment A). The 15-minute measurements were taken between 1:19 p.m. and 4:22 p.m. The average noise levels of noise measured at each location are listed in Table 3-1.

Table 3-1. Existing (Baseline) Noise Measurements

Location Number	Location	L_{eq} dBA	L_{min} dBA	L_{max} dBA	Time
1	On Corte Pacheco adjacent to house number 10.	**48.2**	37.6	61.5	1:19 p.m. – 1:34 p.m.
2	Nova Albion Way and El Pavo Real Circle intersection adjacent to high school football field.	**58.4**	38.6	71.5	1:36 p.m. – 1:51 p.m.
3	Upper loop of El Pavo Real Circle adjacent to house number 39.	**43.6**	35.0	66.1	1:54 p.m. – 2:09 p.m.
4	On Devon Drive adjacent to house number 280.	**58.0**	34.8	75.5	2:15 p.m. – 2:30 p.m.
5	Dias Way and Devon Drive intersection.	**51.8**	32.5	70.6	2:32 p.m. – 2:47 p.m.
6	Esmeyer Drive and Nova Albion Way Intersection adjacent to house number 9.	**57.8**	35.8	77.0	2:54 p.m. – 3:09 p.m.
7	On Wallace Way adjacent to house number 61.	**46.1**	60.3	69.4	3:32 p.m. – 3:47 p.m.
8	On Tamarack Drive adjacent to house number 868.	**51.4**	31.2	73.3	3:50 p.m. – 4:05 p.m.
9	On Devon Drive adjacent to house number 244.	**48.5**	33.2	66.4	4:07 p.m. – 4:22 p.m.

Source: Measurements were taken by ECORP with a Larson Davis SoundExpert LxT precision sound level meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert LxT sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator. See Attachment A for noise measurement outputs.

Notes: L_{eq} is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. L_{min} is the minimum noise level during the measurement period and L_{max} is the maximum noise level during the measurement period.

As shown, the existing noise levels in the Project-vicinity of the Project Site currently ranges from 43.6 to 57.8 dBA L_{eq}. The most common noise in the Project vicinity is produced by automotive vehicles (e.g., cars, trucks, buses, motorcycles) on area roadways. It is noted that these baseline noise measurements were taken on a weekday when school was in session and extended into and past school dismissal.

4.0 REGULATORY FRAMEWORK

4.1 Federal

4.1.1 Occupational Safety and Health Act of 1970

OSHA regulates onsite noise levels and protects workers from occupational noise exposure. To protect hearing, worker noise exposure is limited to 90 decibels with A-weighting (dBA) over an eight-hour work shift (29 Code of Regulations 1910.95). Employers are required to develop a hearing conservation program when employees are exposed to noise levels exceeding 85 dBA. These programs include provision of hearing protection devices and testing employees for hearing loss on a periodic basis.

4.2 State

4.2.1 State of California General Plan Guidelines

The State of California regulates vehicular and freeway noise affecting classrooms, sets standards for sound transmission and occupational noise control, and identifies noise insulation standards and airport noise/land-use compatibility criteria. The State of California General Plan Guidelines (State of California 2003), published by the Governor's Office of Planning and Research (OPR), also provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

4.2.2 State Office of Planning and Research Noise Element Guidelines

The State OPR *Noise Element Guidelines* include recommended exterior and interior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The Noise Element Guidelines contain a Land Use Compatibility table that describes the compatibility of various land uses with a range of environmental noise levels in terms of the CNEL.

4.2.3 California Department of Transportation

In 2020, Caltrans published the Transportation and Construction Vibration Manual (Caltrans 2020b). The manual provides general guidance on vibration issues associated with the construction and operation of projects concerning human perception and structural damage. Table 2-2 above presents recommendations for levels of vibration that could result in damage to structures exposed to continuous vibration.

4.3 Local

4.3.1 City of San Rafael General Plan

The City of San Rafeal Genal Plan Noise Element strives to curb noise impacts from existing sources and prevent adverse effects from potential new sources. The noise element establishes goals, policies and programs to limit the impacts of noise on residents and employees within the City. The following are applicable to the Project:

Goal N-1: Acceptable Noise Levels. Protect the public from excessive unnecessary, and unreasonable noise.

Policy N-1.3: Reducing Noise Through Planning and Design. Use a range of design, construction, site planning, and operational measures to reduce potential noise impacts.

Policy N-1.6: Traffic Noise. Minimize traffic noise through land use policies, law enforcement, street design and improvements, and site planning and landscaping.

Policy N-1.9: Maintaining Peace and Quiet. Minimize noise conflicts resulting from everyday activities such as construction, sirens, yard equipment, business operations, night-time sporting events, and domestic activities.

Policy N-1.11: Vibration. Ensure that the potential for vibration is addressed when transportation, construction, and nonresidential projects are proposed, and that measures are taken to mitigate potential impacts.

4.3.2 City of San Rafael Municipal Code

The City of San Rafael Municipal Code, Chapter 8.13, specifies noise regulations within the City. Specifically, Section 8.13.040 presents general nose limits for various land uses. The noise limits that pertain to the Project are presented in Table 4-1.

Table 4-1. General Nosie Limits		
Land Use	**[1]Daytime Noise Limits**	**[2]Nighttime Noise Limits**
Residential	60 dBA Intermittent 50 dBA Constant	50 dBA Intermittent 40 dBA Constant
[3]Public Property	60 dBA Intermittent 50 dBA Constant	50 dBA Intermittent 40 dBA Constant

Source: City of San Rafael 2023

Notes:

[1] Daytime" for purposes of this chapter means the period between seven a.m. (7:00 a.m.) and nine p.m. (9:00 p.m.) Sunday through Thursday and between seven a.m. (7:00 a.m.) and ten p.m. (10:00 p.m.) on Friday and Saturday.

[2] Nighttime" for purposes of this chapter means the period between nine p.m. (9:00 p.m.) and seven a.m. (7:00 a.m.) Sunday through Thursday and between ten p.m. (10:00 p.m.) and seven a.m. (7:00 a.m.) on Friday and Saturday.

[3]Public Property Noise Limits: No person shall produce, suffer or allow to be produced by any machine, animal or device, or by any other means, a noise level, when measured on any public property, that is greater than the most restrictive noise standard applicable under this chapter to any private property adjoining the receiving public property.

Section 8.13.050 includes construction noise standards which allows construction Monday through Friday from 7:00 a.m. to 6:00 p.m. and on Saturdays from 9:00 a.m. to 6:00 p.m. Construction is prohibited on Sundays and Holidays. Additionally, noise levels at any point outside of the construction property plane shall not exceed 90 dBA. Furthermore, Section 8.13.050 allows for sound generation devices used in athletic events and special events provided they do not generate noise levels exceeding 80 dBA measured at 50 feet from the property plane. The use of sound generation devices is prohibited between the hours of 10:00 p.m. and 10:00 a.m.

5.0 Impact Assessment

5.1 Thresholds of Significance

The impact analysis provided below is based on the following California Environmental Quality Act Guidelines Appendix G thresholds of significance. The Project would result in a significant noise-related impact if it would result in the:

1) 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.

2) Generation of excessive groundborne vibration or groundborne noise levels.

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

For the purposes of this analysis, Project construction noise is compared to the allowable hours of construction as well as the construction noise standards mandated by the City in Section 8.13.050 of the Municipal Code as explained in Section 4.3.2 of this report. Construction vibration will be compared to the FTA recommended standard of 0.3 inch per second PPV with respect to the prevention of structural damage for older residential buildings as adopted by the General Plan Noise Element. This is also the level at which vibrations may begin to annoy people in buildings. The Project would not be a source of groundborne vibration during operations. Onsite noise sources produced by the Project are compared to the noise standards presented in the City's Municipal Code (Table 4-1). Traffic noise as a result of the Project is discussed qualitatively.

5.2 Methodology

This analysis of the existing and future noise environments is based on empirical observations and noise prediction modeling. Predicted construction noise levels were calculated utilizing the Federal Highway Administration's (FHWA's) Roadway Construction Noise Model (2006) coupled with the SoundPLAN 3D noise model, which predicts noise propagation from a noise source based on the location, noise level, and frequency spectra of the noise sources as well as the geometry and reflective properties of the local terrain, buildings and barriers. Groundborne vibration levels associated with construction-related activities for the Project have been evaluated utilizing typical groundborne vibration levels associated with construction equipment. Potential groundborne vibration impacts related to structural damage and human annoyance were evaluated, taking into account the distance from construction activities to nearby structures and typically applied criteria for structural damage and human annoyance.

Onsite stationary source noise levels associated with the Project have been calculated with the SoundPLAN 3D noise model and transportation-source noise levels are discussed qualitatively.

5.3 Impact Analysis

5.3.1 Would the Project Result in Short-Term Construction-Generated Noise in Excess of City Standards?

Onsite Construction Noise

Construction noise associated with the Proposed Project would be temporary and would vary depending on the specific nature of the activities being performed. Noise generated would primarily be associated with the operation of off-road equipment for onsite construction activities as well as construction vehicle traffic on area roadways. Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., site preparation, excavation, paving). Noise generated by construction equipment, including earth movers, pile drivers, and portable generators, can reach high levels. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). During construction, exterior noise levels could negatively affect sensitive land uses in the vicinity of the construction site.

The Project Site is the existing Terra Linda High School campus and is surrounded mainly by residential land uses. The City of San Rafael allows construction Monday through Friday from 7:00 a.m. to 6:00 p.m. and on Saturdays from 9:00 a.m. to 6:00 p.m. Construction is prohibited on Sundays and Holidays. Additionally, noise levels at any point outside of the construction property plane shall not exceed 90 dBA.

Construction equipment used during construction is provided by the Project construction contractor. The anticipated construction equipment for each phase (Phases 1 - 3) and for all specific construction activities within each phase (i.e., demolition, site preparation, building construction, etc.) is then entered individually into the FHWA's Roadway Construction Model to obtain the reference noise measurement for each phase, at the source (the Project Site). Phases with overlapping dates (e.g., demolition and site preparation for Phase 1) were modeled as occurring at the same time to account for worst case noise levels. The reference noise measurement for each phase accounts for all equipment operating simultaneously. The reference construction noise levels outputted by the Roadway Construction Noise Model are then inputted into the SoundPLAN 3D noise model, which then calculates the propagation of construction noise from the Project construction site in order to identify the predicted noise levels at twenty-four noise-sensitive receivers in the Project Area, as a result of Project construction. This was completed by modeling each construction phase as a point source located at the center of each construction site. The methodology of using the center of the construction site is recommended by the FTA (2018) as the majority of construction equipment is not situated at any one location during construction activities, but rather spread throughout the Project Site and at various distances from receptors.

A brief summary of the proposed improvements and the general location on the campus where the construction noise point sources were modeled in SoundPLAN is described below.

- Phase 1 includes the rehabilitation of the aquatics center as well as the modernization of the physical education support spaces. A point source was modeled in SoundPLAN located at the approximate center of the aquatic's facility for all construction phases.
- Phase 2 includes the modernization of existing classroom buildings that includes new LED lighting, flooring, counters, fixtures, painting and finishes, and technology. A point source was modeled in SoundPLAN located at the approximate center of the main school building.
- Phase 3 includes stadium upgrades, new artificial turf on the baseball and softball fields, and improvements to the tennis courts. As multiple construction locations are spread out across the campus, three individual point sources were modeled in SoundPLAN located at the center of the football stadium, the center of the baseball/softball fields, and the center of the tennis courts.

The anticipated short-term construction noise levels generated for the necessary equipment at the twenty-four off-site noise-sensitive receivers in the Project Area for each phase (Phase 1 - 3) and for all specific construction activities within each phase (i.e., demolition, site preparation, building construction, etc.) are presented in Tables 5-1, 5-2 and 5-3. Additionally, noise contour graphics for the construction phase with the highest construction noise levels (see Figures 5-1, 5-2 and 5-3) has been prepared to provide a visual depiction of the predicted noise levels in the Project vicinity from Project construction.

Table 5-1. Phase 1 Construction Average (dBA) Noise Levels at Project Area Receptors

Receptor	Estimated Exterior Construction Noise Level @ Receptor (dBA L_{eq}) During Demolition and Site Preparation	Estimated Exterior Construction Noise Level @ Receptor (dBA L_{eq}) During Building Construction and Paving	Estimated Exterior Construction Noise Level @ Receptor (dBA L_{eq}) During Architectural Coating	Construction Noise Standard (dBA L_{eq})	Exceeds Standard?
#1 Residence on Devon Drive	61.1	61.2	47.3	*90*	**No**
#2 Residence on Devon Drive	61.6	61.7	47.8	*90*	**No**
#3 Residence on Devon Drive	62.3	62.4	48.5	*90*	**No**
#4 Residence on Devon Drive	63.8	63.9	50.0	*90*	**No**
#5 Residence on Devon Drive	63.5	63.6	49.7	*90*	**No**
#6 Residence on Devon Drive	62.2	62.3	48.4	*90*	**No**
#7 Residence on Devon Drive	57.3	57.4	43.5	*90*	**No**
#8 Residence on Devon Drive	53.8	53.9	40.0	*90*	**No**
#9 Residence on Devon Drive	58.6	58.7	44.8	*90*	**No**
#10 Residence on Devon Drive	61.2	61.3	47.4	*90*	**No**
#11 Residence on Devon Drive	56.5	56.6	42.7	*90*	**No**
#12 Residence on El Pavo Real Circle	62.4	62.5	48.6	*90*	**No**
#13 Residence on Esmeyer Drive	59.0	59.1	45.2	*90*	**No**
#14 Residence on Esmeyer Drive	57.3	57.4	43.5	*90*	**No**
#15 Residence on Esmeyer Drive	59.2	59.3	45.4	*90*	**No**

Table 5-1. Phase 1 Construction Average (dBA) Noise Levels at Project Area Receptors

#16 Residence on Esmeyer Drive	58.6	58.7	44.8	*90*	**No**
#17 Residence on Malone Lane	59.1	59.2	45.3	*90*	**No**
#18 Residence on Minor Court	58.0	58.1	44.2	*90*	**No**
#19 Residence on Nova Albion Way	57.5	57.6	43.7	*90*	**No**
#20 Residence on Nova Albion Way	62.5	62.6	48.7	*90*	**No**
#21 Residence on Nova Albion Way	66.3	66.4	52.5	*90*	**No**
#22 Residence on Nova Albion Way	63.6	63.7	49.8	*90*	**No**
#23 Residence on Tamarack Drive	57.3	57.4	43.5	*90*	**No**
#24 Residence on Walace Way	55.8	55.9	42.0	*90*	**No**

Source: Construction noise levels were calculated by ECORP Consulting using the FHWA Roadway Noise Construction Model (FHWA 2006) paired with SoundPLAN. Refer to Attachment B and Attachment C for Model Data Outputs.

Notes: Construction equipment used during construction is provided by the Project construction contractor. Consistent with FTA recommendations for calculating construction noise, construction noise was modeled accounting for all construction equipment operating simultaneously from the center of the Project Site (FTA 2018).

L_{eq} = The equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

Table 5-2. Phase 2 Construction Average (dBA) Noise Levels at Project Area Receptors

Receptor	Estimated Exterior Construction Noise Level @ Receptor (dBA L_{eq}) During Demolition and Building Construction	Construction Noise Standard (dBA L_{eq})	Exceeds Standard?
#1 Residence on Devon Drive	72.7	*90*	**No**
#2 Residence on Devon Drive	69.2	*90*	**No**
#3 Residence on Devon Drive	66.4	*90*	**No**
#4 Residence on Devon Drive	64.4	*90*	**No**
#5 Residence on Devon Drive	62.6	*90*	**No**
#6 Residence on Devon Drive	61.6	*90*	**No**
#7 Residence on Devon Drive	58.6	*90*	**No**
#8 Residence on Devon Drive	56.5	*90*	**No**
#9 Residence on Devon Drive	63.3	*90*	**No**
#10 Residence on Devon Drive	61.0	*90*	**No**
#11 Residence on Devon Drive	59.0	*90*	**No**
#12 Residence on El Pavo Real Circle	68.2	*90*	**No**
#13 Residence on Esmeyer Drive	69.3	*90*	**No**
#14 Residence on Esmeyer Drive	65.7	*90*	**No**
#15 Residence on Esmeyer Drive	71.1	*90*	**No**
#16 Residence on Esmeyer Drive	71.7	*90*	**No**

Table 5-2. Phase 2 Construction Average (dBA) Noise Levels at Project Area Receptors			
#17 Residence on Malone Lane	60.4	*90*	**No**
#18 Residence on Minor Court	63.9	*90*	**No**
#19 Residence on Nova Albion Way	59.8	*90*	**No**
#20 Residence on Nova Albion Way	64.2	*90*	**No**
#21 Residence on Nova Albion Way	70.4	*90*	**No**
#22 Residence on Nova Albion Way	73.5	*90*	**No**
#23 Residence on Tamarack Drive	61.4	*90*	**No**
#24 Residence on Walace Way	62.3	*90*	**No**

Source: Construction noise levels were calculated by ECORP Consulting using the FHWA Roadway Noise Construction Model (FHWA 2006) paired with SoundPLAN. Refer to Attachment B and Attachment C for Model Data Outputs.

Notes: Construction equipment used during construction is provided by the Project construction contractor. Consistent with FTA recommendations for calculating construction noise, construction noise was modeled accounting for all construction equipment operating simultaneously from the center of the Project Site (FTA 2018).

L_{eq} = The equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

Table 5-3. Phase 3 Construction Average (dBA) Noise Levels at Project Area Receptors

Receptor	Estimated Exterior Construction Noise Level @ Receptor (dBA L_{eq}) During Demolition, Site Preparation, Grading, Building Construction & Architectural Coating	Construction Noise Standard (dBA L_{eq})	Exceeds Standard?
#1 Residence on Devon Drive	68.8	*90*	**No**
#2 Residence on Devon Drive	72.5	*90*	**No**
#3 Residence on Devon Drive	77.3	*90*	**No**
#4 Residence on Devon Drive	72.7	*90*	**No**
#5 Residence on Devon Drive	72.5	*90*	**No**
#6 Residence on Devon Drive	76.8	*90*	**No**
#7 Residence on Devon Drive	69.4	*90*	**No**
#8 Residence on Devon Drive	63.5	*90*	**No**
#9 Residence on Devon Drive	70.4	*90*	**No**
#10 Residence on Devon Drive	72.4	*90*	**No**
#11 Residence on Devon Drive	69.5	*90*	**No**
#12 Residence on El Pavo Real Circle	69.1	*90*	**No**
#13 Residence on Esmeyer Drive	65.6	*90*	**No**
#14 Residence on Esmeyer Drive	65.6	*90*	**No**
#15 Residence on Esmeyer Drive	65.6	*90*	**No**

Table 5-3. Phase 3 Construction Average (dBA) Noise Levels at Project Area Receptors

#16 Residence on Esmeyer Drive	65.3	*90*	**No**
#17 Residence on Malone Lane	68.0	*90*	**No**
#18 Residence on Minor Court	67.2	*90*	**No**
#19 Residence on Nova Albion Way	68.9	*90*	**No**
#20 Residence on Nova Albion Way	74.8	*90*	**No**
#21 Residence on Nova Albion Way	71.1	*90*	**No**
#22 Residence on Nova Albion Way	68.7	*90*	**No**
#23 Residence on Tamarack Drive	67.2	*90*	**No**
#24 Residence on Walace Way	62.8	*90*	**No**

Source: Construction noise levels were calculated by ECORP Consulting using the FHWA Roadway Noise Construction Model (FHWA 2006) paired with SoundPLAN. Refer to Attachment B and Attachment C for Model Data Outputs.

Notes: Construction equipment used during construction is provided by the Project construction contractor. Consistent with FTA recommendations for calculating construction noise, construction noise was modeled accounting for all construction equipment operating simultaneously from the center of the Project Site (FTA 2018).

L_{eq} = The equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

As shown in Tables 5-1, 5-2 and 5-3, construction activities would not exceed the applicable noise standard during any phase of construction for all residences surrounding the Project Site.

Additionally, as shown in Figures 5-1, 5-2 and 5-3, the noise level on the Project Site would exceed 65 dBA L_{eq} during the loudest construction activities for each phase. However, on-site noise sensitive receptors (students) would not be exposed to construction noise above 90 dBA. It is noted that construction noise would vary greatly on the Project Site based on the different types of on-site construction activities, the equipment and quantity used, and the varying distances to on-site students. For instance, construction noise experienced within a specific zone of construction (the specific areas of construction would rotate over the course of the Project) would reach levels beyond 90 dBA; however, while construction activity would occur within the school campus, students would not be present in the immediate vicinity of actual construction activities as they would be restricted from these areas for safety concerns, and thus would not be exposed to such noise levels. As previously described, sound level decreases (attenuates) at a rate of approximately 6 dB (dBA) for each doubling of distance from a point source such as a construction site

(FHWA 2017). Accounting for this rate of noise attenuation, construction noise resulting from the worst-case scenario of 20 pieces of heavy-duty offroad construction equipment operating simultaneously (120+ dBA at the source) would be reduced to 85.9 dBA at 100 feet, which is below the 90 dBA standard. It is noted that this worst-case scenario is unlikely in that it is not expected that 20 pieces of heavy-duty offroad construction equipment would be operating simultaneously. Thus, as shown in Figures 5-1, 5-2 and 5-3, the general noise levels experienced across the school campus during the most intense construction activities would range around 65 dBA.

Furthermore, as previously stated, the exterior-to-interior noise reduction of older buildings, such as those currently on the Project Site, offers a noise reduction of about 20 to 25 dBA with closed windows (Caltrans 2002). Thus, construction noise occurring when students are present would generally range between 45 and 40 dBA within classrooms, which is within the normally acceptable noise level for schools according to the OPR State of California General Plan Guidelines Appendix G (2017) and would not interrupt classroom activities. It is noted that construction noise was modeled on a worst-case basis. It is unlikely that so many pieces of construction equipment would be operating at the same time. While construction activities may be a temporary annoyance to on-site students, noise as a result of construction activities would not surpass the 90 dBA construction threshold outside of the specific zones of construction.

While no noise standard would be exceeded and classroom activities would not be disrupted by construction of the Proposed Project, the following best management practices are recommended during the times when construction occurs to further reduce the noise experienced by onsite and offsite sensitive receptors.

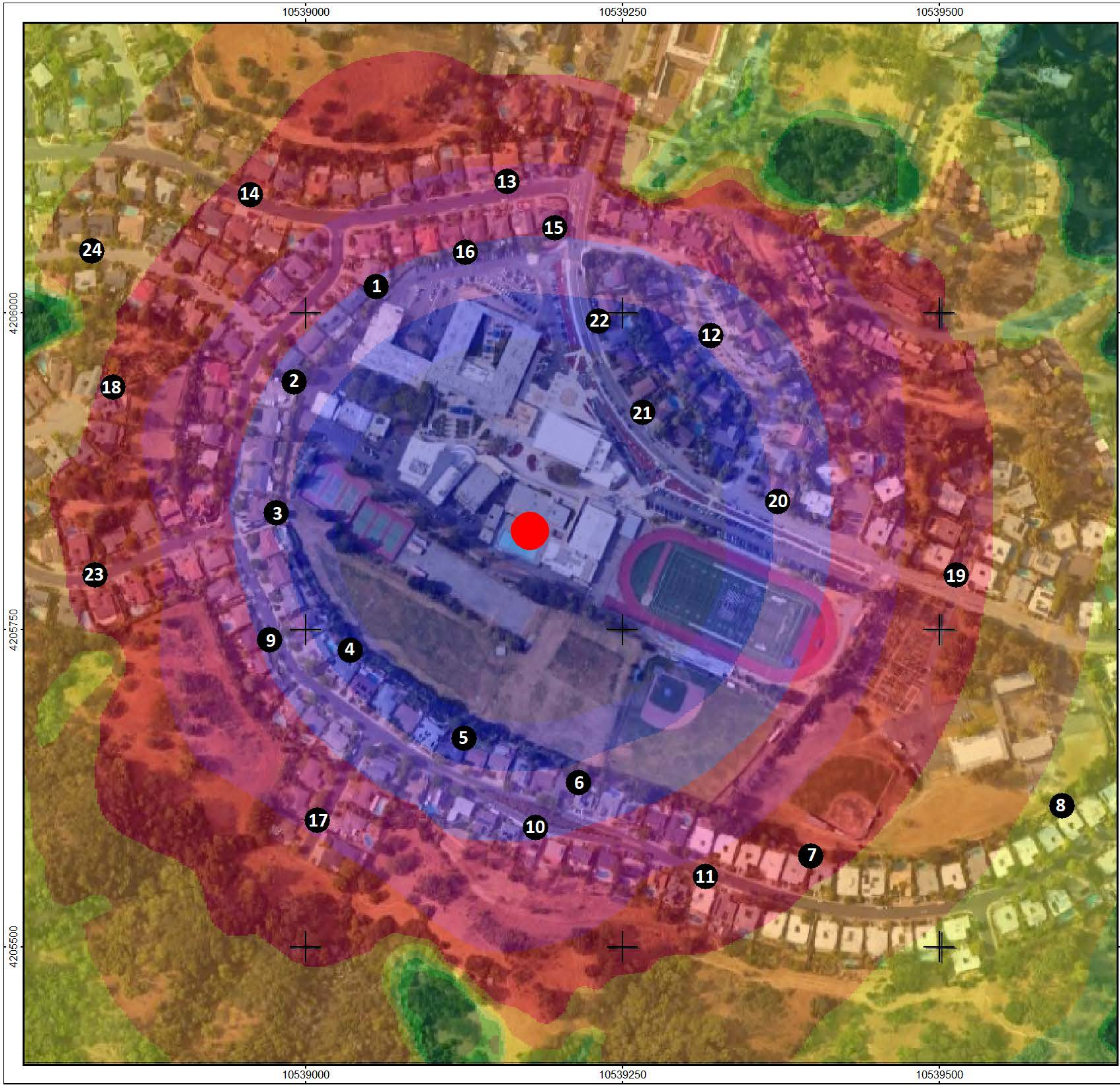
Measure NOI-1: The following measures shall be applied to the Project during construction:

1. All construction equipment, fixed or mobile, will be equipped with properly operating and maintained mufflers, consistent with manufacturer standards.
2. All stationary construction equipment will be placed so that emitted noise is directed away from the noise sensitive receptors nearest the Project Site.
3. As applicable, shut off all equipment when not in use.
4. Equipment staging shall be located in areas that create the greatest distance between construction-related noise/vibration sources and sensitive receptors surrounding the project site.
5. Jackhammers, pneumatic equipment, and all other portable stationary noise sources will be directed away from the noise sensitive receptors nearest the Project Site to the extent possible. Either one-inch plywood or sound blankets can be utilized for this purpose. They should reach up from the ground and block the line of sight between equipment and the nearest off-site residences. The shielding should be without holes and cracks.
6. No amplified music and/or voice will be allowed on the construction site.

Phase 1 Building Construction and Paving

Terra Linda High School Capital Improvements Project

Figure 5-1. Phase 1 Construction Modeled Noise Levels



Construction Noise Levels in dB(A)

	< 49
	49 - 51
	51 - 53
	53 - 55
	55 - 57
	57 - 59
	59 - 61
	61 - 63
	63 - 65
	>= 65

Signs and symbols

Project Construction

Residential Receiver

N

Length scale 1:3082

0 25 50 100 150 200 m

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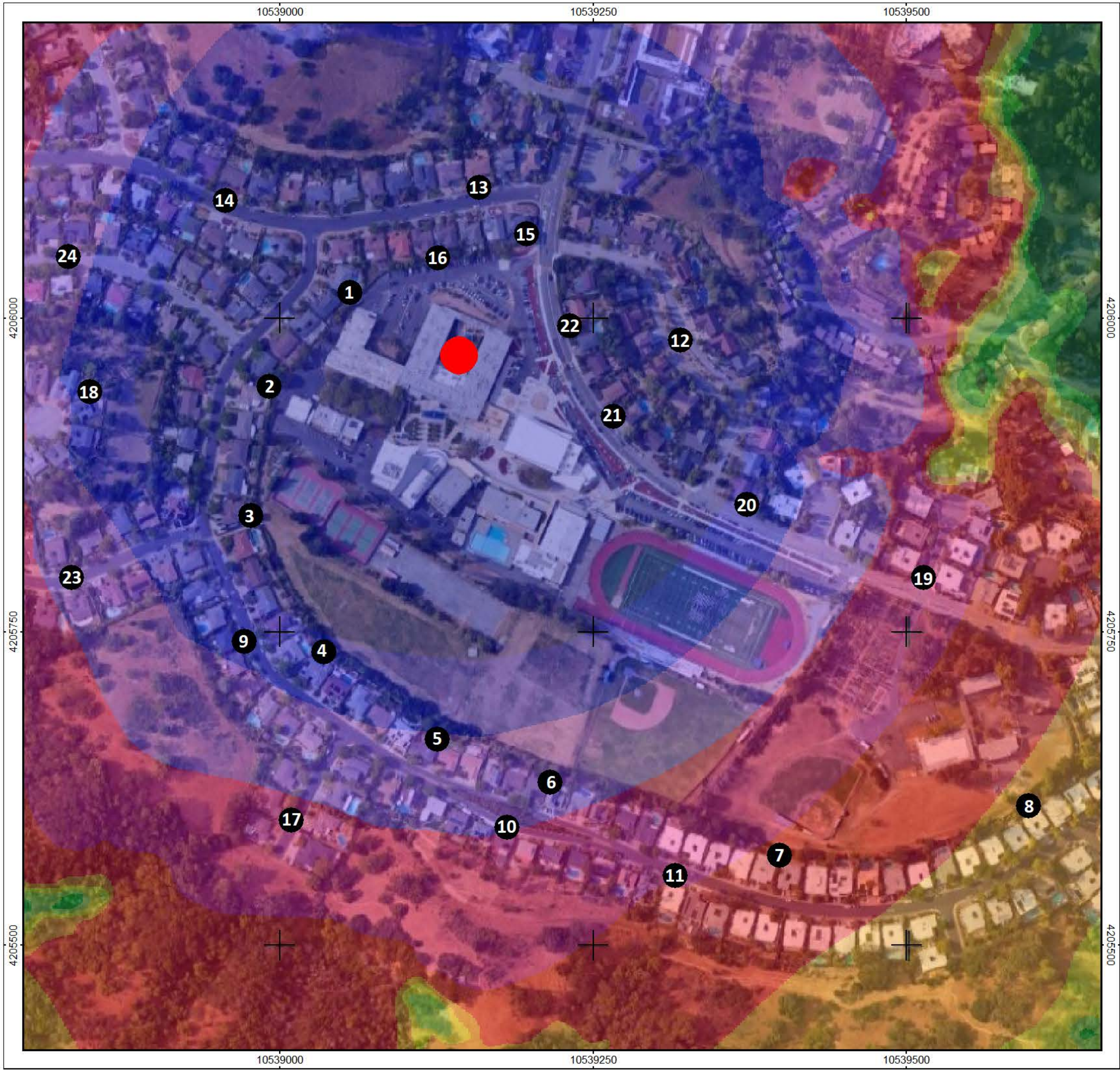
Phase 2 Demolition and Building Construction

Terra Linda High School Capital Improvements Project

Figure 5-2. Phase 2 Construction Modeled Noise Levels



Construction Noise Levels in dB(A)

dB(A)
< 49
49 - 51
51 - 53
53 - 55
55 - 57
57 - 59
59 - 61
61 - 63
63 - 65
>= 65

Signs and symbols

- Project Construction
- Residential Receiver

N

Length scale 1:3071

0 25 50 100 150 200 m

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Phase 3 Demolition, Site Preparation, Grading, Building Construction & Architectural Coating

Terra Linda High School Capital Improvements Project

Figure 5-3. Phase 3 Construction Modeled Noise Levels

Construction Noise Levels in dB(A)

- < 49
- 49 - 51
- 51 - 53
- 53 - 55
- 55 - 57
- 57 - 59
- 59 - 61
- 61 - 63
- 63 - 65
- >= 65

Signs and symbols

- Project Construction
- Residential Receiver

N

Length scale 1:2958

0 25 50 100 150 200 m

5.3.2 Would the Project Result in a Substantial Permanent Increase in Ambient Noise Levels in Excess of City Standards During Operations?

As previously described, noise sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would each be considered noise sensitive and may warrant unique measures for protection from intruding noise. The nearest off-site noise sensitive receptors are residences fronting Nova Albion Way located north of the Project Site, residences fronting Devon Drive located south and west of the Project Site, and Miss Nicky's Preschool located east of the Project Site.

Operational Onsite Noise

The Project is proposing improvements that are needed to modernize and/or replace existing academic and physical education facilities at the Terra Linda High School campus to serve the existing student population and to improve access in compliance with the ADA. The proposed improvement which would modify current activity on the campus and could impact noise sensitive receptors in the Project Area is the rehabilitation of the aquatic center proposed in Phase 1. The Project is proposing the demolition of the existing 25-meter by 25-yard pool and construction of a new 25-meter by 40-yard pool which would meet CIF standards. As the footprint of the pool is changing, noise associated with activity at the newly proposed aquatic center has been calculated using the SoundPLAN 3D noise model. Other improvements proposed by the Project, such as stadium upgrades and new turf on the baseball and softball files, were not modeled in SoundPLAN as the footprint of the area and intensity of events would remain the same as existing conditions. As such, the noise modeling conducted only accounts for activity occurring at the aquatic center.

The modeling scenario accounts for one large area source encompassing the modernized aquatic center including the pool area, pool deck and bleachers. The area source reference noise measurement used in SoundPLAN accounts for normal activities occurring at a sporting event, such as people cheering, whistle blowing and the use of an amplified sound system. Table 5-4 shows the predicted Project noise levels at noise-sensitive receivers in the vicinity of the Project Site as predicted by SoundPLAN. Additionally, a noise contour graphic (see Figure 5-4) has been prepared to provide a visual depiction of the predicted noise levels in the Project vicinity from Project operations.

Table 5-4. Modeled Operational Noise Levels

Location	Modeled Operational Noise Attributed to the Project (dBA L_{eq})	[1]Daytime/ Nighttime Noise Standards (dBA L_{eq})	Exceed Standard?
#1 Residence fronting Esmeyer Drive	**23.0**	*60 / 50*	**No / No**
#2 Residence fronting Nova Albion Way	**25.2**	*60 / 50*	**No / No**
#3 Residence fronting Nova Albion Way	**28.4**	*60 / 50*	**No / No**
#4 Residence fronting Nova Albion Way	**25.9**	*60 / 50*	**No / No**
#5 Miller Creek School District Office	**31.7**	*60 / 50*	**No / No**
#6 Residence fronting Devon Drive	**36.8**	*60 / 50*	**No / No**
#7 Residence fronting Devon Drive	**41.7**	*60 / 50*	**No / No**
#8 Residence fronting Devon Drive	**41.0**	*60 / 50*	**No / No**
#9 Residence fronting Devon Drive	**39.0**	*60 / 50*	**No / No**
#10 Residence fronting Devon Drive	**23.0**	*60 / 50*	**No / No**

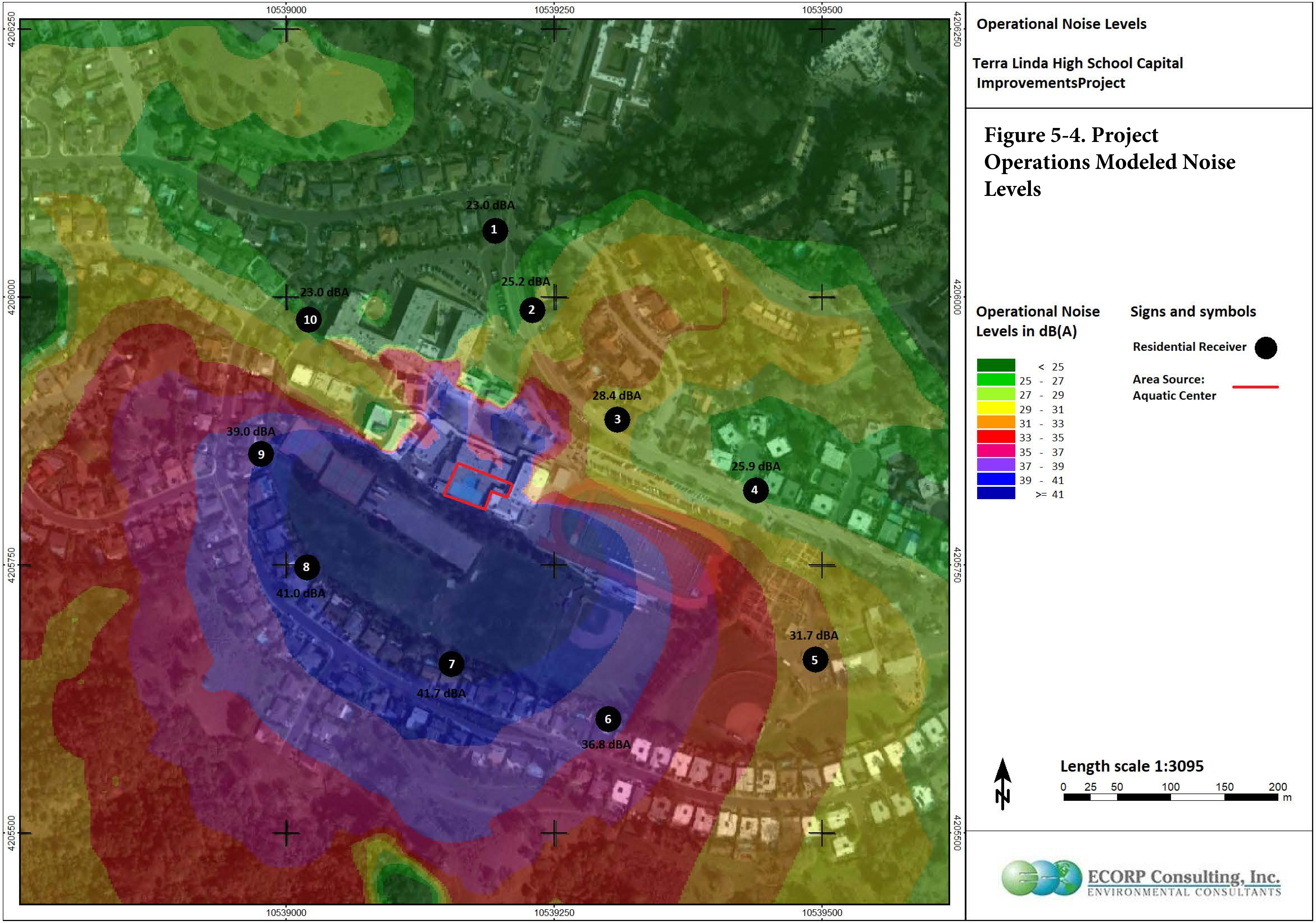
Source: SounPLAN v 8.2. Refer to Attachment D for Model Data Outputs.
Notes:[1]Due to the nature of the noise being produced at the aquatic center, noise levels are compared to the intermittent noise standards.

As shown in Table 5-4, Project operational noise would not exceed the daytime or nighttime noise standards at any location in the Project Area. Additionally, as shown in Table 3-1, modeled noise as predicted by SoundPLAN is lower than what is currently experienced in the area surrounding the campus. It is acknowledged that the Project would provide the campus with a pool which would meet CIF standards thereby increasing the potential for the frequency of noise producing events.

Operational Noise Levels

Terra Linda High School Capital ImprovementsProject

Figure 5-4. Project Operations Modeled Noise Levels



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Operational Offsite Traffic Noise

The Project is proposing the modernization and/or replacement of existing academic and physical education facilities on the Terra Linda High School campus. According to the Vehicle Miles Traveled Memorandum prepared by Michael Baker International (2023), the Project is estimated to generate 92 additional daily vehicle trips. According to Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol (2013), a doubling of traffic on a roadway is required to result in an increase of 3 dB (outside of the laboratory, a 3-dBA change is considered a just-perceivable difference). The Project Site is located in a highly developed area surrounded by residential land uses. The Project Site is accessible from Nova Albion Way, which traverses approximately 40 residences in the immediate vicinity of the Project Site. Additionally, Devon Drive and Esmeyer Drive are collector streets that are commonly used to access the Project Site. Approximately 90 residences front Devon Drive and approximately 75 residences front Esmeyer Drive.

According to the Institute of Transportation Engineers' 10th Edition Trip Generation Manual (2017), single family homes generate an average of 9.44 trips daily, and therefore the approximate 40 residences on Nova Albion are expected to be currently contributing up to 377 traffic trips daily under existing conditions (40 x 9.44= 377). The 90 residences fronting Devon Drive are expected to be currently contributing up to 849 traffic trips daily to these Project vicinity roadways under existing conditions (90 x 9.44= 849) and the 75 residences fronting Esmeyer Drive are expected to currently generate up to 708 traffic trips daily (75 x 9.44 = 708). Thus, the contribution of an additional 92 daily trips during Project operations would not result in a doubling of traffic on Project vicinity roadways.

It is noted that the estimate of existing traffic is a conservative estimate as the number of existing Project vicinity residential units is estimated from aerial photography and only residences located on Nova Albion Way, Devon Drive, and Esmeyer Drive are accounted. There are many more residences located on smaller streets and cul-de-sacs that would directly access Nova Albion Way, Devon Drive, and Esmeyer Drive contributing even more traffic. Thus, Project vicinity roadways accommodate more traffic trips daily than was estimated in this analysis and Project operations would not result in a doubling of traffic. Therefore, its contribution to existing traffic noise would not be perceptible.

5.3.3 Would the Project Expose Structures to Substantial Groundborne Vibration During Construction?

Excessive groundborne vibration impacts result from continuously occurring vibration levels. Increases in groundborne vibration levels attributable to the Project would be primarily associated with short-term construction-related activities. Construction on the Project Site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance.

Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. According to construction-related information provided by the Project construction contractor, the use of pile drivers would not be employed. Vibration decreases rapidly with distance, and it is acknowledged that construction activities would occur throughout the Project Site and would not be concentrated at the point closest to sensitive receptors. Groundborne vibration levels associated with construction equipment are summarized in Table 5-5.

Table 5-5. Representative Vibration Source Levels for Construction Equipment	
Equipment Type	**Peak Particle Velocity at 25 Feet (inches per second)**
Large Bulldozer	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Hoe Ram	0.089
Jackhammer	0.035
Small Bulldozer/Tractor	0.003
Vibratory Roller	0.210

Source: FTA 2018; Caltrans 2020b

City has adopted the FTA recommended standard of 0.3 inch per second PPV with respect to the prevention of structural damage for older residential buildings. This is also the level at which vibrations may begin to annoy people in buildings. It is acknowledged that construction activities would occur throughout the Project Site and would not be concentrated at the point closest to sensitive receptors. Therefore, consistent with FTA recommendations for calculating construction vibration, construction vibration was measured from the center of the Project Site (FTA 2018). As previously described, the Project will be completed in three phases. For a conservative analysis, the construction phase closest to the nearest offsite building (Phase 2) is used. Phase 2, measured from the center of the main school building, is the construction phase that would occur closest to offsite buildings, at approximately 158 feet distant from the nearest residence fronting Devon Drive.

Based on the representative vibration levels presented for various construction equipment types in Table 5-5 and the construction vibration assessment methodology published by the FTA (2018), it is possible to estimate the potential Project construction vibration levels. The FTA provides the following equation:

$$[PPVequip = PPVref \times (25/D)^{1.5}]$$

Table 5-6 presents the expected Project related vibration levels at a distance of 158 feet.

Table 5-6. Construction Vibration Levels at 158 Feet						
Receiver PPV Levels (in/sec)[1]				**Peak Vibration**	**Threshold**	**Exceed Threshold?**
Large Bulldozer, Caisson Drilling, & Hoe Ram	**Loaded Trucks**	**Jackhammer**	**Vibratory Roller**			
0.005	0.004	0.002	0.013	**0.0.13**	*0.3*	**No**

As shown in Table 5-6, vibration as a result of onsite construction activities on the Project Site would not exceed 0.3 PPV at the nearest structure. Thus, onsite Project construction would not exceed the recommended threshold.

5.3.4 Would the Project Expose Structures to Substantial Groundborne Vibration During Operations?

Project operations would not include the use of any stationary equipment that would result in excessive vibration levels. Therefore, the Project would result in negligible groundborne vibration impacts during operations.

5.3.5 Would the Project Expose People Residing or Working in the Project area to Excessive Airport Noise?

The nearest airport to the Project Site is the San Rafael Airport located approximately 1.67 miles northeast of the Project Site. According to the City of San Rafael General Plan EIR Figure 4.13-10, the Project Site is located outside of the 55 dBA noise contours. Implementation of the Proposed Project would not affect airport operations nor result in increased exposure of people on the Project Site to aircraft noise.

6.0 REFERENCES

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Western Electro-Acoustic Laboratory, Inc. 2013. Sound Transmission Loss Test Report No. TL 13-201.

LIST OF ATTACHMENTS

ATTACHMENT A

Baseline (Existing) Noise Measurements – Project Vicinity

Location: W:\Projects\2023\2023-141 Terra Linda HS Modernization Project - San Rafael\Noise\Baseline Noise Measurements\mapping\Terra Linda Baseline Map.aprx - Portrait Template (agne - 10/6/2023)

Map Date: 10/6/2023

Sources: Esri 2023

Noise Measurement Locations Map

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Terra Linda High School Capital Improvements Project, 2023-141

Site Number: 1			
Recorded By: Rosey Worden			
Job Number: 2023-141			
Date: 10/3/2023			
Time: 1:19 p.m. – 1:34 p.m.			
Location: On Corte Pacheco adjacent to house number 10.			
Source of Peak Noise: Maintenance equipment (leaf blower) at the high school track and vehicles on Nova Albion Way.			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
48.2	37.6	61.5	87.6

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 15 mins		**Sky:** Clear
	Note: dBA Offset = 0.02		**Sensor Height (ft):** 3.5
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	3-5	76	29.95

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.032.s	Computer's File Name	LxT_0006133-20231003 131900-LxT_Data.032.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-10-03 13:19:00	Duration	0:15:00.0		
End Time	2023-10-03 13:34:00	Run Time	0:15:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-10-03 13:16:38	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	48.2 dB		
LAE	77.7 dB	SEA	--- dB
EA	6.6 µPa²h		
EA8	211.4 µPa²h		
EA40	1.1 mPa²h		
LZS_{peak}	86.7 dB	2023-10-03 13:29:48	
LAS_{max}	61.5 dB	2023-10-03 13:26:04	
LAS_{min}	37.6 dB	2023-10-03 13:31:53	
LA_{eq}	48.2 dB		
LC_{eq}	61.0 dB	LC_{eq} - LA_{eq}	12.8 dB
LAI_{eq}	50.1 dB	LAI_{eq} - LA_{eq}	1.9 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	48.2 dB	48.2 dB	0.0 dB	
	LDEN	LDay	LEve	LNight
	48.2 dB	48.2 dB	--- dB	--- dB

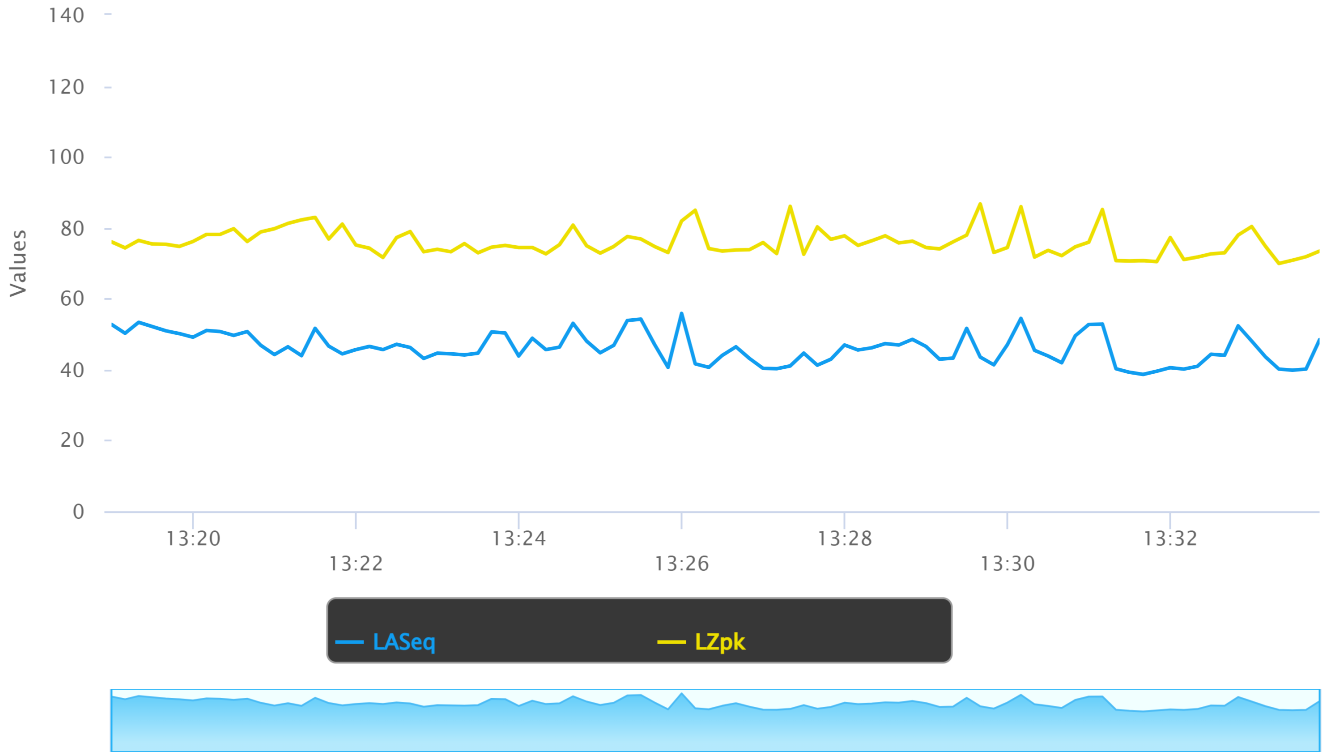
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	48.2 dB		--- dB		--- dB	
$Ls_{(max)}$	61.5 dB	2023-10-03 13:26:04	--- dB	None	--- dB	None
$LS_{(min)}$	37.6 dB	2023-10-03 13:31:53	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	86.7 dB	2023-10-03 13:29:48

Overloads	Count	Duration
	0	0:00:00.0

Statistics

LAS 5.0	54.1 dB
LAS 10.0	51.8 dB
LAS 33.3	46.8 dB
LAS 50.0	44.8 dB
LAS 66.6	43.0 dB
LAS 90.0	40.3 dB

Time History



Site Number: 2			
Recorded By: Rosey Worden			
Job Number: 2023-141			
Date: 10/3/2023			
Time: 1:36 p.m. – 1:51 p.m.			
Location: Nova Albion Way and El Pavo Real Circle intersection adjacent to high school football field.			
Source of Peak Noise: Vehicles on Nova Albion Way and activity at the high school.			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
58.4	38.6	71.5	91.8

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 15 mins		**Sky:** Clear
	Note: dBA Offset = 0.02		**Sensor Height (ft):** 3.5
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	3-5	76	29.95

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.033.s	Computer's File Name	LxT_0006133-20231003 133646-LxT_Data.033.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-10-03 13:36:46	Duration	0:15:00.0		
End Time	2023-10-03 13:51:46	Run Time	0:15:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-10-03 13:16:34	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	58.4 dB		
LAE	87.9 dB	SEA	--- dB
EA	69.2 µPa²h		
EA8	2.2 mPa²h		
EA40	11.1 mPa²h		
LZS_{peak}	91.8 dB	2023-10-03 13:39:58	
LAS_{max}	71.5 dB	2023-10-03 13:42:32	
LAS_{min}	38.6 dB	2023-10-03 13:50:00	
LA_{eq}	58.4 dB		
LC_{eq}	64.4 dB	LC_{eq} - LA_{eq}	6.0 dB
LAI_{eq}	60.8 dB	LAI_{eq} - LA_{eq}	2.4 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	58.4 dB	58.4 dB	0.0 dB	
	LDEN	LDay	LEve	LNight
	58.4 dB	58.4 dB	--- dB	--- dB

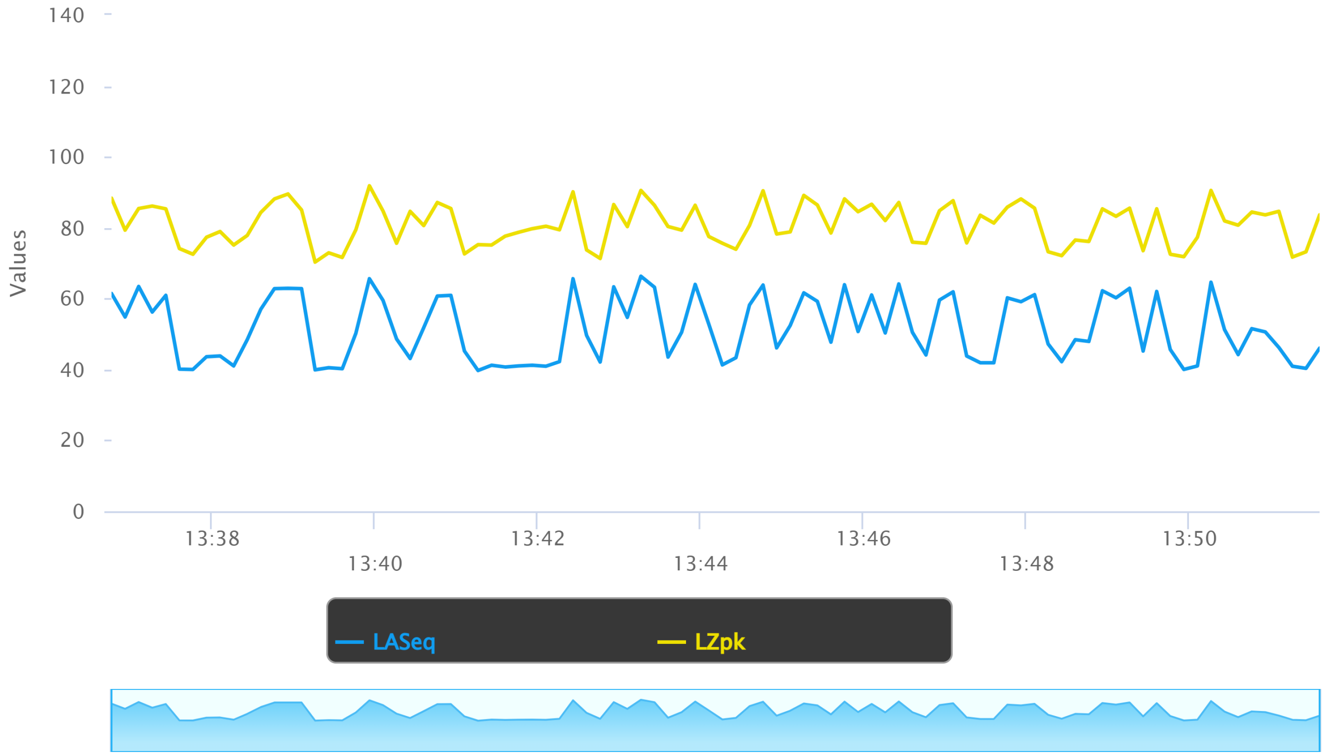
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	58.4 dB		--- dB		--- dB	
$Ls_{(max)}$	71.5 dB	2023-10-03 13:42:32	--- dB	None	--- dB	None
$LS_{(min)}$	38.6 dB	2023-10-03 13:50:00	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	91.8 dB	2023-10-03 13:39:58

Overloads	Count	Duration
	0	0:00:00.0

Statistics

LAS 5.0	65.9 dB
LAS 10.0	63.7 dB
LAS 33.3	52.6 dB
LAS 50.0	45.7 dB
LAS 66.6	42.8 dB
LAS 90.0	40.4 dB

Time History



Site Number: 3			
Recorded By: Rosey Worden			
Job Number: 2023-141			
Date: 10/3/2023			
Time: 1:54 p.m. – 2:09 p.m.			
Location: Upper loop of El Pavo Real Circle adjacent to house number 39.			
Source of Peak Noise: Vehicles on adjacent roadways and distant construction/ maintenance equipment.			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
43.6	35.0	66.1	99.0

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 15 mins	**Sky:** Clear	
	Note: dBA Offset = 0.02	**Sensor Height (ft):** 3.5	
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	3-5	76	29.95

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.034.s	Computer's File Name	LxT_0006133-20231003 135413-LxT_Data.034.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-10-03 13:54:13	Duration	0:15:00.0		
End Time	2023-10-03 14:09:13	Run Time	0:15:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-10-03 13:16:34	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	43.6 dB		
LAE	73.1 dB	SEA	--- dB
EA	2.3 µPa²h		
EA8	73.3 µPa²h		
EA40	366.5 µPa²h		
LZS_{peak}	99.0 dB	2023-10-03 14:07:59	
LAS_{max}	66.1 dB	2023-10-03 13:59:49	
LAS_{min}	35.0 dB	2023-10-03 14:03:14	
LA_{eq}	43.6 dB		
LC_{eq}	58.3 dB	LC_{eq} - LA_{eq}	14.7 dB
LAI_{eq}	47.5 dB	LAI_{eq} - LA_{eq}	3.9 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	43.6 dB	43.6 dB	0.0 dB	
	LDEN	LDay	LEve	LNight
	43.6 dB	43.6 dB	--- dB	--- dB

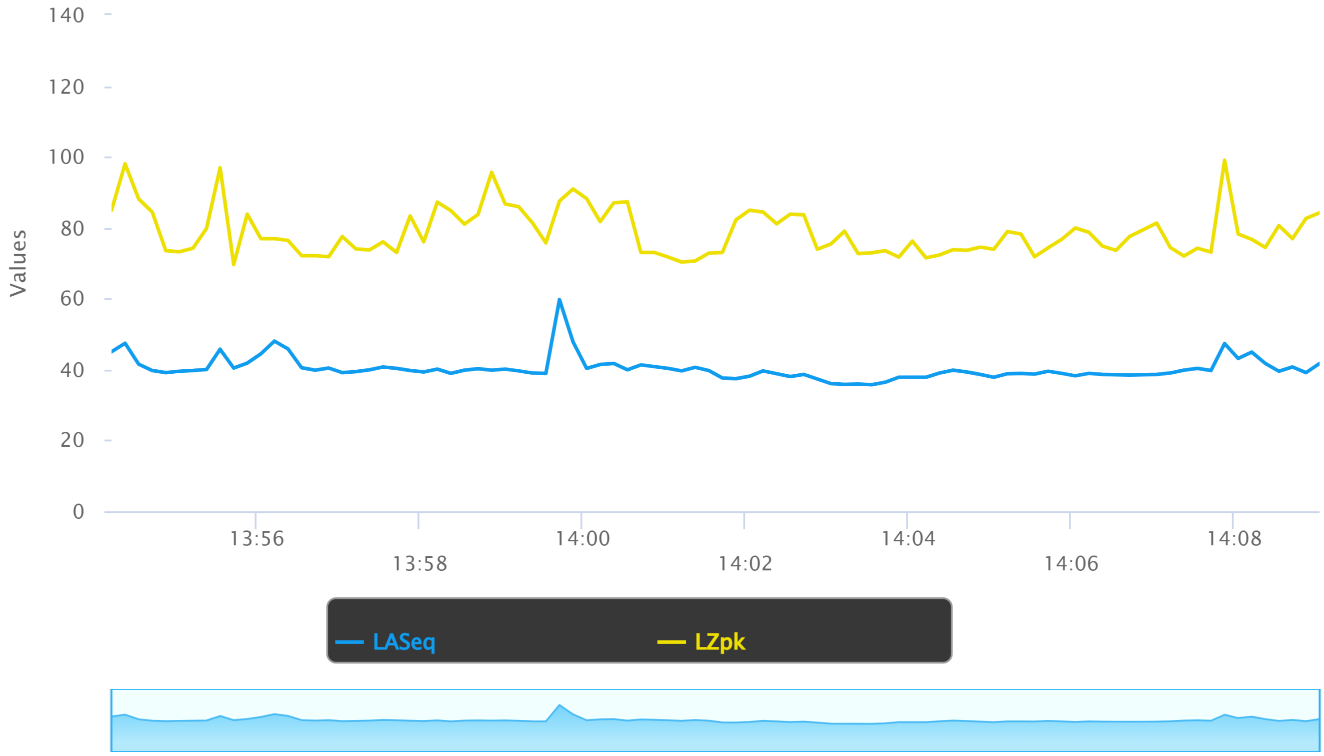
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	43.5 dB		--- dB		--- dB	
$Ls_{(max)}$	66.1 dB	2023-10-03 13:59:49	--- dB	None	--- dB	None
$LS_{(min)}$	35.0 dB	2023-10-03 14:03:14	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	99.0 dB	2023-10-03 14:07:59

Overloads	Count	Duration
	0	0:00:00.0

Statistics

LAS 5.0	45.2 dB
LAS 10.0	42.6 dB
LAS 33.3	40.1 dB
LAS 50.0	39.5 dB
LAS 66.6	38.9 dB
LAS 90.0	37.7 dB

Time History



Site Number: 4
Recorded By: Rosey Worden
Job Number: 2023-141
Date: 10/3/2023
Time: 2:15 p.m. – 2:30 p.m.
Location: On Devon Drive adjacent to house number 280.
Source of Peak Noise: Vehicles on Devon Drive and people talking.

Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
58.0	34.8	75.5	106.3

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 15 mins	**Sky:** Clear	
	Note: dBA Offset = 0.02	**Sensor Height (ft):** 3.5	
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	3-5	76	29.95

<u>Photo of Measurement Location</u>

Measurement Report

Report Summary

Meter's File Name	LxT_Data.035.s	Computer's File Name	LxT_0006133-20231003 141512-LxT_Data.035.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-10-03 14:15:12	Duration	0:15:00.0		
End Time	2023-10-03 14:30:12	Run Time	0:15:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-10-03 13:16:34	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	58.0 dB		
LAE	87.5 dB	SEA	--- dB
EA	63.1 µPa²h		
EA8	2.0 mPa²h		
EA40	10.1 mPa²h		
LZS_{peak}	106.3 dB	2023-10-03 14:29:43	
LAS_{max}	75.5 dB	2023-10-03 14:26:08	
LAS_{min}	34.8 dB	2023-10-03 14:24:41	
LA_{eq}	58.0 dB		
LC_{eq}	66.5 dB	LC_{eq} - LA_{eq}	8.5 dB
LAI_{eq}	61.9 dB	LAI_{eq} - LA_{eq}	3.9 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	58.0 dB	58.0 dB	0.0 dB	
	LDEN	LDay	LEve	LNight
	58.0 dB	58.0 dB	--- dB	--- dB

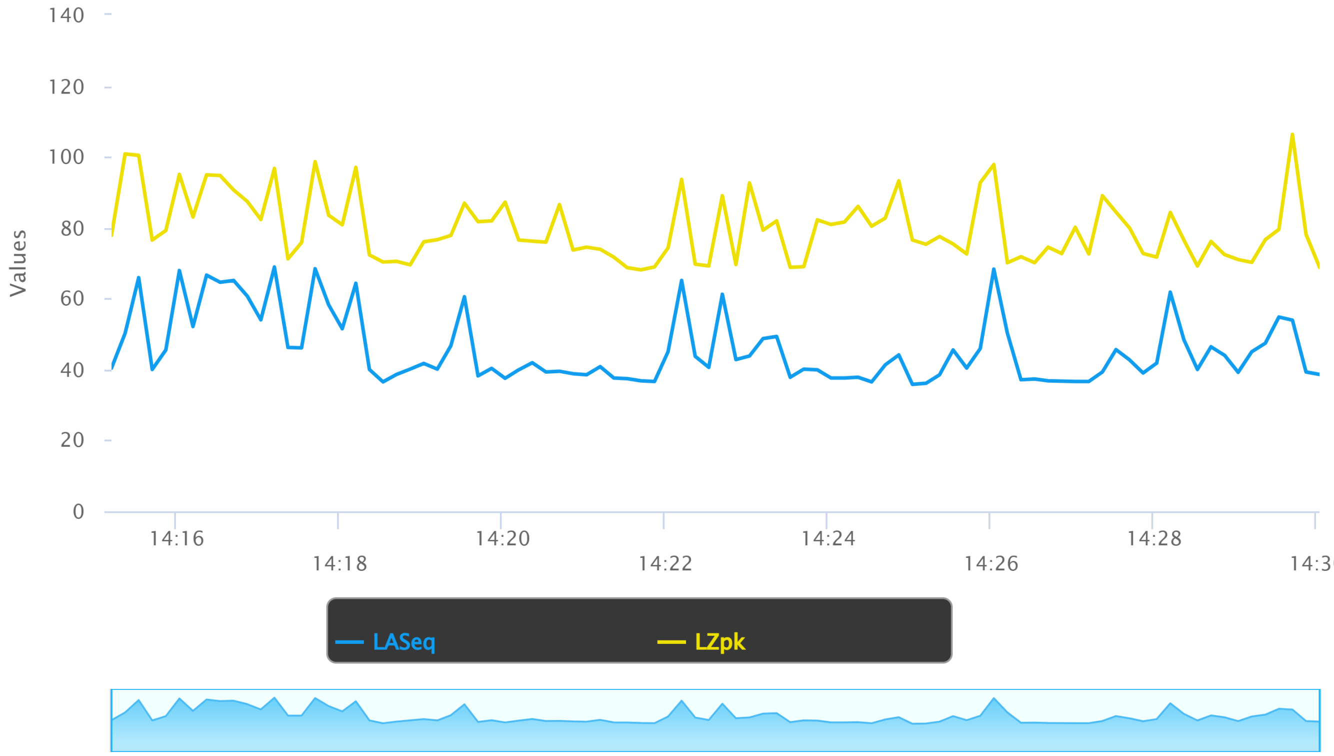
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	58.0 dB		--- dB		--- dB	
$LS_{(max)}$	75.5 dB	2023-10-03 14:26:08	--- dB	None	--- dB	None
$LS_{(min)}$	34.8 dB	2023-10-03 14:24:41	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	106.3 dB	2023-10-03 14:29:43

Overloads	Count	Duration
	0	0:00:00.0

Statistics

LAS 5.0	64.7 dB
LAS 10.0	57.3 dB
LAS 33.3	43.9 dB
LAS 50.0	40.2 dB
LAS 66.6	38.6 dB
LAS 90.0	36.4 dB

Time History



Site Number: 5			
Recorded By: Rosey Worden			
Job Number: 2023-141			
Date: 10/3/2023			
Time: 2:32 p.m. – 2:47 p.m.			
Location: Dias Way and Devon Drive intersection.			
Source of Peak Noise: Vehicles on Dias Way/ Devon Drive and people talking.			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
51.8	32.5	70.6	103.0

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 15 mins		**Sky:** Clear
	Note: dBA Offset = 0.02		**Sensor Height (ft):** 3.5
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	3-5	76	29.95

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.036.s	Computer's File Name	LxT_0006133-20231003 143258-LxT_Data.036.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-10-03 14:32:58	Duration	0:15:00.0		
End Time	2023-10-03 14:47:58	Run Time	0:15:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-10-03 13:16:34	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	51.8 dB		
LAE	81.3 dB	SEA	--- dB
EA	15.1 µPa²h		
EA8	484.3 µPa²h		
EA40	2.4 mPa²h		
LZS_{peak}	103.0 dB	2023-10-03 14:46:11	
LAS_{max}	70.6 dB	2023-10-03 14:42:00	
LAS_{min}	32.5 dB	2023-10-03 14:47:26	
LA_{eq}	51.8 dB		
LC_{eq}	60.1 dB	LC_{eq} - LA_{eq}	8.3 dB
LAI_{eq}	55.2 dB	LAI_{eq} - LA_{eq}	3.4 dB

Exceedances

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
51.8 dB	51.8 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
51.8 dB	51.8 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	51.8 dB		--- dB		--- dB	
$LS_{(max)}$	70.6 dB	2023-10-03 14:42:00	--- dB	None	--- dB	None
$LS_{(min)}$	32.5 dB	2023-10-03 14:47:26	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	103.0 dB	2023-10-03 14:46:11

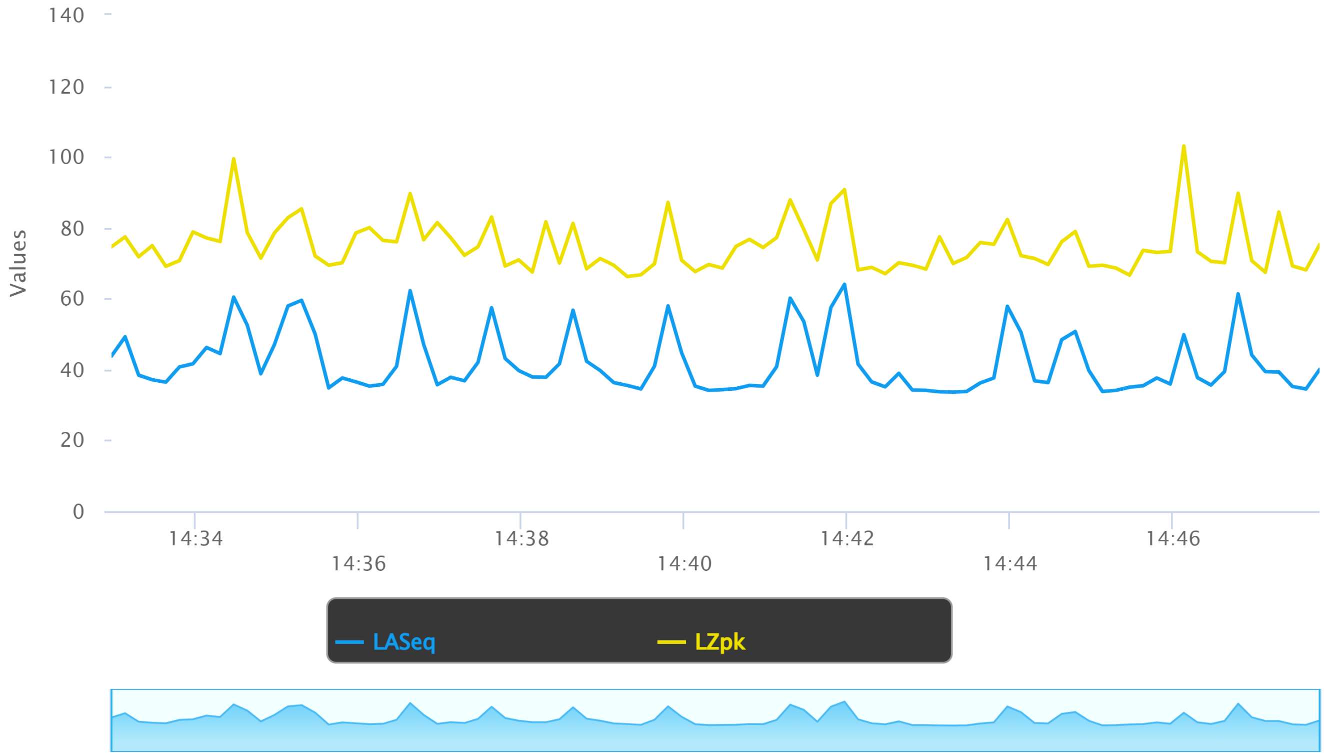
Overloads

Count	Duration
0	0:00:00.0

Statistics

LAS 5.0	58.4 dB
LAS 10.0	52.0 dB
LAS 33.3	41.2 dB
LAS 50.0	37.7 dB
LAS 66.6	35.7 dB
LAS 90.0	34.1 dB

Time History



Site Number: 6
Recorded By: Rosey Worden
Job Number: 2023-141
Date: 10/3/2023
Time: 2:54 p.m. – 3:09 p.m.
Location: Esmeyer Drive and Nova Albion Way Intersection adjacent to house number 9.
Source of Peak Noise: Vehicles on Esmeyer Drive/ Nova Albion Way and distant construction equipment.

Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
57.8	35.8	77.0	103.5

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 15 mins	**Sky:** Clear	
	Note: dBA Offset = 0.02	**Sensor Height (ft):** 3.5	
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	3-5	76	29.95

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.037.s	Computer's File Name	LxT_0006133-20231003 145405-LxT_Data.037.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-10-03 14:54:05	Duration	0:15:00.0		
End Time	2023-10-03 15:09:05	Run Time	0:15:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-10-03 13:16:34	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	57.8 dB		
LAE	87.3 dB	SEA	--- dB
EA	60.3 µPa²h		
EA8	1.9 mPa²h		
EA40	9.6 mPa²h		
LZS_{peak}	103.5 dB	2023-10-03 15:00:41	
LAS_{max}	77.0 dB	2023-10-03 15:01:32	
LAS_{min}	35.8 dB	2023-10-03 15:02:46	
LA_{eq}	57.8 dB		
LC_{eq}	69.6 dB	LC_{eq} - LA_{eq}	11.8 dB
LAI_{eq}	60.3 dB	LAI_{eq} - LA_{eq}	2.5 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	57.8 dB	57.8 dB	0.0 dB	
	LDEN	LDay	LEve	LNight
	57.8 dB	57.8 dB	--- dB	--- dB

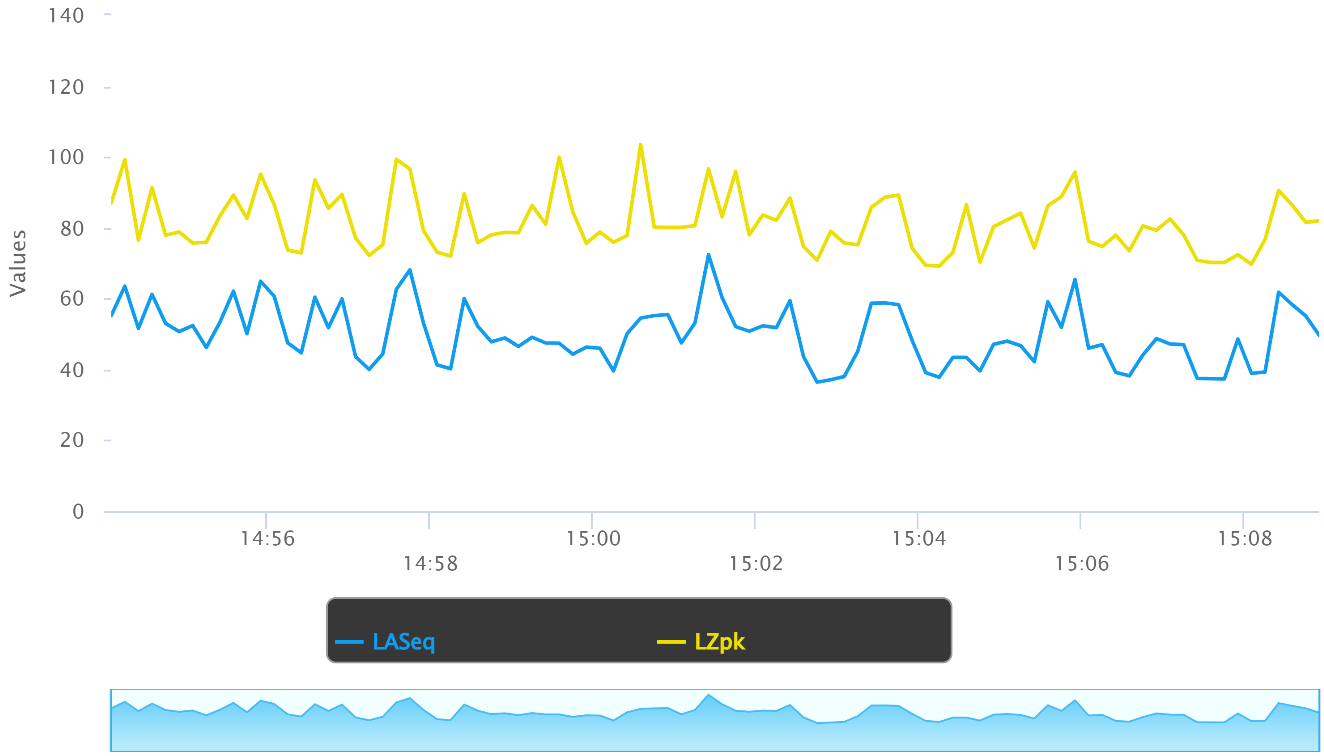
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	57.8 dB		--- dB		--- dB	
$Ls_{(max)}$	77.0 dB	2023-10-03 15:01:32	--- dB	None	--- dB	None
$LS_{(min)}$	35.8 dB	2023-10-03 15:02:46	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	103.5 dB	2023-10-03 15:00:41

Overloads	Count	Duration
	0	0:00:00.0

Statistics

LAS 5.0	64.5 dB
LAS 10.0	60.9 dB
LAS 33.3	50.6 dB
LAS 50.0	47.5 dB
LAS 66.6	43.7 dB
LAS 90.0	37.9 dB

Time History



Site Number: 7
Recorded By: Rosey Worden
Job Number: 2023-141
Date: 10/3/2023
Time: 3:32 p.m. – 3:47 p.m.
Location: On Wallace Way adjacent to house number 61.
Source of Peak Noise: Dogs barking and vehicles on Wallace Way.

Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
46.1	30.3	69.4	100.5

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 15 mins	**Sky:** Clear	
	Note: dBA Offset = 0.02	**Sensor Height (ft):** 3.5	
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	3-5	76	29.95

<u>Photo of Measurement Location</u>

Measurement Report

Report Summary

Meter's File Name	LxT_Data.038.s	Computer's File Name	LxT_0006133-20231003 153233-LxT_Data.038.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-10-03 15:32:33	Duration	0:15:00.0		
End Time	2023-10-03 15:47:33	Run Time	0:15:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-10-03 13:16:34	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	46.1 dB		
LAE	75.6 dB	SEA	--- dB
EA	4.1 µPa²h		
EA8	130.4 µPa²h		
EA40	651.8 µPa²h		
LZS_{peak}	100.5 dB	2023-10-03 15:46:35	
LAS_{max}	69.4 dB	2023-10-03 15:44:12	
LAS_{min}	30.3 dB	2023-10-03 15:33:57	
LA_{eq}	46.1 dB		
LC_{eq}	56.4 dB	LC_{eq} - LA_{eq}	10.3 dB
LAI_{eq}	49.4 dB	LAI_{eq} - LA_{eq}	3.3 dB

Exceedances

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
46.1 dB	46.1 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
46.1 dB	46.1 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	46.1 dB		--- dB		--- dB	
$L_{S(max)}$	69.4 dB	2023-10-03 15:44:12	--- dB	None	--- dB	None
$L_{S(min)}$	30.3 dB	2023-10-03 15:33:57	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	100.5 dB	2023-10-03 15:46:35

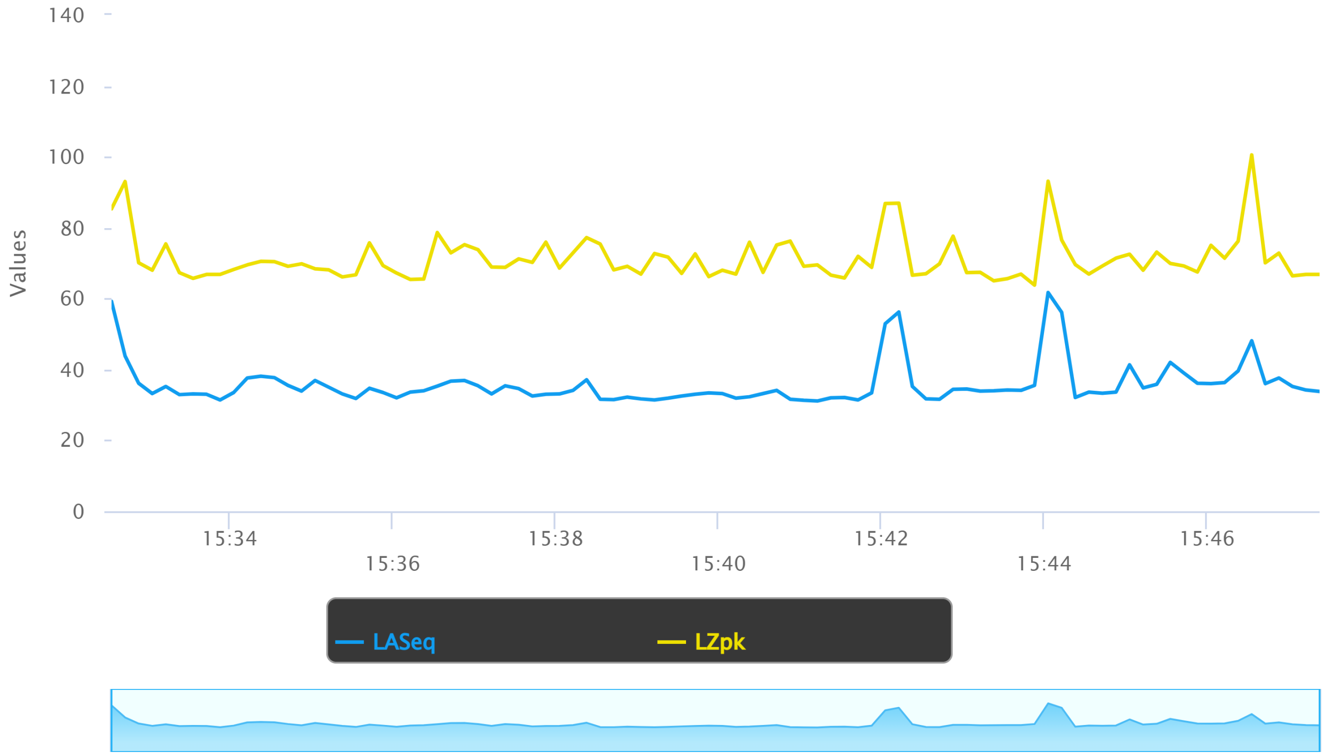
Overloads

Count	Duration
0	0:00:00.0

Statistics

LAS 5.0	44.2 dB
LAS 10.0	39.0 dB
LAS 33.3	34.9 dB
LAS 50.0	33.9 dB
LAS 66.6	32.7 dB
LAS 90.0	31.4 dB

Time History



Site Number: 8
Recorded By: Rosey Worden
Job Number: 2023-141
Date: 10/3/2023
Time: 3:50 p.m. – 4:05 p.m.
Location: On Tamarack Drive adjacent to house number 868.
Source of Peak Noise: Vehicles on Tamarack Drive, dogs barking and people talking.

Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
51.4	31.2	73.3	100.3

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 15 mins	**Sky:** Clear	
	Note: dBA Offset = 0.02	**Sensor Height (ft):** 3.5	
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	3-5	76	29.95

<u>Photo of Measurement Location</u>

Measurement Report

Report Summary

Meter's File Name	LxT_Data.039.s	Computer's File Name	LxT_0006133-20231003 155025-LxT_Data.039.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-10-03 15:50:25	Duration	0:15:00.0		
End Time	2023-10-03 16:05:25	Run Time	0:15:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-10-03 13:16:34	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	51.4 dB		
LAE	80.9 dB	SEA	--- dB
EA	13.8 µPa²h		
EA8	441.7 µPa²h		
EA40	2.2 mPa²h		
LZS_{peak}	100.3 dB	2023-10-03 16:04:49	
LAS_{max}	73.3 dB	2023-10-03 15:51:53	
LAS_{min}	31.2 dB	2023-10-03 16:03:23	
LA_{eq}	51.4 dB		
LC_{eq}	61.5 dB	LC_{eq} - LA_{eq}	10.1 dB
LAI_{eq}	54.4 dB	LAI_{eq} - LA_{eq}	3.0 dB

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	51.4 dB	51.4 dB	0.0 dB	
	LDEN	LDay	LEve	LNight
	51.4 dB	51.4 dB	--- dB	--- dB

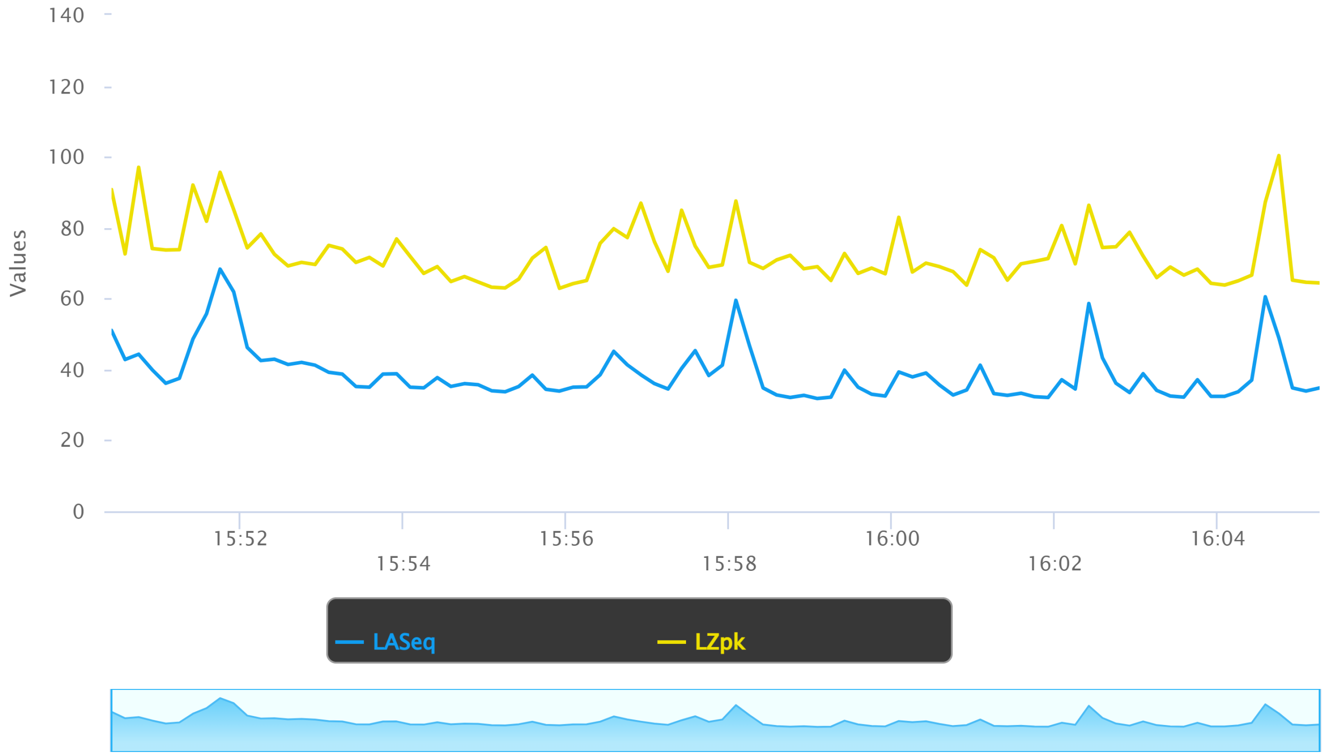
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	51.4 dB		--- dB		--- dB	
$Ls_{(max)}$	73.3 dB	2023-10-03 15:51:53	--- dB	None	--- dB	None
$LS_{(min)}$	31.2 dB	2023-10-03 16:03:23	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	100.3 dB	2023-10-03 16:04:49

Overloads	Count	Duration
	0	0:00:00.0

Statistics

LAS 5.0	52.9 dB
LAS 10.0	46.3 dB
LAS 33.3	37.2 dB
LAS 50.0	35.2 dB
LAS 66.6	34.1 dB
LAS 90.0	32.3 dB

Time History



Site Number: 9
Recorded By: Rosey Worden
Job Number: 2023-141
Date: 10/3/2023
Time: 4:07 p.m. – 4:22 p.m.
Location: On Devon Drive adjacent to house number 244.
Source of Peak Noise: Vehicles on Devon Drive and people talking.

Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
48.5	33.2	66.4	106.7

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 15 mins	**Sky:** Clear	
	Note: dBA Offset = 0.02	**Sensor Height (ft):** 3.5	
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	3-5	76	29.95

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.040.s	Computer's File Name	LxT_0006133-20231003 160738-LxT_Data.040.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-10-03 16:07:38	Duration	0:15:00.0		
End Time	2023-10-03 16:22:38	Run Time	0:15:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-10-03 13:16:34	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	48.5 dB		
LAE	78.0 dB	SEA	--- dB
EA	7.1 µPa²h		
EA8	226.5 µPa²h		
EA40	1.1 mPa²h		
LZS_{peak}	106.7 dB	2023-10-03 16:20:46	
LAS_{max}	66.4 dB	2023-10-03 16:13:25	
LAS_{min}	33.2 dB	2023-10-03 16:10:51	
LA_{eq}	48.5 dB		
LC_{eq}	61.9 dB	LC_{eq} - LA_{eq}	13.4 dB
LAI_{eq}	53.3 dB	LAI_{eq} - LA_{eq}	4.8 dB

Exceedances

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
48.5 dB	48.5 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
48.5 dB	48.5 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	48.6 dB		--- dB		--- dB	
$LS_{(max)}$	66.4 dB	2023-10-03 16:13:25	--- dB	None	--- dB	None
$LS_{(min)}$	33.2 dB	2023-10-03 16:10:51	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	106.7 dB	2023-10-03 16:20:46

Overloads

Count	Duration
0	0:00:00.0

Statistics

LAS 5.0	54.0 dB
LAS 10.0	50.1 dB
LAS 33.3	41.4 dB
LAS 50.0	37.9 dB
LAS 66.6	36.2 dB
LAS 90.0	34.5 dB

ATTACHMENT B

Federal Highway Administration Roadway Construction Noise Model Outputs – Project Construction

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	2/2/2024
Case Description:	Phase 1 Demolition & Site Preparation

Description	**Affected Land Use**
Phase 1 Demolition & Site Preparation	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**	**Estimated Shielding (dBA)**
Concrete Saw	No	20		89.6	1	0
Front End Loader	No	40		79.1	1	0
Tractor	No	40	84		1	0
Tractor	No	40	84		1	0
Excavator	No	40		80.7	1	0
Tractor	No	40	84		1	0

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Concrete Saw		123.6	116.6
Front End Loader		113.1	109.1
Tractor		118	114
Tractor		118	114
Excavator		114.7	110.7
Tractor		118	114
	Total	**123.6**	**121.5**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/2/2024
Case Description: Phase 1 Building Construction & Paving

Description	**Affected Land Use**
Phase 1 Building Construction & Paving	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**	**Estimated Shielding (dBA)**
Crane	No	16		80.6	1	0
Tractor	No	40	84		1	0
Tractor	No	40	84		1	0
Excavator	No	40		80.7	1	0
Excavator	No	40		80.7	1	0
Tractor	No	40	84		1	0
Concrete Mixer Truck	No	40		78.8	1	0
Concrete Mixer Truck	No	40		78.8	1	0
Concrete Mixer Truck	No	40		78.8	1	0
Concrete Mixer Truck	No	40		78.8	1	0
Paver	No	50		77.2	1	0
Roller	No	20		80	1	0

Calculated (dBA)

Equipment	***Lmax**	**Leq**
Crane	114.5	106.6
Tractor	118	114
Tractor	118	114
Excavator	114.7	110.7
Excavator	114.7	110.7

Tractor		118	114
Concrete Mixer Truck		112.8	108.8
Concrete Mixer Truck		112.8	108.8
Concrete Mixer Truck		112.8	108.8
Concrete Mixer Truck		112.8	108.8
Paver		111.2	108.2
Roller		114	107
	Total	**118**	**121.6**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/2/2024
Case Description: Phase 1 Architectural Coating

Description	**Affected Land Use**
Phase 1 Architectural Coating	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**	**Estimated Shielding (dBA)**
Compressor (air)	No	40		77.7	1	0

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Compressor (air)		111.6	107.7
	Total	**111.6**	**107.7**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/2/2024
Case Description: Phase 2 Demolition and Building Construction

Description	**Affected Land Use**
Phase 2 Demolition and Building Construction	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**	**Estimated Shielding (dBA)**
Excavator	No	40		80.7	1	0
Excavator	No	40		80.7	1	0
Excavator	No	40		80.7	1	0
Front End Loader	No	40		79.1	1	0
Front End Loader	No	40		79.1	1	0
Concrete Saw	No	20		89.6	1	0
Concrete Saw	No	20		89.6	1	0
Concrete Saw	No	20		89.6	1	0
Concrete Saw	No	20		89.6	1	0
Compressor (air)	No	40		77.7	1	0
Compressor (air)	No	40		77.7	1	0
Compressor (air)	No	40		77.7	1	0
Compressor (air)	No	40		77.7	1	0
Compressor (air)	No	40		77.7	1	0
Compressor (air)	No	40		77.7	1	0
Tractor	No	40	84		1	0
Tractor	No	40	84		1	0
Tractor	No	40	84		1	0
Tractor	No	40	84		1	0

Calculated (dBA)

Equipment	***Lmax**	**Leq**
Excavator	114.7	110.7
Excavator	114.7	110.7
Excavator	114.7	110.7
Front End Loader	113.1	109.1

Front End Loader		113.1	109.1
Concrete Saw		123.6	116.6
Concrete Saw		123.6	116.6
Concrete Saw		123.6	116.6
Concrete Saw		123.6	116.6
Compressor (air)		111.6	107.7
Compressor (air)		111.6	107.7
Compressor (air)		111.6	107.7
Compressor (air)		111.6	107.7
Compressor (air)		111.6	107.7
Compressor (air)		111.6	107.7
Tractor		118	114
Tractor		118	114
Tractor		118	114
Tractor		118	114
	Total	**123.6**	**125.7**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/2/2024
Case Description: Phase 3 All Construction Phases

Description	**Affected Land Use**
Phase 3 All Construction Phases	Residential

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	1	0
Front End Loader	No	40		79.1	1	0
Concrete Saw	No	20		89.6	1	0
Excavator	No	40		80.7	1	0
Tractor	No	40	84		1	0
Tractor	No	40	84		1	0
Dozer	No	40		81.7	1	0
Dozer	No	40		81.7	1	0
Grader	No	40	85		1	0
Excavator	No	40		80.7	1	0
Tractor	No	40	84		1	0
Tractor	No	40	84		1	0
Tractor	No	40	84		1	0
Generator	No	50		80.6	1	0
Welder / Torch	No	40		74	1	0
Excavator	No	40		80.7	1	0
Front End Loader	No	40		79.1	1	0
Tractor	No	40	84		1	0
Paver	No	50		77.2	1	0
Roller	No	20		80	1	0

	Calculated (dBA)	
Equipment	***Lmax**	**Leq**
Excavator	114.7	110.7
Front End Loader	113.1	109.1
Concrete Saw	123.6	116.6
Excavator	114.7	110.7
Tractor	118	114
Tractor	118	114
Dozer	115.6	111.7
Dozer	115.6	111.7
Grader	119	115
Excavator	114.7	110.7
Tractor	118	114
Tractor	118	114
Tractor	118	114
Generator	114.6	111.6
Welder / Torch	108	104
Excavator	114.7	110.7
Front End Loader	113.1	109.1
Tractor	118	114
Paver	111.2	108.2
Roller	114	107
Total	**123.6**	**125.4**

*Calculated Lmax is the Loudest value.

ATTACHMENT C

SoundPLAN Construction Noise Generation

SoundPLAN

Output Source Information Phase 1 Construction

Reciever	Location	Construction Noise Leve Building Construction and Paving (dBA)
1	Residence on Devon Drive	61.2
2	Residence on Devon Drive	61.7
3	Residence on Devon Drive	62.4
4	Residence on Devon Drive	63.9
5	Residence on Devon Drive	63.6
6	Residence on Devon Drive	62.3
7	Residence on Devon Drive	57.4
8	Residence on Devon Drive	53.9
9	Residence on Devon Drive	58.7
10	Residence on Devon Drive	61.3
11	Residence on Devon Drive	56.6
12	Residence on El Pavo Real Circle	62.5
13	Residence on Esmeyer Drive	59.1
14	Residence on Esmeyer Drive	57.4
15	Residence on Esmeyer Drive	59.3
16	Residence on Esmeyer Drive	58.7
17	Residence on Malone Lane	59.2
18	Residence on Minor Court	58.1
19	Residence on Nova Albion Way	57.6
20	Residence on Nova Albion Way	62.6

SoundPLAN

Output Source Information Phase 1 Construction

21	Residence on Nova Albion Way	66.4
22	Residence on Nova Albion Way	63.7
23	Residence on Tamarack Drive	57.4
24	Residence on Walace Way	55.9

	Citation	Level at Source (dBA)
1	Construction Noise Leve During Building Construction and Paving (RCNM)	121.6

SoundPLAN

Output Source Information Phase 2 Construction

Reciever	Location	Construction Noise Leve Demolition and Building Construction (dBA)
1	Residence on Devon Drive	72.7
2	Residence on Devon Drive	69.2
3	Residence on Devon Drive	66.4
4	Residence on Devon Drive	64.4
5	Residence on Devon Drive	62.6
6	Residence on Devon Drive	61.6
7	Residence on Devon Drive	58.6
8	Residence on Devon Drive	56.5
9	Residence on Devon Drive	63.3
10	Residence on Devon Drive	61
11	Residence on Devon Drive	59
12	Residence on El Pavo Real Circle	68.2
13	Residence on Esmeyer Drive	69.3
14	Residence on Esmeyer Drive	65.7
15	Residence on Esmeyer Drive	71.1
16	Residence on Esmeyer Drive	71.7
17	Residence on Malone Lane	60.4
18	Residence on Minor Court	63.9
19	Residence on Nova Albion Way	59.8
20	Residence on Nova Albion Way	64.2
21	Residence on Nova Albion Way	70.4

SoundPLAN
Output Source Information Phase 2 Construction

22	Residence on Nova Albion Way	73.5
23	Residence on Tamarack Drive	61.4
24	Residence on Walace Way	62.3

	Citation	Level at Source (dBA)
1	Construction Noise Leve Demolitionand Building Construction (RCNM)	125.7

SoundPLAN

Output Source Information Phase 3 Construction

Reciever	Location	Construction Noise Leve Demolition, Site Preparation, Grading, Building Construction & Architectural Coating (dBA)
1	Residence on Devon Drive	68.8
2	Residence on Devon Drive	72.5
3	Residence on Devon Drive	77.3
4	Residence on Devon Drive	72.7
5	Residence on Devon Drive	72.5
6	Residence on Devon Drive	76.8
7	Residence on Devon Drive	69.4
8	Residence on Devon Drive	63.5
9	Residence on Devon Drive	70.4
10	Residence on Devon Drive	72.4
11	Residence on Devon Drive	69.5
12	Residence on El Pavo Real Circle	69.1
13	Residence on Esmeyer Drive	65.6
14	Residence on Esmeyer Drive	65.6
15	Residence on Esmeyer Drive	65.6
16	Residence on Esmeyer Drive	65.3
17	Residence on Malone Lane	68

SoundPLAN
Output Source Information Phase 3 Construction

18	Residence on Minor Court	67.2
19	Residence on Nova Albion Way	68.9
20	Residence on Nova Albion Way	74.8
21	Residence on Nova Albion Way	71.1
22	Residence on Nova Albion Way	68.7
23	Residence on Tamarack Drive	67.2
24	Residence on Walace Way	62.8

	Citation	Level at Source (dBA)
1	Construction Noise Leve Demolition, Site Preparation, Grading, Building Construction & Architectural Coating (RCNM)	125.4

ATTACHMENT D

SoundPLAN Operational Noise Generation

SoundPLAN

Output Source Information

Reciever	Location	Level at Ground Floor
1	Residence fronting Esmeyer Drive	23.0 dBA
2	Residence fronting Nova Albion Way	25.2 dBA
3	Residence fronting Nova Albion Way	28.4 dBA
4	Residence fronting Nova Albion Way	25.9 dBA
5	Miller Creek School District Office	31.7 dBA
6	Residence fronting Devon Drive	36.8 dBA
7	Residence fronting Devon Drive	41.7 dBA
8	Residence fronting Devon Drive	41.0 dBA
9	Residence fronting Devon Drive	39.0 dBA
10	Residence fronting Devon Drive	23.0 dBA

	Citation	Level at Source
1	ECORP Consulting, Inc. reference noise measurement at high school sporing event	66.0 dBA

APPENDIX J

Vehicle Miles Traveled Memorandum

Michael Baker INTERNATIONAL

We Make a Difference

TECHNICAL MEMORANDUM

To: Tim Ryan, San Rafael City Schools

From: Jacob Swim, TE, Michael Baker International

CC: Barbara Heyman, Michael Baker International

Date: February 16, 2024

Subject: Terra Linda High School Capital Improvements - Vehicle Miles Traveled (VMT) Memorandum

Introduction

The purpose of this memorandum is to document a VMT screening assessment for the Terra Linda High School Capital Improvements (Project) located at 320 Nova Albion Way in the City of San Rafael (City). San Rafael City Schools (District) proposes capital improvements at Terra Linda High School to modernize and replace existing outdated, aging academic, and physical education facilities. The proposed Project would not increase student enrollment at Terra Linda High School. **Table 1** provides key project information. **Figure 1** and **Figure 2** shows the regional vicinity map and location of the Project. **Figure 3** shows the conceptual site plan.

Table 1: Project Information

Item	Description
Project Title	Terra Linda High School Capital Improvements
Project Location	320 Nova Albion Way, San Rafael, CA
Existing Use	High School Campus (9 thru 12 grades) with max enrollment of 1,470 students
Site Area	28 acres
Existing Zoning	Zoned Planned Development (PD) District and land use designation as Public/Quasi-Public which includes public schools as allowed land use type.
Area Land Use	The Project Site is bounded by Nova Albion Way on the north, the Miller Creek School District Office to the east, and single-family residences along Devon Drive to the south and west.
Proposed Use	Major capital improvements at the campus, such as providing high performance classrooms and learning environments, including outdoor educational spaces, and construct climate resilient and sustainable facilities. No increase in student enrollment is proposed.
Opening Year	Project would be constructed in three phases with the first phase starting in the summer of 2024 and last phase ending in 2029.
Proposed Access	The main entrance is from Nova Albion Way.

Michael Baker INTERNATIONAL

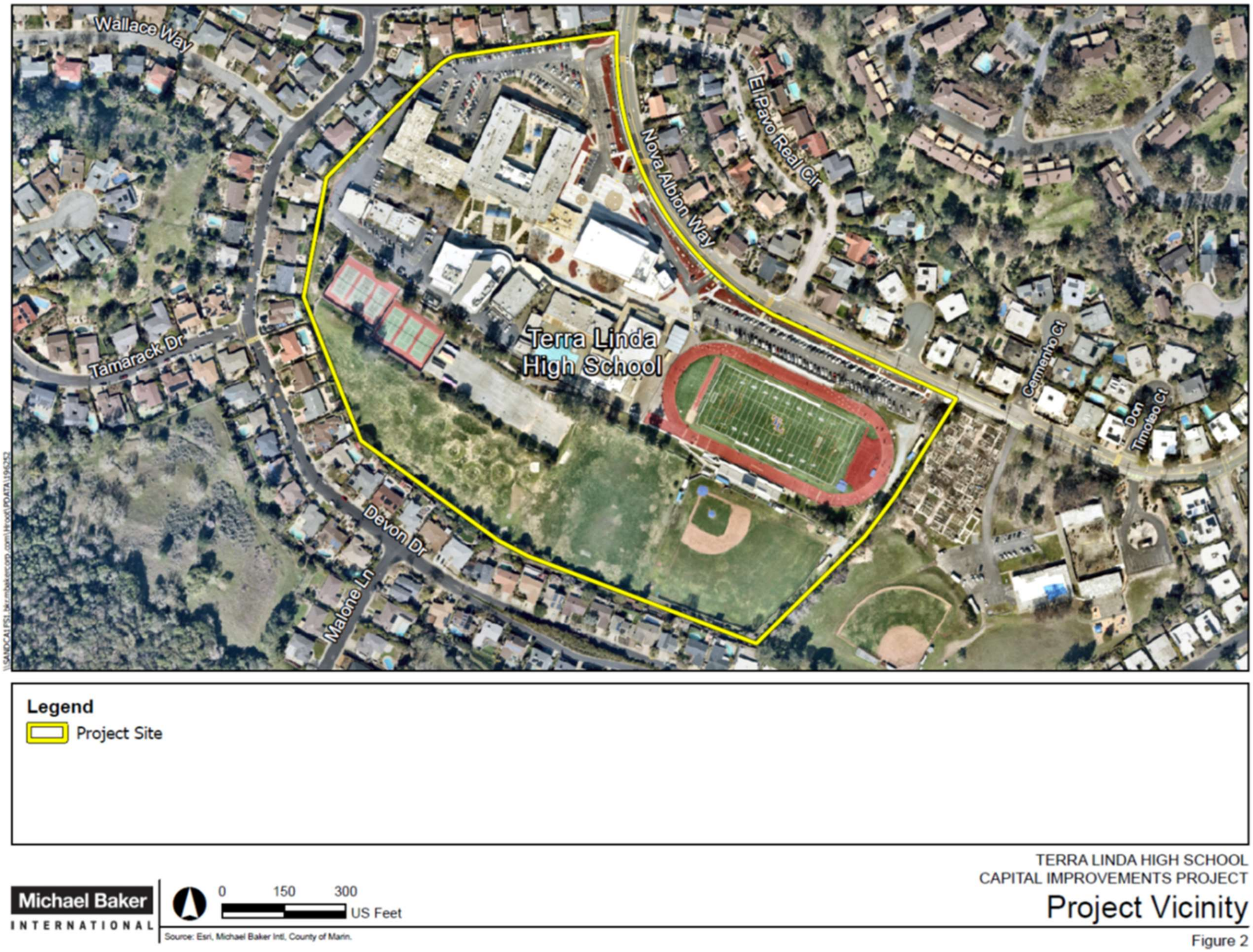
0 1 2 Miles

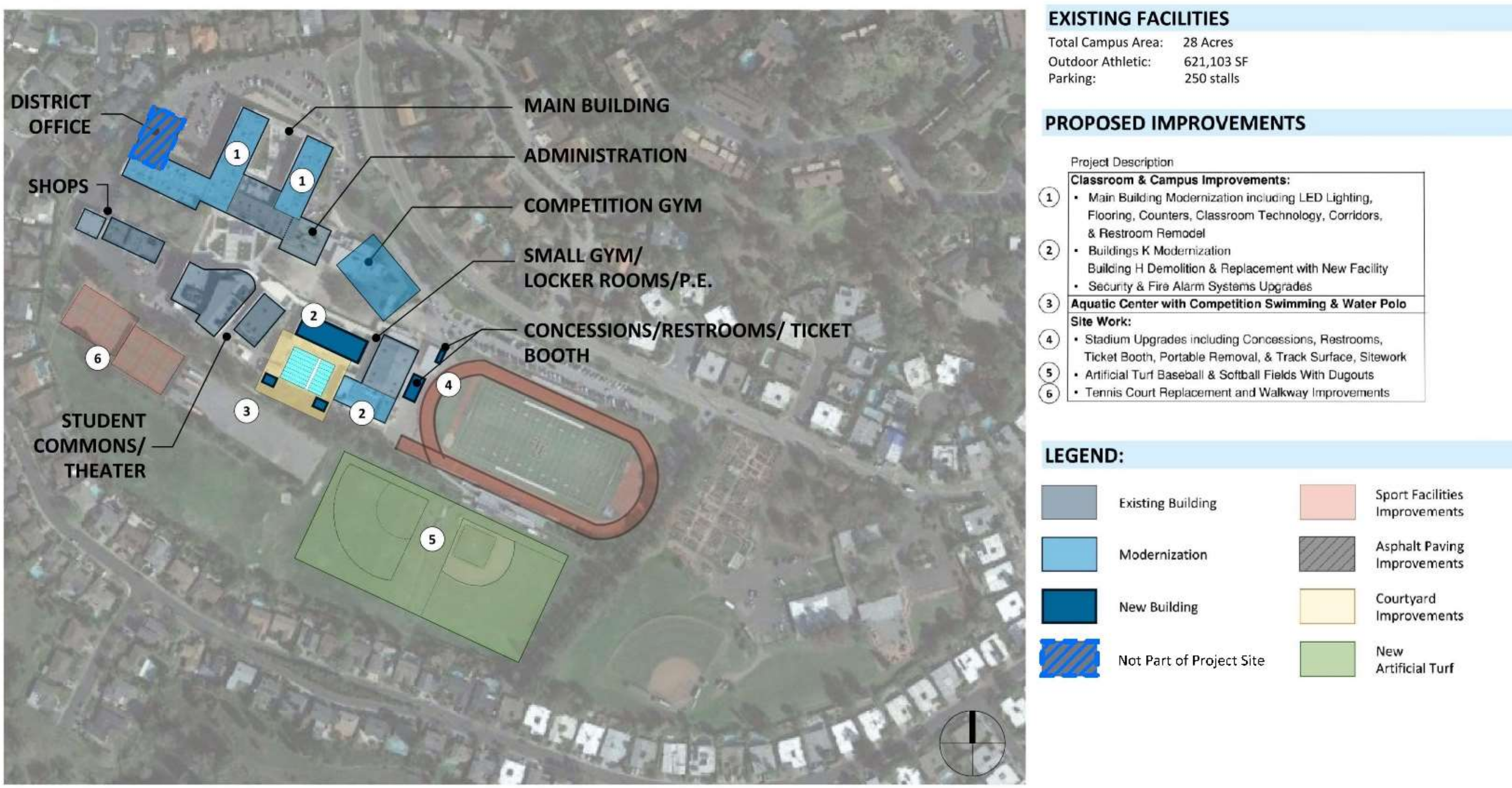
Source: Esri, Michael Baker Intl, County of Marin, USGS, Caltrans.

TERRA LINDA HIGH SCHOOL
CAPITAL IMPROVEMENTS PROJECT

Regional Vicinity

Figure 1


Wallace Way
El Pavo Real Cir
Nova Albion Way
Terra Linda High School
Tamarack Dr
Camerino Ct
Don Timoteo Ct
Devon Dr
Malone Ln
Legend
Project Site
Michael Baker INTERNATIONAL
0 150 300
US Feet
Source: Esri, Michael Baker Intl, County of Marin.
TERRA LINDA HIGH SCHOOL
CAPITAL IMPROVEMENTS PROJECT
Project Vicinity
Figure 2



Site Plan Diagram

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Michael Baker INTERNATIONAL

NOT TO SCALE

Source: San Rafael City Schools, August 21, 2023.

TERRA LINDA HIGH SCHOOL
CAPITAL IMPROVEMENTS PROJECT

Conceptual Site Plan

Figure 3

Project Description

The proposed Project will be implemented in three general phases, as described below.

Phase 1

Phase 1 is comprised of three main components: replacement of the existing pool, equipment room, storage areas, and the pool deck in its entirety, complete renovation of the existing locker and team rooms (southern half of Building K), and the reconstruction of Building H.

A new competition-level aquatics facility would be constructed to support the existing swimming and water polo programs. The existing pool and deck, and a lunch shelter and pool equipment building located to the west of the pool would be demolished. A replacement outdoor swimming pool (132 feet by 75 feet) and new deck would be constructed.

The existing Building H, which currently houses the weight room, wrestling mat room, dance studio (used for cheerleading and also has a climbing wall), and pump room would be demolished. A new building of approximately 10,000 square feet would be constructed to accommodate the same ancillary gym uses. The southern portion of Building K would be modernized. The existing locker rooms, bathrooms, team rooms, and other support spaces would be demolished. Non-structural walls would also be removed; however, no major structural modifications would be made to the building.

The existing scoreboard on Building K would be replaced with a new LED video display. Two new modular buildings would be constructed; a new 183 square foot ticket booth facility with storage and a restroom (Building Q) would be constructed in the general location of the existing portable buildings. The existing concession stand would be removed. New fencing, landscaping, and site lighting would be installed between the Building K and the stadium fence. A new restroom and concessions building of approximately 905 square feet (Building R) would be constructed near the south end of Building K.

Phase 2

The first and second floors of the main school buildings (Buildings A, M and L) will be modernized to be more resilient to physical damage and compliance with ADA standards and to meet future classroom programming needs, such as providing more space to accommodate state-of-the-art technology and equipment. The facilities would be improved with new LED lighting, flooring, counters, fixtures, painting and finishes, and technology. The restroom toilets would be improved to high-security, full-height partitions. The fire alarm system would be upgraded.

Phase 3

The District proposes functioning baseball, softball, and soccer fields. Approximately 200,000 square feet of natural turf would be replaced with permeable, artificial turf. The baseball field would be in the same location and designed and striped to have the same orientation as the existing baseball field in the southeast corner of the campus. The existing field west of the baseball field would be striped for both softball and soccer uses. The new fields may include other improvements, including dugouts, portable bleacher stands, and new scoreboards. A shot-put throw station may be installed to replace the existing station that would be displaced by the softball field.

The existing tennis courts would be replaced, walkways would be improved to meet ADA standards, and the drinking fountain would be replaced with a new ADA-compliant fountain. The existing fencing around the tennis courts would be replaced.

The remainder of the stadium would be improved under Phase 3. Improvements would enhance the appearance of the facility, including but not limited to replacing the existing fencing, painting the railings, repurposing the existing natural turf areas that are in disrepair from reduced watering with outdoor fitness equipment, and relocating the long jump pit to another location.

Construction Schedule

The proposed Project would be implemented in three general phases. The first phase would start the summer of 2024, and the last phase would end five years later, at the end of the fourth quarter in 2029. Below is the anticipated construction schedule by phase.

- Phase 1 (Pool, Buildings H and K, Stadium): April 2024 – August 2025
    - Phase 1a (Building K and Stadium): April 2024 – August 2024
    - Phase 1b (Pool and Building H): June 2024 – August 2025
- Phase 2 (Classroom Buildings): June 2026 – December 2028
    - Phase 2a: June 2026 – December 2026
    - Phase 2b: June 2027 – December 2027
    - Phase 2c: June 2028 – December 2028
- Phase 3 (Artificial Turf, Tennis Courts, Stadium): June 2029 – December 2029

Construction would occur between 6:30 AM and 3:30 PM, and deliveries would not be allowed 15 minutes before and after the morning and afternoon bells.

Project Trip Generation

The Project would not increase student enrollment at the Terra Linda High School. The Project includes permeable artificial turf on both southern fields which cover approximately 5 acres. Based on a review of land uses identified in the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition*, the closest land use associated with the softball, baseball and soccer field improvements is a public park. Therefore, a public park was the land use utilized to determine the increase in vehicle trips based on the project.

It may be noted that operations of the aquatic facilities would be expanded to include potential qualifying championship swim meets and water polo games. These tournament meets and games would be scheduled outside of standard school hours and on weekends. Therefore, trips associated with these events are not anticipated to substantially affect the local neighboring streets during typical AM and PM peak hours.

Table 2 provides a summary of the trip generation rates based on the *ITE Trip Generation Manual*, for a Public Park use (ITE Code 411). **Table 3** provides a summary of the estimated trips generated by the Project. As shown, the Project is estimated to generate 92 additional daily vehicle trips with 0 AM Peak Hour trips, and 23 new PM Peak Hour trips.

Table 2: ITE Trip Generation Rates

Land Use	ITE Code [1]	Daily Trip Rate	AM Peak Hour Rate			PM Peak Hour Rate		
			Total	In	Out	Total	In	Out
Public Park	411	T=0.64X+88.46 / Acre	0.02 /Acre	59%	41%	T=0.06X+22.60 /Acre	55%	45%

[1] Source: ITE Trip Generation Manual, 11th Edition.

Table 3: Project Trip Generation Summary

Land Use	Intensity	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
			Total	In	Out	Total	In	Out
Public Park	5 Acres	92	0	0	0	23	13	10

Analysis Guidelines

The City of San Rafael *Transportation Analysis Guidelines* dated June 2021 was used as the primary resource in the development of this VMT screening analysis. According to the City's Guidelines, projects that generate less than 110 daily vehicle trips are not required to prepare a Transportation Impact Analysis (TIA) or Local Transportation Analysis (LTA). Based on the trip generation table, the Project is conservatively estimated to generate up to 92 daily vehicle trips. Therefore, a TIA or LTA is not required of the Project.

VMT Screening Evaluation

Land use projects that meet the VMT screening thresholds identified in **Table 4** are assumed to result in a less-than-significant transportation impact under CEQA and do not require a detailed quantitative VMT assessment. <u>The Project meets two of the Screening Criteria for land use projects which would allow a determination of a less-than-significant impact on VMT, thus a project-specific VMT assessment is not required.</u>

Table 4: Screening Criteria for Land Use Projects Exempt from VMT Calculation

Project Type	Screening Criteria	Project Evaluation	Result
Transit Priority Area (TPA)	Projects located within ½ mile walkshed around major transit stops (i.e., the Downtown San Rafael and Civic Center SMART Stations) in San Rafael.	Project is not located within ½ mile walkshed around a major transit stop.	Does Not Meet Criteria
Affordable Housing	100% restricted affordable residential projects in infill locations (i.e. development within unused and underutilized lands within existing development patterns).	The Project is not residential, therefore this criterion does not apply.	Does Not Meet Criteria
Small Projects	Projects defined as generating 110 or fewer average daily vehicle trips, absent substantial evidence indicating that a project would generate a potentially significant level of VMT.	The Project is forecast to generate 92 daily vehicle trips.	**Criteria is Met**
Local Serving Public Facility	Locally serving public facilities that encompasses government, civic, cultural, health, and infrastructure uses and activity which contributes to and support community needs. Locally serving public facilities include police stations, fire stations, passive parks, branch libraries, community centers, public utilities, and neighborhood public schools.	The Project is a neighborhood public school.	**Criteria is Met**
Neighborhood-Serving Retail Project	Neighborhood-serving retail projects that are less than 50,000 square feet, which serve the immediate neighborhoods. Examples include dry cleaners, coffee shops, convenience markets, tutoring centers and daycare centers.	The Project is not a retail project, and therefore this criterion does not apply.	Does Not Meet Criteria
Residential and Office Projects in Low VMT Area	The project is located within a low VMT area for its land use. Based on information from the Transportation Authority of Marin (TAM) model, certain areas of San Rafael have lower rates of VMT generation than others. In existing locations where VMT per capita is below the thresholds, projects may be screened from further VMT analysis. The TAM VMT web map can be found at www.tam.ca.gov/vmt	According to the TAM VMT web map, TAZ 800195 where the project is located is not within a Low VMT area.	Does Not Meet Criteria

VMT Assessment During Construction

The proposed construction schedule has been designed to limit interruptions (to the extent feasible) on school operations, and existing school programs would continue under all three phases. Building modernization improvements, under Phase 2, would be phased to avoid the need for temporary student classroom facilities, and school programs during this phase would resume at existing campus facilities.

During construction, sports programs such as lacrosse, tennis, soccer, and track will not be displaced to offsite facilities but avoid construction activities to limit interruptions in school operations to the extent feasible. Football, water polo and swimming programs would be temporarily displaced during construction. The District proposes to relocate the displaced water sports and football programs to offsite facilities located within a 10-mile radius of the campus during the periods they would be affected. **Table 5** provides an estimated number of VMT as a result of the displaced sports programs during construction. VMT is calculated by multiplying the length of the trip in miles (both directions) by the sum of the daily vehicle trips.

Table 5: VMT Calculation During Construction

Sports Program	No. of Students Displaced	Distance to Offsite Facility (miles in both directions) (A)	Number of Vehicular Trips (B)	VMT During Construction C = (A x B)
Water Polo	50	20	100	2,000
Swimming	50	20	100	2,000
Football	50	20	100	2,000

Notes:

1. *Distance to offsite facility assumes both to and from the school site i.e. 20 miles.*
2. *Number of vehicle trips assumes trips to and from the off-site facility assuming all students drive alone in a car. If students carpool, the vehicle trips reduce thus reducing the overall VMT.*

As shown in the table, the distance to and from offsite facilities for students to participate in the water polo and swimming programs is approximately 20 miles i.e., 10 miles in each direction. The exact locations of the offsite water sport facilities have not yet been confirmed by school staff. The number of vehicle trips to and from the school site assumes all of the students drive alone i.e., no carpooling which is highly conservative. If 20 percent of the students carpool to the offsite facilities, the total number of VMT would reduce to 1,800 per sports program. It may be noted that construction of the aquatic center is expected to last 10 to 12 months. Therefore, the increase in VMT in the community would be considered temporary and is not expected to impact the environment.

Conclusions

The VMT evaluation of the school renovations show that the Project meets two of the Screening Criteria for land use projects (Small Projects and Locally Serving Public Facility) which allows for a presumed determination of a less-than-significant CEQA transportation impact on VMT; therefore, a detailed VMT analysis and mitigation measures are not required. Although construction of the aquatic facilities are expected to increase VMT by approximately 2,000 due to students traveling off-site to participate in football, water polo and swimming, the increase in VMT is considered temporary and is not expected to impact the environment.