GEOTECHNICAL AND GEOLOGIC HAZARDS EVALUATION
SOUTH SAN FRANCISCO HIGH SCHOOL ES MODERNIZATION
400 B STREET, SOUTH SAN FRANCISCO, CALIFORNIA 94080

South San Francisco Unified School District (SSFUSD)
398 B Street
South San Francisco, California 94080

August 7, 2026
Project No. 404741002

Geotechnical and Geologic Hazards Evaluation

South San Francisco High School ES Modernization

400 B Street, South San Francisco, California 94080

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1. INTRODUCTION

In accordance with your request and authorization, Ninyo & Moore Geotechnical & Environmental Sciences (SOCOTEC) has performed a geotechnical and geologic hazards evaluation for the campus-wide improvement project for South San Francisco High School in South San Francisco, California (Figure 1). The purpose of our evaluation was to assess the potential impacts of local and regional geology and geologic hazards on the project. This report presents our findings, conclusions, and recommendations regarding the geotechnical aspects related to the design and construction of the proposed improvements.

2. SCOPE OF SERVICES

In accordance with our Proposal No. 08SJO02-03776, dated May 22, 2026 and Independent Consultant Agreement 26027, dated June 12, 2026, our scope of services included:

- Performing a site investigation consisting of:
    - Reviewing readily available geologic and seismic literature pertinent to the project area. This included geologic maps and reports, regional fault maps, seismic hazard maps, and aerial imagery.
    - Marking the proposed locations of our subsurface exploration (borings).
    - Submitting a “dig ticket” to Underground Service Alert of Northern and Central California (USAN) for utility mark-out of the existing public utilities in the vicinity of the proposed borings.
    - Subcontracting with a private utility locator to further check the boring locations for potential conflicts via ground penetrating radar and electro-magnetic scanning.
    - Obtaining a Geotechnical Drilling Permit from San Mateo County Environmental Health Services (SMCEHS).
    - Drilling, sampling, and logging the subsurface conditions in eight geotechnical borings at the approximate locations shown in Figure 2.
    - Performing geotechnical laboratory testing of select samples to assess their geotechnical properties.
    - Performing a geophysical survey to evaluate the variation of seismic shear wave velocity (V_S) utilizing the Refraction Microtremor (ReMi) technique. The approximate location of our ReMi survey is shown on Figure 2.
    - Performing three field infiltration tests using the Double Ring Infiltrometer method (ASTM D2285) at the approximate locations shown in Figure 2. Testing was performed in accordance with the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) § C.3 Technical Guidance.

- Performing characterization of the excess soil cuttings generated during drilling for disposal at an appropriate landfill.

- Performing a geological hazards assessment in accordance with California Geological Survey (CGS) Note 48

- Preparing this report for the South San Francisco Unified School District.

3. SITE AND PROJECT DESCRIPTION

South San Francisco High School (SSFHS) is located at 400 B Street in South San Francisco, California (Figure 1). The campus is bounded by El Camino Real to the west, B Street to the north, Centennial Way Trail to the east, and residential development to the south. Based on our conversations with you and the information provided, we understand the current project consists of the construction of a new building (Building S – CTE Wing) in the western portion of campus, and the renovation of the existing gym and locker room facility (Building N), and construction of new additions adjacent to the gym (Figure 2). The campus is located within the USGS San Francisco South 7.5-minute quadrangle.

3.1. Building S – CTE Wing

The existing Building S on the western boundary of the campus will be demolished and new Building S – CTE Wing structures will be constructed on the parking lot adjacent to the existing Building S. The area is paved and currently being used for parking and storage. Based on the plans provided (CAW Architects, 2026a), two one-story buildings will be constructed in this location, one in the north and one in the south, each with a rough footprint between 8,500 and 9,000 square feet. The structures are anticipated to be supported on shallow footings. Preliminary structural loads are expected to be in the order of 15 to 25 kips (DL + LL) on isolated column footings and 1.5 to 3.5 klf on perimeter strip footings.

The site is relatively flat, with elevations[1] ranging between about 54 and 57 feet above mean sea level (MSL). The location of the north building would be centered about 37.6474°N latitude, 122.4279°W longitude, while the south building would be centered about 37.6469°N latitude, 122.4276°W longitude.

[1] Google Earth

3.2. Building N Renovation and New Locker Room

Building N is located adjacent to the pool in the central portion of the campus, between the baseball (south) and softball (north) diamonds and west of the football field and track. As shown in the conceptual plan provided (CAW Architect, 2026b), the existing portable buildings adjacent to the southeast corner of Building N will be demolished and replaced with a new, 2,989 square-foot (SF) Weight Room. A new Mat Room (1,799 SF) and Girls Team Room (634 SF) will be constructed adjacent to the existing Girls Team Room in the northeast portion of Building N. The structures are anticipated to be supported on shallow footings. Preliminary structural loads are expected to be in the order of 6 to 21 kips (DL + LL) on isolated column footings and 0.45 to 0.80 klf on perimeter strip footings.

Both locations are relatively flat, with elevations[1] ranging between roughly 48 and 52 feet MSL at each location. The approximate center of the new Weight Room is 37.6479°N latitude, 122.4256°W longitude; the approximate center of the new Girls Team Room is 37.6483°N latitude, 122.4260°W longitude; the approximate center of the new Mat Room is 37.6484°N latitude, 122.4259°W longitude.

3.2.1. Existing Foundations

Based on our review of the structural plans (John Lyon Reid A.I.A., 1951) provided as scanned images, the foundation for the Gym (Building N) consists of slabs-on-grade and shallow footings. The project plans (Sheet S1) indicate assumed bearing values of 1,300 psf for dead load (DL) and 2,000 psf for total load for the Gymnasium. Based on the values provided and traditionally accepted factors of safety for DL and total static loads (Dead Load plus Live Load), we assume that the 2,000 psf is an allowable bearing capacity for DL plus LL with a factor of safety of about 2. Per Sheet S2 of the plans, all floor slabs were to be 4-inches-thick, poured on rock fill 4-inches thick, and reinforced with 6/6 – 10/10 (gauge) welded wire fabric with 2-inches of insulating concrete. The footings appear to have a maximum design embedment depth of 2-feet 9-inches as measured from top of slab (Sheet S3).

4. FIELD EXPLORATION AND LABORATORY TESTING

4.1. Field Exploration

Our field exploration consisted of subsurface exploration, a geophysical survey, and infiltration testing. The approximate exploration locations are presented on Figure 2. We discuss each of these in the sections below.

4.1.1. Subsurface Exploration

Our subsurface exploration, conducted on June 24 and 25, 2026, consisted of drilling, logging, and sampling eight geotechnical borings, designated B-1 through B-8 (Figure 2). Prior to commencing the subsurface exploration, we reviewed utility plans provided by the school (Kier + Wright, 2025), notified utility owners of our exploration by submitting a dig ticket through USAN and retained a private utility locator to locate and mark existing utilities in the vicinity of our borings. Additionally, we obtained Geotechnical Drilling Permit from San Mateo County Environmental Health Services.

SOCOTEC retained Hanlon Drilling of Granite Bay, California to drill the borings with a CME-75 truck-mounted drill rig, equipped with 4-inch-diameter solid-stem augers. The exploratory borings were advanced to depths up to 51½ feet bgs. Bulk samples for the upper 5 feet of the subsurface were obtained from the auger cuttings. Disturbed and relatively undisturbed soil samples were collected at selected depths from within the boreholes. A brief explanation of the field procedures for collecting the samples is included in Appendix A.

A representative from SOCOTEC logged the samples in the field in accordance with the Unified Soil Classification System (USCS), using the visual-manual procedures in the American Society for Testing and Materials (ASTM) Standard D2488, before transporting them to our geotechnical laboratory for testing. In addition, field strength tests were conducted using a Pocket Penetrometer and Torvane to estimate the unconfined compressive strength and undrained shear strength of cohesive soils, respectively. Pocket Penetrometer readings are reported in tons per square foot (tsf), and Torvane readings are reported in kilograms per square centimeter (kg/cm^2), based on dial values interpreted as tenths of the scale. These field logs were then used to develop the boring logs included with this report (Appendix A). The blow count values on the boring logs have not been corrected for the effects of overburden pressure, sampler size or hammer efficiency.

The borings were backfilled with neat cement grout and patched with cold asphalt at paved locations at the end of drilling and sampling. Excess soil cuttings generated during drilling were placed in 55-gallon drums and off-hauled from the project site on July 21, 2026 by Belshire Environmental Services.

4.1.2. Geophysical (ReMi) Survey

SOCOTEC performed a geophysical survey using the Refraction Microtremor (ReMi) method on June 16, 2026. The purpose of the study was to evaluate the subsurface shear-wave

velocity and select the corresponding seismic site classification. The survey consisted of collecting microtremor array measurements (MAM) from surface waves using ambient noise as a passive source and an array of geophones along one seismic line. The survey line location is illustrated on Figure 2.

The method provided a shear wave velocity model to a depth of approximately 100 feet which was then used to calculate the average shear velocity (V_{S100}) to select the seismic site class. The results indicate a V_{S100} value of 1,054 feet per second (ft/s). Based on comparison of the calculated V_{S100} values with American Society of Civil Engineers (ASCE) 7-22 Table 20.2-1, the site can be classified as Site Class CD – dense sand or very stiff clay. The seismic model results are provided in Appendix B.

4.1.3. Infiltration Testing

SOCOTEC performed infiltration testing at the site to evaluate the infiltration rate of near surface soil for consideration in the selection and design of storm water management systems. The double ring infiltrometer method was used to evaluate the infiltration rate at three test locations designated as IT-1, IT-2, and IT-3. The approximate test locations are illustrated on Figure 2. The double-ring infiltrometer method excludes infiltration through the sides of the test hole. Test holes with a diameter of about 6-inches were excavated to depths of about 2 feet. The subsurface conditions encountered in the test hole consisted of lean clay. After cleaning the test hole of loose material, a 6-inch diameter metallic ring was inserted in the test hole and driven into the soil subgrade about 4 inches. A second 4-inch diameter metallic ring was inserted in the center of the 6-inch ring and driven about 3¾ inches into the subgrade. Water was added in the annular space and the inner ring. The water level of about 6 inches was maintained in the annular space and inner ring by adding water using two Marriotte tubes having the capacity of 3,000 and 10,000 cubic centimeter (cc). The drop in the water level in the Marriotte tubes were recorded over periodic intervals. The infiltration rate reported is the average infiltration rate in the inner ring over the last four measurement intervals adjusted with the correction factor 0.33 per the guidelines of the San Francisco Public Utilities Commission (SFPUC).

The test holes were backfilled with soil cuttings after completion of the tests. The results of our infiltration testing are presented in Appendix C and summarized in Table 1, below.

Table 1 – Infiltration Test Results			
Test Location	Depth (feet)	Average Infiltration Rate[1] (inches/hour)	Adjusted Infiltration Rate[2] (inches/hour)
IT-1	2	0.36	0.12
IT-2	2	0.18	0.06
IT-3	2	0.08	0.03
IT-4	2	0.12	0.04

Notes:
[1] Average of the measured infiltration rate over the last four (4) time intervals.
[2] Average Infiltration Rate multiplied by a correction factor of 0.33.

4.2. Laboratory Testing

SOCOTEC performed geotechnical laboratory testing on select soil samples collected from the borings to evaluate in-situ soil moisture content and dry density, percentage finer than 75-µm (No. 200 sieve), Atterberg limits, unconfined compression, and unconsolidated-undrained triaxial compression. The results of the in-place moisture content and dry density tests are shown at the corresponding sample depths on the boring logs in Appendix A, while the results of the other laboratory tests performed by SOCOTEC are presented in Appendix D.

Additionally, two samples of the near-surface soil were sent to CERCO Analytical (CERCO) in Concord, California for corrosivity analysis. The results of this testing, including a brief evaluation, are presented in Appendix E, and are discussed in Section 7.3.

5. PREVIOUS STUDY

Geosphere Consultants performed a Geotechnical Engineering and Geologic Hazards Study at the campus in the area between the current two project sites (2012). Their subsurface exploration consisted of four borings drilled to depths of 50, 25, 25, and 22 feet below existing ground surface (bgs). We reviewed this report and incorporated the pertinent information into our analysis. This report is listed in the reference sections, the boring logs and laboratory test results are included in Appendix F, and the approximate locations of their explorations are shown on Figure 2. The pertinent information from this study included:

- Subsurface materials encountered were predominantly coarse-grain material, generally consisting of poorly-graded sand with variable amounts of silt and clay (**SM, SC, SP**). A roughly 16-foot-thick layer of sandy silt (**ML**) was logged in their Boring B-1 from approximately 1½ feet bgs to 18½ feet bgs.
- Though not classified in their report, the subsurface material logged in their borings is consistent with Colma Formation.

- Groundwater was encountered at 35 feet bgs.
- Laboratory testing performed included tests to determine Atterberg Limits, grain size distribution, direct shear strength, and corrosivity.

6. GEOLOGIC AND SUBSURFACE CONDITIONS

6.1. Regional Geologic Setting

The site is situated between the San Francisco Bay, to the east, and the Pacific Ocean, to the west, on the San Francisco Peninsula (Figure 1). The San Francisco Peninsula is part of the Coast Ranges geomorphic province of California. The Coast Ranges have experienced a complex geological history that has resulted in a series of northwest-trending mountain ranges and valleys. The present physiography and geology of the Coast Ranges are a result of deposition and deformation along the boundary between the North American plate and the Pacific plate, a tectonic setting experiencing both translational and compressional stresses. Movement along this boundary is largely concentrated along well-known fault zones, including those associated with the San Andreas, Calaveras, and Hayward faults, as well as associated lesser-order faults.

The Coast Ranges consist of northern and southern ranges separated by the topographic low containing the San Francisco Bay. Bedrock in the Coast Ranges typically consists of Jurassic to Pleistocene age igneous, metamorphic, and sedimentary rock of the Franciscan complex, Salinian block, or Great Valley sequence. Franciscan complex rock dominates the northern Coast Ranges, though volcanic cones and flows of the Quien Sabe, Sonoma, and Clear Lake volcanic fields overly the Franciscan rocks in several areas.

6.2. Site Geology

Regional mapping by Bonilla (1998) indicates the site is underlain by Pleistocene Colma Formation (**Qc**). Bonilla describes the Colma Formation in the vicinity of the site as *"mostly sandy clay and silty sand; yellowish orange to gray"* in the vicinity of the site. A map of the regional geology is presented as Figure 3.

6.2.1. Stratigraphy

The following sections provide a generalized description of the geologic units encountered during our subsurface exploration at the project site. More detailed descriptions are presented on the boring logs in Appendix A. Our interpretation of the subsurface conditions is depicted on the geologic cross-sections in Figures 4 through 9.

6.2.1.1. Pavement Section

Our borings, exclusive of B-4, were performed on paved surfaces. As encountered, the pavement sections were approximately 9-inches-thick in the western portion of the site (B-1, B-2, and B-3). In the central area near Building N (Borings B-5 through B-8), the pavement sections ranged from about 7- to 13-inches-thick. In general, the pavement section consisted of asphalt concrete (AC) overlying aggregate base rock (AB), with varying thicknesses of AC and AB.

6.2.1.2. Colma Formation (Qc | Bonilla, 1998)

Material consistent with Bonilla's description of Colma Formation was encountered from the surface, in B-4, and from below the pavement sections in the other borings, to the terminal depths explored. In general, the Colma Formation, as encountered, consisted of layers of sandy lean clay and silty to clayey sand; a thin (1-foot-thick) layer of sandy silt was logged in Boring B-4 between 15 and 16 feet bgs.

6.3. Groundwater

Groundwater was encountered during drilling in Boring B-2 at a depth of approximately 34 feet bgs; Geosphere Consultants encountered groundwater at a similar depth (35 feet bgs) in their Boring B-1. Groundwater may rise to a level higher than observed due to the relatively low seepage rate in clay and limited time for observation. Fluctuations in groundwater levels will occur due to variations in precipitation, ground surface topography, subsurface stratification, irrigation, groundwater pumping, and other factors that may not have been evident at the time of our field evaluation.

According to the CGS (2021b), the historic high groundwater at the site is between 10 and 20 feet bgs.

7. GEOLOGIC HAZARDS AND CONSIDERATIONS

The geohazards assessment portion of this evaluation considered geologic conditions within the area that could be a potential danger to life or property. Potential concerns evaluated included seismic hazards, expansive soil, corrosivity of near-surface soils, unsuitable materials, naturally occurring asbestos (NOA), static settlement of compressible soil layers, and collapsible soils. These issues are discussed in the following subsections.

7.1. Seismic Hazards

The site is located within the San Francisco Bay Area; a region considered seismically active due to the presence of multiple Holocene-active faults. Numerous small earthquakes occur every year in the region, and earthquakes with Moment Magnitude greater than 6.5 have occurred in the past and can be expected to occur in the future. In the following sections, we discuss the historical seismicity of the region and the effect on the site, the potential for ground surface rupture and strong ground motion, liquefaction and dynamic settlement, seismic slope stability, and inundation due to tsunami or seiche.

7.1.1. Historical Seismicity

Figure 4 presents the location of the site relative to the epicenters of historic earthquakes with magnitudes of 5.5 or more from 1800 to 2000. Table 2, below, summarizes historical seismic events in the region based on a search of the USGS Earthquake Catalog for events between 1800 and today, with a magnitude of 6.5 or more, and located within a 100-kilometer (62-mile) radius of the site.

Table 2 – Summary of Historical Seismicity

Event ID	Date	Magnitude	Approximate Distance from Site	
			Km	Miles
The 1989 Loma Prieta Earthquake	10-18-1989	6.9	83.4	51.9
The 1906 San Francisco Earthquake	04-18-1906	7.9	15.7	9.8
Near Vacaville, California	04-19-1892	6.6	91.6	57.0
The 1868 Hayward Fault Earthquake	10-21-1868	6.8	29.4	18.2
South of San Jose, California	10-08-1865	6.5	68.1	42.3
The 1838 San Andreas Fault Earthquake	06-25-1838	7.4	45.7	28.4

Reference: United States Geological Survey (USGS), Earthquake Hazards Program, https://earthquake.usgs.gov/earthquakes/search/

Records compiled by Schmitt et al. (2017) indicate that ground effects related to historical seismic activity (e.g. liquefaction, sand boils, lateral spreading, ground cracking, landsliding) have not been reported for the site or its vicinity.

7.1.2. Faulting and Ground Surface Rupture

The San Francisco Bay Area is considered seismically active due to the presence of multiple faults in the region. In addition to showing the locations of significant historical earthquake

epicenters mapped within the San Francisco Bay Region, Figure 10 shows the approximate locations of active and potentially active faults.

In response to hazards associated with ground rupture, or surface displacement, the State of California enacted the Alquist-Priolo (A-P) Earthquake Fault Zoning Act (A-P Act) in 1972. The purpose of the A-P Act is to regulate development of structures for human occupancy in areas within Holocene-active fault zones in order to reduce the hazards associated with ground rupture. The A-P Act requires that the State Geologist delineate zones of required investigation along Holocene-active faults to evaluate these risks. As defined by the California Geological Survey (CGS, 2018), Holocene-active faults are faults that have caused surface displacement within the last approximately 11,700 years. Based on our review of the referenced geologic and fault hazard data, the project site is not located within an established Earthquake Fault Zone (Figure 11), nor is it transected by a known active fault. The nearest mapped active fault with the potential for surface rupture is associated with the San Andreas fault zone, approximately 1¾ miles west of the site. Therefore, the potential for ground surface rupture because of faulting at the site is considered low. Cracking of the ground surface as a result of nearby seismic events is possible.

7.1.3. Strong Ground Motion

There are several active faults in the San Francisco Bay Area that are capable of producing strong ground shaking, including the San Andreas, Hayward, and Calaveras. The Working Group on California Earthquake Probabilities (WGCEP) periodically assesses the probabilities of earthquakes for numerous faults in California and provides probability estimates (Field et al., 2015). According to the 2015 assessment, there is a 72 percent probability that at least one magnitude 6.7 or greater earthquake will occur in the Bay Area between 2014 and 2043. Probabilities of a magnitude 6.7 or greater earthquake occurring on the San Andreas fault system during this period is 22% (Aagaard et al., 2016).

Considering the proximity of the site to active faults capable of producing a maximum moment magnitude of 6.0 or more, the project area has a high potential for experiencing strong ground motion. The California Geological Survey (CGS) Map Sheet 48 depicts the expected ground shaking intensity from future earthquakes across the state. The shaking intensity is represented using the Modified Mercalli Intensity (MMI) scale.

Table 3 – Modified Mercalli Intensity Scale			
Intensity		**Shaking**	**Description/Damage**
I	(1)	Not felt	Not felt, except by a very few under especially favorable conditions.
II	(2)	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
III	(3)	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	(4)	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	(5)	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken, Unstable objects overturned. Pendulum clocks may stop.
VI	(6)	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight
VII	(7)	Very Strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken
VIII	(8)	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	(9)	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Building shifted off foundations.
X	(10)	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

The project site lies within an area mapped as having an MMI of 9.0 based on PGA and disaggregated Magnitude (**M**) and distance (*R*) with a 10% probability of exceedance in 50 years. A 10% probability in 50 years was chosen as it most closely aligns with current building standards in the California Building Code (CBC).

The risk-targeted maximum considered earthquake (MCE_R) ground motion response accelerations may be used to evaluate seismic loads for design of buildings and other structures. Using the results of our seismic refraction survey at the site, we calculated that the average shear wave velocity in the upper 100 feet (i.e. 30 meters) of soil (V_{S100}) is approximately 1,054 feet per second. In accordance with Chapter 20 of the American Society of Civil Engineers (ASCE) Publication 7-22 (2022) for the Minimum Design Loads and Associated Criteria for Building and Other Structures, the site is classified as Site Class CD.

In accordance with ASCE 7-22, the multi-period MCE_R ground motion response accelerations were determined using the United States Geological Survey (USGS) Seismic Design Geodatabase accessed through the ASCE 7 Hazard Tool (2026). The multi-period MCE_R ground motion response accelerations are based on the spectral response accelerations in

the direction of maximum horizontal response represented by a 5% damped acceleration response spectrum that is expected to achieve a 1% probability of collapse within a 50-year period with deterministic limits. The spectral response acceleration parameters, consistent with ASCE 7-22, are provided in Section 11.2 for the evaluation of seismic loads on buildings and other structures. For the retrofit of the existing buildings, the spectral response acceleration parameters for BSE-2N, BSE-1N, BSE-2E, and BSE-1E seismic hazard levels in accordance with ASCE 41-23 using the ASCE 7 Hazard Tool (2025) are also provided in Section 11.2.

7.1.4. Liquefaction/Dynamic Settlement Analysis

The strong vibratory motions generated by earthquakes can trigger a rapid loss of shear strength in saturated, loose, granular soils of low plasticity (liquefaction) or in wet, sensitive, cohesive soils (strain softening). Liquefaction and strain softening can result in a loss of foundation bearing capacity or lateral spreading of sloping or unconfined ground. Liquefaction can also generate sand boils leading to subsidence at the ground surface. The potential for liquefaction to occur is considered greatest where Holocene alluvial deposits along with shallow groundwater are present within the upper 50 feet of the ground surface.

As previously mentioned, we encountered groundwater at a depth of 34 feet bgs during our exploration, and historic high groundwater is between 10 and 20 feet bgs (CGS, 2021).

7.1.4.1. Liquefaction

The site is not located within a seismic hazard zone for liquefaction (Figure 11) as mapped by the California Geological Survey (CGS, 2021b). Mapping by Witter et al. (2006) indicates that the site has a very low susceptibility to liquefaction.

The site is underlain by Colma Formation which consisted of layers of firm to hard sandy lean clay and medium dense to very dense silty to clayey sand; a thin (1-foot-thick) layer of sandy silt was logged in Boring B-4 between 15 and 16 feet bgs. Historic high groundwater level at the site is between 10 and 20 feet bgs. We did not encounter saturated, loose, granular soils during our subsurface exploration. The fine-grained soil (silt and clay) encountered during our subsurface exploration generally does not conform to the characteristics of liquefiable soils published by Bray and Sancio (2006). The cohesive soils encountered were not wet or sensitive. Because of the high percentage of fines and relative high blow count within the granular soil layers as well as the thickness of the overlying non-liquefiable soil, we do not

regard liquefaction, strain softening, or related hazards including lateral spreading or sand-boil induced ground subsidence to be design considerations. Dynamic settlement from seismic ground shaking is addressed below.

7.1.4.2. Dynamic Settlement

The strong vibratory motion associated with earthquakes can also densify loose granular soil leading to surficial settlements. Seismic-induced settlement is not limited to the near-surface environment and may occur in both dry and saturated sand and silt. Cohesive soils are not typically susceptible to dynamic settlement.

Considering the typically high percentage of fines within the granular soils, the thickness of the overlying clayey layers, and the very low risk of liquefaction, we judge that seismic-induced settlement is not a design consideration.

7.1.5. Seismic Slope Stability

The proposed project is not located within a hazard zone for earthquake-induced landslides as shown on the Earthquake Zones of Required Investigation Map (Figure 11) prepared by the CGS (2021a). Building S – CTE Wing is located approximately 50 feet east of the roughly 20-foot-high slope descending from the campus to El Camino Real. However, due to the relative flat nature of the site, and very low risk of liquefaction, we do not regard seismic slope stability as a design consideration.

7.1.6. Tsunami and Seiche Inundation

Tsunamis are long wavelength seismic sea waves (long compared to ocean depth) generated by the sudden movements of the ocean floor during submarine earthquakes, landslides, or volcanic activity. The Tsunami Hazard Area Map for San Mateo County (State of California, 2021) maps the site outside a tsunami hazard area.

Seismic seiches are standing waves generated in a large, enclosed body of water, like the southern San Francisco Bay, when seismic waves from an earthquake pass through an area. Based on the location of the campus (distance from the shore, elevation, etc.), we do not consider the potential for damage due to tsunamis or seiches to be a design consideration.

7.2. Expansive Soil

Some clay minerals undergo volume changes upon wetting or drying. Unsaturated soil containing those minerals will shrink/swell with the removal/addition of water. The heaving pressures associated with this volume change can damage structures and flatwork. Laboratory testing was performed on near-surface soils at borings B-1, B-3, B-5, and B-7 to evaluate the Atterberg Limits of the soil. The tests were performed in accordance with the American Society of Testing and Materials (ASTM) Standard D4318 (Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils). The results of our laboratory test indicate that samples tested had a varying plasticity index (PI) of 8 to 17 which is indicative of very low to medium expansion characteristic. To reduce the potential for heave and differential movement due to shrink/ swell behavior, recommendations are provided for moisture conditioning of subgrade soils and deepened foundations.

7.3. Corrosive/Deleterious Soil

As previously mentioned, two samples of the near-surface soil were sent to CERCO to evaluate the corrosivity of the samples on the basis of tests to quantify pH, electrical resistivity, chloride content, and soluble sulfate content. The results of the testing and the full corrosivity evaluation are presented in Appendix E.

The California Department of Transportation (Caltrans) defines a corrosive environment for structures as an area where the soil has a chloride concentration of 500 parts per million (ppm) or greater, a soluble sulfate concentration of 0.15% (1,500 ppm) or greater, or a pH of 5.5 or less (Caltrans, 2021). The criteria used to evaluate the deleterious nature of soil on concrete are listed in Table 3.

Table 4 – Criteria for Deleterious Soil on Concrete

Sulfate Content Percent by Weight	Sulfate Exposure	Exposure Class
0.0 to 0.1	Negligible	S0
0.1 to 0.2	Moderate	S1
0.2 to 2.0	Severe	S2
> 2.0	Very Severe	S3

Reference: American Concrete Institute (ACI) Committee 318 Table 19.3.1.1 (ACI, 2024)

Based on the results of CERCO's testing and the above criteria (Table 5), the near-surface soil tested at the project site does not meet the definition of a corrosive environment for structures and has an exposure classification for sulfate S0 (negligible).

Table 5 – Corrosivity Test Results			
Sample ID[1]	Chloride Concentration (ppm)	Soluble Sulfate Concentration (ppm)	pH
B-2 @ 0.75 - 5.0’	N.D.[2]	25	8.30
B-6 @ 1.1 - 5.0’	N.D.	49	8.05

Notes:

[1] See Figure 2 for sample locations

[2] None Detected (< 15 ppm)

As noted in Appendix E, the resistivity measurements classify the B-2 sample as “corrosive” to ferrous metals and the B-6 sample as “moderately corrosive”. Based on these results, CERCO recommends that *“All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buries metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.”* As such, a corrosion engineer should be consulted to provide recommendations to mitigate corrosion.

Recommendations to mitigate the impact of corrosive soil on concrete structures are presented in Section 11.5, and the full evaluation, including complete test results, prepared by CERCO, is provided in Appendix E.

7.4. Unsuitable Materials

Fill materials that were not placed and compacted under the observation of a geotechnical engineer, or fill materials lacking documentation of such observation, are considered to be undocumented fill and unsuitable as a bearing material below foundations due to the potential for differential settlement resulting from variable support characteristics or the potential inclusion of deleterious materials. Undocumented fill was not encountered in the borings. In the event that undocumented fill is encountered during construction, we should be contacted for additional recommendations.

7.5. Naturally Occurring Asbestos

Natural occurrences of asbestos are more likely to be encountered in, and immediately adjacent to, outcrops of serpentinite and ultramafic rocks. Serpentinite and ultramafic rocks were not encountered during our subsurface exploration. Regional mapping by Churchill and Hill (2000) indicate that no ultramafic rocks have been mapped in the general vicinity of the project site and the nearest outcrop of a possible NOA bearing formation (Franciscan sheared rocks | **Kju**), as

mapped by Bonilla (1998), is located about 1½ miles northeast of the site underlying San Bruno Mountain; the nearest outcrop of serpentinite (**sp**) is located about 2¼ miles east of the site on Point San Bruno. Based on the locations of these units and the fact that Colma Creek flows between the site and both of these units, we judge that the risk of encountering significant concentrations of naturally occurring asbestos at the site is low.

7.6. Static Settlement

Compression or consolidation of loose or soft soil due to new overburden fill, structural loads, or increased effective stresses from dewatering can result in ground settlement. The subsurface conditions encountered in the borings generally consisted of firm to hard clay, stiff silt, and medium dense to very dense clayey and silty sand. Based on the observed subsurface conditions and the proposed project and presuming that remedial grading is performed in accordance with the recommendations in this report, we estimate that the total static settlement due to consolidation or compression will be up to approximately ½ inch with differential static settlement to be about ¼-inch over a horizontal distance of approximately 30 feet.

7.7. Collapsible Soils

Collapsible soil is broadly defined as loose and cemented soil with low moisture content that is susceptible to a large and sudden reduction in volume upon wetting, with no increase in vertical stress. The process of soil collapse upon wetting is referred to as hydrocollapse. Another type of collapse can occur in saturated soil bearing soluble minerals when subjected to continuous leaching. Some common soluble soil minerals include calcium chloride, magnesium chloride, sodium chloride, potassium chloride, gypsum, anhydrite, dolomite, and calcium carbonate (Mansour et al., 2008). The composition of minerals dissolved in leaching water will affect the soil mineral dissolution rate. Collapsible soils were not encountered during our subsurface investigation.

8. FLOODING HAZARDS

As part of our evaluation, we considered hazards associated with flooding (including those from dam failures) that could be a potential danger to life or property at the site. We discuss these hazards below.

8.1. Riverine

Based on the flood insurance rate map (FIRM) prepared by the Federal Emergency Management Agency (FEMA, 2019), the site lies in an area of minimal flood hazard, labeled Zone X (unshaded). Areas designated as Zone X (unshaded) are determined to be outside the 0.2 percent annual chance flood plain (500-year flood zone). A copy of the firm is presented as Figure 12.

8.2. Dam Inundation

Properties located downstream of dams can be inundated with flood waters if the dams were to fail. According to the California Division of Safety of Dams (DSOD) web-based Dam Breach Inundation Maps, there are no dams or large reservoirs located upstream of the site that could fail and inundate the area within 1,000 feet of the site. As such, inundation due to dam failure is not a design consideration for this project.

9. EXCAVATION CONSIDERATIONS

We anticipate that the proposed project will involve excavations of up to a few feet in depth for pad grading, foundation construction, and utility installation. The materials encountered during our subsurface evaluation over this interval included Colma Formation that consisted of firm to very stiff sandy lean clay. We anticipate that heavy earthmoving equipment in good working condition should be able to make the proposed excavations. Excavations in fill, if encountered, may encounter obstructions consisting of debris, rubble, abandoned structures, or over-sized materials that may require special handling or demolition equipment for removal.

Near-vertical temporary cuts in the near surface deposits up to 4 feet in depth should remain stable for a limited period of time. However, sloughing of the materials exposed on the excavation sidewall may occur, particularly if the excavation encounters granular soil, is exposed to water, or if the sidewall is disturbed during construction operations. Excavation subgrade may become unstable if exposed to wet conditions. Recommendations for temporary excavations are provided in Section 11.1.9. Excavated materials may also be wet and need to be dried out before reuse as fill.

10. FINDINGS AND CONCLUSIONS

Based on our geohazards assessment, the primary consideration is the potential for strong ground shaking associated with a major seismic event on one of several active faults in the region. This can be addressed through adherence to Building Code design requirements. Based on the results of our geotechnical evaluation, it is our opinion that the proposed improvements are feasible from

a geotechnical standpoint provided the recommendations presented in this report are incorporated into the design and construction of the subject project. The conclusions from our evaluation are as follows:

- Our subsurface exploration encountered Colma Formation materials in our borings as discussed in Section 6.2.
- Groundwater was encountered in Boring B-2 at a depth of approximately 34 feet bgs and at a depth of 35 feet bgs during Geosphere Consultants exploration. Variation and fluctuation in groundwater levels should be anticipated as discussed in Section 6.3.
- Active faults are not mapped within the site; therefore, we do not consider ground surface rupture due to faulting a potential hazard for this project.
- The site could experience a relatively large degree of ground shaking during a significant earthquake on a nearby fault. Seismic design criteria are presented in Section 11.2.
- The site is not located within a mapped Earthquake Fault Zone or Seismic Hazard Zone (liquefaction or earthquake-induced landslides).
- We evaluated the potential for liquefaction. Because of the high percentage of fines and relative high blow count within the granular soil layers as well as the thickness of the overlying non-liquefiable soil, we do not regard liquefaction, strain softening, or related hazards including lateral spreading or sand-boil induced ground subsidence to be design considerations.
- Seismic-induced settlement is not a design consideration.
- Due to the relative flat nature of the site, and very low risk of liquefaction, we do not regard seismic slope stability as a design consideration.
- Based on the location of the campus (distance from the shore, elevation, etc.), we do not consider the potential for damage due to tsunamis or seiches to be a design consideration.
- Near surface clay soils encountered on the site were determined through laboratory testing to be very low to moderately expansive. To reduce the potential for differential movement and distress to the proposed improvements due to shrink/swell behavior, foundations should be designed for expansive soils. We provide recommendations for suitable foundation embedment depths and subgrade preparation.
- Based on the results of the soil corrosivity tests during this study, the soils are considered to be moderately corrosive to corrosive (Appendix E). A corrosion engineer should be consulted to provide specific guidance on protective measures to mitigate corrosion, as appropriate.
- Hazardous materials, volcanic eruption, Radon-222 gas, and regional subsidence are not hazards associated with the site.
- The nearest outcrop of serpentinite is about 2¼ mile east of the site, and the closest possible serpentinite-baring formation (**Kju**) is about 1½ miles northeast of the campus. In addition, NOA bearing material was not encountered in our borings, and the site is separated from these units by Colma Creek. Based on these conditions, we judge that the risk of encountering significant concentrations of naturally occurring asbestos at the site is low.

- The total estimated static settlement is approximately ½ inch with a differential static settlement of approximately ¼ inch over a lateral distance of about 30 feet.
- Collapsible soils were not encountered during our subsurface investigation.
- The site is in Zone X, which is defined as an area determined to be outside the 0.2 percent annual chance flood plain (500-year flood zone). There are no dams or large reservoirs located upstream of the site that could fail and inundate the site (DSOD). As such, inundation due to flooding or dam failure is not a design consideration for this project.
- Excavations that remain unsupported and exposed to water, or encounter seepage, or granular soil may be unstable and prone to sloughing. Recommendations for excavation stabilization are provided in Section 11.1.8.
- The earth materials underlying the site over the anticipated depth of excavation should be excavatable with conventional earth moving equipment in good working condition. Near-vertical excavations in granular materials or below groundwater should be considered unstable. The subgrade of excavations extending near to or below groundwater may be unstable without dewatering to depress the water level. Recommendations for excavation stabilization are presented.

11. RECOMMENDATIONS

The following sections present our geotechnical recommendations for the design and construction of the proposed improvements. The project improvements should be designed and constructed in accordance with these recommendations, applicable codes, and appropriate construction practices.

11.1. Earthwork

Earthwork should be performed at newly constructed buildings (new S-CTE Building and Gym Building Additions). Earthwork should be in accordance with the requirements of applicable governing agencies and the recommendations presented below. SOCOTEC should observe earthwork operations. Evaluations performed by SOCOTEC during the course of operations may result in new recommendations, which could supersede the recommendations in this section.

11.1.1. Pre-Construction Conference

We recommend that a preconstruction conference be held to discuss the earthwork recommendations presented in the report. Representatives of the school, the architect, the civil engineer, SOCOTEC, the general contractor along with underground and grading subcontractors should be in attendance to discuss project schedule and earthwork requirements.

11.1.2. Site Preparation

Site preparation should include the clearing of existing structures inclusive of foundations and slabs-on-grade, and underground utility lines that will not be incorporated into the new development, removal of vegetation, debris and other deleterious materials from areas to be graded. Tree stumps and roots should be removed to such a depth that organic material is generally not present. Clearing and grubbing should extend to the limits of the planned site improvements. Rubble and excavated materials that do not meet criteria for use as fill should be disposed of in an appropriate landfill. Existing utilities in the work area that are to remain in service will need to be rerouted or protected in a manner that will not impede site grading or foundation construction. Existing utilities to be abandoned should be removed, crushed in place, or backfilled with grout.

Excavations resulting from removal of buried utilities, tree stumps, or obstructions should be backfilled with compacted fill in accordance with the recommendations in the following sections.

11.1.3. Chemical Treatment for Winterization

The on-site soil at the newly constructed buildings (new S-CTE Buildings and Building N Additions) may be chemically treated with high calcium quicklime or cement for winterization. The high calcium quicklime should conform to ASTM Standard C977. 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, 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.

For preliminary cost evaluation a dosage of 4 percent by dry weight of soil should be assumed, with an assumed dry weight of soil of 110 pcf. The actual dosage to achieve desired performance should be determined through laboratory testing at the time of construction.

Testing typically requires about 5 days from receipt of a fresh sample of lime. The contractor should provide a sample of the lime that will be used in construction to SOCOTEC about 2 weeks prior to the planned start of lime treatment.

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 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 minimum mellowing period after the initial mixing. The lime-soil mixture should be compacted within 3 days after initial mixing to achieve 95 percent of the reference density as evaluated by ASTM D1557 on a dry density basis. Note that re-mixing and compaction operation for cement treatment varies from lime treatment.

The grading contractor should provide assistance to SOCOTEC with grade checking to confirm surface elevations and depth of mixing as the treatment operation proceeds.

11.1.4. Observation and Removals

Prior to placement of fill, or the placement of forms or reinforcement for foundations, the client should request an evaluation of the exposed subgrade by SOCOTEC. Materials that are considered unsuitable shall be excavated under the observation of SOCOTEC in accordance with the recommendations in this section or supplemental recommendations by the geotechnical engineer.

Unsuitable materials include, but may not be limited to dry, loose, soft, wet, expansive, organic, or compressible natural soil, and undocumented or otherwise deleterious fill materials. Unsuitable materials should be removed from trench bottoms and below bearing surfaces to a depth at which suitable foundation subgrade is exposed, as evaluated in the field by SOCOTEC.

11.1.5. Material Recommendations

Materials used during earthwork operations should comply with the requirements listed in Table 6. Materials should be evaluated by the Civil engineer for suitability prior to use. The contractor should notify the geotechnical consultant 72 hours prior to import of materials or use of on-site materials to permit time for sampling, testing, and evaluation of the proposed

materials. On-site materials may need to be dried out before re-use as fill. The contractor should be responsible for the consistency of import material brought to the site.

Table 6 – Recommended Material Requirements

Material and Use	Source	Requirements[1,2]
General Fill:	Import	Close-graded with 35% or more passing No. 4 sieve and either: Expansion Index of 50 or less, Plasticity Index of 12 or less, or Less than 10 percent, by dry weight, passing No. 200 sieve
	On-Site Borrow	No requirements needed.
Pipe/Conduit Bedding and Pipe Zone Material: Material below conduit invert to 12 inches above conduit	Import	90 to 100 percent (by mass) should pass No. 4 sieve, and 5 percent or less should pass No. 200 sieve
Trench Backfill: Above bedding material	Import or On-Site Borrow	As per general fill and excluding rock/lumps retained on 4-inch sieve or 2-inch sieve in top 12 inches
Aggregate Base	Import	Class 2, ¾ inch max. Should NOT contain recycled asphalt concrete if used below floor slabs. CSS[4] Section 26-1.02
Controlled Low Strength Material (CLSM)	Import	CSS[4] Section 19-3.02G

Notes:
1 In general, fill should be free of rocks or lumps in excess of 6 inches in diameter, trash, debris, roots, vegetation or other deleterious material.
2 In general, import fill should be tested or documented to be non-corrosive[3] and free from hazardous materials in concentrations above levels of concern.
3 Non-corrosive as defined by the Corrosion Guidelines (Caltrans, 2021).
4 California Standard Specifications (Caltrans, 2024).

11.1.6. Fill Placement and Compaction

Fill and backfill should be compacted in horizontal lifts in conformance with the recommendations presented in Table 7. The allowable uncompacted thickness of each lift of fill depends on the type of compaction equipment utilized, but generally should not exceed 8 inches in loose thickness for large equipment and 4 inches for manually operated equipment.

Table 7 – Fill Placement and Compaction Recommendations

Fill Type	Location	Relative Compaction[1]	Minimum Moisture Content[2]
Rough Subgrade	In areas to receive fill	90%	+3%
General Fill	All locations during rough grading	90%	+2%
Lime-Treated Soils	All locations	95%	+3%

Table 7 – Fill Placement and Compaction Recommendations			
Fill Type	**Location**	**Relative Compaction[1]**	**Minimum Moisture Content[2]**
Bedding and Pipe Zone Fill	Material from bottom of trench to 6-12 inches above pipe or conduit	90%	Optimum
Trench Backfill	From bedding up to 12 inches below finished subgrade and Top 12 inches of subgrade except for areas subject to vehicular loading	90%	+2%
	Top 12 inches of subgrade in areas subject to vehicular loading	95%	+2%
Finished Subgrade	Building pad inclusive of basement areas, concrete flatwork	90%	+3%
	Pavement areas subject to vehicle traffic	95%	+3%
Aggregate Base	Below slabs-on-grade, flatwork and pavements	95%	Optimum

Notes:
1 Expressed as percent relative compaction or ration of field density to reference density (typically on a dry density basis for soil and aggregate, and on a wet density basis for asphalt concrete). The reference density of soil and aggregate should be evaluated by ASTM D1557; the reference density for asphalt concrete should be evaluated by ASTM D2041.
2 Target moisture content at compaction relative to optimum as evaluated by ASTM D1557.

Compacted fill should be maintained in a moist (but not saturated) condition by the periodic sprinkling of water prior to placement of additional overlying fill. Fill that has been permitted to dry out and loosen or develop desiccation cracking, should be scarified, moisture-conditioned, and recompacted as per the requirements above.

Prior to final subgrade preparation in the pavement areas, utility trench backfill should be properly placed and compacted as previously recommended. The compacted subgrade should be non-yielding when proof-rolled with a loaded ten-wheel truck, such as a water truck or dump truck, prior to pavement construction. Subgrade soils should be maintained in a moist and compacted condition until covered with the complete pavement section.

Aggregate base should be placed in thin lifts in a manner to prevent segregation, uniformly moisture conditioned, and compacted to at least 95 percent relative compaction to provide a smooth, unyielding surface.

11.1.7. Utility Trenches

Trenches constructed for the installation of underground utilities should be stabilized in accordance with our recommendations in Section 11.1.7. Materials type and quality, placement procedures and compaction requirements for utility bedding, shading and backfill materials should meet local agency and/or other applicable utility providers' requirements. From a geotechnical perspective, bedding and shading material to a minimum of 6 inches

above the top of pipe should consist of sand. Open graded gravel should not be used unless fully encapsulated within a geotextile filter fabric. Bedding and pipe zone fill should be shoveled under pipe haunches and compacted by manual or mechanical, hand-held tampers.

In the absence of local agency and/or other applicable utility providers' requirements, utility trench backfill above the bedding and shading materials may consist of on-site soils that have been processed to remove rock fragments over 3 inches in largest dimension, rubbish, vegetation and other undesirable substances. Backfill materials should be placed in level lifts generally about 4 to 8 inches in loose thickness, moisture conditioned and should be compacted by mechanical means. Lift thickness will be a function of the type of compaction equipment in use and the contractor's ability to achieve uniform compaction throughout the lift of material being compacted. Thinner lifts will be required for manually operated equipment, such as wackers or vibratory plates; thicker lifts possible where a sheepsfoot wheel is used on the stick of an excavator. Where there are no specific utility company or jurisdictional requirements for compaction of backfill, the backfill should be compacted to no less than 90 percent relative compaction. Where trenches are located in pavement areas the top 12 inches should be compacted to no less than 95 percent relative compaction. Densification of trench backfill by flooding or jetting should not be permitted.

Trenches should not be excavated adjacent to footings. If trenches are to be excavated near a continuous footing, the bottom of the trench should be located above a 2:1 (horizontal to vertical) plane projected downward from the bottom of the footing. Utility lines that cross beneath footings should be encased in concrete, CLSM or compacted clay soils below the footing for a distance equivalent to the depth of the excavation.

11.1.8. Temporary Excavations and Shoring

Trench excavations shall be stabilized in accordance with the Excavation Rules and Regulations (29 Code of Federal Regulations [CFR], Part 1926) stipulated by the Occupational Safety and Health Administration (OSHA). Stabilization shall consist of shoring sidewalls or laying slopes back.

Dewatering pits or sumps should be used to depress the groundwater level (if encountered) below the bottom of the excavation. Table 8 lists the OSHA material type classifications and corresponding allowable temporary slope layback inclinations for soil deposits that may be encountered on site. Alternatively, an internally-braced shoring system or trench shield conforming to the OSHA Excavation Rules and Regulations (29 CFR, Part 1926) may be used

to stabilize excavation sidewalls during construction. The lateral earth pressures listed in Table 8 may be used to design or select the internally-braced shoring system or trench shield. The recommendations listed in this table are based upon the limited subsurface data provided by our exploratory borings and reflect the influence of the environmental conditions that existed at the time of our exploration. Excavation stability, material classifications, allowable slopes, and shoring pressures should be re-evaluated and revised, as-needed, during construction. Excavations, shoring systems and the surrounding areas should be evaluated daily by a competent person for indications of possible instability or collapse.

Table 8 – OSHA Material Classifications and Allowable Slopes

Formation	OSHA Classification	Allowable Temporary Slope[1,2,3]	Lateral Earth Pressure on Shoring[4] (psf)
Cohesive Material (above groundwater)	Type B	1H:1V (45°)	45×D + 72
Granular Material (above groundwater)	Type C	1½ H:1V (34°)	80×D + 72

Notes:
1 Allowable slope for excavations less than 20 feet deep. Excavation sidewalls in cohesive soil may be benched to meet the allowable slope criteria (measured from the bottom edge of the excavation). The allowable bench height is 4 feet. The bench at the bottom of the excavation may protrude above the allowable slope criteria.
2 In layered soil, layers shall not be sloped steeper than the layer below.
3 Temporary excavations less than 5 feet deep may be made with vertical side slopes and remain unshored if judged to be stable by a competent person (29 CFR, Part 1926.650).
4 'D' is depth of excavation for excavations up to 20 feet deep. Includes a surface surcharge equivalent to two feet of soil.

The shoring system should be designed or selected by a qualified individual or specialty subcontractor. The shoring parameters presented in this report are preliminary design criteria, and the designer should evaluate the adequacy of these parameters and make appropriate modifications for their design. We recommend that the contractor take appropriate measures to protect workers. OSHA requirements pertaining to worker safety should be observed.

Excavations made in close proximity to existing structures may undermine the foundation of those structures and/or cause soil movement related distress to the existing structures. Stabilization techniques for excavations in close proximity to existing structures will need to account for the additional loads imposed on the shoring system and appropriate setback distances for temporary slopes. SOCOTEC should be consulted for additional recommendations if the proposed excavations cross below a plane extending down and away from the foundation bearing surfaces of the adjacent structure at an inclination of 2:1 (horizontal to vertical).

11.1.9. Construction Dewatering

Water intrusion into the excavations may occur as a result of groundwater intrusion or surface runoff. The contractor should be prepared to take appropriate dewatering measures in the event that water intrudes into the excavations. Sump pits, trenches, or similar measures should be used to depress the water level below the bottom of the excavation. Considerations for construction dewatering should include anticipated drawdown, volume of pumping, potential for settlement, and groundwater discharge. Disposal of groundwater should be performed in accordance with the guidelines of the Regional Water Quality Control Board.

11.1.10. Rainy Weather Considerations

Earthwork and foundation construction should be performed during the period beginning mid-April through mid-October to avoid the rainy season. In the event that grading is performed during the rainy season, the plans for the project should be supplemented to include a stormwater management plan prepared in accordance with the requirements of the relevant agency having jurisdiction. The plan should include details of measures to protect the subject property and adjoining off-site properties from damage by erosion, flooding or the deposition of mud, debris, or construction-related pollutants, which may originate from the site or result from the grading operation. The protective measures should be installed by the commencement of grading, or prior to the start of the rainy season. The protective measures should be maintained in good working order until building official grants approval to remove the temporary devices.

Rainy weather may impact the stability of excavation subgrade and exposed ground. Temporary swales should be constructed to divert surface runoff away from excavations and slopes. Steep temporary slopes should be covered with plastic sheeting during significant rains.

11.2. Seismic Design Considerations

Design of the proposed new buildings should be performed in accordance with the requirements of governing jurisdictions and applicable building codes. Table 9 presents the spectral response acceleration parameters in accordance with ASCE 7-22 and the CBC (2025) guidelines.

Table 9 – 2025 California Building Code Seismic Design Criteria	
Seismic Design Parameters **Evaluated for 37.6477° Latitude, -121.4267° Longitude**	**Values**
Site Class	CD
MCE_R Spectral Response Acceleration at 0.2-Second Period, S_s	2.53 g
MCE_R Spectral Response Acceleration at 1.0-Second Period, S_1	1.00 g
MCE_R Spectral Response Acceleration at Short Periods Adjusted for Site Class, S_{MS}	2.71 g
MCE_R Spectral Response Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	1.98 g
Design Spectral Response Acceleration at Short Periods, S_{DS}	1.81 g
Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	1.32 g
Maximum Considered Earthquake Geometric Mean (MCE_G) Peak Ground Acceleration, PGA_M	0.95 g
Seismic Design Category for Risk Category II	E

For the portion of the Gym Building being retrofitted, the spectral response acceleration parameters for BSE-2N, BSE-1N, BSE-2E, and BSE-1E seismic hazard levels were determined in accordance with ASCE 41-23 using the ASCE 7 Hazard Tool (2026). The values are presented in Tables 10 through 13.

Table 10 – ASCE 41-23 Seismic Design Criteria BSE-2N Hazard	
Spectral Response Acceleration Parameters	**Values**
Spectral Response Acceleration at Short Periods, S_{XS}	2.7g
Spectral Response Acceleration at 1.0-second Period, S_{X1}	1.97g

Table 11 – ASCE 41-23 Seismic Design Criteria BSE-1N Hazard	
Spectral Response Acceleration Parameters	**Values**
Spectral Response Acceleration at Short Periods, S_{XS}	1.8g
Spectral Response Acceleration at 1.0-second Period, S_{X1}	1.31g

Table 12 – ASCE 41-23 Seismic Design Criteria BSE-2E Hazard	
Spectral Response Acceleration Parameters	**Values**
Spectral Response Acceleration at Short Periods, S_{XS}	2.22g
Spectral Response Acceleration at 1.0-second Period, S_{X1}	1.52g

Table 13 – ASCE 41-23 Seismic Design Criteria BSE-1E Hazard	
Spectral Response Acceleration Parameters	**Values**
Spectral Response Acceleration at Short Periods, S_{XS}	1.05g
Spectral Response Acceleration at 1.0-second Period, S_{X1}	0.59g

11.3. Foundation Recommendations

Foundations should be designed in accordance with structural considerations and our geotechnical recommendations. In addition, requirements of the governing jurisdictions, practices of the Structural Engineers Association of California, and applicable building codes should be considered in the design of the structures.

11.3.1. New and Existing Spread Footings

The new S-CTE buildings and Building N additions bearing on subgrade soils prepared as per the recommendations in Section 11.1 may be designed using the criteria listed in Table 14 and Table 15, respectively. Structures supported on footings consistent with these recommendations should be designed for the total and differential static settlements listed in Table 14 and 15 for sustained loads.

Table 14 – Recommended Design Parameters for S-CTE Buildings

Footing	Sustained Loads	Footing Widths	Bearing Depth[1]	Allowable Bearing Capacity[2]	Static Settlement
Wall Footing	8 kips/foot or less	18 inches or more	2 feet or more	2,500 psf	1/2 inch total 1/4 inch differential over 30 feet
Column Footing	140 kips or less	24 inches or more	2 feet or more	2,500 psf	1/2 inch total 1/4 inch differential over 30 feet

Notes:
1 Below the adjacent finish grade and the existing grade.
2 Net allowable bearing capacity in pounds per square foot with Safety Factor of 2 or more. Allowable bearing capacity may be increased by one-third for wind or seismic load combinations.

Based on our review of the as-built drawings, the existing Building N is supported on shallow foundations consisting of isolated and continuous footings with embedment depths of up to 2 feet and 9 inches. Below is the table summarizing the design criteria for Building N and proposed adjacent additions.

Table 15 – Recommended Design Parameters for Building N and Additions					
Footing	**Sustained Loads**	**Footing Widths**	**Bearing Depth[1]**	**Allowable Bearing Capacity[2]**	**Static Settlement[3]**
Wall Footing	8 kips/foot or less	18 inches or more	2 feet or more	2,000 psf	1/2 inch total 1/4 inch differential over 30 feet
Column Footing	140 kips or less	24 inches or more	2 feet or more	2,000 psf	1/2 inch total 1/4 inch differential over 30 feet

Notes:

1 Below the adjacent finish grade and the existing grade. Depth of new footings should be consistent with existing footing foundations, especially where new footings are near existing footings.

2 Net allowable bearing capacity in pounds per square foot with Safety Factor of 2 or more. Allowable bearing capacity may be increased by one-third for wind or seismic load combinations. The data from our subsurface exploration in Borings 5, 6, 7, and 8 indicates an allowable bearing capacity of 2,000 psf for DL+LL (FS=2) which is consistent with the assumed allowable bearing capacity of existing foundations for the Gymnasium (John Lyon Reid A.I.A., 1951)

Our subsurface evaluation was limited to drilling borings in readily accessible locations around the site, and we did not observe the subgrade soils directly beneath the existing footings. However, we have assumed that the existing footings are bearing on competent alluvium consistent with the allowable bearing capacity.

New spread footings should be reinforced with deformed steel bars as detailed by the project structural engineer. Where footings are located adjacent to utility trenches or other excavations, the footing bearing surfaces should bear below an imaginary plane extending upward from the bottom edge of the adjacent trench/excavation at a 2:1 (horizontal to vertical) angle above the bottom edge of the footing. Footings should be deepened or excavation depths reduced as-needed. Footing bottoms should not be sloped more than 1-unit vertical to 10 units horizontal. Wall footings may be stepped provided that the bearing grade differential between adjacent steps does not exceed 18 inches and the slope of a series of such steps does not exceed 1-unit vertical to 2 units horizontal.

A friction coefficient of 0.30 may be assumed for evaluating frictional resistance to lateral loads in combination with lateral bearing resistance. An allowable lateral bearing pressure of 300 psf per foot of embedment depth may be used to evaluate lateral bearing resistance for level and gently sloping ground conditions where the ground slope adjacent to the foundation is 5 percent or less with a safety factor of 2 and a lateral deflection equivalent to 1 percent of the foundation embedment depth to mobilize the assumed passive condition. The lateral bearing pressure should be neglected to a depth of 12 inches where the ground adjacent to the foundation is not covered by a slab or pavement. The lateral bearing pressure may be

increased by one-third for wind or seismic alternative load combinations in Section 1605A.2 of the 2025 CBC with a corresponding reduction in the safety factor.

The weight of the material above a plane rising up and away from the bottom edges of the footings at 20 degrees off plumb may be considered, along with the weight of the footing and the material over the footing, when evaluating footing resistance to uplift. A unit weight of 125 pounds per cubic foot (pcf) for soil or aggregate and 150 pcf for normal weight concrete may be assumed for this evaluation.

11.3.2. Slabs-on-Grade Floors

Slab-on-grade floors can be used for improvements supported on shallow foundations, provided they are underlain by subgrade soils prepared in accordance with the recommendations in this report. Slabs should be designed by the project structural engineer based on the anticipated loading conditions. A vapor retarder is recommended in areas where moisture-sensitive floor coverings or conditioned environments are anticipated. Where a vapor retarding system is not used, slabs should be constructed on 4 inches of compacted aggregate base. The slab should be reinforced with deformed steel bars with a nominal diameter of ⅜ inch or more as designed by the project structural engineer. Masonry briquettes or plastic chairs should be used to maintain the position of slab reinforcement, during concrete placement, in the upper half of the slab with appropriate concrete cover over the reinforcing steel. Refer to Section 11.5 for the recommended concrete cover over reinforcing steel. Joints consistent with the guidelines of ACI Committee 302 may be constructed at periodic intervals to reduce the potential for random cracking of the slab.

11.3.3. Moisture Retarder

The migration of moisture through slabs underlying enclosed spaces or overlain by moisture sensitive floor coverings should be discouraged by providing a moisture vapor retarding system between the subgrade soil and the bottom of slabs. We recommend that the moisture vapor retarding system consist of a 4-inch-thick capillary break, overlain by a 15-mil-thick plastic membrane. Sand should not be placed over the vapor retarder. The capillary break should be constructed of clean, compacted, open-graded crushed rock or angular gravel of ¾-inch nominal size. The crushed rock or angular gravel should be compacted with a vibratory plate compactor or roller to reduce the potential for damage to the vapor retarder by rock puncture during placement of reinforcement and concrete. The plastic membrane should conform to the requirements in the latest version of ASTM Standard E1745 for a Class A

membrane. To reduce the potential for slab curling and cracking, an appropriate concrete mix with low shrinkage characteristics and a low water-to-cementitious-materials ratio should be specified. In addition, the concrete should be delivered and placed in accordance with ASTM C94 with attention to concrete temperature and elapsed time from batching to placement, and the slab should be cured in accordance with the guidelines of ACI Committee 302.

11.4. Pavements and Flatwork

Recommendations for flexible and rigid pavements and exterior concrete flatwork are presented in the following sections. A design R-value of 16 was selected based on the type of material encountered in the borings. The pavement subgrade should be observed by the geotechnical engineer during grading to check the finish subgrade for consistency with the assumed condition. Subgrade soils should be prepared by scarifying the soils to a depth of 12 inches, moisture conditioned and compacted as discuss in Section 11.1.6. Prepared subgrade should be maintained in a moist (but not saturated) condition by the periodic sprinkling of water until such time as it is covered by placement of additional overlying fill. Subgrade that has been permitted to dry out and loosen or develop desiccation cracking, should be reprocessed including scarification, moisture conditioning and recompacting.

11.4.1. Asphalt Pavement

Aggregate base for pavement should be placed in lifts of no more than 8 inches in loose thickness and compacted per Section 11.1.6. Asphalt concrete should be placed and compacted in accordance with Caltrans Standard Specification and Construction Manual; asphalt concrete should be compacted to between 92 and 96 percent of the theoretical maximum specific gravity and density (Rice gravity – ASTM D2041) of the material. Pavements should be sloped so that runoff is diverted to an appropriate collector (concrete gutter, swale, or area drain) to reduce the potential for ponding of water on the pavement. Concentration of runoff over asphalt pavement should be discouraged. Below is a table summarizing the recommended asphalt pavement sections based on the assumed TI and design R-value.

Table 16 – Asphalt Concrete Pavement Sections

Traffic Index	R-Value	Alternative 1	Alternative 2
3	16	4 inches AC	2 inches AC[1] 6 inches AB[2]
5	16	7 inches AC	3 inches AC 8 inches AB

Table 16 – Asphalt Concrete Pavement Sections			
Traffic Index	R-Value	Alternative 1	Alternative 2
7	16	10 inches AC	4 inches AC 13 inches AB

Notes:
1 AC is Type A, Dense-Graded Hot Mix Asphalt complying with Caltrans Standard Specification 39-2 (2018).
2 AB is Class 2 Aggregate Base complying with Caltrans Standard Specification 26-1.02 (2018).

11.4.2. Exterior Flatwork

Walkways and other exterior flatwork not subject to vehicular loading should be 4 inches thick (or more) over 4 inches of aggregate base that conforms to the criteria for Class 2 aggregate base in Section 26-1.02 of the California Standard Specifications (Caltrans, 2024). Concrete and aggregate base thickness should be increased to 6 inches or more for flatwork subject to vehicular traffic up to periodic garbage trucks and emergency vehicles. Flatwork subject to impact from unloading of dumpsters should be 8 inches thick or more.

Appropriate jointing of concrete flatwork can encourage cracks to form at joints, reducing the potential for crack development between joints. Joints should be laid out in a square pattern at consistent intervals. Contraction and construction joints should be detailed and constructed in accordance with the guidelines of ACI Committee 302. The ratio of lateral spacing between contraction joints to the nominal thickness of the slab should not exceed 24 for jointed plain concrete. 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.

Flatwork may be reinforced with distributed steel to reduce the potential for differential slab movement where cracking occurs. The distributed reinforcing steel should be terminated about 3 inches from contraction joints and should consist of No. 3 deformed bars at 18 inches on center, both ways, or with 6x6-D4/D4 welded wire fabric supplied as sheets (not rolls). Slabs reinforced with distributed steel should be 6 inches thick (or more) for No. 3 bar reinforcement and 5 inches thick (or more) for 6x6-D4/D4 reinforcement to provide adequate concrete cover for the steel. To reduce the potential for differential slab movement across joints, the distributed steel may be extended through the joints. This improvement will be balanced by a reduction in the functionality of the contraction joint to encourage crack formation at joints. Flatwork subject to impact from unloading of dumpsters should be reinforced with No. 4 deformed bars at 12 inches on center, both ways extending through contraction joints, if present. Masonry briquettes or plastic chairs should be used to maintain the position of the reinforcement in the upper half of the slab with 1½ inches of cover over the

steel and 3 inches of cover under the steel. Root barriers adjacent to trees may be considered to reduce the potential for pavement heave from root growth.

11.5. Concrete Placement

Limited laboratory testing indicated that the concentration of sulfate and corresponding potential for sulfate attack on concrete is negligible for the soil tested. However, due to the potential for variation in site soil characteristics and the possible future use of reclaimed water at the site, we recommend that Type II/V or Type V cement be used for concrete structures in contact with soil. In addition, we recommend a water-to-cement ratio of no more than 0.45. A 3-inch thick, or thicker, concrete cover should be maintained between reinforcing steel and soil where concrete is cast against soil in accordance with recommendations of ACI Committee 318.

To reduce the potential for shrinkage cracks in the concrete during curing, concrete for slabs and flatwork should not contain large quantities of water or accelerating admixtures containing calcium chloride. Higher compressive strengths may be achieved by using larger aggregates in lieu of increasing the cement content and corresponding water demand. Additional workability, if desired, may be obtained by including water-reducing or air-entraining admixtures. Concrete should be placed in accordance with the guidelines of ACI Committee 302 and project specifications. Particular attention should be given to curing techniques and curing duration. Slabs that do not receive adequate curing have a more pronounced tendency to curl upwards at edges and corners, and to develop random shrinkage cracks and other defects.

In the event that contraction joints are used to influence the location of crack development in slabs and the joints are to be constructed by saw cutting of the slabs, saw cuts should be made by soff-cut sawing within 4 to 12 hours after the initial hardening (not curing) of the concrete, as appropriate for the atmospheric conditions. The contractor should be responsible for monitoring of the concrete during initial set or hardening and selecting the appropriate time for cutting of the slabs

11.6. Surface Drainage and Site Maintenance

Surface drainage on the site should generally be provided so that water is diverted away from structures and is not permitted to pond. Positive drainage should be established adjacent to structures to divert surface water to an appropriate collector (graded swale, v-ditch, or area drain) with a suitable outlet. The recommended gradient for positive drainage adjacent to structures is approximately 2 percent over a distance of 10 feet for pavement or flatwork and approximately 5 percent over 10 feet for relatively pervious surfaces. Slope, pad, and roof drainage (from adjacent

structures) should be collected and diverted to suitable discharge areas away from structures or other slopes by non-erodible devices (e.g., gutters, downspouts, concrete swales, etc.). Graded swales, v ditches, or curb and gutter should be provided at the site perimeter to restrict flow of surface water onto and off of the site. Slopes should be vegetated or otherwise armored to reduce potential for erosion of soil. Drainage structures should be periodically cleaned out and repaired, as-needed, to maintain appropriate site drainage patterns.

Landscaping adjacent to foundations should include vegetation with low-water demands and irrigation should be limited to that which is needed to sustain the plants. Trees should be restricted from the areas adjacent to foundations a distance equivalent to the canopy radius of the mature tree. Infiltration basins, dry wells, and other stormwater management measures that rely on infiltration without a liner and subdrain should not be located within 20 feet of structure foundations. Bioretention planters located within 20 feet of structure foundations should be lined with concrete or a plastic membrane and include a subdrain.

Care should be taken by the contractor during grading to preserve any berms, drainage terraces, interceptor swales or other drainage devices on or adjacent to the project area. Drainage patterns established at the time of grading should be maintained for the life of the project. Future alteration of the established drainage patterns may impact the constructed improvements.

11.7. Geotechnical Engineer of Record Services

The recommendations provided in this report are based on preliminary design information for the proposed construction. The Geotechnical Engineer-of-Record (GEOR) should review the plans that are developed by the design team before construction bidding, to check that the scope of the project as designed is consistent with the assumed basis of this report and evaluate conformance with the geotechnical recommendations. It should be noted that, upon review of these documents, some recommendations presented in this report might be revised or modified.

During construction, the GEOR should evaluate the exposed subsurface conditions for consistency with the conditions encountered in the discrete borings performed for this study, and to check that the work conforms with the geotechnical recommendations. Specifically, the geotechnical engineer should be retained to:

- Observe preparation and compaction of subgrade.
- Check and test imported materials prior to use as fill.
- Observe placement and compaction of fill.

- Perform field density tests to evaluate fill and subgrade compaction.
- Check the foundation excavations for bearing materials and cleaning prior to placement of reinforcing steel and concrete.

The recommendations provided in this report assume that SOCOTEC will be retained as the geotechnical consultant during the construction phase of the project. If another geotechnical consultant is selected, we request that the selected consultant provide a letter to the architect and the owner (with a copy to SOCOTEC) indicating that they fully understand SOCOTEC's recommendations, and that they are in full agreement with the recommendations contained in this report.

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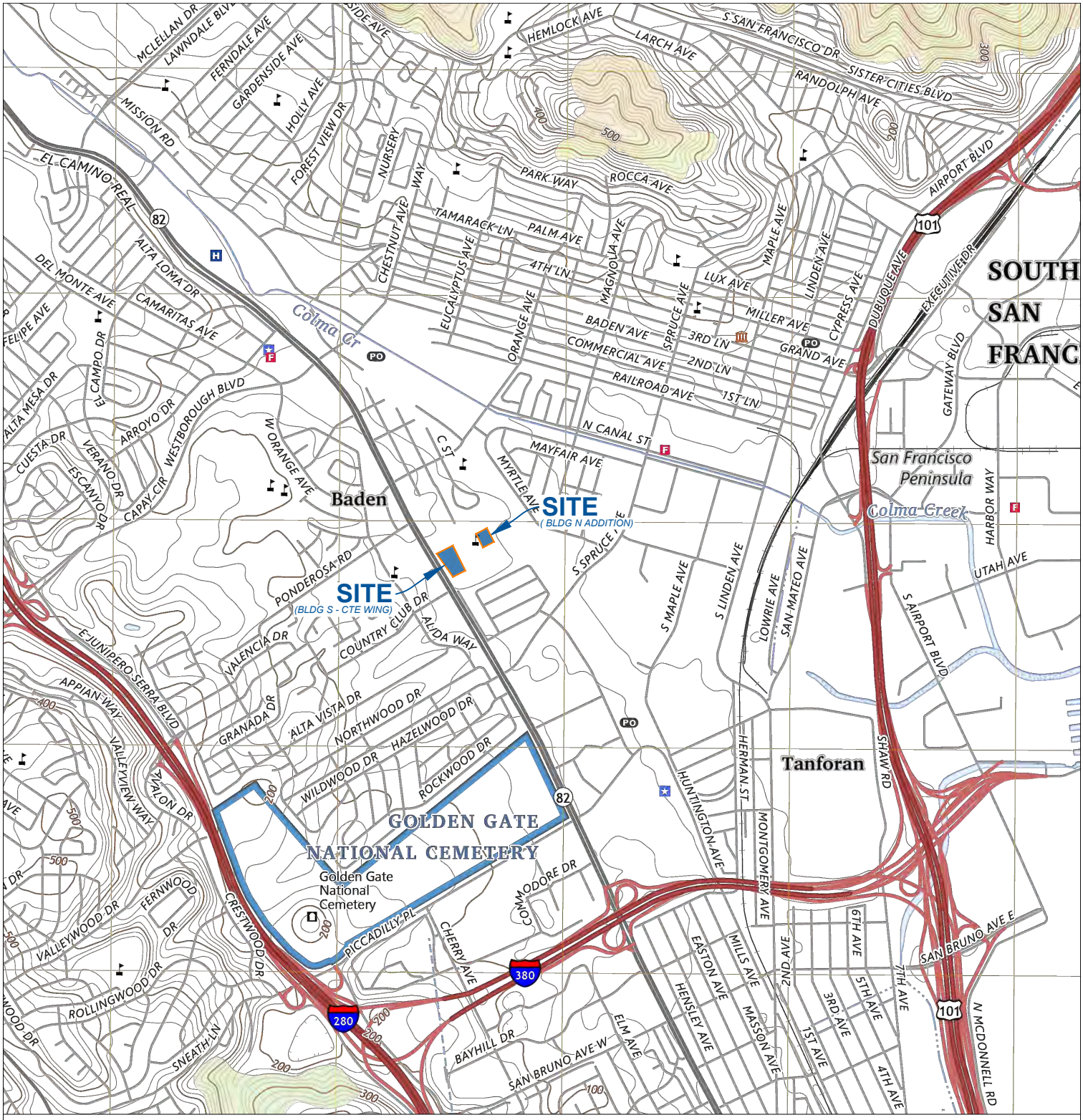
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FIGURES



NOTE: DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE | REFERENCE: USGS, 2026

N

SCALE (FEET)
0 2,000 4,000

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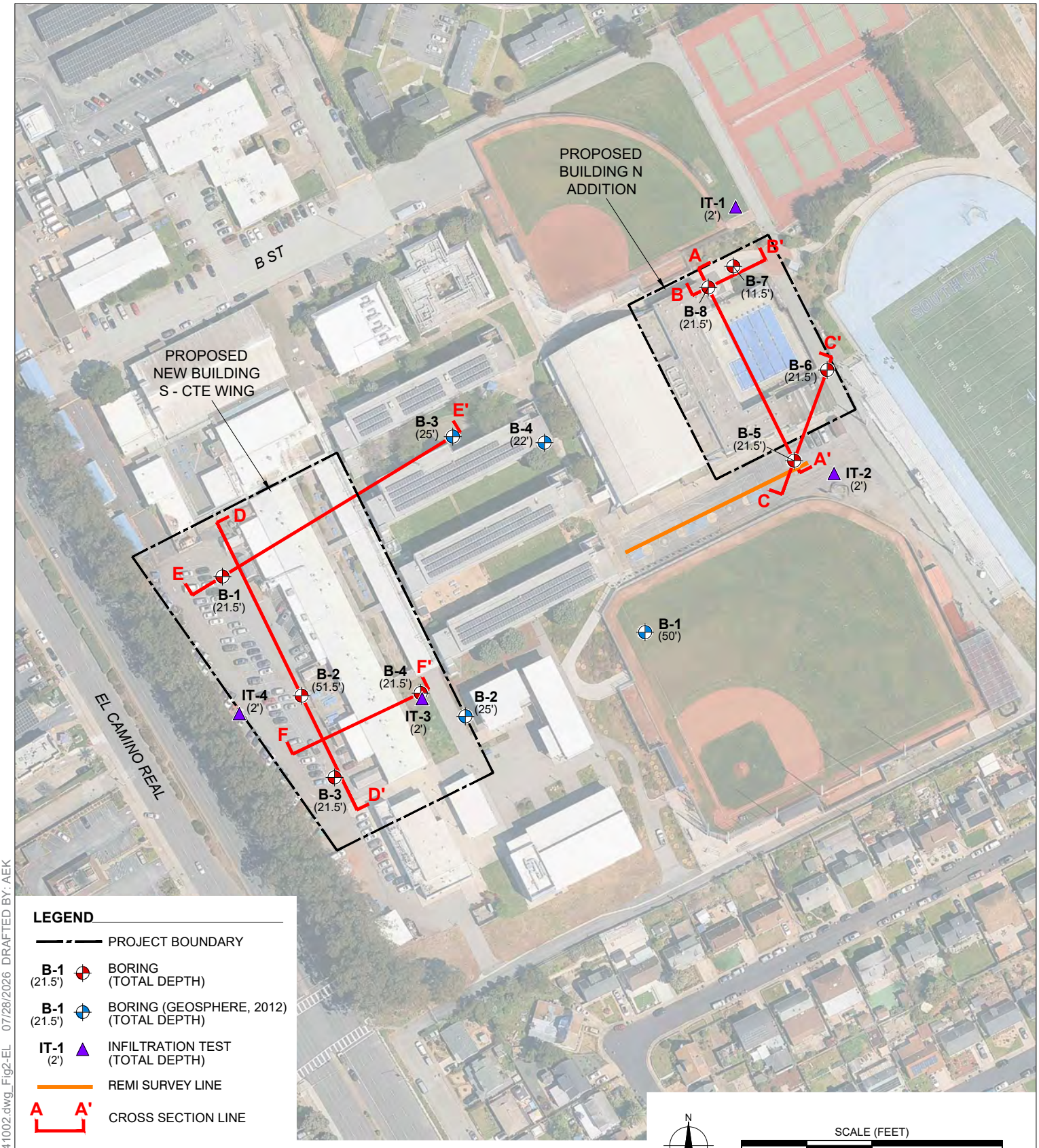
FIGURE 1

SITE LOCATIONS

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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SOCOTEC



NOTE: DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE | REFERENCE: GOOGLE EARTH, 2026

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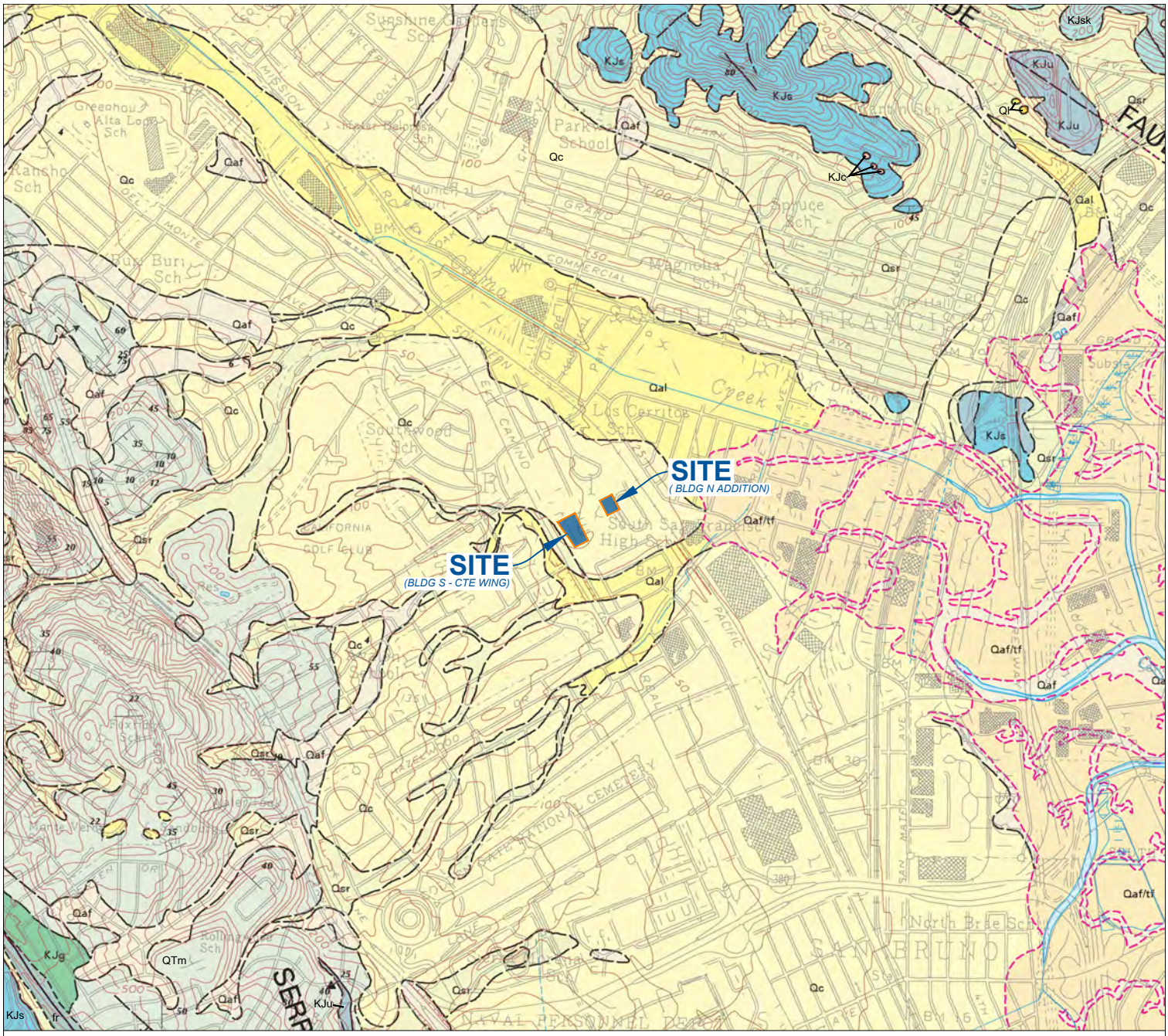
FIGURE 2

SITE PLAN

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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LEGEND

Qaf	ARTIFICIAL FILL (HOLOCENE)	Qc	COLMA FORMATION (PLEISTOCENE)	KJc	FRANCISCAN COMPLEX: CHERT (CRETACEOUS & JURASSIC)
Qaf/tf	ARTIFICIAL FILL OVER TIDAL FLAT (HOLOCENE)	fr	FAULT ROCKS (PLEISTOCENE)	KJg	FRANCISCAN COMPLEX: GREENSTONE (CRETACEOUS & JURASSIC)
Ql	LANDSLIDE DEPOSITS (HOLOCENE)	QTm	MERCED FORMATION (PLEISTOCENE/PLIOCENE)	KJu	FRANCISCAN COMPLEX: SHEARED ROCKS (CRETACEOUS & JURASSIC)
Qal	ALLUVIUM (HOLOCENE)	KJs	FRANCISCAN COMPLEX: SANDSTONE & SHALE (CRETACEOUS & JURASSIC)		
Qsr	SLOPE DEBRIS & RAVINE FILL (PLEISTOCENE)	KJsk	FRANCISCAN COMPLEX: SANDSTONE & SHALE (CRETACEOUS & JURASSIC)		

THRUST FAULT
FAULT
GEOLOGIC CONTACT
STRIKE AND DIP OF BEDDING

NOTE: DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE | REFERENCE: USGS, BONILLA, 1998

N

SCALE (FEET)
0 2,000 4,000

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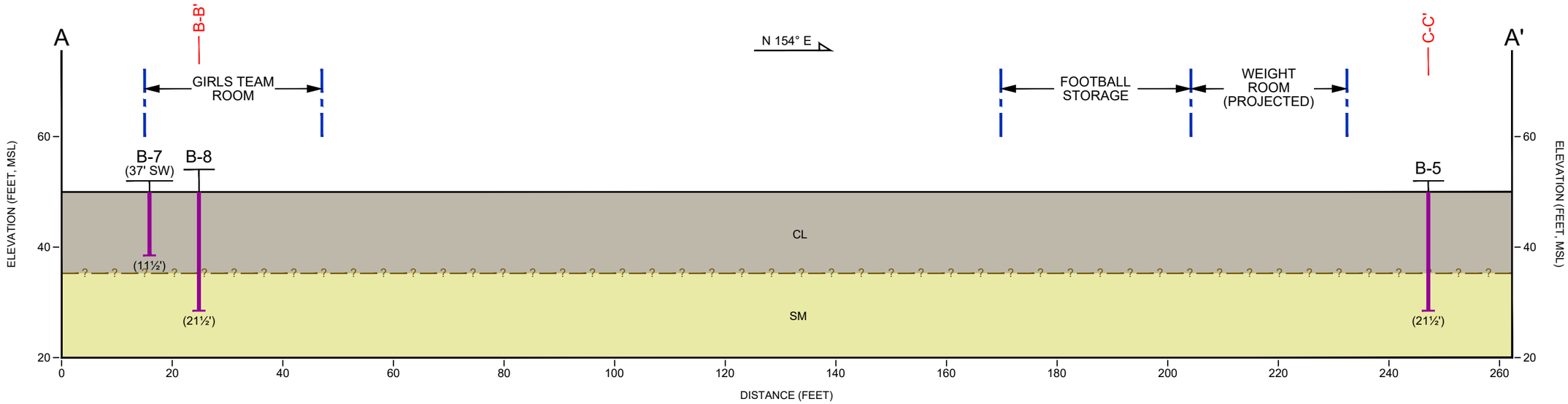
FIGURE 3

REGIONAL GEOLOGY

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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LEGEND

SOIL TYPES

- CL — LEAN CLAY
- SM — SILTY SAND

SYMBOLS

- GEOLOGIC CONTACT QUERIED WHERE UNCERTAIN
- MSL — MEAN SEA LEVEL

EXPLORATIONS

- B-7 (37' SW) — BORING NUMBER (PROJECTED DISTANCE AND DIRECTION TO THE CROSS SECTION)
- (11½') — TOTAL DEPTH (FEET)

20 0 20

APPROXIMATE SCALE IN FEET

NOTE: DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE

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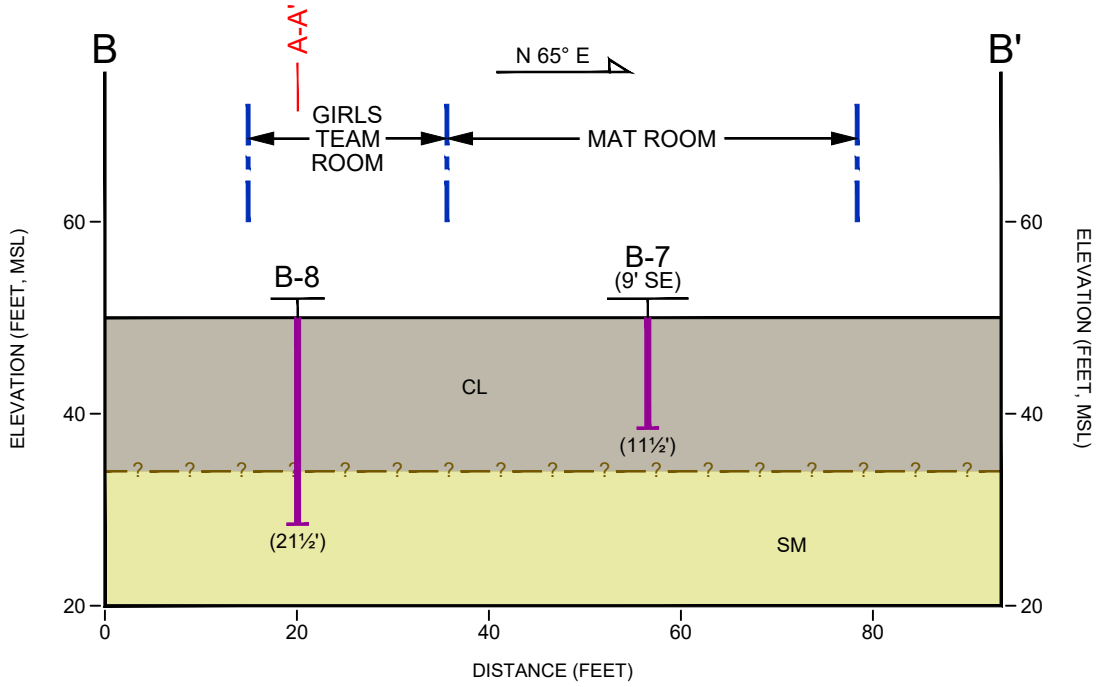
FIGURE 4

GEOLOGIC CROSS SECTION A-A'

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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SOCOTEC



LEGEND

SOIL TYPES

CL	LEAN CLAY
SM	SILTY SAND

SYMBOLS

?	GEOLOGIC CONTACT QUERIED WHERE UNCERTAIN
MSL	MEAN SEA LEVEL

EXPLORATIONS

B-7 (9' SE)	BORING NUMBER (PROJECTED DISTANCE AND DIRECTION TO THE CROSS SECTION)
(11½')	TOTAL DEPTH (FEET)

20 0

APPROXIMATE SCALE IN FEET

20

NOTE: DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE

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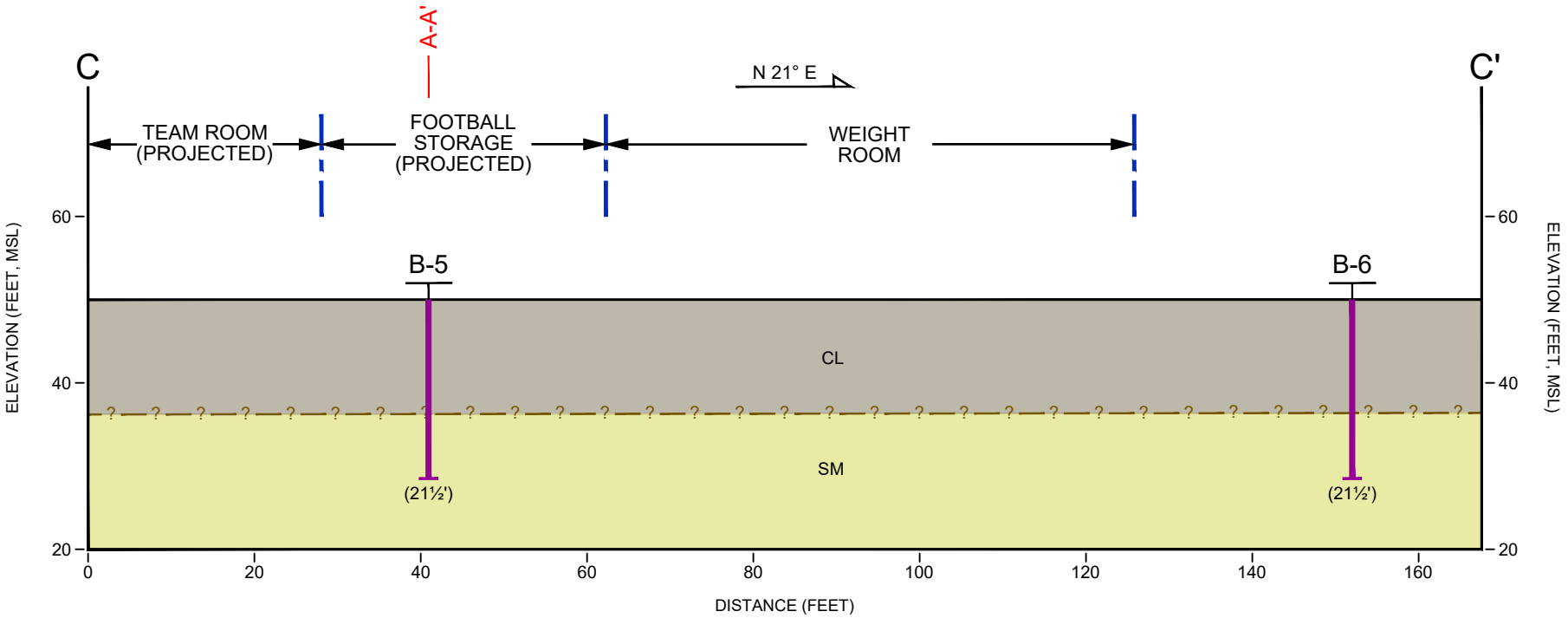
FIGURE 5

GEOLOGIC CROSS SECTION B-B'

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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SOCOTEC



LEGEND

SOIL TYPES

CL	LEAN CLAY
SM	SILTY SAND

SYMBOLS

?	GEOLOGIC CONTACT QUERIED WHERE UNCERTAIN
MSL	MEAN SEA LEVEL

EXPLORATIONS

B-5	BORING NUMBER
(11½')	TOTAL DEPTH (FEET)

20 0

APPROXIMATE SCALE IN FEET

20

NOTE: DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE

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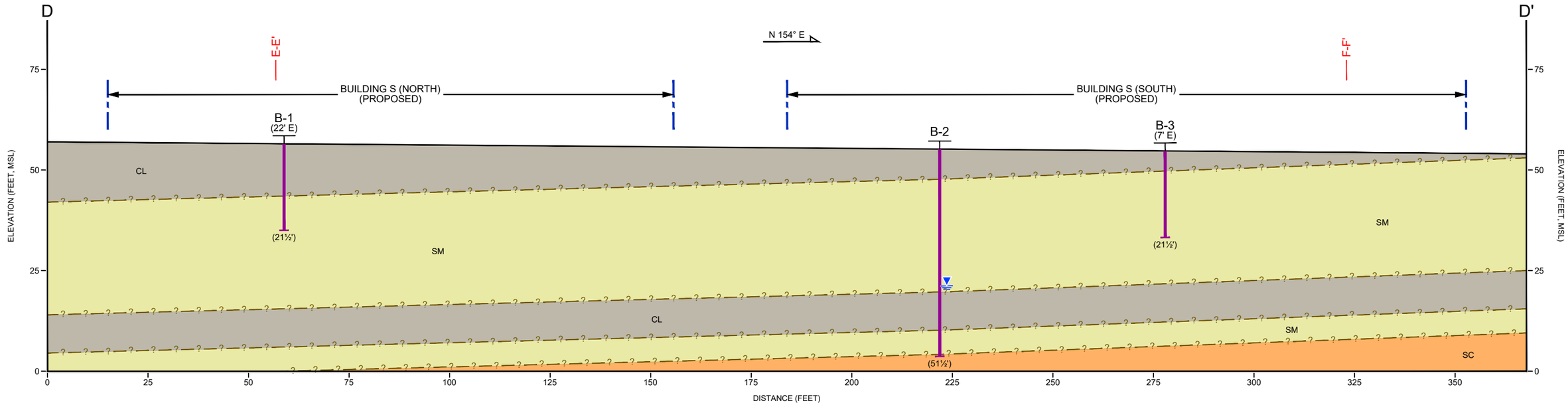
FIGURE 6

GEOLOGIC CROSS SECTION C-C'

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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LEGEND

SOIL TYPES

CL	LEAN CLAY
SM	SILTY SAND
SC	CLAYEY SAND

SYMBOLS

?	GEOLOGIC CONTACT QUERIED WHERE UNCERTAIN
MSL	MEAN SEA LEVEL
	GROUNDWATER (ENCOUNTERED AT TIME OF DRILLING)

EXPLORATIONS

B-1 (22' E)	BORING NUMBER (PROJECTED DISTANCE AND DIRECTION TO THE CROSS SECTION)
(21½')	TOTAL DEPTH (FEET)

25 0

APPROXIMATE SCALE IN FEET

25

NOTE: DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE

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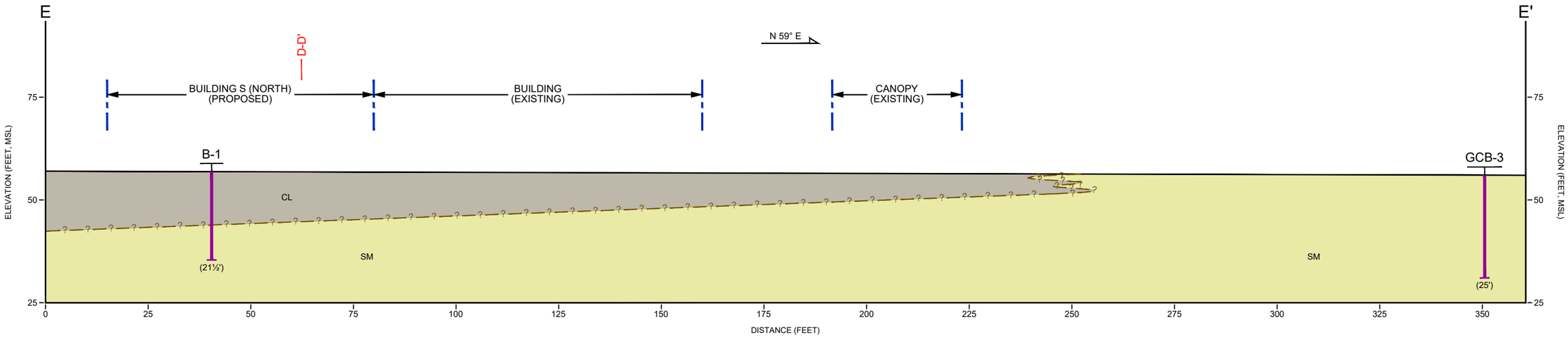
FIGURE 7

GEOLOGIC CROSS SECTION D-D'

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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LEGEND

SOIL TYPES

CL	LEAN CLAY
SM	SILTY SAND
SC	CLAYEY SAND

SYMBOLS

?	GEOLOGIC CONTACT QUERIED WHERE UNCERTAIN
MSL	MEAN SEA LEVEL
	GROUNDWATER (ENCOUNTERED AT TIME OF DRILLING)

EXPLORATIONS

B-1	BORING NUMBER (SOCOTEC, 2026)
(21½')	TOTAL DEPTH (FEET)
GCB-3	BORING NUMBER (GEOSPHERE CONSULTANTS, 2012)
(25')	TOTAL DEPTH (FEET)

25 0

APPROXIMATE
SCALE IN FEET

25

NOTE: DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE

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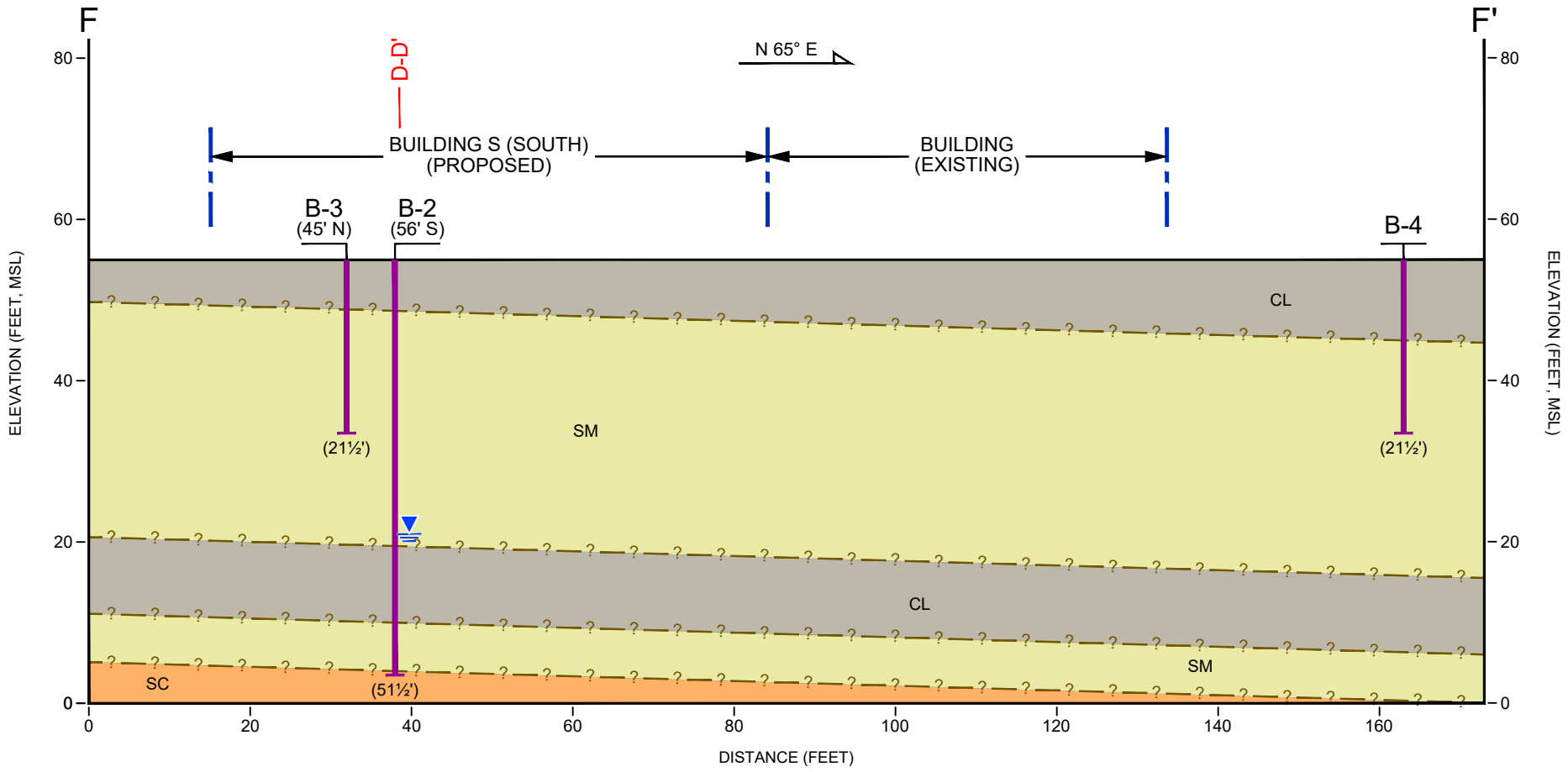
FIGURE 8

GEOLOGIC CROSS SECTION E-E'

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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LEGEND

SOIL TYPES

CL	LEAN CLAY
SM	SILTY SAND
SC	CLAYEY SAND

SYMBOLS

?	GEOLOGIC CONTACT QUERIED WHERE UNCERTAIN
MSL	MEAN SEA LEVEL
	GROUNDWATER (ENCOUNTERED AT TIME OF DRILLING)

EXPLORATIONS

B-2 (56' S) — BORING NUMBER (PROJECTED DISTANCE AND DIRECTION TO THE CROSS SECTION)

(51½') — TOTAL DEPTH (FEET)

20 0 — APPROXIMATE SCALE IN FEET — 20

NOTE: DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE

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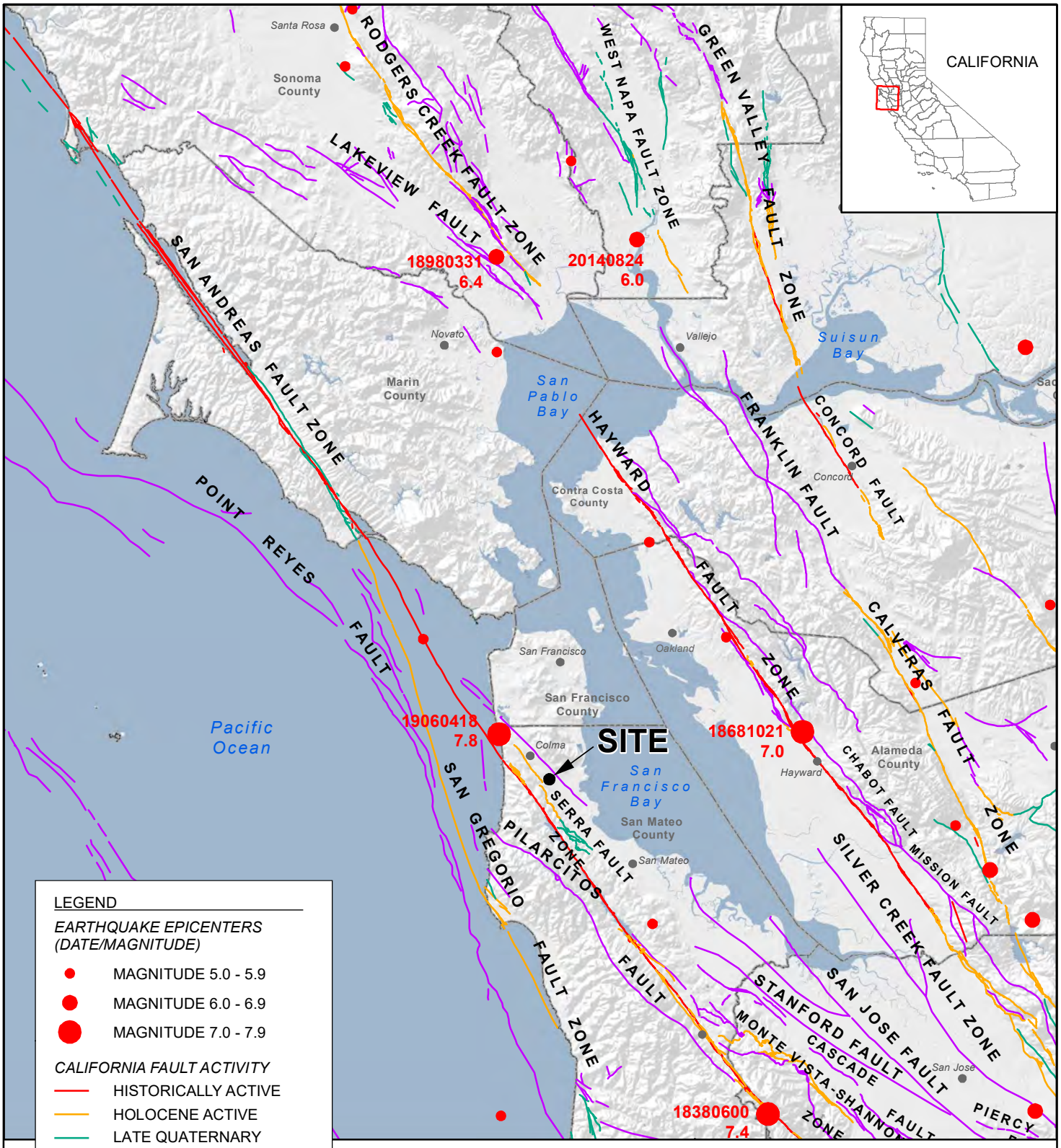
FIGURE 9

GEOLOGIC CROSS SECTION F-F'

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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NOTE: DIRECTIONS, DIMENSIONS, AND LOCATIONS ARE APPROXIMATE

SOURCES: CALIFORNIA GEOLOGICAL SURVEY, 2010, FAULT ACTIVITY MAP OF CALIFORNIA; CALIFORNIA GEOLOGICAL SURVEY, 2000, MAP SHEET 49

404741002-Fig6-FL.pdf 07/07/2026 DRAFTED BY: AEK

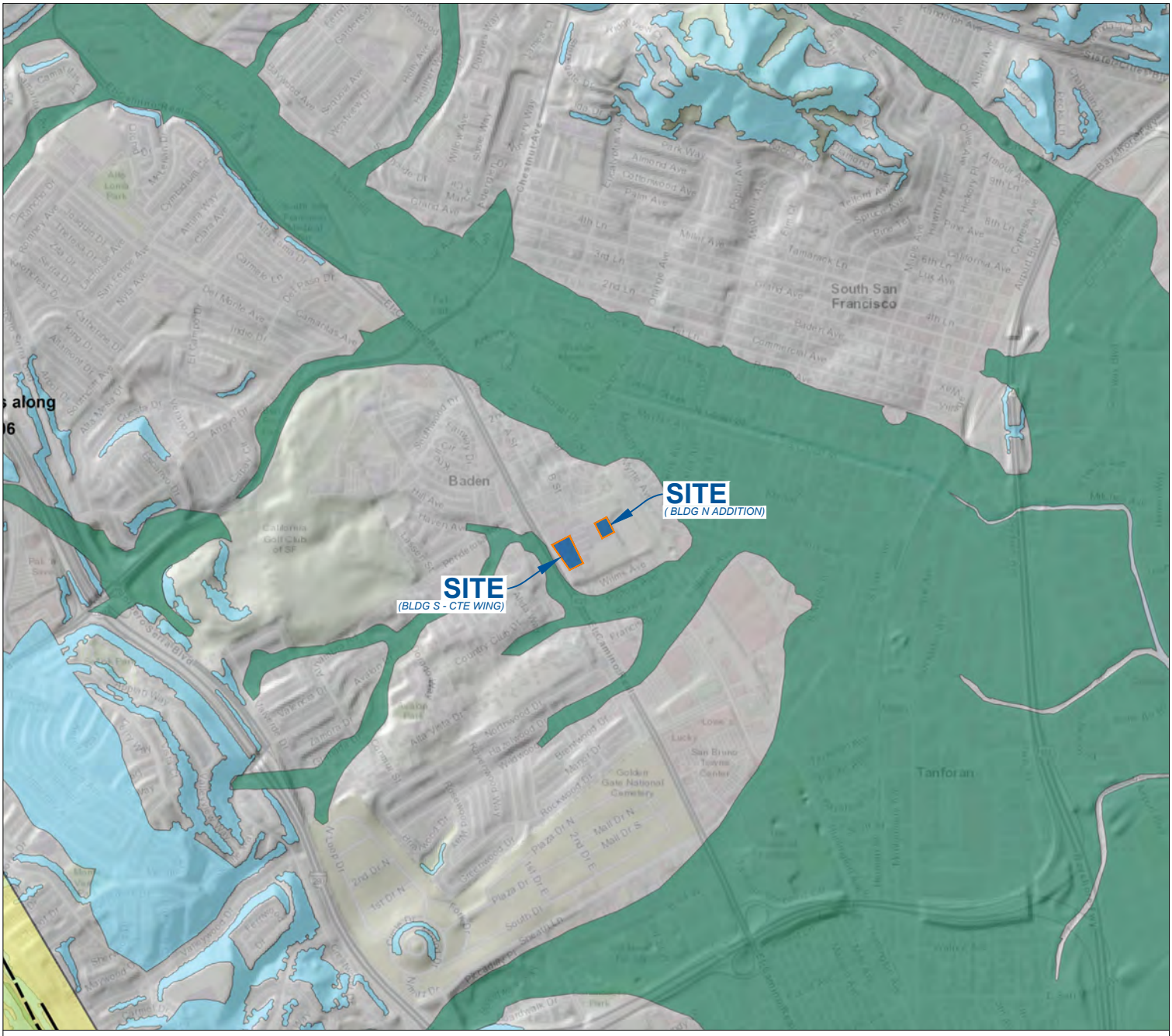
FIGURE 10

FAULT LOCATIONS AND EARTHQUAKE EPICENTERS

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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LEGEND

EARTHQUAKE FAULT ZONES:
Zone boundaries are delineated by straight-line segments; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

OVERLAP OF EARTHQUAKE FAULT ZONE AND LIQUEFACTION ZONE:
Areas that are covered by both Earthquake Fault Zone and Liquefaction Zone.

OVERLAP OF EARTHQUAKE FAULT ZONE AND EARTHQUAKE-INDUCED LANDSLIDE ZONE:
Areas that are covered by both Earthquake Fault Zone and Earthquake-Induced Landslide Zone.

LIQUEFACTION ZONES:
Areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

EARTHQUAKE-INDUCED LANDSLIDE ZONES:
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

N

SCALE (FEET)
0 2,000 4,000

NOTE: DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE | REFERENCE: CGS, 1982, 2021

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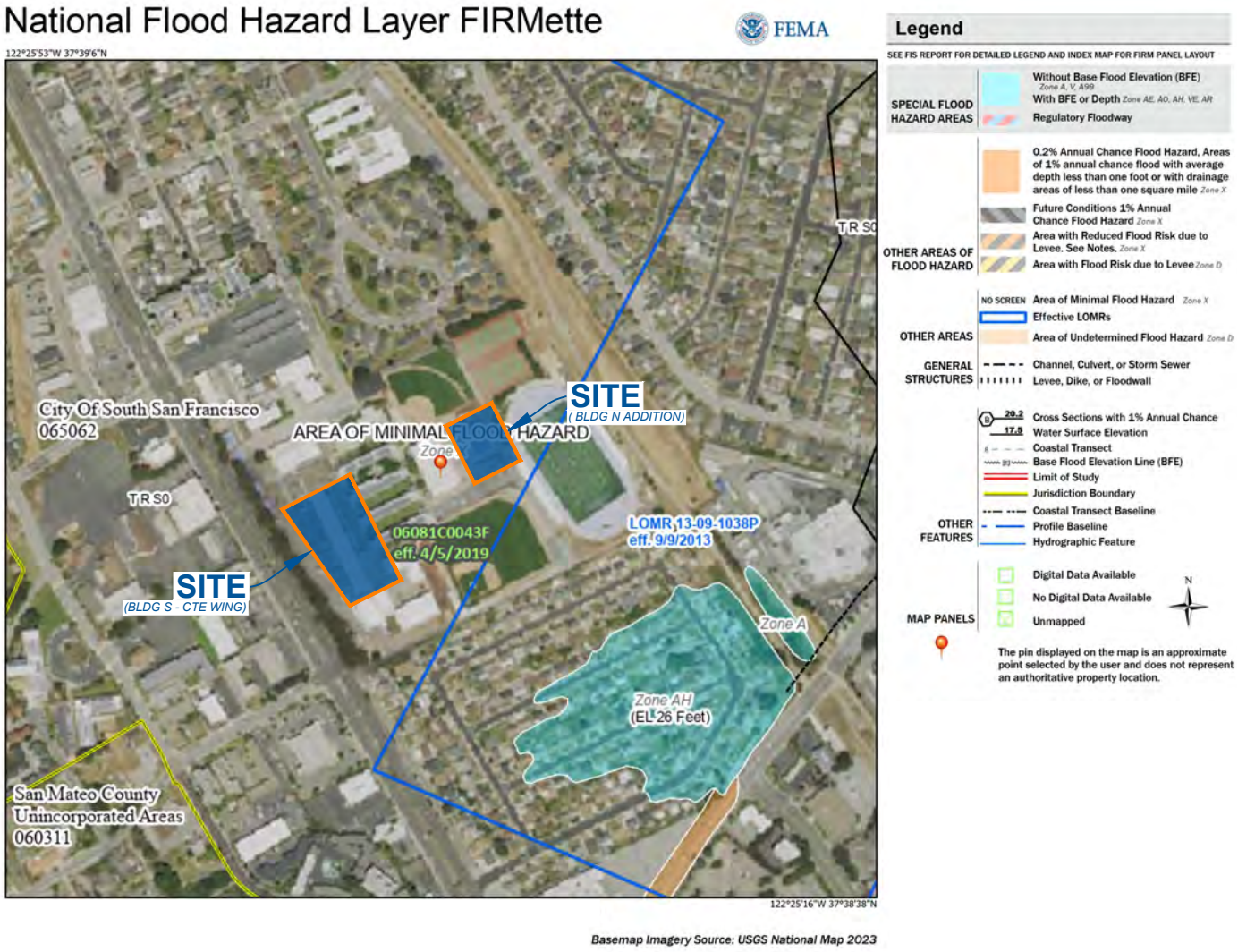
FIGURE 11

SEISMIC HAZARD ZONES

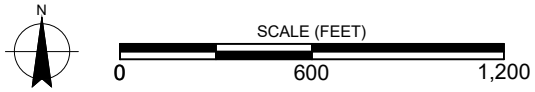
SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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Basemap Imagery Source: USGS National Map 2023



NOTE: DIMENSIONS, DIRECTIONS, AND LOCATIONS ARE APPROXIMATE | REFERENCE: FEMA, 2026

FIGURE 12

FEMA FLOOD MAP

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA

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APPENDIX A
BORING LOGS

APPENDIX A

FIELD PROCEDURE FOR COLLECTION OF SAMPLES

Disturbed Samples

Disturbed soil samples were obtained in the field using the following methods.

Bulk Samples

Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler

Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1⅜ inches. The sampler was driven into the ground 18 inches or the interval recorded on the boring log where driving refusal occurred, with a 140-pound hammer falling relatively freely from a height of 30 inches in general accordance with ASTM D1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration or the interval reported. Soil samples were observed and removed from the sampler, bagged, sealed and transported to the laboratory for testing.

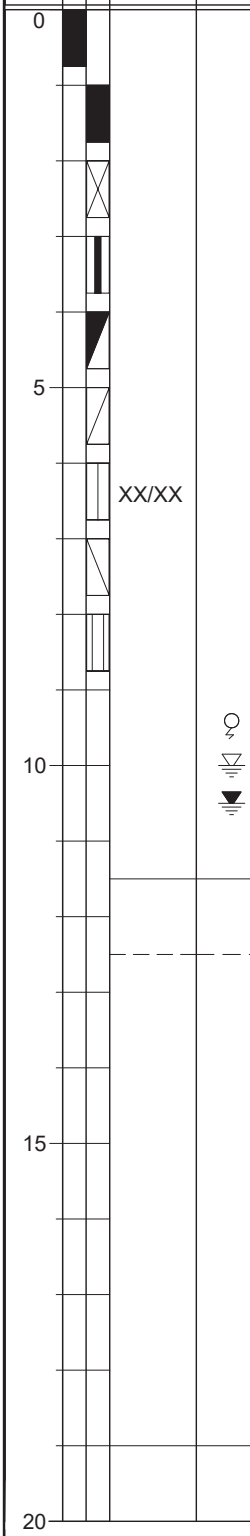
Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using the following method.

Modified Split-Barrel Drive Sampler

Relatively undisturbed soil samples were obtained in the field using a modified split-barrel drive sampler. The sampler, with an external diameter of 3.0 inches, was lined with 6-inch-long, thin wall stainless steel liners with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with a 140-pound hammer with a drop height of 30 inches in general accordance with ASTM D3550. The driving weight was permitted to fall relatively freely. The sampler was driven into the ground 18 inches or the interval recorded on the boring log where driving refusal occurred. The approximate length of the fall, the weight of the hammer, and the number of blows for the last 12 inches of penetration or the interval reported presented on the boring logs. The blow counts are recorded as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the liners, sealed, and transported to the laboratory for testing

BORING LOG EXPLANATION SHEET



Bulk sample.

Modified split-barrel drive sampler.

No recovery with modified split-barrel drive sampler.

Sample retained by others.

Standard Penetration Test (SPT).

No recovery with a SPT.

Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.

No recovery with Shelby tube sampler.

Continuous Push Sample.

Seepage.

Groundwater encountered during drilling.

Groundwater measured after drilling.

SM

MAJOR MATERIAL TYPE (SOIL):

Solid line denotes unit change.

CL

Dashed line denotes material change.

Attitudes: Strike/Dip
b: Bedding
c: Contact
j: Joint
f: Fracture
F: Fault
cs: Clay Seam
s: Shear
bss: Basal Slide Surface
sf: Shear Fracture
sz: Shear Zone
sbs: Shear Bedding Surface

The total depth line is a solid line that is drawn at the bottom of the boring.

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BORING LOG

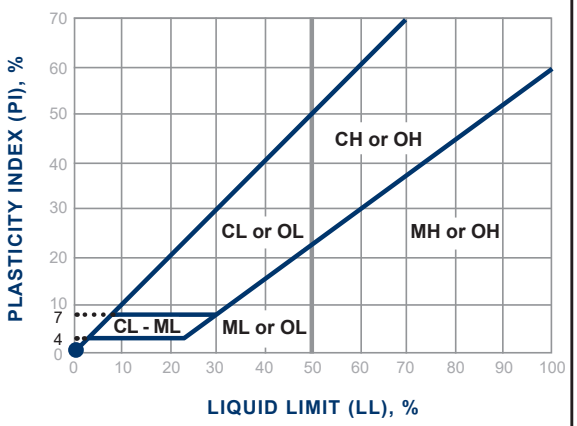
Soil Classification Chart Per ASTM D 2488

Primary Divisions			Secondary Divisions		
			Group Symbol	Group Name	
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	**GRAVEL** more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL	
			GP	poorly graded GRAVEL	
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt	
			GP-GM	poorly graded GRAVEL with silt	
			GW-GC	well-graded GRAVEL with clay	
			GP-GC	poorly graded GRAVEL with	
		GRAVEL with FINES more than 12% fines	GM	silty GRAVEL	
			GC	clayey GRAVEL	
			GC-GM	silty, clayey GRAVEL	
	SAND 50% or more of coarse fraction passes No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND	
			SP	poorly graded SAND	
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt	
			SP-SM	poorly graded SAND with silt	
			SW-SC	well-graded SAND with clay	
			SP-SC	poorly graded SAND with clay	
		SAND with FINES more than 12% fines	SM	silty SAND	
			SC	clayey SAND	
			SC-SM	silty, clayey SAND	
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	**SILT and CLAY** liquid limit less than 50%	INORGANIC	CL	lean CLAY	
			ML	SILT	
			CL-ML	silty CLAY	
		ORGANIC	OL (PI > 4)	organic CLAY	
			OL (PI < 4)	organic SILT	
	SILT and CLAY liquid limit 50% or more	INORGANIC	CH	fat CLAY	
			MH	elastic SILT	
		ORGANIC	OH (plots on or above "A"-line)	organic CLAY	
			OH (plots below "A"-line)	organic SILT	
	Highly Organic Soils		PT	Peat	

Grain Size

Description		Sieve Size	Grain Size	Approximate Size
Boulders		> 12"	> 12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

Plasticity Chart



Apparent Density - Coarse-Grained Soil

Apparent Density	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

Consistency - Fine-Grained Soil

Consis-tency	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

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USCS METHOD OF SOIL CLASSIFICATION

DATE DRILLED 6/24/26 BORING NO. B-1

GROUND ELEVATION 56' ± MSL SHEET 1 OF 1

METHOD OF DRILLING 4" SSA, CME-75 TRUCK MOUNTED (HANLON)

DRIVE WEIGHT 140 LBS (AUTO) DROP 30 INCHES

SAMPLED BY DHL LOGGED BY DHL REVIEWED BY CEH

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 4 inches thick.
						CL	AGGREGATE BASE: Approximately 5.5 inches thick.
		50	17.3	111.1			Brown/ yellowish brown, moist, hard, sandy lean CLAY. PP > 4.5.
		66					PP > 4.5.
		29					Dark brown.
10		26	13.1				Very stiff.
						SM	Brown, moist, medium dense, silty SAND; fine grained.
		20	12.0				
20		24	18.0				Dense.
							Total Depth = 21.5 feet.
							Groundwater was not encountered at the time of drilling.
							Backfilled with cement grout and patched with concrete dyed black on 6/24/26, shortly after completion of drilling.
							PP = Pocket Penetrometer readings in tsf.
30							Notes:
							Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents (Google, 2026).
40							

FIGURE A - 1

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SAN FRANCISCO, CALIFORNIA

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DATE DRILLED 6/24/26 BORING NO. B-2

GROUND ELEVATION 54' ± MSL SHEET 1 OF 2

METHOD OF DRILLING 4" SSA, CME-75 TRUCK MOUNTED (HANLON)

DRIVE WEIGHT 140 LBS (AUTO) DROP 30 INCHES

SAMPLED BY DHL LOGGED BY DHL REVIEWED BY CEH

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE:
						CL	Approximately 4 inches thick.
							AGGREGATE BASE:
							Approximately 5.5 inches thick.
		43					Light brown, moist, hard, sandy lean CLAY; black staining.
							PP > 4.5, TS = 1.38.
		36	14.7	116.6			PP > 4.5, TS = 1.00.
		79				SM	Light brown to brown, moist, very dense, silty SAND.
10		39					Buff; medium dense; very fine grained.
		62					Brown; few gravel.
20		27					With iron oxide staining; dense.
		93/11.5					Light brown with iron oxide staining; very dense.
30		25	19.0				Dense.
							Wet; medium dense.
		15				CL	Brown with orange, wet, stiff, sandy lean CLAY.
40							

FIGURE A - 2

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SAN FRANCISCO, CALIFORNIA

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SOCOTEC

DATE DRILLED 6/24/26 BORING NO. B-2

GROUND ELEVATION 54' ± MSL SHEET 2 OF 2

METHOD OF DRILLING 4" SSA, CME-75 TRUCK MOUNTED (HANLON)

DRIVE WEIGHT 140 LBS (AUTO) DROP 30 INCHES

SAMPLED BY DHL LOGGED BY DHL REVIEWED BY CEH

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40		49				CL	Brown with orange, wet, hard (PP > 4.5, TS = 0.88), sandy lean CLAY.
		72 51				SM	Brown with black speckling, wet, very dense, silty SAND.
50		53				SC	Brown, with orange, wet, very dense, clayey SAND; fine to medium grained.
							Total Depth = 51.5 feet.
							Groundwater was measured at a depth of approximately 34 feet in borehole shortly after completion of drilling.
							Backfilled with cement grout and patched with concrete dyed black on 6/24/26, shortly after completion of drilling.
							PP = Pocket Penetrometer readings in tsf. TS = Torvane Shear readings in kg/cm^2.
60							Notes:
							Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents (Google, 2026).
70							
80							

FIGURE A - 3

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SAN FRANCISCO, CALIFORNIA

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SOCOTEC

DATE DRILLED 6/24/26 BORING NO. B-3

GROUND ELEVATION 55' ± MSL SHEET 1 OF 1

METHOD OF DRILLING 4" SSA, CME-75 TRUCK MOUNTED (HANLON)

DRIVE WEIGHT 140 LBS (AUTO) DROP 30 INCHES

SAMPLED BY DHL LOGGED BY DHL REVIEWED BY CEH

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 4 inches thick. AGGREGATE BASE: Approximately 5 inches thick.
		23	17.0	114.5		CL	Brown, moist, very stiff, sandy lean CLAY. PP = 3.0, TS = 0.5.
		21				SM	Brown and light brown, moist, medium dense (PP > 4.5, TS = 0.3), silty SAND.
		51	14.1	119.0			Dense.
10		34					Medium dense; trace gravel; some iron oxide staining.
		52					Very dense.
20		30					Dense; fine grained.
							Total Depth = 21.5 feet. Groundwater was not encountered at the time of drilling. Backfilled with cement grout and patched with concrete dyed black on 6/24/26, shortly after completion of drilling. PP = Pocket Penetrometer readings in tsf. TS = Torvane Shear readings in kg/cm^2. Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents (Google, 2026).
30							
40							

FIGURE A - 4

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SAN FRANCISCO, CALIFORNIA

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SOCOTEC

DATE DRILLED 6/25/26 BORING NO. B-4

GROUND ELEVATION 55' ± MSL SHEET 1 OF 1

METHOD OF DRILLING 4" SSA, CME-75 TRUCK MOUNTED (HANLON)

DRIVE WEIGHT 140 LBS (AUTO) DROP 30 INCHES

SAMPLED BY DHL LOGGED BY DHL REVIEWED BY CEH

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						CL	Brown, moist, firm, sandy lean CLAY.
		4	20.0	105.6			PP = 1.75, TS = 0.3.
		15					Very stiff.
		56					Light brown with black speckling; hard.
10		43	15.8	116.1		SM	Light brown with iron oxide staining, moist, dense, silty SAND; some clay.
		29					
		12				ML	Light brown, moist, stiff, sandy SILT.
						SM	Light brown, moist, dense, silty SAND; some clay.
20		23					Light brown with iron oxide staining; dense.
							Total Depth = 21.5 feet.
							Groundwater was not encountered at the time of drilling.
							Backfilled with cement grout on 6/25/26, shortly after completion of drilling.
							PP = Pocket Penetrometer readings in tsf. TS = Torvane Shear readings in kg/cm^2.
30							Notes:
							Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents (Google, 2026).
40							

FIGURE A - 5

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SAN FRANCISCO, CALIFORNIA

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SOCOTEC

DATE DRILLED 6/25/26 BORING NO. B-5

GROUND ELEVATION 48' ± MSL SHEET 1 OF 1

METHOD OF DRILLING 4" SSA, CME-75 TRUCK MOUNTED (HANLON)

DRIVE WEIGHT 140 LBS (AUTO) DROP 30 INCHES

SAMPLED BY DHL LOGGED BY DHL REVIEWED BY CEH

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 3 inches thick.
						CL	AGGREGATE BASE: Approximately 4 inches thick.
		4	16.1	110.1			Brown with orange, moist, firm, sandy lean CLAY; some silt. PP = 1.75, TS = 0.25.
		4	20.0	105.0			Dark brown with iron oxide staining; (PP = 1.5, TS = 0.2)
		26					Light brown/ yellow; very stiff (PP = 1.75, TS = 0.85).
10		29	18.7	109.2			PP > 4.5, TS = 1.13.
						SM	Yellow, moist, dense, silty SAND; fine grained sand.
		24					
20		24					Some clay.
							Total Depth = 21.5 feet.
							Groundwater was not encountered at the time of drilling.
							Backfilled with cement grout and patched with cold patch on 6/25/26, shortly after completion of drilling.
							PP = Pocket Penetrometer readings in tsf. TS = Torvane Shear readings in kg/ cm^2.
30							Notes:
							Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents (Google, 2026).
40							

FIGURE A - 6

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SAN FRANCISCO, CALIFORNIA

404741002 | 08/26

SOCOTEC

DATE DRILLED 6/25/26 BORING NO. B-6

GROUND ELEVATION 48' ± MSL SHEET 1 OF 1

METHOD OF DRILLING 4" SSA, CME-75 TRUCK MOUNTED (HANLON)

DRIVE WEIGHT 140 LBS (AUTO) DROP 30 INCHES

SAMPLED BY DHL LOGGED BY DHL REVIEWED BY CEH

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 3.5 inches thick.
						CL	AGGREGATE BASE: Approximately 10 inches thick.
		15					Brown, moist, very stiff, sandy lean CLAY; some silt. PP = 1.75, TS = 0.3.
		7	16.1	112.8			Dark brown; stiff (PP > 4.5, TS = 1.63).
		8					With iron oxide staining; (PP = 1.0, TS = 0.15).
10		21					PP = 2.75, TS = 0.3.
						SM	Yellow, moist, dense, silty SAND.
		28					
20		24					
							Total Depth = 21.5 feet.
							Groundwater was not encountered at the time of drilling.
							Backfilled with cement grout and patched with cold patch on 6/25/26, shortly after completion of drilling.
							PP = Pocket Penetrometer readings in tsf. TS = Torvane Shear readings in kg/cm^2.
30							Notes:
							Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents (Google, 2026).
40							

FIGURE A - 7

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SAN FRANCISCO, CALIFORNIA

404741002 | 08/26

SOCOTEC

DATE DRILLED 6/24/26 BORING NO. B-7

GROUND ELEVATION 50' ± MSL SHEET 1 OF 1

METHOD OF DRILLING 4" SSA, CME-75 TRUCK MOUNTED (HANLON)

DRIVE WEIGHT 140 LBS (AUTO) DROP 30 INCHES

SAMPLED BY DHL LOGGED BY DHL REVIEWED BY CEH

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 4 inches thick.
						CL	AGGREGATE BASE: Approximately 9 inches thick.
		6	19.3	104.9			Dark brown, moist, firm, lean CLAY. PP = 1.0, TS = 0.18.
		8					Brown; stiff (PP = 1.0, TS = 0.18).
		5	18.2	114.1			Gray; firm (PP = 0.75, TS = 0.08).
10		25					Very stiff (PP = 2.25, TS = 0.8).
							Total Depth = 21.5 feet.
							Groundwater was not encountered at the time of drilling.
							Backfilled with cement grout and patched with concrete dyed black on 6/24/26, shortly after completion of drilling.
							PP = Pocket Penetrometer readings in tsf. TS = Torvane Shear readings in kg/cm^2.
20							Notes:
							Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents (Google, 2026).
30							
40							

FIGURE A - 8

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SAN FRANCISCO, CALIFORNIA

404741002 | 08/26

SOCOTEC

DATE DRILLED 6/25/26 BORING NO. B-8

GROUND ELEVATION 51' ± MSL SHEET 1 OF 1

METHOD OF DRILLING 4" SSA, CME-75 TRUCK MOUNTED (HANLON)

DRIVE WEIGHT 140 LBS (AUTO) DROP 30 INCHES

SAMPLED BY DHL LOGGED BY DHL REVIEWED BY CEH

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 4 inches thick.
						CL	AGGREGATE BASE: Approximately 8 inches thick.
		9					Brown and dark brown, moist, stiff, sandy lean CLAY. PP > 4.5, TS = 1.0.
		10	16.0	116.0			PP = 4.0, TS = 0.88. Grayish blue.
		10					Dark brown; (PP = 1.25, TS = 0.15); scattered debris.
10		15					Gray.
							Brown; PP = 3.5, TS = 0.4.
		51					Yellow; hard.
						SM	Yellow, moist, dense, silty SAND. Medium dense; trace gravel.
		16					
20		21					Light brown; dense.
							Total Depth = 21.5 feet.
							Groundwater was not encountered at the time of drilling.
							Backfilled with cement grout and patched with cold patch on 6/25/26, shortly after completion of drilling.
							PP = Pocket Penetrometer readings in tsf. TS = Torvane Shear readings in kg/cm^2.
30							Notes:
							Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents (Google, 2026).
40							

FIGURE A - 9

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SAN FRANCISCO, CALIFORNIA

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SOCOTEC

APPENDIX B

GEOPHYSICAL (REMI) SURVEY

APPENDIX B

GEOPHYSICAL REFRACTION MICROTREMOR (ReMi) SURVEY

The Refraction Microtremor (ReMi) survey was performed to evaluate the subsurface shear wave velocity at the representative location (Figure 2). Microtremor Array Measurements (MAM) was the passive seismic method used during the survey which consisted of a single linear profile of seismic data collection. The method provided a shear wave velocity model to a depth of approximately 100 feet (30 meters) below the ground surface (bgs) and V_{S100} for seismic site classification (CBC, 2019). The following sections provide a summary of the methods and analyses used in our study. The seismic model results are provided in Figure B-1.

FIELD METHODS

A Geode 24–Channel Seismograph (Geometrics Inc., San Jose, CA) was used for ReMi surveying, with 4.5 Hertz (Hz) vertical component geophone placement every 10 feet for a total profile length of 230 feet. Approximately twenty records were collected, with a record length of 30 seconds (s) and 2 millisecond (ms) sample interval. The field data were digitally recorded in SEG2 format, reviewed in the field for data quality, saved to a hard disk, and documented.

DATA PROCESSING AND MODELING

The ReMi survey's seismic data were processed using SeisImager (Geometrics Inc., San Jose, CA) seismic processing software. The dispersive characteristics of surface waves are used to evaluate the subsurface velocity at depth. Longer wavelength (that is, longer-period and lower-frequency) surface waves travel deeper and thus contain more information about deeper velocity structure. Shorter wavelength (that is, shorter-period and higher-frequency) surface waves travel shallower and thus contain more information about shallower velocity structure. The dispersion is dependent on the material properties, such as surface wave velocity, relative material densities, and Poisson's ratio. An inversion is performed on the collected passive seismic shear wave records within SeisImager to produce a model of the variation in shear wave velocities with depth. The following data processing flow was used to calculate Average Shear-wave Velocities (AV_S) to a depth of approximately 100 feet (V_{S100}).

- Collated records into list file and edited any bad channels or records,
- Applied 2D Spatial Auto Correlation (SPAC); using a linear array and 24 geophones at 10 feet spacing,
- Phase velocity frequency transformation from 2 to 20 Hz
- Automated velocity picks of raw phase velocity were calculated and updated manually,

- Created an initial model and carried out a non-linear Least Squares Method (LSM) inversion to produce a final shear wave velocity model; convergence of the inversion was judged whether the model achieved an RMS <5% within 5-7 iterations,
- Calculated V_{S100} using final shear wave velocity model.

RESULTS

Shear wave data resolution generally decreases with depth, due to the loss of sensitivity of the dispersion curve to changes in shear wave velocity as depth increases. The layered model in Figure B-1 indicates our interpretation of the approximate changes in shear wave velocity vertically with depth across the surveyed location, based on our MAM seismic modeling results, in.

The model results indicate a V_{S100} value of **1,054 feet/sec** and a Seismic Site Classification of **Class CD** accordingly.

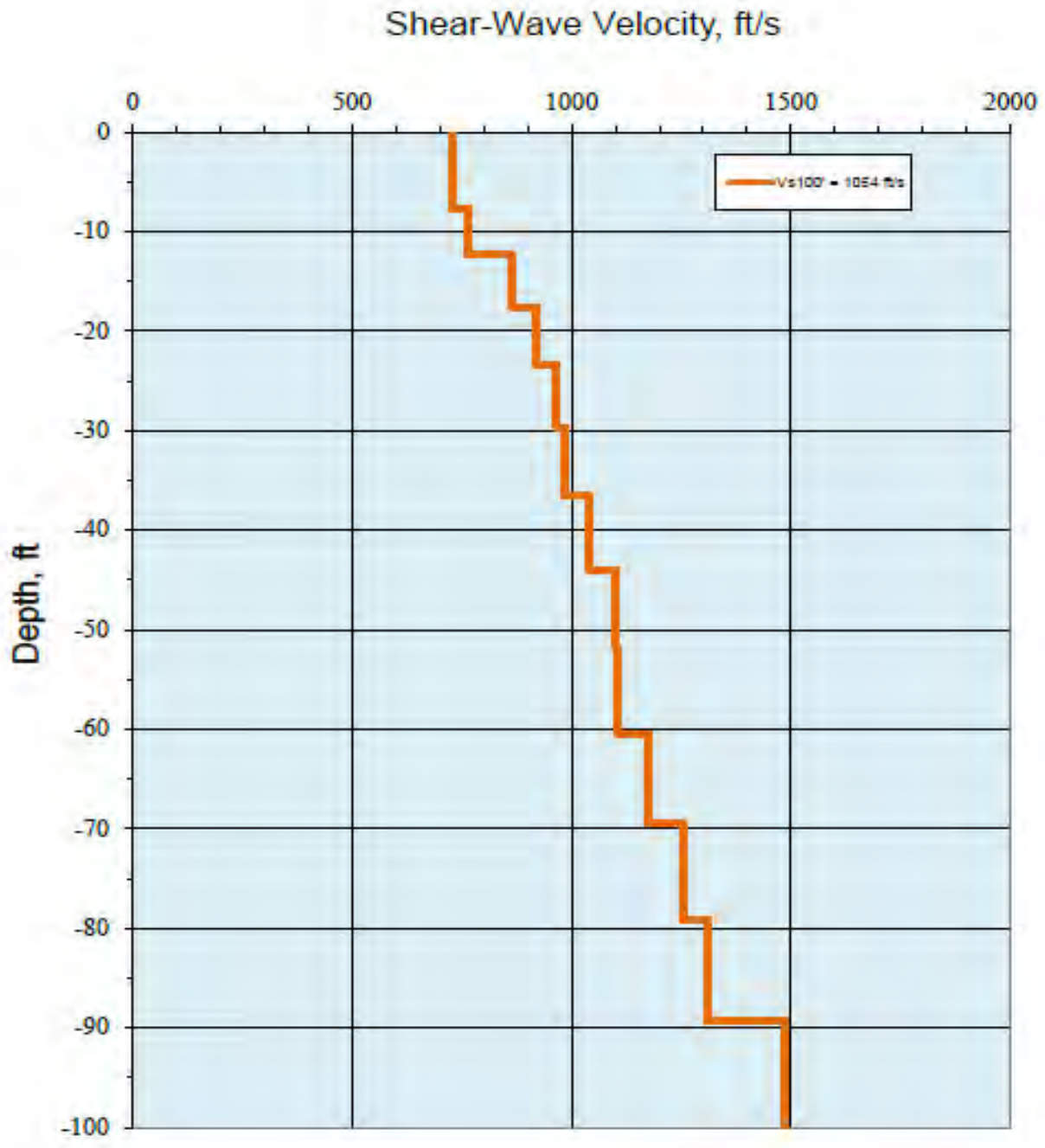


FIGURE B-1

REMI SURVEU SHEAR WAVE VELOCITY MODEL

SOUTH SAN FRANCISCO HIGH SCHOOL MODERNIZATION
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA
404741002 | 08/26

SOCOTEC

APPENDIX C
INFILTRATION TESTING

Project =	SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
Project No. =	404741002
Test Location =	IT-1
Liquid Use and pH =	Tap Water (~7)
Liquid level maintained using =	Marriotte Tubes
Penetration of Rings (in) =	Inner: 3 3/4 Outer: 4
Historic Depth to Water Table =	
Description of Surface =	Grass
Weather Conditions (°F) =	64
Correction Factor =	0.33
Date =	6/25/2026
Tested By =	SXT

Constants	Area (cm^2)	Depth to Liquid (cm)	Conversion 1 Div = # (cc)
Inner Ring	81	15.24	5.352
Annular Space	101	15.24	16.753

Test No. (feet)	Time (hr:min)	Elapsed Time (hr)	Flow Readings				Liquid Temp. (°F)	Incremental Infiltration Rate		Adjusted Infiltration Rate Inner (in/hr)
			Inner Reading		Annular Space			Inner (in/hr)	Annular (in/hr)	
			Reading (cm)	Flow (cm^3)	Reading (cm)	Flow (cm^3)				
IT-1 (2') Brown, moist, lean CLAY	9:10 AM	0.25	42.20	123.10	40.40	335.06	64.00	2.39	5.21	0.79
	9:25 AM		39.90		38.40		65.00			
	9:25 AM	0.25	39.90	21.41	38.40	318.31	65.00	0.42	4.95	0.14
	9:40 AM		39.50		36.50		69.00			
	9:40 AM	0.25	39.50	21.41	36.50	150.78	69.00	0.42	2.34	0.14
	9:55 AM		39.10		35.60		"			
	9:55 AM	0.25	39.10	21.41	35.60	167.53	69.00	0.42	2.60	0.14
	10:10 AM		38.70		34.60		70.00			
	10:10 AM	0.5	38.70	32.11	34.60	284.80	70.00	0.31	2.21	0.10
	10:40 AM		38.10		32.90		67.00			
	10:40 AM	0.5	38.10	32.11	32.90	184.28	67.00	0.31	1.43	0.10
	11:10 AM		37.50		31.80		71.00			

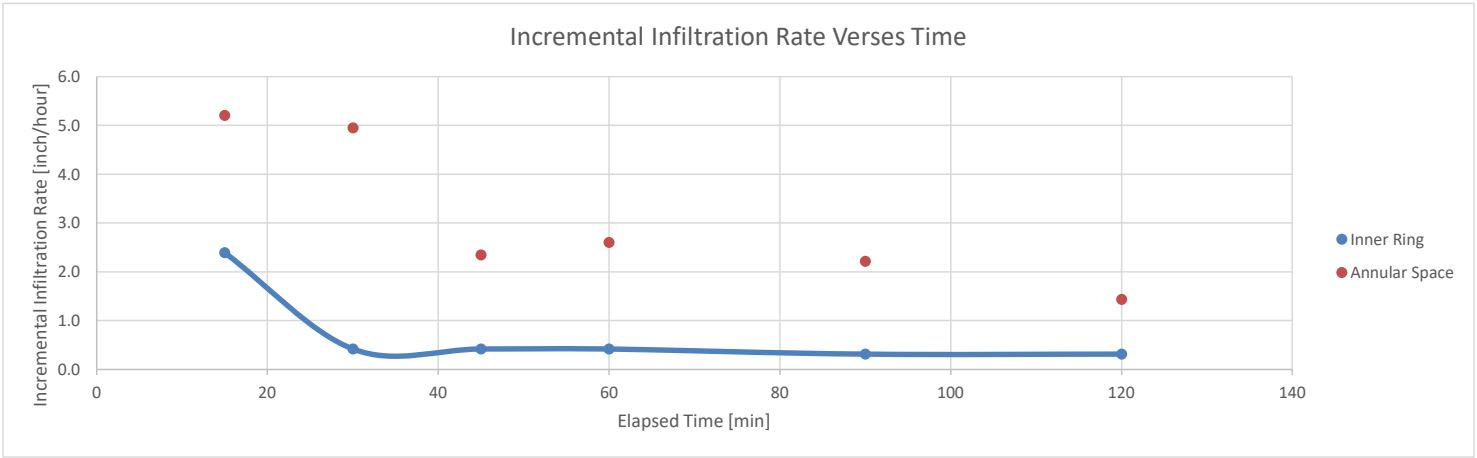


FIGURE C-1

INFILTRATION TEST RESULTS

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SANFRANCISCO, CALIFORNIA

SOCOTEC

Project =	SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
Project No. =	404741002
Test Location =	IT-2
Liquid Use and pH =	Tap Water (~7)
Liquid level maintained using =	Marriotte Tubes
Penetration of Rings (in) =	Inner: 3 3/4 Outer: 4
Historic Depth to Water Table =	
Description of Surface =	Gravel
Weather Conditions (°F) =	72
Correction Factor =	0.33
Date =	6/25/2026
Tested By =	SXT

Constants	Area (cm^2)	Depth to Liquid (cm)	Conversion 1 Div = # (cc)
Inner Ring	81	15.24	5.352
Annular Space	101	15.24	16.753

Test No. (feet)	Time (hr:min)	Elapsed Time (hr)	Flow Readings				Liquid Temp. (°F)	Incremental Infiltration Rate		Adjusted Infiltration Rate Inner (in/hr)
			Inner Reading		Annular Space			Inner (in/hr)	Annular (in/hr)	
			Reading (cm)	Flow (cm^3)	Reading (cm)	Flow (cm^3)				
IT-2 (2') Gray, moist, lean CLAY; few gravel	11:30 AM	0.25	34.70	26.76	30.90	234.54	72.00	0.52	3.65	0.17
	11:45 AM		34.20		29.50		73.00			
	11:45 AM	0.25	34.20	10.70	29.50	67.01	73.00	0.21	1.04	0.07
	12:00 PM		34.00		29.10		75.00			
	12:00 PM	0.25	34.00	16.06	29.10	33.51	75.00	0.31	0.52	0.10
	12:15 PM		33.70		28.90		74.00			
	12:15 PM	0.25	33.70	10.70	28.90	33.51	74.00	0.21	0.52	0.07
	12:30 PM		33.50		28.70		75.00			
	12:30 PM	0.5	33.50	10.70	28.70	33.51	75.00	0.10	0.26	0.03
	1:00 PM		33.30		28.50		76.00			
	1:00 PM	0.5	33.30	10.70	28.50	33.51	76.00	0.10	0.26	0.03
	1:30 PM		33.10		28.30		80.00			

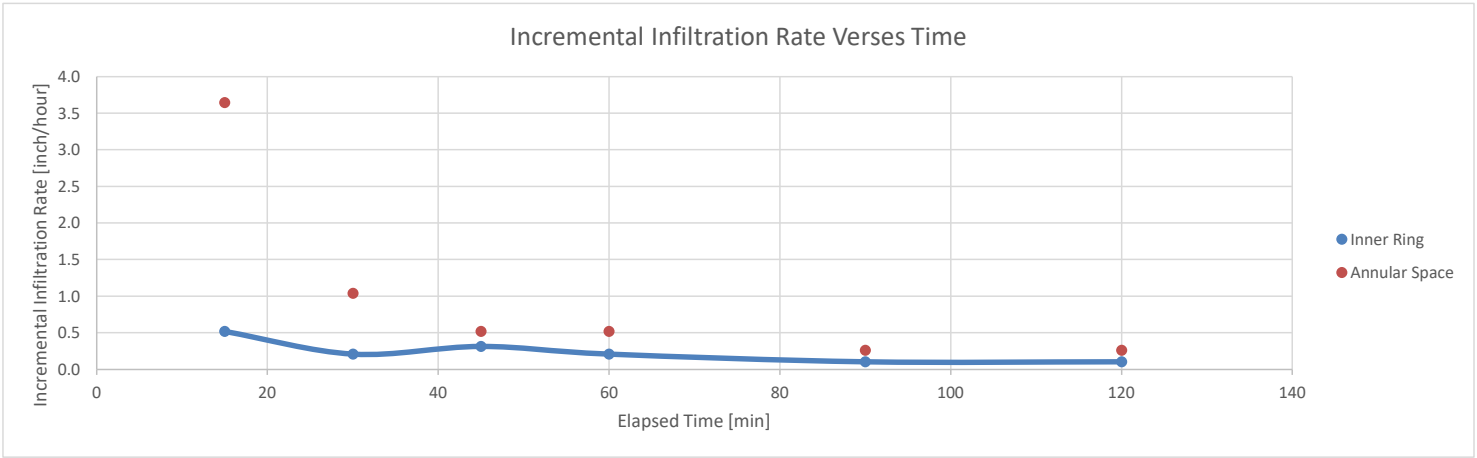


FIGURE C-2

INFILTRATION TEST RESULTS

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SANFRANCISCO, CALIFORNIA

SOCOTEC

Project =	SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
Project No. =	404741002
Test Location =	IT-3
Liquid Use and pH =	Tap Water (~7)
Liquid level maintained using =	Marriotte Tubes
Penetration of Rings (in) =	Inner: 3 3/4 Outer: 4
Historic Depth to Water Table =	
Description of Surface =	Soil
Weather Conditions (°F) =	68
Correction Factor =	0.33
Date =	6/24/2026
Tested By =	SXT

Constants	Area (cm^2)	Depth to Liquid (cm)	Conversion 1 Div = # (cc)
Inner Ring	81	15.24	5.352
Annular Space	101	15.24	16.753

Test No. (feet)	Time (hr:min)	Elapsed Time (hr)	Flow Readings				Liquid Temp. (°F)	Incremental Infiltration Rate		Adjusted Infiltration Rate Inner (in/hr)
			Inner Reading		Annular Space			Inner (in/hr)	Annular (in/hr)	
			Reading (cm)	Flow (cm^3)	Reading (cm)	Flow (cm^3)				
IT-3 (2') Dark brown, moist, lean CLAY	11:40 AM	0.25	48.00	48.17	42.50	50.26	68.00	0.94	0.78	0.31
	11:55 AM		47.10		42.20		67.00			
	11:55 AM	0.25	47.10	16.06	42.20	50.26	67.00	0.31	0.78	0.10
	12:10 PM		46.80		41.90		66.00			
	12:10 PM	0.25	46.80	5.35	41.90	16.75	66.00	0.10	0.26	0.03
	12:25 PM		46.70		41.80		70.00			
	12:25 PM	0.25	46.70	5.35	41.80	16.75	70.00	0.10	0.26	0.03
	12:40 PM		46.60		41.70		75.00			
	12:40 PM	0.5	46.60	5.35	41.70	16.75	75.00	0.05	0.13	0.02
	1:10 PM		46.50		41.60		73.00			
	1:10 PM	0.5	46.50	5.35	41.60	16.75	73.00	0.05	0.13	0.02
	1:40 PM		46.40		41.50		75.00			

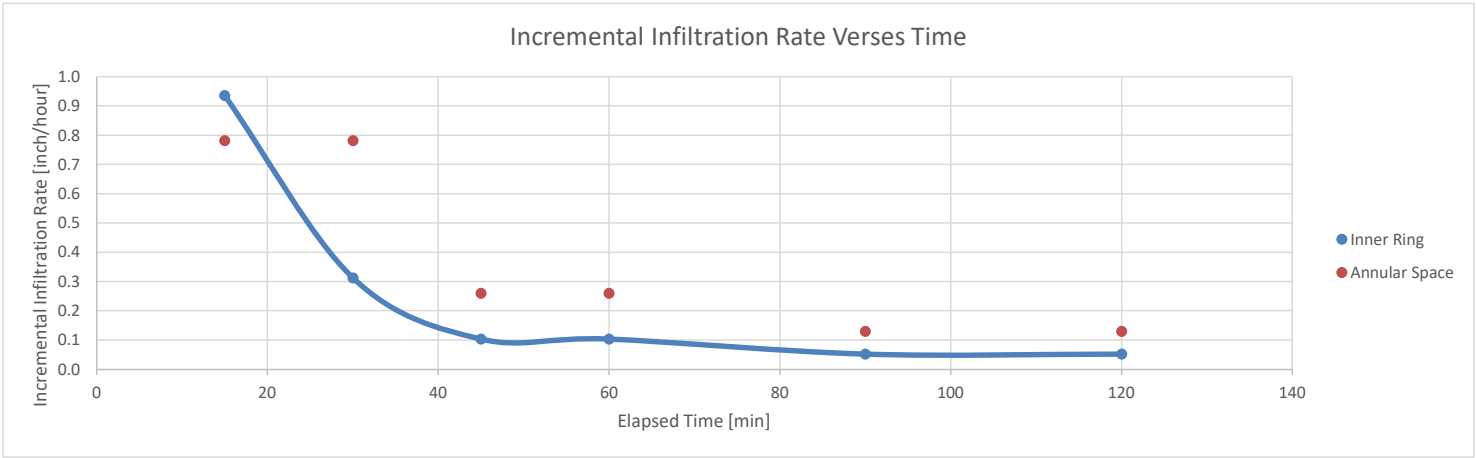


FIGURE C-3

INFILTRATION TEST RESULTS

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SANFRANCISCO, CALIFORNIA

SOCOTEC

Project =	SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
Project No. =	404741002
Test Location =	IT-4
Liquid Use and pH =	Tap Water (~7)
Liquid level maintained using =	Marriotte Tubes
Penetration of Rings (in) =	Inner: 3 3/4 Outer: 4
Historic Depth to Water Table =	
Description of Surface =	Asphalt concrete
Weather Conditions (°F) =	59
Correction Factor =	0.33
Date =	6/25/2026
Tested By =	SXT

Constants	Area (cm^2)	Depth to Liquid (cm)	Conversion 1 Div = # (cc)
Inner Ring	81	15.24	5.352
Annular Space	101	15.24	16.753

Test No. (feet)	Time (hr:min)	Elapsed Time (hr)	Flow Readings				Liquid Temp. (°F)	Incremental Infiltration Rate		Adjusted Infiltration Rate Inner (in/hr)
			Inner Reading		Annular Space			Inner (in/hr)	Annular (in/hr)	
			Reading (cm)	Flow (cm^3)	Reading (cm)	Flow (cm^3)				
IT-4 (2') Brown, moist, lean CLAY with few sand	9:05 AM	0.25	51.50	26.76	44.60	50.26	59.00	0.52	0.78	0.17
	9:20 AM		51.00		44.30		71.00			
	9:20 AM	0.25	51.00	5.35	44.30	16.75	71.00	0.10	0.26	0.03
	9:35 AM		50.90		44.20		70.00			
	9:35 AM	0.25	50.90	5.35	44.20	16.75	70.00	0.10	0.26	0.03
	9:50 AM		50.80		44.10		72.00			
	9:50 AM	0.25	50.80	5.35	44.10	33.51	72.00	0.10	0.52	0.03
	10:05 AM		50.70		43.90		"			
	10:05 AM	0.5	50.70	16.06	43.90	50.26	72.00	0.16	0.39	0.05
	10:35 AM		50.40		43.60		76.00			
	10:35 AM	0.5	50.40	10.70	43.60	33.51	76.00	0.10	0.26	0.03
	11:05 AM		50.20		43.40		73.00			

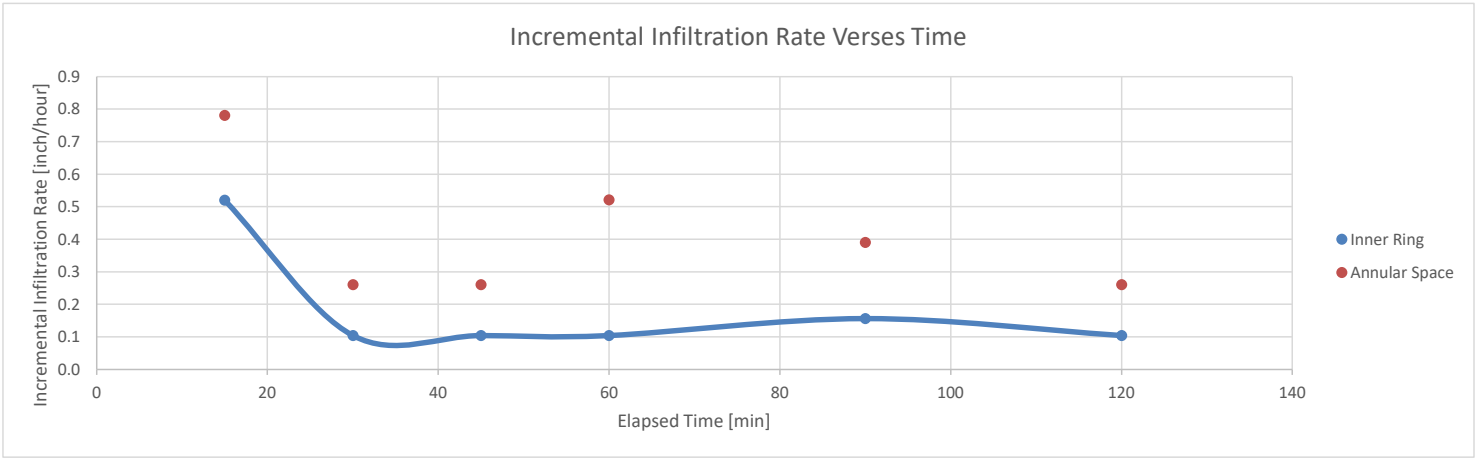


FIGURE C-4

INFILTRATION TEST RESULTS

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET, SOUTH SANFRANCISCO, CALIFORNIA

SOCOTEC

APPENDIX D
LABORATORY TESTING

APPENDIX D

LABORATORY TESTING

Classification
Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D2488. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

In-Place Moisture And Density Tests
The moisture content and dry density of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with ASTM D2216 and D7263 (Method B). The test results are presented on the logs of the exploratory borings in Appendix A.

No. 200 Analysis
Evaluations of the percentage of particles finer than the No. 200 sieve in selected soil samples were performed in general accordance with ASTM D 1140. The results of the tests are presented on Figure D-1.

Atterberg Limits
Evaluations of the percentage of particles finer than the No. 200 sieve in selected soil samples were performed in general accordance with ASTM D 1140. The results of the tests are presented on Figure D-2.

Unconfined Compression
unconfined compression tests were performed on a relatively undisturbed samples in general accordance with ASTM D 2166. The test results are shown on Figure D-3.

Unconsolidated-Undrained Triaxial Compression
Triaxial compression tests were performed on selected relatively undisturbed samples in general accordance with ASTM D 2850. The test results are shown on Figure D-4.

SAMPLE LOCATION	SAMPLE DEPTH (feet)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	USCS (TOTAL SAMPLE)
B-1	15.0-16.5	Silty SAND	98	42	SM
B-2	11.0-11.5	Silty SAND	99	40	SM
B-3	6.0-6.5	Silty SAND	100	41	SM
B-3	11.0-11.5	Silty SAND	97	38	SM
B-4	15.0-16.0	Sandy SILT	99	51	ML
B-8	16.5-18.0	Silty SAND	99	44	SM

PERFORMED IN ACCORDANCE WITH ASTM D1140

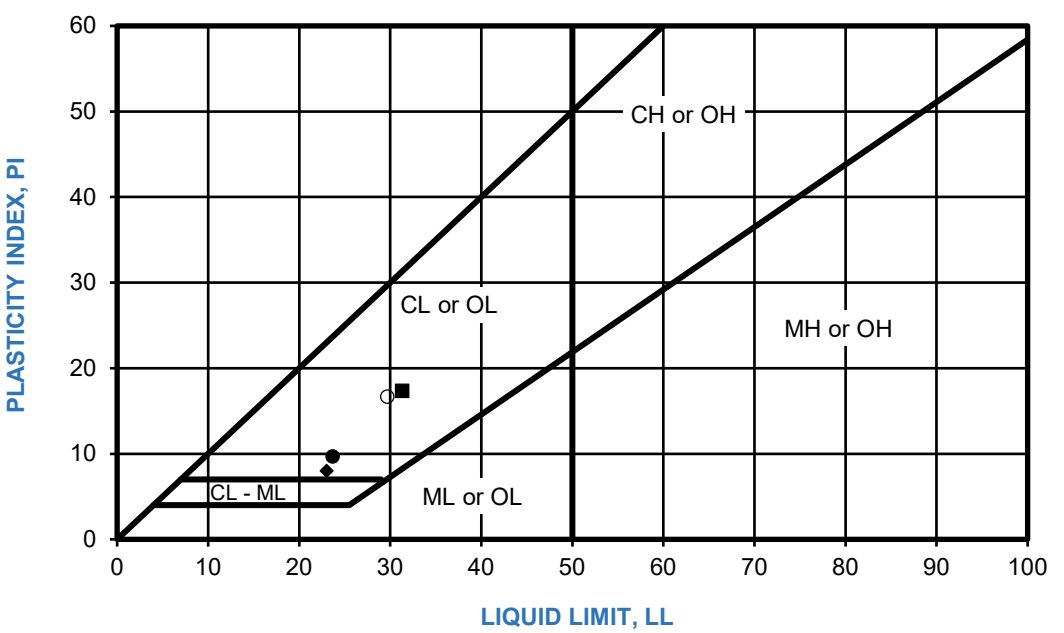
FIGURE D-1

NO. 200 SIEVE ANALYSIS TEST RESULTS

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA
404741002 | 08/26

SOCOTEC

SYMBOL	LOCATION	DEPTH (feet)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX (PI)	USCS CLASSIFICATON (PERCENT FINER THAN NO. 40 SIEVE)	USCS (SAMPLE)
●	B-1	0.75-5.0	24	14	10	CL	CL
■	B-3	3.0-3.5	31	14	17	CL	CL
◆	B-5	0.5-5.0	23	15	8	CL	CL
○	B-7	1.1-5.5	30	13	17	CL	CL



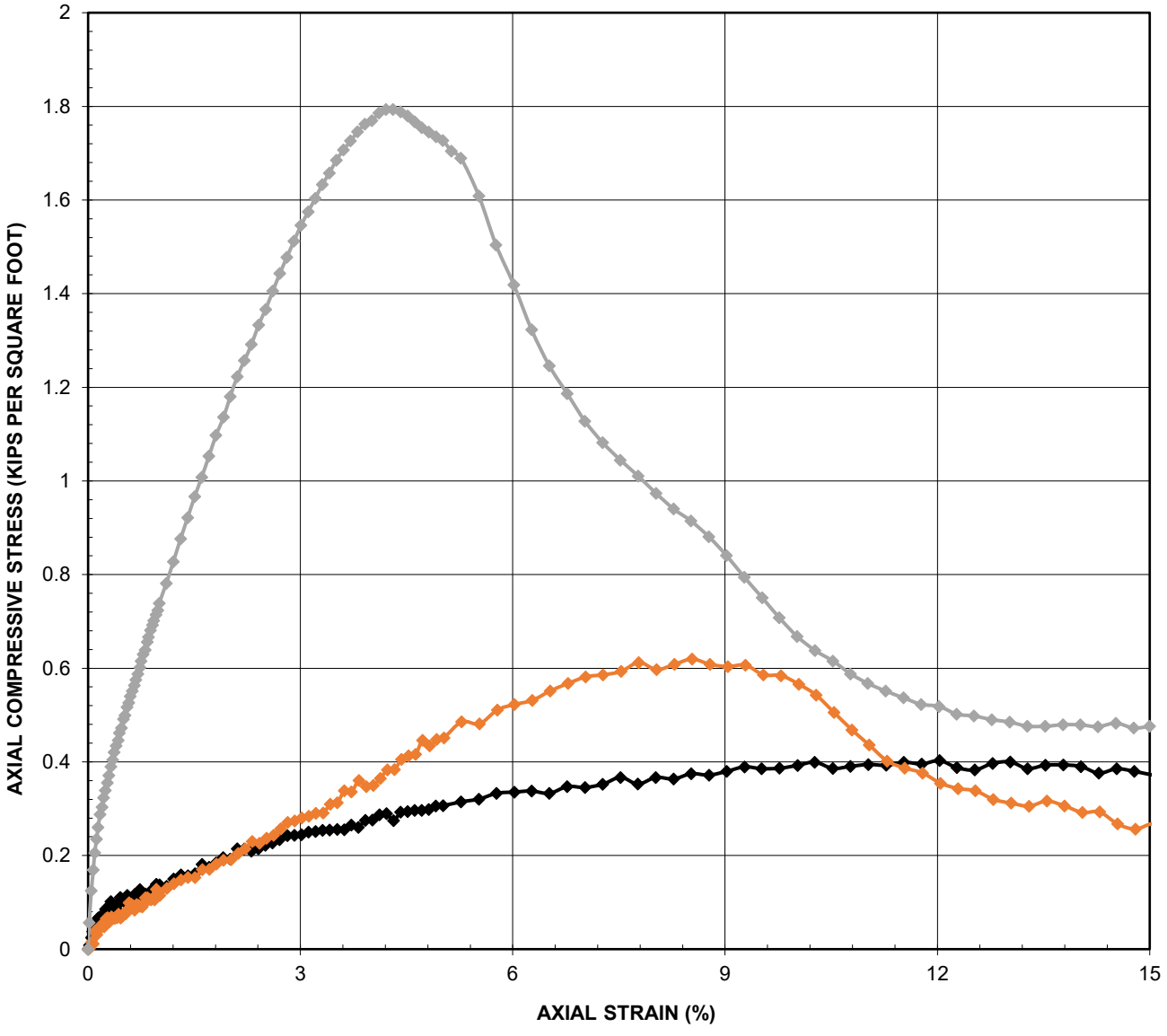
PERFORMED IN ACCORDANCE WITH ASTM D4138

FIGURE D-2

ATTERBERG LIMITS TEST RESULTS

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA
404741002 | 08/26

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SYMBOL	DESCRIPTION	SOIL TYPE	SAMPLE LOCATION	SAMPLE DEPTH (feet)	MOISTURE CONTENT *w* (percent)	DRY DENSITY γ_d (pcf)	STRAIN RATE (%/min)	UNDRAINED SHEAR STR s_u (ksf)
◆	Sandy lean CLAY	CL	B-4	3.5-4.0	20.0	105.6	1.00	0.20
◆	Sandy lean CLAY	CL	B-5	6.0-6.5	20.0	105.0	1.00	0.31
◆	Sandy lean CLAY	CL	B-6	6.0-6.5	16.1	112.8	1.00	0.90

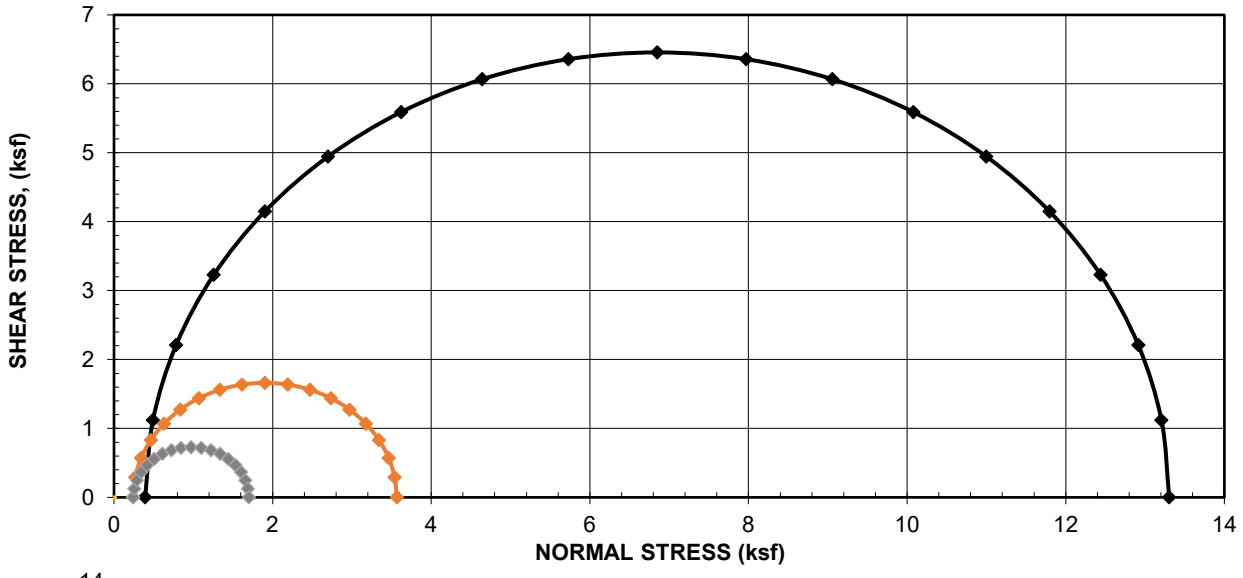
PERFORMED IN ACCORDANCE WITH ASTM D2166

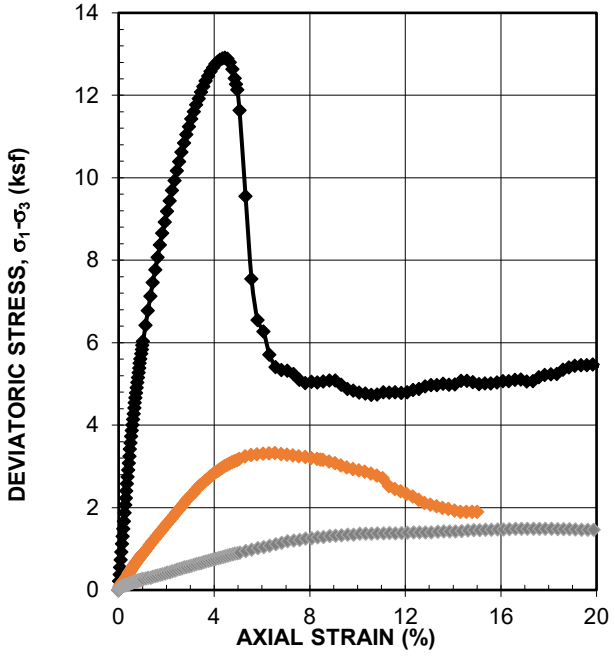
FIGURE D-3

UNCONFINED COMPRESSION RESULTS

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT
400 B STREET
SOUTH SAN FRANCISCO, CALIFORNIA
404741002 | 08/26

SOCOTEC





SYMBOL		◆	◆	◆	
SAMPLE LENGTH, (inches)		6.00	5.10	5.90	
SAMPLE DIAMETER, (inches)		2.40	0.00	2.41	
SPECIFIC GRAVITY, ( )		2.65	2.65	2.65	
INITIAL	MOISTURE, (percent)	14.7	17.0	19.3	
	DRY DENSITY, (pcf)	116.6	114.5	104.9	
	VOID RATION, ( )	0.418	0.444	0.576	
	SATURATION, (percent)	93.2	101.4	88.7	
CELL PRESSURE, (ksf)		0.4	0.2	0.2	
BACK PRESSURE, (ksf)		0.0	0.0	0.0	
STRAIN RATE, (%/min)		1.0	1.0	1.0	
AT FAILURE	ELAPSED TIME, t_f (minutes)	4.5	6.6	14.9	
	AXIAL STRAIN, ε_f (%)	4.5	6.5	14.9	
	DEVIATOR STRESS, (ksf)	12.91	3.32	1.46	
	MAJOR STRESS, σ_{1f} (ksf)	13.30	3.57	1.70	
	MINOR STRESS, σ_{3f} (ksf)	0.39	0.24	0.24	
MEMBRANE CORRECTION USED		NO	NO	YES	

SYMBOL	DESCRIPTION (USCS SOIL TYPE)	SAMPLE LOCATION	SAMPLE DEPTH (feet)	COMPRESSIVE STRENGTH (ksf)	UU SHEAR STRENGTH s_u (ksf)	REMARKS
◆	Sandy lean CLAY (CL)	B-2	6.0-6.5	12.91	6.46	
◆	Sandy lean CLAY (CL)	B-3	3.5-4.0	3.32	1.66	
◆	Sandy lean CLAY (CL)	B-7	3.5-4.0	1.46	0.73	

PERFORMED IN ACCORDANCE WITH ASTM D2850 ON INTACT SPECIMENS

MOISTURE CONTENT AND DENSITY EVALUATED BY ASTM D2216 & ASTM D7263, SPECIFIC GRAVITY ASSUMED

FIGURE D-4

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION RESULTS

SOUTH SAN FRANCISCO HIGH SCHOOL CAMPUS-WIDE MODERNIZATION PROJECT

400 B STREET

SOUTH SAN FRANCISCO, CALIFORNIA

404741002 | 08/26

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APPENDIX E

CORROSIVITY TESTING
(CERCO ANALYTICAL)

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

14 July, 2026

Job No. 2607027
Cust. No.13270

Mr. Kenneth Celino
Ninyo & Moore
2149 O'Toole Avenue, Suite 30
San Jose, CA 95131

Subject: Project No.: 404741002
Project Name: SSFHS Campus Wide Modernization, 400 B Street, South San Francisco, CA
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Celino:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on July 7, 2026. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Sample No. 001 is classified as "corrosive" and Sample No. 002 is classified as "moderately corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations reflect none detected with a reporting limit of 15 mg/kg.

The sulfate ion concentrations are 25 mg/kg and 49 mg/kg and are determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The pH of the soil are 8.30 and 8.05, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

for

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: Ninyo & Moore
Client's Project No.: 404741002
Client's Project Name: SSFHS Campus Wide Modernization, 400 B Street, South San Francisco, CA
Date Sampled: 24-Jun-26 & 25-Jun-26
Date Received: 7-Jul-26
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 14-Jul-2026

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2607027-001	B-2 @ 0.75-5.0'	-	8.30	-	1,600	-	N.D.	25
2607027-002	B-6 @ 1.1-5.0'	-	8.05	-	2,100	-	N.D.	49

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G187	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	-	9-Jul-2026	-	9-Jul-2026	-	9-Jul-2026	9-Jul-2026

* Results Reported on "As Received" Basis

N.D. - None Detected (< 15 mg/kg)

Julia Clauson
Chemist

Quality Control Summary - **All laboratory quality control parameters were found to be within established limits**

APPENDIX F

PREVIOUS BORING LOGS & LAB TESTING
(GEOSPHERE CONSULTANTS, 2012)

APPENDIX A

Boring Logs

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

2001 Crow Canyon Road Suite 100
San Ramon, CA 94583-5387
Telephone: 925 314-7100
Fax: 925 855-7140

BORING NUMBER B-1

CLIENT South San Francisco Unified School District
PROJECT NAME South San Francisco High School
PROJECT NUMBER 91-02789-PW
PROJECT LOCATION 400 B Street, South San Francisco, CA 94080
DATE STARTED 1/5/12 **COMPLETED** 1/5/12
GROUND ELEVATION 51 ft **HOLE SIZE** 8"
DRILLING CONTRACTOR Exploration Geoservices Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 8"
AT TIME OF DRILLING ---
LOGGED BY RS **CHECKED BY**
AT END OF DRILLING 35.00 ft / Elev 16.00 ft Groundwater encountered
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**GRASS/TOP SOIL:** wet										
		(ML) **SANDY SILT:** Yellowish brown, very moist, and medium dense	MC 1-1		5-8-10 (18)		117	14				
5			MC 1-2		7-10-14 (24)		113	17	NP	NP	NP	54
		becomes moist and dense	MC 1-3		8-14-23 (37)		104	14				
15			SPT 1-4		13-14-31 (45)							
20		(SP) **POORLY GRADED SAND:** Gray brown, dry, very dense, and w/ traces of gravels 50 blows for 5"	SPT 1-5		50							
25		(SM) **SILTY SAND:** Gray brown and moist										
30		(SM) **SILTY SAND:** Light gray brown, wet, and very dense 50 blows for 5.5"	SPT 1-6		26-50							

(Continued Next Page)

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Fax: 925 855-7140

BORING NUMBER B-1

CLIENT South San Francisco Unified School District **PROJECT NAME** South San Francisco High School

PROJECT NUMBER 91-02789-PW **PROJECT LOCATION** 400 B Street, South San Francisco, CA 94080

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
30		(SM) **SILTY SAND:** Light gray brown, wet, and very dense 50 blows for 5.5" *(continued)*										
35		▼										
40		(SP-SM) **POORLY GRADED SAND W/SILT:** Light gray brown, wet, and very dense	SPT 1-7		17-24-30 (54)							
45												
50		(SM) **SILTY SAND:** Grayish brown, very moist, and very dense	SPT 1-8		17-24-35 (59)							

Bottom of borehole at 50.0 feet.

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BORING NUMBER B-2

CLIENT South San Francisco Unified School District
PROJECT NAME South San Francisco High School
PROJECT NUMBER 91-02789-PW
PROJECT LOCATION 400 B Street, South San Francisco, CA 94080
DATE STARTED 1/6/12 **COMPLETED** 1/6/12
GROUND ELEVATION 55 ft **HOLE SIZE** 8"
DRILLING CONTRACTOR Exploration Geoservices Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 8"
AT TIME OF DRILLING ---
LOGGED BY RS **CHECKED BY**
AT END OF DRILLING --- No Groundwater
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**3" ASPHALT** **4" AGGREGATE BASE** (SC) **CLAYEY SAND:** Olive brown, moist, and dense	MC 2-1		14-21-29 (50)							
5		(SM) **SILTY SAND:** Olive brown, moist, and medium dense	MC 2-2		8-5-7 (12)		105	19				
10		(SM) **SILTY SAND:** Brown-gray mottled, moist, very dense, and w/ iron stains	MC 2-3		18-30-38 (68)							
15		becomes yellowish brown	MC 2.4		14-33-44 (77)							
20												
25		becomes very moist to wet and w/ traces of clay	SPT 2-5		17-31-42 (73)							

Bottom of borehole at 25.0 feet.

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Fax: 925 855-7140

BORING NUMBER B-3

CLIENT South San Francisco Unified School District
PROJECT NAME South San Francisco High School
PROJECT NUMBER 91-02789-PW
PROJECT LOCATION 400 B Street, South San Francisco, CA 94080
DATE STARTED 1/5/12 **COMPLETED** 1/5/12
GROUND ELEVATION 55 ft **HOLE SIZE** 8"
DRILLING CONTRACTOR Exploration Geoservices Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 8"
AT TIME OF DRILLING ---
LOGGED BY RS **CHECKED BY**
AT END OF DRILLING --- No Groundwater
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**GRASS/TOP SOIL:** Dark/ olive gray										
		(SM) **SILTY SAND:** Yellowish brown, moist, very dense, and w/ clay 70 blows for 6"	MC 3-1		11-20-46 (66)							
5		becomes grayish brown and damp 70 blows for 3"	MC 3-2		14-36-46 (82)							
10		(SM) **SILTY SAND:** Yellowish brown, damp, dense, and w/ iron stains	MC 3-3		11-14-21 (35)		118	14				
15		becomes very dense and fine grain 50 blows for 6"	SPT 3-4		26-50							
20												
25		becomes moist, dense, and w/ iron stains	SPT 3-5		13-18-31 (49)							

Bottom of borehole at 25.0 feet.

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Fax: 925 855-7140

BORING NUMBER B-4

CLIENT South San Francisco Unified School District
PROJECT NAME South San Francisco High School
PROJECT NUMBER 91-02789-PW
PROJECT LOCATION 400 B Street, South San Francisco, CA 94080
DATE STARTED 1/5/12 **COMPLETED** 1/5/12
GROUND ELEVATION 55 ft **HOLE SIZE** 8"
DRILLING CONTRACTOR Exploration Geoservices Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 8"
AT TIME OF DRILLING ---
LOGGED BY RS **CHECKED BY**
AT END OF DRILLING --- No Groundwater
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**GRASS TOPSOIL:** moist										
		(SM) **SILTY SAND:** Olive-gray, brown mottled, moist, and medium dense	MC 4-1		8-10-12 (22)		113	12				
5		(SM) **SILTY SAND:** Dark gray, very moist, and medium dense	MC 4-2		5-6-8 (14)							
10		(SM) **SILTY SAND:** Light gray, very moist to wet, and medium dense	MC 4-3		3-4-9 (13)		110	18				
15		becomes grayish brown, moist, and very dense 70 blows for 6"	MC 4-4		17-37-46 (83)							
20		(SM) **SILTY FINE SAND:** Yellowish brown, moist, and dense	SPT 4-5		15-19-21 (40)							

Bottom of borehole at 22.0 feet.

APPENDIX B

LABORATORY TEST RESULTS

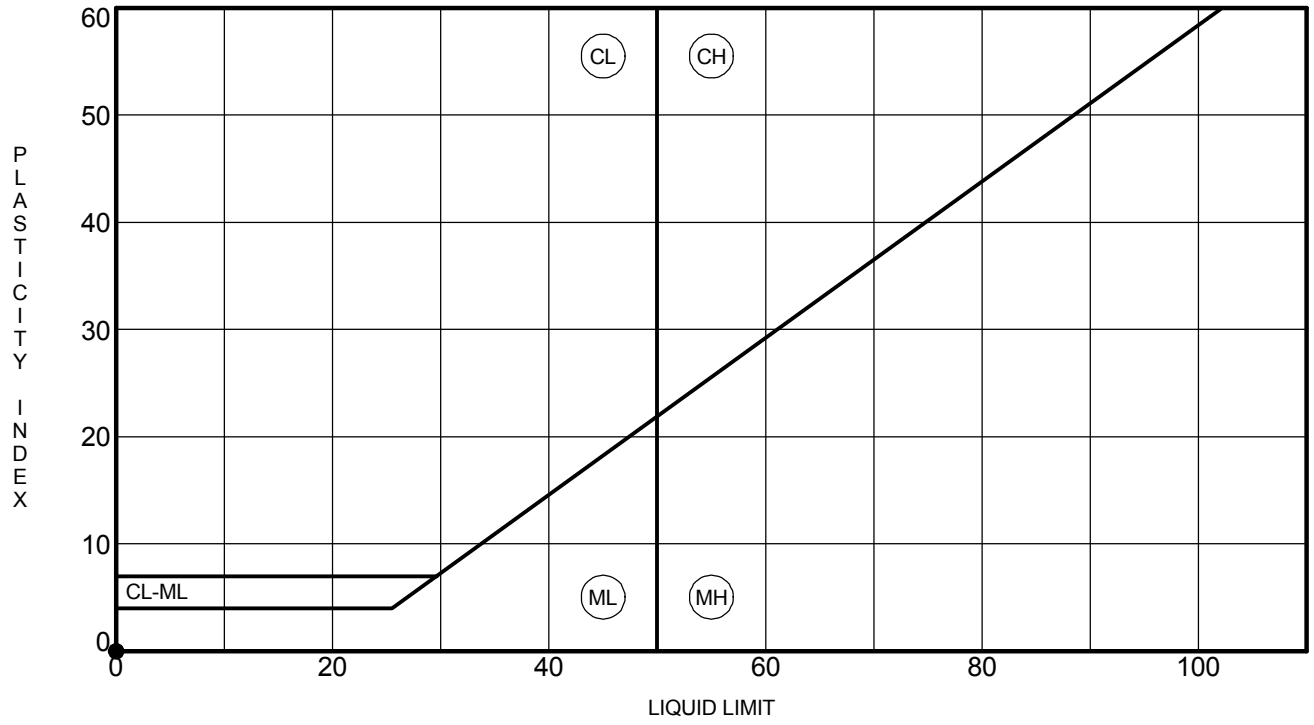
Atterberg Limits
Sieve Analysis
Direct Shear
Corrosion
Summary Laboratory Results

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ATTERBERG LIMITS' RESULTS

CLIENT South San Francisco Unified School District
PROJECT NAME South San Francisco High School
PROJECT NUMBER 91-02789-PW
PROJECT LOCATION 400 B Street, South San Francisco, CA 94080



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**B-1**	**4.5**	**NP**	**NP**	**NP**	**54**	**SANDY SILT(ML)**

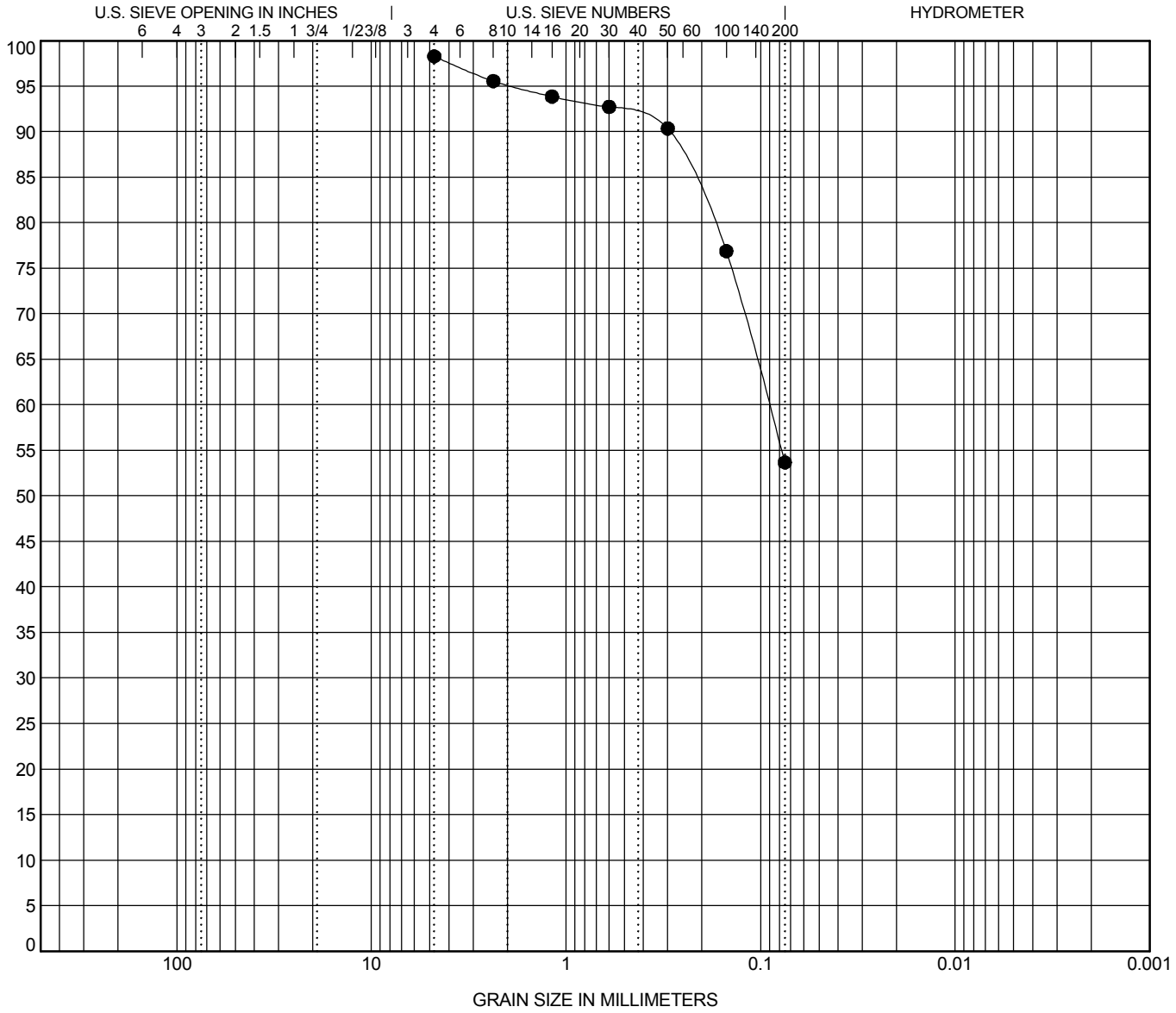
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GRAIN SIZE DISTRIBUTION

CLIENT South San Francisco Unified School District **PROJECT NAME** South San Francisco High School

PROJECT NUMBER 91-02789-PW **PROJECT LOCATION** 400 B Street, South San Francisco, CA 94080

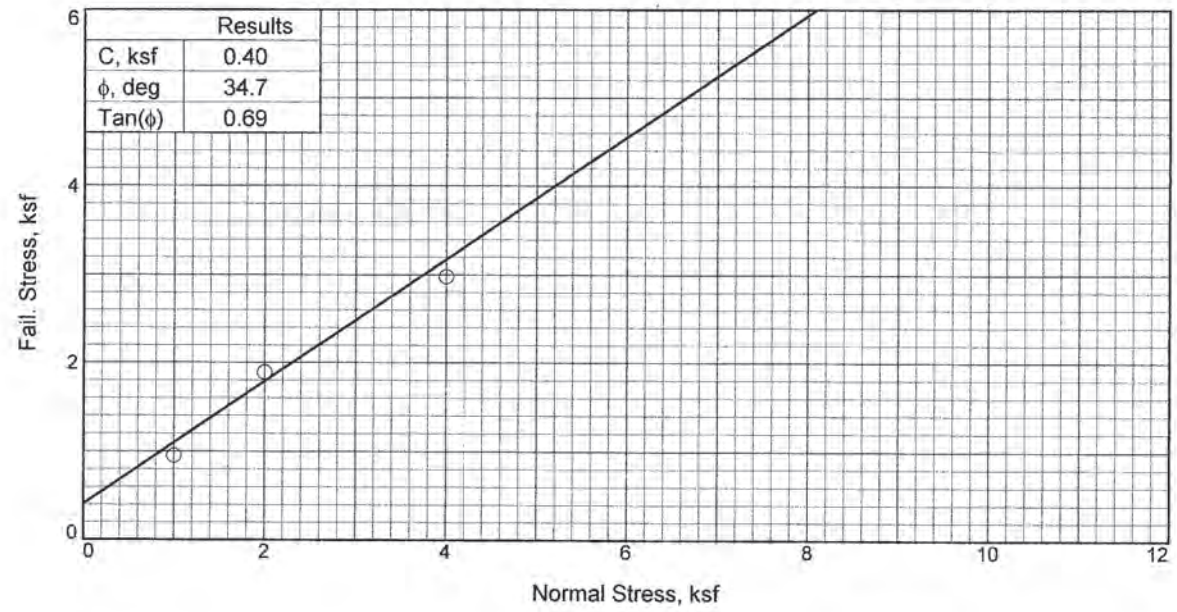


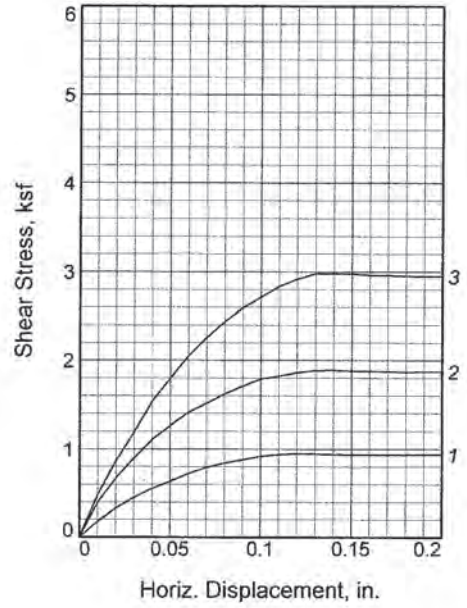
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**B-1**	**4.5**	**SANDY SILT(ML)**	**NP**	**NP**	**NP**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-1**	**4.5**	**4.75**	**0.091**				**44.6**	**53.7**	

GRAIN SIZE - CONSOLIDATED.GDT - 1/26/12 11:33 - R:\GEOTECH PROJECTS BY NUMBER\2700-2799\91-02789-PW SOUTH SAN FRANCISCO HS\SOUTH SAN FRANCISCO HIGH SCHOOL.GPJ





Sample No.		1	2	3
Initial	Water Content, %	15.8	15.8	15.8
	Dry Density, pcf	114.9	114.6	115.6
	Saturation, %	91.4	90.9	93.4
	Void Ratio	0.4675	0.4702	0.4575
	Diameter, in.	2.416	2.416	2.416
	Height, in.	1.000	1.000	1.000
At Test	Water Content, %	15.4	15.5	15.0
	Dry Density, pcf	115.0	114.8	115.8
	Saturation, %	89.4	89.5	88.7
	Void Ratio	0.4662	0.4685	0.4553
	Diameter, in.	2.416	2.416	2.416
	Height, in.	0.999	0.999	0.999
Normal Stress, ksf		1.00	2.00	4.00
Fail. Stress, ksf		0.95	1.89	2.98
Displacement, in.		0.120	0.140	0.140
Ult. Stress, ksf				
Displacement, in.				
Strain rate, in./min.		0.020	0.020	0.020

Sample Type: Mod.Cal.
Description: Very dense dark gray clayey SAND(SC)

Assumed Specific Gravity= 2.70
Remarks:

Figure _____

Client: Geosphere Consultants,Inc.

Project: S.San Francisco High

Location: B-3
Depth: 4.5'
Proj. No.: 91-02789-PW **Date Sampled:**

DIRECT SHEAR TEST REPORT

Soil Mechanics Lab

Tested By: MA

Corrosivity Test Summary

CTL # 724-006 **Date:** 1/30/2012 **Tested By:** PJ **Checked:** PJ

Client: Geosphere Consultants **Project:** South San Francisco High School **Proj. No:** 91-02789-PW

Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate-(water soluble)		pH	ORP	Sulfide	Moisture	Soil Visual Description
Boring	Sample, No.	Depth, ft.	As Rec.	Minimum	Saturated	mg/kg	mg/kg	%		(Redox)	Qualitative	%	
						Dry Wt.	Dry Wt.	Dry Wt.		mv	by Lead	At Test	
			ASTM G57	Cal 643	ASTM G57	Cal 422-mod.	Cal 417-mod.	Cal 417-mod.	ASTM G51	SM 2580B	Acetate Paper	ASTM D2216	
B-2	-	2-4	-	-	2,199	11	182	0.0182	4.4	418	Negative	15.8	Dark Brown Clayey SAND

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2001 Crow Canyon Road Suite 100
San Ramon, CA 94583-5387
Telephone: 925 314-7100
Fax: 925 855-7140

SUMMARY OF LABORATORY RESULTS

CLIENT South San Francisco Unified School District **PROJECT NAME** South San Francisco High School

PROJECT NUMBER 91-02789-PW **PROJECT LOCATION** 400 B Street, South San Francisco, CA 94080

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-1	2.0							14.3	117.2		
B-1	4.5	NP	NP	NP	4.75	54	ML	17.2	112.6		
B-1	9.5							13.9	104.5		
B-2	4.5							18.7	105.4		
B-3	9.5							14.4	117.5		
B-4	2.0							12.2	112.8		
B-4	9.5							18.3	109.9		

LAB SUMMARY - CONSOLIDATED.GDT - 1/26/12 11:34 - R:\GEOTECH PROJECTS BY NUMBER\2700-2799\91-02789-PW SOUTH SAN FRANCISCO HS\SOUTH SAN FRANCISCO HIGH SCHOOL.GPJ

