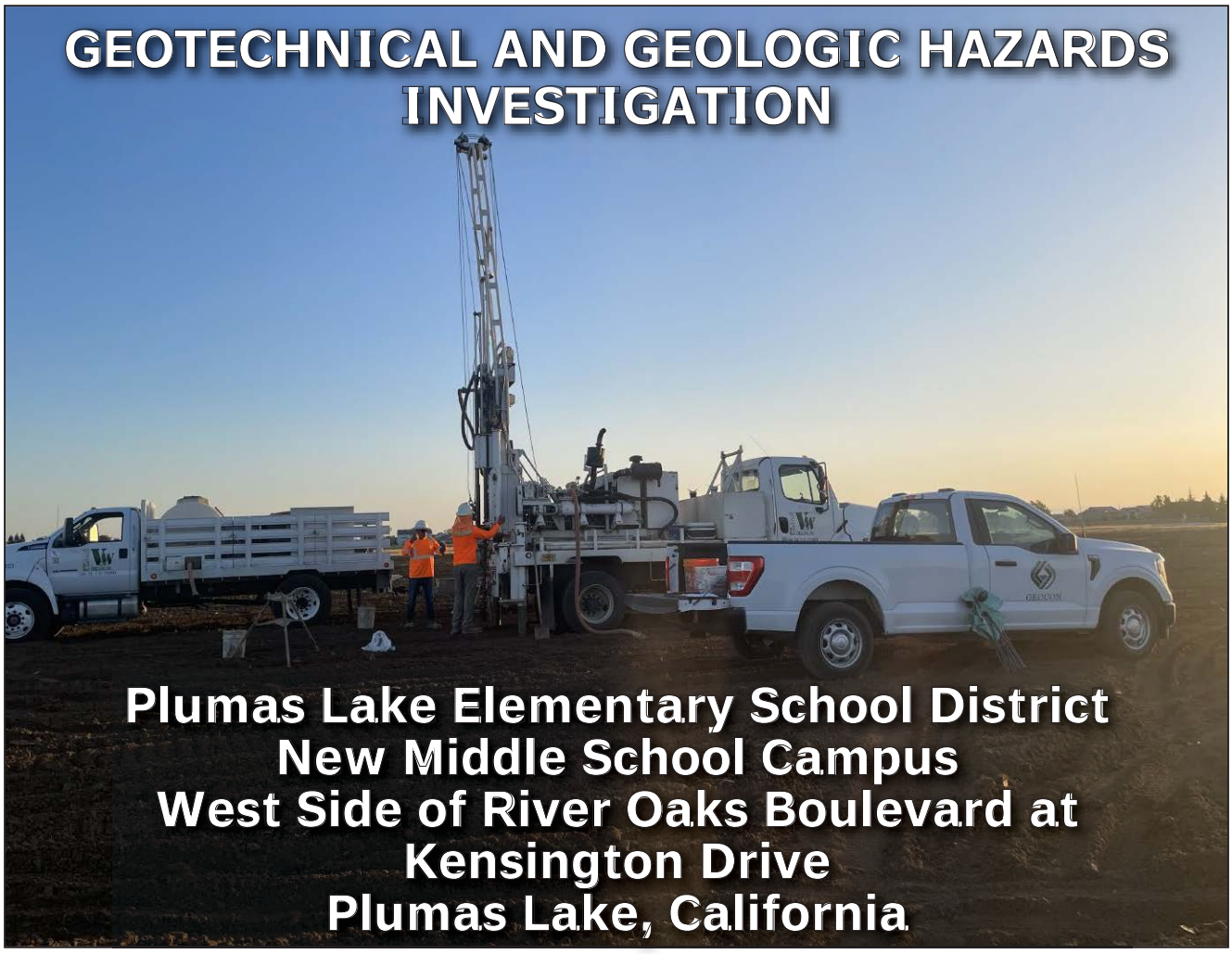
APPENDIX F: GEOTECHNICAL EVALUATION REPORT



GEOTECHNICAL AND GEOLOGIC HAZARDS INVESTIGATION



Plumas Lake Elementary School District
New Middle School Campus
West Side of River Oaks Boulevard at Kensington Drive
Plumas Lake, California

PREPARED FOR:

PLUMAS LAKE ELEMENTARY SCHOOL DISTRICT
2743 PLUMAS SCHOOL ROAD
PLUMAS LAKE, CALIFORNIA 95961

PREPARED BY:

GEOCON CONSULTANTS, INC.
2480 HILBORN ROAD, SUITE 240
FAIRFIELD, CALIFORNIA 94534

GEOCON PROJECT NO. E9425-04-01

AUGUST 2024

Project No. E9425-04-01
August 9, 2024

Plumas Lake Elementary School District
2743 Plumas School Road
Plumas Lake, California 95961

Attention: Mr. Jeff Roberts

Subject: PLUMAS LAKE ELEMENTARY SCHOOL DISTRICT
NEW MIDDLE SCHOOL CAMPUS
WEST SIDE OF RIVER OAKS BOULEVARD AT KENSINGTON DRIVE
PLUMAS LAKE, CALIFORNIA
GEOTECHNICAL AND GEOLOGIC HAZARDS INVESTIGATION

Dear Mr. Roberts:

In accordance with your authorization of our proposal dated April 16, 2024, we have performed a geotechnical and geologic hazards investigation to support the design and construction of a new middle school campus in Plumas Lake, California. Our investigation was performed to observe the soil and geologic conditions that may impact site development for the project as presently planned. The accompanying report presents the results of our investigation and conclusions and recommendations pertaining to the geotechnical and geologic aspects of the proposed project. The findings of this study indicate the site is suitable for development as planned provided the recommendations of this report are implemented during design and construction.

If you have any questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Sincerely,
GEOCON CONSULTANTS, INC.

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GEOTECHNICAL INVESTIGATION

1.0 PURPOSE AND SCOPE

This report presents the results of a geotechnical and geologic hazards investigation for a planned new Plumas Lake Elementary School District middle school campus in Plumas Lake, California (see Vicinity Map, Figure 1). The purpose of this investigation was to evaluate the subsurface soil and geologic conditions in the area of the planned development and provide conclusions and recommendations pertaining to the geotechnical and geologic aspects of project design and construction, based on the conditions encountered during our study.

The scope of this investigation included field exploration, laboratory testing, engineering analysis, and the preparation of this report. Our field exploration was performed between May 28 and May 31, 2024, and included 6 Cone Penetrometer Test (CPT) soundings to maximum depths of approximately 51 feet, drilling 22 exploratory borings to depths of approximately 51 ½ feet or less below existing grade, and performing borehole percolation testing in 2 additional shallow borings. The locations of the CPT soundings, soil borings, and percolation tests are depicted on the Site Plan, Figure 2. A detailed discussion of our field investigation, soil boring logs and CPT data profiles are presented in Appendix A.

Laboratory tests were performed on selected soil samples obtained during the investigation to evaluate pertinent geotechnical parameters. Appendix B presents the laboratory test results in tabular format and graphical format. Pertinent information from our seismic hazards analyses including site-specific response spectra and liquefaction analysis is presented in Appendix C.

The opinions expressed herein are based on analysis of the data obtained during the investigation and our experience with similar soil and geologic conditions. References reviewed to prepare this report are provided in the *List of References* section.

If project details vary significantly from those described herein, Geocon should be contacted to determine the necessity for review and possible revision of this report.

2.0 SITE CONDITIONS AND PROJECT DESCRIPTION

The project site is an approximately 25-acre parcel (Yuba County APN 016-350-021) situated west of River Oaks Boulevard in the census-designated place of Plumas Lake. The irregularly shaped parcel lies approximately 600 to 1000 feet west of River Oaks Boulevard between Kensington Drive and

Pembroke Drive. WGS84 site coordinates are N 39.0008°, W 121.5586°. Topographically, this site is relatively flat with ground surface elevations of approximately 40 to 45 feet mean sea level (MSL) based on topographic mapping by the United States Geological Survey (USGS) and other web-based information. The drainage swale immediately west of the project site has thalweg elevations of approximately 30 feet MSL and bank inclinations of approximately 4:1 (horizontal:vertical) or flatter in the site vicinity.

The project site is currently an agricultural field cultivated with seasonal row crops. Aside from irrigation and a gravel-surfaced access road at the western perimeter, the site is generally undeveloped with no noticeable improvements. Development in the site vicinity includes residential subdivisions comprising one- to two-story single-family homes across River Oaks Boulevard to the east and an unfinished residential subdivision to the north. Agricultural fields cultivated with row crops exist immediately south of the site, and in the area between the site and River Oaks Boulevard. An orchard lies opposite the drainage swale to the west. The Feather River flows generally north-south approximately one-third to one-half mile west of the site.

Based on the site layout exhibit provided, we understand the new middle school campus will include seven new classroom buildings with six to eight rooms each, a new gym, a new library and multi-purpose room building, and a new administrative building in a cluster in the northeastern portion of the project site. Additionally, five portable classroom buildings are planned in the northwestern portion of the site. The planned gym will have a footprint of approximately 10,000 square feet; all other buildings will be less than 10,000 square feet. An extension of Kensington Drive to the west of River Oaks Boulevard, a new bus drop-off loop, and new parking lots and drop-off areas will be constructed along the northern margin of the campus. The western portion of the site will receive new tennis/pickleball courts, basketball courts, a multi-sport field, and a track and football field. We understand the fields will have natural turf playing surfaces. Ancillary site improvements such as new underground utilities, storm water treatment bioswales, exterior flatwork, site lighting, and landscaping are anticipated throughout the site. Grading plans were not provided. Based on site topography, we have assumed grading will generally consist of cuts and fills of less than two feet to attain design subgrade throughout the site. Conceptual layout of the proposed facilities is depicted on the Site Plan, Figure 2.

We understand the gym, library and multi-purpose room, and administrative buildings will utilize steel roofs with concrete masonry unit bearing walls. Structural loading will be approximately 3,000 pounds per lineal foot for the library and multi-purpose room building and administrative building, and approximately 6,300 pounds per lineal foot for the gym. Structural loading information for the new classroom buildings was not provided. We have assumed the classroom buildings will utilize structural steel and light-gauge steel framing. Conventional continuous strip and spread column footings and slab-

on-grade will be used for foundation support. If project details differ from those described herein, we should be contacted to review the applicability of the conclusions and recommendations presented in this report.

3.0 SOIL AND GEOLOGIC CONDITIONS

We identified site soil conditions and geology through exploratory borings and review of published geologic literature (see *List of References*). Refer to the exploratory boring logs included in Appendix A for the vertical extents of the materials encountered at each exploratory boring location.

3.1 Regional and Local Geology

Plumas Lake is located within the Great Valley Geomorphic Province of California, more commonly known as the Central Valley. The valley is a broad lowland between the Sierra Nevada to the east and Coast Ranges to the west. The Central Valley has been filled by a sequence of deep alluvial deposition derived from weathering processes in the Sierra Nevada and Coast Ranges. The weathering and subsequent deposition within the valley has resulted in alluvium that can be thousands of feet in thickness. The site lies on the border of the Sacramento and Chico 30' by 60' quadrangles, and we were unable to obtain any geologic maps which encompass the entire site. The two geologic maps that were used to create our Geologic Map (Figure 4) exhibit slightly different geologic units from one another. However, based on available geologic mapping by the United States Geological Survey (USGS) and others, and the soils conditions encountered in our subsurface exploration, the site is underlain by Holocene- to Pleistocene-age alluvial deposits which are comprised of basin deposits, fan deposits, and Riverbank Formation materials. Soil deposits within these units are often discontinuous and of similar nature and are not readily differentiated in our soil borings. Therefore, we have grouped them together as Quaternary alluvium.

3.2 Quaternary Alluvium

Based on the conditions encountered in our soil borings, the alluvial deposits at the site generally extend from the ground surface to the maximum depth explored – approximately 51 ½ feet below existing grade. The soil appears to be primarily fine grained, consisting of silts and clays with discontinuous interbeds of silty sand. The alluvium generally comprises medium stiff to hard, lean to fat clays with variable amounts of sand and silt, stiff to hard silts with variable amounts of sand, clay, and gravel, very stiff to hard clayey silts to silty clays, and medium dense to very dense sands with variable amounts of silt. A geologic cross section is presented as Figure 5.

4.0 GROUNDWATER

Our shallow borings (maximum depth of 5 feet) did not encounter groundwater, but each of our deeper borings and all 6 CPTs encountered groundwater between depths of approximately 6 feet to 21 feet below existing grade. Our borings and CPTs were backfilled shortly after drilling. Therefore, measured depth to groundwater may not represent stabilized groundwater levels. Fluctuations of groundwater levels may occur due to variations in precipitation, temperature, and other factors. Depth to groundwater can also vary significantly due to localized pumping, irrigation practices, and seasonal fluctuations. Therefore, it is possible that groundwater may be higher or lower than the levels observed during our investigation. Groundwater elevation data from a well located approximately ¾-mile southeast of the site (State Well No. 13N04E08H002M) indicates a high groundwater level of approximately 3½ feet below grade for the available data (2012 to current).

5.0 GEOLOGIC HAZARDS

5.1 Surface Fault Rupture

The numerous faults in Northern California include active, potentially active, and inactive faults. The criteria for these major groups were developed by the California Geological Survey for the Alquist-Priolo Earthquake Fault Zone Program. By definition, an active fault is one that has had surface displacement within Holocene time (about the last 11,000 years). A potentially active fault has demonstrated surface displacement during Quaternary time (approximately the last 1.6 million years) but has had no known Holocene movement. Faults that have not moved in the last 1.6 million years are considered inactive.

Regional faults in proximity to the site are depicted on Figure 6. Based on our review of geologic maps and reports, the site is not within a currently established Alquist-Priolo (AP) Earthquake Fault Zone. No active or potentially active faults with the potential for surface fault rupture are known to pass directly beneath the site. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low.

The Plumas Lake area is generally characterized by relatively low seismic activity. Table 5.1 presents approximate distances to active faults in the site vicinity based on web-based mapping by the California Geological Survey (CGS). The fault distances and magnitudes tabulated below are intended only to generally characterize the seismic setting of the site and are not necessarily bases for the ground motion hazard analyses discussed in Section 5.3. Site latitude is 39.0008° N, site longitude is 121.5586° W.

TABLE 5.1
REGIONAL FAULT SUMMARY

Fault Name	Approximate Distance to Site (miles)	Maximum Earthquake Magnitude, M_w
Unnamed traces at Sutter Buttes	16 ¼	unpublished
Swain Ravine	18 ¼	unpublished
Paynes Peak	26	6.5
Maidu East	27	unpublished
Unnamed trace near Dunningan Hills Fault	27 ¼	unpublished
Cleveland Hills	30	6.7

The faults tabulated above are sources of potential ground motion. However, earthquakes that might occur on other faults within the region are also potential generators of significant ground motion and could subject the site to ground shaking.

5.2 Seismicity

As with all of Northern California, the site has experienced historic earthquakes from various regional faults. The seismicity of the region surrounding the site was formulated based on research of an electronic database of earthquake data. The epicenters of recorded earthquakes with magnitudes equal to or greater than 4.0 within a radius of 60 miles of the site are depicted on Figure 7, Regional Seismicity Map.

Based on our review of available reports published by CGS and the USGS, the site has not experienced significant ground failure as a result of the events listed above. The site could be subjected to strong ground shaking in the event of an earthquake. However, this hazard is common in Northern California and the effects of ground shaking can be mitigated if the proposed structures are designed and constructed in conformance with current building codes and engineering practices.

5.3 Ground Motion Hazard Analysis

A site-specific ground motion hazard analysis was performed in accordance with ASCE 7-16 Chapter 21 and Section 1613A of the 2022 CBC.

5.3.1 Site-Specific Shear Wave Velocity

On May 28, 2024, Middle Earth Geo Testing, Inc. performed seismic CPT (SCPT) soundings in CPT-1, CPT-3, and CPT-6. The SCPTs measured the shear waves generated at the ground surface to a depth of

50 feet below the existing ground surface. The SCPT profiles are included herein as Figures C4 through C6.

Based on the results of the SCPTs, the site-specific soil shear wave velocity for the upper 30 meters of soil (Vs30) is estimated as 435 meters/second. In accordance with Section 1613A.3.2 of the 2022 California Building Code and Table 20.3-1 of ASCE 7-16, the estimated soil shear wave velocity falls within the boundaries of a Site Class "C".

Although there are potentially liquefiable soils underlying the site, we assume that the proposed single-story structures will have a fundamental period of less than 0.5 second and therefore will not require a site-response analysis.

5.3.2 Probabilistic Seismic Hazard Analysis

The risk-targeted Maximum Considered Earthquake (MCE_R) probabilistic response spectrum consists of the spectral response accelerations which are expected to achieve a 1 percent probability of collapse within a 50-year period, evaluated at 5 percent damping.

The median spectral response accelerations having a 2 percent chance of exceedance in 50 years were evaluated at 5 percent damping using the USGS Hazard Curves (dynamic) tool. The NSHM Conterminous U.S. 2018 (v4.2.0) edition was used within the analysis, which is based on the UCERF-3 fault model. The soil underlying the site was modeled with the measured shear wave velocity (V_S30) of 435 meters per second. The site class determination is based on SCPT data as discussed above.

The web application uses the ground motion prediction equations (GMPEs) from the NGA-West 2 project: Abrahamson-et al. (2014) NGA West 2, Boore et al. (2014) NGA West 2, Campbell-Bozorgnia (2014) NGA West 2, and Chiou-Youngs (2014) NGA West 2. Each GMPE was assigned an equal weight and the median value of the four GMPEs was evaluated. The median spectral accelerations were rotated to maximum direction using the period specific ratios from Shahi et al. (2013 & 2014).

The GMPE of Campbell and Bozorgnia requires that the depth to where the shear wave velocity reaches 2.5 kilometers per second ($Z_{2.5}$) be defined. Additionally, the GMPEs of Abrahamson-et al., Boore et al. and Chiou-Youngs require that the depth to where the shear wave velocity reaches 1 kilometer per second ($Z_{1.0}$) be defined. The values of $Z_{2.5}$ and $Z_{1.0}$ are internally calculated by the Hazard Curves (dynamic) tool.

The MCE uniform hazard response spectrum was adjusted to risk-targeted spectral accelerations corresponding to a 1 percent chance of collapse in 50 years by using the USGS Risk-Targeted Ground Motion Calculator and following ASCE 7-16 Section 21.2.1.2 Method 2.

The risk-targeted Maximum Considered Earthquake (MCE_R) probabilistic response spectrum is provided on Figure C1.

In accordance with ASCE 7-16, Supplement 1, Section 21.2.2, the largest spectral response acceleration of the probabilistic response spectrum is less than 1.2Fa, with Fa determined from Table 11.4.1 and Sa taken as 1.5; therefore, a deterministic analysis of ground motion was not required.

5.3.3 Site-Specific Response Spectrum

The probabilistic MCE_R response spectra is the Site-Specific MCE_R. Two thirds of the Site-Specific MCE_R is the Design Earthquake (DE) Response Spectrum, provided the results are not less than 80 percent of the modified General Design Response Spectrum determined by ASCE 7-16 Section 11.4.6 with Fa and Fv determined as specified in Section 21.3.

Graphical representations of the analyses are presented on Figures C1 and C2. The Site-Specific Design Earthquake response spectrum at 5 percent damping is presented on Figure C2 and in tabular form on Figure C3.

5.3.4 Mapped Acceleration Parameters

The following table summarizes the mapped acceleration parameters obtained from the 2022 California Building Code (CBC; Based on the 2019 International Building Code [IBC] and ASCE 7-16), Chapter 16A Structural Design, Section 1613A Earthquake Loads. The data was calculated using the online application *Seismic Design Maps*, provided by OSHPD. The short spectral response uses a period of 0.2 second.

TABLE 5.3.4
MAPPED SPECTRAL ACCELERATIONS

Parameter	Value	2022 CBC Reference
Site Class	C	Section 1613A.2.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	0.513g	Figure 1613A.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.245g	Figure 1613A.2.1(3)
Site Coefficient, F_A	1.295	Table 1613A.2.3(1)
Site Coefficient, F_V	1.5	Table 1613A.2.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	0.664g	Section 1613A.2.3 (Eqn 16-20)

Parameter	Value	2022 CBC Reference
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	0.368g	Section 1613A.2.3 (Eqn 16-21)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.443g	Section 1613A.2.4 (Eqn 16-22)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.245g	Section 1613A.2.4 (Eqn 16-23)
T_S	0.55 sec	ASCE 7-16 Chapter 11
Site Latitude	39.0008	--
Site Longitude	-121.5586	--

5.3.5 Site-Specific Seismic Design Criteria

Based the site-specific ground motion hazard analysis performed, and in accordance with the ASCE 7-16 Section 21.4, site-specific design acceleration parameters shall be derived using the results of the site-specific ground motion hazard analysis.

The parameter S_{DS} shall be taken as equal to 90 percent of the maximum spectral acceleration obtained from the site-specific analysis at any period within the range from 0.2 to 5 seconds, inclusive. The parameter S_{D1} shall be taken as the maximum value of the product of the spectral acceleration and period for periods from 1 to 2 seconds, inclusive. The values of S_{MS} and S_{M1} shall be taken as 1.5 times the site-specific values of S_{DS} and S_{D1}. The site-specific design acceleration parameters shall not be less than 80 percent of the general seismic design values determined by ASCE 7-16 Section 11.4.

The following table presents the site-specific seismic design parameters based on the site-specific ground motion hazard analysis.

TABLE 5.3.5
SITE-SPECIFIC DESIGN ACCELERATION PARAMETERS

Parameter	Value
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	0.731g
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	0.490g
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.488g
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.327g

5.3.6 Site-Specific Peak Ground Acceleration

The site-specific Maximum Considered Earthquake (MCE_G) peak ground acceleration was evaluated in accordance with ASCE 7-16 Section 21.5. The significant difference between the MCE_G peak ground acceleration and the analysis presented above is that the MCE_G is calculated without the risk-targeted adjustment factors.

The probabilistic and deterministic 84th percentile peak ground accelerations were analyzed using the same approaches as described above. The analysis used the same Site Class and scenario earthquake. However, within the probabilistic calculation, the risk-targeted adjustment factor was not applied.

The deterministic MCE_G shall not be less than $0.5F_{PGA}$, where F_{PGA} is determined from ASCE 7-16 Table 11.8-1 with the value of PGA taken as 0.5g. The site-specific MCE_G peak ground acceleration is taken as the lesser of the probabilistic and deterministic MCE_G, provided the value is not less than 80 percent of the value of PGA_M as determined by ASCE 7-16 Equation 11.8.1.

TABLE 5.3.6
ASCE 7-16 SITE-SPECIFIC PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-16 Reference
Site-Specific MCE_G Peak Ground Acceleration, PGA_M	0.291g	Section 21.5

Conformance to the criteria in the above tables for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

5.4 Liquefaction

Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary loss of shear strength due to pore pressure buildup under the cyclic shear stresses associated with intense earthquakes. Primary factors that trigger liquefaction are moderate to strong ground shaking (seismic source), relatively clean, loose granular soils (primarily poorly graded sands and silty sands), and saturated soil conditions (shallow groundwater). Due to the increasing overburden pressure with depth, liquefaction of granular soils is generally limited to the upper 50 feet of a soil profile.

We used the computer software program CLiq (Version 2.2.0.37, Geologismiki), the in-situ soil parameters measured in the CPT soundings, and laboratory test data to evaluate liquefaction potential using the 2014 methodology of Boulanger and Idriss. Our evaluation incorporated an earthquake moment magnitude (M_W) of 6.69 and a groundwater depth of 3 ½ feet. The earthquake moment magnitude selected for our analysis is the mean magnitude presented by the USGS Unified Hazard Tool deaggregation for borderline Site Class C/D (V_{S30}=360 m/s). We used a Peak Ground Acceleration (PGA) of 0.291g in our liquefaction evaluation based on our ground motion hazard analysis for the site. Our liquefaction analysis identified potentially liquefiable layers at each CPT location. In general, these layers are located between 7 and 50 feet below existing grade at the site. Consequences of liquefaction can include ground surface settlement, ground loss (sand boils) and lateral slope displacements (lateral spreading). For liquefaction-induced sand boils or fissures to occur, pore water pressure induced within liquified strata must exert enough force to break through overlying, non-liquefiable layers. Based on methodology recommended by Youd and Garris (1995), which advanced original research by Ishihara (1985), a capping layer of non-liquefiable soil can prevent the occurrence of sand boils and fissures.

Liquefaction potential at the site also was evaluated based on the Liquefaction Potential Index (LPI). The LPI is a measure of the liquefaction potential based on an analysis of the entire vertical soil profile, and not just discrete layers (Iwasaki, 1986; Toprak and Holzer, 2003). Factors taken into consideration for the LPI calculations include: thickness of the liquefied layer; proximity of the liquefied layer to the surface; and, the factor of safety. The LPI ranges from 0 to 100 with the value zero representing no liquefaction potential. Surface manifestations of liquefaction can occur at LPI ≥ 5. The LPI for the soil conditions at our CPTs were less than 5, indicating a low risk for liquefaction during the design seismic event.

Based on the low liquefaction potential index, the presence of the non-liquefiable layer that mantles the site, the depth to significant liquefiable layers, and the thickness and discontinuous nature of the liquefiable layers, the potential for ground loss due to sand boils or fissures in a seismic event is considered low.

The likely consequence of potential liquefaction at the site is settlement. Our analysis indicates that total ground surface settlements on the order of 1 inch may result from liquefaction after a design-level seismic event. We recommend that foundations and project improvements be designed to accommodate approximately 1 inch of total liquefaction-induced settlement and approximately ¾ inch of differential settlement across a horizontal distance of 50 feet. Output from our liquefaction analysis is presented in Appendix C.

5.5 Lateral Spreading

The portable classroom buildings planned for the northwestern margin of the site are situated approximately 525 feet from the nearest free face geometry at the drainage swale to the west. Research by Toprak and Holzer (2003) indicates a correlation between Liquefaction Potential Index (LPI) and the effects of lateral spreading wherein surface manifestations of lateral spread are unlikely to occur where the LPI is less than 12. Our analysis indicates LPIs less than 5 at each of our CPT locations, and LPI less than 2 at CPT6, which is situated nearest to the drainage swale at the location of the planned portables. In our opinion, the risk of lateral spreading resulting in surface manifestations at the site is low.

5.6 Tsunamis and Seiches

The site is not located near the ocean or other enclosed bodies of water that could generate tsunamis (seismic sea waves) or seiches (wave oscillations in an enclosed or semi-enclosed body of water). Thus, these phenomena do not pose a hazard to the site.

5.7 Landslides and Slope Stability

The site is essentially flat and level, and the slope descending toward the drainage swale just west of the site has inclinations of approximately 4:1 or flatter. We did not observe slopes susceptible to landslides or slope failures in areas that could affect the proposed structures. We do not consider the potential for landsliding and slope instability to be a hazard to the proposed project.

5.8 Flooding

Based on the Flood Insurance Rate Maps (FIRM) prepared by the Federal Emergency Management Agency (FEMA), the site is in an area determined to be with reduced flood risk due to levees. The drainage swale immediately west of the site is intended to contain a 1% annual chance flood discharge.

5.9 Expansive Soil

Laboratory test results from samples of the near-surface clays indicate high expansion potential and are classified as “expansive” per 2022 CBC. Expansive soils may undergo significant volume changes with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. Based on the results of our laboratory testing and our experience in the area, recommendations that consider highly expansive soils are provided in this report.

5.10 Hydrocollapsible Soils

Based on the consistency and relative density of the alluvial soils encountered in our borings, and the absence of porous soils at our sample locations, it is our opinion that the potential for hydrocollapse in the soils that underlie the site is low.

5.11 Volcanic Activity

According to the USGS, the closest volcanic activity is represented by persistent geothermal energy and long-period volcanic seismicity in Clear Lake, which is located approximately 60 miles to the west. According to the 2018 update to the USGS *National Volcanic Threat Assessment,* the threat for the Clear Lake volcanic field is listed as "high". However, according to web-based information by USGS, the most likely hazards are limited to near-vent hazards that only impact the Clear Lake area and do not extend to the project area. Due to the significant distance between the site and the Clear Lake volcanic field or other volcanoes, the potential for impacts to the site due to regional volcanic activity is low.

5.12 Regional Subsidence

We are not aware of any regional subsidence in the project area due to groundwater pumping or other factors. As such, it is our opinion that project design does not require any special considerations for regional subsidence.

5.13 Naturally Occurring Asbestos

According to published geologic information, the site is located approximately 20 miles west of an ultramafic rock unit. Naturally occurring asbestos (NOA) minerals (chrysotile, tremolite, actinolite) are more likely to be encountered in areas with ultramafic rocks due to metamorphic processes. Based on the site geology, which consists of alluvium that did not appear to contain ultramafic source material, and regional topography, the likelihood of NOA being present at the site is considered low.

5.14 Soil Corrosion Screening

Soil samples obtained during our field exploration were subjected to laboratory testing for minimum resistivity, pH, and chloride and water-soluble sulfate. The laboratory test results and published screening levels are presented in Appendix B. Soil corrosivity should be considered in the design of buried metal pipes, underground structures, etc.

Water-soluble sulfate test results on selected samples of site soils indicate an S0 exposure classification for sulfate attack on normal portland cement concrete (PCC) as defined in Chapter 318, Table 19.3.1.1 of the ACI *Building Code Requirements for Structural Concrete*. ACI does not set forth requirements for S0 sulfate exposure classification. In addition, none of the eight soil samples tested would be classified as corrosive to buried metal improvements based on Caltrans criteria.

Geocon does not practice in the field of corrosion engineering and mitigation. If corrosion sensitive improvements are planned, it is recommended that a corrosion engineer be retained to evaluate corrosion test results and incorporate the necessary precautions to avoid premature corrosion of buried metal pipes and concrete structures in direct contact with the soils.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 General

6.1.1 It is our opinion that neither soil nor geologic conditions were encountered during our investigation that would preclude the project as presently proposed. Primary geotechnical considerations are the high expansion potential of site soils and the potential for seismically-induced settlements. The implementation of proper soil moisture conditioning, compaction, and surface drainage are recommended to reduce the potential shrink-swell of the site soils. In addition, a layer of low-expansive fill will be required beneath all interior and exterior slabs-on-grade.

6.1.2 Based on the assumed structural loading, we anticipate the planned classroom buildings and other structures can be supported on conventional shallow spread footings and continuous strip footings. For shallow foundation systems designed and constructed as recommended herein, post-construction settlement due to assumed loading should be on the order of 1 inch or less with differential settlements of approximately ¾ inch or less across a horizontal distance of 50 feet.

6.1.3 We should review grading and structural plans as they become available to determine applicability of the recommendations provided herein, particularly those related to site grading and building pad preparation. Updated or supplemental recommendations may be necessary.

6.1.4 Any changes in the design, location or elevation of the proposed improvements, as outlined in this report, should be reviewed by this office. Geocon should be contacted to determine the necessity for review and possible revision of this report.

6.1.5 All references to relative compaction and optimum moisture content in this report are based on ASTM D 1557 (latest edition).

6.2 Soil and Excavation Characteristics

6.2.1 Based on the soil conditions encountered in our exploratory borings, the onsite alluvial soils can be excavated with moderate effort using conventional excavation equipment. However, excavations that extend into the hardpan layer present across the site may require additional effort or special provisions – instances of cementation were noted in our soil borings. We do not anticipate excavations in the native alluvium at the site will generate oversize material (greater than 3 inches in nominal dimension).

6.2.2 It is the responsibility of the contractor to ensure that all excavations and trenches are properly shored and maintained in accordance with applicable Occupational Safety and Health Administration (OSHA) rules and regulations to maintain safety and maintain the stability of adjacent existing improvements.

6.2.3 The alluvial soils encountered at the site are considered "expansive" as defined by 2022 CBC. The recommendations of this report assume proposed conventional shallow foundation systems will derive support in engineered fills and/or competent alluvium.

6.3 Materials for Fill

6.3.1 Excavated soils generated from cut operations at the site are suitable for use as engineered fill in structural areas provided they do not contain deleterious matter, organic material, or cementations larger than 3 inches in maximum dimension.

6.3.2 Import or low-expansive material should possess a "low" expansion potential (Expansion Index less than 50), a Plasticity Index less than 15, be free of organic material and construction debris, and not contain rock larger than 3 inches in greatest dimension. It should be assumed that soils excavated from the site do not meet the requirements for low-expansive fill. Low-expansive fill may also consist of aggregate base, or native soils treated with approximately 5% quicklime by weight. Additional testing should be performed to determine the required percentage of lime and to develop more specific recommendations for lime treatment and a quality control program for the same.

6.3.3 Environmental characteristics and corrosion potential of import soil materials may also be considered. Proposed import materials should be sampled, tested, and approved by Geocon prior to its transportation to the site.

6.4 Grading

6.4.1 All clearing operations and earthwork (including over-excavation, scarification, and recompaction) should be observed and all fills tested for recommended compaction and moisture content by representatives of Geocon.

6.4.2 Structural areas should be considered as areas extending a minimum of 5 feet horizontally from a foundation or beyond the outside dimensions of buildings, including footings and overhangs carrying structural loads, where not restricted by property boundaries or other logistical constraints.

6.4.3 A preconstruction conference should be held at the site prior to the beginning of grading operations with the owner, contractor, civil engineer and geotechnical engineer in attendance. Special soil handling requirements can be discussed at that time.

6.4.4 Site preparation should commence with the removal of all surface vegetation and existing improvements from the area to be developed/graded. All active or inactive utilities within the construction area should be protected, relocated, or abandoned. Any pipelines to be abandoned that are greater than 2 inches and less than 18 inches in diameter should be removed or filled with sand-cement slurry. Utilities larger than 18 inches in diameter should be removed. Excavations or depressions resulting from demolition and site clearing operations, or other existing excavations or depressions, should be restored with engineered fill in accordance with the recommendations of this report.

6.4.5 After stripping, the exposed subgrade in building pad areas should be over-excavated to a depth of approximately 24 inches below existing or proposed pad grade, whichever is lower. The exposed bottom should be scarified 8 to 12 inches moisture conditioned to at least 2% above optimum moisture and recompacted to at least 90% relative compaction. Recommended over-excavation depths may be reduced at the time of grading based on exposed soils conditions, but only at the sole discretion of Geocon representatives.

6.4.6 Over-excavation, exposed bottom surfaces and bottom processing should be observed by our representatives on a full-time basis. If undocumented fill or soft soils are encountered during construction, the unsuitable materials should be completely removed to expose a competent native bottom and replaced with properly compacted fill.

6.4.7 If grading commences in winter or spring, or in periods of precipitation, excavated and in-place soils may be wet. Earthwork contractors should be aware of potential compaction/workability difficulties. The most effective site preparation alternatives will depend on site conditions prior to and during grading operations; we should evaluate site conditions at those times and provide supplemental recommendations, if necessary. Earthwork and pad preparation operations in these conditions will likely be difficult with low productivity. Often, a period of at least one month of warm and dry weather is necessary to

allow the site to dry sufficiently so that heavy grading equipment can operate effectively. Conversely, during the dry summer and fall months, dry clay soils may require additional grading effort (discing or other means) to attain proper moisture conditioning. We note that infiltrated rainwater and irrigation water can perch atop the hardpan layer at the site and hinder drying operations.

6.4.8 It is imperative that positive drainage be provided such that runoff is directed away from the work area. Improper drainage and ponded water can saturate exposed soils and result in the need for additional over-excavations or other measures.

6.4.9 All structural fill and backfill should be placed in layers no thicker than will allow for adequate bonding and compaction (typically 8 to 12 inches). Fill soils should be placed and compacted to at least 90% relative compaction to at least 2% above optimum moisture content (near optimum where predominantly sands or gravels). Fill areas with in-place density tests showing moisture contents less than those recommended will require additional moisture conditioning prior to placing additional fill.

6.4.10 Due to the presence of expansive clay soils, the upper 18 inches of building pads (not including the crushed rock below the slab) should consist of low-expansive fill materials meeting the requirements of Section 6.3.2. Low-expansive fill should be moisture conditioned near to slightly above optimum moisture content and compacted to at least 90% relative compaction.

6.5 Shallow Footings

6.5.1 The new campus buildings may utilize conventional shallow foundations consisting of spread footings and continuous strip footings founded in properly compacted fill or competent alluvium.

6.5.2 It is recommended that continuous footings have a minimum embedment depth of 24 inches below lowest adjacent pad grade, which is not to be confused with finished floor elevation. Continuous footings should be at least 12 inches wide. A continuous footing should be provided along the perimeter of each new building. Spread footings should be at least 4 feet square and founded at least 24 inches below lowest adjacent pad grade. Any spread footings along a building perimeter should be integral with the strip footing.

6.5.3 Footings proportioned as recommended may be designed for a net allowable soil bearing pressure of 3,500 pounds per square foot (psf). A one-third increase in allowable bearing capacity is permitted for use with the alternative load combinations given in Section 1605.2 of the 2022 CBC.

6.5.4 For shallow foundation systems designed and constructed as recommended herein, estimated post-construction settlement due to dead + live loads should be 1 inch or less with differential settlements of approximately ¾ inch or less across a horizontal distance of 50 feet.

6.5.5 The allowable passive pressure used to resist lateral movement of the footings may be assumed to be equal to a fluid weighing 350 pounds per cubic foot (pcf). The allowable coefficient of friction to resist sliding is 0.30 for concrete against soil. Combined passive resistance and friction may be utilized for design provided that the passive resistance is reduced by 50%. Where not protected by flatwork or pavement, the upper 1 foot of soil should be neglected when calculating passive resistance to lateral loads.

6.5.6 Minimum reinforcement for continuous footings should consist of four No. 5 steel reinforcing bars; two placed near the top of the footing and two near the bottom. Spread footing reinforcement should be designed by the project structural engineer.

6.5.7 The foundation dimensions and minimum reinforcement recommendations presented herein are based upon soil conditions only and are not intended to be used in lieu of those required for structural purposes.

6.5.8 Underground utilities running parallel to footings should not be constructed in the zone of influence of footings. The zone of influence may be taken to be the area beneath the footing and within a 1:1 plane extending out and down from the bottom edge of the footing.

6.5.9 Footing bottoms and walls should be sprinkled as necessary to maintain a moist condition without significant shrinkage cracks as would be expected in any concrete placement. Prior to placing rebar reinforcement, foundation excavations should be evaluated by our representatives for appropriate support characteristics and moisture content. Moisture conditioning may be required for the materials exposed at footing bottom, particularly if foundation excavations are left open for an extended period.

6.6 Temporary Excavations

6.6.1 The contractor should have a "competent person" as defined by OSHA evaluate all excavations. All onsite excavations must be conducted in such a manner that potential surcharges from existing structures, construction equipment, and vehicle loads are resisted. The surcharge area may be defined by a 1:1 projection down and away from the bottom of an existing foundation or vehicle load. Penetrations below this 1:1 projection will require special excavation measures such as sloping and possibly shoring.

6.6.2 It is the contractor's responsibility to provide sufficient and safe excavation support as well as protecting nearby utilities, structures, and other improvements which may be damaged by earth movements.

6.7 Underground Utilities

6.7.1 Underground utility trenches should be backfilled with properly compacted material. The material excavated from the trenches should be adequate for use as backfill provided it does not contain deleterious matter, vegetation or rock larger than 3 inches in maximum dimension. Trench backfill should be placed in loose lifts not exceeding 8 inches and should be compacted to at least 90% relative compaction to at least 2% above optimum moisture content (near optimum moisture where backfill materials are predominantly sands and gravels).

6.7.2 Bedding and pipe zone backfill typically extends from the bottom of the trench excavations to a minimum of 6 inches above the crown of the pipe. Pipe bedding material should consist of crushed aggregate, clean sand or similar open-graded material. Proposed bedding and pipe zone materials should be reviewed by Geocon prior to construction; open-graded materials such as ¾ inch drain rock may require wrapping with filter fabric to mitigate the potential for piping. Pipe bedding and backfill should also conform to the requirements of the governing utility agency.

6.7.3 Utility trenches backfilled with granular material (including pipe bedding material) may serve as conduits for groundwater and may cause pumping, seepage or other undesirable effect, particularly on sites with expansive soils. Trench plugs should be provided where utility trenches enter the building perimeter. Trench plugs may consist of compacted lime-treated native soil, or cement slurry or similar materials. Trench plug material should completely surround the pipe and be in contact with the undisturbed walls and bottom of the trench.

The length of soil trench plugs should be on the order of one to two feet. The geotechnical engineer should review the placement and design of trench plugs prior to plan finalization.

6.8 Concrete Slabs-on-Grade

6.8.1 Concrete slabs-on-grade subject to vehicle loading are considered pavements and should be designed in accordance with the recommendations in Section 6.11 of this report.

6.8.2 Concrete slabs-on-grade for structures, not subject to vehicle loading, should be a minimum of 5 inches thick and should be underlain by at least 18 inches of low-expansive fill per the recommendations in Section 6.4. Minimum slab reinforcement should consist of No. 3 steel reinforcing bars placed 18 inches on center in both horizontal directions. Steel reinforcing should be positioned vertically near the slab midpoint.

6.8.3 Interior slabs in areas with floor coverings or slabs in areas where moisture would be objectionable should be underlain by 3 inches of ½-inch or ¾-inch crushed rock with no more than 5% passing the No. 200 sieve to serve as a capillary break. The crushed rock should not be counted toward the 18 inches of low expansive fill recommended above.

6.8.4 Exterior slabs, not subject to traffic loads, should be at least 4 inches thick and reinforced with No. 3 steel reinforcing bars placed 18 inches on center in both horizontal directions, positioned near the slab midpoint. We recommend that at least 12 inches of AB compacted to at least 95% relative compaction be used below exterior concrete slabs. Prior to placing AB, the subgrade should be scarified 8 inches, moisture conditioned to at least 2% above optimum and properly compacted to at least 90% relative compaction. Plastic moisture cut-offs extending below the AB layer should be provided where exterior slabs are adjacent to landscaping.

6.8.5 In lieu of specific recommendations from the structural or civil engineer, we recommend that crack control joints be spaced at intervals not greater than 8 feet for 4-inch-thick slabs (10 feet for 5-inch slabs). Crack control joints should extend a minimum depth of one-fourth the slab thickness and should be constructed using saw-cuts or other methods as soon as practical after concrete placement. Construction joints should be designed by the project structural engineer.

6.8.6 The recommendations of this report are intended to reduce the potential for cracking of slabs due to soil movement. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade may exhibit some cracking due to soil movement. This is common for project areas that contain expansive soils since designing to eliminate potential soil movement is cost prohibitive. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

6.9 Moisture Protection Considerations

6.9.1 A vapor barrier is not required beneath interior slab-on-grade for geotechnical purposes. Further, the migration of moisture through concrete slabs or moisture otherwise released from slabs is not a geotechnical issue. However, for the convenience of the owner, we are providing the following general suggestions for consideration by the owner, architect, structural engineer, and contractor. The suggested procedures may reduce the potential for moisture-related floor covering failures on concrete slabs-on-grade, but moisture problems may still occur even if the procedures are followed. If more detailed recommendations are desired, we recommend consulting a specialist in this field.

6.9.2 A vapor barrier meeting ASTM E 1745-09 Class C requirements may be placed directly below the slab, without a sand cushion. To reduce the potential for punctures, a higher quality vapor barrier (15 mil, Class A or B) should be used. The vapor barrier, if used, should extend to the edges of the slab, and should be sealed at all seams and penetrations.

6.9.3 The concrete water/cement ratio should be as low as possible. The water/cement ratio should not exceed 0.45 for concrete placed directly on the vapor barrier. Midrange plasticizers could be used to facilitate concrete placement and workability.

6.9.4 Proper finishing, curing, and moisture vapor emission testing should be performed in accordance with the latest guidelines provided by the American Concrete Institute, Portland Cement Association, and ASTM.

6.10 Retaining Walls

6.10.1 Lateral earth pressures may be used in the design of retaining walls and buried structures. Lateral earth pressures against these facilities may be assumed to be equal to the pressure exerted by an equivalent fluid. The unit weight of the equivalent fluid depends on the design conditions. Table 6.10 summarizes the weights of the equivalent fluid based on the different design conditions. The following recommendations assume that retaining wall backfill materials between the wall and extending to at least a 1:1 plane projected up from the base of the wall will consist of materials meeting the requirements of Section 6.3.2.

TABLE 6.10
RECOMMENDED LATERAL EARTH PRESSURES

Condition	Equivalent Fluid Density (Drained)
Active	40 pcf
At-Rest	60 pcf

6.10.2 Unrestrained walls should be designed using the active case. Unrestrained walls are those that are allowed to rotate more than 0.01H (where H is the height of the wall). Walls restrained from movement should be designed using the at-rest case. The above soil pressures assume level backfill under drained conditions within an area bounded by the wall and a 1:1 plane extending upward from the base of the wall and no surcharges within that same area. Where vehicle loads are expected atop the wall backfill, an additional uniform surcharge pressure equivalent to 2 feet of backfill should be used for wall design. Where the vehicle loading will be limited to passenger cars, the additional uniform surcharge equivalent may be reduced to 1 foot of backfill soil.

6.10.3 Retaining walls greater than 2 feet tall (retained height) should be provided with a drainage system adequate to prevent the buildup of hydrostatic forces and should be waterproofed as required by the project architect. Positive drainage for retaining walls should consist of a vertical layer of permeable material positioned between the retaining wall and the soil backfill. The permeable material may be composed of a composite drainage geosynthetic or a natural permeable material such as crushed gravel at least 12 inches thick and capped with at least 12 inches of native soil. A geosynthetic filter fabric should be placed between the gravel and the soil backfill. Provisions for removal of collected water should be provided for either system by installing a perforated drainage pipe along the bottom of the permeable material which leads to suitable drainage facilities.

6.10.4 We recommend that all retaining wall designs be reviewed by Geocon to confirm the incorporation of the recommendations provided herein. In particular, potential surcharges from adjacent structures and other improvements should be reviewed by Geocon.

6.11 Pavements

6.11.1 The upper 12 inches of pavement subgrade should be scarified, moisture conditioned to at least 2% above optimum moisture content and compacted to at least 90% relative compaction (near optimum and to at least 95% relative compaction where predominantly sandy or lime-treated). The finished subgrade should be proof rolled with a laden water truck or similar equipment with high contact pressure to verify stability.

6.11.2 Sidewalk, curb, gutter, and driveway encroachments should be designed and constructed in accordance with local agency requirements, as applicable.

6.11.3 We recommend the following asphalt concrete (AC) pavement sections for design to establish subgrade elevations in pavement areas. The project civil engineer should determine the appropriate Traffic Index (TI) based on anticipated traffic conditions. The flexible pavement sections below are based on estimated design TIs. We can provide additional sections based on other TIs if necessary. Supplemental recommendations will be provided if lime-treatment is planned in pavement areas.

TABLE 6.11
FLEXIBLE PAVEMENT SECTION RECOMMENDATIONS

Location	Estimated Traffic Index (TI)	AC Thickness (inches)	AB Thickness (inches)
Parking Stalls	4.5	3	8
Driveways	6.0	3 ½	12 ½
Heavy-Duty	7.0	4	15 ½

Notes: The recommended flexible pavement sections are based on the following assumptions:

1. AB: Class 2 AB with a minimum R-Value of 78 and meeting the requirements of Section 26 of the latest Caltrans Standard Specifications.
2. AB is compacted to 95% or higher relative compaction at or near optimum moisture content. Prior to placing AB, the subgrade should be proof-rolled with a loaded water truck to verify stability.
3. AC: Asphalt concrete conforming to local agency standards or Section 39 of the latest Caltrans Standard Specifications.

6.11.4 The AC sections in Table 6.11 are final, minimum thicknesses. If staged-pavements are used, the construction bottom AC lift should be at least 2 inches thick.

6.11.5 Unless specifically designed and evaluated by the project civil or structural engineer, where concrete paving will be utilized for the support of vehicles, we recommend the Portland cement concrete (PCC) be at least 6 inches thick. The concrete should be underlain by at least 12 inches of AB compacted to at least 95% relative compaction near optimum moisture content. We should evaluate pavements to support heavy trucks or non-typical loading on a case-by-case basis; supplemental recommendations may be provided.

6.11.6 Concrete for rigid pavements should have a minimum 28-day compressive strength of 3,500 psi. Minimum rigid pavement reinforcement should consist of No. 3 steel reinforcing bars placed 18 inches on center in both horizontal directions. Steel reinforcing should be positioned vertically near the slab midpoint. Doweling, reinforcing steel or other load-transfer mechanisms should be provided at joints to reduce the potential for vertical offset.

6.11.7 Consideration may be given to providing a thickened edge on the outside of concrete slabs subject to wheel loads. The thickened edge should be 2 inches thicker than the design slab thickness at the slab edge and taper back to the design slab thickness 3 feet behind the face of the slab.

6.11.8 In general, we recommend that concrete pavements be designed, constructed and maintained in accordance with industry standards such as those provided by the American Concrete Institute or the American Concrete Pavement Association.

6.11.9 Crack control joints should be spaced at intervals not greater than 12 feet for 6-inch slabs and should be constructed using saw-cuts or other methods as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness and should be constructed using saw-cuts or other methods as soon as practical after concrete placement. Construction joints should be designed by the project structural engineer.

6.11.10 The performance of pavements is highly dependent upon providing positive surface drainage away from the edge of pavements. Ponding of water on or adjacent to the pavement will likely result in saturation of the subgrade materials and subsequent cracking, subsidence and pavement distress. If planters are planned adjacent to paving, it is recommended that the perimeter curb be extended at least 6 inches below the bottom of the aggregate base to minimize the introduction of water beneath the paving. Alternatives such as plastic moisture cut-offs or modified drop-inlets may also be considered in lieu of deepened curbs.

6.11.11 Asphalt pavement section recommendations for driveways and parking areas are based on Caltrans design procedures. It should be noted that most rational pavement design procedures are based on projected street or highway traffic conditions and, hence, may not be representative of vehicular loading that occurs in parking lots and driveways. Pavement proximity to landscape irrigation, reduced traffic speed and short turning radii increase the potential for pavement distress to occur in parking lots even though the volume of traffic is significantly less than that of an adjacent street. The Caltrans Highway Design Manual indicates that the resulting pavement sections for parking lots are minimized to keep initial costs down but are reasonable because additional AC surfacing can be added later, if needed, and generally without incurring traffic hazards or traffic handling problems. It is generally not economically feasible to design and construct the entire parking lot and driveways for the unique loading conditions previously described. Periodic maintenance of the pavement in these areas, therefore, should be anticipated.

6.12 Surface Drainage

6.12.1 Proper surface drainage is critical to the future performance of the project. Uncontrolled infiltration of irrigation excess and storm runoff into the soils can adversely affect the performance of the planned improvements. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change to important engineering properties. Proper drainage should be maintained at all times.

6.12.2 All site drainage should be collected and transferred to the street in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundations or retaining walls. Drainage should not be allowed to flow uncontrolled over any descending slope. The proposed structures should be provided with roof gutters. Discharge from downspouts, roof drains and scuppers not permitted onto unprotected soils within five feet of the building perimeter. Planters which are located adjacent to foundations should be sealed or properly drained to prevent moisture intrusion into the materials providing foundation support. Landscape irrigation within five feet of the building perimeter footings should be kept to a minimum to just support vegetative life.

6.12.3 Positive site drainage should be provided away from structures, pavement, and the tops of slopes to swales or other controlled drainage structures. Building pad and pavement areas should be fine graded such that water is not allowed to pond. Final soil grade should slope a minimum of 2% away from structures.

6.12.4 We recommend implementing measures to reduce infiltrating surface water near buildings and slabs-on-grade. Such measures may include:

- Selecting drought-tolerant plants that require little or no irrigation, especially within 5 feet of buildings, slabs-on-grade, or pavements.
- Using drip irrigation or low-output sprinklers and automatic timers for irrigation systems.
- Appropriately spaced area drains.
- Hard-piping roof downspouts to appropriate collection facilities.

6.12.5 Experience has shown that even with these provisions, subsurface seepage may develop in areas where no such water conditions existed prior to site development. This is particularly true where a substantial increase in surface water infiltration has resulted from an increase in landscape irrigation.

6.12.6 The hardpan layer common throughout the site may inhibit the infiltration of stormwater or irrigation water and should be considered in project design.

7.0 FURTHER GEOTECHNICAL SERVICES

7.1 Plan and Specification Review

7.1.1 We should review project plans and specifications prior to final design submittal to assess whether our recommendations have been properly implemented and evaluate if additional analysis and/or recommendations are required.

7.2 Testing and Observation Services

7.2.1 The recommendations provided in this report are based on the assumption that we will continue as Geotechnical Engineer of Record throughout the construction phase and provide compaction testing and observation services and foundation observations throughout the project. It is important to maintain continuity of geotechnical interpretation and confirm that field conditions encountered are similar to those anticipated during design. If we are not retained for these services, we cannot assume any responsibility for others interpretation of our recommendations, and therefore the future performance of the project.

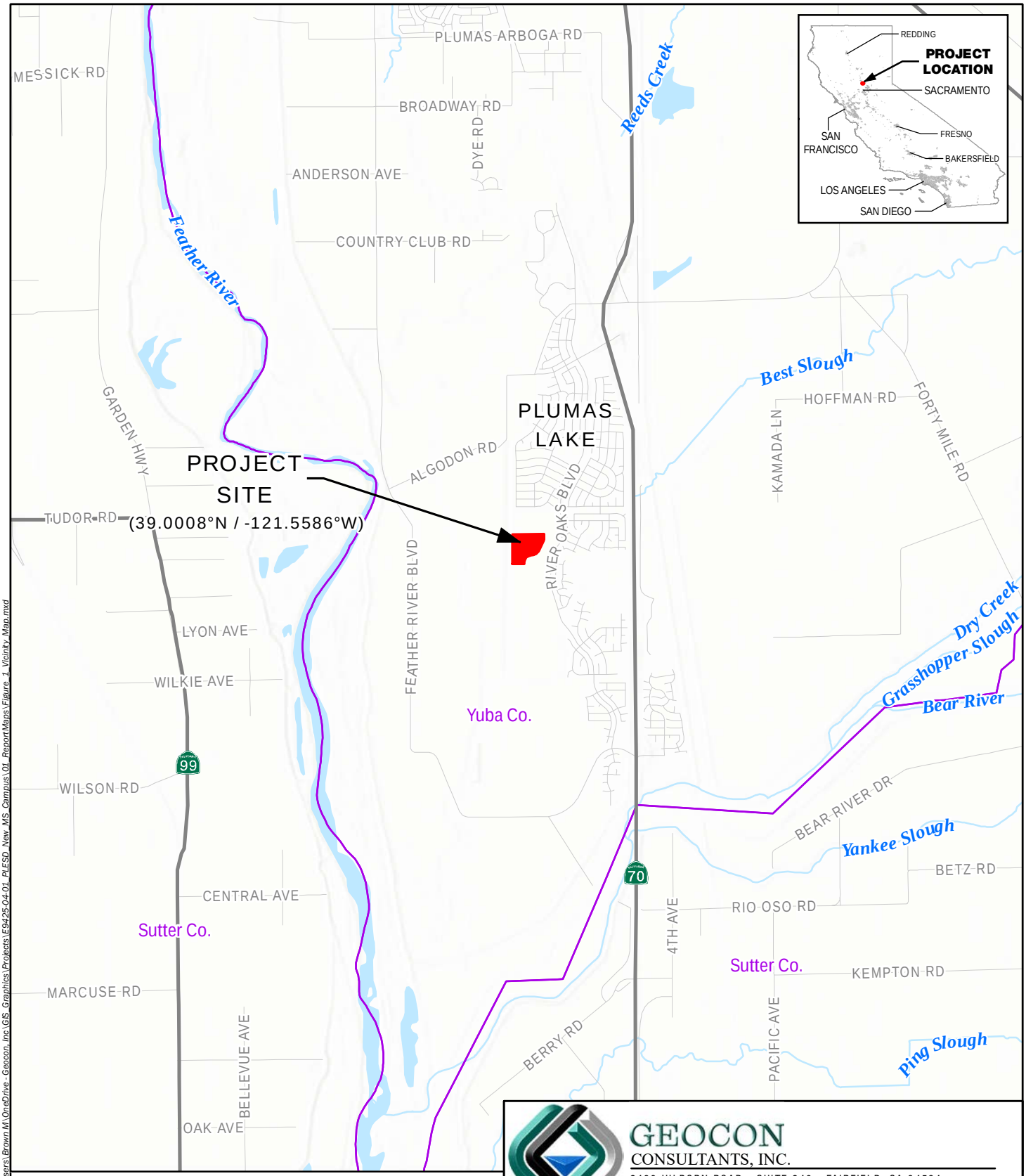
8.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Consultants, Inc. should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the geotechnical scope of services provided by Geocon Consultants, Inc.

This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices used in the site area at this time. No warranty is provided, express or implied.



GEOCON 8/9/2024 USER:Brown M PATH:C:\Users\Brown M\OneDrive - Geocon, Inc\GIS Graphics\Projects\E9425-04-01_PLESD New MS Campus\01 Report\Maps\Figure 1 Vicinity Map.mxd

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PLESD New Middle School Campus

Plumas Lake,
California

VICINITY MAP

E9425-04-01	August 2024	Figure 1



Proposed Site Optimization Plan by Plumas Lake Elementary School District

Legend

- B26 — Approximate Boring Location
- CPT6 — Approximate Cone Penetration Test (CPT) Location
- P2 — Approximate Percolation Test Location
- A A' — Approximate Cross-Section Location (Figure 5)
- Approximate Site Boundary

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Scale in Feet

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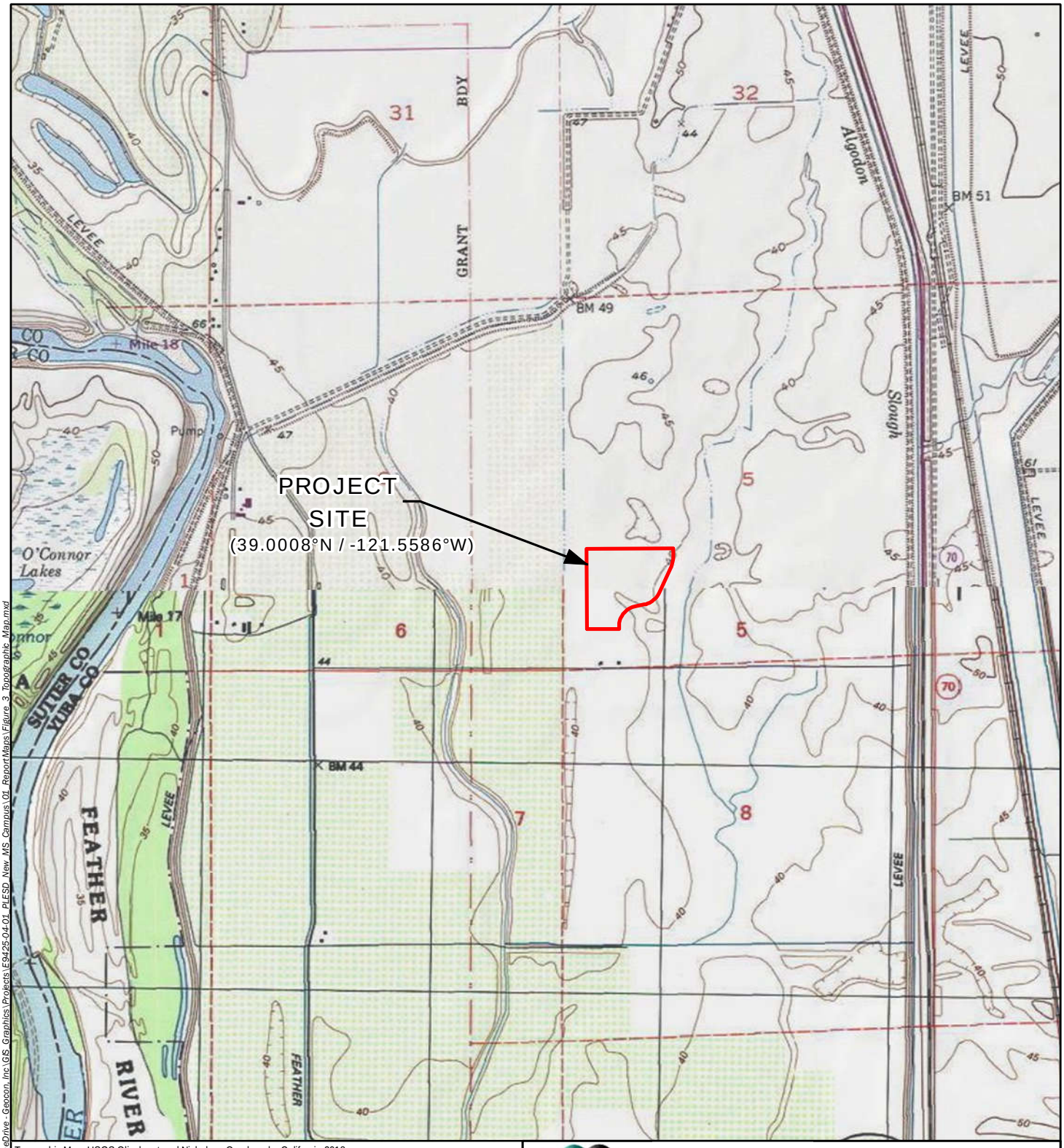
PLESD New Middle School Campus

Plumas Lake, California

SITE PLAN/DEVELOPMENT PLAN

E9425-04-01	August 2024	Figure 2

GEOCON 7/12/2024 USER Brown M PATH C:\Users\Brown M\OneDrive - Geocon, Inc\GIS_Graphics\Projects\E9425-04-01_PLESD_New_MS_Campus\GL_ReportMaps\Figure_2_Site_Plan.mxd



Topograhic Map: USGS Olivehurst and Nicholaus Quadrangle, California 2018

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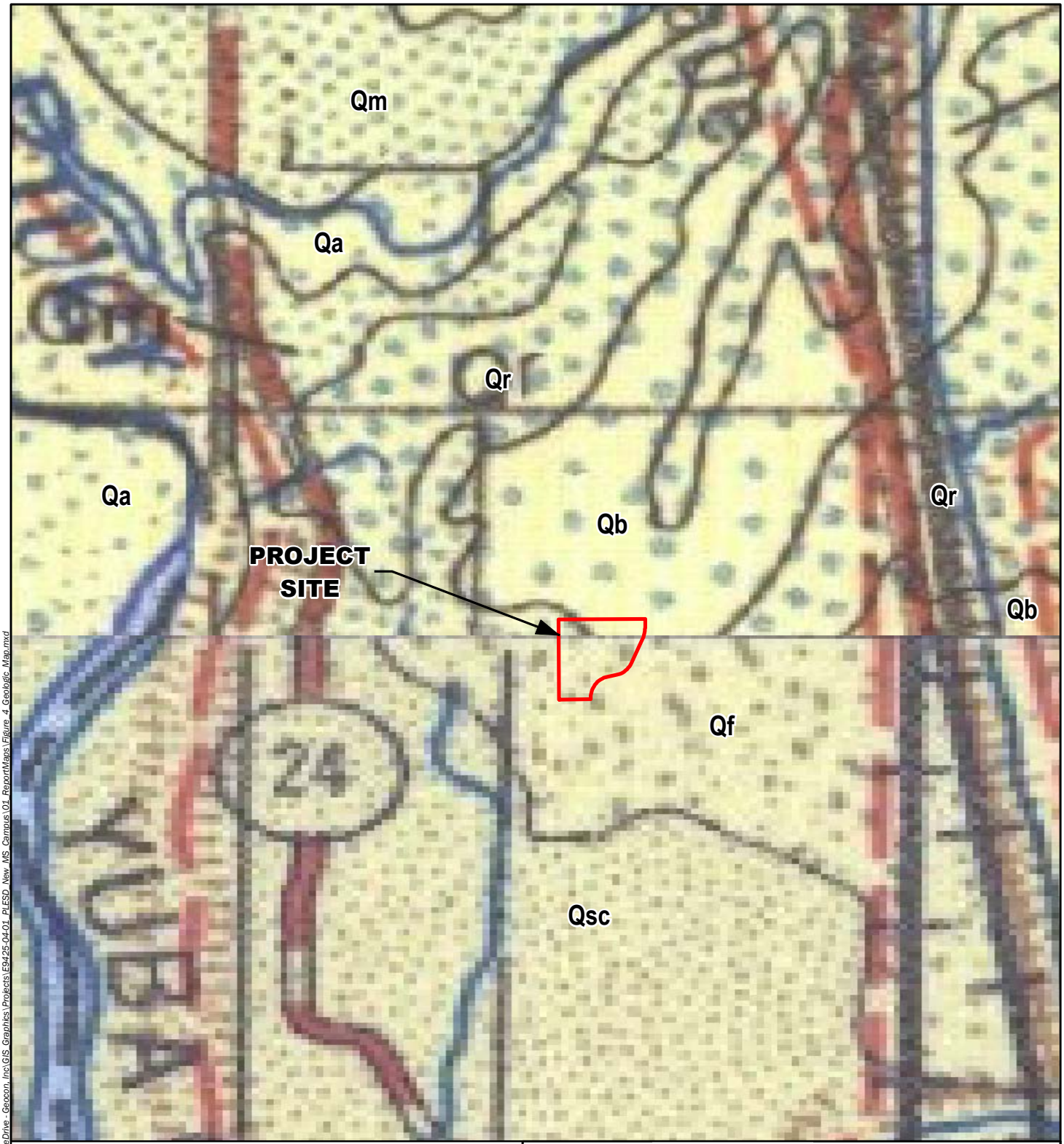
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California

TOPOGRAPHIC MAP

E9425-04-01	August 2024	Figure 3

GEOCON 8/9/2024 USER:Brown M PATH:C:\Users\Brown M\OneDrive - Geocon, Inc\GIS Graphics\Projects\E9425-04-01_PLESD_New_MS_Campus\01_Report\Maps\Figure_3_Topographic_Map.mxd



Geologic Map of the Chico Quadrangle, California; G.J. Saucedo and D.L. Wagner; 1992 and Geologic Map of California, Sacramento Sheet; Rudolph G. Strand and James B Koeing; 1965

Unit Explantion

- Qa — Natural levee and channel deposits
- Qsc — Stream channel deposits
- Qf — Fan deposits
- Qb — Basin deposits
- Qr — Riverbank Formation (alluvium)

N

0 2,000

Scale in Feet

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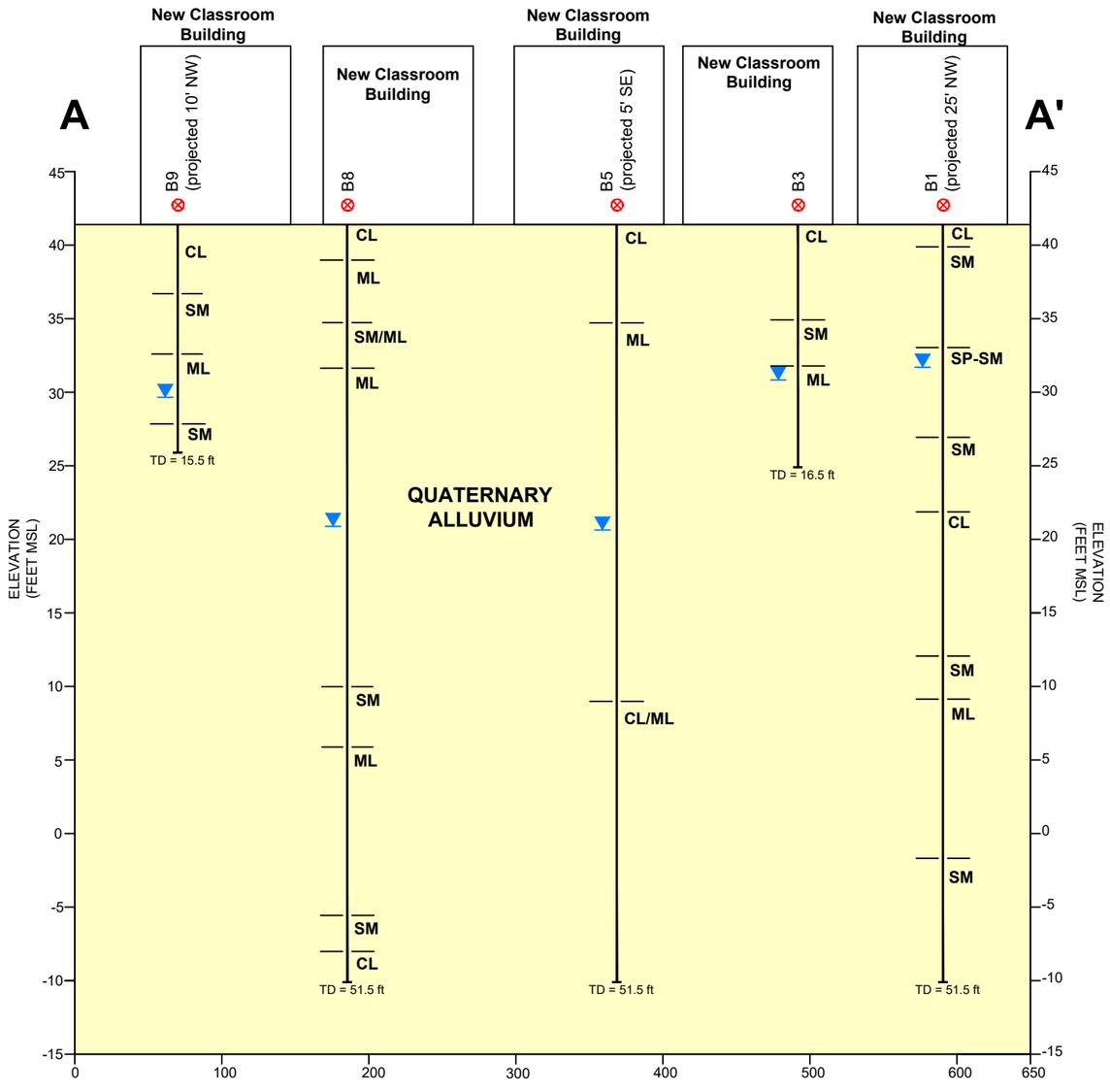
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GEOLOGIC MAP

E9425-04-01	August 2024	Figure 4

GEOCON 7/12/2024 USER Brown M PATH C:\Users\Brown M\OneDrive - Geocon, Inc\GIS Graphics\Projects\E9425-04-01_PLESD_New_MS_Campus\01_ReportMaps\Figure_4_Geologic_Map.mxd



Legend

B9 Exploration Location

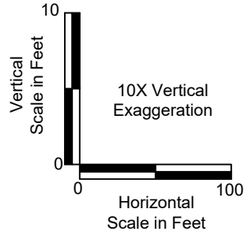
Water Level

Lithology Contact

Quaternary alluvium comprises fan deposits, basin deposits, and Riverbank formation

Soil Classifications:
SP = Poorly graded sands, gravelly sands, little or no fines
SM = Silty sands with or without gravel
ML = Inorganic Silts and very fine sands
CL = Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays

Abbreviation:
ft = Feet
MSL = Mean Sea Level



Notes:
1. This figure depicts generalized subsurface conditions inferred from boring explorations and is intended for use as general geologic characterization and an aid for design. Actual subsurface conditions, including groundwater depths/elevations, may vary. Please refer to the broing logs for detailed subsurface conditions encountered at each boring location.

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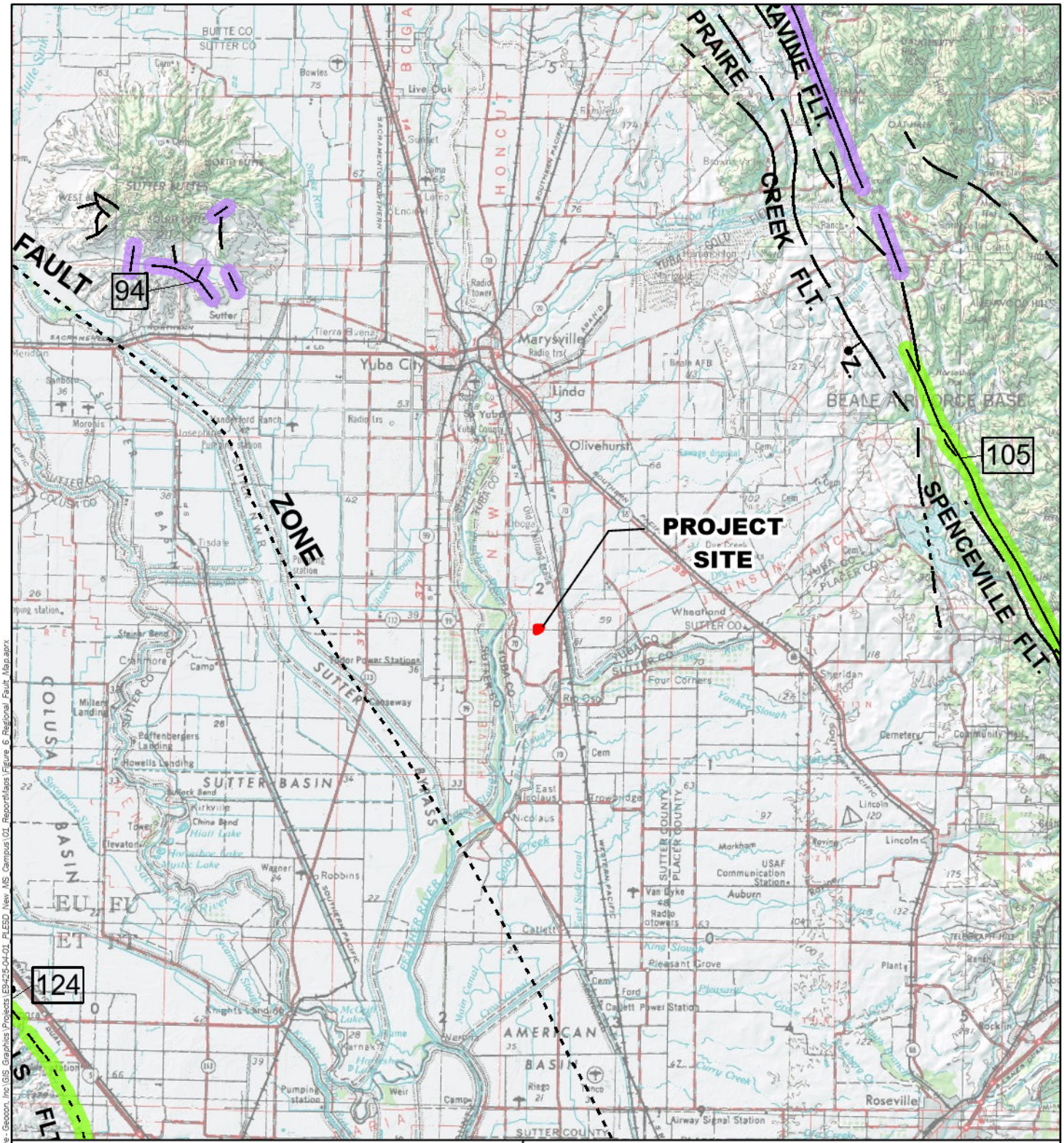
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CROSS SECTION A-A'

E9425-04-01	August 2024	Figure 5

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Fault Activity Map of California by Charles W. Jennings and William A. Bryant published in 2010. (California Department of Conservation, GIS)

Legend

- Structural discontinuity
- Fault, Certain
- Fault, Approximate
- Fault, Concealed
- Thrust Fault, Certain
- Thrust Fault, Approximate
- Fault with Late Quaternary Activity (within past 700,000 years)
- Quaternary Fault (activity with in past 1.6 million years)

N

0 5

Scale in Miles

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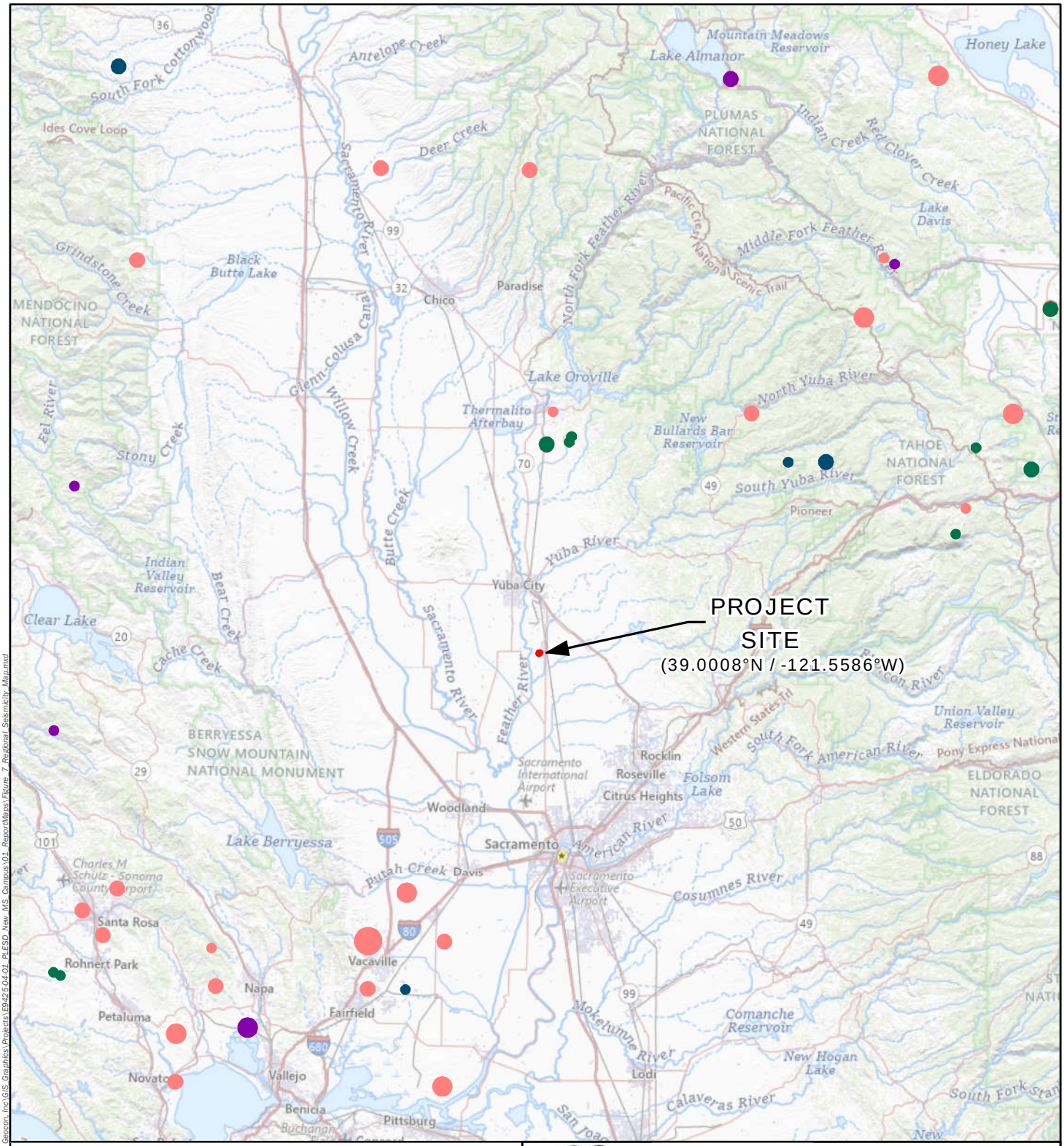
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Plumas Lake, California

REGIONAL FAULT MAP

E9425-04-01	August 2024	Figure 6

GEOCON 8/9/2024 USER:Brown,M PATH:C:\Users\Brown,M\OneDrive - Geocon, Inc\GIS_Graphics\Projects\E9425-04-01_PLESD_New_MS_Campus\02_Reports\Maps\Figure 6_Regional Fault_Map.aprx



Epicenters of and Areas Damaged by M> 5 California Earthquakes, 1800-2023; California Department of Conservation and NOAA

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REGIONAL SEISMICITY MAP

E9425-04-01	August 2024	Figure 7

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APPENDIX A

APPENDIX A

FIELD EXPLORATION

Fieldwork for our investigation included a site visit, subsurface exploration and soil sampling, CPT soundings, and borehole percolation testing. The locations of our exploratory borings, CPT soundings, and borehole percolation tests are shown on the Site Plan, Figure 2. Soil boring logs, CPT profiles, and borehole percolation test results for our exploration are presented as figures following the text in this appendix. The borings, CPT soundings, and borehole percolation tests were located by pacing from existing reference points. Therefore, the exploration locations shown on Figure 2 are approximate.

Our field exploration included drilling 22 exploratory soil borings and 2 shallow borings for borehole percolation testing. Our borings were performed between May 28 and 31, 2024, using a truck-mounted Mobile B-24 drill rig equipped with 4-inch solid-flight augers and a truck-mounted Central Mining Equipment CME55 drill rig equipped with 8-inch hollow-stem augers. Sampling in the borings was accomplished using a 140-pound cathead hammer with a 30-inch drop where advanced with the Mobile B-24 drill rig and a 140-pound automatic-trip hammer with a 30-inch drop where advanced with the CME55 drill rig. Samples were obtained with a 3-inch outside-diameter (OD), split spoon (California Modified) sampler. The number of blows required to drive the sampler the last 12 inches (or fraction thereof) of the 18-inch sampling interval were recorded on the boring logs. The blow counts shown on the boring logs should not be interpreted as standard SPT “N” values; corrections have not been applied. Borings for percolation testing were equipped with an Aardvark constant-head permeameter to evaluate soil hydraulic conductivity.

Subsurface conditions encountered in the exploratory borings were visually examined, classified and logged in general accordance with the American Society for Testing and Materials (ASTM) Practice for Description and Identification of Soils (Visual-Manual Procedure D2488). This system uses the Unified Soil Classification System (USCS) for soil designations. The log depicts soil and geologic conditions encountered and depths at which samples were obtained. The log also includes our interpretation of the conditions between sampling intervals. Therefore, the logs contain both observed and interpreted data. We determined the lines designating the interface between soil materials on the logs using visual observations, drill rig penetration rates, excavation characteristics and other factors. The transition between materials may be abrupt or gradual. Where applicable, the field logs were revised based on subsequent laboratory testing.

Our field exploration also included the advancement of 6 CPT soundings to depths of approximately 50 feet or less below the existing ground surface utilizing a truck-mounted CPT rig with a down-pressure capacity of approximately 20 tons. The CPTs were performed on May 28, 2024, by Middle Earth Geo Testing of Hayward, California using an integrated electronic cone system. The cone has a tip area of 10 square centimeters, a friction sleeve area of 150 square centimeters, and a ratio of friction sleeve area to tip end area equal to 0.80. The cone bearing (Qc) and sleeve friction (Fs) were measured and recorded during tests at approximately 2-inch depth intervals. The CPT data consisting of cone bearing, sleeve friction, friction ratio and equivalent standard penetration blow counts (N) versus penetration depth below the existing ground surface for each location has been recorded and is presented in this appendix.

Our CPT soundings and borings deeper than 5 feet in depth were backfilled with neat cement grout in accordance with Yuba County Environmental Health Department permit requirements. Our borings to 5 feet depth were backfilled with compacted soil cuttings.

UNIFIED SOIL CLASSIFICATION

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO.4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO.4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC CLAYS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
	HIGHLY ORGANIC SOILS		PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

BORING/TRENCH LOG LEGEND

- No Recovery
- Shelby Tube Sample
- Bulk Sample
- SPT Sample
- Modified California Sample
- Groundwater Level (At Completion)
- Groundwater Level (Seepage)

PENETRATION RESISTANCE

SAND AND GRAVEL			SILT AND CLAY			
RELATIVE DENSITY	BLOWS PER FOOT (SPT)*	BLOWS PER FOOT (MOD-CAL)*	CONSISTENCY	BLOWS PER FOOT (SPT)*	BLOWS PER FOOT (MOD-CAL)*	COMPRESSIVE STRENGTH (tsf)
VERY LOOSE	0 - 4	0 - 6	VERY SOFT	0 - 2	0 - 3	0 - 0.25
LOOSE	5 - 10	7 - 16	SOFT	3 - 4	4 - 6	0.25 - 0.50
MEDIUM DENSE	11 - 30	17 - 48	MEDIUM STIFF	5 - 8	7 - 13	0.50 - 1.0
DENSE	31 - 50	49 - 79	STIFF	9 - 15	14 - 24	1.0 - 2.0
VERY DENSE	OVER 50	OVER 79	VERY STIFF	16 - 30	25 - 48	2.0 - 4.0
			HARD	OVER 30	OVER 48	OVER 4.0

*NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE LAST 12 INCHES OF AN 18-INCH DRIVE

MOISTURE DESCRIPTIONS

FIELD TEST	APPROX. DEGREE OF SATURATION, S (%)	DESCRIPTION
NO INDICATION OF MOISTURE; DRY TO THE TOUCH	S<25	DRY
SLIGHT INDICATION OF MOISTURE	25≤S<50	DAMP
INDICATION OF MOISTURE; NO VISIBLE WATER	50≤S<75	MOIST
MINOR VISIBLE FREE WATER	75≤S<100	WET
VISIBLE FREE WATER	100	SATURATED

QUANTITY DESCRIPTIONS

APPROX. ESTIMATED PERCENT	DESCRIPTION
<5%	TRACE
5 - 10%	FEW
11 - 25%	LITTLE
26 - 50%	SOME
>50%	MOSTLY

GRAVEL/COBBLE/BOULDER DESCRIPTIONS

CRITERIA	DESCRIPTION
PASS THROUGH A 3-INCH SIEVE AND BE RETAINED ON A NO. 4 SIEVE (#4 TO 3")	GRAVEL
PASS A 12-INCH SQUARE OPENING AND BE RETAINED ON A 3-INCH SIEVE (3"-12")	COBBLE
WILL NOT PASS A 12-INCH SQUARE OPENING (>12")	BOULDER

BEDDING SPACING DESCRIPTIONS

THICKNESS/SPACING	DESCRIPTOR
GREATER THAN 10 FEET	MASSIVE
3 TO 10 FEET	VERY THICKLY BEDDED
1 TO 3 FEET	THICKLY BEDDED
3 /8-INCH TO 1 FOOT	MODERATELY BEDDED
1 /4-INCH TO 3 /8-INCH	THINLY BEDDED
/8-INCH TO 1 /4-INCH	VERY THINLY BEDDED
LESS THAN /8-INCH	LAMINATED

STRUCTURE DESCRIPTIONS

CRITERIA	DESCRIPTION
ALTERNATING LAYERS OF VARYING MATERIAL OR COLOR WITH LAYERS AT LEAST /4-INCH THICK	STRATIFIED
ALTERNATING LAYERS OF VARYING MATERIAL OR COLOR WITH LAYERS LESS THAN /4-INCH THICK	LAMINATED
BREAKS ALONG DEFINITE PLANES OF FRACTURE WITH LITTLE RESISTANCE TO FRACTURING	FISSURED
FRACTURE PLANES APPEAR POLISHED OR GLOSSY, SOMETIMES STRIATED	SLICKENSIDED
COHESIVE SOIL THAT CAN BE BROKEN DOWN INTO SMALLER ANGULAR LUMPS WHICH RESIST FURTHER BREAKDOWN	BLOCKY
INCLUSION OF SMALL POCKETS OF DIFFERENT SOIL, SUCH AS SMALL LENSES OF SAND SCATTERED THROUGH A MASS OF CLAY	LENSED
SAME COLOR AND MATERIAL THROUGHOUT	HOMOGENOUS

CEMENTATION/INDURATION DESCRIPTIONS

FIELD TEST	DESCRIPTION
CRUMBLES OR BREAKS WITH HANDLING OR LITTLE FINGER PRESSURE	WEAKLY CEMENTED/INDURATED
CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE	MODERATELY CEMENTED/INDURATED
WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE	STRONGLY CEMENTED/INDURATED

IGNEOUS/METAMORPHIC ROCK STRENGTH DESCRIPTIONS

FIELD TEST	DESCRIPTION
MATERIAL CRUMBLES WITH BARE HAND	WEAK
MATERIAL CRUMBLES UNDER BLOWS FROM GEOLOGY HAMMER	MODERATELY WEAK
/8-INCH INDENTATIONS WITH SHARP END FROM GEOLOGY HAMMER	MODERATELY STRONG
HAND-HELD SPECIMEN CAN BE BROKEN WITH **ONE** BLOW FROM GEOLOGY HAMMER	STRONG
HAND-HELD SPECIMEN CAN BE BROKEN WITH **COUPLE** BLOWS FROM GEOLOGY HAMMER	VERY STRONG
HAND-HELD SPECIMEN CAN BE BROKEN WITH **MANY** BLOWS FROM GEOLOGY HAMMER	EXTREMELY STRONG

IGNEOUS/METAMORPHIC ROCK WEATHERING DESCRIPTIONS

DEGREE OF DECOMPOSITION	FIELD RECOGNITION	ENGINEERING PROPERTIES
SOIL	DISCOLORED, CHANGED TO SOIL, FABRIC DESTROYED	EASY TO DIG
COMPLETELY WEATHERED	DISCOLORED, CHANGED TO SOIL, FABRIC MAINLY PRESERVED	EXCAVATED BY HAND OR RIPPING (Saprolite)
HIGHLY WEATHERED	DISCOLORED, HIGHLY FRACTURED, FABRIC ALTERED AROUND FRACTURES	EXCAVATED BY HAND OR RIPPING, WITH SLIGHT DIFFICULTY
MODERATELY WEATHERED	DISCOLORED, FRACTURES, INTACT ROCK-NOTICEABLY WEAKER THAN FRESH ROCK	EXCAVATED WITH DIFFICULTY WITHOUT EXPLOSIVES
SLIGHTLY WEATHERED	MAY BE DISCOLORED, SOME FRACTURES, INTACT ROCK-NOT NOTICEABLY WEAKER THAN FRESH ROCK	REQUIRES EXPLOSIVES FOR EXCAVATION, WITH PERMEABLE JOINTS AND FRACTURES
FRESH	NO DISCOLORATION, OR LOSS OF STRENGTH	REQUIRES EXPLOSIVES

IGNEOUS/METAMORPHIC ROCK JOINT/FRACTURE DESCRIPTIONS

FIELD TEST	DESCRIPTION
NO OBSERVED FRACTURES	UNFRACTURED/UNJOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT 1 TO 3 FOOT INTERVALS	SLIGHTLY FRACTURED/JOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT 4-INCH TO 1 FOOT INTERVALS	MODERATELY FRACTURED/JOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT 1-INCH TO 4-INCH INTERVALS WITH SCATTERED FRAGMENTED INTERVALS	INTENSELY FRACTURED/JOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT LESS THAN 1-INCH INTERVALS; MOSTLY RECOVERED AS CHIPS AND FRAGMENTS	VERY INTENSELY FRACTURED/JOINTED

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KEY TO LOGS

Figure A1

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B1

ELEV. (MSL.) _____ DATE COMPLETED **5/31/2024**

EQUIPMENT **Truck Mounted CME 55 w/ Mud Rotary**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-BULK			CL	**ALLUVIUM** Stiff, moist, dark yellowish brown with black speckling, CLAY			
2	B1-1.5 B1-2					13	104.1	23.2
4	B1-3.5			SM	Very dense, moist, yellowish brown with black specking, Silty SAND, strongly cemented hard pan	50/6"	89.8	31.8
6	B1-5.5				-more silt, strongly cemented hard pan	50/5"		
8	B1-8 B1-8.5				-medium dense, weakly to moderately cemented hard pan	29		
10	B1-11		▼	SP-SM	Medium dense, wet, reddish brown, (f-c) SAND with few silts	20	83.1	21.7
12								
14								
16	B1-15.5 B1-16			SM	Medium dense, wet, reddish brown, Silty (f-m) SAND	35		27.9
18								
20				CL	Stiff, wet, yellowish brown with black speckling, CLAY with few (f) sands			
22								
24	B1-23 B1-23.5					20	89.0	38.2 34.5
26	B1-24.5 B1-25				-very stiff, more sand	45		
28	B1-27.5 B1-28				-stiff	23		

Figure A2, Log of Boring B1, page 1 of 2

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

⊠ ... DISTURBED OR BAG SAMPLE ☐ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B1

ELEV. (MSL.) _____ DATE COMPLETED **5/31/2024**

EQUIPMENT **Truck Mounted CME 55 w/ Mud Rotary**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30				SM	Very dense, wet, yellowish brown with red oxidation staining, Silty (m-c) SAND			
32	B1-32.5					68		
	B1-33			ML	Hard, wet, yellowish brown, Sandy SILT			
34								
36	B1-35.5					29		
	B1-36				-very stiff, bluish gray, elastic, micaceous			
38								
40								
	B1-40.5					40		
42	B1-41				-more sand (f-m)			20.3
44				SM	Dense, wet, yellowish brown, poorly graded Silty (f-m) SAND			
	B1-45.5					46		
46	B1-46							
48								
50								
	B1-50.5				-sand (f-c), with trace subrounded gravels	74		22.4
	B1-51							
					BORING TERMINATED AT 51.5 FEET GROUNDWATER ENCOUNTERED AT 10 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A2, Log of Boring B1, page 2 of 2

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B2

ELEV. (MSL.) _____ DATE COMPLETED **5/29/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B2-BULK			CL	**ALLUVIUM** Very stiff, moist, dark yellowish brown, CLAY			
2	B2-1.5 B2-2			CL/CH	PP= 1.75 Very stiff, moist, yellowish brown, Sandy Silty CLAY -borderline lean to fat	43		
4								
6	B2-5.5				-hard, with white calcium precipitation	50/6"	108.9	20.0
8	B2-7.5 B2-8			SM	Very dense, moist, yellowish brown with black speckling, Silty (f) SAND	50/6"	103.3	22.0
10	B2-10 B2-10.5		▼		-wet, with trace white calcium precipitation	50/6"	98.3	25.3
12								
14				ML	Hard, wet, yellowish brown with red oxidation staining, Sandy SILT			
16	B2-15 B2-15.5					50/6"		
					BORING TERMINATED AT 16 FEET GROUNDWATER ENCOUNTERED AT 11 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A3, Log of Boring B2, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B3

ELEV. (MSL.) _____ DATE COMPLETED **5/29/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B3-BULK			CL	**ALLUVIUM** Very stiff, moist, dark yellowish brown with black speckling, CLAY			
2	B3-1.5 B3-2				-hard, with sand and silt, hard pan	85/11"	96.3	22.5
4								
6	B3-5				-with white calcium precipitation	50/5"		
8	B3-8 B3-8.5			SM	Very dense, moist, reddish brown, Silty (m) SAND	82/12"	102.3	22.1
10	B3-10.5		▼	ML	Hard, wet, yellowish brown, (f) Sandy SILT	78/12"		
12								
14								
16	B3-15.5 B3-16				- with interbedded lenses of poorly graded SAND	63	86.6	36.6
					BORING TERMINATED AT 16.5 FEET GROUNDWATER ENCOUNTERED AT 11 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A4, Log of Boring B3, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
▨ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
☐ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B4

ELEV. (MSL.) _____ DATE COMPLETED **5/28/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
	B4-1			ML	**ALLUVIUM** Hard, moist, dark yellowish brown with black speckling, SILT with (f-c) sand -hard pan, moderately to strongly cemented	50/6"		20.3
2								
4								
	B4-5				-with white calcium precipitation	50/6"		
6								
8	B4-8				-light yellowish brown, moderately cemented	50/5"		
10	B4-10							
	B4-10.5		▼		-wet, yellowish brown with red oxidation staining, more sand, moderately cemented	50/5"	96.1	26.6
12								
14								
	B4-15.5				-dark yellowish brown with black speckling, moderately cemented	50/6"		
16					BORING TERMINATED AT 16 FEET GROUNDWATER ENCOUNTERED AT 11 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A5, Log of Boring B4, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B5

ELEV. (MSL.) _____ DATE COMPLETED **5/30/2024**

EQUIPMENT **Truck Mounted CME 55 w/ Mud Rotary**

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B5-BULK	CL	**ALLUVIUM** Medium stiff, moist, reddish brown with black speckling, CLAY			
2	B5-1.5 B5-2		PP=1.5 tsf	29	100.2	23.0
4	B5-3		-hard, with sand and silt, hard pan	50/5"		
6	B5-5.5		-strongly cemented	50/5"	99.4	19.7
8	B5-8 B5-8.5	ML	Hard, most, yellowish brown with black speckling, Sandy SILT -weakly cemeneted -with interbedded lenses of Silty SAND	61	89.7	32.7
10	B5-10.5		-very stiff, less sand	37		38.8
12	B5-11				82.5	39.5
14						
16	B5-15.5 B5-16		-hard	61		
18						
20			▼			
22	B5-22.5 B5-23		-very stiff, wet	26		39.6
24						
26	B5-25.5 B5-26		-with red oxidation staining	30		
28	B5-28 B5-28.5		-interbedded lenses of more sand	51		37.0

Figure A6, Log of Boring B5, page 1 of 2

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B5

ELEV. (MSL.) _____ DATE COMPLETED **5/30/2024**

EQUIPMENT **Truck Mounted CME 55 w/ Mud Rotary**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30								
32								
34				CL-ML	Hard, wet, light yellowish brown with black speckling and red oxidation staining, Clayey SILT to Silty CLAY			
36	B5-35.5 B5-36					50		
38								
40	B5-39.5 B5-40				-very stiff	40		
42								
44								
46	B5-45.5 B5-46					85/12"		
48								
50	B5-50.5 B5-51				-hard, reddish brown	81/11"		
					BORING TERMINATED AT 51.5 FEET GROUNDWATER ENCOUNTERED AT 21 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A6, Log of Boring B5, page 2 of 2

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ☐ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B6

ELEV. (MSL.) _____ DATE COMPLETED **5/28/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**ALLUVIUM** Hard, moist, dark yellowish brown with black speckling, Lean CLAY PP= 1.75 tsf			
2	B6-1 B6-1.5				-hard, with sand and silt, hard pan, with white calcium precipitation	50/6"	104.1	20.9
4								
6	B6-5					50/6"	92.8	19.2
8	B6-8 B6-8.5			ML	Very stiff, moist, dark yellowish brown, Sandy SILT -with interbedded layers of poorly graded (f-m) SAND	42	87.8	27.7 32.1
10			▼		-wet			
12					-no recovery	54		
14				CL	Hard, wet, dark yellowish brown with black speckling, Sandy CLAY			
16	B6-15.5					78/12"		
					BORING TERMINATED AT 16 FEET GROUNDWATER ENCOUNTERED AT 10 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A7, Log of Boring B6, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

⊠ ... DISTURBED OR BAG SAMPLE ☐ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B7

ELEV. (MSL.) _____ DATE COMPLETED **5/28/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2	B7-1 B7-1.5			CL	**ALLUVIUM** Stiff, moist, dark yellowish brown, Lean CLAY -hard, yellowish brown with black speckling, with sand and silt, hard pan	50/5"	108.1	18.0
4								
6	B7-5					50/4"	101.2	16.7
8	B7-8			SM	Very dense, moist, yellowish brown, Silty (f-m) SAND with few (f) gravels, with white calcium percipitation	50/6"		25.9
10	B7-10.5 B7-11		▼	ML	Hard, moist, yellowish brown with red oxidation staining, SILT with trace sand and clay -wet	50/6"	84.0	38.3
12								
14								
16	B7-15.5 B7-16					80		
					BORING TERMINATED AT 16.5 FEET GROUNDWATER ENCOUNTERED AT 11 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A8, Log of Boring B7, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B8

ELEV. (MSL.) _____ DATE COMPLETED **5/30/2024**

EQUIPMENT **Truck Mounted CME 55 w/ Mud Rotary**

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B8-BULK	CL	**ALLUVIUM** Medium stiff, moist, dark yellowish brown, CLAY			
2	B8-2			12	111.6	20.7
4	B8-3.5	ML	Hard, moist, yellowish brown with black speckling, Sandy Clayey SILT, hard pan	50/6"		
6	B8-5.5 B8-6		-with white calcium precipitation, and trace rounded gravels	78/11"	113.1	17.6
8	B8-8 B8-8.5	SM/ML	Dense, moist, reddish brown, Silty (f-c) SAND to Sandy SILT with trace rounded gravel -interbedded lenses of poorly graded SAND	62	111.1	19.3 19.4
10	B8-10.5 B8-11	ML	Hard, moist, light yellowish brown with red oxidation staining and black speckling, SILT with clay	58	87.9	34.5
12						
14	B8-14		-with sand, with white calcium precipitation	50/6"		
16			-very stiff, more sand (f-m)			
18	B8-17 B8-17.5			38	95.8	35.3 29.5
20			▼ -wet			
22			-hard, reddish brown with black speckling, with white calcium precipitation			
24	B8-23.5 B8-24			49		
26						
28						

Figure A9, Log of Boring B8, page 1 of 2

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

⊠ ... DISTURBED OR BAG SAMPLE ☐ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B8

ELEV. (MSL.) _____ DATE COMPLETED **5/30/2024**

EQUIPMENT **Truck Mounted CME 55 w/ Mud Rotary**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B8-30.5 B8-31				-very stiff	43		
32				SM	Medium dense, wet, reddish brown, Silty (m-c) SAND			
34								
36	B8-35.5 B8-36			ML	Stiff, wet, yellowish brown with black speckling, Clayey SILT with trace (f) sand	23		23.7
38								
40	B8-40.5 B8-41				-very stiff	42		
42								
44								
46	B8-45.5 B8-46					65		
48				SM	Dense, wet, yellowish brown with red oxidation staining, Silty (f-m) SAND			
50	B8-50.5 B8-51			CL	Hard, moist, yellowish brown with black speckling, Silty CLAY	90/12"		

BORING TERMINATED AT 51.5 FEET
GROUNDWATER ENCOUNTERED AT 21 FEET
BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS

Figure A9, Log of Boring B8, page 2 of 2

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B9

ELEV. (MSL.) _____ DATE COMPLETED **5/29/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B9-BULK	CL	**ALLUVIUM** Stiff, moist, dark yellowish brown, CLAY with trace sand PP= 1.75 tsf			
2	B9-1.5 B9-2		-hard, yellowish brown with black speckling, with sand and silt, hard pan	50/6"	101.8	24.1
4			-with white calcium precipitation			
6	B9-5	SM	Very dense, moist, yellowish brown with black speckling, Silty (f-c) SAND with few (f) gravels, strongly cemented, with white calcium precipitation	50/6"		20.8
8						
10	B9-10.5 B9-11	ML	Hard, moist, yellowish brown with red oxidation staining, SILT with trace sand	62	82.3	37.4
12			-wet			
14		SM	Dense, wet, dark reddish brown, Silty SAND			
16	B9-15.5 B9-16			45	104.8	21.5
			BORING TERMINATED AT 16.5 FEET GROUNDWATER ENCOUNTERED AT 12 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A10, Log of Boring B9, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B10

ELEV. (MSL.) _____ DATE COMPLETED **5/29/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	Very dense, moist, yellowish brown, Silty (f-m) SAND			
2	B10-1.5 B10-2					70	107.0	16.3 17.3
4								
6	B10-5			ML	Hard, moist, yellowish brown with black speckling, Sandy SILT, hard pan	50/6"	104.6	17.7
8	B2-7.5				-strongly cemented hard pan	50/3"		
10	B10-10.5				-with white calcium precipitation, weakly cemented hard pan	50/5"		36.1
12								
14			▼		-wet			
	B10-15					50/6"	100.0	22.0
					BORING TERMINATED AT 15.5 FEET GROUNDWATER ENCOUNTERED AT 14 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A11, Log of Boring B10, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B11

ELEV. (MSL.) _____ DATE COMPLETED **5/28/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0						
	B11-1.5	CH	**ALLUVIUM** Stiff, moist, dark yellowish brown, fat CLAY	54		
2	B11-2				94.0	26.6
		CL	Hard, moist, yellowish brown with black speckling, Sandy CLAY with silt, hard pan			
4						
			-with white calcium precipitation			
6	B11-5.5 B11-6	ML	Hard, moist, yellowish brown with red oxidation staining, SILT with trace (f) sand	50	78.4	39.8
8	B11-8			44		
	B11-8.5	SM	Medium dense, moist, dark yellowish brown with red oxidation staining, Silty SAND - with interbedded lenses of poorly graded SAND			
10	B11-10.5		-wet	27	95.3	22.5
	B11-11					28.9
12						
14						
16	B11-15.5 B11-16	ML	Hard, wet, dark yellowish brown with black speckling, Sandy SILT, weakly cemented	68		

BORING TERMINATED AT 16.5 FEET
GROUNDWATER ENCOUNTERED AT 10 FEET
BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS

Figure A12, Log of Boring B11, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
⊠ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
☐ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B12

ELEV. (MSL.) _____ DATE COMPLETED **5/31/2024**

EQUIPMENT **Truck Mounted CME 55 w/ Mud Rotary**

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B12-BULK	CL	**ALLUVIUM** Medium stiff, moist, dark yellowish brown with black speckling, CLAY			
2	B12-1.5 B12-2			9		
			-hard, with sand and silt, hard pan			
4	B12-3.5 B12-4			79/11"		
			-strongly cemented hard pan			
6	B12-5.5 B12-6	SM	Very dense, moist, yellowish brown with black speckling, Silty (f) SAND	70/12"	97.4	26.1
8	B12-8 B12-8.5		-medium dense	28	96.7	28.9
		ML	Very stiff, moist, yellowish brown with black speckling, Sandy SILT			
10	B12-10.5 B12-11		-with interbedded lenses of Silty SAND, white calcium precipitation	29	99.5	26.8
12		SP	Dense, wet, reddish brown, poorly graded SAND			
14		ML	Hard, wet, yellowish brown, Sandy SILT, with white calcium precipitation			
16	B12-15.5 B12-16			82/11"		
18						
20						
22						
24	B12-23 B12-23.5 B12-24.5 B12-25		-less sand	26 59		40.2
26		SM	Medium dense, wet, yellowish brown with red oxidation staining, Silty (f-m) SAND			
28	B12-27.5 B12-28			38		34.6

Figure A13, Log of Boring B12, page 1 of 2

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
▨ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
☐ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B12

ELEV. (MSL.) _____ DATE COMPLETED **5/31/2024**

EQUIPMENT **Truck Mounted CME 55 w/ Mud Rotary**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30					-reddish brown, less silt			
32	B12-32.5 B12-33					32		32.9
34								
36	B12-35.5 B12-36					32		
38								
40	B12-40.5 B12-41			SP-SM	Medium dense, wet, yellowish brown with white speckling, (f-m) SAND with few silts	30		29.7
42								
44				ML	Hard, wet, yellowish brown mottling, Sandy SILT with clay			
46	B12-45.5 B12-46					78/12"		
48								
50	B12-50.5					50/5"		
					BORING TERMINATED AT 51 FEET GROUNDWATER ENCOUNTERED AT 12 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A13, Log of Boring B12, page 2 of 2

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B13

ELEV. (MSL.) _____ DATE COMPLETED **5/29/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B13-BULK			CL	**ALLUVIUM** Very stiff, moist, dark yellowish brown with black speckling, CLAY			
2	B13-1 B13-1.5				-hard, with sand and silt, hard pan	50/6"	115.3	17.1
4								
6	B13-5				-hard pan	50/5"	95.4	19.9
8	B13-7.5 B13-8					50/5"	106.6	21.5
10				SM	Very dense, moist, reddish brown, Silty SAND			
	B13-10.5 B13-11				-with interbedded lenses of fine to medium grained poorly graded SAND	82/12"		
12			▼					
14					-wet			
16	B13-15.5					50/6"	87.2	32.6
					BORING TERMINATED AT 16 FEET GROUNDWATER ENCOUNTERED AT 13 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A14, Log of Boring B13, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B14

ELEV. (MSL.) _____ DATE COMPLETED **5/29/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B14-BULK B14-1			CL	**ALLUVIUM** Very stiff, moist, dark yellowish brown with black speckling, CLAY	50/5"		
2					-hard, with sand and silt, hard pan			
4								
6	B14-5				-hard pan	50/5"		
8	B14-8 B14-8.5			SM	Very dense, moist, yellowish brown, Silty SAND	90		
10	B14-10.5 B14-11		▼		-with interbedded lenses of poorly graded SAND -wet	68	100.0	23.6
12								
14								
16	B14-15.5 B14-16					70		
					BORING TERMINATED AT 16.5 FEET GROUNDWATER ENCOUNTERED AT 11 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A15, Log of Boring B14, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B15

ELEV. (MSL.) _____ DATE COMPLETED **5/29/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B15-BULK			CL	**ALLUVIUM** Very stiff, moist, dark yellowish brown with black speckling, CLAY			
2	B15-1.5 B15-2					27	105.8	22.4
4					-hard, with sand and silt, hard pan			
6	B15-5					50/6"	106.3	17.8
8	B15-7.5				-light yellowish brown, with white calcium precipitation, hard pan	50/6"		
10	B15-10.5		▼	ML	Hard, moist, light yellowish brown, (f) Sandy SILT, weakly cemented	50/6"	99.0	24.6
12					-wet			
14								
16	B15-15.5 B15-16				-with interbedded lenses of poorly graded SAND	75/12"		
					BORING TERMINATED AT 16.5 FEET GROUNDWATER ENCOUNTERED AT 12 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A16, Log of Boring B15, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B17

ELEV. (MSL.) _____ DATE COMPLETED **5/29/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B17-BULK			CL	**ALLUVIUM** Stiff, moist, dark yellowish brown with black speckling, CLAY			
2	B17-2.5 B17-3				-hard, with sand and silt, hard pan, with white calcium precipitation	60	110.1	18.2
4	B17-4.5					57		
					BORING TERMINATED AT 5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A17, Log of Boring B17, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B18

ELEV. (MSL.) _____ DATE COMPLETED **5/29/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B18-BULK			CL	**ALLUVIUM** Stiff, moist, dark yellowish brown with black speckling, CLAY			
2	B18-2 B18-2.5				-hard, with sand and silt, hard pan	50/5"	97.9	24.7
4	B17-4.5				-with white calcium precipitation	80/12"	108.8	16.4
					BORING TERMINATED AT 5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A18, Log of Boring B18, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B20

ELEV. (MSL.) _____ DATE COMPLETED **5/29/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B20-BULK			CL	**ALLUVIUM** Stiff, moist, dark yellowish brown with black speckling, CLAY			
2	B20-1.5 B20-2				-hard, with sand and silt, hard pan	50/4"	106.5	22.8
4								
6	B20-5			ML	Hard, moist, yellowish brown with red oxidation staining, (f) Sandy SILT, with calcium precipitation	50/6"	97.9	25.4
8	B20-7.5 B20-8					50/6"		
10					-more sand			
12	B20-11		▼			80/12"	86.9	32.8
14				SM	Medium dense, wet, dark reddish brown, poorly graded (m) SAND with silt			
16	B20-15.5 B20-16					32		20.9
					BORING TERMINATED AT 16.5 FEET GROUNDWATER ENCOUNTERED AT 13 FEET BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A19, Log of Boring B20, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B21

ELEV. (MSL.) _____ DATE COMPLETED **5/29/2024**

EQUIPMENT **Truck Mounted Rig w/ 4" Solid Stem Auger**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B21-BULK			CH	**ALLUVIUM** Stiff, moist, dark yellowish brown with black speckling, fat CLAY with trace sand			
2	B21-2.5 B21-3					18		
4	B21-4 B21-4.5			CL	Hard, moist, yellowish brown with black speckling, Sandy CLAY with silt, hard pan, with white calcium precipitation	62	97.1	25.9
					BORING TERMINATED AT 5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A20, Log of Boring B21, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B23

ELEV. (MSL.) _____ DATE COMPLETED **5/30/2024**

EQUIPMENT **Truck Mounted CME 55 w/ Mud Rotary**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B23-BULK			CL	**ALLUVIUM** Stiff, moist, dark yellowish brown with black speckling, CLAY with sand			
2	B23-2.5 B23-3					10	105.9	21.0 21.3
4	B23-4 B23-4.5			SM	Very dense, moist, reddish brown, Silty SAND - weakly cemented	71/12"		
					BORING TERMINATED AT 5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A21, Log of Boring B23, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B24

ELEV. (MSL.) _____ DATE COMPLETED **5/30/2024**

EQUIPMENT **Truck Mounted CME 55 w/ Mud Rotary**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B24-BULK			CL	**ALLUVIUM** Stiff, moist, dark yellowish brown with black speckling, CLAY with sand			
2	B24-2.5 B24-3					18	113.2	16.9
4	B24-4 B24-4.5				-hard, with silt, hard pan	55		
					BORING TERMINATED AT 5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A22, Log of Boring B24, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E9425-04-01** PROJECT NAME **PLESD New Middle School Campus**

BORING B26

ELEV. (MSL.) _____ DATE COMPLETED **5/30/2024**

EQUIPMENT **Truck Mounted CME 55 w/ Mud Rotary**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B26-BULK			CL	**ALLUVIUM** Stiff, moist, dark yellowish brown with black speckling, CLAY with trace sand			
2	B26-2.5 B26-3					19	105.5	23.1
4	B26-4 B26-4.5				-hard, light reddish brown with black speckling, more sand, with silt, hard pan	88/12"		
					BORING TERMINATED AT 5 FEET GROUNDWATER NOT ENCOUNTERED BACKFILLED WITH NEAT CEMENT GROUT AND SOIL CUTTINGS			

Figure A23, Log of Boring B26, page 1 of 1

GEO_NO_WELL E9425-04-01 PLESD NEW MS CAMPUS GI LOGS.GPJ 08/08/24

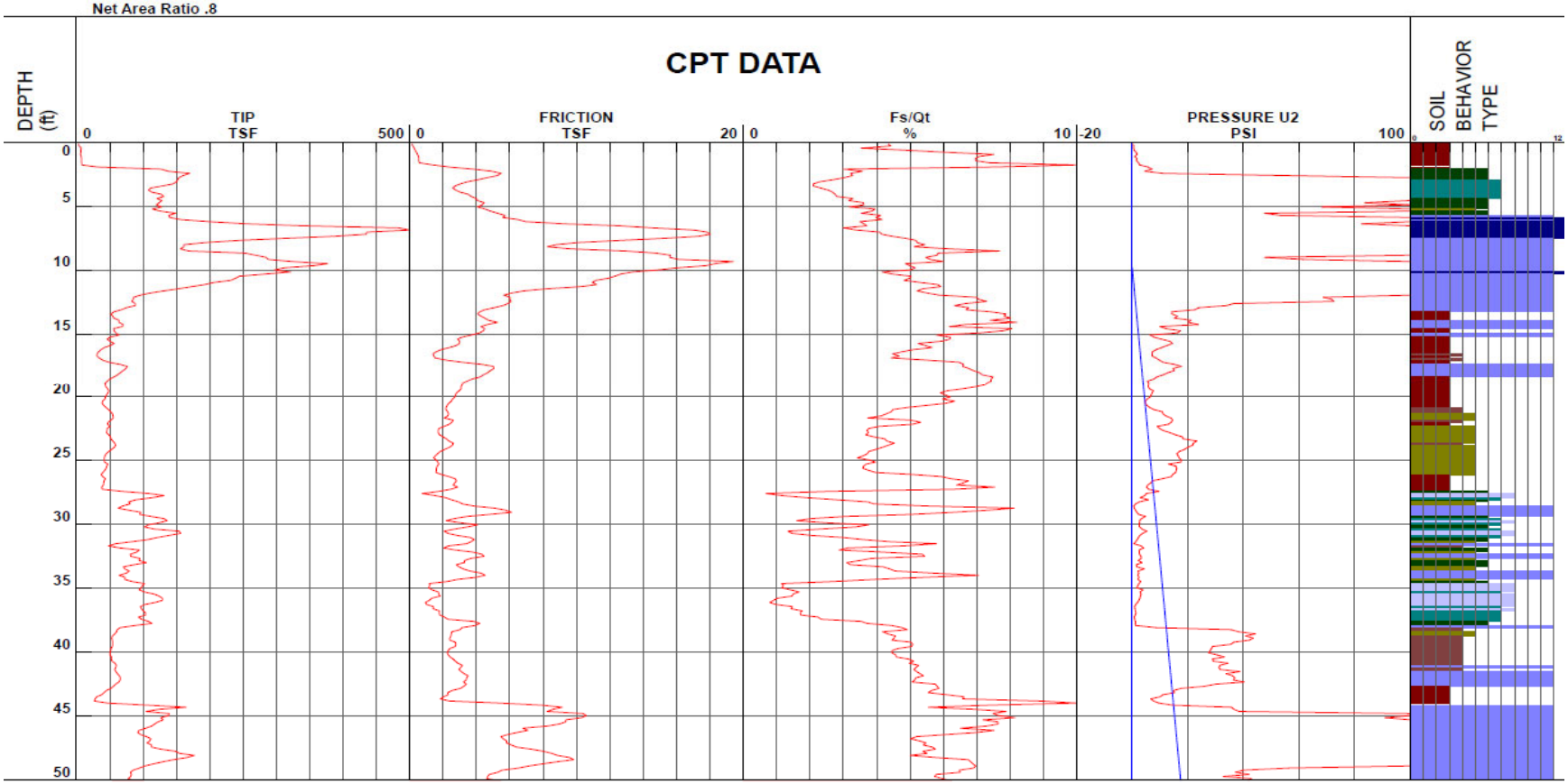
SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
☐ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Project	PLESD NEW MS Campus	Operator	JM-FA	Filename	SDF(992).cpt
Job Number	E9425-04-01	Cone Number	DPG1556	GPS	
Hole Number	CPT-01	Date and Time	5/28/2024 2:32:11 PM	Maximum Depth	50.85 ft
EST GW Depth During Test	9.90 ft				

Net Area Ratio .8



Cone Size 15cm²

*Soil behavior type and SPT based on data from UBC-1983

GEOCON CONSULTANTS, INC.

CONE PENETROMETER TEST DATA

CPT 1

Project: Plumas Lake ESD New Middle School Campus

Location: Plumas Lake, California

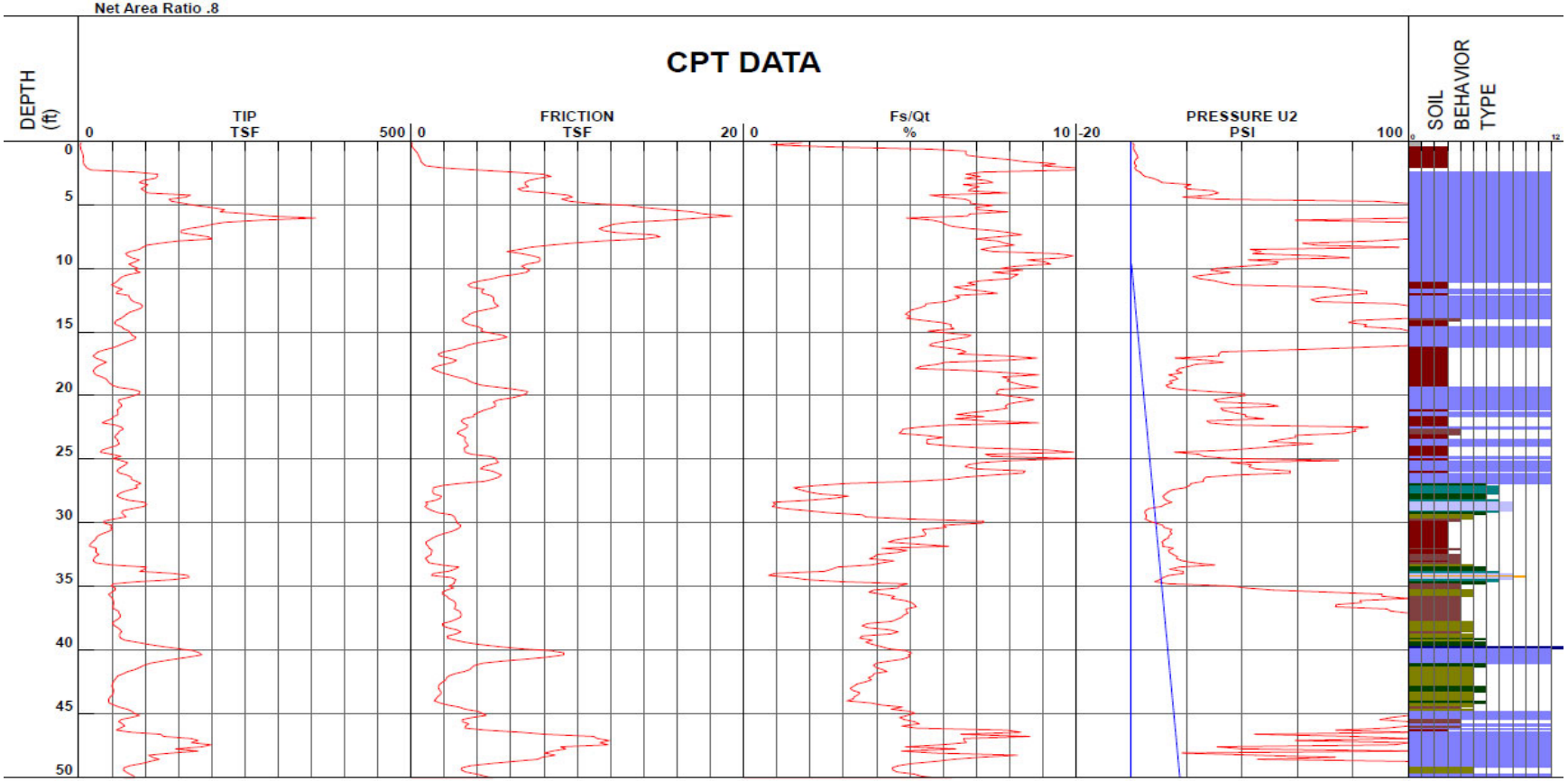
Project No. E9425-04-01

Date: August 2024

FIGURE A24

Project	PLESD NEW MS Campus	Operator	JM-FA	Filename	SDF(993).cpt
Job Number	E9425-04-01	Cone Number	DPG1556	GPS	
Hole Number	CPT-02	Date and Time	5/28/2024 3:35:10 PM	Maximum Depth	50.85 ft
EST GW Depth During Test		9.70 ft			

Net Area Ratio .8



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 15cm²

*Soil behavior type and SPT based on data from UBC-1983

GEOCON CONSULTANTS, INC.

CONE PENETROMETER TEST DATA

CPT 2

Project: Plumas Lake ESD New Middle School Campus

Location: Plumas Lake, California

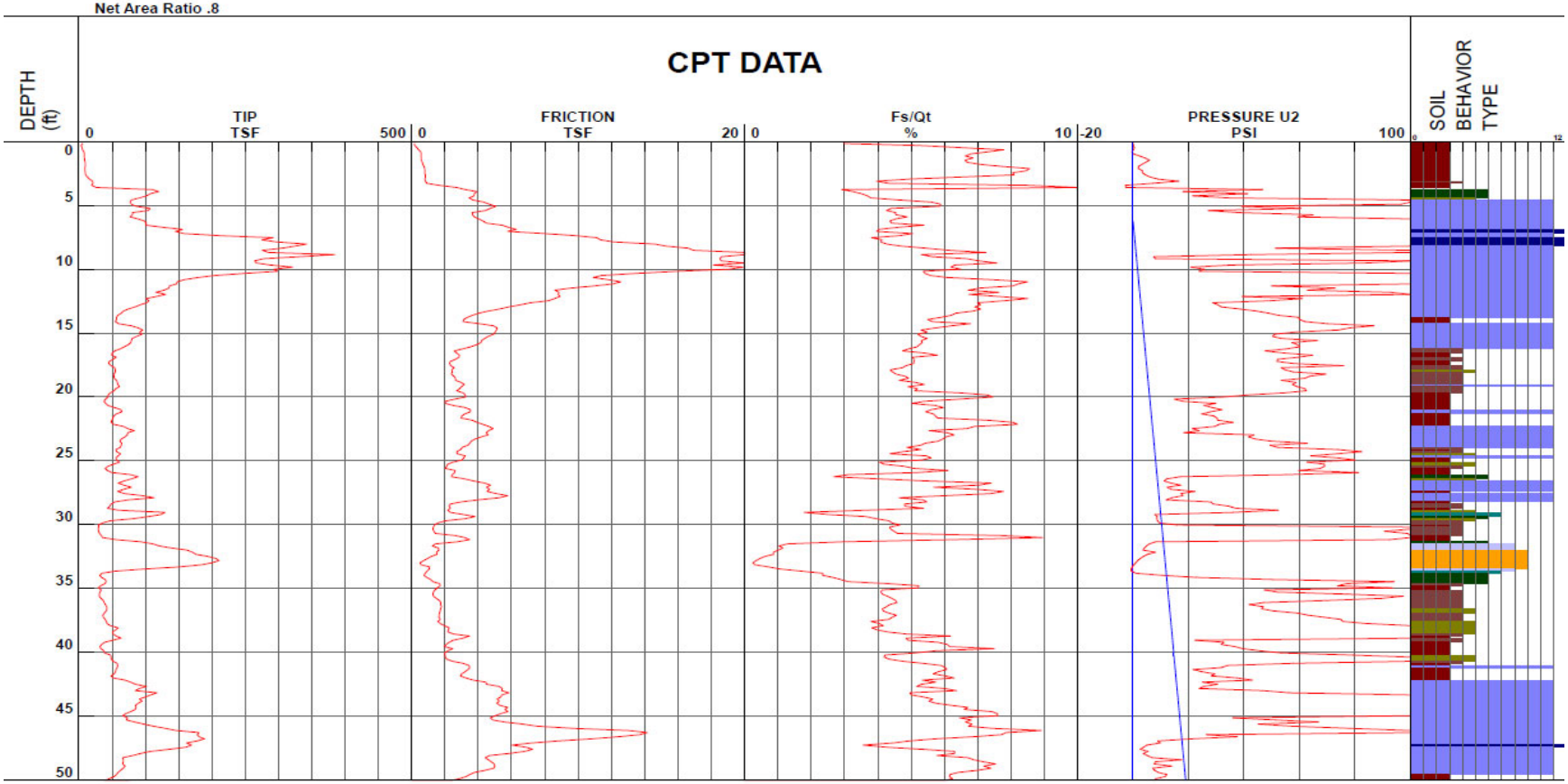
Project No. E9425-04-01

Date: August 2024

FIGURE A25

Project	PLESD NEW MS Campus	Operator	JM-FA	Filename	SDF(985).cpt
Job Number	E9425-04-01	Cone Number	DDG1627	GPS	
Hole Number	CPT-03	Date and Time	5/28/2024 8:18:28 AM	Maximum Depth	50.85 ft
EST GW Depth During Test		6.20 ft			

Net Area Ratio .8



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 15cm²

S*Soil behavior type and SPT based on data from UBC-1983

GEOCON CONSULTANTS, INC.

CONE PENETROMETER TEST DATA

CPT 3

Project: Plumas Lake ESD New Middle School Campus

Location: Plumas Lake, California

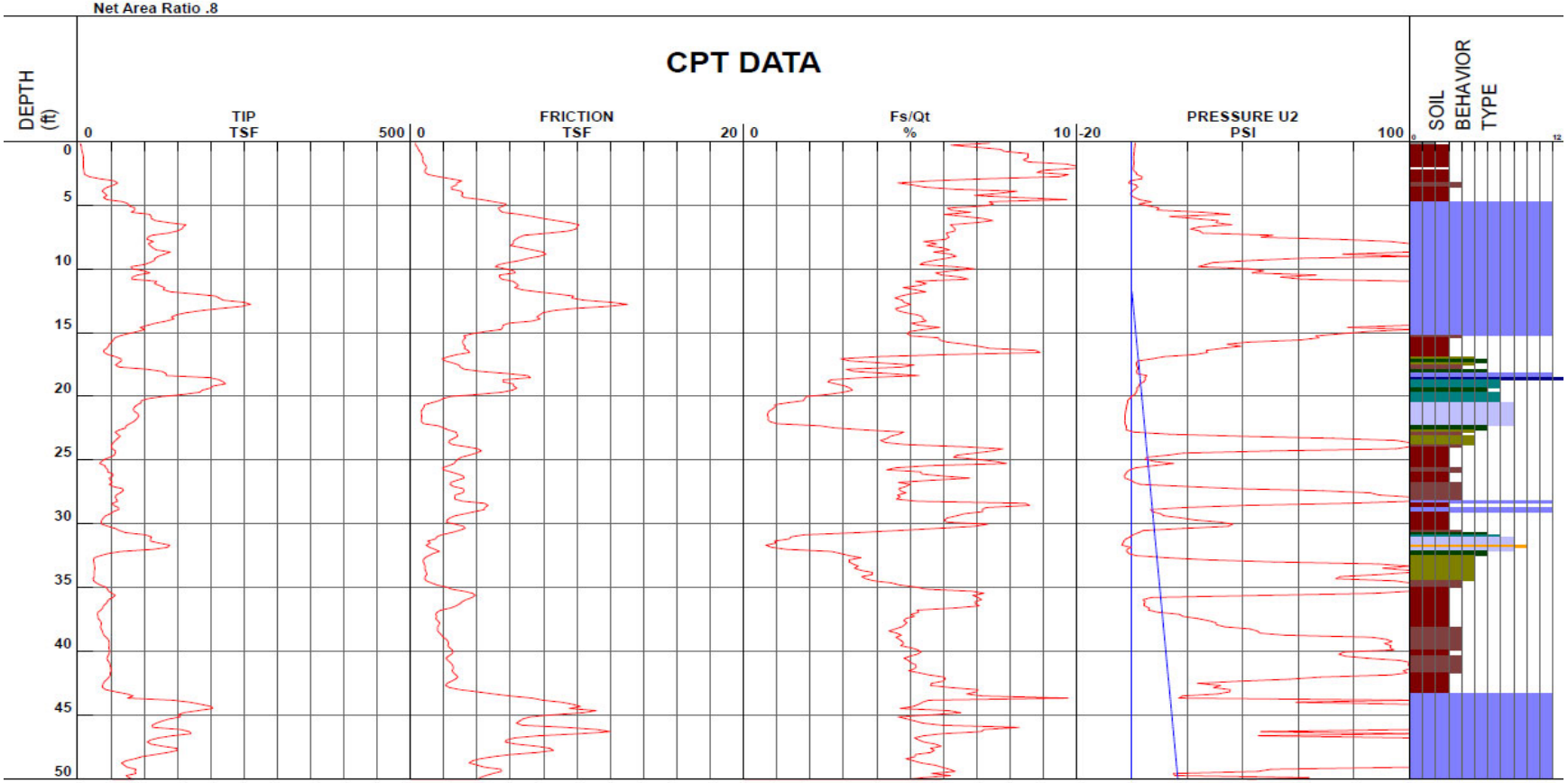
Project No. E9425-04-01

Date: August 2024

FIGURE A26

Project	PLESD NEW MS Campus	Operator	JM-FA	Filename	SDF(986).cpt
Job Number	E9425-04-01	Cone Number	DDG1627	GPS	
Hole Number	CPT-04	Date and Time	5/28/2024 9:45:31 AM	Maximum Depth	50.85 ft
EST GW Depth During Test		11.90 ft			

Net Area Ratio .8



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 15cm²

*Soil behavior type and SPT based on data from UBC-1983

GEOCON CONSULTANTS, INC.

CONE PENETROMETER TEST DATA

CPT 4

Project: Plumas Lake ESD New Middle School Campus

Location: Plumas Lake, California

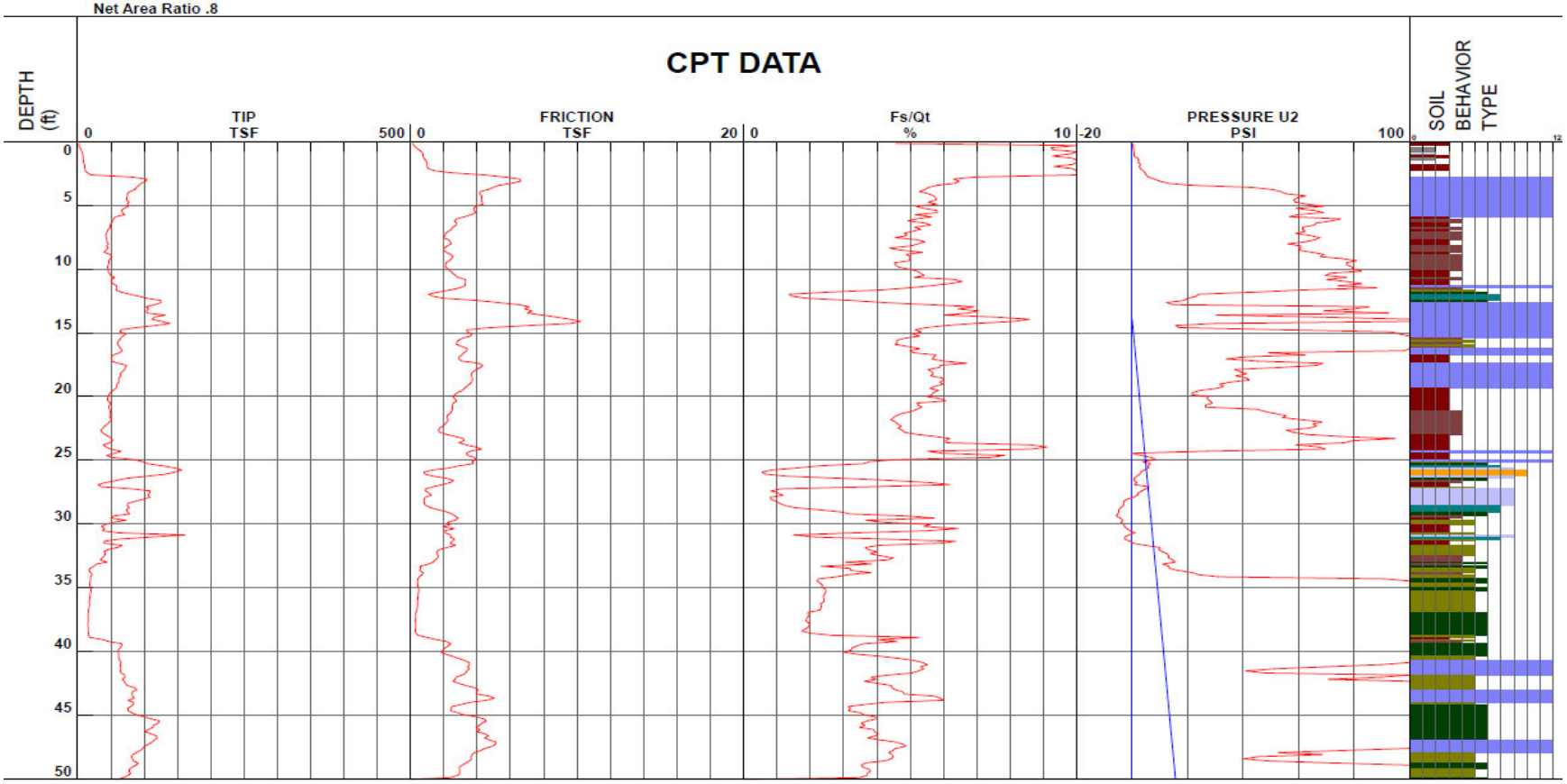
Project No. E9425-04-01

Date: August 2024

FIGURE A27

Project	PLESD NEW MS Campus	Operator	JM-FA	Filename	SDF(990).cpt
Job Number	E9425-04-01	Cone Number	DPG1556	GPS	
Hole Number	CPT-05	Date and Time	5/28/2024 1:49:53 PM	Maximum Depth	50.36 ft
EST GW Depth During Test		14.00 ft			

Net Area Ratio .8



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm²

S*Soil behavior type and SPT based on data from UBC-1983

GEOCON CONSULTANTS, INC.

CONE PENETROMETER TEST DATA

CPT 5

Project: Plumas Lake ESD New Middle School Campus

Location: Plumas Lake, California

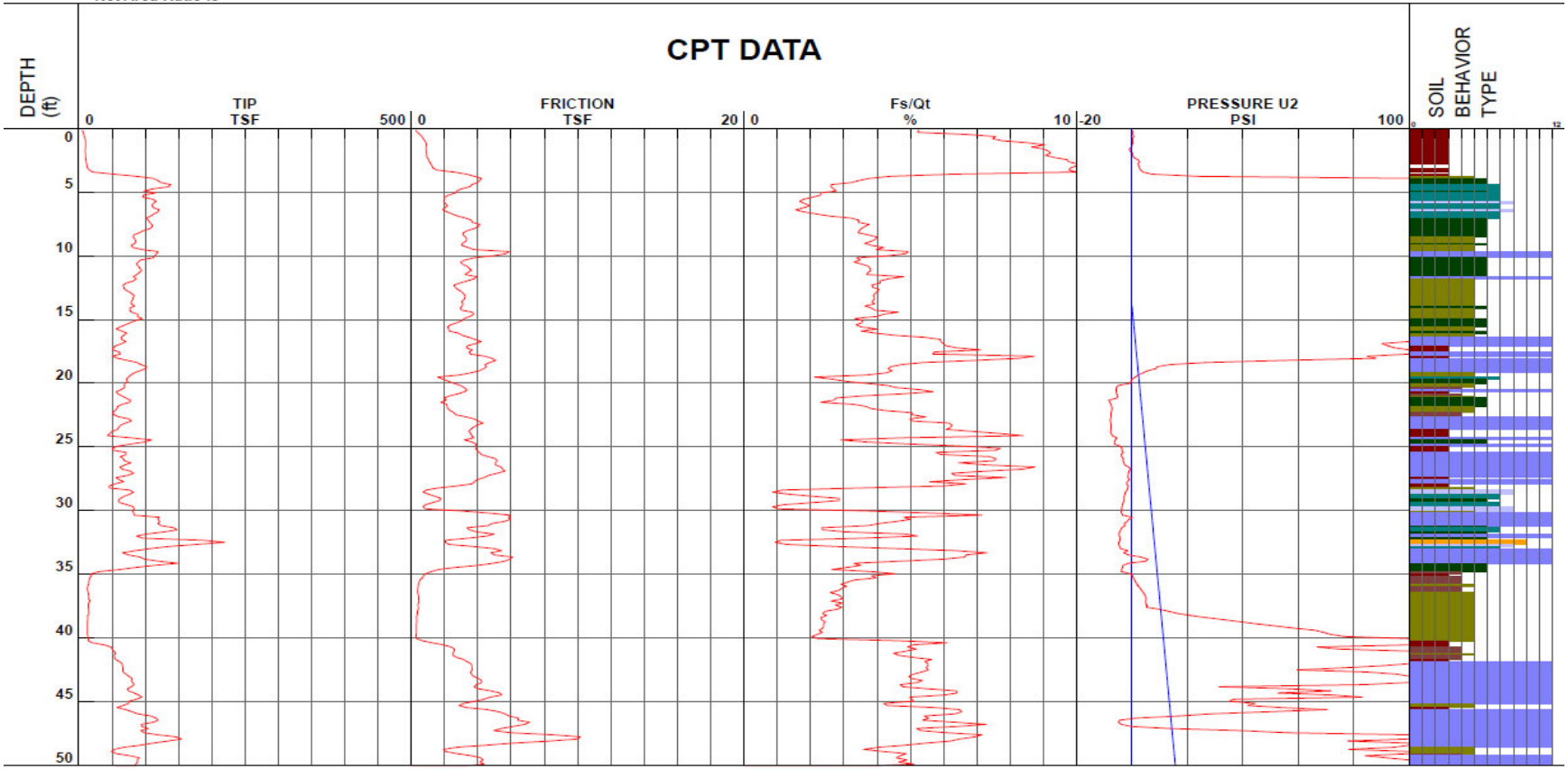
Project No. E9425-04-01

Date: August 2024

FIGURE A28

Project	PLESD NEW MS Campus	Operator	JM-FA	Filename	SDF(987).cpt
Job Number	E9425-04-01	Cone Number	DPG1556	GPS	
Hole Number	CPT-06	Date and Time	5/28/2024 12:01:20 PM	Maximum Depth	50.69 ft
EST GW Depth During Test		14.00 ft			

Net Area Ratio .8



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm²

*Soil behavior type and SPT based on data from UBC-1983

GEOCON CONSULTANTS, INC.

CONE PENETROMETER TEST DATA

CPT 6

Project: Plumas Lake ESD New Middle School Campus

Location: Plumas Lake, California

Project No. E9425-04-01

Date: August 2024

FIGURE A29

Aardvark Permeameter Data Analysis

GEOCON

Project Name:	PLESD New MS Campus GI	Date:	5/29/2024
Project Number:	E9425-04-01	By:	HL
Borehole Location:	P-1	Ref. EL:	
USCS Soil Class:	CL/S, hard pan	Bottom EL:	

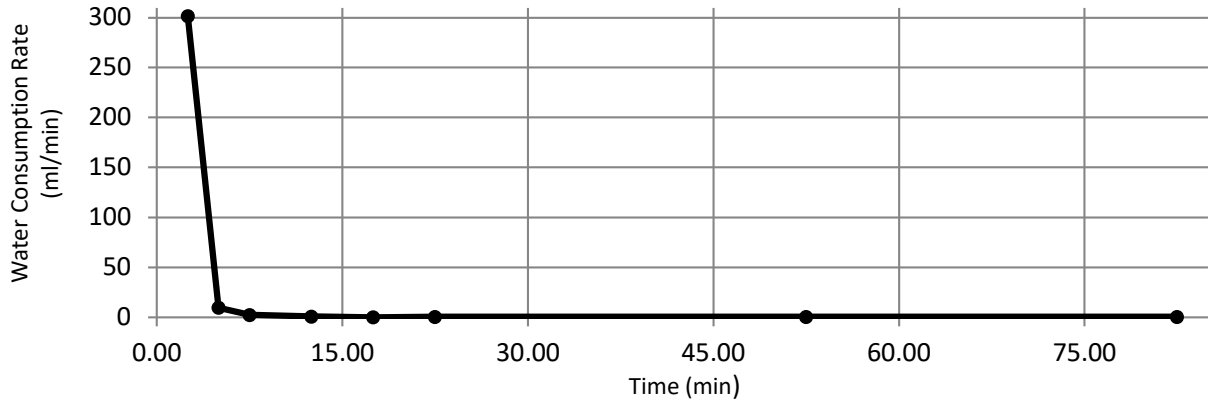
Borehole Diameter (2r):	4.00	in	=	10.16	cm
Borehole Depth (H):	4.58	ft	=	139.60	cm
Dist. Btwn Reservoir & Top of Borehole:	2.33	ft	=	71.02	cm
Depth to Water Table (s):	10.00	ft	=	304.80	cm
Height APM Raised from Bottom:	0.00	in	=	0.00	cm

Distance Btwn Reservoir and APM (D):	192.2018	cm
Head Height (h):	9.58	cm
Distance Btwn Constant Head and Water Table (L):	174.78	cm

Reading	Time (min)	Time Elapsed (min)	Resevoir Water Weight (g)	Interval Water Consumption (g)	Total Water Consumption (g)	*Water Consumption Rate (ml/min)
1	0.00		9346			
2	2.50	2.50	8592	754	754	301.60
3	5.00	2.50	8568	24	778	9.60
4	7.50	2.50	8562	6	784	2.40
5	12.50	5.00	8558	4	788	0.80
6	17.50	5.00	8558	0	788	0.00
7	22.50	5.00	8556	2	790	0.40
8	52.50	30.00	8544	12	802	0.40
9	82.50	30.00	8532	12	814	0.40

*1 ml = 1 g

Steady Flow Rate, ml/min (Q): 0.40



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3	K_{sat} =	0.0005	cm/min	0.0130	in/hr

Project: Plumas Lake ESD New Middle School Campus
Location: Plumas Lake, California
Project No. E9425-04-01

FIGURE A30

GEOCON

Aardvark Permeameter Data Analysis

Project Name:	PLESD New MS Campus GI	Date:	5/29/2024
Project Number:	E9425-04-01	By:	HL
Borehole Location:	P-2	Ref. EL:	
USCS Soil Class:	CL/S, hard pan	Bottom EL:	

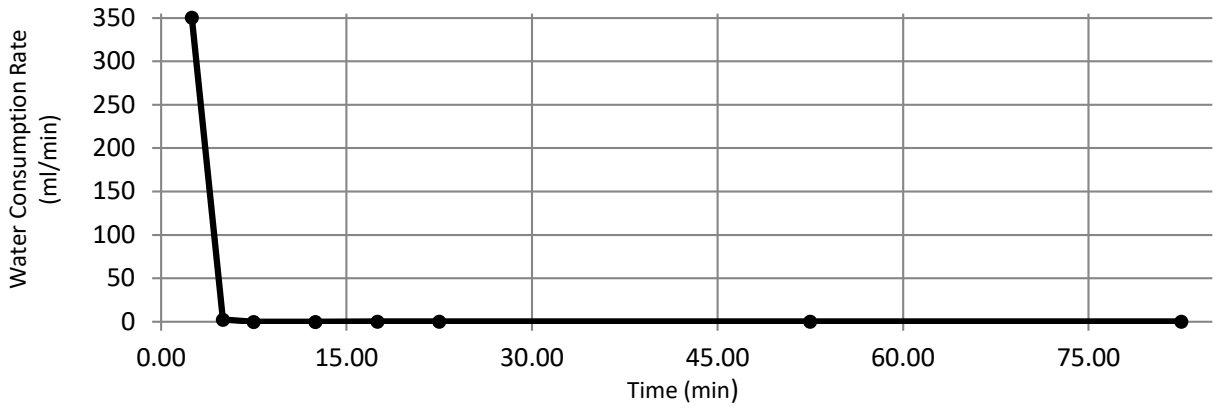
Borehole Diameter (2r):	4.00	in	=	10.16	cm
Borehole Depth (H):	4.92	ft	=	149.96	cm
Dist. Btwn Reservoir & Top of Borehole:	2.33	ft	=	71.02	cm
Depth to Water Table (s):	10.00	ft	=	304.80	cm
Height APM Raised from Bottom:	0.00	in	=	0.00	cm

Distance Btwn Reservoir and APM (D):	202.565	cm
Head Height (h):	9.61	cm
Distance Btwn Constant Head and Water Table (L):	164.45	cm

Reading	Time (min)	Time Elapsed (min)	Resevoir Water Weight (g)	Interval Water Consumption (g)	Total Water Consumption (g)	*Water Consumption Rate (ml/min)
1	0.00		8096			
2	2.50	2.50	7220	876	876	350.40
3	5.00	2.50	7214	6	882	2.40
4	7.50	2.50	7214	0	882	0.00
5	12.50	5.00	7214	0	882	0.00
6	17.50	5.00	7212	2	884	0.40
7	22.50	5.00	7210	2	886	0.40
8	52.50	30.00	7198	12	898	0.40
9	82.50	30.00	7186	12	910	0.40

*1 ml = 1 g

Steady Flow Rate, ml/min (Q): 0.40



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3	K_{sat} =	0.0005	cm/min	0.0129	in/hr

Project: Plumas Lake ESD New Middle School Campus
Location: Plumas Lake, California
Project No. E9425-04-01

FIGURE A31

APPENDIX B

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected samples were tested for in-situ dry density and moisture content, grain size distribution, Atterberg Limits, expansion, maximum dry density and optimum moisture content, shear strength, unconfined compressive strength, R-value, and screening-level corrosion parameters. The results of our testing are summarized in tabular format below and the following figures. In-situ dry density and/or moisture content test results are included on the boring logs in Appendix A.

TABLE B-I
SUMMARY OF LABORATORY ATTERBERG LIMITS TEST RESULTS
ASTM D 4318

Sample No.	Liquid Limit	Plastic Limit	Plasticity Index
B1-27.5	41	23	18
B2-1.5	50	28	22
B4-5	40	33	7
B6-1	49	21	28
B8-3.5	33	25	8
B11-1.5	51	21	30
B13-1	43	18	25
B21-2.5	52	20	32
B24-2.5	49	20	29
B26-2.5	39	19	20

TABLE B-II
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829

Sample No.	Moisture Content		Dry Density* (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
B1-BULK	12.0	28.2	101.9	80
B9-BULK	12.2	31.6	99.9	85
B14-BULK	11.8	29.8	102.0	90
B20-BULK	12.0	26.8	103.2	95

* before saturation

APPENDIX B
LABORATORY TESTING (Continued)

TABLE B-III
SUMMARY OF LABORATORY GRAIN SIZE ANALYSIS – NO. 200 WASH
ASTM D 1140

Boring No.	Sample Depth (feet)	Fraction Passing No. 200 Sieve (%)
B1	15.5	45
B1	23	92
B1	41	56
B5	10.5	97
B5	28	87
B6	8	56
B8	17	74
B8	35.5	24
B11	10.5	24
B12	23	99
B12	27	35
B12	33	22
B12	40.5	5
B20	15.5	23
B23	2.5	79

TABLE B-IV
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT
ASTM D 1557

Boring No.	Sample Depth (feet)	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B2	0-5	118.5	12.0
B12	0-5	121.0	11.5

TABLE B-V
SUMMARY OF LABORATORY R-VALUE TEST RESULTS
ASTM D 2844

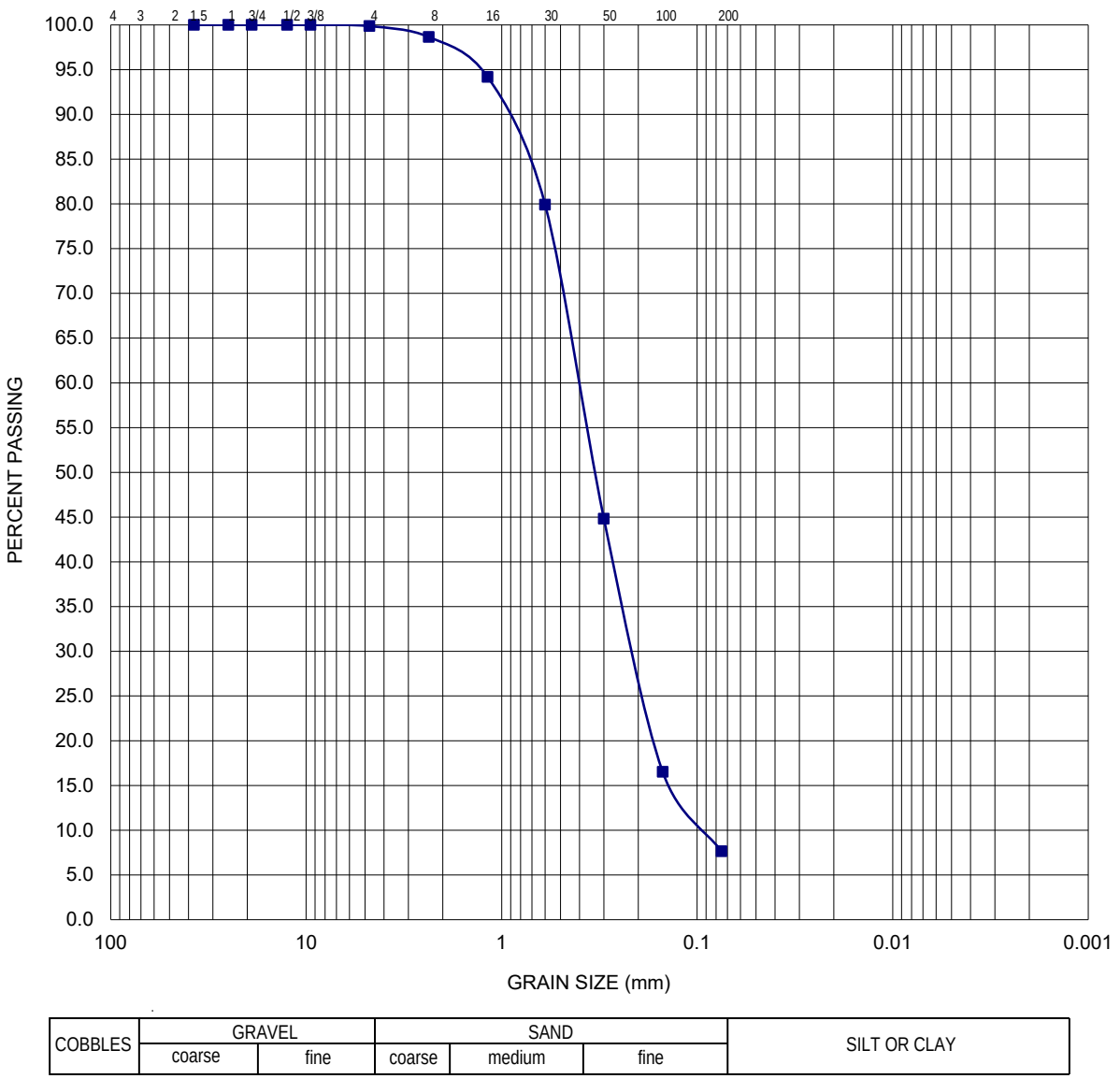
Sample No.	Description	R-Value
B1-BULK	Brown CLAY with sand and silt	8
B17-BULK	Yellow-brown CLAY with sand and silt	<5

APPENDIX B
LABORATORY TESTING (Continued)

TABLE B-VI
SUMMARY OF SOIL CORROSION PARAMETERS
CTM 643, CTM 417, CTM 422

Sample No.	Soil Type (USCS Classification)	Resistivity (ohm-cm)	pH	Chloride (ppm)	Sulfate (ppm)
B1-1.5	CLAY (CL)	880	6.6	<10	55
B3-5	CLAY with sand and silt (CL)	1,210	7.7	<10	32
B7-1	CLAY with sand and silt (CL)	910	7.0	<10	18
B9-1.5	CLAY with trace sand (CL)	780	7.6	<10	53
B11-5.5	SILT with trace sand (ML)	1,900	7.6	<10	43
B12-3.5	CLAY with sand and silt (CL)	1,180	7.2	<10	24
B14-1	CLAY with sand and silt (CL)	1,150	7.1	<10	43
B20-2	CLAY with sand and silt (CL)	960	6.8	<10	47

1. Caltrans considers a site corrosive to foundation elements if one or more of the following conditions exist for the representative soil samples at the site:
   - The pH is equal to or less than 5.5.
   - Chloride concentration is equal to or greater than 500 parts per million (ppm) or 0.05%.
   - Sulfate concentration is equal to or greater than 1,500 ppm (0.15%)
2. According to the American Concrete Institute 318 Chapter 19, Type II cement may be used where sulfate levels are below 2,000 ppm (0.2%)
3. Resistivity serves as an indicator parameter for the possible presence of soluble salts and is not included as a parameter to define a corrosive area for structures. A minimum resistivity value for soil and/or water less than 1,100 ohm-centimeters indicates the presence of high quantities of soluble salts and a higher propensity for corrosion.



Boring: B1

Depth To Sample: 11.0

Sieve Date: 7/2/2024

Tested and Computed by: TS

Test Data

Sieve Number	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
% Passing	100	100	100	100	100	99.9	98.7	94.2	79.9	44.8	16.5	7.7

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Fax: (925) 371-5915

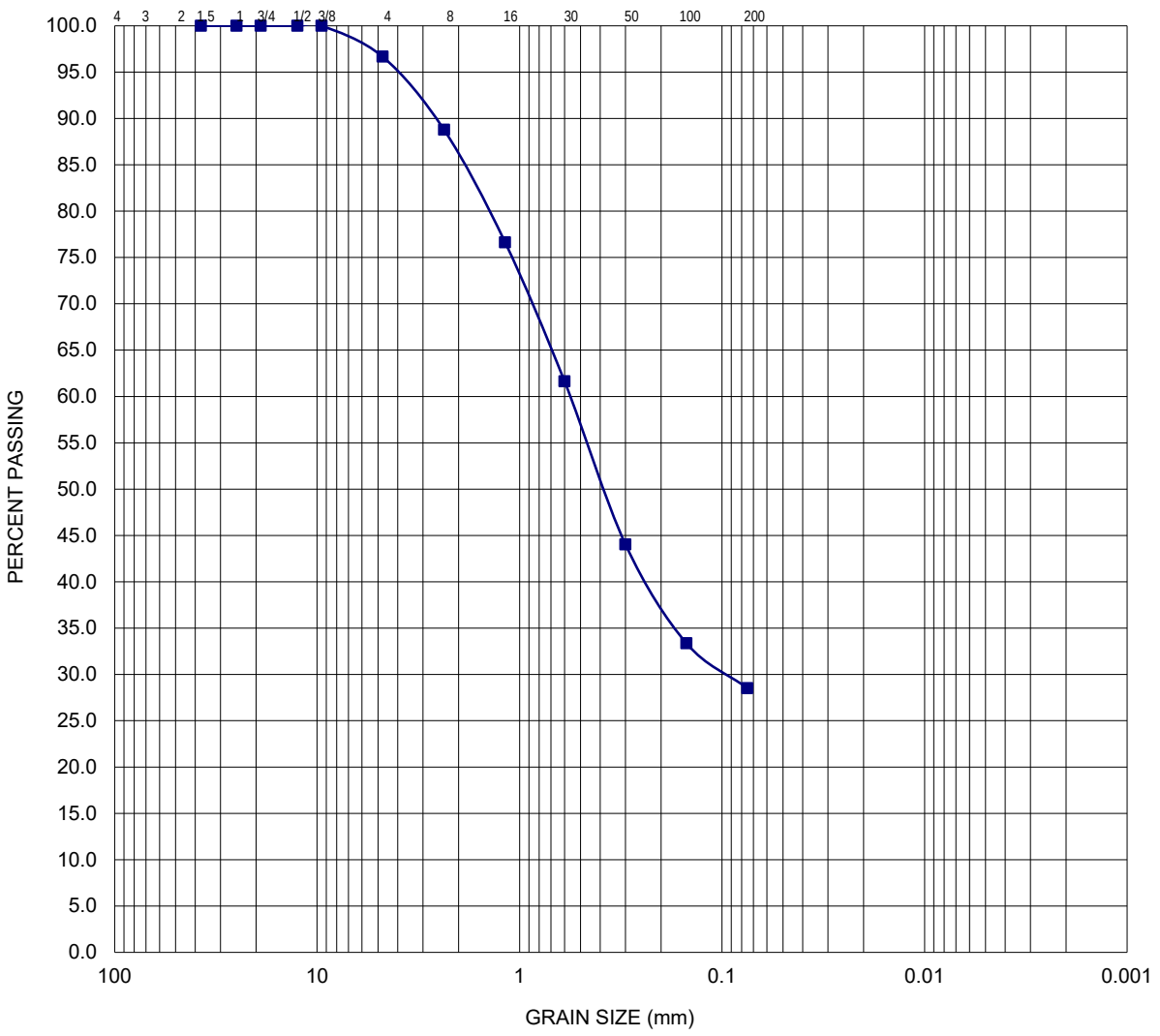
Particle Size Analysis - ASTM D422

Project: PLESD New MS Campus

Location: Plumas Lake, California

Project No.: E9425-04-01

Figure B1



Boring: B1

Depth To Sample: 50.5

Sieve Date: 7/2/2024

Tested and Computed by: TS

Test Data

Sieve Number	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
% Passing	100	100	100	100	100	96.7	88.8	76.6	61.6	44.0	33.4	28.5

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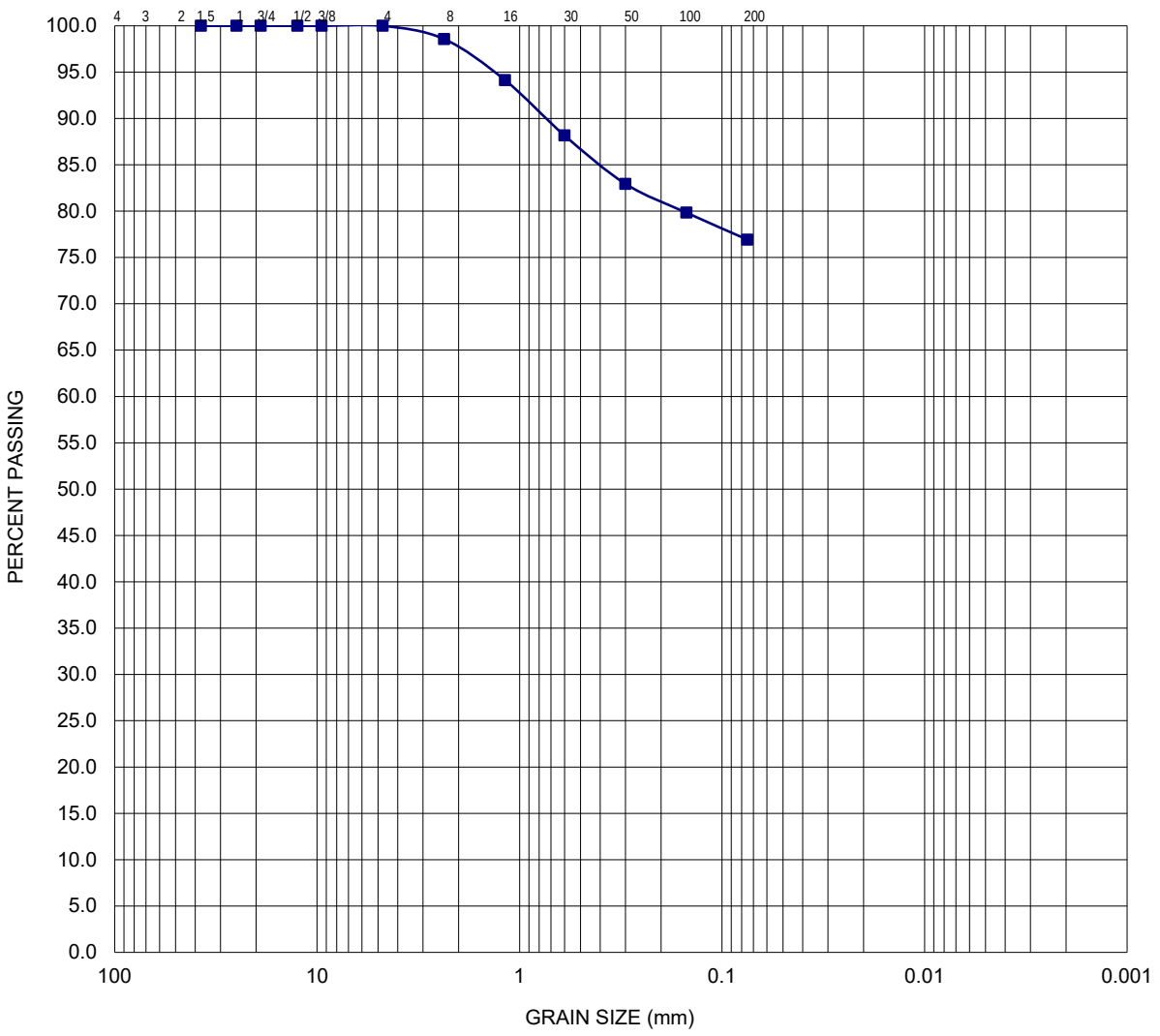
Particle Size Analysis - ASTM D422

Project: PLESD New MS Campus

Location: Plumas Lake, California

Project No.: E9425-04-01

Figure B2



Boring: B4

Depth To Sample: 1.0

Sieve Date: 7/2/2024

Tested and Computed by: TS

Test Data

Sieve Number	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
% Passing	100	100	100	100	100	100.0	98.6	94.1	88.2	82.9	79.8	76.9

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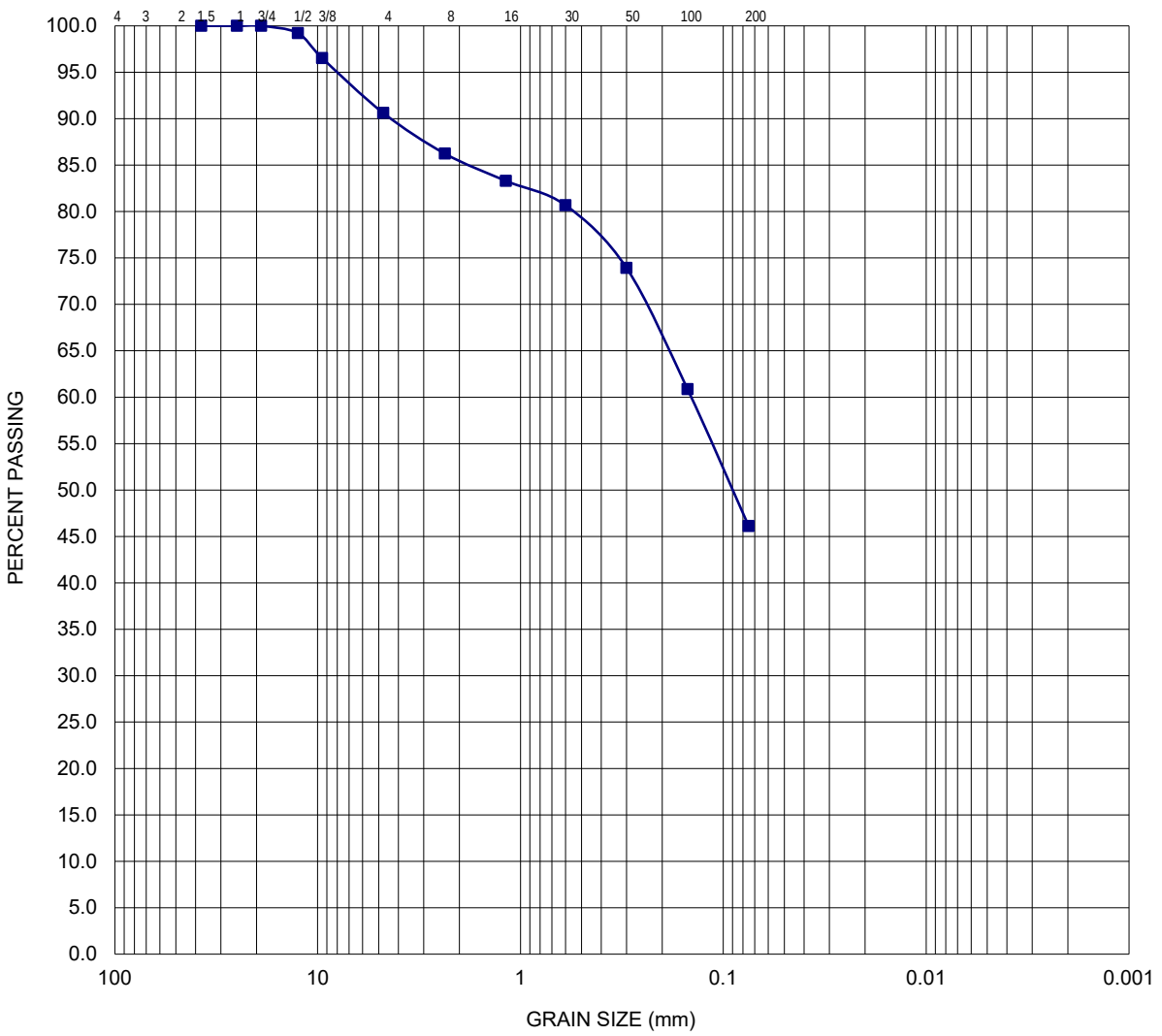
Particle Size Analysis - ASTM D422

Project: PLESD New MS Campus

Location: Plumas Lake, California

Project No.: E9425-04-01

Figure B3



Boring: B7

Depth To Sample: 8.0

Sieve Date: 7/2/2024

Tested and Computed by: TS

Test Data

Sieve Number	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
% Passing	100	100	100	99	97	90.6	86.2	83.3	80.7	73.9	60.9	46.1

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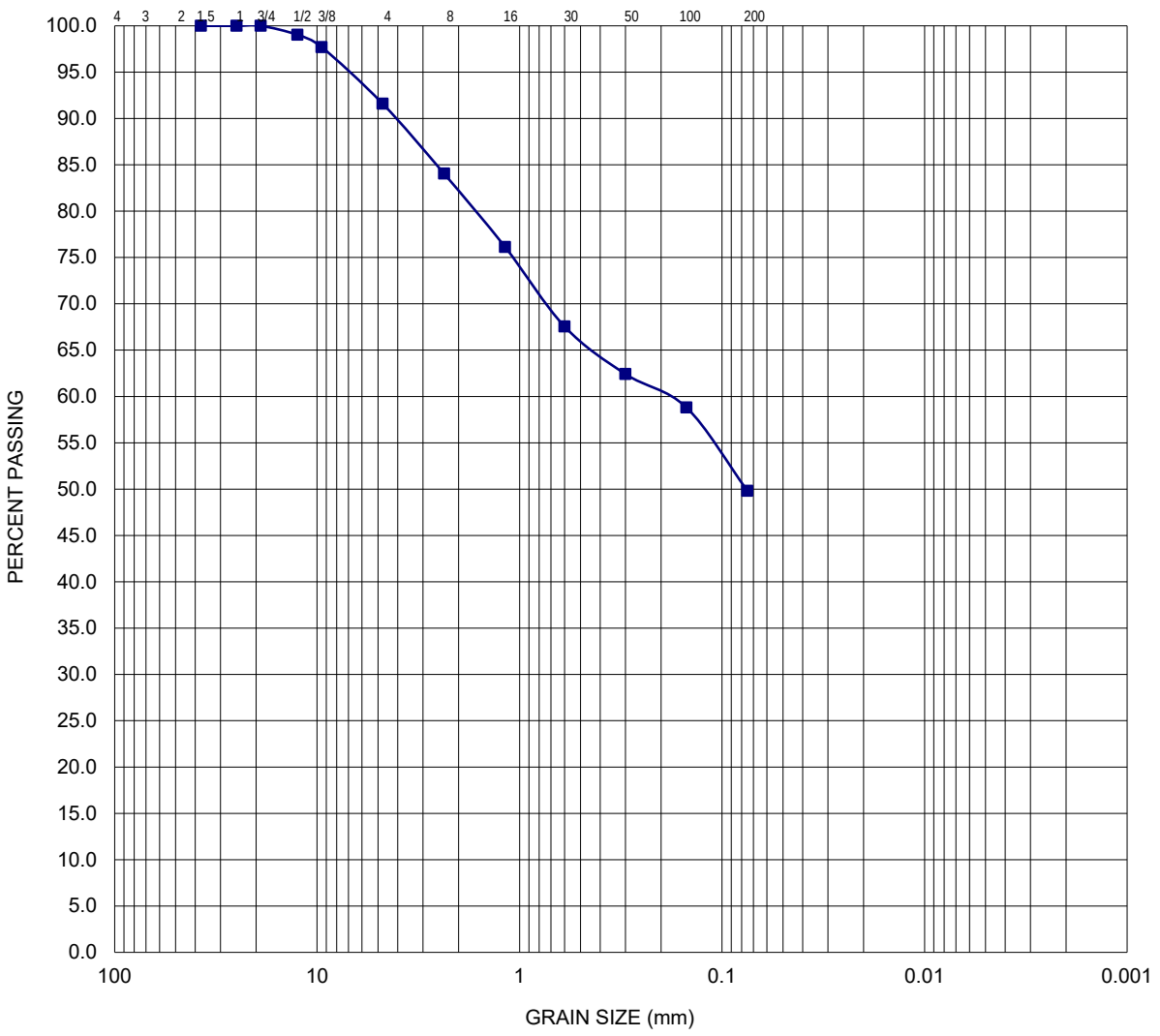
Particle Size Analysis - ASTM D422

Project: PLESD New MS Campus

Location: Plumas Lake, California

Project No.: E9425-04-01

Figure B4



Boring: B8

Depth To Sample:8.0

Sieve Date: 7/2/2024

Tested and Computed by: TS

Test Data

Sieve Number	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
% Passing	100	100	100	99	98	91.6	84.0	76.1	67.5	62.4	58.8	49.8

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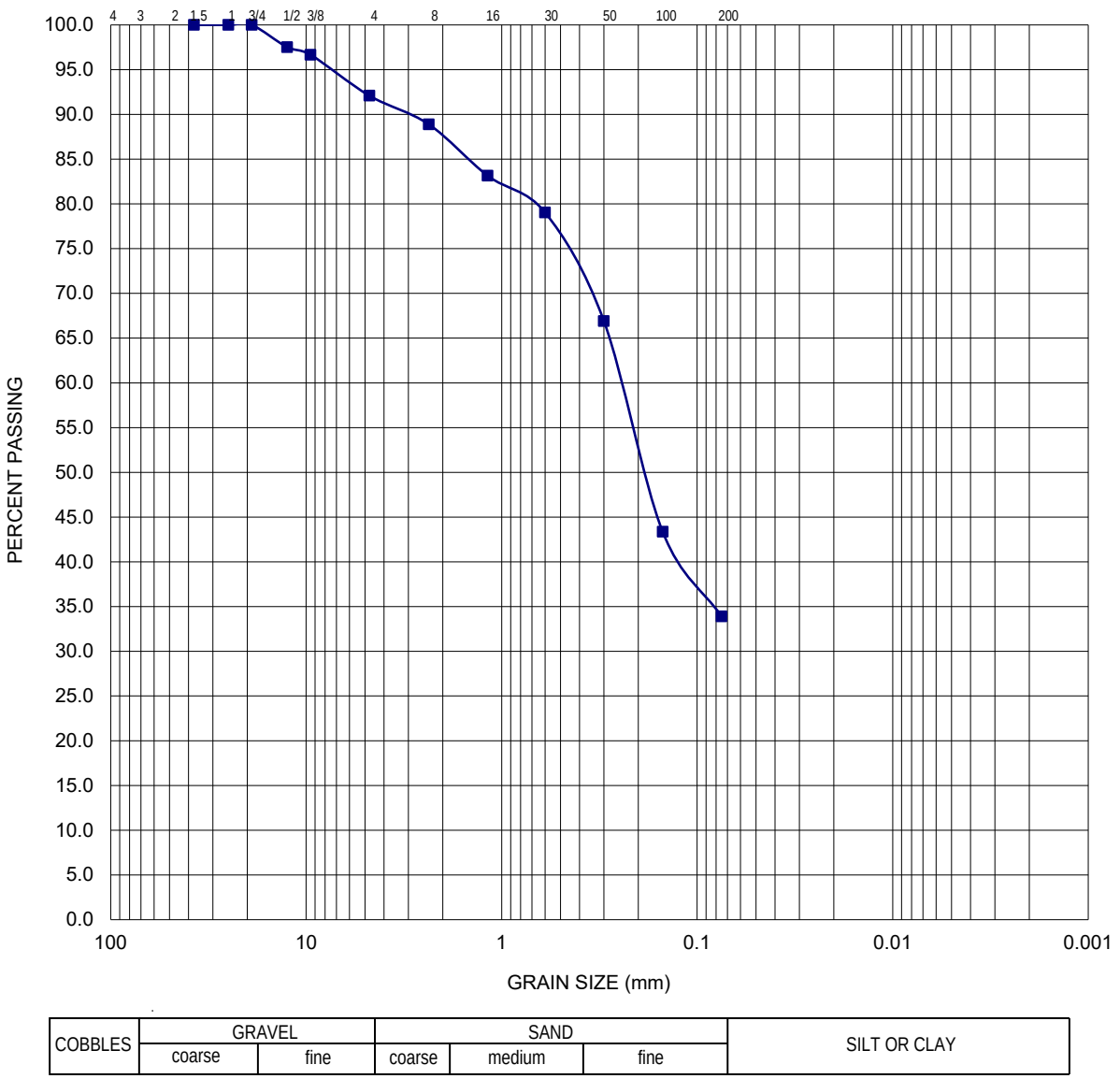
Particle Size Analysis - ASTM D422

Project: PLESD New MS Campus

Location: Plumas Lake, California

Project No.: E9425-04-01

Figure B5



Boring: B9

Depth To Sample: 5.0

Sieve Date: 7/2/2024

Tested and Computed by: TS

Test Data

Sieve Number	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
% Passing	100	100	100	98	97	92.1	88.9	83.2	79.0	66.9	43.4	33.9

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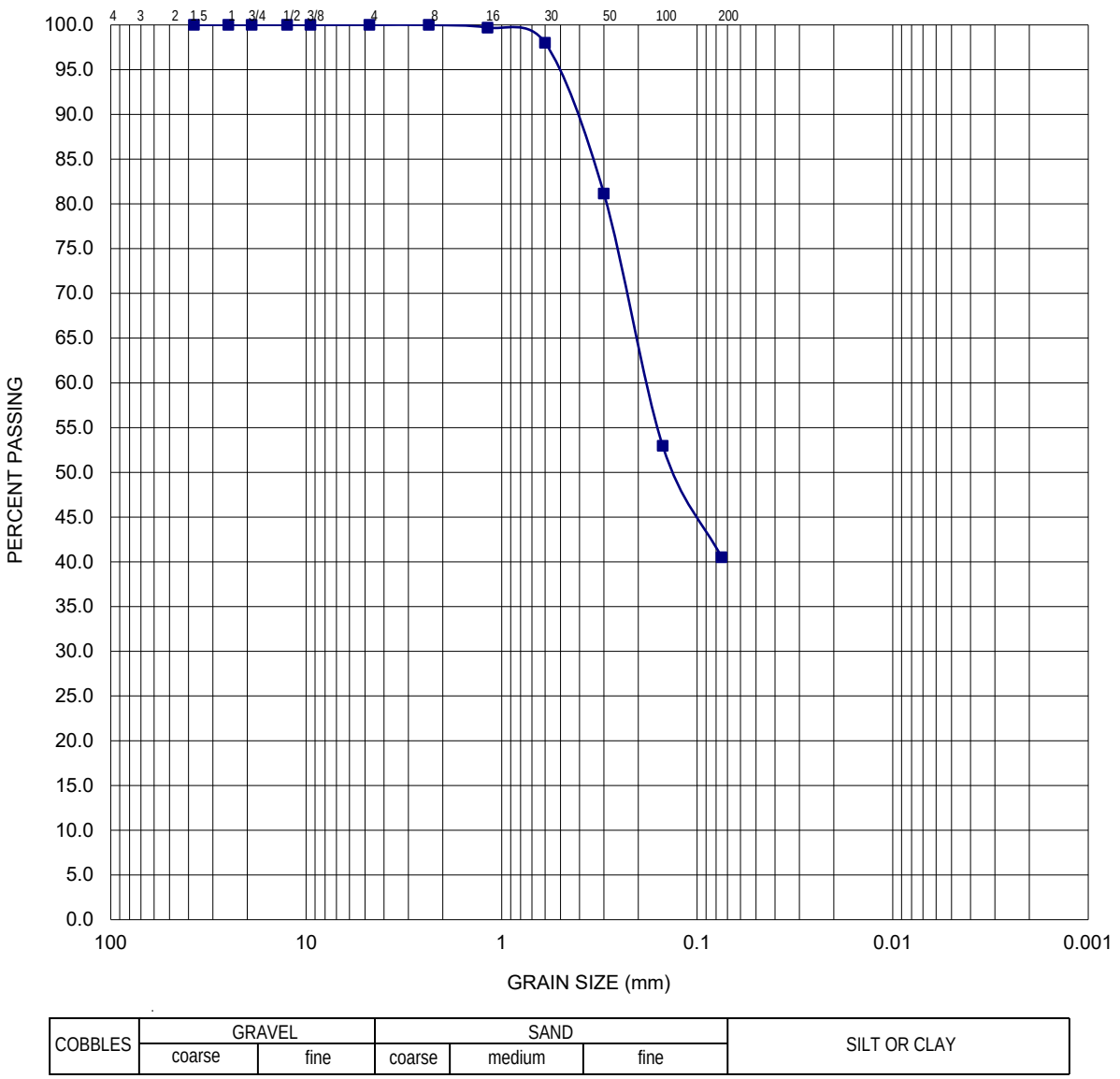
Particle Size Analysis - ASTM D422

Project: PLESD New MS Campus

Location: Plumas Lake, California

Project No.: E9425-04-01

Figure B6



Boring: B10

Depth To Sample: 1.5

Sieve Date: 7/2/2024

Tested and Computed by: TS

Test Data

Sieve Number	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
% Passing	100	100	100	100	100	100.0	100.0	99.7	98.0	81.1	53.0	40.5

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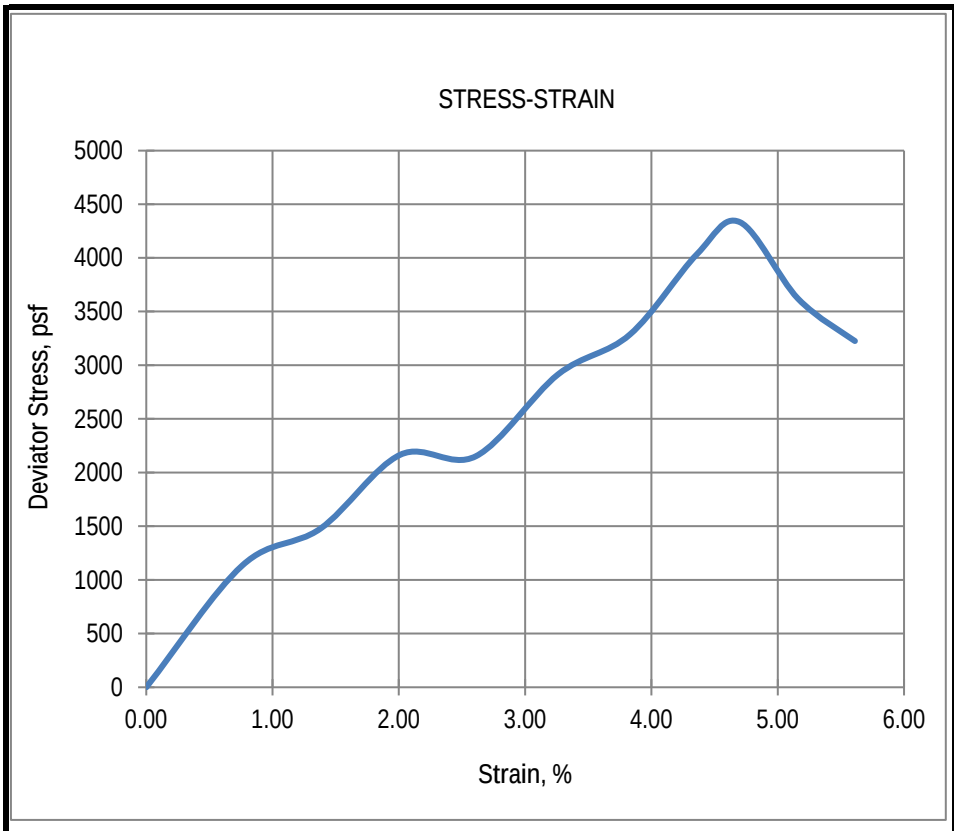
Particle Size Analysis - ASTM D422

Project: PLESD New MS Campus

Location: Plumas Lake, California

Project No.: E9425-04-01

Figure B7



Failure Photo

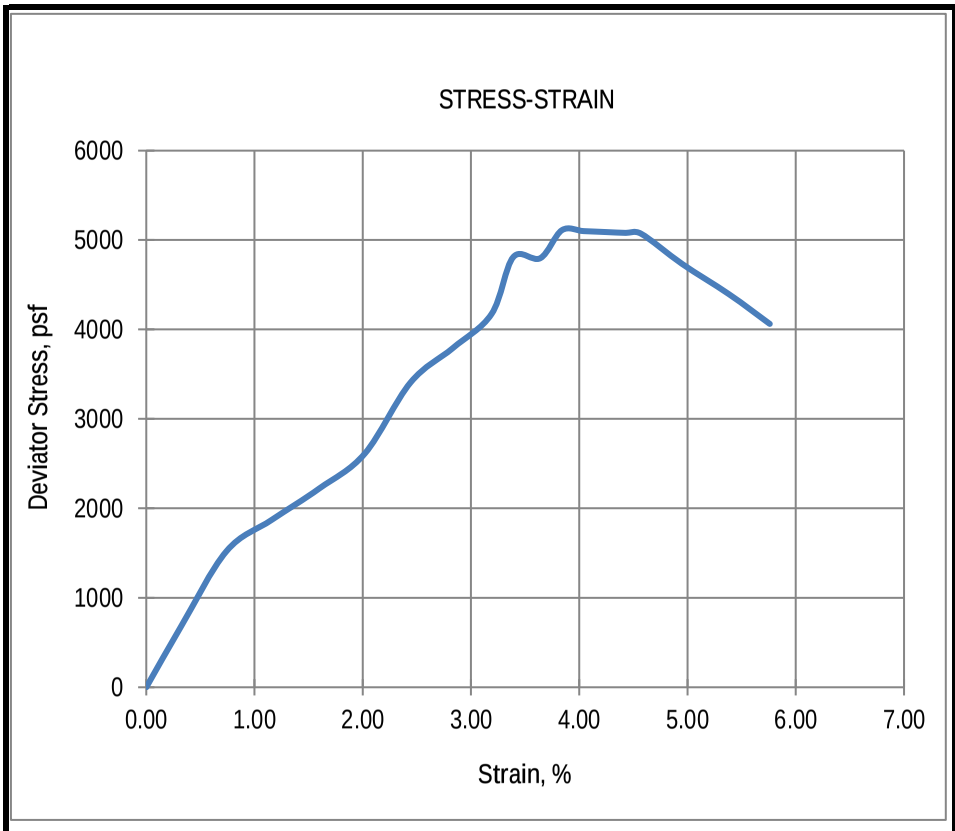
Sample Description	
Boring Number	B3
Sample Depth (feet)	2'
Material Description	Sandy CLAY with silt
Initial Conditions at Start of Test	
Height (inch) average of 3	3.83
Diameter (inch) average of 3	2.41
Moisture Content (%)	22.9
Dry Density (pcf)	96.3
Estimated Specific Gravity	2.7
Saturation (%)	82.5
Shear Test Conditions	
Strain Rate (%/min)	1.0197
Major Principal Stress at Failure (psf)	4330
Strain at Failure (%)	4.7
Test Results	
Unconfined Compressive Strength (tons/ft^2)	2.2
Unconfined Compressive Strength (lbs/ft^2)	4334
Shear Strength (tons/ft^2)	1.1
Shear Strength (lbs/ft^2)	2167

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Unconfined Compressive Strength (ASTM D2166)

Project: PLESD New MS Campus
Location: Plumas Lake, CA
Proj. No.: E9425-04-01

Figure B8



Failure Photo



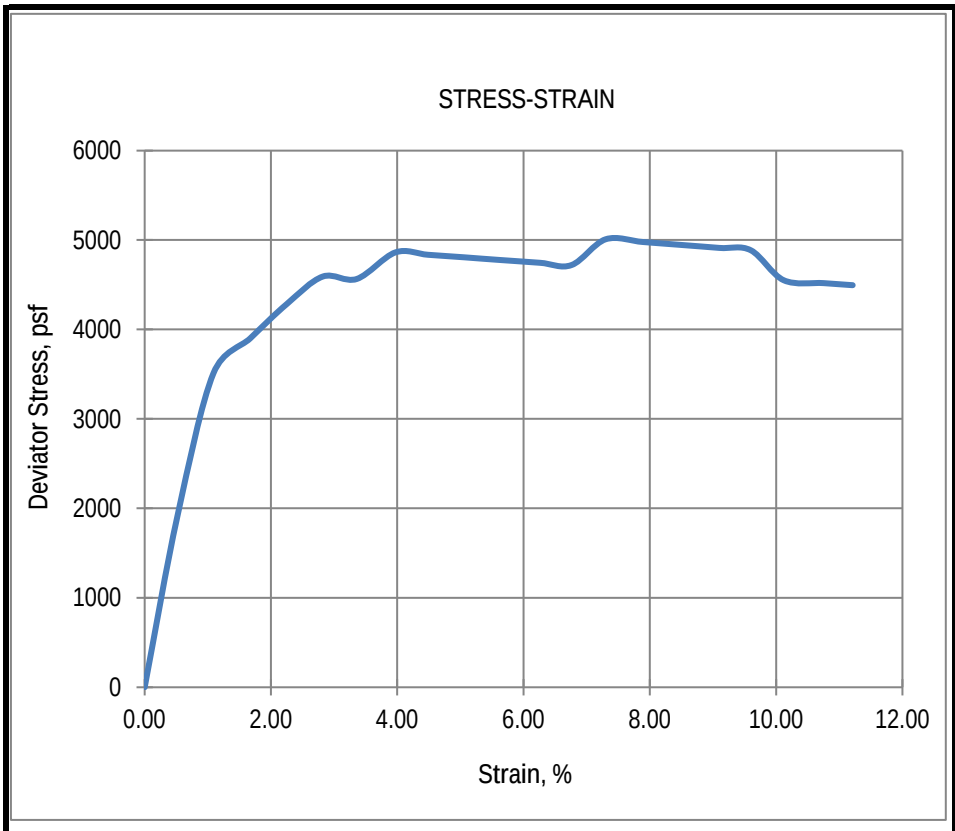
Sample Description	
Boring Number	B5
Sample Depth (feet)	2'
Material Description	Sandy CLAY with silt
Initial Conditions at Start of Test	
Height (inch) average of 3	5.93
Diameter (inch) average of 3	2.38
Moisture Content (%)	23.0
Dry Density (pcf)	100.2
Estimated Specific Gravity	2.7
Saturation (%)	91.1
Shear Test Conditions	
Strain Rate (%/min)	0.6067
Major Principal Stress at Failure (psf)	5110
Strain at Failure (%)	3.8
Test Results	
Unconfined Compressive Strength (tons/ft^2)	2.6
Unconfined Compressive Strength (lbs/ft^2)	5111
Shear Strength (tons/ft^2)	1.3
Shear Strength (lbs/ft^2)	2555

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Unconfined Compressive Strength (ASTM D2166)

Project: PLESD New MS Campus
Location: Plumas Lake, CA
Proj. No.: E9425-04-01

Figure B9



Failure Photo



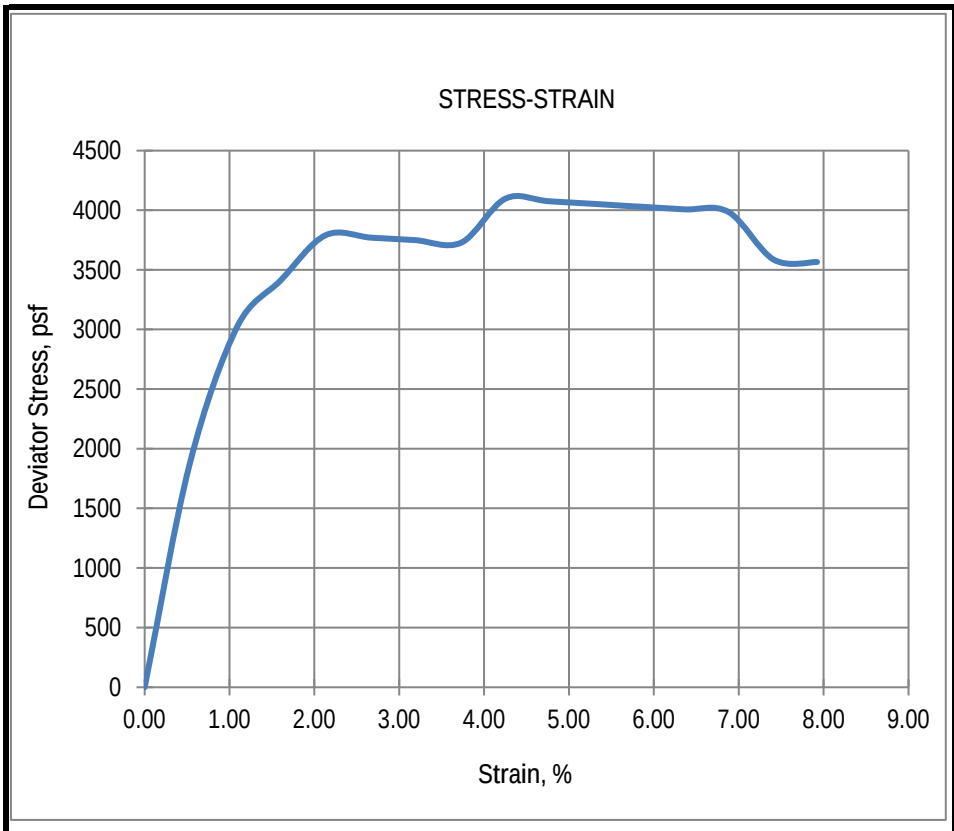
Sample Description	
Boring Number	B8
Sample Depth (feet)	2'
Material Description	Sandy CLAY with silt
Initial Conditions at Start of Test	
Height (inch) average of 3	4.79
Diameter (inch) average of 3	2.36
Moisture Content (%)	20.7
Dry Density (pcf)	111.6
Estimated Specific Gravity	2.7
Saturation (%)	110.0
Shear Test Conditions	
Strain Rate (%/min)	1.0673
Major Principal Stress at Failure (psf)	5010
Strain at Failure (%)	7.3
Test Results	
Unconfined Compressive Strength (tons/ft^2)	2.5
Unconfined Compressive Strength (lbs/ft^2)	5009
Shear Strength (tons/ft^2)	1.3
Shear Strength (lbs/ft^2)	2504

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Unconfined Compressive Strength (ASTM D2166)

Project: PLESD New MS Campus
Location: Plumas Lake, CA
Proj. No.: E9425-04-01

Figure B10



Failure Photo



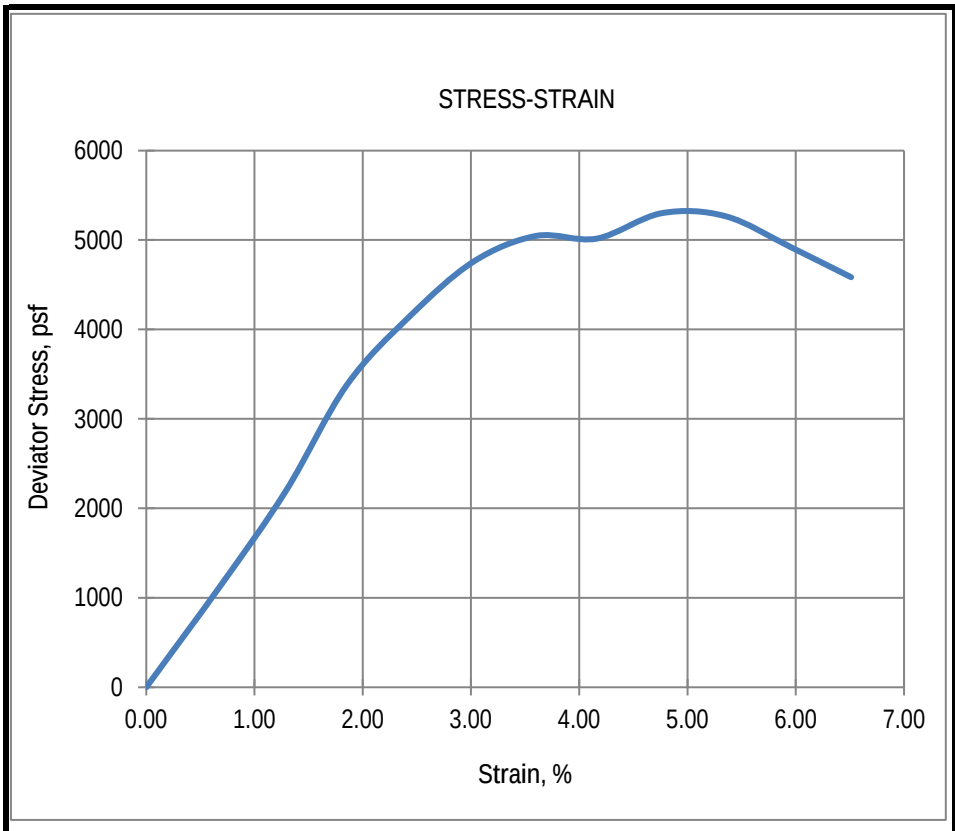
Sample Description	
Boring Number	B9
Sample Depth (feet)	2'
Material Description	Sandy CLAY with silt
Initial Conditions at Start of Test	
Height (inch) average of 3	5.06
Diameter (inch) average of 3	2.39
Moisture Content (%)	24.1
Dry Density (pcf)	101.8
Estimated Specific Gravity	2.7
Saturation (%)	99.2
Shear Test Conditions	
Strain Rate (%/min)	0.9902
Major Principal Stress at Failure (psf)	4100
Strain at Failure (%)	4.3
Test Results	
Unconfined Compressive Strength (tons/ft^2)	2.0
Unconfined Compressive Strength (lbs/ft^2)	4097
Shear Strength (tons/ft^2)	1.0
Shear Strength (lbs/ft^2)	2049

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Unconfined Compressive Strength (ASTM D2166)

Project: PLESD New MS Campus
Location: Plumas Lake, CA
Proj. No.: E9425-04-01

Figure B11



Failure Photo



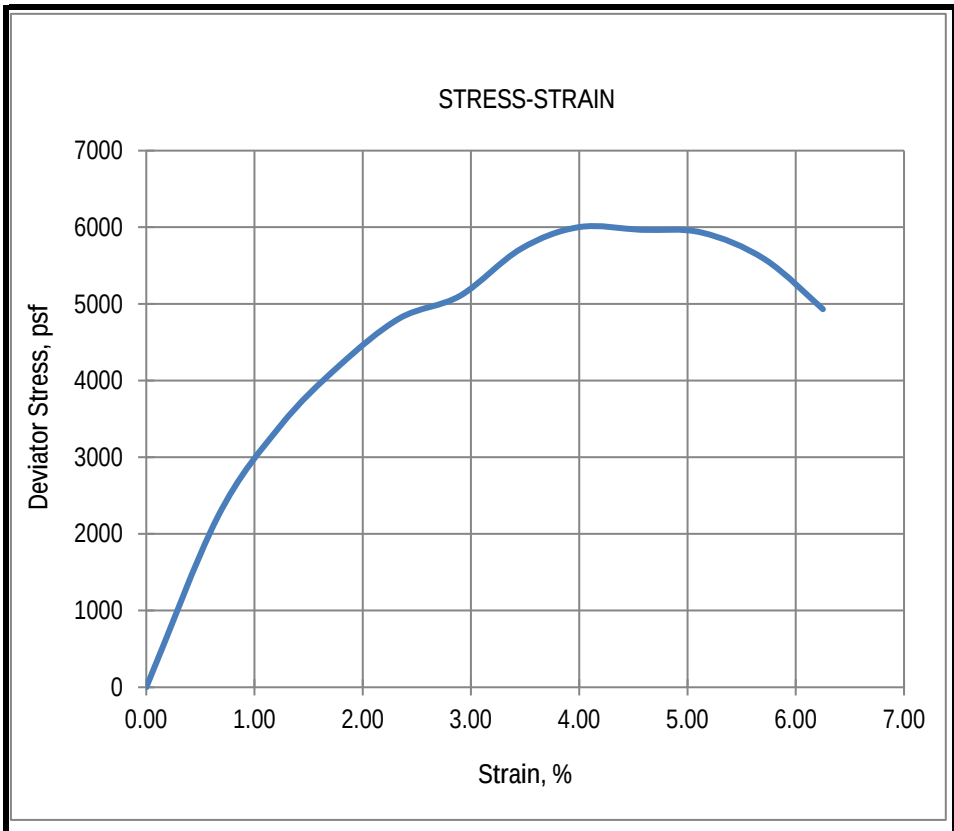
Sample Description	
Boring Number	B11
Sample Depth (feet)	2'
Material Description	Sandy CLAY with silt
Initial Conditions at Start of Test	
Height (inch) average of 3	4.81
Diameter (inch) average of 3	2.40
Moisture Content (%)	26.6
Dry Density (pcf)	94.0
Estimated Specific Gravity	2.7
Saturation (%)	90.7
Shear Test Conditions	
Strain Rate (%/min)	1.0851
Major Principal Stress at Failure (psf)	5300
Strain at Failure (%)	4.8
Test Results	
Unconfined Compressive Strength (tons/ft^2)	2.6
Unconfined Compressive Strength (lbs/ft^2)	5299
Shear Strength (tons/ft^2)	1.3
Shear Strength (lbs/ft^2)	2650

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Unconfined Compressive Strength (ASTM D2166)

Project: PLESD New MS Campus
Location: Plumas Lake, CA
Proj. No.: E9425-04-01

Figure B12



Failure Photo



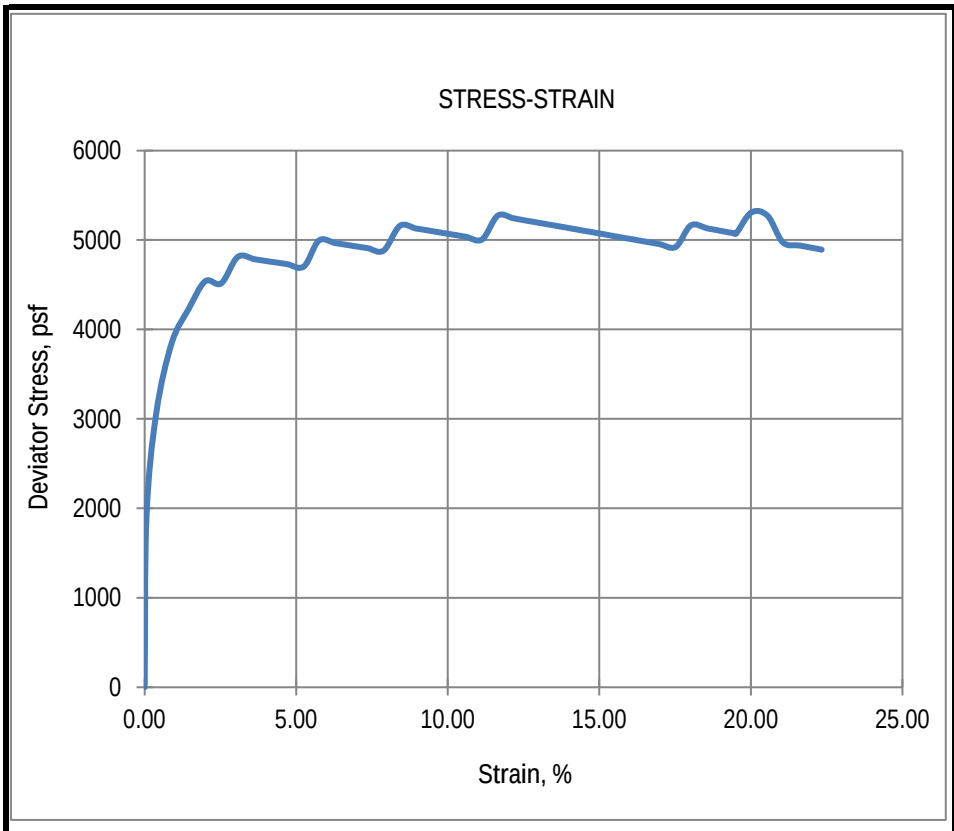
Sample Description	
Boring Number	B13
Sample Depth (feet)	1.5'
Material Description	Sandy CLAY with silt
Initial Conditions at Start of Test	
Height (inch) average of 3	5.01
Diameter (inch) average of 3	2.40
Moisture Content (%)	17.1
Dry Density (pcf)	115.3
Estimated Specific Gravity	2.7
Saturation (%)	100.4
Shear Test Conditions	
Strain Rate (%/min)	1.0421
Major Principal Stress at Failure (psf)	6000
Strain at Failure (%)	4.0
Test Results	
Unconfined Compressive Strength (tons/ft^2)	3.0
Unconfined Compressive Strength (lbs/ft^2)	6002
Shear Strength (tons/ft^2)	1.5
Shear Strength (lbs/ft^2)	3001

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Unconfined Compressive Strength (ASTM D2166)

Project: PLESD New MS Campus
Location: Plumas Lake, CA
Proj. No.: E9425-04-01

Figure B13



Failure Photo



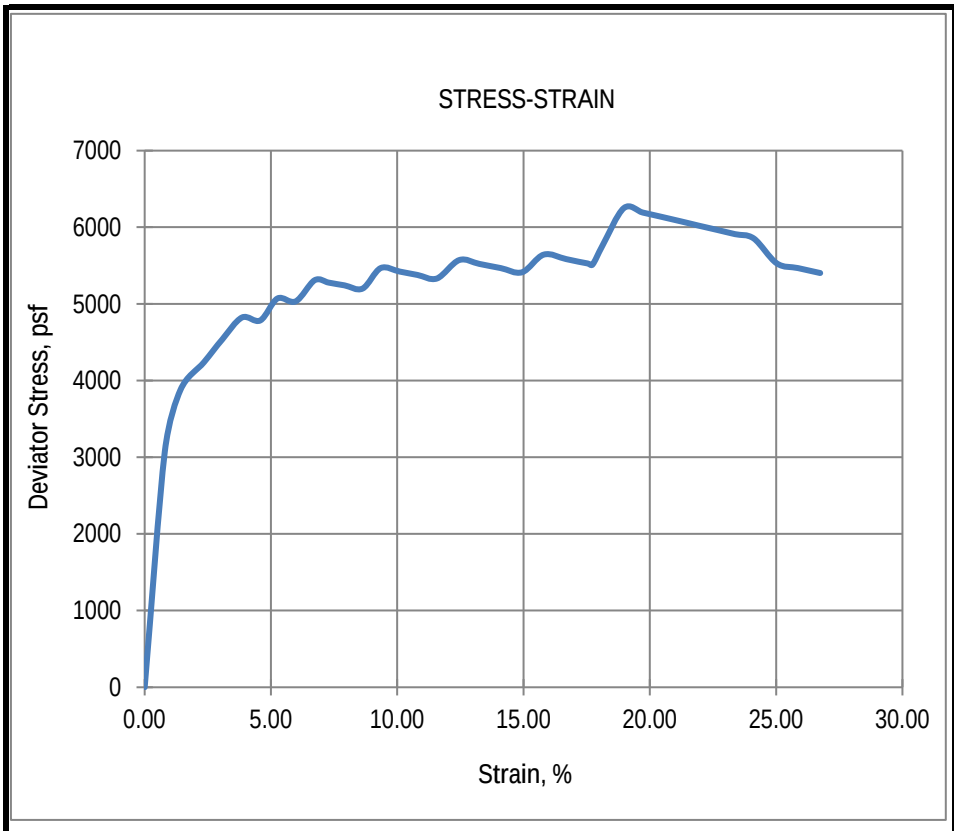
Sample Description	
Boring Number	B15
Sample Depth (feet)	2'
Material Description	Sandy CLAY
Initial Conditions at Start of Test	
Height (inch) average of 3	5.01
Diameter (inch) average of 3	2.39
Moisture Content (%)	22.4
Dry Density (pcf)	105.8
Estimated Specific Gravity	2.7
Saturation (%)	102.3
Shear Test Conditions	
Strain Rate (%/min)	0.9711
Major Principal Stress at Failure (psf)	5270
Strain at Failure (%)	11.7
Test Results	
Unconfined Compressive Strength (tons/ft^2)	2.6
Unconfined Compressive Strength (lbs/ft^2)	5273
Shear Strength (tons/ft^2)	1.3
Shear Strength (lbs/ft^2)	2636

Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
Telephone: 925-371-5900
Fax: 925-371-5915

Unconfined Compressive Strength (ASTM D2166)

Project: PLESD New MS Campus
Location: Plumas Lake, CA
Proj. No.: E9425-04-01

Figure B14



Failure Photo



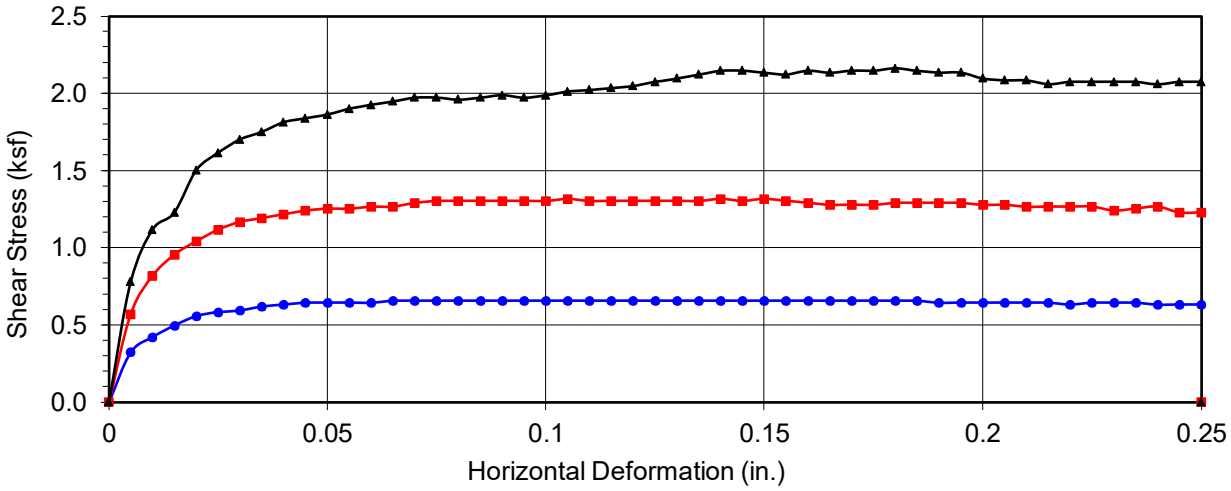
Sample Description	
Boring Number	B20
Sample Depth (feet)	1.5'
Material Description	Sandy CLAY with silt
Initial Conditions at Start of Test	
Height (inch) average of 3	5.02
Diameter (inch) average of 3	2.38
Moisture Content (%)	22.8
Dry Density (pcf)	106.5
Estimated Specific Gravity	2.7
Saturation (%)	105.7
Shear Test Conditions	
Strain Rate (%/min)	1.4607
Major Principal Stress at Failure (psf)	5530
Strain at Failure (%)	19.0
Test Results	
Unconfined Compressive Strength (tons/ft^2)	2.8
Unconfined Compressive Strength (lbs/ft^2)	5528
Shear Strength (tons/ft^2)	1.4
Shear Strength (lbs/ft^2)	2764

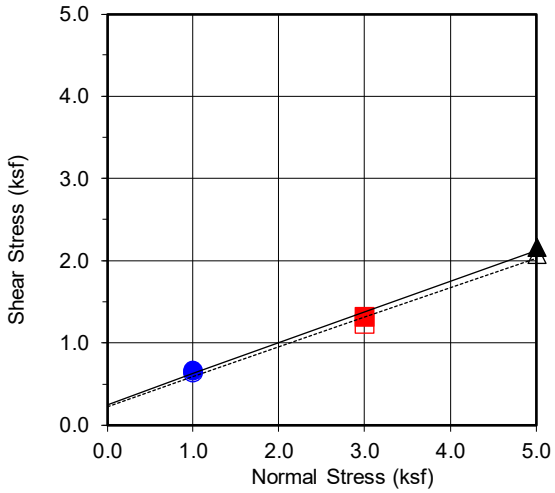
Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
Telephone: 925-371-5900
Fax: 925-371-5915

Unconfined Compressive Strength (ASTM D2166)

Project: PLESD New MS Campus
Location: Plumas Lake, CA
Proj. No.: E9425-04-01

Figure B15





Boring No.	B2
Sample No.	B2@0-5'
Depth (ft)	0-5
Sample Type:	Bulk

Soil Identification:
Lean CLAY (CL), strong brown

Strength Parameters

	C (psf)	ϕ (^{o})
Peak	251	21
Ultimate	231	20

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.66	■ 1.32	▲ 2.16
Shear Stress @ End of Test (ksf)	○ 0.63	□ 1.23	△ 2.07
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	12.0	12.1	12.1
Initial Dry Density (pcf)	107.0	107.0	107.1
Initial Degree of Saturation (%)	56.1	57.0	56.8
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	22.0	18.7	16.8

GEOCON

DIRECT SHEAR TEST RESULTS

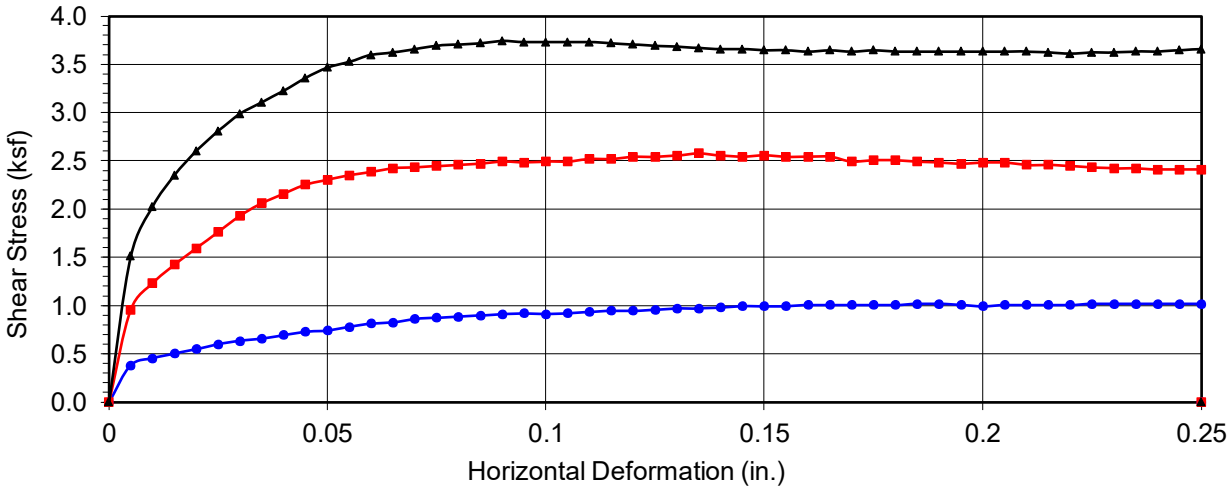
Consolidated Drained ASTM D-3080

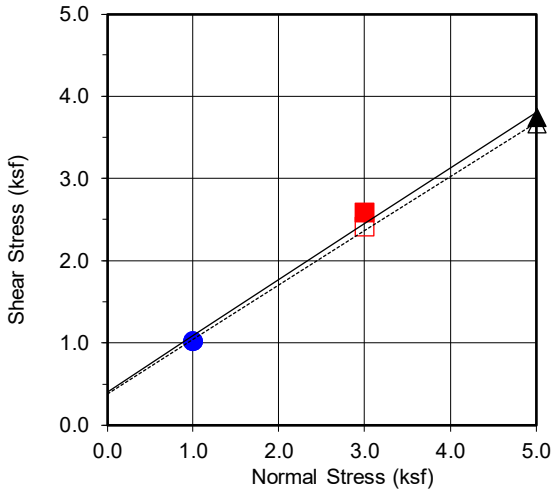
Checked by: JBM

Project No.: E9425-04-01

PLESD New Middle School Campus
Plumas Lake, California

August 2024 Figure B16





Boring No.	**B6**
Sample No.	**B6@5**
Depth (ft)	**5**
Sample Type:	Ring

Soil Identification:		
Silty SAND (SM), light brown		
Strength Parameters		
	C (psf)	ϕ (^{o})
Peak	405	34
Ultimate	384	33

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 1.02	■ 2.58	▲ 3.74
Shear Stress @ End of Test (ksf)	○ 1.02	□ 2.41	△ 3.66
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	19.5	18.7	19.3
Initial Dry Density (pcf)	91.0	95.5	92.0
Initial Degree of Saturation (%)	61.9	65.8	62.5
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	28.2	26.7	25.8

GEOCON

DIRECT SHEAR TEST RESULTS

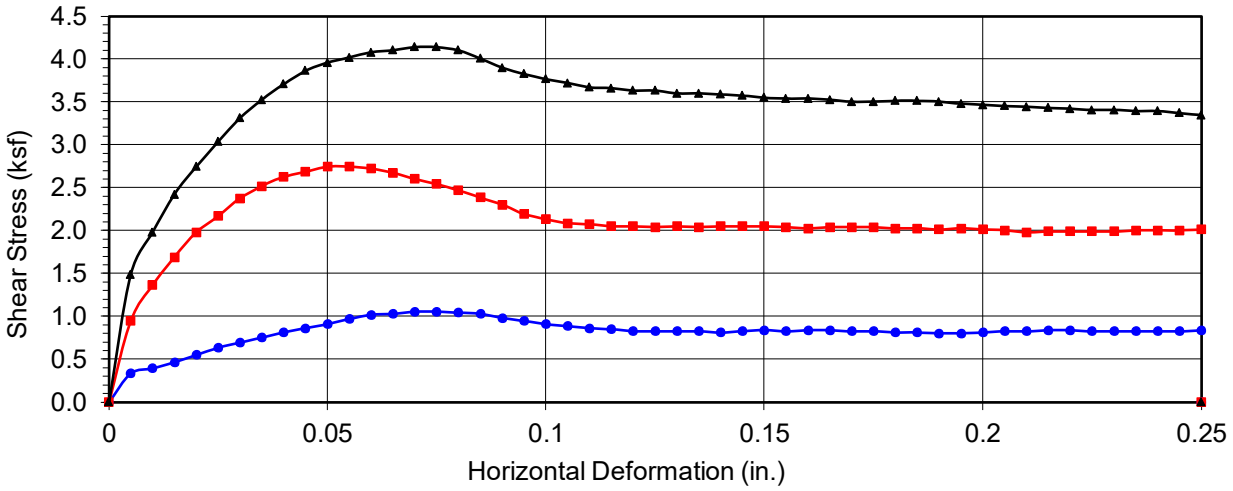
Consolidated Drained ASTM D-3080

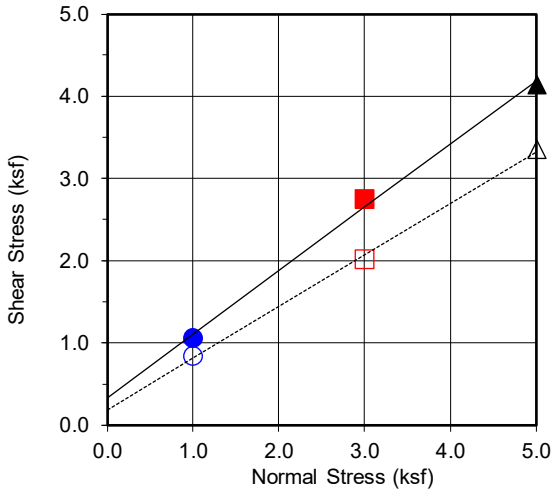
Checked by: JBM

Project No.: E9425-04-01

PLESD New Middle School Campus
Plumas Lake, California

August 2024 Figure B17





Boring No.	**B10**
Sample No.	**B10@2**
Depth (ft)	**2**
Sample Type:	Ring

Soil Identification:

Silty SAND (SM), reddish brown

Strength Parameters

	C (psf)	ϕ (^{o})
Peak	335	38
Ultimate	187	32

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 1.06	■ 2.75	▲ 4.14
Shear Stress @ End of Test (ksf)	○ 0.84	□ 2.02	△ 3.35
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	18.1	16.8	17.1
Initial Dry Density (pcf)	107.1	107.0	106.9
Initial Degree of Saturation (%)	84.9	79.1	80.0
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	21.1	19.6	19.2

GEOCON

DIRECT SHEAR TEST RESULTS

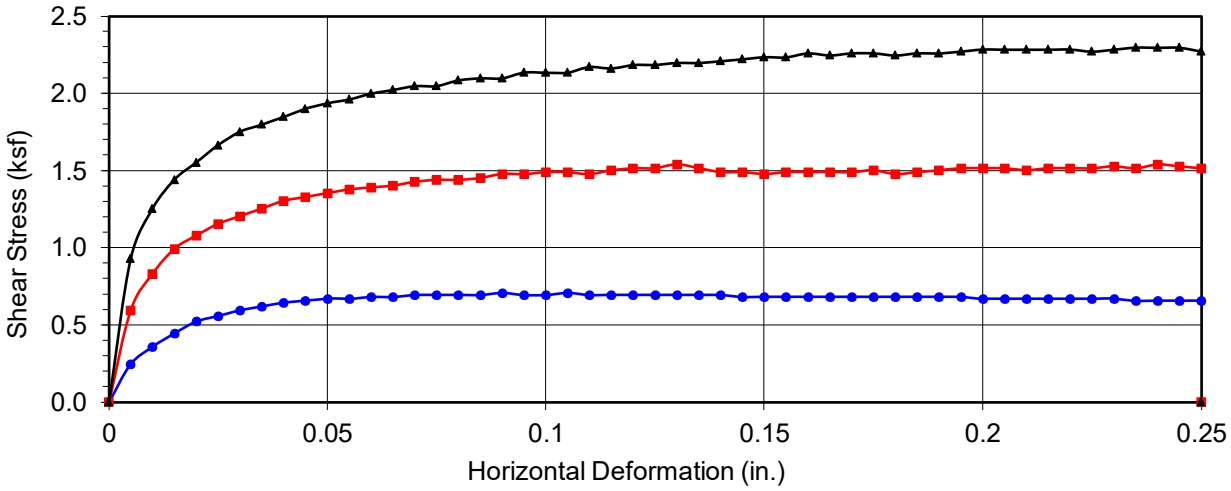
Consolidated Drained ASTM D-3080

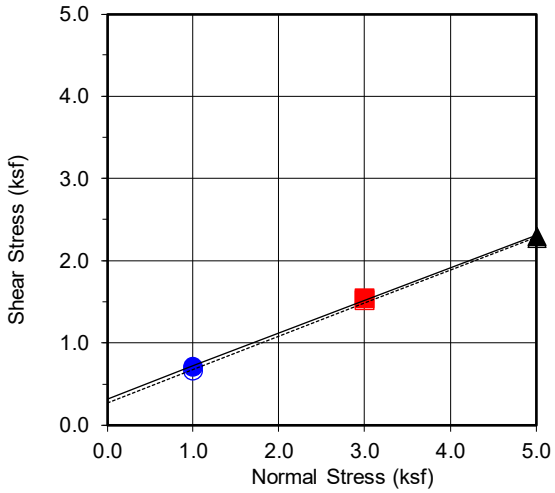
Checked by: JBM

Project No.: E9425-04-01

PLESD New Middle School Campus
Plumas Lake, California

August 2024 Figure B18





Boring No.	B12
Sample No.	B12-BULK
Depth (ft)	0-5
Sample Type:	Bulk

Soil Identification:
Clayey SAND (SC), brown

Strength Parameters

	C (psf)	ϕ (^{o})
Peak	323	22
Ultimate	271	22

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.71	■ 1.54	▲ 2.30
Shear Stress @ End of Test (ksf)	○ 0.66	□ 1.52	△ 2.27
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	11.4	11.6	11.6
Initial Dry Density (pcf)	109.1	108.9	108.9
Initial Degree of Saturation (%)	56.4	57.0	57.0
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	18.7	17.9	14.7

GEOCON

DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

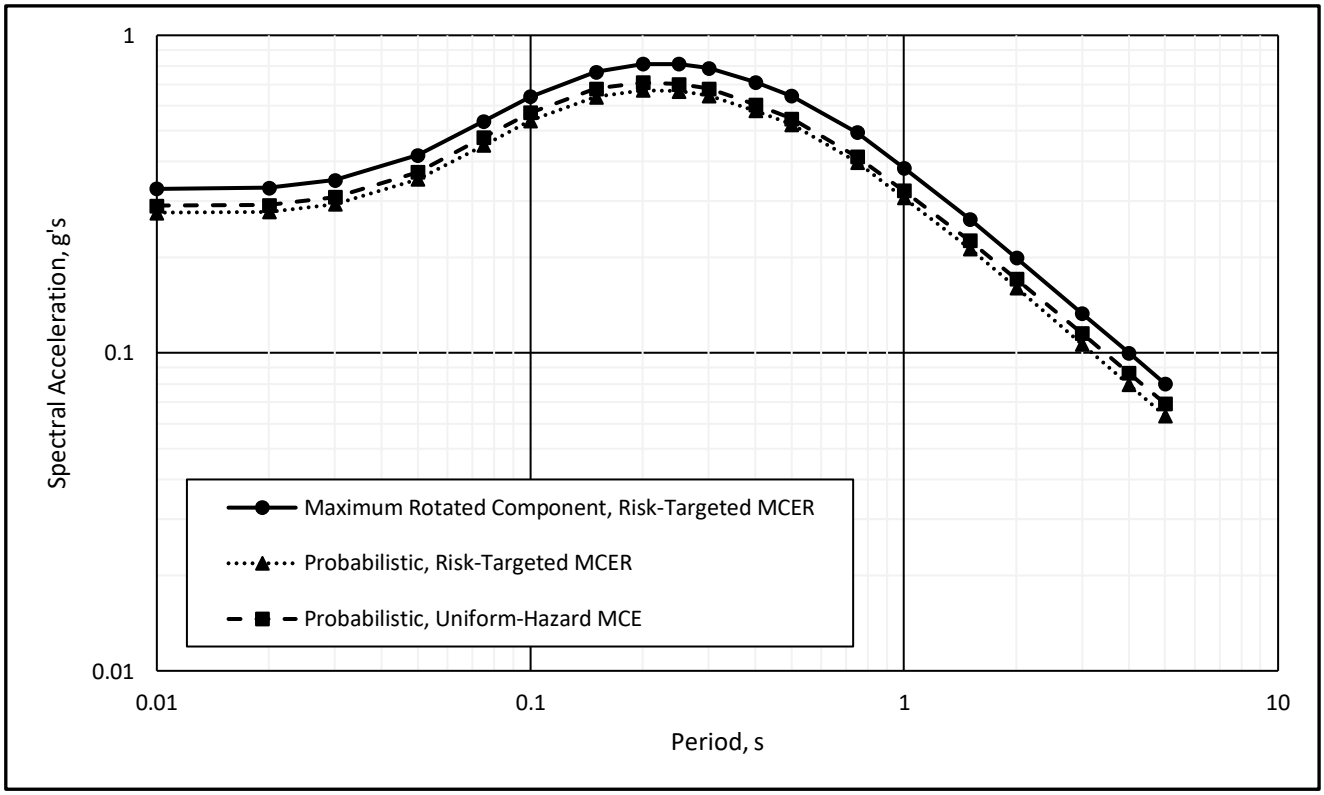
Checked by: JBM

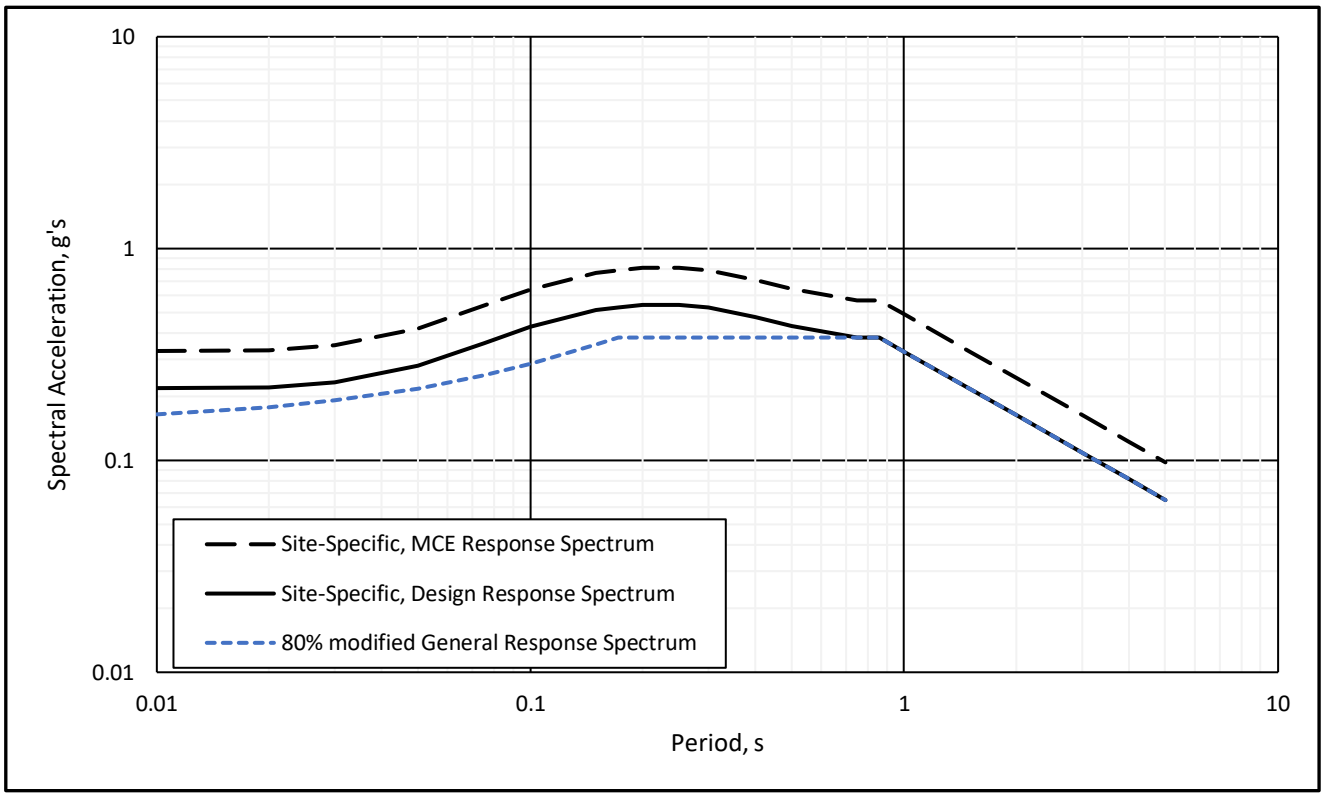
Project No.: E9425-04-01

PLESD New Middle School Campus
Plumas Lake, California

August 2024 Figure B19

APPENDIX C





GEOCON

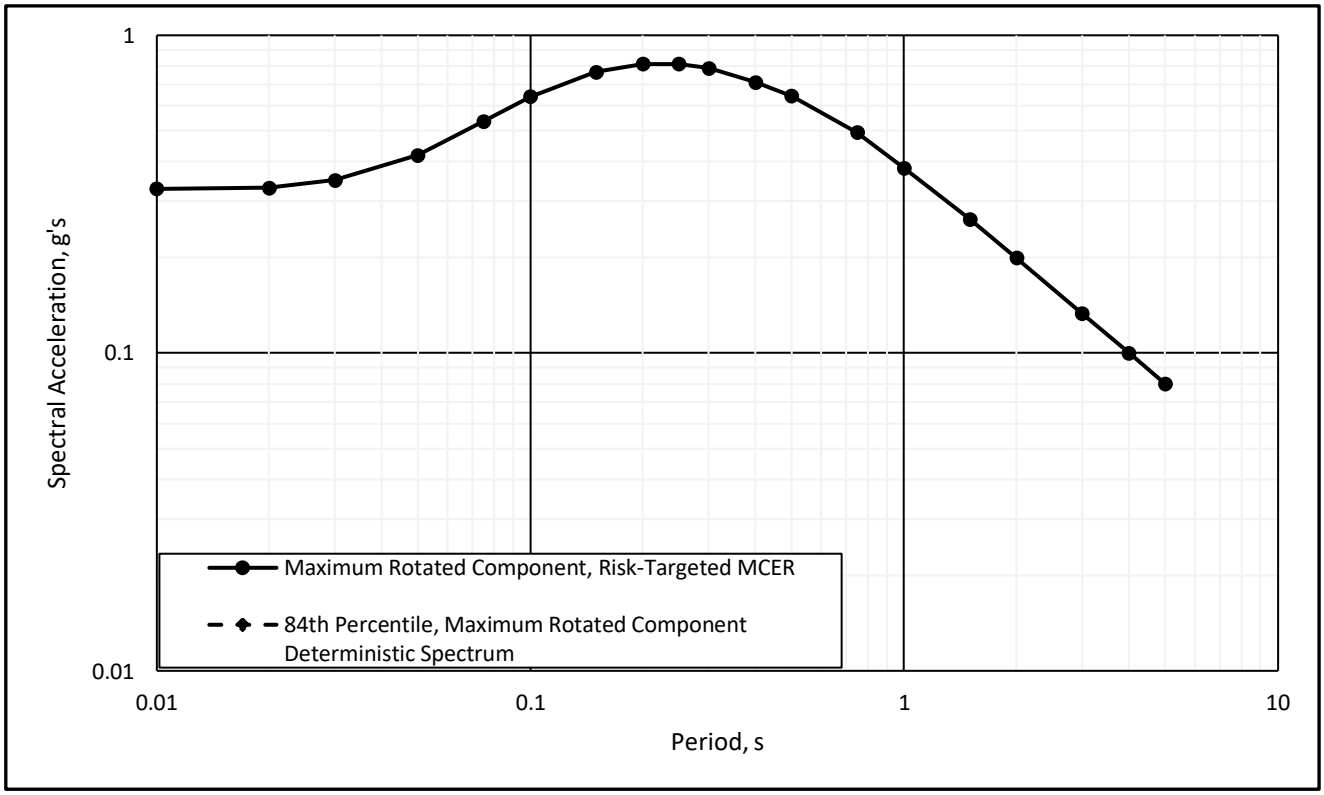
DESIGN RESPONSE SPECTRUM

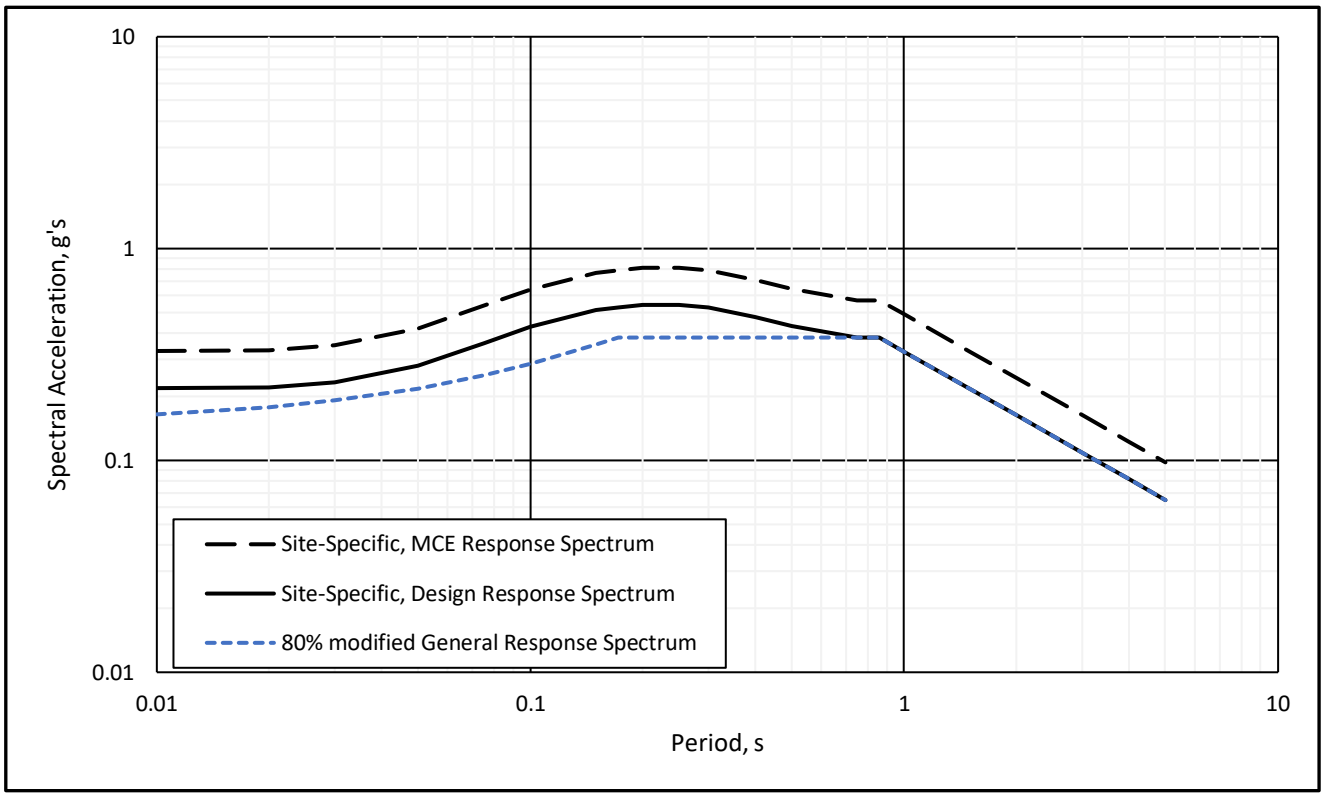
Checked by: JT

Project No.: E9425-04-01

Plumas Lake Elementary School District
New Middle School Campus
Plumas Lake, CA

Aug 24 Figure C1





GEOCON

DESIGN RESPONSE SPECTRUM

Checked by: JT

Project No.: E9425-04-01

Plumas Lake Elementary School District
New Middle School Campus
Plumas Lake, CA

Aug 24 Figure C2

Spectral Period (seconds)	Probabilistic Uniform-Hazard	Risk-Targeted, Probabilistic	Risk Factor, Cr	Maximum-Rotated Component Scale Factor	MRC, Risk-Targeted Probabilistic	84th Percentile, Deterministic	Site-Specific Design Earthquake	80% Modified General Response Spectrum	Site-Specific Maximum Considered Earthquake
0.01	0.291	0.276	0.950	1.19	0.329	--	0.219	0.165	0.329
0.02	0.292	0.278	0.951	1.19	0.331	--	0.220	0.179	0.331
0.03	0.310	0.294	0.949	1.19	0.350	--	0.233	0.192	0.350
0.05	0.371	0.352	0.949	1.19	0.419	--	0.279	0.218	0.419
0.08	0.478	0.451	0.944	1.19	0.537	--	0.358	0.252	0.537
0.10	0.571	0.538	0.943	1.19	0.641	--	0.427	0.285	0.641
0.15	0.679	0.639	0.942	1.20	0.767	--	0.511	0.351	0.767
0.17	--	--	--	--	--	--	0.525	0.380	0.788
0.20	0.710	0.671	0.945	1.21	0.812	--	0.542	0.380	0.812
0.25	0.702	0.666	0.948	1.22	0.813	--	0.542	0.380	0.813
0.30	0.679	0.646	0.951	1.22	0.788	--	0.525	0.380	0.788
0.40	0.605	0.578	0.956	1.23	0.711	--	0.474	0.380	0.711
0.50	0.546	0.524	0.960	1.23	0.644	--	0.430	0.380	0.644
0.75	0.415	0.398	0.960	1.24	0.494	--	0.380	0.380	0.570
0.86	--	--	--	--	--	--	0.380	0.380	0.570
1.0	0.325	0.308	0.950	1.24	0.382	--	0.327	0.327	0.490
1.5	0.226	0.213	0.944	1.24	0.264	--	0.218	0.218	0.327
2.0	0.171	0.161	0.939	1.24	0.199	--	0.163	0.163	0.245
3.0	0.115	0.106	0.923	1.25	0.133	--	0.109	0.109	0.163
4.0	0.086	0.079	0.920	1.26	0.100	--	0.082	0.082	0.123
5.0	0.069	0.063	0.917	1.26	0.080	--	0.065	0.065	0.098

SM_S = 0.731 g

SM_1 = 0.490 g

SD_S = 0.488 g

SD_1 = 0.327 g

Reference: ASCE 7-16 21.4 DESIGN ACCELERATION PARAMETERS

Where the site-specific procedure is used to determine the design ground motion in accordance with Section 21.3, the parameter S_{DS} shall be taken as 90% of the maximum spectral acceleration, S_a, obtained from the site-specific spectrum, at any period within the range from 0.2 to 5 s, inclusive. The parameter S_{D1} shall be taken as the maximum value of the product, TS_a, for periods from 1 to 2 s for sites with $v_{s,30}$ > 1,200 ft/s ($v_{s,30}$ > 365.76 m/s) and for periods from 1 to 5 s for sites with $v_{s,30}$ ≤ 1,200 ft/=s ($v_{s,30}$ ≤ 365.76 m/s). The parameters S_{MS} and S_{M1} shall be taken as 1.5 times S_{DS} and S_{D1}, respectively. The values so obtained shall not be less than 80% of the values determined in accordance with Section 11.4.3 for S_{MS} and S_{M1} and Section 11.4.5 for S_{DS} and S_{D1}.

Spectral acceleration values reported in units of "g". "--" Indicates that spectral period was not used at that calculation step

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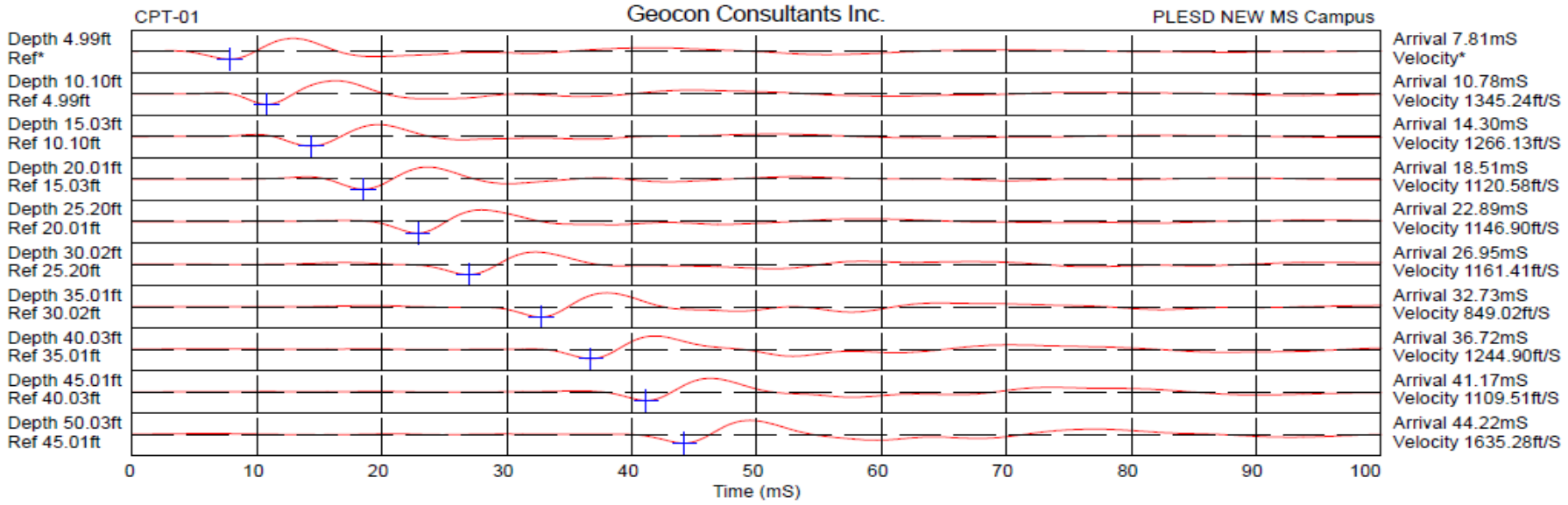
DESIGN RESPONSE SPECTRUM

Checked by: JT

Project No.: E9425-04-01

Plumas Lake Elementary School District
New Middle School Campus
Plumas Lake, CA

Aug 24 Figure C3



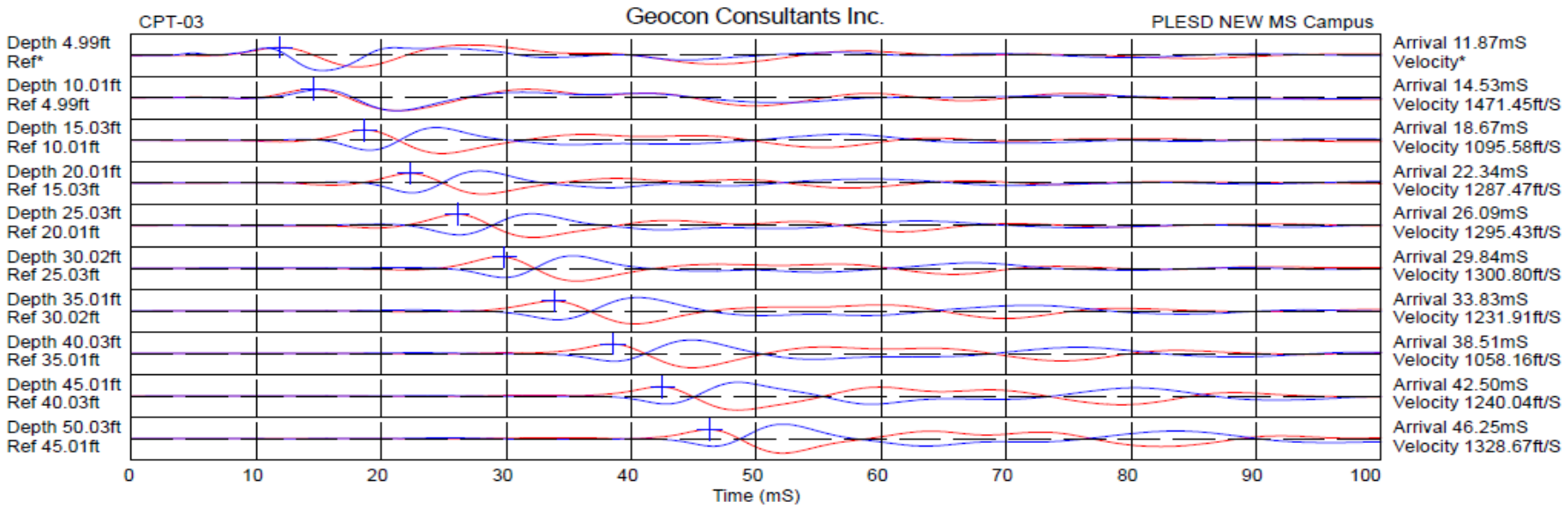
Hammer to Rod String Distance (ft): 5.83
* = Not Determined

GEOCON CONSULTANTS, INC.

SEISMIC CONE PENETEROMETER TEST
SHEAR WAVE DATA - CPT 1

Project: Plumas Lake ESD New Middle School Campus
Location: Plumas Lake, California
Project No. E9425-04-01
Date: August 2024

FIGURE C4



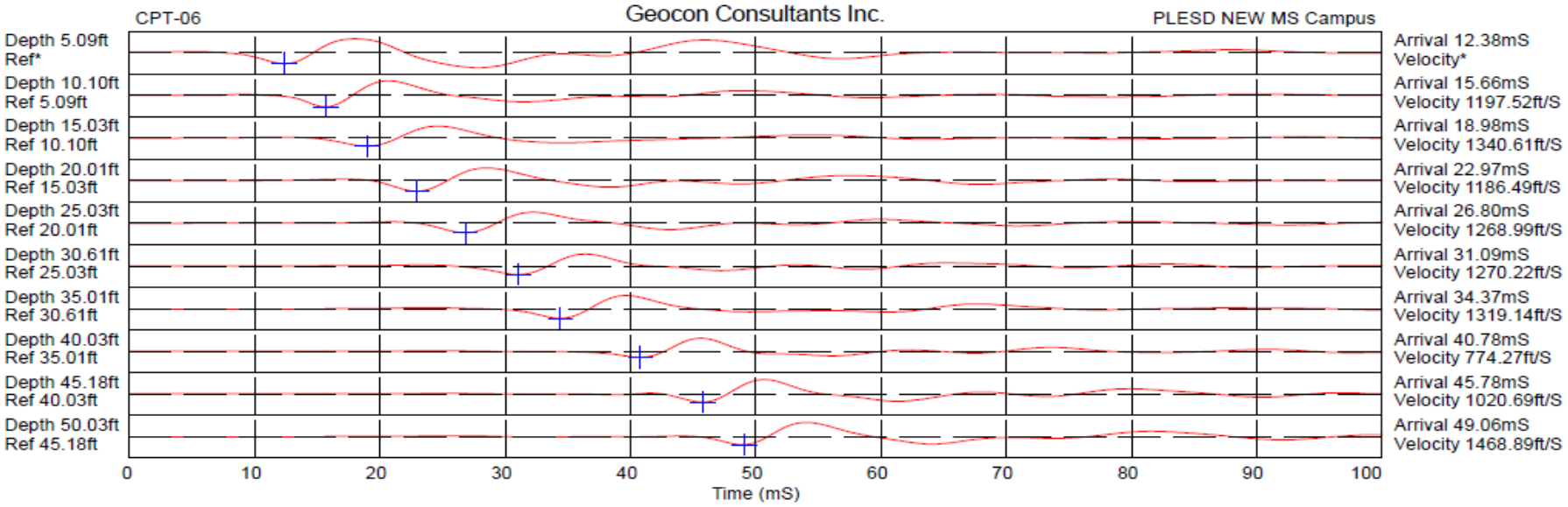
Hammer to Rod String Distance (ft): 5.83
* = Not Determined

GEOCON CONSULTANTS, INC.

SEISMIC CONE PENETEROMETER TEST
SHEAR WAVE DATA - CPT 3

Project: Plumas Lake ESD New Middle School Campus
Location: Plumas Lake, California
Project No. E9425-04-01
Date: August 2024

FIGURE C5



Hammer to Rod String Distance (ft): 5.83
* = Not Determined

GEOCON CONSULTANTS, INC.

SEISMIC CONE PENETEROMETER TEST
SHEAR WAVE DATA - CPT 6

Project: Plumas Lake ESD New Middle School Campus
Location: Plumas Lake, California
Project No. E9425-04-01
Date: August 2024
FIGURE C6

Project Number:	E9425-04-01		Project Name:		PLESD New MS Campus					
Calculation By:	JBM	Date:		7/25/2024	sCPT Profile:		CPT1			
Depth (ft)	4.99	10.1	15.03	20.01	25.2	30.02	35.01	40.03	45.01	50.03
Velocity (ft/s)	–	1345.24	1266.13	1120.58	1146.9	1161.41	849.02	1244.9	1109.51	1635.28
Thickness/Velocity		0.007508	0.0038938	0.004444127	0.0045252	0.0041501	0.0058774	0.0040325	0.0044885	0.0030698

Vs(d) (ft/s)	1190.7795
Vs(d) (m/s)	362.9496
Vs30 (m/s)	443.25686

Depth in feet divided by sum of thickness/velocity readings
Convert to meters
Extrapolate to 30m per correlation below

From Caltrans *Geotechnical Manual, Design Acceleration Response Spectrum Module* - based on *Boore* (2004)

V_{s30} for sites with data <100 feet

$V_{s30} = (1.45-(0.015*d))*V_{s(d)}$

d = depth in meters to bottom of known soil column

$V_{s(d)}$ = Time averaged velocity (m/s) for known soil column

1 foot = 0.3048 meters

GEOCON CONSULTANTS, INC.

SITE-SPECIFIC VS30 ANALYSIS

SEISMIC CPT 1

Project: Plumas Lake ESD New Middle School Campus

Location: Plumas Lake, California

Project No. E9425-04-01

Date: August 2024

FIGURE C7

Project Number:	E9425-04-01		Project Name:		PLESD New MS Campus					
Calculation By:	JBM	Date:		7/25/2024	sCPT Profile:		CPT3			
Depth (ft)	4.99	10.01	15.03	20.01	25.03	30.02	35.01	40.03	45.01	50.03
Velocity (ft/s)	--	1471.45	1095.58	1287.47	1295.43	1300.8	1231.91	1058.16	1240.04	1328.67
Thickness/Velocity		0.0068028	0.004582	0.003868051	0.0038752	0.0038361	0.0040506	0.0047441	0.004016	0.0037782

Vs(d) (ft/s)	1264.1236
Vs(d) (m/s)	385.30488
Vs30 (m/s)	470.55854

Depth in feet divided by sum of thickness/velocity readings
Convert to meters
Extrapolate to 30m per correlation below

From Caltrans *Geotechnical Manual, Design Acceleration Response Spectrum Module* - based on *Boore* (2004)

V_{s30} for sites with data <100 feet

$V_{s30} = (1.45-(0.015*d))*V_{s(d)}$

d = depth in meters to bottom of known soil column

$V_{s(d)}$ = Time averaged velocity (m/s) for known soil column

1 foot = 0.3048 meters

GEOCON CONSULTANTS, INC.

SITE-SPECIFIC VS30 ANALYSIS

SEISMIC CPT 3

Project: Plumas Lake ESD New Middle School Campus

Location: Plumas Lake, California

Project No. E9425-04-01

Date: August 2024

FIGURE C8

Project Number:	E9425-04-01		Project Name:		PLESD New MS Campus					
Calculation By:	JBM	Date:		7/25/2024	sCPT Profile:		CPT6			
Depth (ft)	5.09	10.1	15.03	20.01	25.03	30.61	35.01	40.03	45.18	50.03
Velocity (ft/s)	–	1197.52	1340.61	1186.49	1268.99	1270.22	1319.14	774.27	1020.69	1468.89
Thickness/Velocity		0.0084341	0.0036774	0.004197254	0.0039559	0.0043929	0.0033355	0.0064835	0.0050456	0.0033018

Vs(d) (ft/s)	1167.5675
Vs(d) (m/s)	355.87458
Vs30 (m/s)	434.6164

Depth in feet divided by sum of thickness/velocity readings
Convert to meters
Extrapolate to 30m per correlation below

From Caltrans *Geotechnical Manual, Design Acceleration Response Spectrum Module* - based on *Boore* (2004)

V_{s30} for sites with data <100 feet

$V_{s30} = (1.45-(0.015*d))*V_{s(d)}$

d = depth in meters to bottom of known soil column

$V_{s(d)}$ = Time averaged velocity (m/s) for known soil column

1 foot = 0.3048 meters

GEOCON CONSULTANTS, INC.

SITE-SPECIFIC VS30 ANALYSIS

SEISMIC CPT 6

Project: Plumas Lake ESD New Middle School Campus

Location: Plumas Lake, California

Project No. E9425-04-01

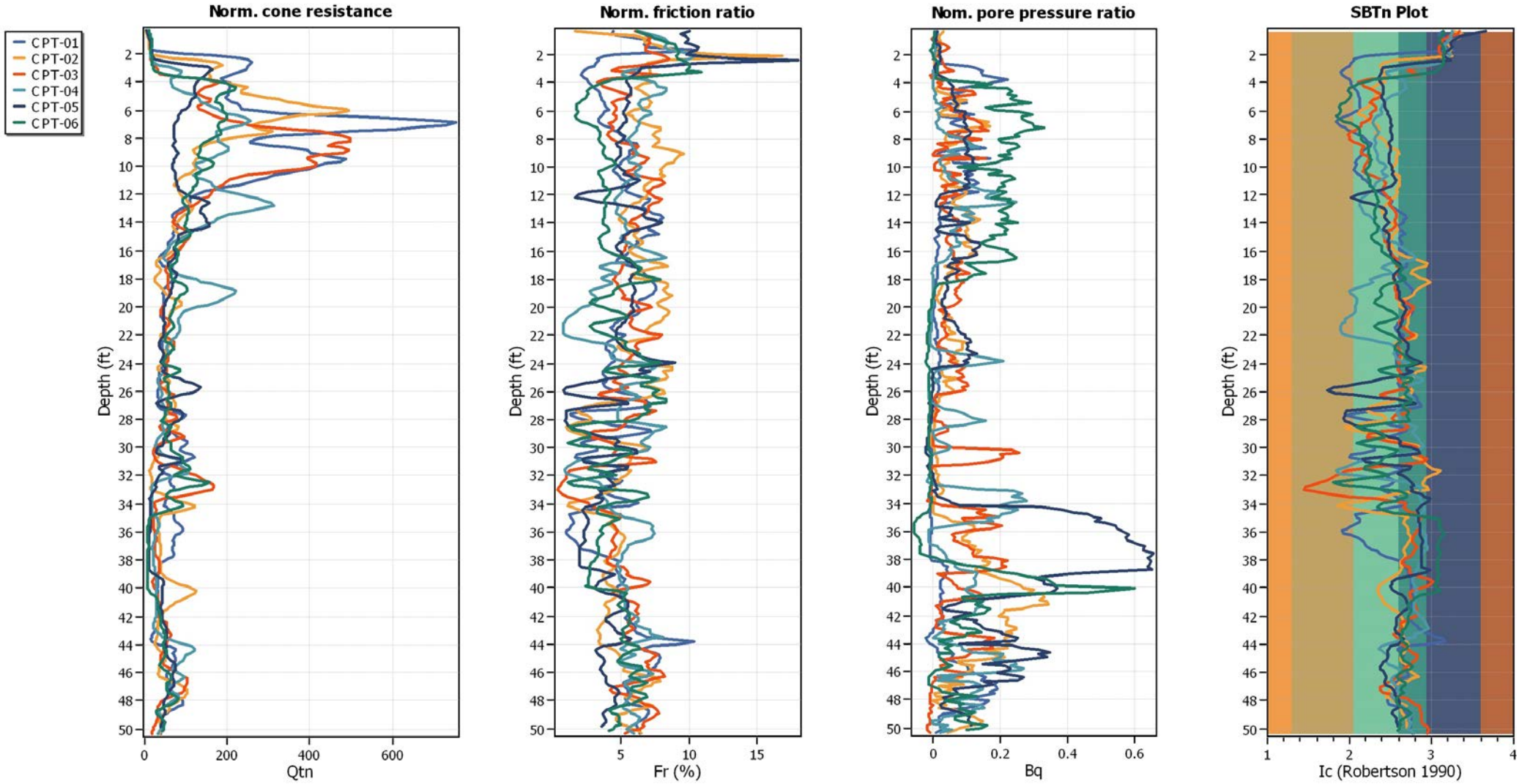
Date: August 2024

FIGURE C9

GEOCON

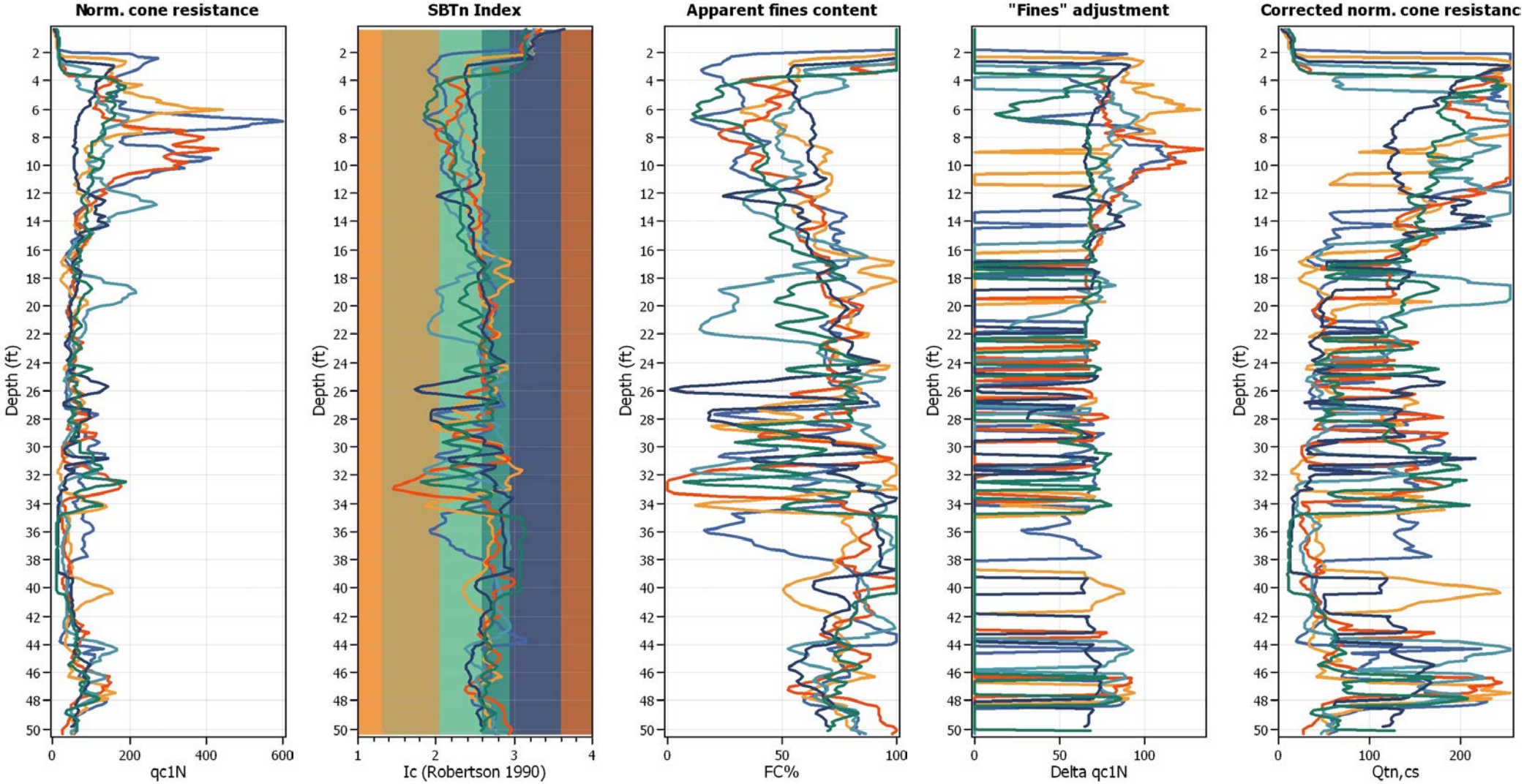
Project:

Overlay Normalized Plots



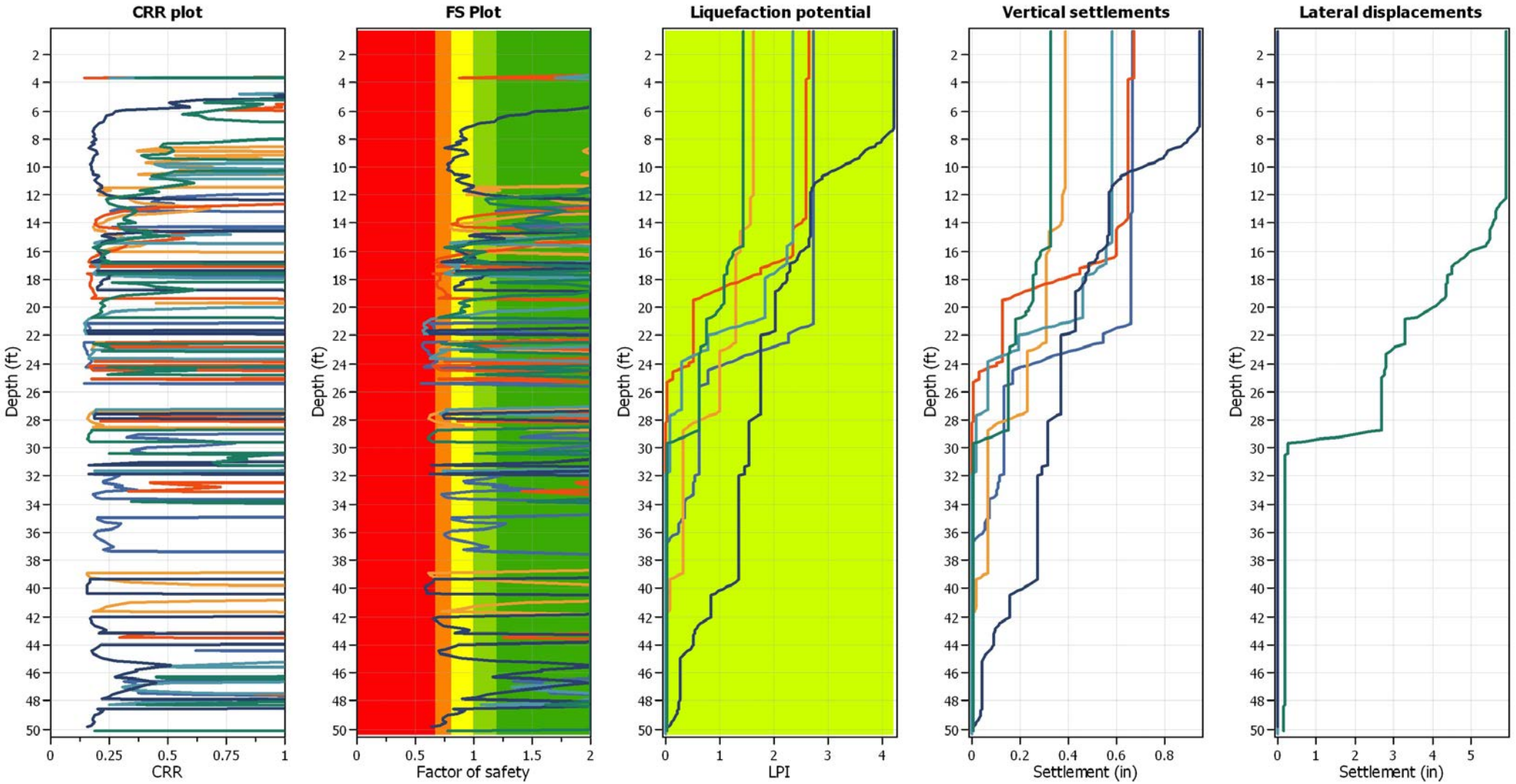
Project:

Overlay Intermediate Results



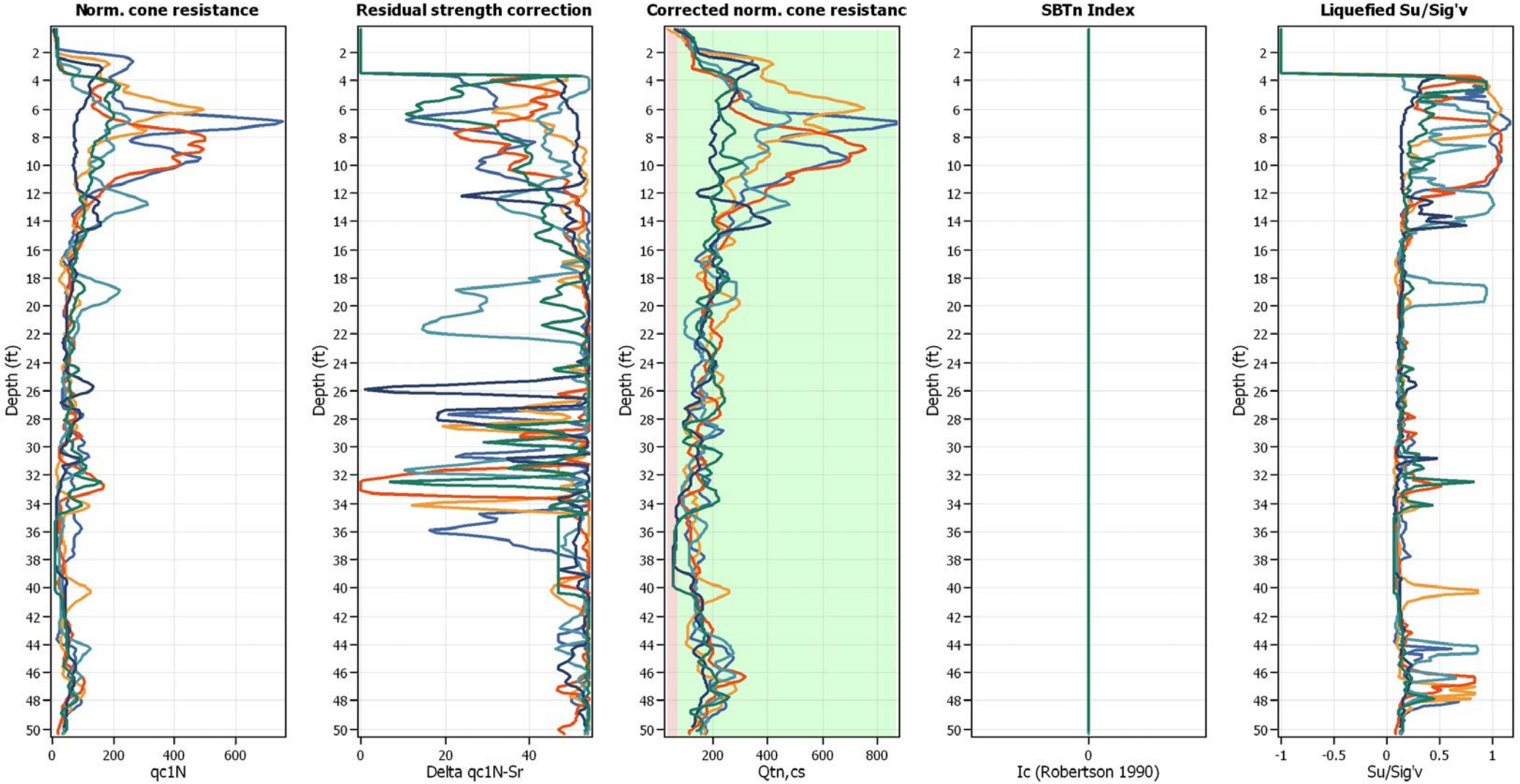
Project:

Overlay Cyclic Liquefaction Plots



Project:

Overlay Strength Loss Plots



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