UPDATE
GEOTECHNICAL INVESTIGATION

SPECTRUM PEDESTRIAN BRIDGE
3013 SCIENCE PARK ROAD AND
3545 CRAY COURT
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

ALEXANDRIA®

JANUARY 20, 2021
PROJECT NO. G1813-52-07

Project No. G1813-52-07
January 20, 2021

Alexandria Real Estate Equities, Inc.
10996 Torreyanna Road, Suite 250
San Diego, California 92121

Attention: Mr. Michael D'Ambrosia

Subject: UPDATE GEOTECHNICAL INVESTIGATION
SPECTRUM PEDESTRIAN BRIDGE
3013 SCIENCE PARK ROAD AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

Dear Mr. D'Ambrosia:

In accordance with your authorization of our Proposal No. LG-19311 dated December 6, 2019, we herein submit the results of our update geotechnical investigation for the subject pedestrian bridge. We performed our investigation to assess the underlying geologic conditions and potential geologic hazards, and to assist in the design of the proposed improvements. The accompanying report presents the results of our study and conclusions and recommendations pertaining to the geotechnical aspects of the design and construction of the proposed development. The site is considered suitable for development provided the recommendations of this report are followed.

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

Very truly yours,

GEOCON INCORPORATED

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UPDATE GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of our update geotechnical investigation related to the proposed pedestrian bridge between 3013 Science Park Road (Spectrum II) and 3545 Cray Court (Spectrum V). The bridge alignment is located northeast of the terminus of Cray Court and the Spectrum V Building; and south of Science Park Road, southwest of the existing Spectrum II building in the Torrey Pines area of the City of San Diego California (see Vicinity Map).

Vicinity Map

The purpose of this study is to evaluate the surface and subsurface soil conditions and general site geology, and to identify geotechnical constraints that may impact development of the property. In addition, provide foundation design criteria, 2019 CBC seismic design criteria, retaining wall recommendations, concrete flatwork design criteria, and excavation considerations. The scope of this geotechnical investigation also included a review of readily available published and unpublished geologic literature (see *List of References*).

We performed a field investigation that included excavating 5 small-diameter exploratory borings to a maximum depth of approximately 70 feet. Two of the borings were recently performed in December 2020 north and south of the current proposed bridge alignment. We performed three other borings in 2019 and 2020 for previous alternatives considered for the bridge alignment. Previous borings were performed in 1997, 2012, 2015 and 2016, during studies for Spectrum II, III, and V, prior to the removal of the previous building on the Spectrum III site and prior to construction of the existing

building on the Spectrum V site. The Geologic Map (Figure 1) presents the approximate locations of the borings. Appendix A presents the boring logs and other details of the field investigation. We tested selected soil samples obtained during the field investigation to evaluate pertinent physical and chemical soil properties for engineering analyses and to assist in providing recommendations for site grading and development. Details of the laboratory tests and a summary of the test results are presented in Appendix B and on the boring logs in Appendix A. Logs of previous exploratory borings by Geocon and others are presented in Appendices D through J.

The Geologic Map, Figure 1, depicts the existing soil and geologic conditions. The plan depicts the proposed bridge alignment and mapped geologic contacts based on our site reconnaissance and field excavations. The conclusions and recommendations presented herein are based on analyses of the data reviewed as part of this study and our experience with similar soil and geologic conditions.

2. SITE AND PROJECT DESCRIPTION

The southern bridge abutment of the proposed pedestrian bridge would be located adjacent to the canyon approximately 70 yards northwest of Spectrum V, a 2- to 3-story commercial structure that is currently under renovation. The bridge would extend over the canyon and connect to the western side of the Spectrum II property. The northern abutment would be located southwest of Spectrum II, and adjacent to the canyon south of the existing DG pathway on the west site of Spectrum II. The Existing Site Plan shoes the approximate location of the proposed bridge.

Existing Site Plan

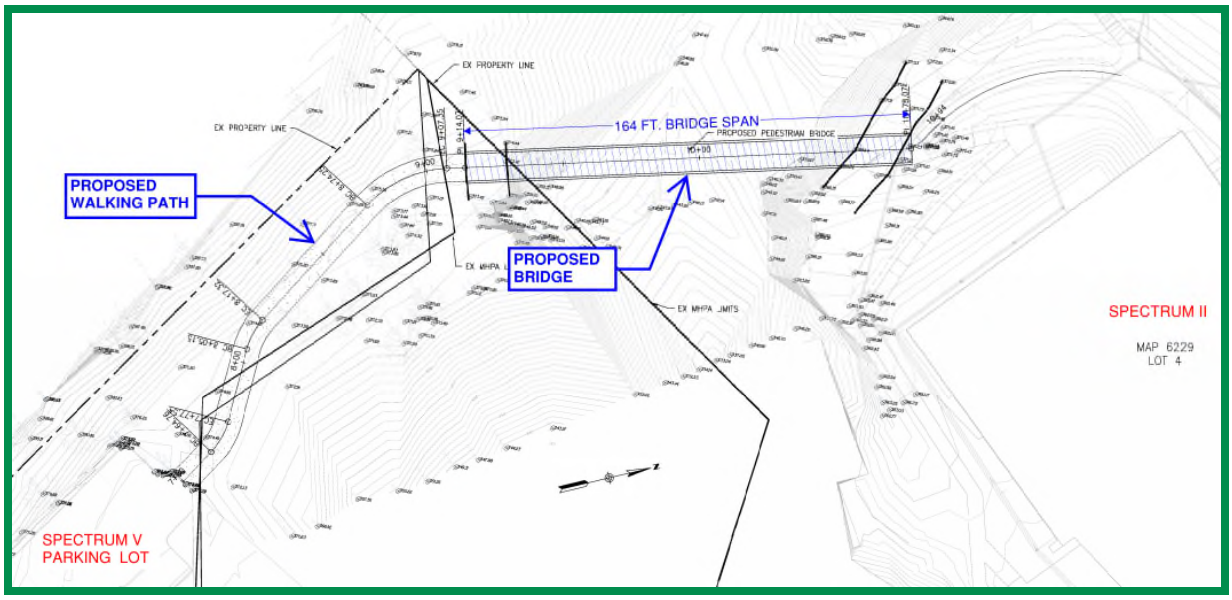
The elevation at the southern and northern connections would be at about 373 and 371 feet above mean sea level (MSL), respectively. The canyon below the planned bridge possesses relatively steep side slopes with inclinations of about 1:5 (horizontal to vertical) and is near vertical in the roughly upper 10 to 15 feet of the canyon side walls in the vicinity of the proposed abutment locations. The elevation at the base of the canyon is about 343 in the area of the proposed bridge.

At Spectrum V, the existing structure consists of a 2-story office building over one level of subterranean parking. Previous grading plans indicate that the building was proposed for a finish floor elevation of 375.0 feet above Mean Sea Level (MSL) with a basement elevation of 360.5 feet MSL.

The structures located at 3013 Science Park Road (Spectrum II) were constructed in 2015 through 2017. A previous office building was demolished at the site, prior to the construction of the current Spectrum II building. We understand some caissons from the demolished building were left in place in the vicinity of the landscaped area and DG pathway on the west side of the current Spectrum II building. These caissons may be encountered during the construction of the proposed bridge. The Previous Building Map shows the planned bridge and previous Spectrum 2 structure.

Previous Building Map

The pedestrian bridge would provide access to both sides of the Spectrum complex and extend about 164 feet between abutments across the canyon. A new walking path would be constructed from the south abutment to the existing Spectrum V parking lot to the south. The Proposed Site Plan shows the location of the planned bridge and walking path.



Proposed Site Plan

3. PREVIOUS DEVELOPMENT

We reviewed readily available geotechnical reports related to the subject site. At the Spectrum II site, a geotechnical investigation was performed by Geocon Incorporated in 2012 and 2015 prior to site redevelopment. Geocon was retained to perform testing and observation services during the site grading for the existing Spectrum II building. We did not perform the testing and observation during the grading or construction of the previously demolished office building at the Spectrum II site

At the Spectrum III and IV sites just to the east of the Spectrum II site, ICG Incorporated performed a geotechnical investigation for the La Jolla Spectrum office park in August of 1990, which indicated that the site was originally graded in 1969 and 1970. Several of the ICG borings were located within the limits of the Spectrum III site (see Figure 1, Geologic Map). Geotechnics Incorporated performed testing and observation services during additional site grading for Lots 11 and 12 between July 22 and December 19, 1997. According to the As-Graded Geotechnical Report by Geotechnics, undocumented fill was removed from Lots 11 and 12 in areas where new grading would place 4 feet or more fill. The undocumented fill was removed below proposed sewer and storm drain locations, and the removal bottom elevations were surveyed by Rick Engineering. According to the Geotechnics report, undocumented fill was not removed in areas where less than 4 feet of fill was placed.

Kleinfelder, Inc. performed a geotechnical investigation in 1997, including additional borings to help evaluate the lateral and vertical extent of undocumented fill remaining at the subject site. Kleinfelder determined that fill placed in 1969 was not placed in accordance with current standards. Kleinfelder identified areas within 3115 Merryfield Row (Spectrum III) and 3215 Merryfield Row (Spectrum IV) that contained undocumented fills, and they recommended that all undocumented fill within a distance

of at least five feet outside the buildings be removed and replaced as engineered fill. They also recommended that the upper 1 foot of soil in pavement areas be removed and recompacted.

At the Spectrum V site, a geotechnical investigation was performed by Geocon Incorporated in 1997 prior to site development. Geocon was not retained to perform testing and observation services during development of the property, and therefore, was no longer the Geotechnical Engineer of Record. Based on the information provided in the referenced report prepared by Testing Engineers – San Diego, Inc. (TESD), geotechnical services were performed between February and December of 1998. TESD assumed all responsibility as the new Geotechnical Engineer of Record and provided testing and observation services based on the recommendations provided in the referenced 1997 geotechnical investigation report. According to the referenced 1998 final report, the building pad was undercut to a maximum depth of three feet below existing grade, and fill was compacted to at least 90 percent relative compaction. We assume this undercut was only in the western portion of the building pad shown as a cut area on the grading plan. The referenced TESD included testing and observation services performed during the backfill of utility trenches and retaining walls, and for pavement construction at the site. According to their report, footing excavations were observed by a representative of TESD. An as-graded geologic map was not included with the TESD report, and we did not find an as-graded geologic map during our research of readily available published and unpublished geotechnical literature; therefore, we are unable to confirm the finish grade elevations, or actual cuts and fill depths for the site.

Borings logs from previous geotechnical investigations are included in Appendices D through J of this report.

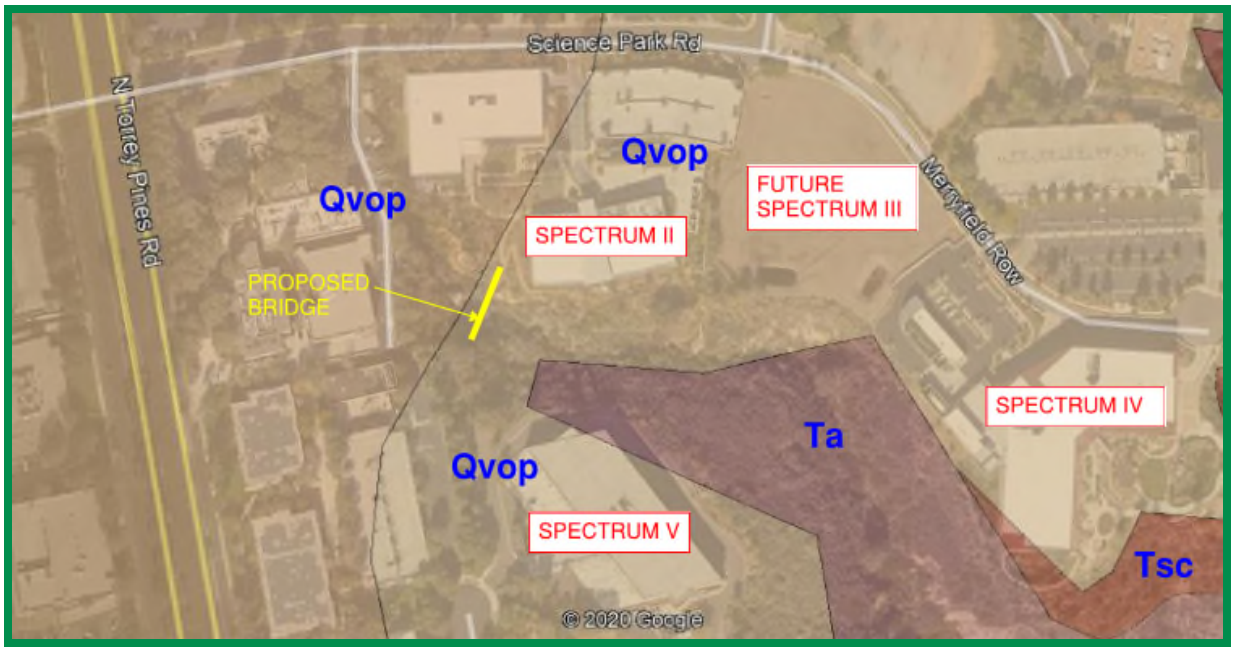
4. GEOLOGIC SETTING

Regionally, the site is located in the Peninsular Ranges geomorphic province. The province is bounded by the Transverse Ranges to the north, the San Jacinto Fault Zone on the east, the Pacific Ocean coastline on the west, and the Baja California on the south. The province is characterized by elongated northwest-trending mountain ridges separated by straight-sided sediment-filled valleys. The northwest trend is further reflected in the direction of the dominant geologic structural features of the province that are northwest to west-northwest trending folds and faults, such as the nearby Rose Canyon fault zone.

Locally, the site is within the coastal plain of San Diego County. The coastal plain is underlain by a thick sequence of relatively undisturbed and non-conformable sedimentary bedrock units that thicken to the west and range in age from Upper Cretaceous age through the Pleistocene age which have been deposited on Cretaceous to Jurassic age igneous and volcanic bedrock. Geomorphically, the coastal plain is characterized by a series of twenty-one, stair-stepped marine terraces (younger to the west) that have been dissected by west flowing rivers. The coastal plain is a relatively stable block that is

dissected by relatively few faults consisting of the potentially active La Nacion Fault Zone and the active Rose Canyon Fault Zone.

The site is located on the western portion of the coastal plain. Marine sedimentary units make up the geologic sequence encountered on the site and consist of Pleistocene-age Very Old Paralic Deposits (formerly known as the Lindavista Formation) and the Tertiary-aged Scripps Formation and Ardath Shale. The Very Old Paralic Deposits are shallow marine deposits generally consisting of sand and silty sand units interfingered with layers of silt and clay. The Regional Geologic Map shows the geologic units in the area of the site.



Regional Geologic Map

5. SOIL AND GEOLOGIC CONDITIONS

We encountered surficial material (consisting of undocumented fill and previously placed fill) and three formational units (consisting of Very Old Paralic Deposits, the Scripps Formation and the Ardath Shale) during our field investigation. Although not encountered during our field investigation, we expect an additional surficial soil unit consisting of alluvium to be present within the central canyon drainage. The surficial soil and geologic units are discussed herein in order of increasing age. The occurrence and distribution of the units encountered, including descriptions of the units, are presented on the exploratory boring logs in Appendix A. We present the approximate lateral extent of the geologic conditions on the Geologic Map, Figure 1, and the subsurface relationship between the geologic units on the Geologic Cross-Section A-A', Figure 2. We prepared the geologic cross-section using interpolation between exploratory borings; therefore, actual geologic conditions between the borings may vary from those illustrated and should be considered approximate.

5.1 Undocumented Fill (Qudf)

Fill was placed during rough grading of the Spectrum III site without geotechnical observation or compaction testing, and these fills are considered undocumented fill that are not suitable for support of structures or improvements. The Geologic Map, Figure 1, shows the northwestern portion and southern edge of the Spectrum III site as containing undocumented fill. The Spectrum III site is currently undergoing grading operations to remove the undocumented fill down to the previously placed compacted fill, prior to constructing the proposed improvements on the Spectrum III site. Undocumented fill is not considered suitable for supporting structural loads; however, the undocumented fill at the Spectrum III site is not located within in the area where the bridge is currently being proposed.

5.2 Previously Placed Fill (Qpf)

We encountered previously placed fill in our recent boring B-4, south of the proposed south bridge abutment in the northwest corner of the existing Spectrum V parking lot. The thickness of the previously placed fill was about 2 feet below existing grade at boring B-4. We encountered thicker previously placed fill in our borings previously performed to the east (approximately 10½ and 15 feet thick in borings B-1 and B-3 northeast of the Spectrum V building and approximately 20½ feet in boring B-2 across the canyon on the Spectrum III site. The fill was placed during the previous development of the Spectrum V area and during the development of the Spectrum II and III buildings. The fill consists primarily of silty to clayey, fine- to medium-grained sand. The fill soil possesses a “very low” to “low” expansion potential (expansion index of 50 or less). The previously placed fill is not located in the areas of the proposed bridge abutments. The previously placed fill may be encountered where the proposed walking path from the south end of the bridge approaches the Spectrum V parking lot. Remedial grading of the previously placed fill may be required during the grading operations.

5.3 Alluvium (Qal)

Although not encountered during our field investigations, we expect alluvium to be present within the canyon drainage located between the two bridge abutments. Holocene-age alluvium is sheet-flow or stream deposited material found within canyon drainages and generally vary in thickness dependent upon the size of the canyon and extent of the drainage area. We expect the alluvium to consist of loose to medium dense clayey sands that can become saturated and difficult to excavate during the rainy season. We estimate the thickness of the alluvium to range up to approximately 15 feet within the tributary canyon based on the existing topography. Due to the relatively unconsolidated nature of these deposits, remedial grading would be necessary if the areas are to receive additional fill or proposed structures.

5.4 Very Old Paralic Deposits, (Qvop)

Very Old Paralic Deposits (formerly called the Lindavista Formation) exists at or near grade at the north end of the proposed bridge on the Spectrum II site and at the south end of the proposed bridge

northeast of the Spectrum V site. We encountered the Very Old Paralic Deposits below the previously placed fill in Boring B-4 at the northeast corner of the existing Spectrum V parking lot and just below the DG pathway in boring B-5 west of the existing Spectrum II building. The Very Old Paralic Deposits extend to depths of approximately 7 and 6 feet below existing grade in borings B-4 and B-5, respectively. Based on our borings and visual mapping of the canyon area, the Very Old Paralic Deposits in the area of the north and south bridge abutments is present above an elevation of about 365 to 366 feet MSL. The unit consists of medium dense to very dense, damp to moist, reddish brown to olive brown, slightly clayey sandstone. This unit can be interlayered with gravel, cobble, and well-cemented layers. Difficult excavation, localized concretions and possible refusal may occur within this unit, if encountered. The Very Old Paralic Deposits are considered suitable for support of properly compacted fill and structural loading.

5.5 Scripps Formation (Tsc)

We encountered the Eocene-age Scripps Formation mapped by Kennedy and Tan (2008) below the fill and Very Old Paralic Deposits across the southern (Spectrum V), northern (Spectrum II) and eastern (Spectrum III) portions of the site. The formational materials generally consist of very dense, yellowish brown to reddish brown to olive brown, silty to clayey, fine-grained sandstone and siltstone and silty claystone. Soil generated from this unit typically possess a “very low” to “high” expansion potential (expansion index of 90 or less) and an “S0” to “S2” water-soluble sulfate exposure. The Scripps Formation possesses adequate soil support characteristics for support of properly compacted fill and structural loading.

5.6 Ardath Shale (Ta)

We encountered the Tertiary-age Ardath Shale in our borings underlying the Scripps Formation at the southern (Spectrum V) end of the site below an elevation of 323 feet MSL. The Ardath we encountered consists of hard, gray, clayey siltstone and sandy siltstone. The upper portion may contain thin beds of medium-grained sandstone similar to the overlying Scripps Formation (Kennedy and Tan, 2008). The Ardath Shale may contain localized areas of highly cemented concretionary beds. Soil generated from this unit typically possess a “very low” to “high” expansion potential (expansion index of 90 or less) and an “S0” to “S2” water-soluble sulfate exposure. The Ardath Shale is generally considered suitable for support of properly compacted structural fill and improvements.

6. GROUNDWATER

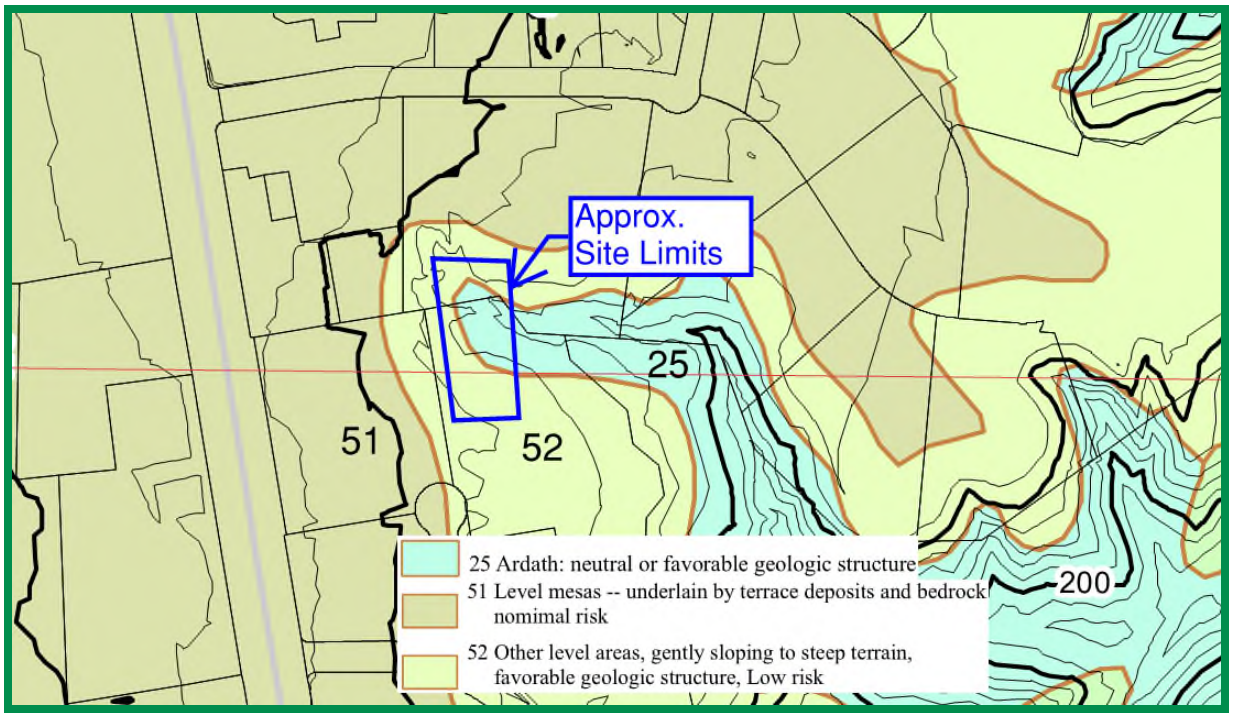
We did not encounter groundwater or seepage during our field investigation. We expect groundwater exists deeper than about 200 feet below the site; therefore, we do not expect groundwater to adversely impact proposed project development. It is not uncommon for groundwater or seepage conditions to develop where none previously existed. Groundwater elevations are dependent on seasonal

precipitation, irrigation, and land use among other factors and, vary as a result. Proper surface drainage will be important to future performance of the project.

7. GEOLOGIC HAZARDS

7.1 Geologic Hazard Category

The City of San Diego Seismic Safety Study, Geologic Hazards and Faults, Map Sheet 34 defines the northern and southern ends of the site and upper portions of the canyon area as a Hazard Category 52: *Other level areas, gently sloping to steep terrain, favorable geologic structure, low risk,* and the areas within the canyon as Hazard Category 25: Ardath: neutral or favorable geologic structure.



City of San Diego Seismic Safety Study

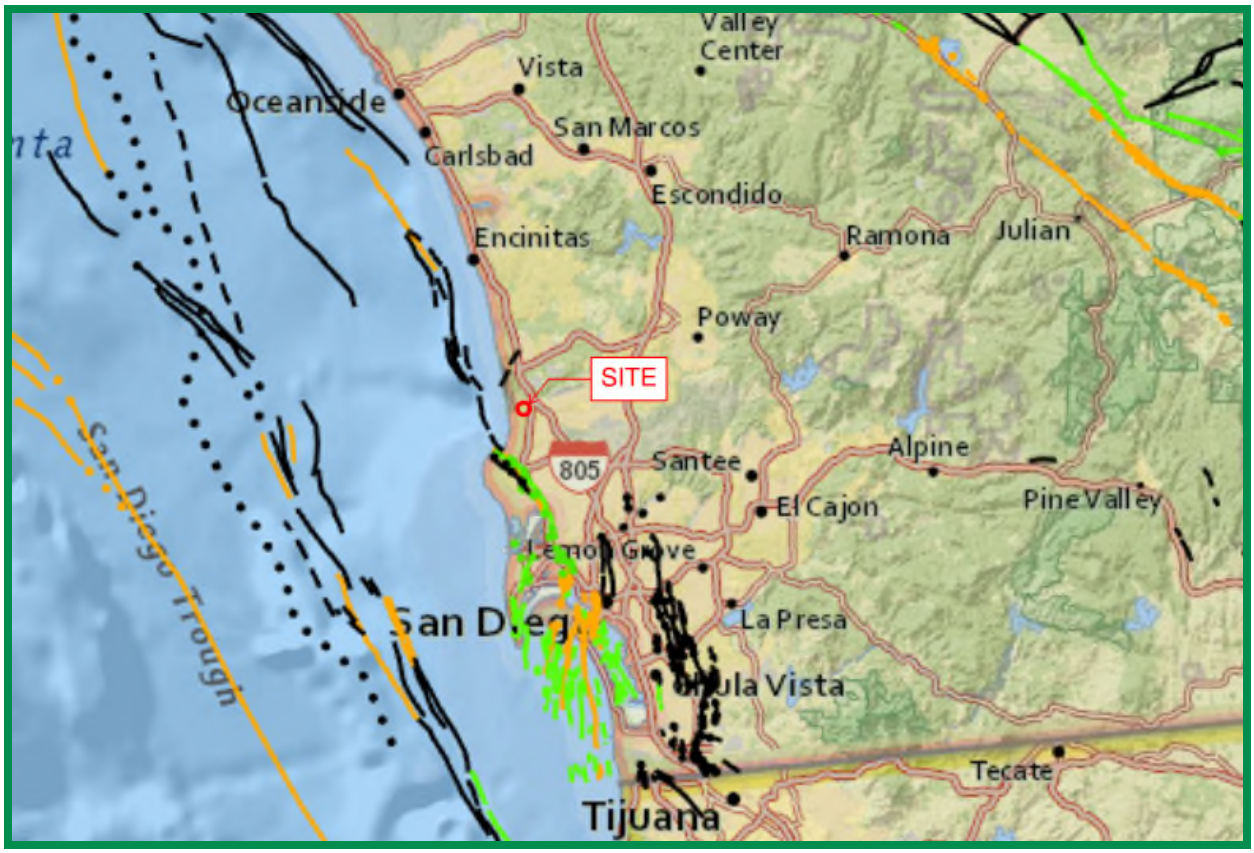
7.2 Faulting

A review of geologic literature and experience with the soil and geologic conditions in the general area indicate that known active, potentially active, or inactive faults are not located at the site. An active fault is defined by the California Geological Survey (CGS) as a fault showing evidence for activity within the last 11,000 years. The site is not located within a State of California Earthquake Fault Zone.

The site is not located on any known active, potentially active or inactive fault traces as defined by the CGS. A fault described as *Potentially Active, Inactive, presumed inactive or activity unknown fault* is

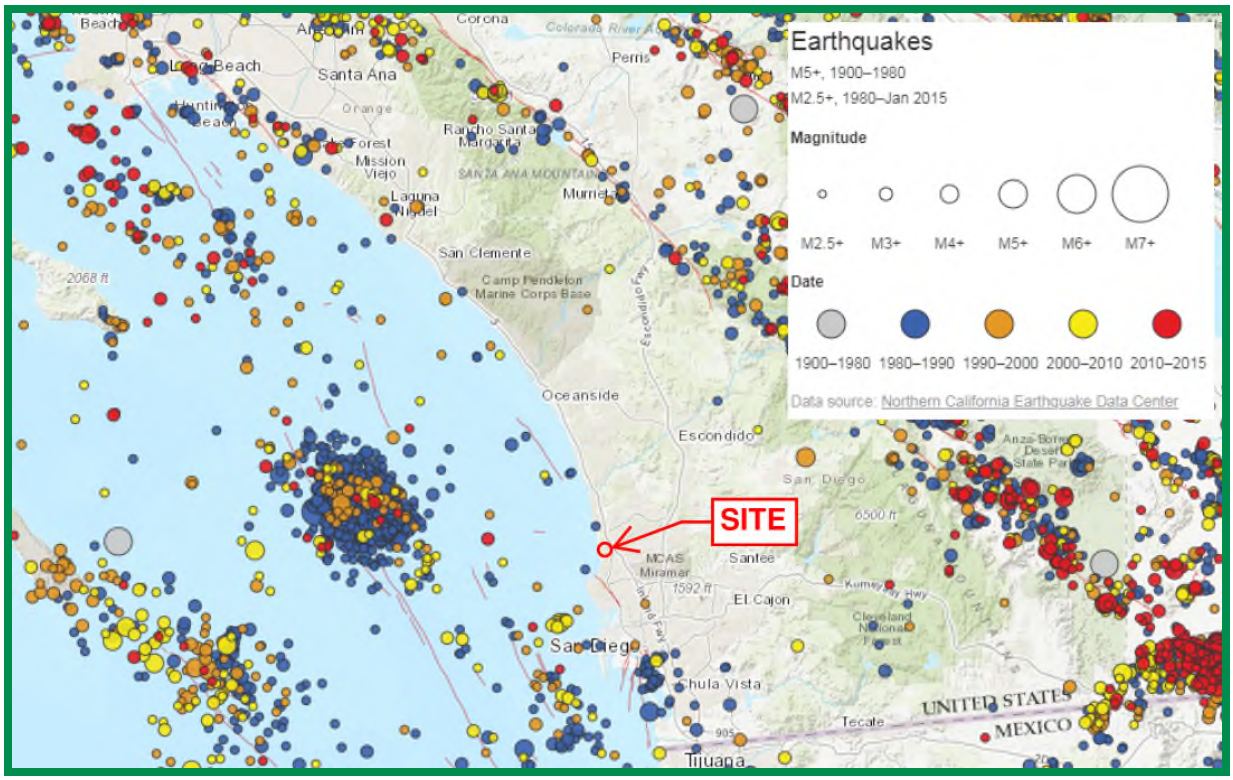
located approximately 0.4 miles to the southeast of the project site. We do not expect this fault will have an impact on site development.

The USGS has developed a program to evaluate the approximate location of faulting in the area of properties. The following figure shows the location of the existing faulting in the San Diego County and Southern California region. The fault traces are shown as solid, dashed and dotted that represent well-constrained, moderately constrained and inferred, respectively. The fault line colors represent faults with ages less than 150 years (red), 15,000 years (orange), 130,000 years (green), 750,000 years (blue) and 1.6 million years (black).



Faults in Southern California

The San Diego County and Southern California region is seismically active. The following figure presents the occurrence of earthquakes with a magnitude greater than 2.5 from the period of 1900 through 2015 according to the Bay Area Earthquake Alliance website.



Earthquakes in Southern California

Considerations important in seismic design include the frequency and duration of motion and the soil conditions underlying the site. Seismic design of structures should be evaluated in accordance with the California Building Code (CBC) guidelines currently adopted by the local agency.

7.3 Ground Rupture

Ground surface rupture occurs when movement along a fault is sufficient to cause a gap or rupture where the upper edge of the fault zone intersects that earth surface. The potential for ground rupture is considered to be very low due to the absence of active faults at the subject site.

7.4 Seiches and Tsunamis

A seiche is a run-up of water within a lake or embayment triggered by fault- or landslide-induced ground displacement. The site is not located in the vicinity of or downstream from such bodies of water. Therefore, the risk of seiches affecting the site is negligible.

A tsunami is a series of long-period waves generated in the ocean by a sudden displacement of large volumes of water. Causes of tsunamis include underwater earthquakes, volcanic eruptions, or offshore slope failures. The first-order driving force for locally generated tsunamis offshore southern California is expected to be tectonic deformation from large earthquakes. The property is located at an elevation

of about 335 to 360 feet above MSL and is about 1 mile from the Pacific Ocean; therefore, the risk of tsunamis affecting the site is negligible.

7.5 Liquefaction and Seismically Induced Settlement

Liquefaction typically occurs when a site is located in a zone with seismic activity, on-site soils are cohesionless/silt or clay with low plasticity, groundwater is encountered within 50 feet of the surface, and soil relative densities are less than about 70 percent. If the four previous criteria are met, a seismic event could result in a rapid pore-water pressure increase from the earthquake-generated ground accelerations. Seismically induced settlement is settlement that may occur whether the potential for liquefaction exists or not. Due to the absence of a near surface groundwater elevation and the dense to very dense nature of the existing compacted fill and formational materials, the potential for liquefaction occurring at the property is considered negligible.

7.6 Hydroconsolidation

Hydroconsolidation is the tendency of unsaturated soil structure to collapse upon saturation resulting in the overall settlement of the effected soil and any overlying foundations or improvements supported thereon. Potentially compressible surficial soil and existing fill is typically removed and recompacted during remedial site grading. However, if compressible soil is left in-place, a potential for settlement due to hydroconsolidation of the soil exists. The potential for hydroconsolidation can be mitigated by remedial grading and the use of stiffer foundation systems. Based on the laboratory test results, we do not expect a significant potential for hydroconsolidation exists in the underlying materials.

7.7 Slope Stability

Due to the accumulation of talus at the base of the surficial slopes on either side of the canyon, we expect that the existing surficial slopes at inclinations steeper than approximately ¾:1 (horizontal:vertical) will continue the erode and create debris at the base of the slope over time.

We performed slope stability analyses using the two-dimensional computer program *GeoStudio2007* created by Geo-Slope International Ltd. We calculated the factor of safety for the planned slopes for rotational-mode analyses using the Spencer's method which satisfies both moment and force equilibrium. Figures C-2 and C-3 in Appendix C present output of the computer program including the calculated factor of safety and the failure surface.

We used direct shear strength parameters based on laboratory tests and our experience with similar soil types in nearby areas for the slope stability analyses. Our calculations indicate the slopes at the site should have calculated factors of safety (FOS) of at least 1.5 under static conditions for deep-seated failure.

The slopes should be properly maintained for the slopes to keep their appropriate engineering properties. Slopes should be landscaped with drought-tolerant vegetation having variable root depths and requiring minimal landscape irrigation. In addition, slopes should be drained and properly maintained to reduce erosion.

7.8 Landslides

Examination of aerial photographs in our files, review of published geologic maps for the site vicinity, and the relatively level topography, it is our opinion landslides are not present at the subject property. However, surficial erosion does occur on the relatively steep portions of the slopes and talus does accumulate at the toe of the slope.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 General

8.1.1 We did not encounter soil or geologic conditions during the investigation that, in our opinion, would preclude the development of the property as presently planned, provided the recommendations of this report are followed.

8.1.2 Although we were unable to drill borings at the locations of the north and south abutments (access was limited due to existing landscaping on the north side and existing trees and brush on the south side), our field investigation, visual observation and review of the referenced documents indicate the existing site is underlain by Very Old Paralic Deposits ranging from approximately 6 to 7 feet thick at the north and south ends of the bridge. The Very Old Paralic Deposits are overlying Scripps Formation. Shallow previously placed fill will likely be encountered in the area of the proposed walking path as it approaches the Spectrum V site to the south.

8.1.3 The proposed bridge foundations will likely be supported by deep foundations (drilled piers or micropiles) bearing in formational materials. However, recommendations considering shallow conventional footings supported on formational materials are presented herein.

8.1.4 If shallow foundations are planned, the foundations should be deepened such that the bottom outside edge of the footing is at least 15 feet horizontally from the nearest daylighting face of the canyon/slope or should be set back at least 15 feet from the top of the slope. Deep foundations should be designed so that they begin acquiring bearing capacity at a depth at which the outside edge of the pile is at least 15 feet to daylight horizontally.

8.1.5 We did not observe groundwater or seepage in the exploratory borings to the total depths explored. We expect that groundwater extends deeper than 200 feet below the proposed bridge abutment locations. We do not anticipate ground water to be encountered during construction of the proposed development; however, it is not uncommon for groundwater or seepage conditions to develop where none previously existed due to the permeability characteristics of the geologic units on site. During the rainy season, seepage conditions may develop that would require special consideration.

8.1.6 Excavation of the existing previously placed fill should generally be possible with moderate to heavy effort using conventional, heavy-duty equipment during grading and trenching operations. Excavations that extend into formational materials could require very heavy effort, and possible localized rock breaking or refusal should be anticipated. Difficult drilling should be expected within the formational materials.

8.1.7 Geocon Incorporated should review the final grading and foundation plans prior to the submittal to regulatory agencies for approval. Additional analyses may be required once the plans have been provided.

8.1.8 Subsurface conditions observed may be extrapolated to reflect general soil and geologic conditions; however, variations in subsurface conditions between exploratory borings should be expected.

8.1.9 Adequate drainage provisions are imperative to the performance of the development. Site drainage should be maintained to direct surface runoff into controlled drainage devices. Positive site drainage should be maintained away from structures and pavements and tops of slopes and directed to storm drain facilities.

8.1.10 Surface settlement monuments will not be required on the project.

8.1.11 With the exception of retaining wall drains, we do not expect other subdrains are required for this project.

8.2 Excavation and Soil Characteristics

8.2.1 Excavation of the in-situ fill soil should be possible with moderate to heavy effort using conventional heavy-duty equipment. Excavations within the Scripps Formation and Ardath Shale should be possible with heavy to very heavy effort using conventional heavy-duty equipment. Localized areas of the formational units could require special excavation equipment and possibly rock breaking, if encountered.

8.2.2 The soil encountered in the field investigation is considered to be “non-expansive” and “expansive” (expansion index [EI] of 20 or less and greater than 20, respectively) as defined by 2019 California Building Code (CBC) Section 1803.5.3. Table 8.2.1 presents soil classifications based on the expansion index. We expect a majority of the soil encountered possess a “very low” to “low” expansion potential (EI of 50 or less).

TABLE 8.2.1
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	ASTM D 4829 Expansion Classification	2019 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

8.2.3 We performed laboratory tests on samples of the site materials to evaluate the percentage of water-soluble sulfate content. Results from the laboratory water-soluble sulfate content tests are presented in Appendix B and indicate that the on-site materials at the locations tested possess "S0" sulfate exposure to concrete structures as defined by 2019 CBC Section 1904 and ACI 318-14 Chapter 19. The Scripps Formation and the Ardath Shale are known to possess "S0" to "S2" water-soluble sulfate exposure classes. Table 8.2.2 presents a summary of concrete requirements set forth by 2019 CBC Section 1904 and ACI 318. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

TABLE 8.2.2
REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOLUTIONS

Exposure Class	Water-Soluble Sulfate (SO_4) Percent by Weight	Cement Type (ASTM C 150)	Maximum Water to Cement Ratio by Weight[1]	Minimum Compressive Strength (psi)
S0	$SO_4<0.10$	No Type Restriction	n/a	2,500
S1	$0.10\leq SO_4<0.20$	II	0.50	4,000
S2	$0.20\leq SO_4\leq 2.00$	V	0.45	4,500
S3	$SO_4>2.00$	V+Pozzolan or Slag	0.45	4,500

8.2.4 We tested samples for potential of hydrogen (pH) and resistivity laboratory tests to aid in evaluating the corrosion potential to subsurface metal structures. We also performed laboratory tests of samples of the site materials to evaluate the percentage of chloride ion content in accordance with AASHTO T 291. Appendix B presents the laboratory test results.

8.2.5 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be performed if improvements susceptible to corrosion are planned.

8.3 Subdrains

8.3.1 With the exception of wall drains, other subdrains are not expected.

8.4 Seismic Design Criteria – 2019 California Building Code

8.4.1 Table 8.4.1 summarizes site-specific design criteria obtained from the 2019 California Building Code (CBC; Based on the 2018 International Building Code [IBC] and ASCE 7-16), Chapter 16 Structural Design, Section 1613 Earthquake Loads. We used the computer program *U.S. Seismic Design Maps*, provided by the Structural Engineers Association (SEA) to calculate the seismic design parameters. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.2.2 of the 2019 CBC and Table 20.3-1 of ASCE 7-16. The values presented herein are for the risk-targeted maximum considered earthquake (MCE_R). Sites designated as Site Class D, E and F may require additional analyses if requested by the project structural engineer and client.

TABLE 8.4.1
2019 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2019 CBC Reference
Site Class	C	Section 1613.2.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.233g	Figure 1613.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.434g	Figure 1613.2.1(2)
Site Coefficient, F_A	1.200	Table 1613.2.3(1)
Site Coefficient, F_V	1.500*	Table 1613.2.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.479g	Section 1613.2.3 (Eqn 16-36)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	0.652g*	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.986g	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.434g*	Section 1613.2.4 (Eqn 16-39)

***** Using the code-based values presented in this table, in lieu of a performing a ground motion hazard analysis, requires the exceptions outlined in ASCE 7-16 Section 11.4.8 be followed by the project structural engineer. Per Section 11.4.8 of ASCE/SEI 7-16, a ground motion hazard analysis should be performed for projects for Site Class "E" sites with Ss greater than or equal to 1.0g and for Site Class "D" and "E" sites with S1 greater than 0.2g. Section 11.4.8 also provides exceptions which indicates that the ground motion hazard analysis may be waived provided the exceptions are followed.

8.4.2 Table 8.4.2 presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-16.

TABLE 8.4.2
ASCE 7-16 PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-16 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.557g	Figure 22-7
Site Coefficient, F_{PGA}	1.200	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.668g	Section 11.8.3 (Eqn 11.8-1)

8.4.3 Conformance to the criteria in Tables 8.4.1 and 8.4.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a large earthquake. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

8.5 Grading

8.5.1 Grading should be performed in accordance with the *Recommended Grading Specifications* in Appendix K. Where the recommendations of this report conflict with Appendix K, the recommendations of this section shall take precedence.

8.5.2 Earthwork should be observed and compacted fill tested by representatives of Geocon Incorporated.

8.5.3 A pre-construction conference with the city inspector, owner, contractor, civil engineer, and geotechnical engineering company in attendance should be held at the site prior to the beginning of export or shoring operations. Special soil handling requirements can be discussed at that time.

8.5.4 Site preparation should begin with demolishing existing buildings and improvements and removal of deleterious material and vegetation. The depth of removal should be such that material exposed in cut areas or soil to be used as fill are relatively free of organic matter. Material generated during stripping and/or site demolition should be exported from the site and not used as fill unless approved by Geocon Incorporated.

8.5.5 Grading of the site should commence with the removal of existing improvements from the areas to be graded. Deleterious debris should be exported from the site and should not be mixed with

fill, if planned. Existing underground improvements within the proposed improvement areas should be removed and the resulting depressions located below the planned grading limits should be properly backfilled in accordance with the procedures described herein.

8.5.6 We expect the proposed bridge will be supported on shallow foundations or on drilled pier or micropile foundation systems bearing on formational materials. Proposed retaining walls should be supported on properly compacted fill placed above formational materials.

8.5.7 If shallow foundations are used, we expect the shallow foundations for the north and south abutments would be underlain by the formational material. For shallow bridge foundations, the footing should be excavated into the formation, and removals should not be required. Within the limits of grading and proposed flatwork areas outside of structures, the upper 1 to 2 feet should be scarified, moisture conditioned as necessary, and properly compacted. We should evaluate if deeper removals are required due to existing soft/loose or wet soil during the demolition operations. This remedial grading should extend laterally at least 2 feet beyond the perimeter of the pavement areas, where possible. Table 8.5.1 provides a summary of the grading recommendations.

TABLE 8.5.1
SUMMARY OF GRADING RECOMMENDATIONS

Area	Removal Requirements
Shallow Bridge Foundations	Foundations will be in Formational Materials, Remove Existing Materials to Expose the Formational Materials
Site Development	Process Upper 1 to 2 Feet of Existing Materials
Grading Limits	5 Feet Outside of Shallow Foundations/2 Feet Outside of Improvement Areas, Where Possible
Exposed Bottoms of Remedial Grading	Scarify Upper 12 Inches

8.5.8 Prior to fill soil being placed, the existing ground surface should be scarified, moisture conditioned as necessary, and compacted to a depth of at least 12 inches. Deeper removals may be required if saturated or loose fill soil is encountered. A representative of Geocon should be on-site during removals to evaluate the limits of the remedial grading.

8.5.9 The site should then be brought to final subgrade elevations with fill compacted in layers. In general, soil native to the site is suitable for use from a geotechnical engineering standpoint as fill if relatively free from vegetation, debris and other deleterious material. Layers of fill should be about 6 to 8 inches in loose thickness and no thicker than will allow for adequate bonding and compaction. Fill, including backfill and scarified ground surfaces, should be

compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content in accordance with ASTM Test Procedure D 1557. Fill materials placed below optimum moisture content may require additional moisture conditioning prior to placing additional fill. The upper 12 inches of subgrade soil underlying vehicular pavement should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content shortly before paving operations.

8.5.10 Import fill (if necessary) should consist of the characteristics presented in Table 8.5.2. Geocon Incorporated should be notified of the import soil source and should perform laboratory testing of import soil prior to its arrival at the site to determine its suitability as fill material.

TABLE 8.5.2
SUMMARY OF IMPORT FILL RECOMMENDATIONS

Soil Characteristic	Values
Expansion Potential	"Very Low" to "Medium" (Expansion Index of 90 or less)
Particle Size	Maximum Dimension Less Than 3 Inches
	Generally Free of Debris

8.6 Excavation Slopes

8.6.1 The recommendations included herein are provided for stable excavations. It is the responsibility of the contractor and their competent person to ensure all excavations, temporary slopes and trenches are properly constructed and maintained in accordance with applicable OSHA guidelines in order to maintain safety and the stability of the excavations and adjacent improvements. These excavations should not be allowed to become saturated or to dry out. Surcharge loads should not be permitted to a distance equal to the height of the excavation from the top of the excavation. The top of the excavation should be a minimum of 15 feet from the edge of existing improvements. Excavations steeper than those recommended or closer than 15 feet from an existing surface improvement should be shored in accordance with applicable OSHA codes and regulations.

8.6.2 The stability of the excavations is dependent on the design and construction of the shoring system and site conditions. Therefore, Geocon Incorporated cannot be responsible for site safety and the stability of the proposed excavations.

8.7 Concrete Slabs-On-Grade

8.7.1 Concrete slabs-on-grade for structures should be constructed in accordance with Table 8.7.

TABLE 8.7
MINIMUM CONCRETE SLAB-ON-GRADE RECOMMENDATIONS

Parameter	Value
Minimum Concrete Slab Thickness	4 inches
Minimum Steel Reinforcement	No. 3 Bars 18 Inches on Center, Both Directions
Typical Slab Underlayment	3 to 4 Inches of Sand/Gravel/Base
Design Expansion Index (EI)	50 or less

8.7.2 Slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (ACI 302.2R-06). In addition, the membrane should be installed in accordance with manufacturer's recommendations and ASTM requirements and installed in a manner that prevents puncture. The vapor retarder used should be specified by the project architect or developer based on the type of floor covering that will be installed and if the structure will possess a humidity-controlled environment.

8.7.3 The bedding sand thickness should be determined by the project foundation engineer, architect, and/or developer. It is common to have 3 to 4 inches of sand for 5-inch and 4-inch thick slabs, respectively, in the southern California region. However, we should be contacted to provide recommendations if the bedding sand is thicker than 6 inches. The foundation design engineer should provide appropriate concrete mix design criteria and curing measures to assure proper curing of the slab by reducing the potential for rapid moisture loss and subsequent cracking and/or slab curl. We suggest that the foundation design engineer present the concrete mix design and proper curing methods on the foundation plans. It is critical that the foundation contractor understands and follows the recommendations presented on the foundation plans.

8.7.4 Concrete slabs should be provided with adequate crack-control joints, construction joints and/or expansion joints to reduce unsightly shrinkage cracking. The design of joints should consider criteria of the American Concrete Institute (ACI) when establishing crack-control spacing. Crack-control joints should be spaced at intervals no greater than 12 feet. Additional steel reinforcing, concrete admixtures and/or closer crack control joint spacing should be considered where concrete-exposed finished floors are planned.

8.7.5 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisturized to maintain a moist condition as would be expected in any such concrete placement.

8.7.6 The concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slabs for supporting expected loads.

8.7.7 Where exterior flatwork abuts the structure at entrant or exit areas, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

8.7.8 The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soil (if present), differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. 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.

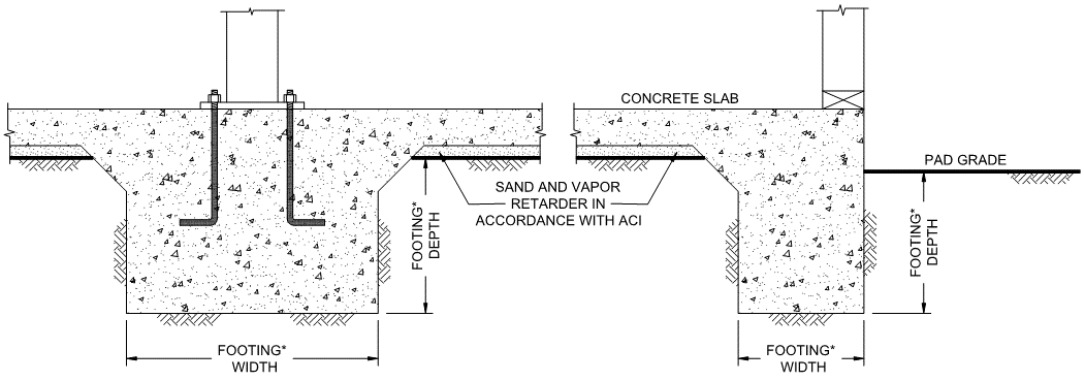
8.8 Shallow Foundations

8.8.1 The proposed pedestrian bridge can be supported on a shallow foundation system supported entirely on formational materials. If shallow foundations are used, we expect the shallow foundations for the north and south abutments would be underlain by formational material. Foundations for the structure should consist of continuous strip footings and/or isolated spread footings. Footings should be deepened such that the bottom outside edge of the footing is at least 15 feet horizontally from the nearest daylighting face of the canyon/slope. Table 8.8.1 provides a summary of the foundation design recommendations.

TABLE 8.8.1
SUMMARY OF FOUNDATION RECOMMENDATIONS

Parameter	Value
Minimum Continuous Foundation Width	12 inches
Minimum Isolated Foundation Width	24 inches
Minimum Foundation Depth	24 Inches Below Lowest Adjacent Grade
Minimum Steel Reinforcement	4 No. 5 Bars, 2 at the Top and 2 at the Bottom
Allowable Bearing Capacity	6,000 psf (Formation)
Bearing Capacity Increase	500 psf per Foot of Depth
	300 psf per Foot of Width
Maximum Allowable Bearing Capacity	10,000 psf (Formation)
Design Expansion Index	50 or less

8.8.2 The foundations should be embedded in accordance with the recommendations herein and the Wall/Column Footing Dimension Detail. The embedment depths should be measured from the lowest adjacent pad grade for both interior and exterior footings. Footings should be deepened such that the bottom outside edge of the footing is at least 15 feet horizontally from the nearest daylighting face of the canyon/slope.



Wall/Column Footing Dimension Detail

8.8.3 The bearing capacity values presented herein are for dead plus live loads and may be increased by one-third when considering transient loads due to wind or seismic forces.

8.8.4 Where the bridge foundation or other improvements are planned near the top of a slope steeper than 3:1 (horizontal:vertical) or near the top of the near-vertical canyon edges, special foundations and/or design considerations are recommended due to the tendency for lateral soil movement to occur.

- Footings should be setback and/or deepened such that the bottom outside edge of the footing is at least 15 feet horizontally from the nearest daylighting face of the canyon/slope.

- Although other improvements, which are relatively rigid or brittle, such as concrete flatwork or masonry walls, may experience some distress if located near the top of a slope, it is generally not economical to mitigate this potential. It may be possible, however, to incorporate design measures that would permit some lateral soil movement without causing extensive distress. Geocon Incorporated should be consulted for specific recommendations.

8.8.5 We should observe the foundation excavations prior to the placement of reinforcing steel and concrete to check that the exposed soil conditions are similar to those expected and that they have been extended to the appropriate bearing strata. Foundation modifications may be required if unexpected soil conditions are encountered.

8.8.6 Total Settlements of up to 2½ inches at the north tower and 2 inches at the south tower are expected for footings bearing in compacted fill. Table 8.8.2 provides the estimated total settlements for the proposed structure.

TABLE 8.8.2
SUMMARY OF ESTIMATED TOTAL SETTLEMENT

Parameter	Location	Footing Size Used for Settlement (feet)	Allowable Bearing Capacity (psf)	Estimated Total Settlement
Estimated Total Settlement	North and South Abutments	20 x 20	6,000 (in Formation)	½ Inch (in Formation)

8.8.7 Differential settlement of up to ½ inch in 40 feet is expected for the planned structure as shown in Table 8.8.3.

TABLE 8.8.3
SUMMARY OF ESTIMATED DIFFERENTIAL SETTLEMENT

Parameter	Location	Value
Estimated Differential Settlement	North and South Abutments	½ Inch

8.8.8 Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

8.9 Drilled Pier Recommendations

8.9.1 Drilled piers or cast-in-place-hole (CIDH) piles can be used for the proposed bridge foundation support. The foundation recommendations herein assume that the piers will extend through the fill into the Scripps Formation and/or the Ardath Shale. The piers should be embedded at least 5 feet within the formational materials. Capacity should be ignored above an elevation where the outside edge of the pier is at least 15 feet horizontally from the nearest daylighting face of the canyon/slope.

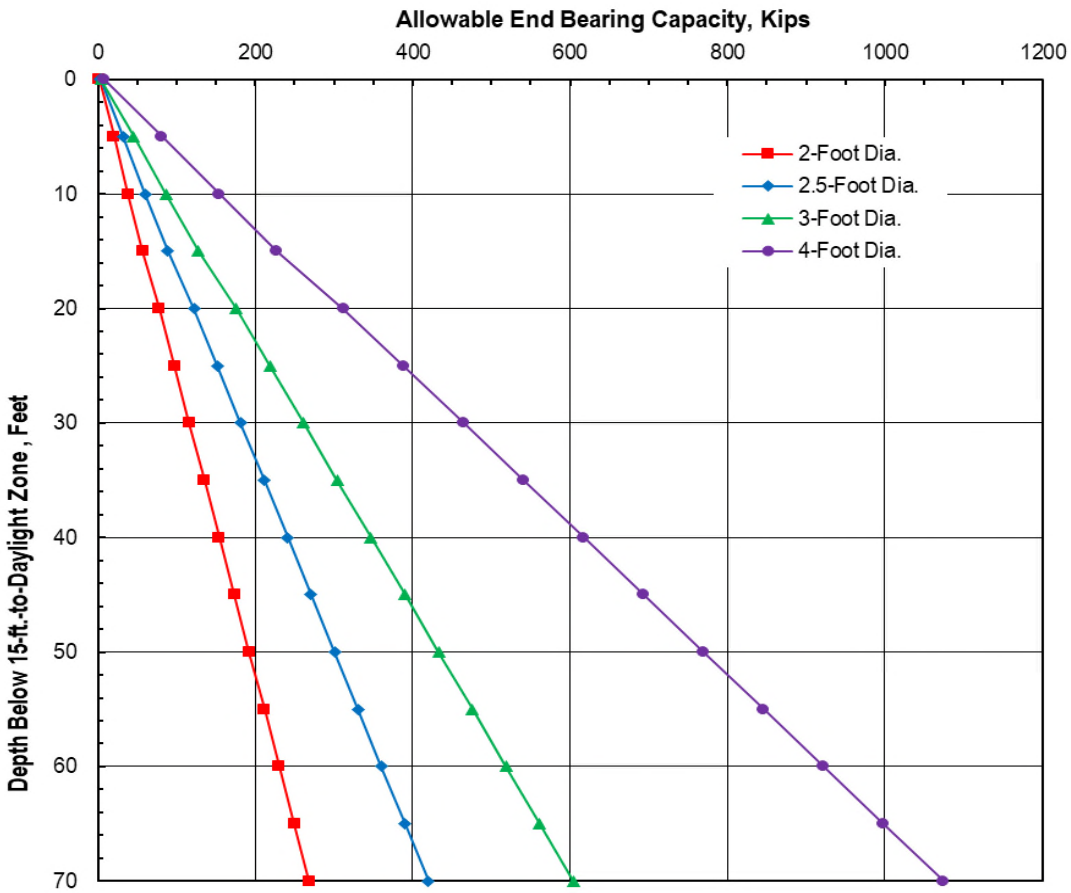
8.9.2 Piers can be designed to develop support by end bearing and skin friction within the formational materials below the depth at which the outside edge of the pier is at least 15 feet to daylight/canyon face using the parameters presented in Table 8.9.

TABLE 8.9
SUMMARY OF DRILLED PIER RECOMMENDATIONS

Parameter	Value
Minimum Pile Diameter	2 Feet
Minimum Pile Spacing	3 Times Pile Diameter
Minimum Foundation Embedment Depth	10 Feet
	Minimum of 15 feet to Daylight/Canyon Face
	5 Feet in Formational Materials
Allowable Bearing Capacity	Per Chart
Allowable Skin Friction Capacity	200 psf (Fill Materials)
	600 psf (Formational Materials)
Estimated Total Settlement	½ Inch
Estimated Differential Settlement	½ Inch in 40 Feet

8.9.3 The diameter of the piers should be a minimum of 2 feet. The piles should be embedded into the formational materials at least 5 feet and have a minimum length of 10 feet and should extend to a depth at which the bottom outside edge of the pier is at least 15 feet horizontally from the nearest daylighting face of the canyon/slope. The design length of the drilled piers should be determined by the designer based on the elevation of the pile cap or grade beam and the elevation of the top of the formational materials obtained from the Geologic Map and Geologic Cross-Sections presented herein. It is difficult to evaluate the exact length of the proposed drilled piers due to the variable thickness of the existing fill; therefore, some variation should be expected during drilling operations.

8.9.4 The end bearing capacity can be determined by the End Bearing Capacity Chart. Piers can be designed to develop support by end bearing and skin friction within the formational materials below the depth at which the outside edge of the pier is at least 15 feet to daylight/canyon face. The depth on the chart is the depth below the elevation at which the outside edge of the pile is a minimum of 15 feet horizontally to daylight/canyon face. These allowable values possess a factor of safety of at least 2 and 3 for skin friction and end bearing, respectively.



End Bearing Capacity Chart

8.9.5 The allowable downward capacity may be increased by one-third when considering transient wind or seismic loads.

8.9.6 Single pile uplift capacity can be taken as 75 percent of the allowable downward skin friction capacity.

8.9.7 If pier spacing is at least 3 times the maximum dimension of the pier, no reduction in axial capacity for group effects is considered necessary. If piles are spaced between 2 and 3 pile diameters (center to center), the single pile axial capacity should be reduced by 25 percent. Geocon Incorporated should be contacted to provide single-pile capacity if piers are spaced closer than 2 diameters.

8.9.8 The formational materials may contain gravel and cobble and may possess very dense and cemented zones; therefore, the drilling contractor should expect difficult drilling conditions during excavations for the piers. Because a significant portion of the piers capacity will be developed by end bearing, the bottom of the borehole should be cleaned of loose cuttings

prior to the placement of steel and concrete. Experience indicates that backspinning the auger does not remove loose material and a flat cleanout plate is necessary.

8.9.9 We expect localized seepage may be encountered during the drilling operations and casing may be required to maintain the integrity of the pier excavation, particularly if seepage or sidewall instability is encountered. Groundwater or seepage may be encountered during the drilling operations at an elevation below the canyon bottom. Concrete should be placed within the excavation as soon as possible after the auger/cleanout plate is withdrawn to reduce the potential for discontinuities or caving.

8.9.10 Pile settlement of production piers is expected to be on the order of ½ inch if the piers are loaded to their allowable capacities. Geocon should provide updated settlement estimates once the foundation plans are available. Settlements should be essentially complete shortly after completion of the building superstructure.

8.9.11 We can provide a lateral pile capacity analysis using the *LPILE* computer program once the pile type, size, and approximate length has been provided. The total capacity of pile groups should be considered less than the sum of the individual pile capacities for pile spacing of less than 8D (where D is pile diameter) for lateral loads parallel to the pile group and 3D for loads perpendicular to the pile group. The reduction in capacity is based on pile spacing and positioning and can result in group efficiency on the order of 50 percent of the sum of single-pile capacities. We can evaluate the lateral capacity of pile groups using the *GROUP* computer program, if requested.

8.9.12 Where the bridge foundation or other improvements are planned near the top of a slope steeper than 3:1 (horizontal:vertical) or near the top of the near-vertical canyon edges, special foundations and/or design considerations are recommended due to the tendency for lateral soil movement to occur.

- Footings should be setback and deepened such that the bottom outside edge of the footing is at least 15 feet horizontally from the nearest daylighting face of the canyon/slope.

- Although other improvements, which are relatively rigid or brittle, such as concrete flatwork or masonry walls, may experience some distress if located near the top of a slope, it is generally not economical to mitigate this potential. It may be possible, however, to incorporate design measures that would permit some lateral soil movement without causing extensive distress. Geocon Incorporated should be consulted for specific recommendations.

8.9.13 We should observe the drilling operations during excavation for the foundations to check that the soil conditions are similar to those expected and that they have been extended to the appropriate bearing strata. Foundation modifications may be required if unexpected soil conditions are encountered.

8.9.14 Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

8.10 Micropiles

8.10.1 In general, ground conditions are moderately suited for micropile construction techniques. However, due to the gravel and cobbles within the formational materials, some caving or sloughing of the unsupported excavations may be encountered. In addition, sidewall instability of the excavations may randomly occur if cohesionless soil is encountered during the drilling operations.

8.10.2 The foundations can be supported on micropiles bearing into the Very Old Paralic Deposits and the Scripps Formation. The micropiles should be designed to develop support by skin friction within of the formational materials. Micropiles should have a minimum embedment depth of 5 feet into formational materials and should be setback and deepened such that the bottom outside edge of the footing is at least 15 feet horizontally from the nearest daylighting face of the canyon/slope. Piles can be designed to develop support by end bearing and skin friction within the formational materials below the depth at which the outside edge of the pier is at least 15 feet to daylight/canyon face. The micropiles should be designed by a structural engineer with adequate experience. The capacities for micropiles should be evaluated using the soil strength parameters shown in Table 8.10. The capacity of the micropiles will depend on the installation procedures and construction operations. Therefore, the values presented in Table 8.10 should be used as a guideline. A factor of safety of at least 2 should be applied to the ultimate bond stresses to obtain the allowable bond stresses. We estimate the settlement of the micropiles will be approximately ½ inch.

TABLE 8.10
SOIL STRENGTH PARAMETERS FOR MICROPILES

Description	Cohesion	Friction Angle	Ultimate Bond Stress
Formational Materials	500 psf	34 degrees	20 psi

8.10.3 We expect the micropiles design can range from 6 to 12 inches in diameter. The structural engineer should design for appropriate sizes with the information provided herein.

8.10.4 If caving soil is encountered in the boreholes, casing or drilling fluid should be used to maintain the borehole integrity prior to placement of the grout. Centralizers should be used when installing steel reinforcement.

8.10.5 Experience has shown that the use of pressure grouting during formation of the bond of the micropile will increase the soil-grout bond stress. A pressure grouting tube can be installed during the construction of the micropile. Post grouting can be performed if adequate capacity cannot be obtained by other construction methods.

8.10.6 Testing of the micropiles should be performed in accordance with the guidelines of the *Federal Highway Administration Micropile Design and Construction Guidelines* or similar guidelines. At least 2 verification load tests should be performed to 2.5 times the design load prior to the construction of the production piles. Verification tests piles should be sacrificial piles and should only be bonded in formational materials. In addition, at least 2 of the production piles should be proof tested to at least 1.67 times the design load. The load test failure criteria should be established in the project plans and specifications. Load tests should only be performed after sufficient hydration has occurred within the grout. Micropiles that fail to meet project specified test criteria should be replaced or additional piles should be constructed. Observation of micropile installation and testing should be performed by a representative of Geocon Incorporated.

8.10.7 Geocon Incorporated should review the structural plans for the project prior to final design submittal to determine whether additional analyses and/or recommendations are required.

8.11 Exterior Concrete Flatwork

8.11.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations presented in Table 8.11. The recommended steel reinforcement would help reduce the potential for cracking.

TABLE 8.11
MINIMUM CONCRETE FLATWORK RECOMMENDATIONS

Expansion Index, EI	Minimum Steel Reinforcement* Options	Minimum Thickness
EI $\leq$ 90	6x6-W2.9/W2.9 (6x6-6/6) welded wire mesh	4 Inches
	No. 3 Bars 18 inches on center, Both Directions	

* In excess of 8 feet square.

8.11.2 Even with the incorporation of the recommendations of this report, the exterior concrete flatwork has a potential to experience some uplift due to expansive soil beneath grade. The steel reinforcement should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork. Additionally, flatwork should be structurally connected to the curbs, where possible, to reduce the potential for offsets between the curbs and the flatwork.

8.11.3 Concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be verified prior to placing concrete. Base materials will not be required below concrete improvements.

8.11.4 Where exterior flatwork abuts the structure at entrant or exit points, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

8.11.5 The recommendations presented herein are intended to reduce the potential for cracking of exterior slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, slabs-on-grade will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Crack control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

8.12 Retaining Walls

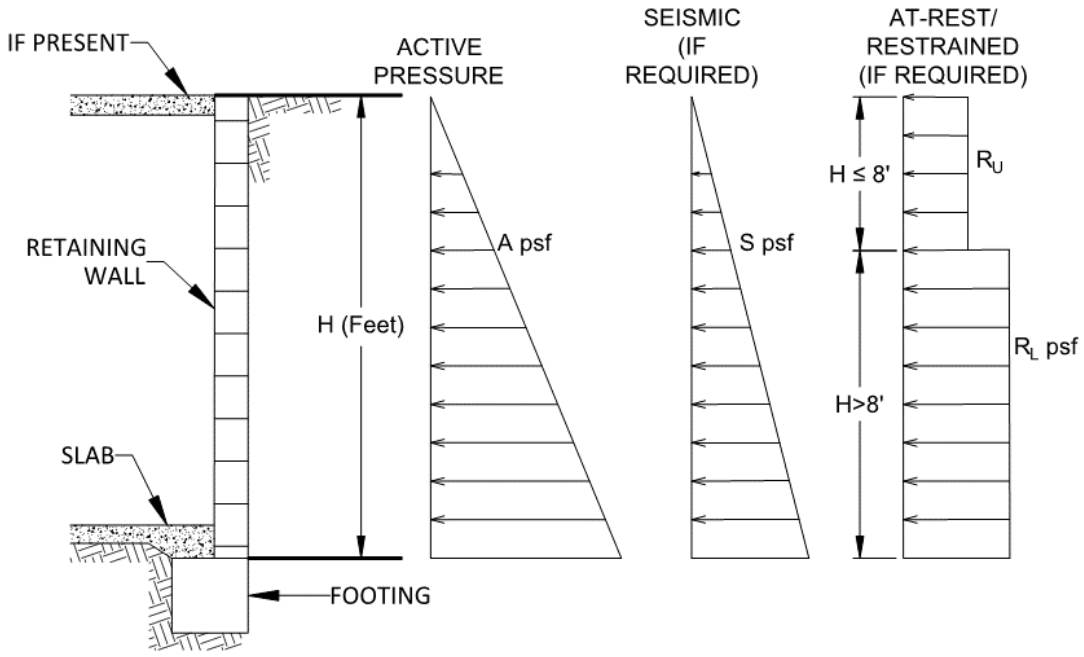
8.12.1 Retaining walls should be designed using the values presented in Table 8.12.1. Soil with an expansion index (EI) of greater than 90 should not be used as backfill material behind retaining walls.

TABLE 8.12.1
RETAINING WALL DESIGN RECOMMENDATIONS

Parameter	Value
Active Soil Pressure, A (Fluid Density, Level Backfill)	40 pcf
Active Soil Pressure, A (Fluid Density, 2:1 Sloping Backfill)	55 pcf
Seismic Pressure, S	17H psf
At-Rest/Restrained Walls Additional Uniform Pressure (0 to 8 Feet High)	7H psf
At-Rest/Restrained Walls Additional Uniform Pressure (8+ Feet High)	13H psf
Expected Expansion Index for the Subject Property	EI≤90

H equals the height of the retaining portion of the wall

8.12.2 The project retaining walls should be designed as shown in the Retaining Wall Loading Diagram.



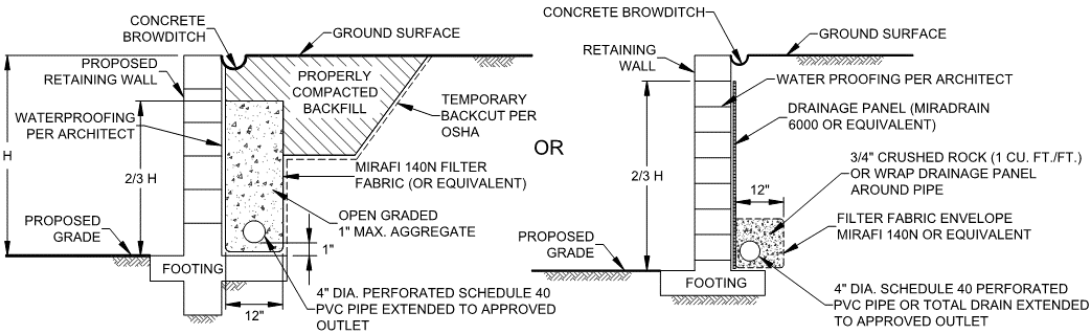
Retaining Wall Loading Diagram

8.12.3 Unrestrained walls are those that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall) at the top of the wall. Where walls are restrained from movement at the top (at-rest condition), an additional uniform pressure should be applied to the wall. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to 2 feet of fill soil should be added.

8.12.4 The structural engineer should determine the Seismic Design Category for the project in accordance with Section 1613.3.5 of the 2019 CBC or Section 11.6 of ASCE 7-10. For structures assigned to Seismic Design Category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 1803.5.12 of the 2019 CBC. The seismic load is dependent on the retained height where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall.

8.12.5 Retaining walls should be designed to ensure stability against overturning sliding, and excessive foundation pressure. Where a keyway is extended below the wall base with the intent to engage passive pressure and enhance sliding stability, it is not necessary to consider active pressure on the keyway.

8.12.6 Drainage openings through the base of the wall (weep holes) should not be used where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The recommendations herein assume a properly compacted granular (EI of 90 or less) free-draining backfill material with no hydrostatic forces or imposed surcharge load. The retaining wall should be properly drained as shown in the Typical Retaining Wall Drainage Detail. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.



Typical Retaining Wall Drainage Detail

8.12.7 The retaining walls may be designed using either the active and restrained (at-rest) loading condition or the active and seismic loading condition as suggested by the structural engineer. Typically, it appears the design of the restrained condition for retaining wall loading may be adequate for the seismic design of the retaining walls. However, the active earth pressure combined with the seismic design load should be reviewed and also considered in the design of the retaining walls.

8.12.8 In general, wall foundations having should be designed in accordance with Table 8.12.2. The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, retaining wall foundations should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope. The allowable downward capacity may be increased by one-third when considering transient wind or seismic loads.

TABLE 8.12.2
SUMMARY OF RETAINING WALL FOUNDATION RECOMMENDATIONS

Parameter	Value
Minimum Retaining Wall Foundation Width	12 inches
Minimum Retaining Wall Foundation Depth	12 Inches
Minimum Steel Reinforcement	Per Structural Engineer
Allowable Bearing Capacity in Fill	2,000 psf
Bearing Capacity Increase	500 psf per Foot of Depth
	300 psf per Foot of Width
Maximum Allowable Bearing Capacity in Fill	3,500 psf
Estimated Total Settlement	1 Inch
Estimated Differential Settlement	½ Inch in 40 Feet

8.12.9 The recommendations presented herein are generally applicable to the design of rigid concrete or masonry retaining walls. In the event that other types of walls (such as mechanically stabilized earth [MSE] walls, soil nail walls, or soldier pile walls) are planned, Geocon Incorporated should be consulted for additional recommendations.

8.12.10 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The retaining walls and improvements above the retaining walls should be designed to incorporate an appropriate amount of lateral deflection as determined by the structural engineer.

8.12.11 Soil contemplated for use as retaining wall backfill, including import materials, should be identified in the field prior to backfill. At that time, Geocon Incorporated should obtain samples for laboratory testing to evaluate its suitability. Modified lateral earth pressures may be necessary if the backfill soil does not meet the required expansion index or shear strength. City or regional standard wall designs, if used, are based on a specific active lateral earth pressure and/or soil friction angle. In this regard, on-site soil to be used as backfill may or may not meet the values for standard wall designs. Geocon Incorporated should be

consulted to assess the suitability of the on-site soil for use as wall backfill if standard wall designs will be used.

8.13 Lateral Loading

8.13.1 Table 8.13 should be used to help design the proposed structures and improvements to resist lateral loads for the design of footings or shear keys. The allowable passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in design for passive resistance.

TABLE 8.13
SUMMARY OF LATERAL LOAD DESIGN RECOMMENDATIONS

Parameter	Value
Passive Pressure Fluid Density	350 pcf
Coefficient of Friction (Concrete and Soil)	0.35

8.13.2 The passive and frictional resistant loads can be combined for design purposes. The lateral passive pressures may be increased by one-third when considering transient loads due to wind or seismic forces.

8.14 Site Drainage and Moisture Protection

8.14.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2019 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

8.14.2 In the case of basement walls or building walls retaining landscaping areas, a water-proofing system should be used on the wall and joints, and a Miradrain drainage panel (or similar) should be placed over the waterproofing. The project architect or civil engineer should provide detailed specifications on the plans for all waterproofing and drainage.

8.14.3 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

8.14.4 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. Area drains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes can be used. In addition, where landscaping is planned adjacent to the pavement, construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material should be considered.

8.15 Grading and Foundation Plan Review

8.15.1 Geocon Incorporated should review the grading plans and foundation plans for the project prior to final design submittal to evaluate whether additional analyses and/or recommendations are required.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. 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 Incorporated 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 scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner or 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.

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

EXISTING SPECTRUM 2 PARKING STRUCTURE

PROPOSED SPECTRUM 3 BUILDING

EXISTING SPECTRUM BUILDING 2

EXISTING SPECTRUM BUILDING 5 FF=360.5

PREVIOUS BUILDING LOCATION

PROPOSED BRIDGE LOCATION

PROPERTY LINE

SPECTRUM I

SPECTRUM III

CTRUM II

SCIENCE PARK RD

CTRUM WAY COURT

MERRYFIELD ROW

DENSE TREES

DENSE BRUSH

Area of Work

HV_132 386.34

Qvop

Qcf/Qpf/Qvop

Qcf/Qvop

Qcf/Qpf/Qvop

Qpf/Qvop

Qpf/Qvop

Qcf/Qpf/ Tsc

Qcf/ Tsc

Qpf/ Tsc

Qpf/ Tsc

Qpf/ Tsc

Qpf/ Tsc

Qpf/ Tsc

Qpf/ Tsc

Qudf/ Qpf/ Tsc

Qudf/ Tsc

Qcf/ Tsc

Qpf/ Tsc

Qcf/Qpf/ Tsc

Qudf/ Qpf/ Tsc

Tsc

Qal

Tsc

Qvop

Qal

Tsc

Qvop

Tsc

Qal

Tsc

Ta

Tsc

Ta

B-5 (387)

B-4 (367)

B-1 (365)

B-7 (347)

B-2 (369)

B-6 (362.5)

B-3 (351)

B-10 (?)

B-8 (353)

B-9 (348.5)

B-11 (357.5) 361

B-16 365

B-10 (347.5) 357.5

B-17 359

B-1 (349) 354

B-13 (348.5) 355

B-1 (330.5) 345

B-2 (355) 355

B-14 (346) 353

B-5 348 (343.5)

B-12 (336.5) 353

B-1 (324) 352

B-2 (340) 353

B-4 348 (327.5)

B-3 (335.5) 338

B-29 (330) 350

B-11B (330) 350

B-15 (339) 349

B-1 346 (323)

B-5 (370) 371

B-4 (371) 373

B-8 360 (358)

B-1 361 (346)

B-2 361 (359)

B-3 (357) 371

B-3 361 (350.5)

B-9 366 (363)

B-7 355 (353)

P-2

A

A'

0' 40' 80' 120' 160'

SCALE 1"=40' (On 36x24)

GEOCON LEGEND

Qal .....ALLUVIUM

Qudf .....UNDOCUMENTED FILL (Dotted Where Buried)

Qcf .....COMPACTED FILL

Qpf .....PREVIOUSLY PLACED FILL

Qvop .....VERY OLD PARALIC DEPOSITS (Dotted Where Buried)

Tsc .....SCRIPPS FORMATION (Dotted Where Buried)

Ta .....ARDATH SHALE

355.5 .....APPROX. LOCATION OF ELEVATION BOTTOM OF PREVIOUS OVEREXCAVATION (Feet, MSL)

.....APPROX. LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried, Queried Where Uncertain)

B-5 .....APPROX. LOCATION OF GEOTECHNICAL BORING (Geocon, 2021 - Appendix A)

B-9 .....APPROX. LOCATION OF GEOTECHNICAL BORING (Geocon, 1997 - Appendix D)

B-2 .....APPROX. LOCATION OF GEOTECHNICAL BORING (Geocon, 2012 & 2015 - Appendix E)

B-11 .....APPROX. LOCATION OF GEOTECHNICAL BORING (Geocon, 2015 & 2016 - Appendix F)

B-4 .....APPROX. LOCATION OF BORING (ICG, 1990 - Appendix G)

B-11 .....APPROX. LOCATION OF GEOTECHNICAL BORING (Kleinfelder, 1997 - Appendix H)

B-29 .....APPROX. LOCATION OF GEOTECHNICAL BORING (Kleinfelder, 1998 - Appendix I)

B-1 .....APPROX. LOCATION OF GEOTECHNICAL BORING (Kleinfelder, 1998 - Appendix J)

P-2 .....APPROX. LOCATION OF INFILTRATION TEST

361 .....APPROX. ELEVATION AT TOP OF BORING AT TIME OF DRILLING (In Feet, Mean Sea Level)

(323).....APPROX. ELEVATION WHERE FORMATION ENCOUNTERED IN BORING (In Feet, Mean Sea Level)

A A' .....APPROX. LOCATION OF GEOLOGIC CROSS-SECTION

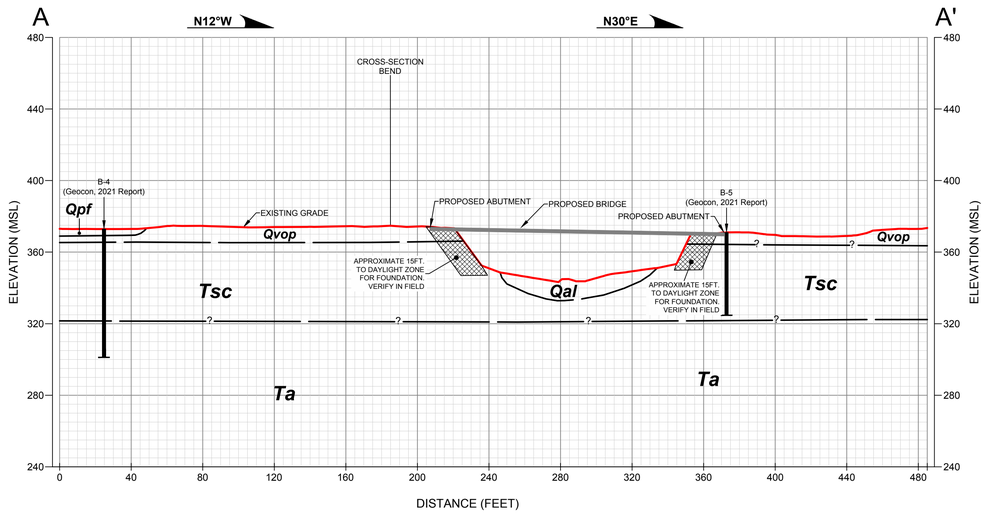
GEOLOGIC MAP

SPECTRUM PEDESTRIAN BRIDGE
3013 SCIENCE PARK ROAD AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858.558-6900 - FAX 858.558-6159

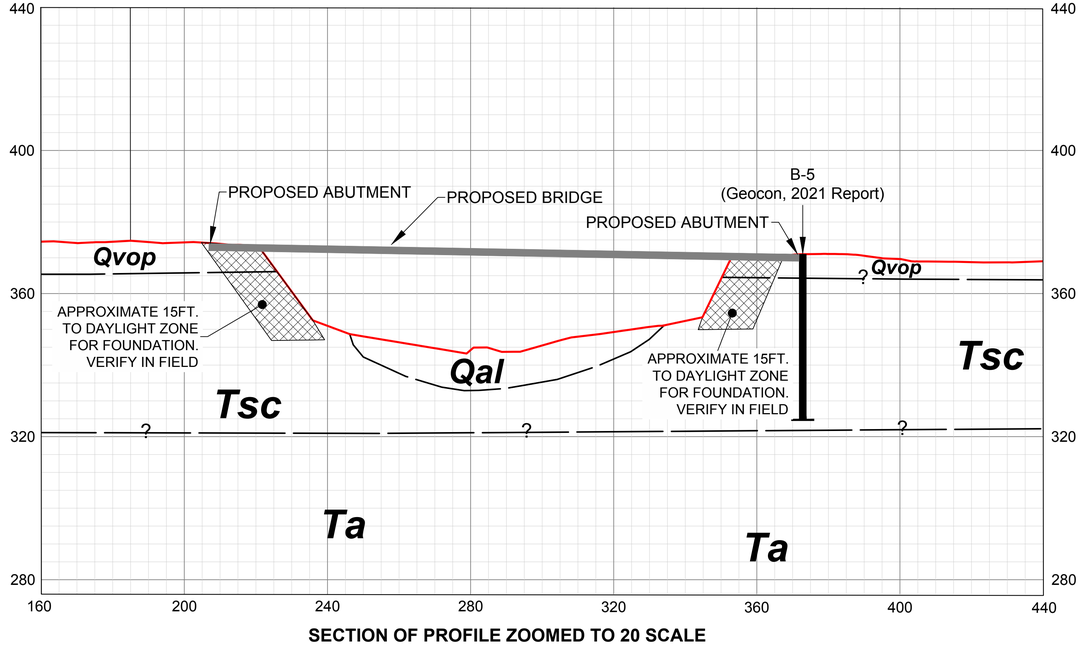
SCALE	1" = 40'	DATE	01 - 20 - 2021
PROJECT NO.	G1813 - 52 - 07	FIGURE	1
SHEET	1 OF 1		

Plotted:01/20/2021 12:54PM | By:JONATHAN WILKINS | File Location:Y:\PROJECTS\G1813-52-07 Spectrum Bridge\SHEETS\G1813-52-07 GeologicMap.dwg



GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 40' (Vert. = Horiz.)



SECTION OF PROFILE ZOOMED TO 20 SCALE

GEOCON LEGEND

- ***Qpf*** ..... PREVIOUSLY PLACED FILL
- ***Qal*** ..... ALLUVIUM
- ***Qvop*** ..... VERY OLD PARALIC DEPOSITS
- ***Tsc*** ..... SCRIPPS FORMATION
- ***Ta*** ..... ARDATH SHALE
- B-5 ..... APPROX. LOCATION OF GEOTECHNICAL BORING (Appendix A)
- ..... APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)

GEOLOGIC CROSS - SECTION

SPECTRUM PEDESTRIAN BRIDGE
3013 SCIENCE PARK ROAD AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE	1" = 40'
DATE	01 - 20 - 2021
PROJECT NO.	G1813 - 52 - 07
FIGURE	2
SHEET	1 OF 1

Plotted:01/20/2021 12:56PM | By:JONATHAN WILKINS | File Location: Y:\PROJECTS\G1813-52-07 Spectrum Bridge\SHEETS\G1813-52-07 CrossSection.dwg

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

We performed the fieldwork for our investigation on December 27, 2019, and January 2, June 8, December 28 and December 29, 2020. The exploratory excavations consisted of the observation and logging of five small-diameter borings. Borings were performed by Tri-County Drilling using a CME 75 truck-mounted drill rig, and by Pacific Drilling Co. using a Fraste limited access drill rig and a Diedrich D50 truck-mounted drill rig. The locations of the exploratory borings are shown on the Geologic Map, Figure 1. Boring logs and an explanation of the geologic units encountered are presented on Figures A-1 through A-5.

We obtained samples during our subsurface exploration in the borings using either a California sampler or a Standard Penetration Test (SPT) sampler. Both samplers are composed of steel and are driven to obtain ring samples. The California sampler has an inside diameter of 2.5 inches and an outside diameter of 3 inches. Up to 18 rings are placed inside the sampler that is 2.4 inches in diameter and 1 inch in height. The SPT sampler has an inside diameter of 1.5 inches and an outside diameter of 2 inches. We obtained ring samples at appropriate intervals, placed them in moisture-tight containers, and transported them to the laboratory for testing. The type of sample is noted on the exploratory boring logs.

The California and SPT samplers were driven up to 12 and 18 inches, respectively. The sampler is connected to A rods and driven into the bottom of the excavation using a 140-pound hammer with a 30-inch drop. Blow counts are recorded for every 6 inches the sampler is driven. The penetration resistances shown on the boring logs are shown in terms of blows per foot. The values indicated on the boring logs are the sum of the last 12 inches of the sampler. If the sampler was not driven for 12 inches, an approximate value is calculated in term of blows per foot or the final 6-inch interval is reported. These values are not to be taken as N-values as adjustments have not been applied. We estimated elevations shown on the boring logs either from a topographic map or by using a benchmark. Each excavation was backfilled as noted on the boring logs.

We visually examined, classified, and logged the soil encountered in the borings in general accordance with American Society for Testing and Materials (ASTM) practice for Description and Identification of Soils (Visual-Manual Procedure D 2488). The logs depict the soil and geologic conditions observed and the depth at which samples were obtained. Fieldwork for our investigation included subsurface exploration and soil sampling. The locations of the exploratory borings are shown on the Geologic Map, Figure 1. Boring logs, and an explanation of the geologic units encountered, are presented in figures following the text in this appendix. We located the borings in the field using a measuring tape and existing reference points. Therefore, actual boring locations may deviate slightly.

PROJECT NO. G1813-52-07

BORING B 1

ELEV. (MSL.) **361'** DATE COMPLETED **12-27-2019**

EQUIPMENT **DIEDRICH D-120 W/ 8"HSA** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-1			SM/SC	**3 INCHES TOPSOIL AND MULCH**			
					PREVIOUSLY PLACED FILL (Qpf) Medium dense, moist, yellowish brown, Silty to Clayey fine to medium SAND			
2								
4								
6	B1-2				-Becomes wet, brown to reddish brown, trace mica	28	118.7	11.4
	B1-2A					30	118.5	13.2
8								
10	B1-3				-Becomes brown with dark brown mottling; trace organics	17		13.8
12	B1-3A					22	113.4	14.6
14								
	B1-4			SM/SC	**SCRIPPS FORMATION (Tsc)**	50/5"	107.4	10.0
16	B1-5				Very dense, moist, yellowish brown, Silty to Clayey fine to medium SANDSTONE			
18								
20	B1-6				-No recovery	50/4"		
22	B1-7				-Yellowish brown with dark brown mottling	98/9"		14.9
24								
	B1-8					50/5"	109.6	15.4
26								
28								

Figure A-1,
Log of Boring B 1, Page 1 of 2

G1813-52-07.GPJ

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. G1813-52-07

BORING B 1

ELEV. (MSL.) **361'** DATE COMPLETED **12-27-2019**

EQUIPMENT **DIEDRICH D-120 W/ 8"HSA** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B1-9			ML	Hard, damp, gray with reddish brown mottling, Sandy SILTSTONE	50/6"		16.8
32								
34								
36	B1-10				-Upper rings of sample are disturbed; moist, reddish brown with gray mottling	50/5"	123.0	15.3
38								
40	B1-11 B1-12				-Poor recovery, appears to be slough from drilling spoils -Very difficult drilling	50/0.5"		
42								
44				CL	Hard, moist, gray to light reddish brown, Silty CLAYSTONE; little sand			
46	B1-13					50/6"	83.9	19.2
48								
50	B1-14			ML	**ARDATH SHALE (Ta)** Hard, moist, gray, Clayey SILTSTONE	50/4"	97.2	26.4
52								
54								
56	B1-15				-Very difficult drilling	86/9"		20.1
	B1-16				-Sampler bouncing; no recovery; fine white powder/dust on end of sampler and on drill bit	50/0.5"		
					BORING TERMINATED AT 57.6 FEET Backfilled with 20ft³ bentonite and cement grout			

Figure A-1,
Log of Boring B 1, Page 2 of 2

G1813-52-07.GPJ

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. G1813-52-07

BORING B 2

ELEV. (MSL.) **348'** DATE COMPLETED **01-02-2020**

EQUIPMENT **DIEDRICH D-120 W/ 8"HSA** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B2-1			SM	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, moist, olive brown to dark olive brown, Silty fine to medium SAND			
2								
4								
6	B2-2					26	105.2	14.5
8					-Difficult drilling at around 7 feet			
10	B2-3				-Becomes dense, trace mica	56	114.7	11.3
12	B2-4							
14								
16	B2-5				-Becomes medium dense, gravel up to 1 inch, trace mica, trace rootlets	25	100.1	12.0
18								
20	B2-6			SM	**SCRIPPS FORMATION (Tsc)** Dense, moist, light reddish brown to olive brown, Silty fine to medium SANDSTONE; trace mica	41	114.0	14.3
22								
24								
26	B2-7				-Reddish brown	64	106.7	12.8
28								

G1813-52-07.GPJ

Figure A-2,
Log of Boring B 2, Page 1 of 3

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. G1813-52-07

BORING B 2

ELEV. (MSL.) **348'** DATE COMPLETED **01-02-2020**

EQUIPMENT **DIEDRICH D-120 W/ 8"HSA** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B2-8				-Becomes very dense, damp, reddish brown with light brown mottling; some .5-inch; 2-inch rock stuck in shoe of sampler; grinding during drilling	90	110.5	7.4
32								
34								
36	B2-9				-Becomes more Clayey; some gravel less then 1-inch	50/3"		
38					-Difficult drilling, grinding on rocks			
40	B2-10					50/4"		
42								
44								
46	B2-11					50/3"	104.7	7.9
48								
50	B2-12				-1-inch rock in shoe of sampler; little gravel	50/5"		
52								
54								
56	B2-13 B2-14			ML	**ARDATH SHALE (Ta)** Hard, wet, gray with reddish brown mottling, Sandy SILTSTONE; trace mica	50/3"	104.4	19.9
58								

Figure A-2,
Log of Boring B 2, Page 2 of 3

G1813-52-07.GPJ

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. G1813-52-07

BORING B 2

ELEV. (MSL.) **348'** DATE COMPLETED **01-02-2020**

EQUIPMENT **DIEDRICH D-120 W/ 8"HSA** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
60	B2-15				-Becomes dark gray; trace mica	50/5"		
	B2-16							
62								
64								
	B2-17					50/3"	112.7	14.6
66								
68								
	B2-18					50/3"	98.6	23.8
70					BORING TERMINATED AT 70.3 FEET Groundwater not encountered Boring backfilled with 24.5 ft³ bentonite and cement grout			

Figure A-2,
Log of Boring B 2, Page 3 of 3

G1813-52-07.GPJ

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.

GEOCON

PROJECT NO. G1813-52-07

BORING B 3

ELEV. (MSL.) **361'** DATE COMPLETED **06-08-2020**

EQUIPMENT **DIEDRICH D-120 W/ 8"HSA** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B3-1			SM	**3 INCHES TOPSOIL**			
					PREVIOUSLY PLACED FILL (Qpf) Medium dense, moist, yellowish brown, Silty fine to medium SAND			
2								
4								
	B3-2					37	117.5	14.5
6								
8								
10	B3-3				-Top of sample saturated	82/11"	112.9	16.4
				SM/SC	**SCRIPPS FORMATION (Tsc)** Very dense, moist, yellow brown, Silty to Clayey fine to medium SANDSTONE			
12								
14								
	B3-4					50/6"	99.5	13.0
16								
18								
20	B3-5					50/4"	99.7	11.9
	B3-6					98/9"		
22	B3-7							
24								
	B3-8				-Reddish brown with brown mottling	84/8"	102.6	19.1
26								
28								

Figure A-3,
Log of Boring B 3, Page 1 of 2

G1813-52-07.GPJ

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. G1813-52-07

BORING B 3

ELEV. (MSL.) **361'** DATE COMPLETED **06-08-2020**

EQUIPMENT **DIEDRICH D-120 W/ 8"HSA** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B3-9			SM	Very dense, damp, reddish brown, Silty fine to medium SANDSTONE	50/3"	101.5	14.7
32								
34								
	B3-10			ML	Hard, moist, gray and reddish brown mottled, Clayey SILTSTONE	78/10"		
36								
38								
40	B3-11					50/5"	101.9	13.8
42								
44								
	B3-12					50/2"		
46	B3-13				-No recovery in Cal. Sampler	50/2"		
48								
50	B3-14			CL	**ARDATH SHALE (Ta)**	95/9"		
	B3-15				Hard, moist, gray, Sandy, Silty CLAYSTONE			
52								
54	B3-16				-Difficult drilling, no recovery	50/1"		
	B3-17				-No recovery	92/11"		
					-Boring terminated due to practical drilling refusal			
					BORING TERMINATED AT 55 FEET			
					No groundwater encountered			
					Boring backfilled with 19.2 ft³ bentonite			

Figure A-3,
Log of Boring B 3, Page 2 of 2

G1813-52-07.GPJ

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. G1813-52-07

BORING B 4

ELEV. (MSL.) **373'** DATE COMPLETED **12/29/2020**

EQUIPMENT **DIEDRICH RIG W/ 8"HSA** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**4 INCH ASPHALT CONCRETE OVER 6 INCH BASE**			
	B4-1			CL	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, moist, brown, Silty to Sandy CLAY			
2				CL	**VERY OLD PARALIC DEPOSITS (Qvop)** Medium dense, damp, olive brown and light brown, Silty to Sandy CLAYSTONE; little mica			
4								
	B4-2					35		
6								
8				SM	**SCRIPPS FORMATION (Tsc)** Medium dense, damp, brown to light brown, Silty fine to medium SANDSTONE			
10	B4-3					28	112.1	17.5
12								
14								
	B4-4			SP	Medium dense, damp, light brown to light reddish brown, fine to coarse SANDSTONE; few silt	45	104.5	6.6
16								
18								
				SM	Very dense, damp, light brown to light yellowish brown, Silty, fine SANDSTONE			
20	B4-5					70/10"	94.2	8.6
22								
24								
	B4-6				-Same	50/6"	89.4	15.4
26	B4-7							
28								

Figure A-4,
Log of Boring B 4, Page 1 of 3

G1813-52-07.GPJ

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. G1813-52-07

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 4** ELEV. (MSL.) **373'** DATE COMPLETED **12/29/2020** EQUIPMENT **DIEDRICH RIG W/ 8"HSA** BY: **K. JAMES**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
30	B4-8				-Same	50/6"	100.1	15.0
32								
34								
36	B4-9				-Becomes fine to medium	71/10"	106.6	21.1
38								
40	B4-10					50/5"	100.9	13.6
42								
44								
46	B4-11				-Same; upper 2 inch of sample disturbed	50/4"	106.6	13.9
48								
50	B4-12				**ARDATH SHALE (Ta)** Very dense, damp, gray, Sandy SILTSTONE; trace mica	50/3"	115.1	14.8
52								
54								
56	B4-13				-Same	50/5"	103.7	18.3
58					-Difficult drilling			

Figure A-4,
Log of Boring B 4, Page 2 of 3

G1813-52-07.GPJ

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. G1813-52-07

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 4** ELEV. (MSL.) **373'** DATE COMPLETED **12/29/2020** EQUIPMENT **DIEDRICH RIG W/ 8"HSA** BY: **K. JAMES**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
60	B4-14				-Same	83		
62								
64								
66	B4-15					81		
68								
70	B4-16					85		
					BORING TERMINATED AT 71 FEET Boring backfilled with 24.8 ft³ bentonite grout No groundwater encountered			

Figure A-4,
Log of Boring B 4, Page 3 of 3

G1813-52-07.GPJ

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. G1813-52-07

BORING B 5

ELEV. (MSL.) **371'** DATE COMPLETED **12-28-2020**

EQUIPMENT **FRASTE RIG W/8" HSA** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B5-1				**DECOMPOSED GRANITE PATHWAY AND SUBGRADE**			
2				SM	**VERY OLD PARALIC DEPOSITS (Qvop)** Dense, damp, reddish brown, Silty, fine to coarse SANDSTONE; trace 1-2 inch rocks; trace mica			
4								
6	B5-2					51	113.3	10.9
8				SM	**SCRIPPS FORMATION (Tsc)** Medium dense, damp, light brown with yellowish brown mottling, Silty, fine to medium SANDSTONE with localized lenses of sandy clay			
10	B5-3					35	103.1	17.7
12	B5-4							
14								
16	B5-5			SC	Dense, damp, reddish brown with light brown, mottling, Clayey, fine to medium SANDSTONE; trace 1/2-inch rocks	55	115.4	11.7
18								
20	B5-6				-Becomes very dense, few 1/2-inch rocks	80/11"	105.5	6.2
22								
24								
26	B5-7				-Becomes dense, few 1/2-inch rocks, 2-inch rock in bottom ring of sample	60	115.1	13.9
28								
				SM	Medium dense, damp, brown, Silty, fine to medium SANDSTONE; trace			

Figure A-5,
Log of Boring B 5, Page 1 of 2

G1813-52-07.GPJ

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. G1813-52-07

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 5** ELEV. (MSL.) **371'** DATE COMPLETED **12-28-2020** EQUIPMENT **FRASTE RIG W/8" HSA** BY: **K. JAMES** MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B5-8				mica; trace rock	44	110.0	15.1
32								
34								
36	B5-9 B5-10				-Becomes light brown, less cohesive	46 27	97.4	7.4
38								
40	B5-11				-Becomes dense	60	99.0	5.9
42								
44								
46	B5-12				-Becomes light reddish brown BOTTOM OF BORING AT 46 FEET Boring backfilled with 16.1ft³ bentonite grout No groundwater encountered	75		

Figure A-5,
Log of Boring B 5, Page 2 of 2

G1813-52-07.GPJ

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.

APPENDIX B

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. We tested selected samples for in-place dry density and moisture content, maximum dry density and optimum moisture content, shear strength, expansion index, water-soluble sulfate characteristics, pH and resistivity, water-soluble chloride content, correlated unconfined compressive strength, gradation and consolidation. The results of our laboratory tests are presented in Tables B-I through B-VI and the enclosed figures. In addition, the in-place dry density and moisture content results are presented on the exploratory boring logs in Appendix A.

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

Sample No.	Description (Geologic Unit)	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B1-1	Yellowish brown, Silty to Clayey, fine to medium SAND (Qpf)	127.2	10.3
B2-1	Olive brown to dark olive brown, Silty, fine to medium SAND	130.2	8.8
B3-1	Yellowish brown, Silty fine to medium SAND	130.5	9.2
B4-1	Brown, Silty to Clayey, fine to medium SAND (Qpf)	127.4	10.4
B5-1	Reddish brown, Silty, fine to coarse SAND (Qvop)	135.8	7.1

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

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	2019 CBC Expansion Classification	Expansion Classification
	Before Test	After Test				
B1-1	9.1	17.4	112.8	20	Very Low	Non-Expansive
B2-1	8.9	16.7	113.2	13	Very Low	Non-Expansive
B3-1	8.3	17.9	114.4	16	Very Low	Non-Expansive
B4-1	9.8	19.8	110.3	37	Low	Expansive
B5-1	8.3	15.1	1116.7	3	Very Low	Non-Expansive

TABLE B-III
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Depth (feet)	Water-Soluble Sulfate (%)	Exposure Class
B1-1	0-5	0.024	S0
B1-5	15.5-20	0.026	S0
B2-1	0-5	0.033	S0
B2-10	40	0.011	S0
B2-16	61-65	0.014	S0
B3-1	0-5	0.028	S0
B3-7	22-25	0.029	S0
B3-15	51-54	0.063	S0
B4-1	0-5	0.030	S0
B4-7	26-30	0.019	S0

TABLE B-IV
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (pH) AND RESISTIVITY TEST RESULTS
CALIFORNIA TEST NO. 643

Sample No.	pH	Minimum Resistivity (ohm-centimeters)
B1-1	7.6	1,200
B2-1	7.3	690
B3-1	8.1	880
B4-1	8.1	540
B5-1	7.8	320

TABLE B-V
SUMMARY OF LABORATORY WATER-SOLUBLE CHLORIDE CONTENT TEST RESULTS
AASHTO TEST NO. T291

Sample No.	Chloride Content (ppm)	Chloride Content (%)
B1-1	184	0.018
B2-1	618	0.062
B3-1	208	0.021
B4-1	489	0.049
B5-1	1610	0.161

TABLE B-VI
SUMMARY OF HAND PENETROMETER TEST RESULTS
ASTM D 1558

Sample No.	Depth (feet)	Geologic Unit	Hand Penetrometer Reading, Unconfined Compression Strength (tsf)	Undrained Shear Strength (ksf)
B1-2	5	Qpf	3.0	3.0
B1-2A	6	Qpf	2.5	2.5
B1-3	10	Qpf	2.5	2.5
B1-3A	11.5	Qpf	2.5	2.5
B1-4	15	Tsc	4.0	4.0
B1-7	22	Tsc	3.5	3.5
B1-8	25	Tsc	4.5	4.5
B1-9	30	Tsc	4.5	4.5
B1-10	35	Tsc	4.5	4.5
B1-13	45	Tsc	4.5	4.5
B1-14	50	Ta	4.5	4.5
B1-15	55	Ta	4.5	4.5
B2-1	5	Qpf	4.0	4.5
B2-3	10	Qpf	4.0	4.5
B2-5	15	Qpf	4.0	4.5
B2-7	25	Tsc	4.5	4.5
B2-8	30	Tsc	4.5	4.5
B2-9	35	Tsc	4.5	4.5
B2-10	40	Tsc	4.5	4.5
B2-11	45	Tsc	4.5	4.5
B2-12	50	Tsc	4.5	4.5
B2-13	55	Ta	4.5	4.5
B2-15	60	Ta	4.5	4.5
B2-17	65	Ta	4.5	4.5
B2-18	65	Ta	4.5	4.5
B3-2	5	Qpf	2.5	2.5
B3-3	10	Qpf	3.5	3.5
B3-4	15	Tsc	3.5	3.5
B3-5	20	Tsc	3.5	3.5
B3-8	25	Tsc	4.5	4.5
B3-9	30	Tsc	4.5	4.5
B3-11	40	Tsc	4.5	4.5
B3-14	50	Ta	4.5	4.5
B4-3	10	Tsc	4.5	4.5

TABLE B-VI (Concluded)
SUMMARY OF HAND PENETROMETER TEST RESULTS
ASTM D 1558

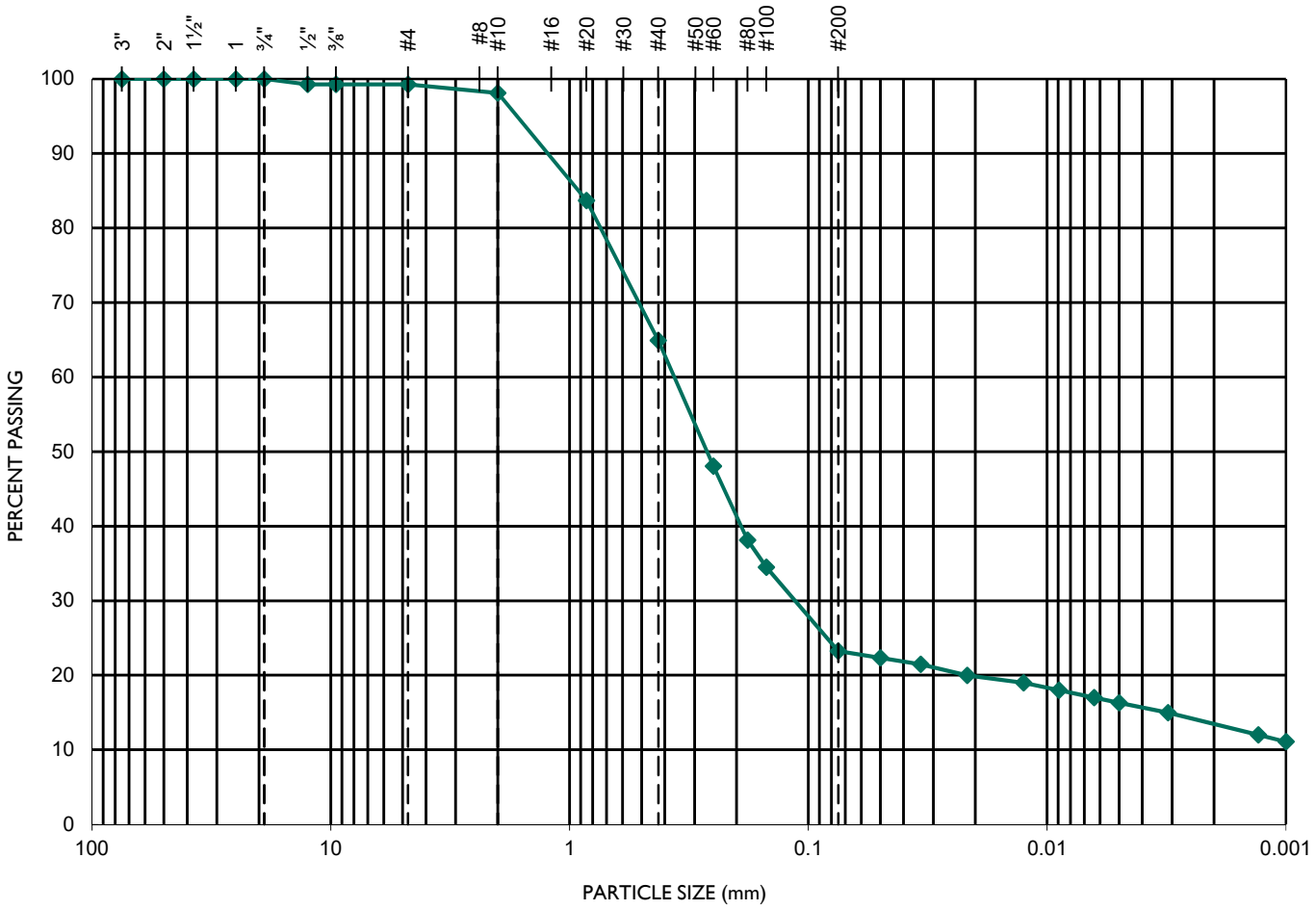
Sample No.	Depth (feet)	Geologic Unit	Hand Penetrometer Reading, Unconfined Compression Strength (tsf)	Undrained Shear Strength (ksf)
B4-4	15	Tsc	4.0	4.0
B4-8	30	Tsc	4.5	4.5
B4-9	35	Tsc	4.5	4.5
B4-10	40	Tsc	4.5	4.5
B4-11	45	Tsc	4.5	4.5
B4-12	50	Ta	4.5	4.5
B5-2	5	Qvop	4.5	4.5
B5-5	15	Tsc	3.0	3.0
B5-6	20	Tsc	4.5	4.5
B5-7	25	Tsc	4.0	4.0
B5-8	30	Tsc	4.5	4.5
B5-11	40	Tsc	4.5	4.5

SAMPLE NO.: **B1-2** GEOLOGIC UNIT: **Qpf**

SAMPLE DEPTH (FT.): **5**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE



TEST DATA					
D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	C_c	C_u	SOIL DESCRIPTION
0.00064	0.12006	0.37392	59.8	580.4	Silty Clayey SAND

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SIEVE ANALYSES - ASTM D 135 & D 422

Spectrum Pedestrian Bridge

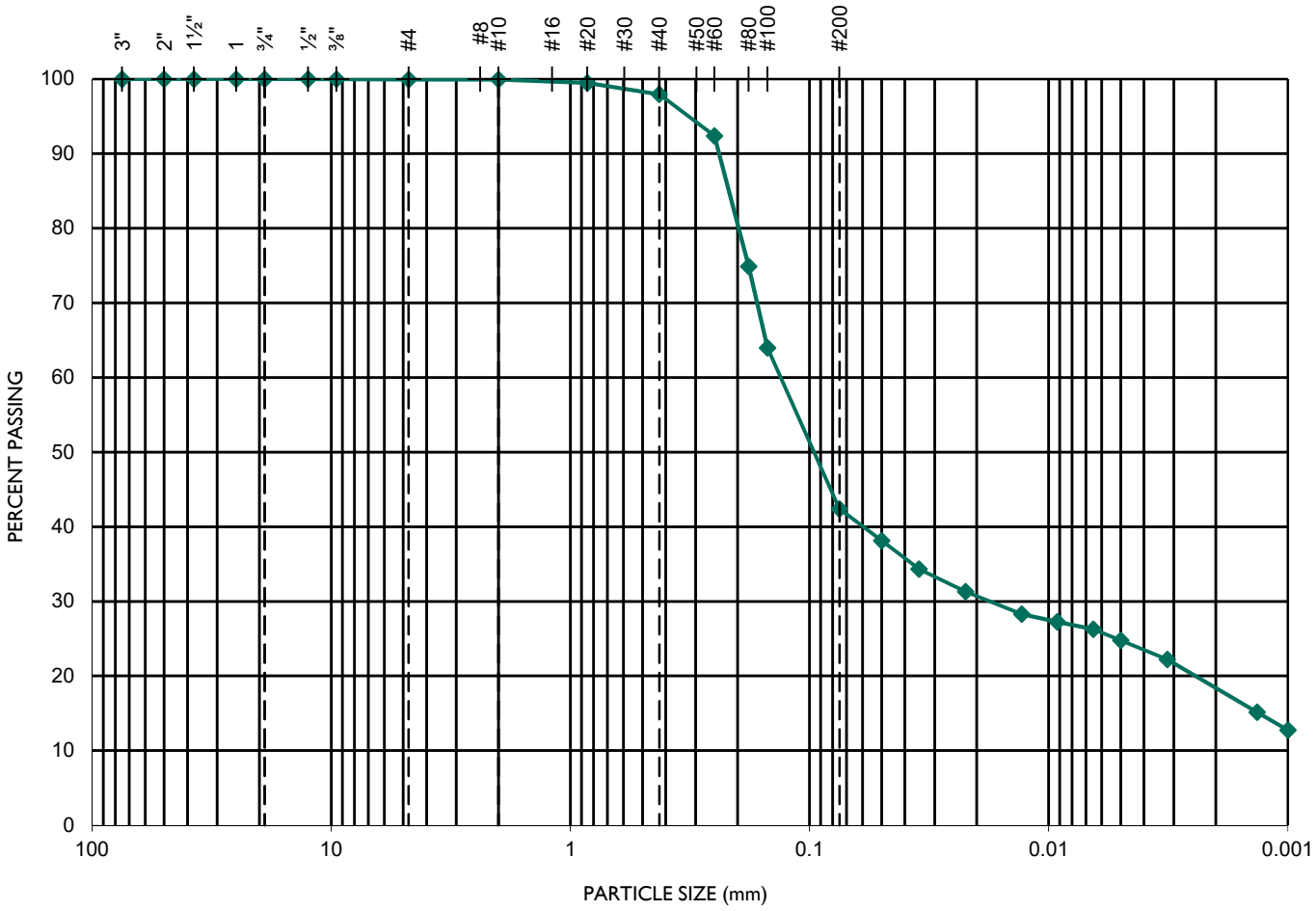
PROJECT NO.: G1813-52-07

SAMPLE NO.: **B1-5** GEOLOGIC UNIT: **Tsc**

SAMPLE DEPTH (FT.): **16**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE



TEST DATA					
D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	C_c	C_u	SOIL DESCRIPTION
0.00061	0.01828	0.13625	4.0	223.6	Silty Clayey SAND

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SIEVE ANALYSES - ASTM D 135 & D 422

Spectrum Pedestrian Bridge

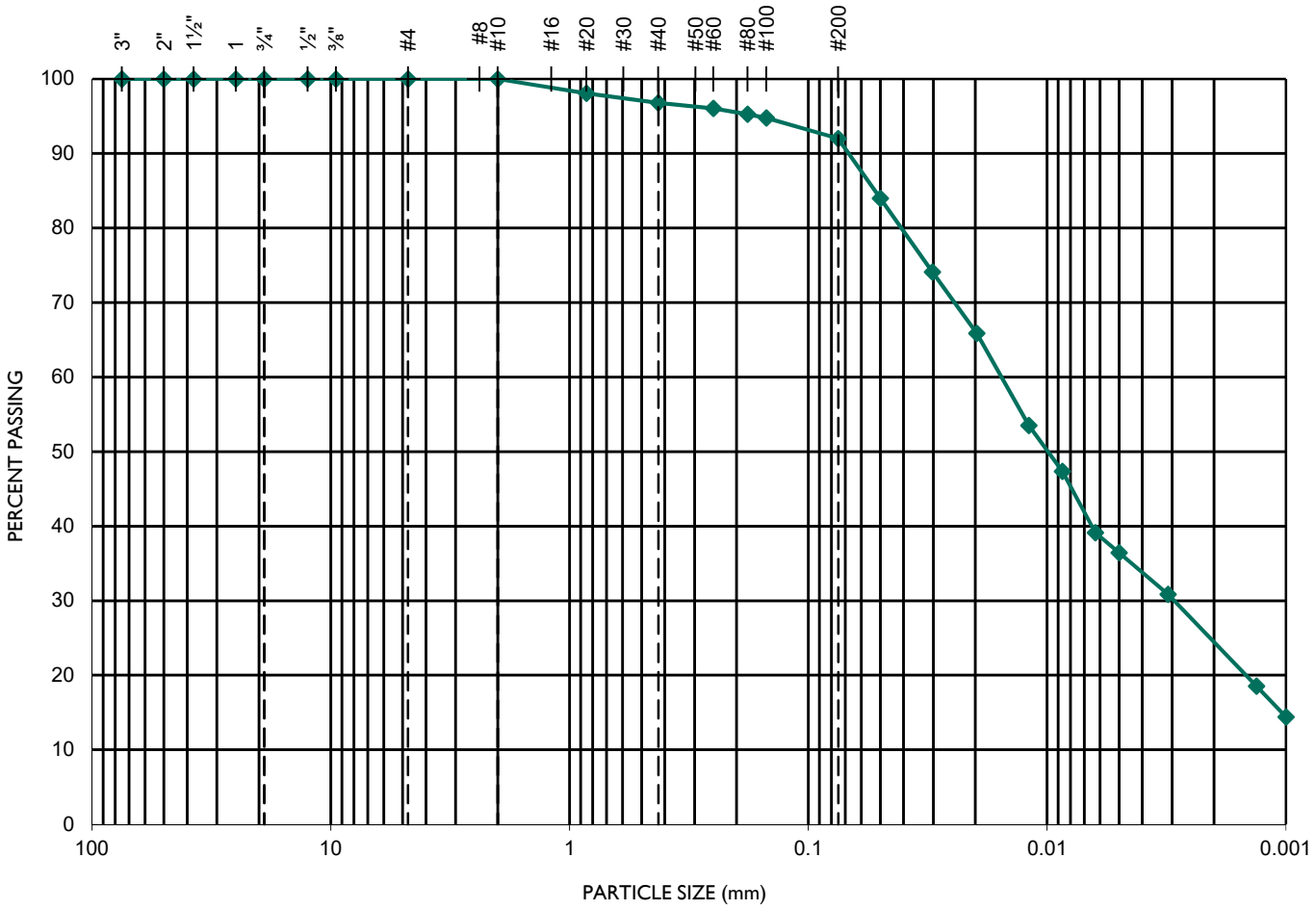
PROJECT NO.: G1813-52-07

SAMPLE NO.: **B1-13** GEOLOGIC UNIT: **Tsc**

SAMPLE DEPTH (FT.): **45**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE



TEST DATA					
D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	C_c	C_u	SOIL DESCRIPTION
0.00065	0.00299	0.01604	0.9	24.7	Silty CLAY

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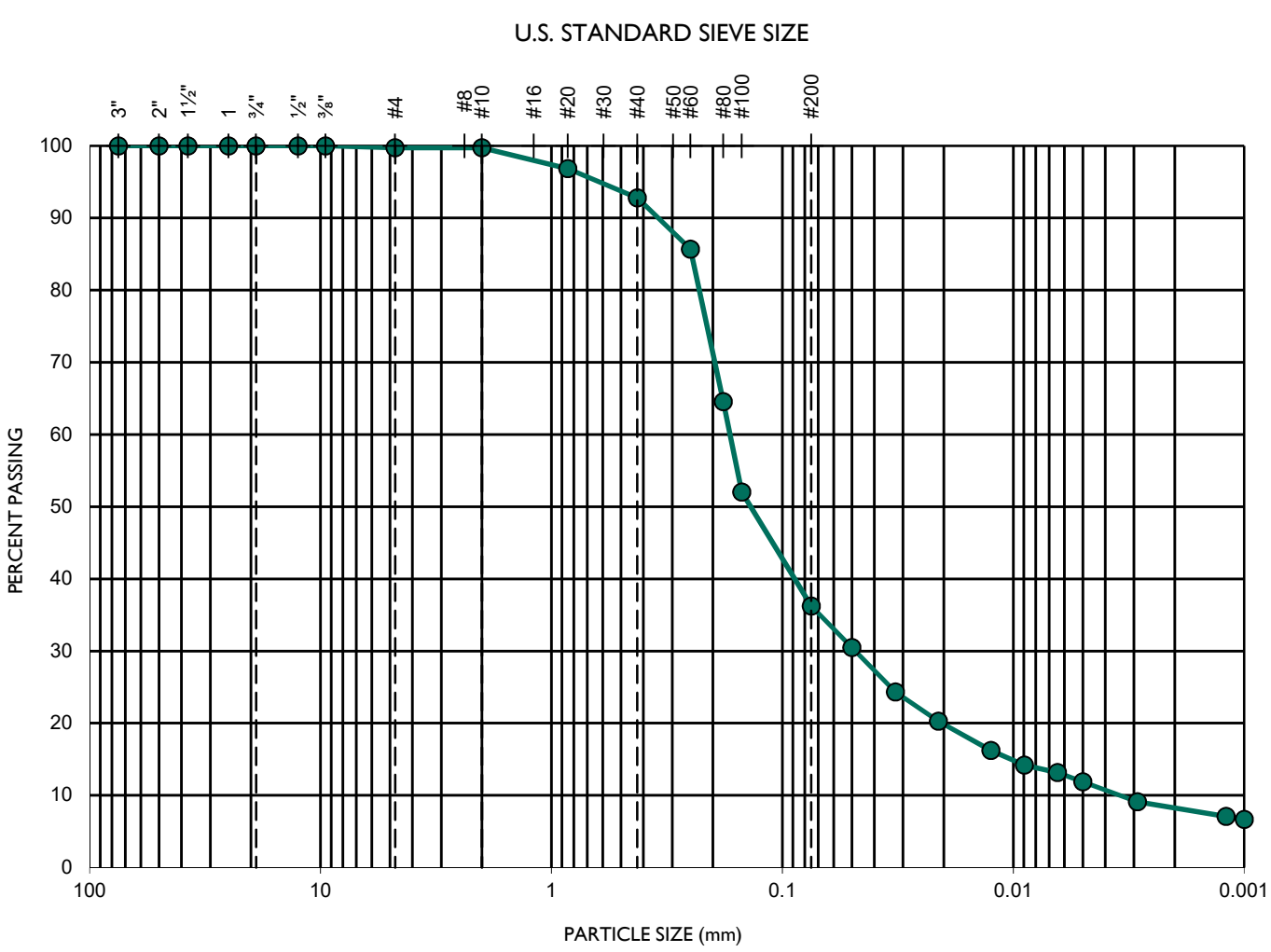
Spectrum Pedestrian Bridge

PROJECT NO.: G1813-52-07

SAMPLE NO.: **B3-3** GEOLOGIC UNIT: **Qpf**

SAMPLE DEPTH (FT.): **10**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



TEST DATA					
D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	C_c	C_u	SOIL DESCRIPTION
0.00357	0.04863	0.16909	3.9	47.4	Silty SAND

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SIEVE ANALYSES - ASTM D 135 & D 422

Spectrum Pedestrian Bridge

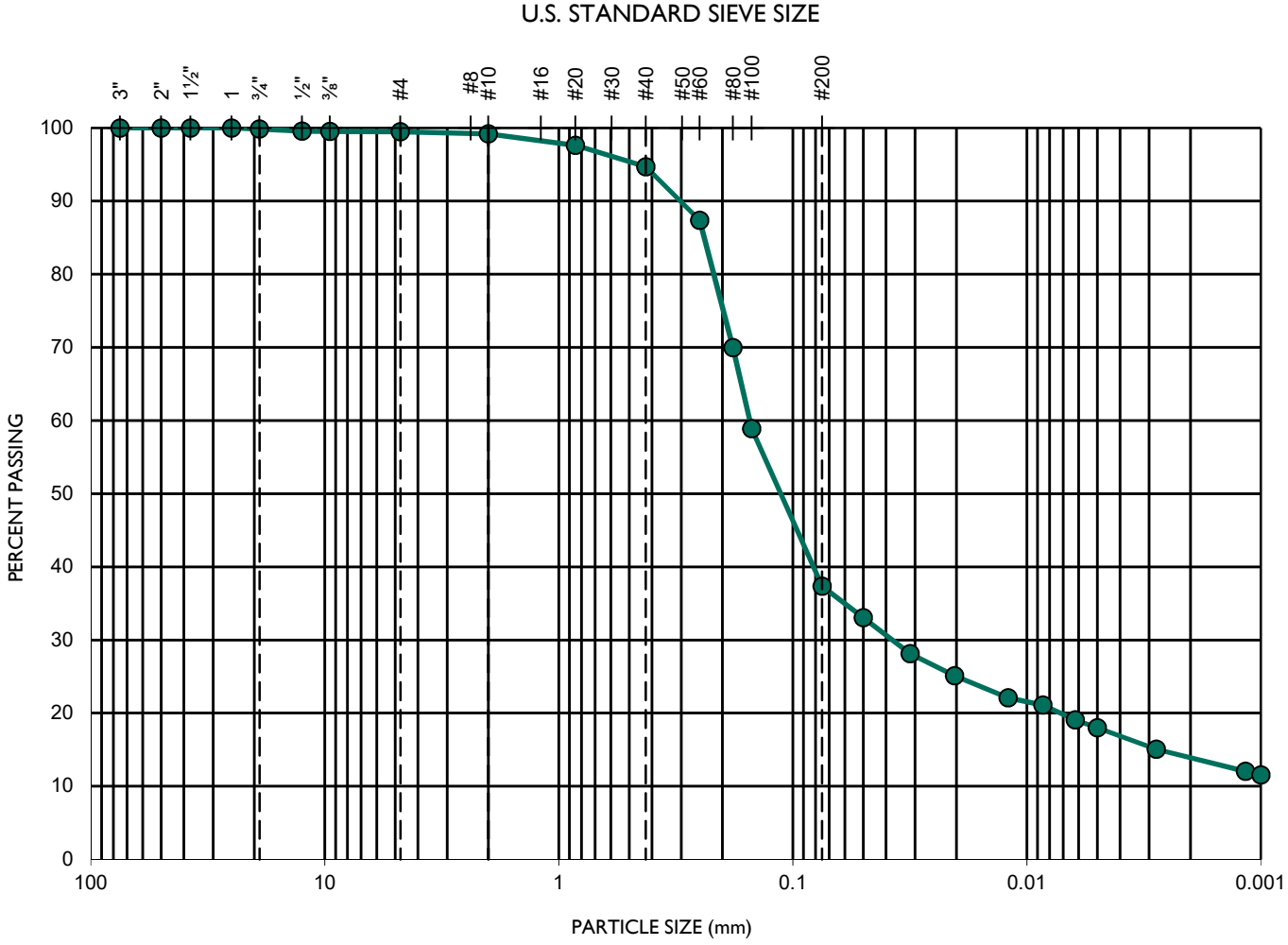
PROJECT NO.: G1813-52-07

SAMPLE NO.: **B3-7**

SAMPLE DEPTH (FT.): **22-25**

GEOLOGIC UNIT: **Tsc**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



TEST DATA					
D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	C_c	C_u	SOIL DESCRIPTION
0.00052	0.03860	0.15307	18.7	294.7	Silty Clayey SAND

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SIEVE ANALYSES - ASTM D 135 & D 422

Spectrum Pedestrian Bridge

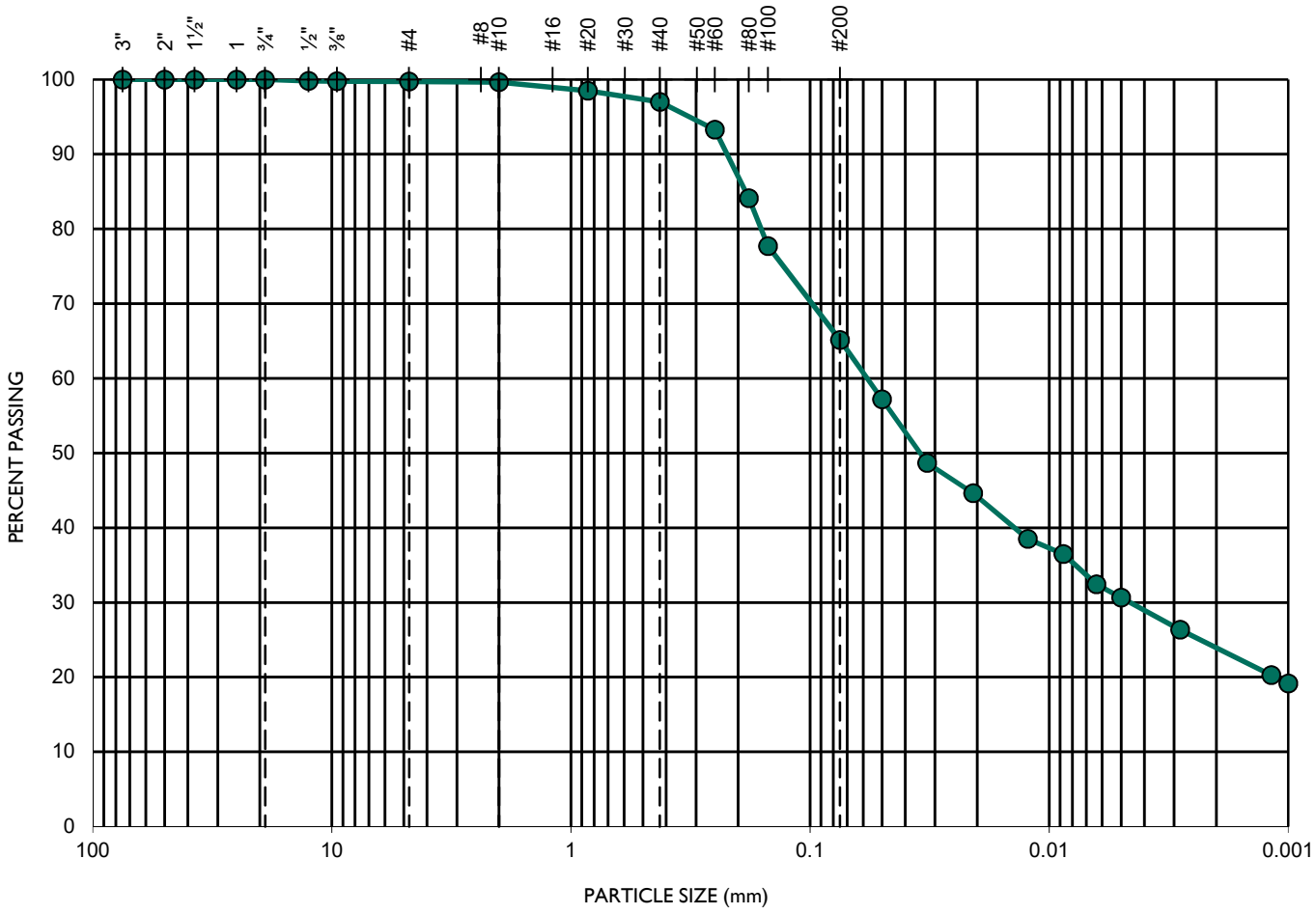
PROJECT NO.: G1813-52-07

SAMPLE NO.: **B3-15** GEOLOGIC UNIT: **Ta**

SAMPLE DEPTH (FT.): **51-54**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE



TEST DATA					
D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	C_c	C_u	SOIL DESCRIPTION
--	0.00467	0.05882	--	--	Sandy Silty CLAY

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SIEVE ANALYSES - ASTM D 135 & D 422

Spectrum Pedestrian Bridge

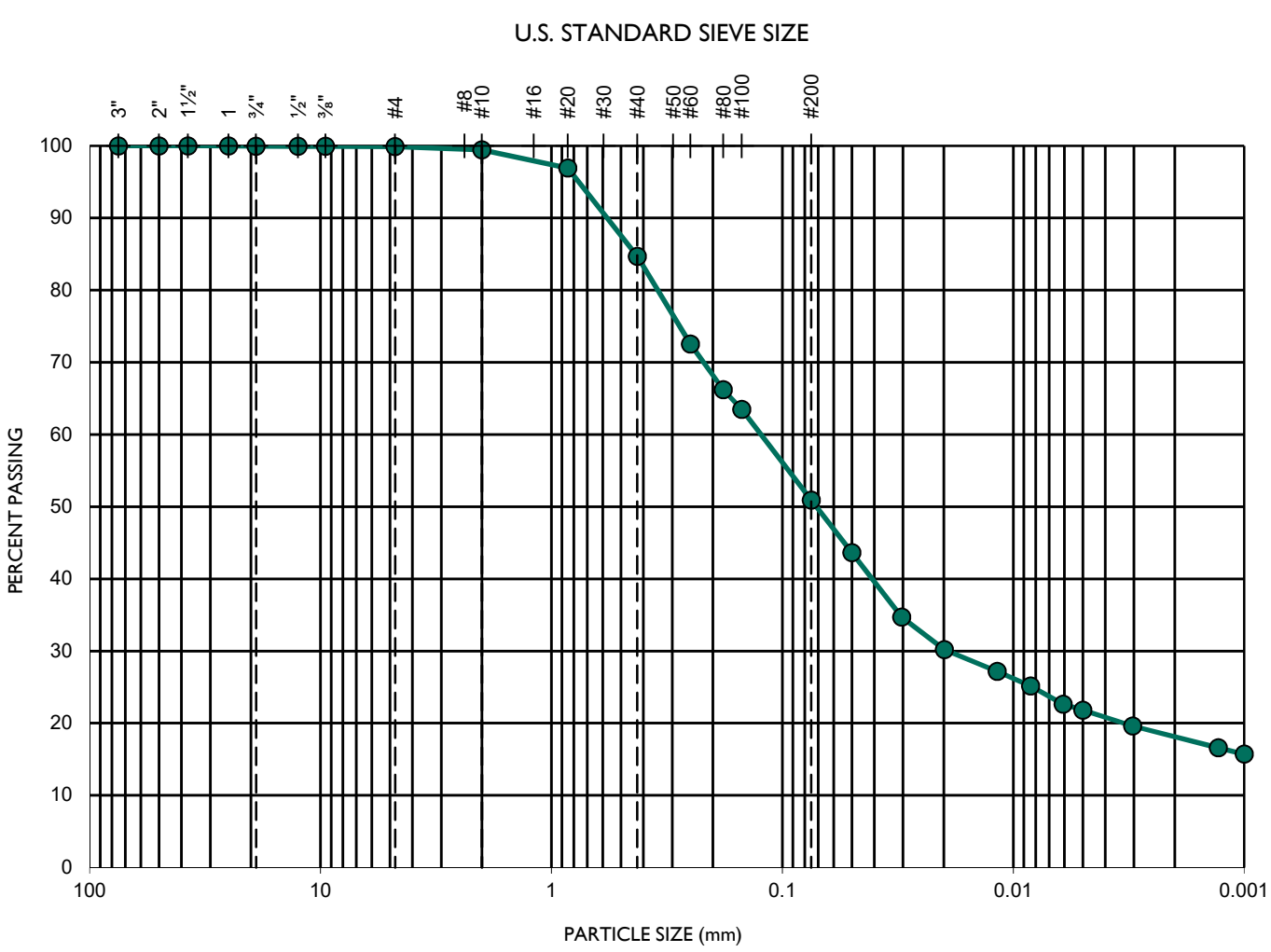
PROJECT NO.: G1813-52-07

SAMPLE NO.: **B4-1**

SAMPLE DEPTH (FT.): **0-5**

GEOLOGIC UNIT: **Qvop**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



TEST DATA					
D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	C_c	C_u	SOIL DESCRIPTION
--	0.01937	0.12931	--	--	Sandy Silty CLAY

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SIEVE ANALYSES - ASTM D 135 & D 422

SPECTRUM PEDESTRIAN BRIDGE

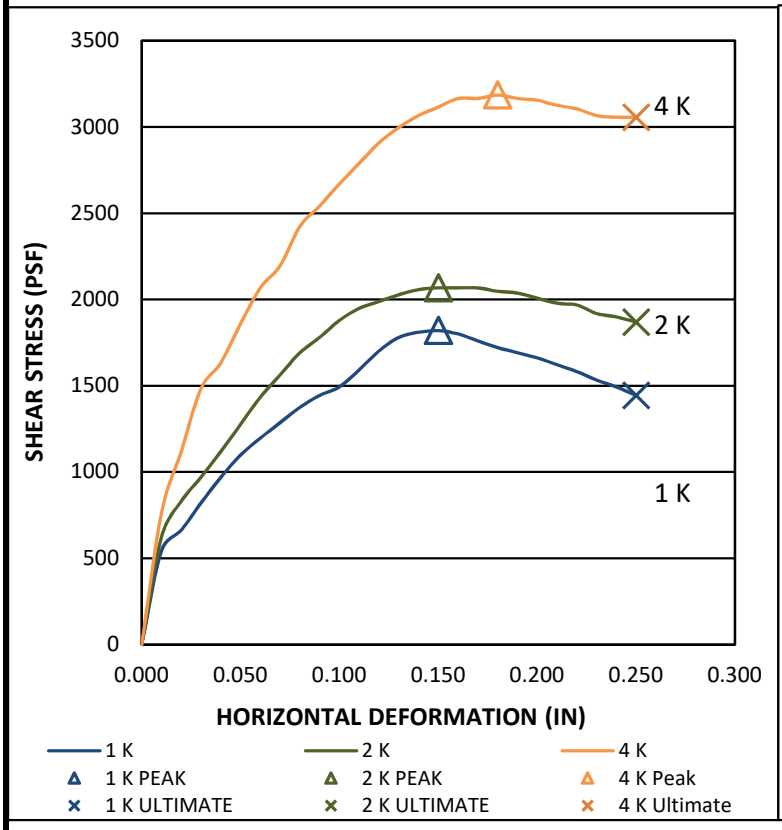
PROJECT NO.: G1813-52-07

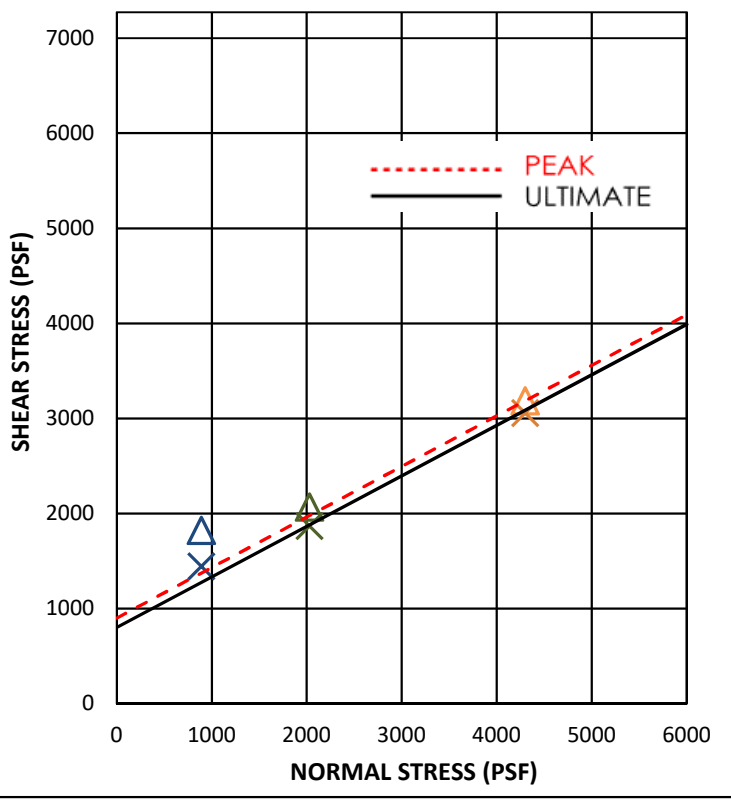
SAMPLE NO.:	B1-2	GEOLOGIC UNIT:	Qpf
SAMPLE DEPTH (FT):	5	NATURAL/REMOLDED:	N

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	11.7	11.3	11.2	11.4
DRY DENSITY (PCF):	122.7	116.3	116.9	118.7

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
WATER CONTENT (%):	12.9	14.1	14.4	13.8
PEAK SHEAR STRESS (PSF):	1820	2067	3185	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1444	1869	3056	--

RESULTS		
PEAK	COHESION, C (PSF)	900
	FRICTION ANGLE (DEGREES)	28
ULTIMATE	COHESION, C (PSF)	800
	FRICTION ANGLE (DEGREES)	28





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DIRECT SHEAR - ASTM D 3080

Spectrum Pedestrian Bridge

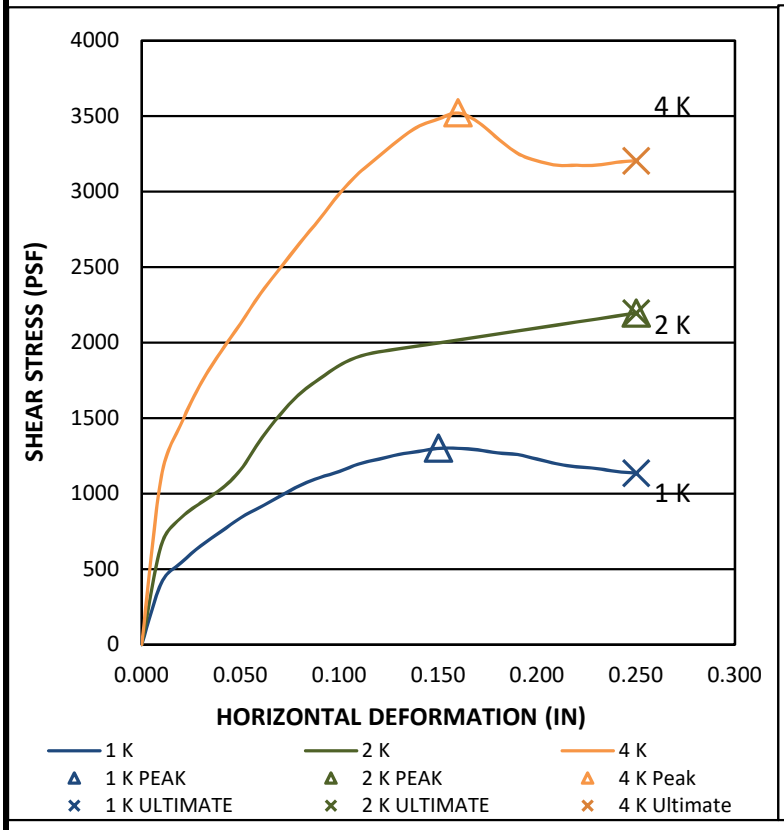
PROJECT NO.: G1813-52-07

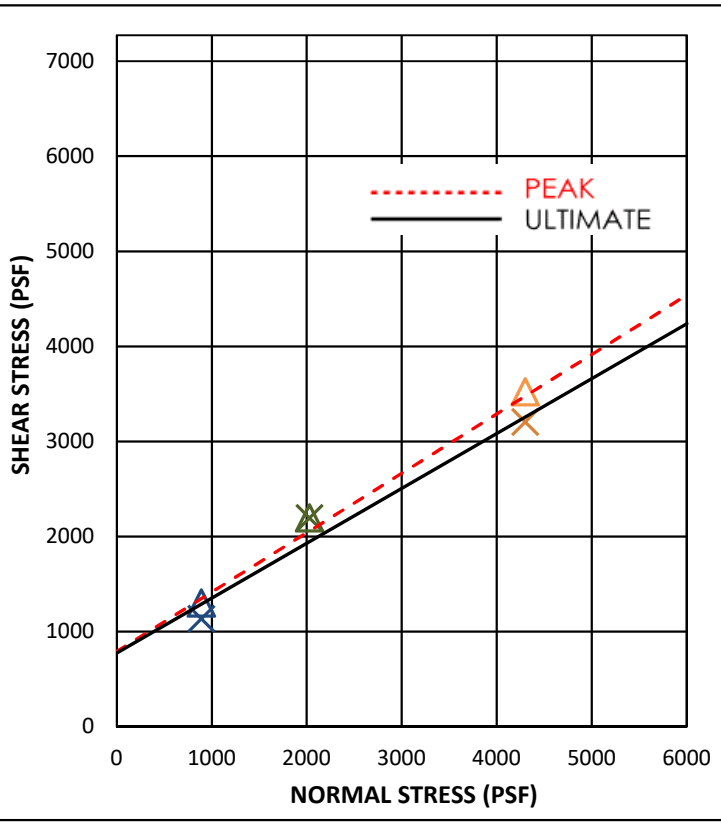
SAMPLE NO.:	**B1-8**	GEOLOGIC UNIT:	**Tsc**
SAMPLE DEPTH (FT):	**25**	NATURAL/REMOLDED:	**N**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	15.3	14.9	15.8	15.4
DRY DENSITY (PCF):	110.6	107.3	111.0	109.6

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	17.0	18.4	16.8	17.4
PEAK SHEAR STRESS (PSF):	1300	2196	3521	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1136	2196	3204	--

RESULTS		
PEAK	COHESION, C (PSF)	790
	FRICTION ANGLE (DEGREES)	32
ULTIMATE	COHESION, C (PSF)	775
	FRICTION ANGLE (DEGREES)	30





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Spectrum Pedestrian Bridge

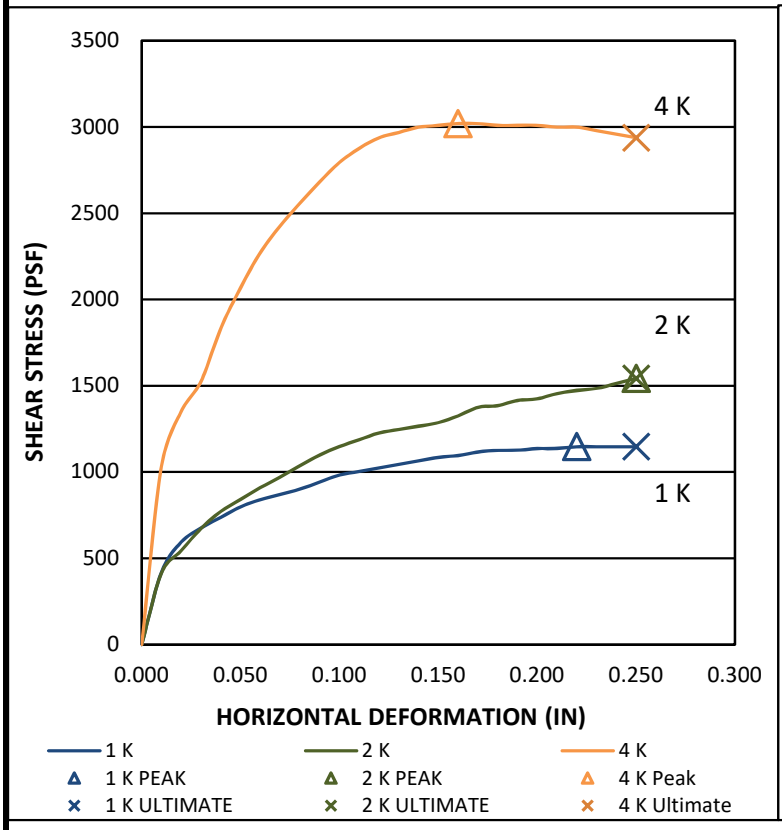
PROJECT NO.: G1813-52-07

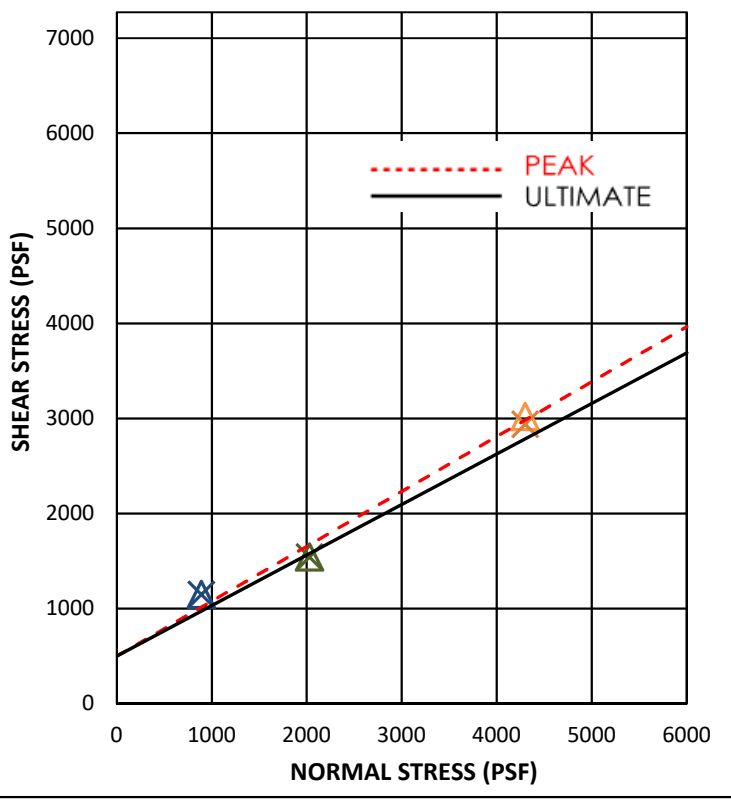
SAMPLE NO.:	B1-14	GEOLOGIC UNIT:	Ta
SAMPLE DEPTH (FT):	50	NATURAL/REMOLDED:	N

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	22.1	34.7	22.4	26.4
DRY DENSITY (PCF):	104.5	85.8	101.2	97.2

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	1 K	2 K	4 K	AVERAGE
WATER CONTENT (%):	23.2	33.5	24.2	27.0
PEAK SHEAR STRESS (PSF):	1146	1543	3019	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1146	1543	2937	--

RESULTS		
PEAK	COHESION, C (PSF)	500
	FRICTION ANGLE (DEGREES)	30
ULTIMATE	COHESION, C (PSF)	500
	FRICTION ANGLE (DEGREES)	28





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DIRECT SHEAR - ASTM D 3080

Spectrum Pedestrian Bridge

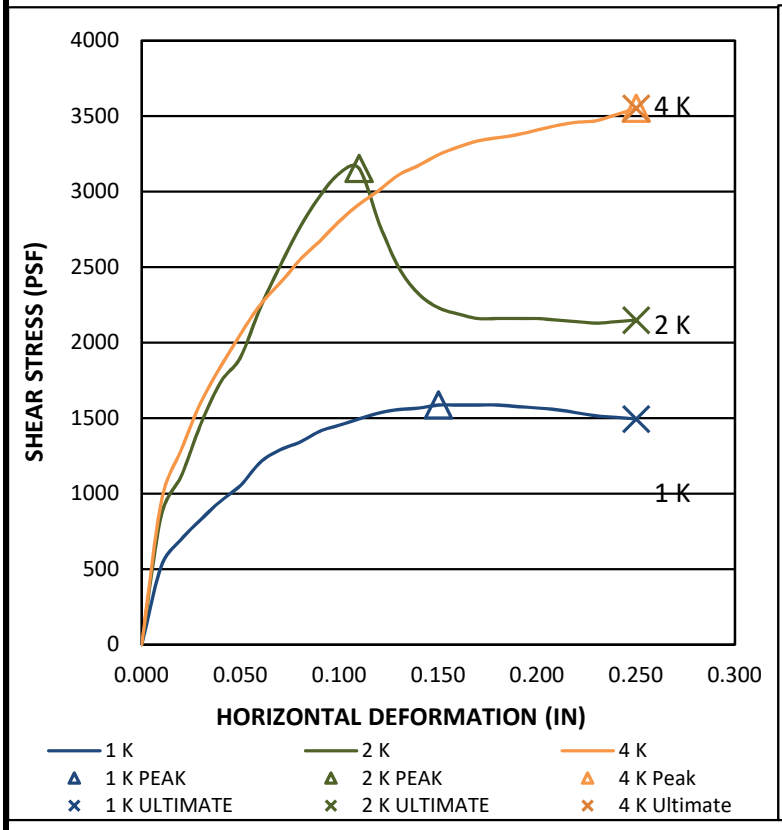
PROJECT NO.: G1813-52-07

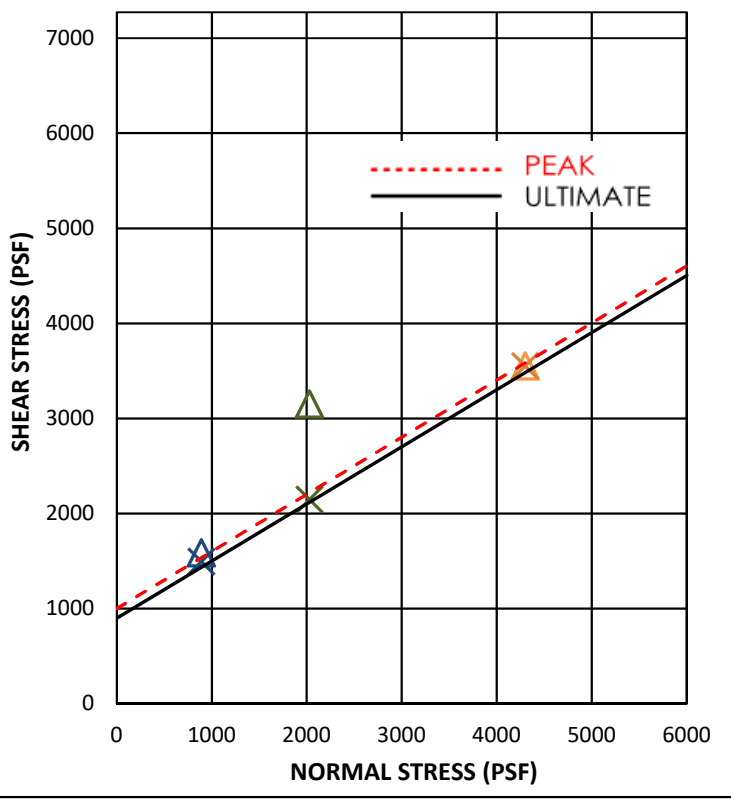
SAMPLE NO.:	**B2-3**	GEOLOGIC UNIT:	**Qpf**
SAMPLE DEPTH (FT):	**10**	NATURAL/REMOLDED:	**N**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	11.4	12.2	10.3	11.3
DRY DENSITY (PCF):	115.1	119.4	109.7	114.7

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	15.2	13.6	16.6	15.2
PEAK SHEAR STRESS (PSF):	1586	3152	3551	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1494	2149	3551	--

RESULTS		
PEAK	COHESION, C (PSF)	1000
	FRICTION ANGLE (DEGREES)	31
ULTIMATE	COHESION, C (PSF)	900
	FRICTION ANGLE (DEGREES)	31





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DIRECT SHEAR - ASTM D 3080

Spectrum Pedestrian Bridge

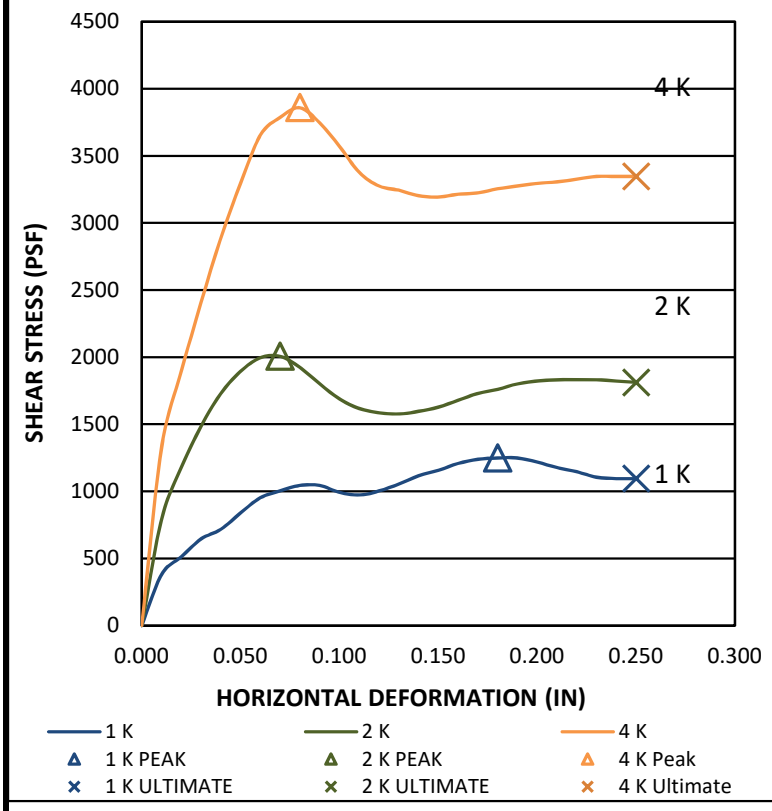
PROJECT NO.: G1813-52-07

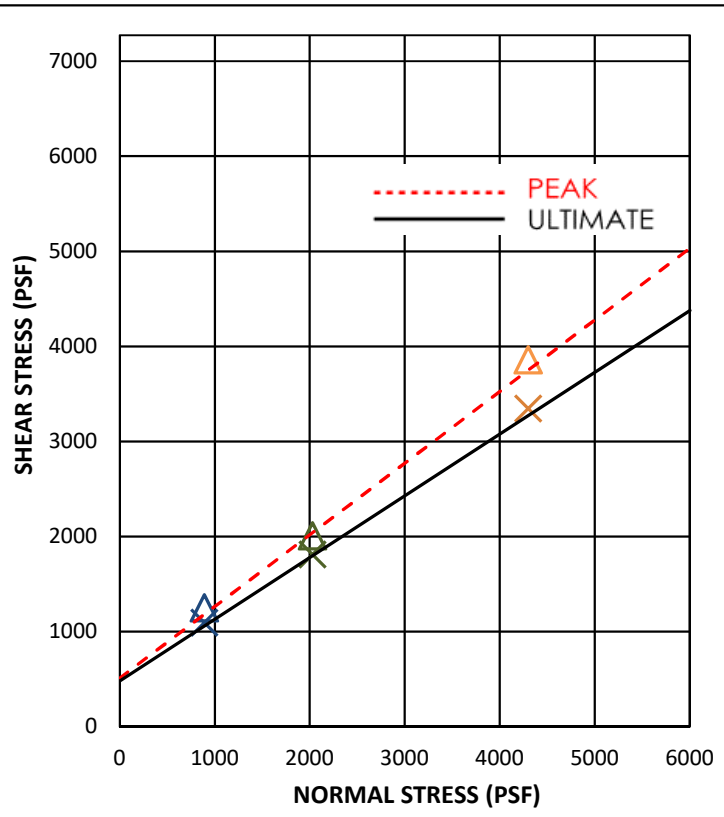
SAMPLE NO.:	**B2-7**	GEOLOGIC UNIT:	**Tsc**
SAMPLE DEPTH (FT):	**25**	NATURAL/REMOLDED:	**N**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	14.3	11.6	12.5	12.8
DRY DENSITY (PCF):	104.6	107.8	106.7	106.4

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	18.2	16.0	16.7	17.0
PEAK SHEAR STRESS (PSF):	1249	2006	3858	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1095	1811	3347	--

RESULTS		
PEAK	COHESION, C (PSF)	510
	FRICTION ANGLE (DEGREES)	37
ULTIMATE	COHESION, C (PSF)	480
	FRICTION ANGLE (DEGREES)	33





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Spectrum Pedestrian Bridge

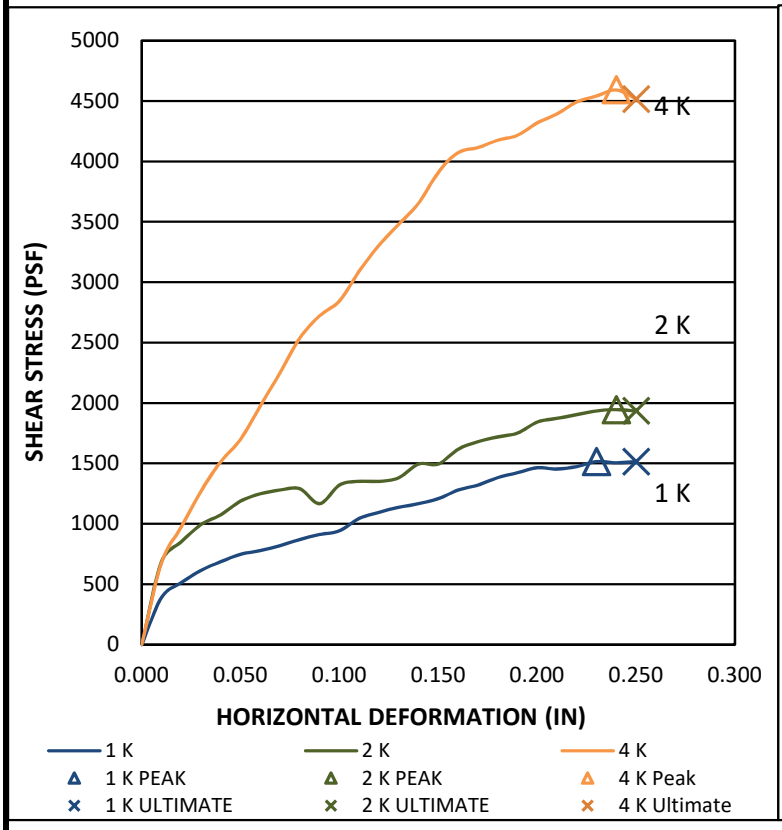
PROJECT NO.: G1813-52-07

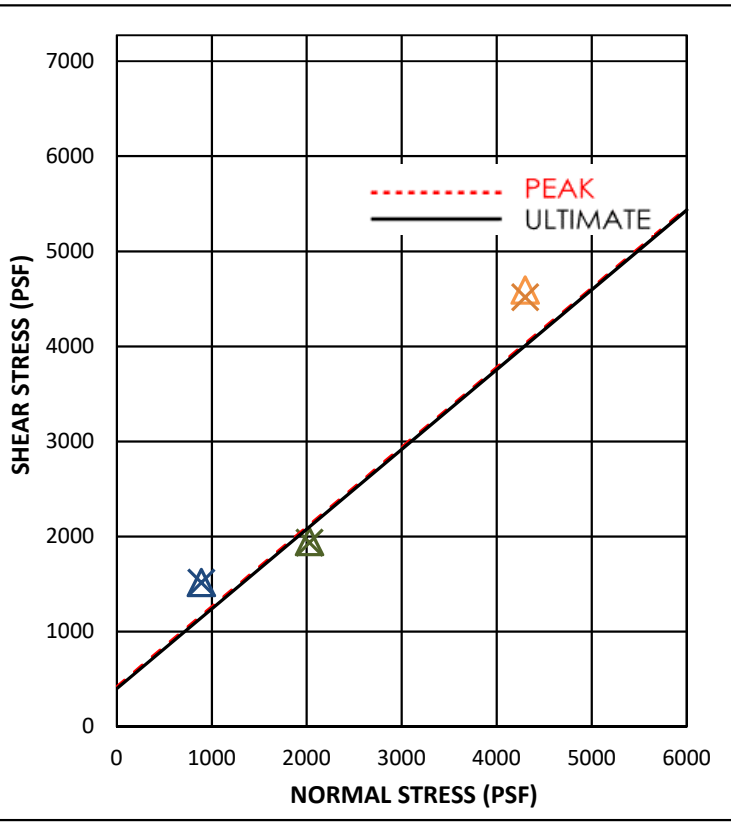
SAMPLE NO.:	**B2-8**	GEOLOGIC UNIT:	**Tsc**
SAMPLE DEPTH (FT):	**30**	NATURAL/REMOLDED:	**N**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	7.8	6.4	7.9	7.4
DRY DENSITY (PCF):	110.8	111.4	109.3	110.5

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	14.9	15.3	15.5	15.2
PEAK SHEAR STRESS (PSF):	1515	1945	4592	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1515	1934	4517	--

RESULTS		
PEAK	COHESION, C (PSF)	420
	FRICTION ANGLE (DEGREES)	40
ULTIMATE	COHESION, C (PSF)	400
	FRICTION ANGLE (DEGREES)	40





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Spectrum Pedestrian Bridge

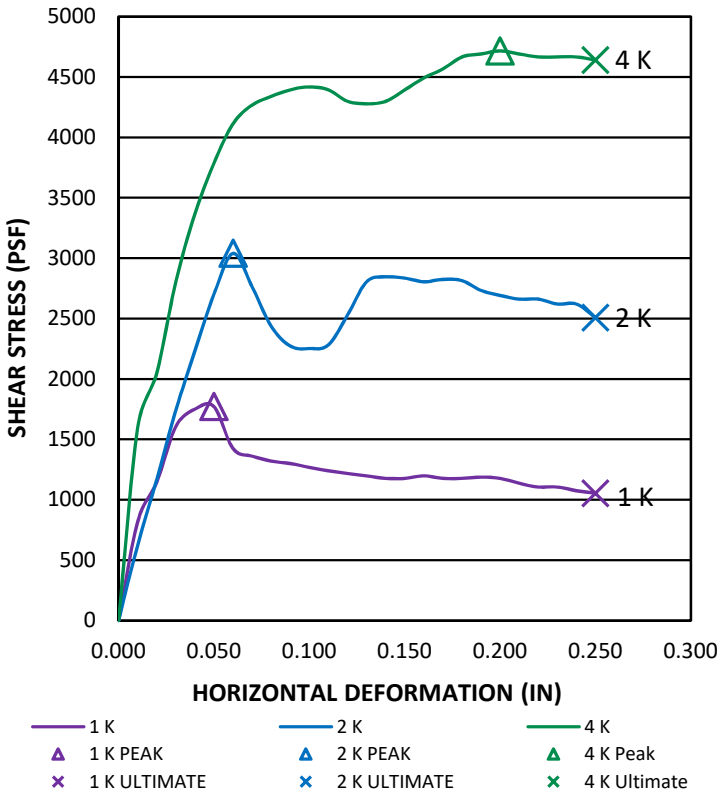
PROJECT NO.: G1813-52-07

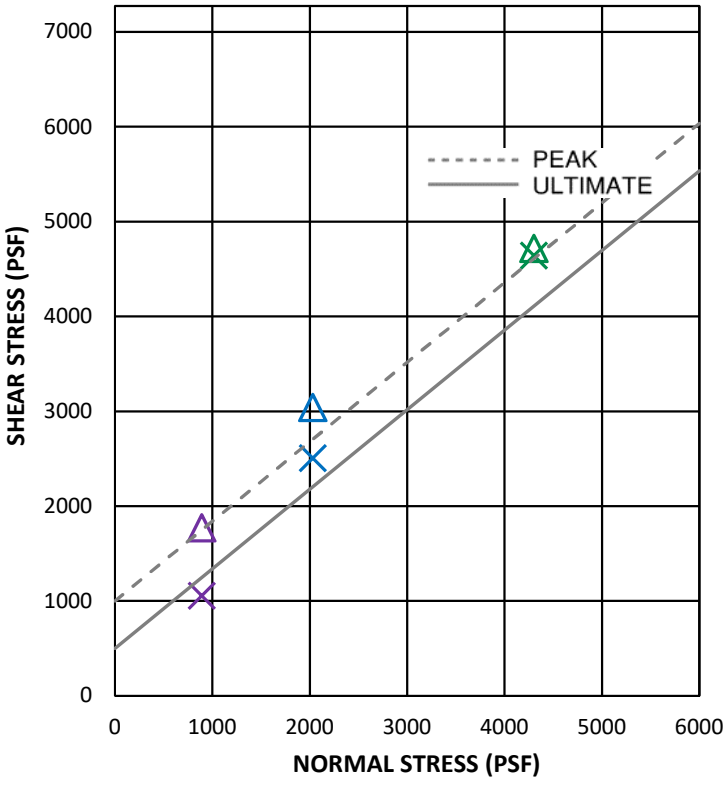
SAMPLE NO.:	**B3-3**	GEOLOGIC UNIT:	**Qpf**
SAMPLE DEPTH (FT):	**10**	NATURAL/REMOLDED:	**N**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	15.3	16.2	17.5	16.4
DRY DENSITY (PCF):	116.0	112.2	110.4	112.9

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	16.2	17.7	18.8	17.5
PEAK SHEAR STRESS (PSF):	1771	3040	4716	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1054	2507	4641	--

RESULTS		
PEAK	COHESION, C (PSF)	1000
	FRICTION ANGLE (DEGREES)	40
ULTIMATE	COHESION, C (PSF)	500
	FRICTION ANGLE (DEGREES)	40





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DIRECT SHEAR - ASTM D 3080

Spectrum Pedestrian Bridge

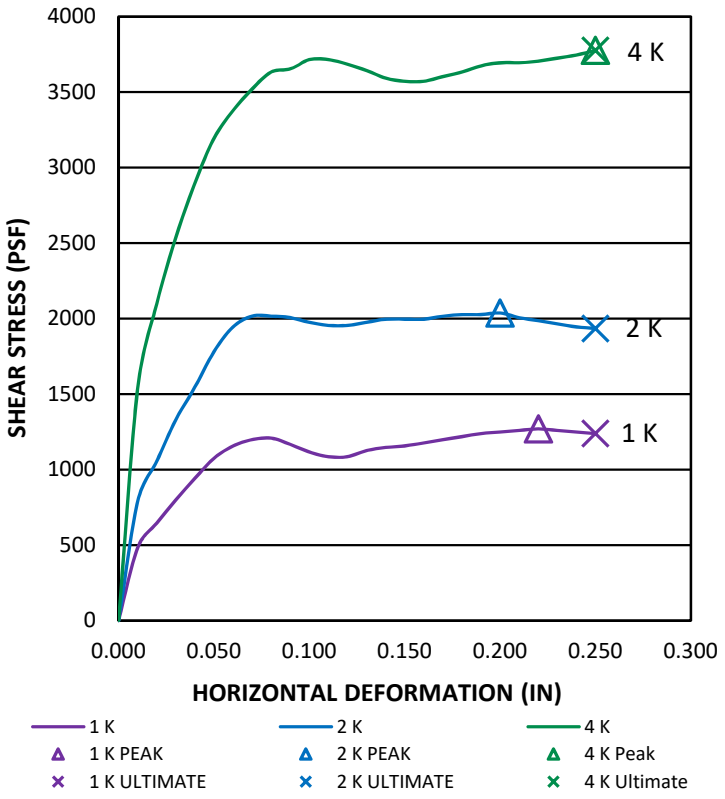
PROJECT NO.: G1813-52-07

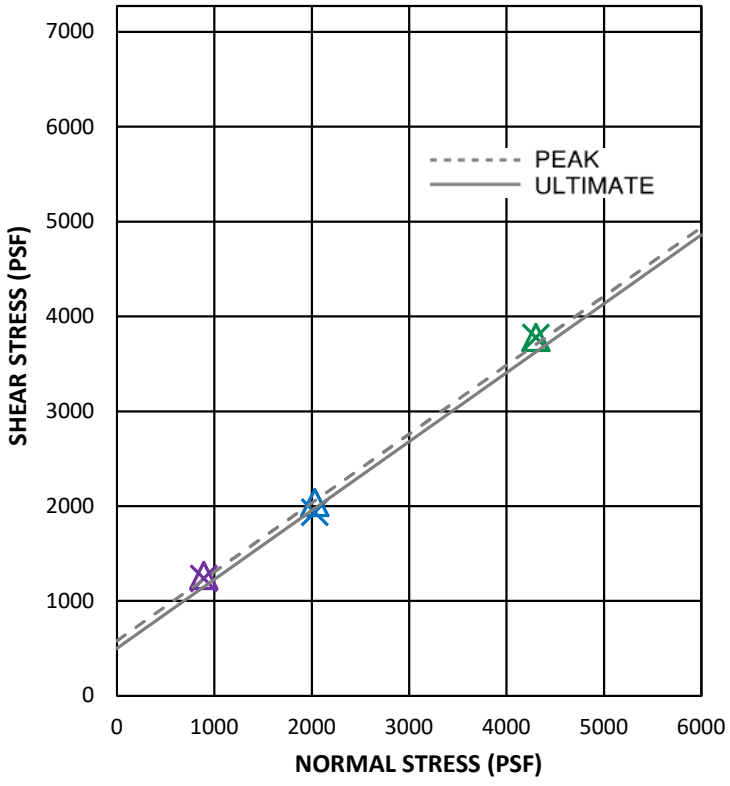
SAMPLE NO.:	**B3-8**	GEOLOGIC UNIT:	**Tsc**
SAMPLE DEPTH (FT):	**25**	NATURAL/REMOLDED:	**N**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	19.3	19.1	18.9	19.1
DRY DENSITY (PCF):	103.1	101.2	103.5	102.6

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	21.6	21.5	21.4	21.5
PEAK SHEAR STRESS (PSF):	1269	2037	3777	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1238	1934	3777	--

RESULTS		
PEAK	COHESION, C (PSF)	580
	FRICTION ANGLE (DEGREES)	36
ULTIMATE	COHESION, C (PSF)	500
	FRICTION ANGLE (DEGREES)	36





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Spectrum Pedestrian Bridge

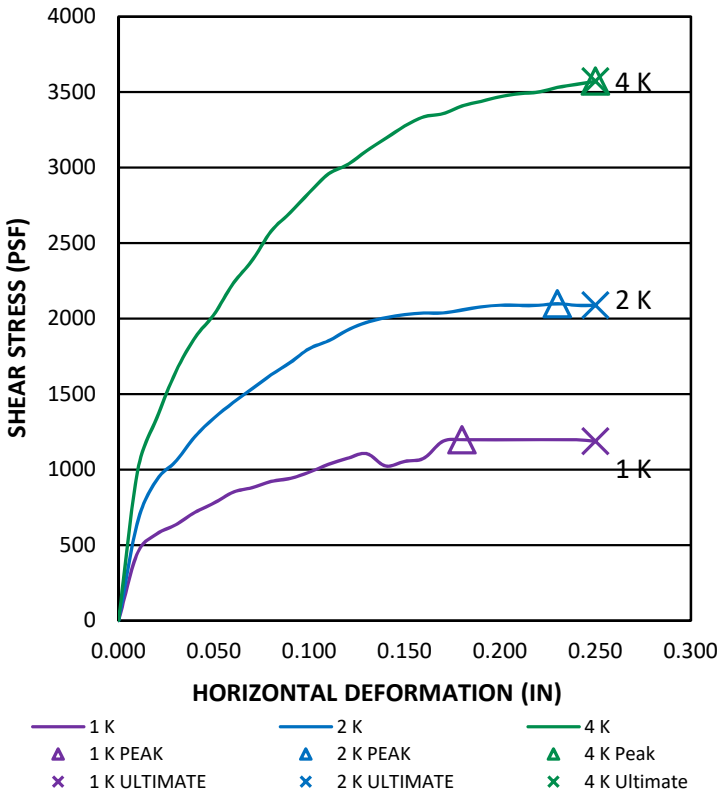
PROJECT NO.: G1813-52-07

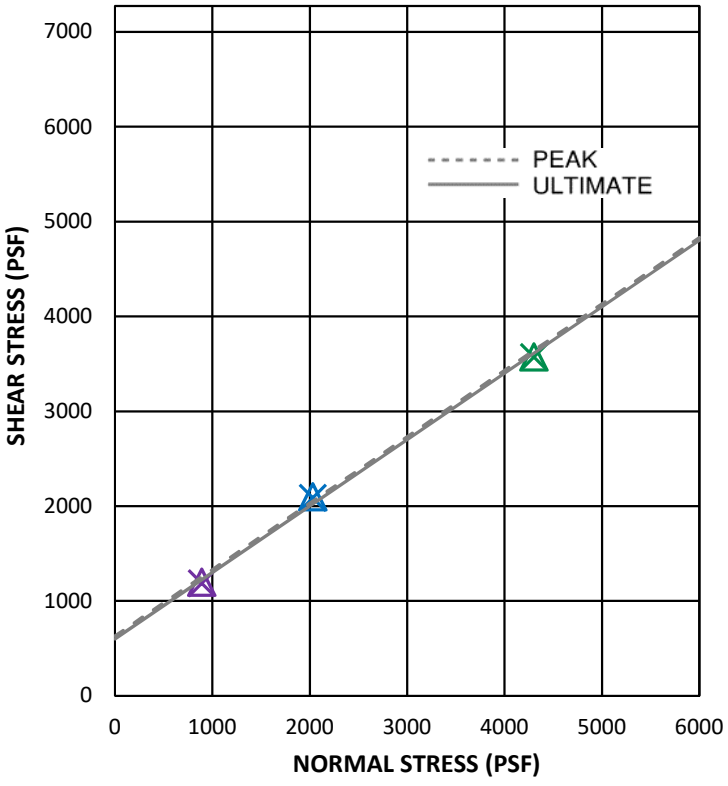
SAMPLE NO.:	**B3-11**	GEOLOGIC UNIT:	**Tsc**
SAMPLE DEPTH (FT):	**40**	NATURAL/REMOLDED:	**N**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	13.6	14.0	13.9	13.8
DRY DENSITY (PCF):	101.9	103.1	100.8	101.9

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	21.9	21.4	22.6	22.0
PEAK SHEAR STRESS (PSF):	1197	2098	3572	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1187	2088	3572	--

RESULTS		
PEAK	COHESION, C (PSF)	630
	FRICTION ANGLE (DEGREES)	35
ULTIMATE	COHESION, C (PSF)	600
	FRICTION ANGLE (DEGREES)	35





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Spectrum Pedestrian Bridge

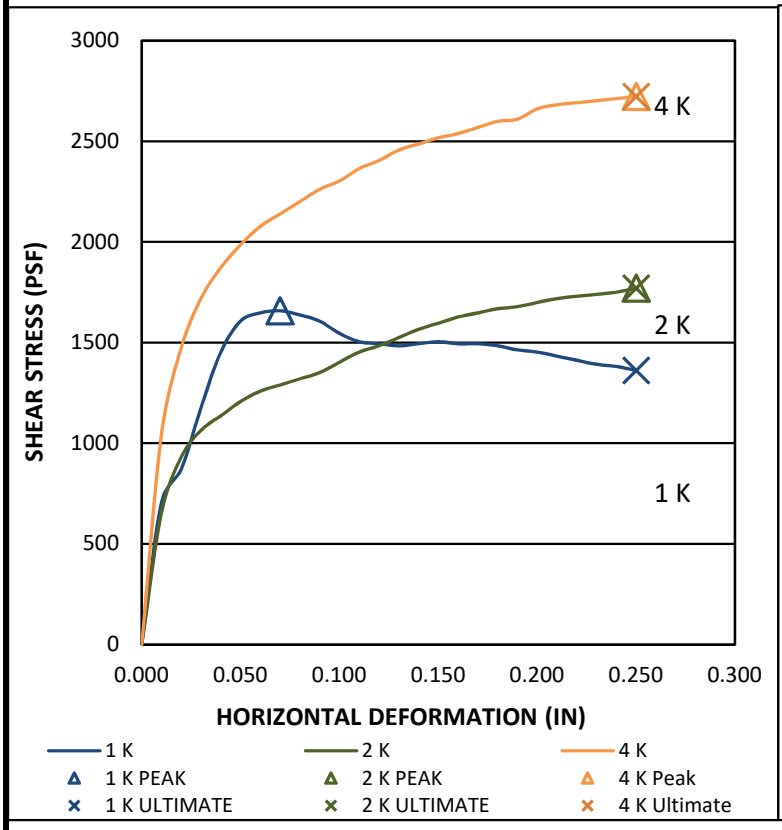
PROJECT NO.: G1813-52-07

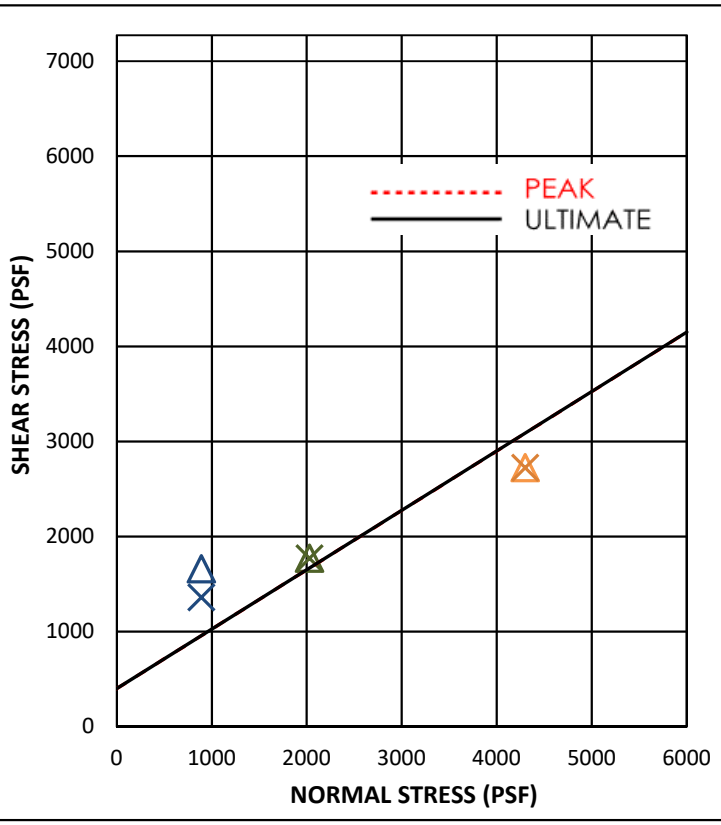
SAMPLE NO.:	**B2-17**	GEOLOGIC UNIT:	**Ta**
SAMPLE DEPTH (FT):	**65**	NATURAL/REMOLDED:	**N**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	14.5	14.6	14.7	14.6
DRY DENSITY (PCF):	115.1	111.4	111.4	112.7

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	16.1	17.1	18.1	17.1
PEAK SHEAR STRESS (PSF):	1658	1771	2722	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1361	1771	2722	--

RESULTS		
PEAK	COHESION, C (PSF)	400
	FRICTION ANGLE (DEGREES)	32
ULTIMATE	COHESION, C (PSF)	400
	FRICTION ANGLE (DEGREES)	32





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DIRECT SHEAR - ASTM D 3080

Spectrum Pedestrian Bridge

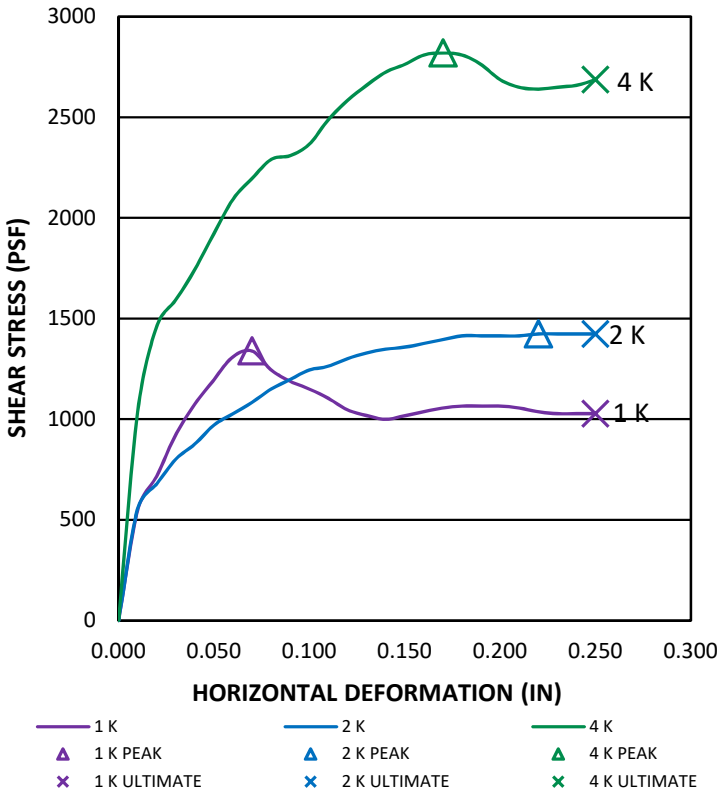
PROJECT NO.: G1813-52-07

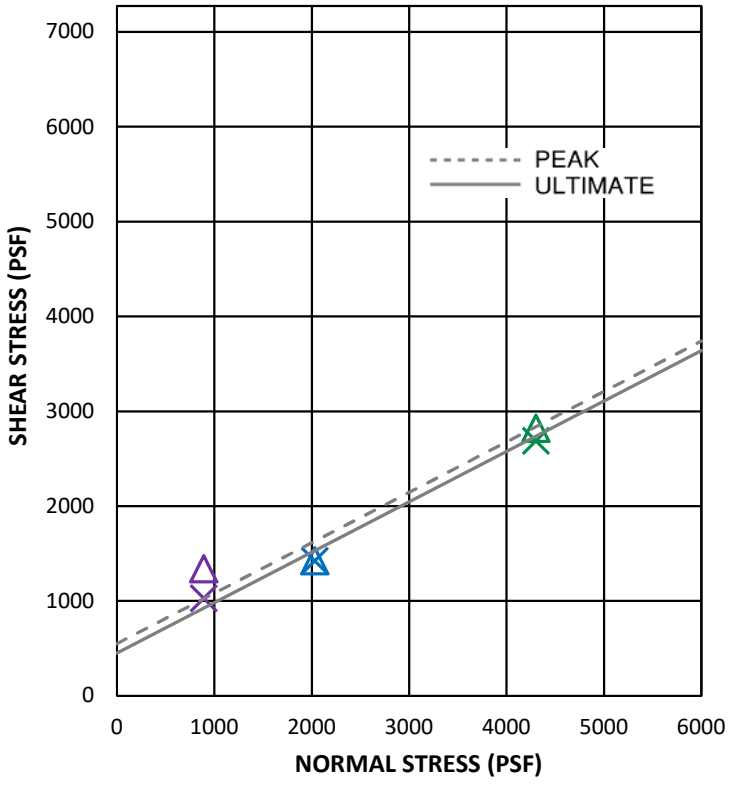
SAMPLE NO.:	**B4-2**	GEOLOGIC UNIT:	**Qvop**
SAMPLE DEPTH (FT):	**5**	NATURAL/REMOLDED:	**R**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	13.5	14.1	14.2	14.0
DRY DENSITY (PCF):	113.3	99.1	106.5	106.3

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	16.0	22.6	19.2	19.3
PEAK SHEAR STRESS (PSF):	1339	1424	2819	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1028	1424	2687	--

RESULTS		
PEAK	COHESION, C (PSF)	550
	FRICTION ANGLE (DEGREES)	28
ULTIMATE	COHESION, C (PSF)	450
	FRICTION ANGLE (DEGREES)	28





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DIRECT SHEAR - ASTM D 3080

SPECTRUM PEDESTRIAN BRIDGE

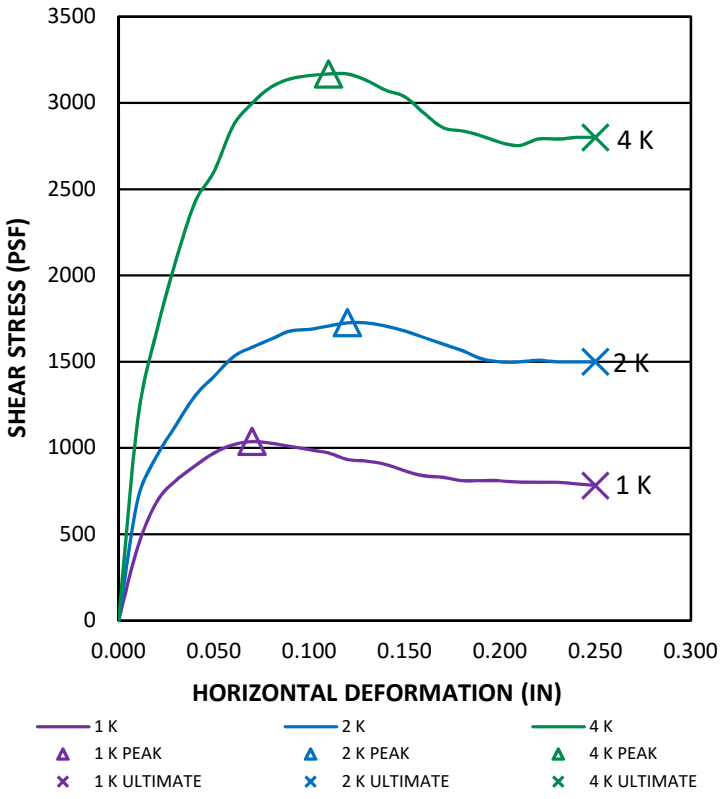
PROJECT NO.: G1813-52-07

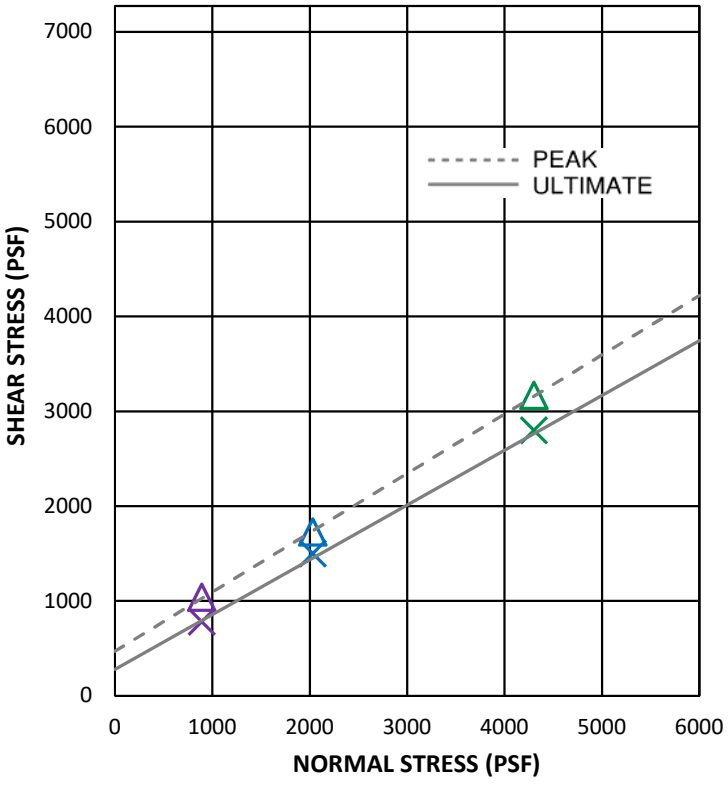
SAMPLE NO.:	**B4-4**	GEOLOGIC UNIT:	**Tsc**
SAMPLE DEPTH (FT):	**15**	NATURAL/REMOLDED:	**N**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	6.0	6.9	6.9	6.6
DRY DENSITY (PCF):	104.9	103.9	104.7	104.5

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	16.2	16.6	16.0	16.3
PEAK SHEAR STRESS (PSF):	1037	1725	3168	--
ULT.-E.O.T. SHEAR STRESS (PSF):	782	1499	2800	--

RESULTS		
PEAK	COHESION, C (PSF)	470
	FRICTION ANGLE (DEGREES)	32
ULTIMATE	COHESION, C (PSF)	280
	FRICTION ANGLE (DEGREES)	30





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DIRECT SHEAR - ASTM D 3080

SPECTRUM PEDESTRIAN BRIDGE

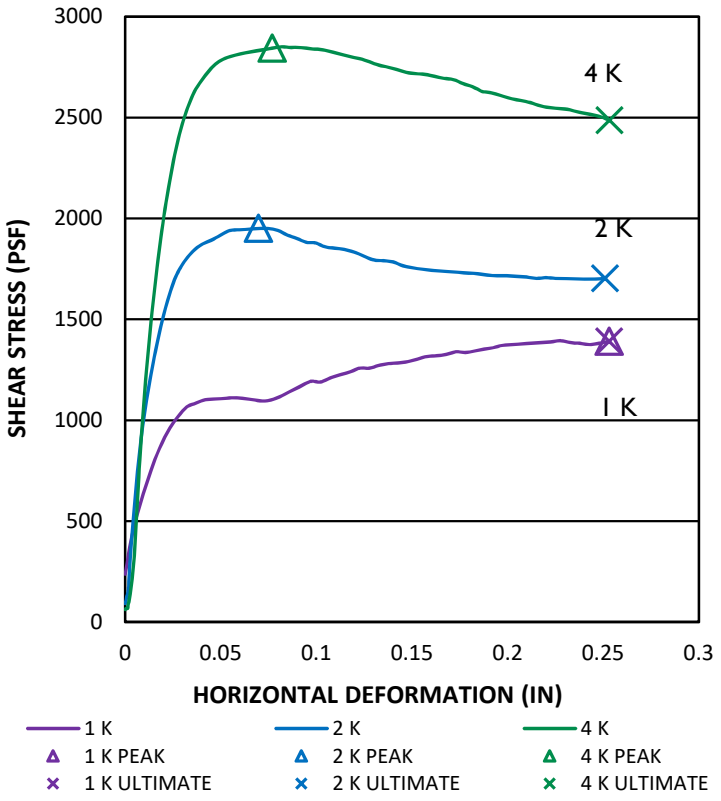
PROJECT NO.: G1813-52-07

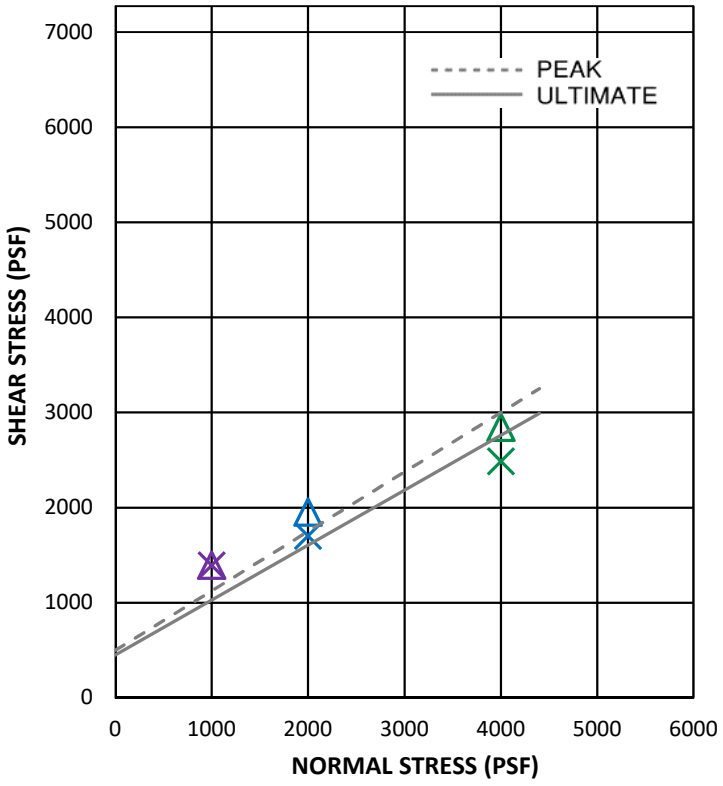
SAMPLE NO.:	**B4-13**	GEOLOGIC UNIT:	**Ta**
SAMPLE DEPTH (FT):	**5**	NATURAL/REMOLDED:	**N**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	1000	2000	4000	--
WATER CONTENT (%):	17.6	19.1	18.3	18.3
DRY DENSITY (PCF):	105.3	102.8	103.0	103.7

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	20.9	23.3	22.1	22.1
PEAK SHEAR STRESS (PSF):	1391	1950	2844	--
ULT.-E.O.T. SHEAR STRESS (PSF):	1391	1703	2487	--

RESULTS		
PEAK	COHESION, C (PSF)	500
	FRICTION ANGLE (DEGREES)	32
ULTIMATE	COHESION, C (PSF)	450
	FRICTION ANGLE (DEGREES)	30





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DIRECT SHEAR - ASTM D 3080

SPECTRUM PEDESTRIAN BRIDGE

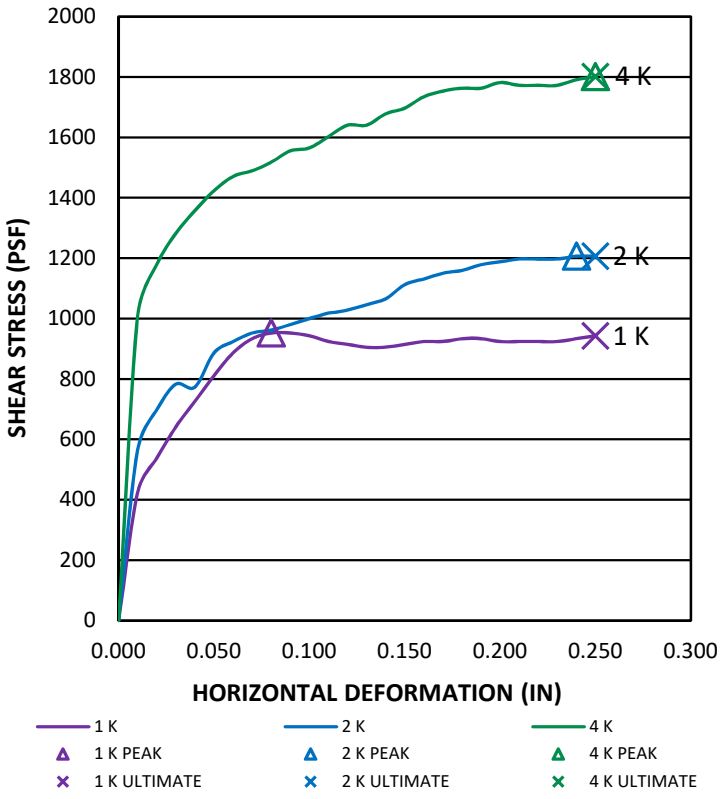
PROJECT NO.: G1813-52-07

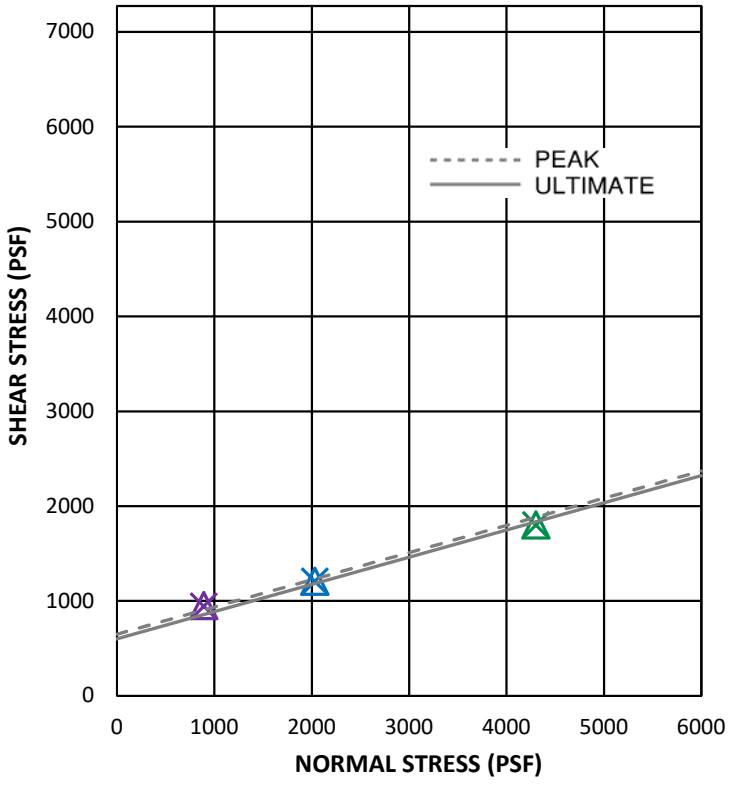
SAMPLE NO.:	**B5-3**	GEOLOGIC UNIT:	**Tsc**
SAMPLE DEPTH (FT):	**10'**	NATURAL/REMOLDED:	**N**

INITIAL CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
ACTUAL NORMAL STRESS (PSF):	890	2030	4300	--
WATER CONTENT (%):	13.0	20.0	20.2	17.7
DRY DENSITY (PCF):	107.1	100.5	101.7	103.1

AFTER TEST CONDITIONS				
NORMAL STRESS TEST LOAD	**1 K**	**2 K**	**4 K**	**AVERAGE**
WATER CONTENT (%):	16.5	25.2	24.5	22.1
PEAK SHEAR STRESS (PSF):	952	1207	1801	--
ULT.-E.O.T. SHEAR STRESS (PSF):	943	1207	1801	--

RESULTS		
PEAK	COHESION, C (PSF)	650
	FRICTION ANGLE (DEGREES)	16
ULTIMATE	COHESION, C (PSF)	600
	FRICTION ANGLE (DEGREES)	16





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DIRECT SHEAR - ASTM D 3080

SPECTRUM PEDESTRIAN BRIDGE

PROJECT NO.: G1813-52-07

SAMPLE NO.: **B1-2a** GEOLOGIC UNIT: **Qpf**

SAMPLE DEPTH (FT): **6**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	118.5
INITIAL WATER CONTENT (%):	13.2%
SAMPLE SATURATED AT (KSF):	2.0
INITIAL SATURATION (%):	87.5%

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CONSOLIDATION CURVE - ASTM D 2435

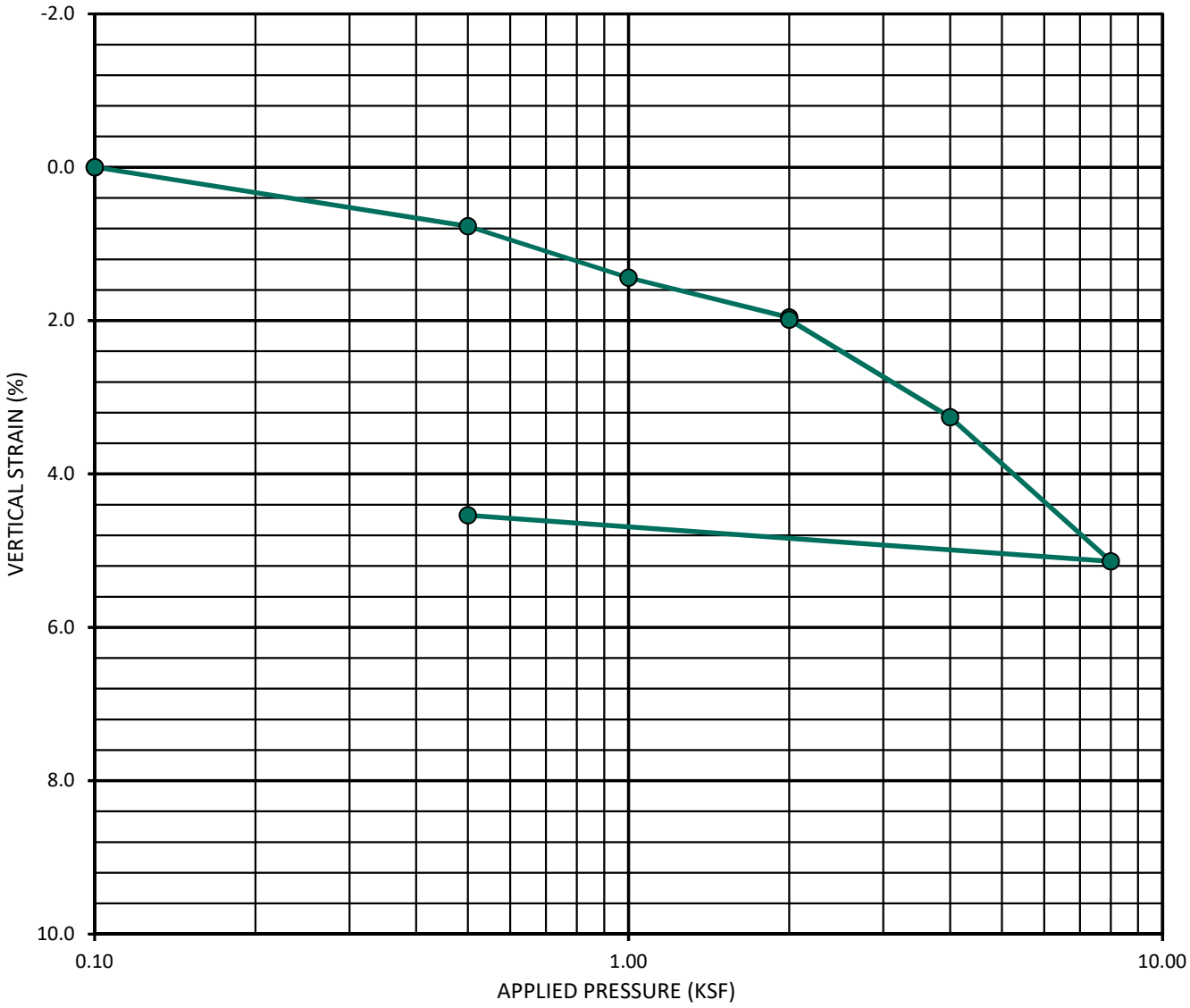
Spectrum Pedestrian Bridge

PROJECT NO.: G1813-52-07

SAMPLE NO.: **B1-3a** GEOLOGIC UNIT: **Qpf**

SAMPLE DEPTH (FT): **12**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	113.4
INITIAL WATER CONTENT (%):	14.6%
SAMPLE SATURATED AT (KSF):	2.0
INITIAL SATURATION (%):	94.5%



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CONSOLIDATION CURVE - ASTM D 2435

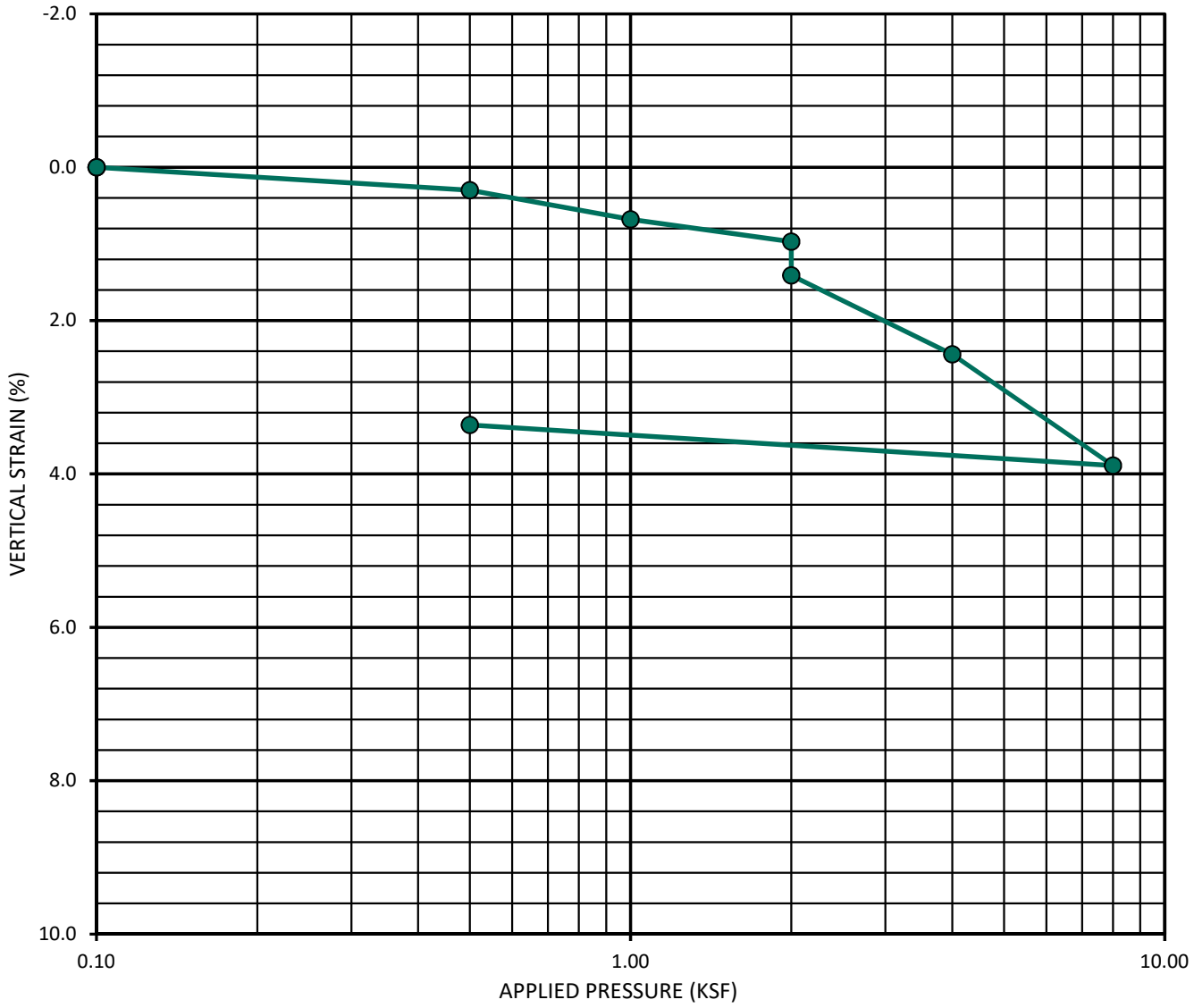
Spectrum Pedestrian Bridge

PROJECT NO.: G1813-52-07

SAMPLE NO.: **B2-2** GEOLOGIC UNIT: **Qpf**

SAMPLE DEPTH (FT): **5'**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	105.2
INITIAL WATER CONTENT (%):	14.5%
SAMPLE SATURATED AT (KSF):	2
INITIAL SATURATION (%):	74.2%



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CONSOLIDATION CURVE - ASTM D 2435

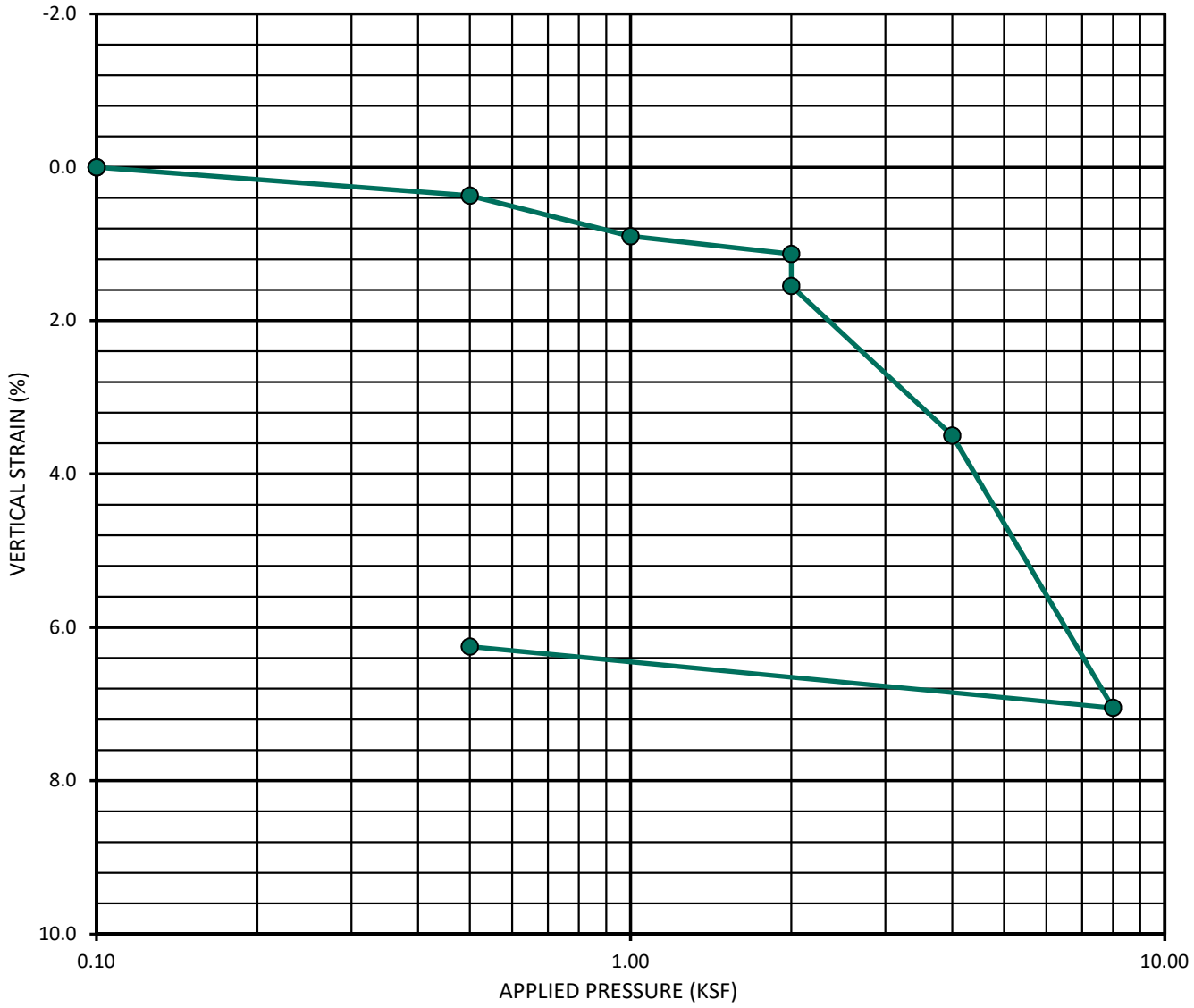
Spectrum Pedestrian Bridge

PROJECT NO.: G1813-52-07

SAMPLE NO.: **B2-5 Remold** GEOLOGIC UNIT: **Qpf**

SAMPLE DEPTH (FT): **15**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	101.3
INITIAL WATER CONTENT (%):	11.5%
SAMPLE SATURATED AT (KSF):	2
INITIAL SATURATION (%):	47.8%



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CONSOLIDATION CURVE - ASTM D 2435

Spectrum Pedestrian Bridge

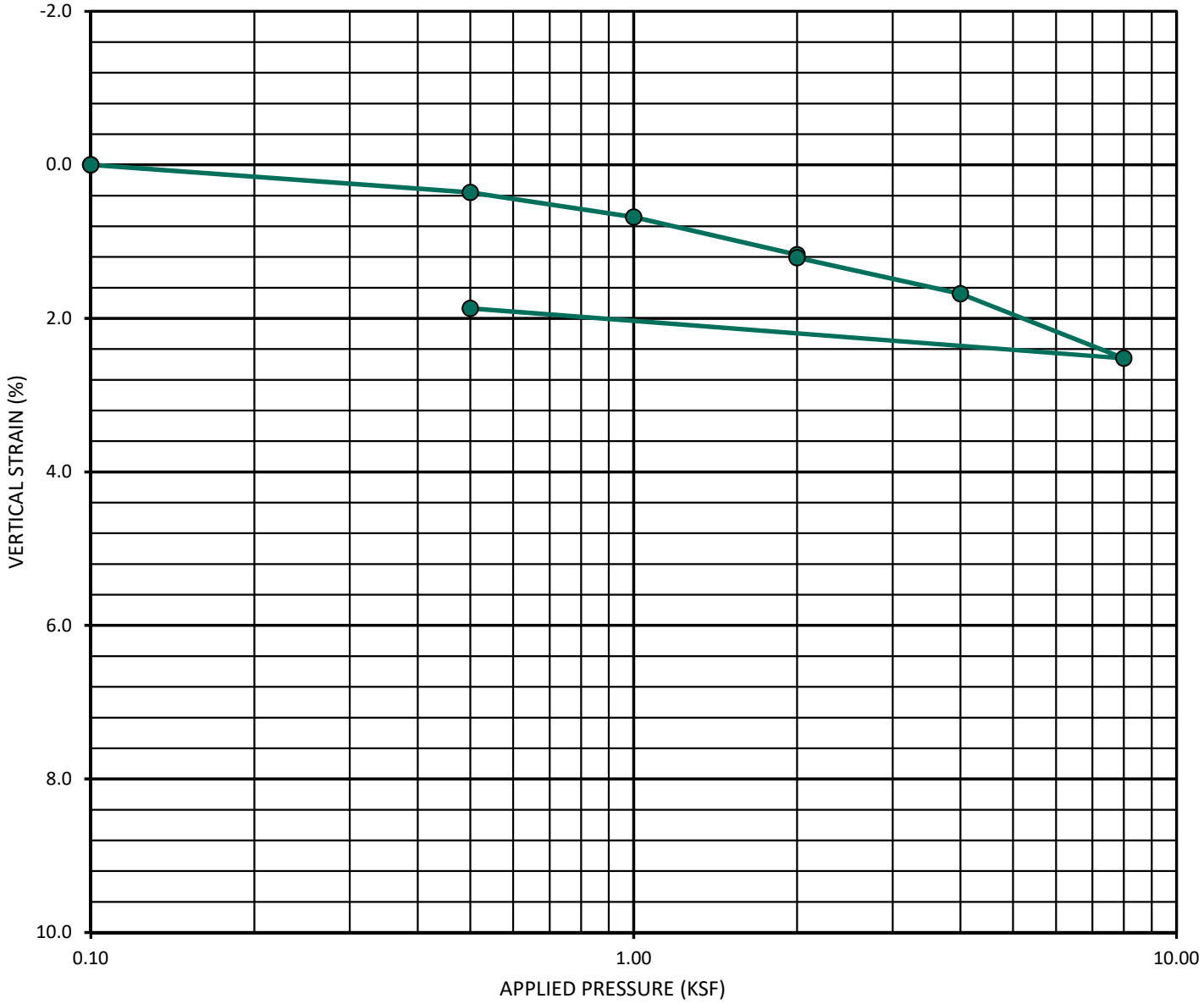
PROJECT NO.: G1813-52-07

SAMPLE NO.: **B3-2**

SAMPLE DEPTH (FT): **5**

GEOLOGIC UNIT: **Qpf**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	117.5
INITIAL WATER CONTENT (%):	14.5%
SAMPLE SATURATED AT (KSF):	2.0
INITIAL SATURATION (%):	93.7%



CONSOLIDATION CURVE - ASTM D 2435

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Spectrum Pedestrian Bridge

PROJECT NO.: G1813-52-07

APPENDIX C

APPENDIX C

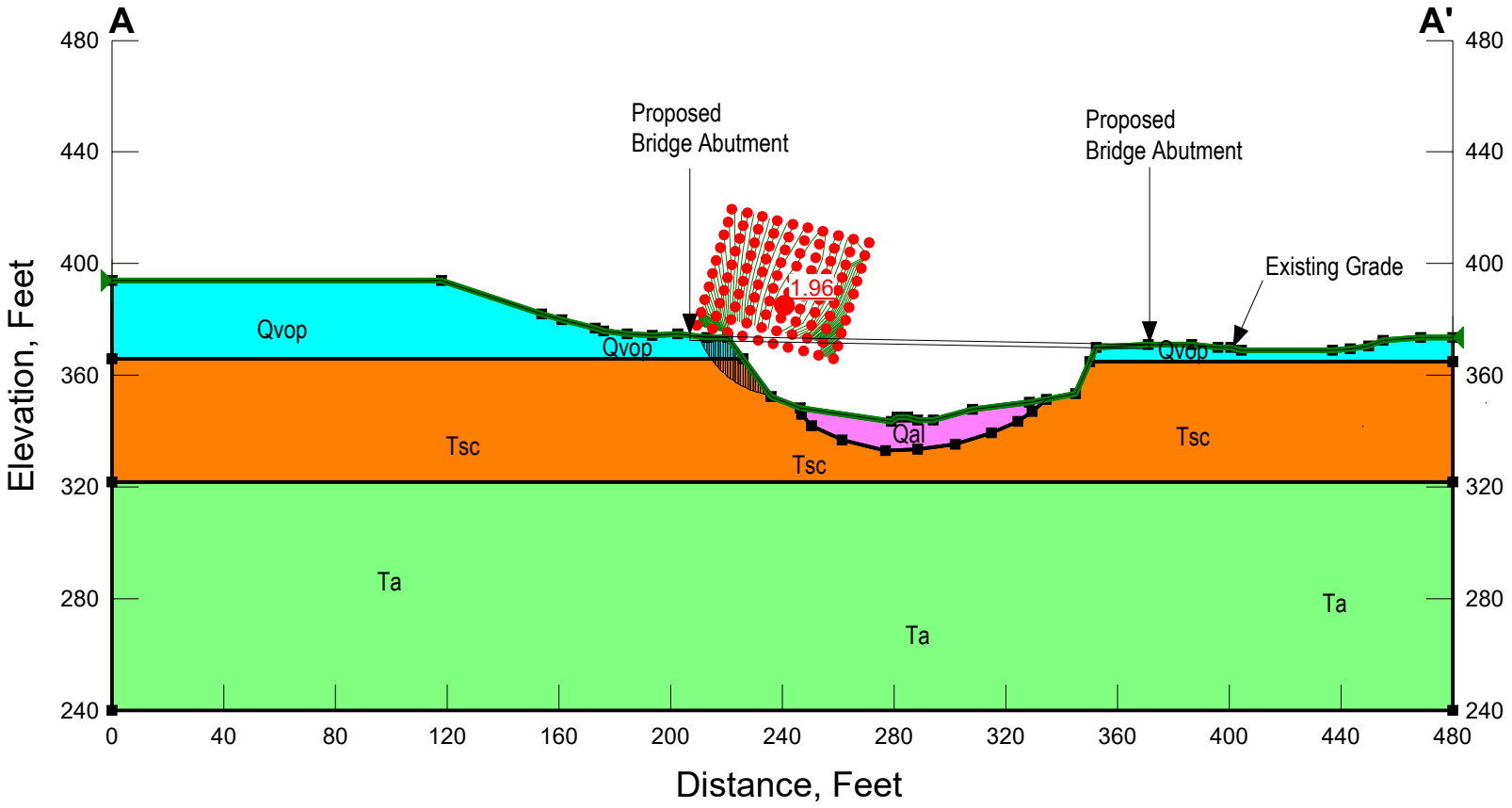
SLOPE STABILITY ANALYSES

FOR

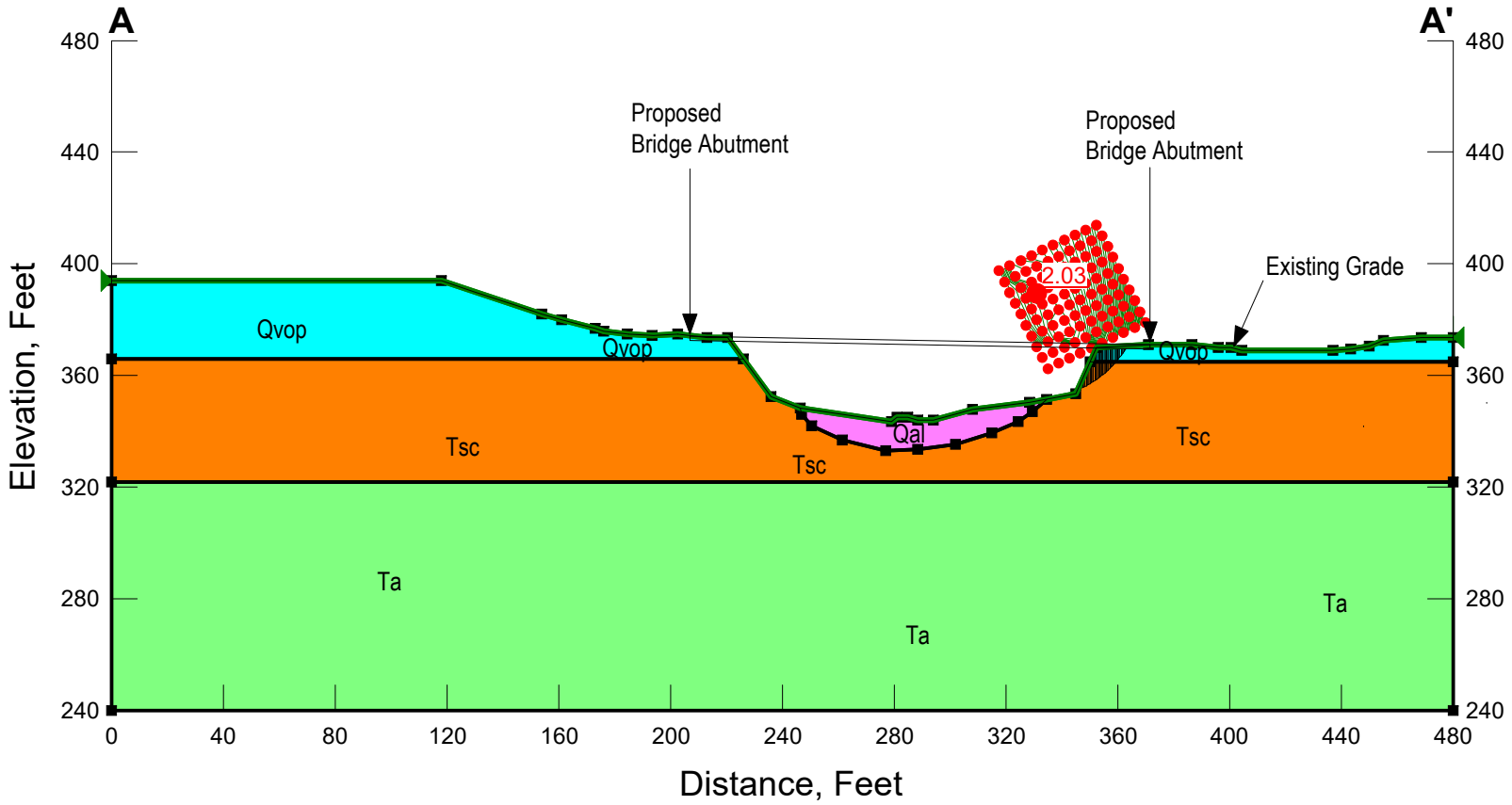
SPECTRUM PEDESTRIAN BRIDGE
3115 MERRYFIELD ROW AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

PROJECT NO. G1813-52-07

Spectrum Pedestrian Bridge
Project No. G1813-52-07
Name: A-A'-Case 1.gsz
Date: 1/18/2021 Time: 4:35:53 PM
Name: Qvop Unit Weight: 125 pcf Cohesion: 500 psf Phi: 28 °
Name: Tsc Unit Weight: 125 pcf Cohesion: 400 psf Phi: 34 °
Name: Ta Unit Weight: 130 pcf Cohesion: 400 psf Phi: 32 °
Name: Qal Unit Weight: 125 pcf Cohesion: 200 psf Phi: 24 °



Spectrum Pedestrian Bridge
Project No. G1813-52-07
Name: A-A'-Case 2.gsz
Date: 1/18/2021 Time: 4:39:50 PM
Name: Qvop Unit Weight: 125 pcf Cohesion: 500 psf Phi: 28 °
Name: Tsc Unit Weight: 125 pcf Cohesion: 400 psf Phi: 34 °
Name: Ta Unit Weight: 130 pcf Cohesion: 400 psf Phi: 32 °
Name: Qal Unit Weight: 125 pcf Cohesion: 200 psf Phi: 24 °



APPENDIX D

APPENDIX D

LOG OF EXPLORATORY BORINGS FROM PREVIOUS GEOTECHNICAL INVESTIGATION:

GEOTECHNICAL INVESTIGATION
ONE CRAY COURT
LA JOLLA PINES TECHNOLOGY CENTRE, LOT 7A
LA JOLLA, CALIFORNIA
PREPARED BY GEOCON INCORPORATED
DATED OCTOBER 29, 1997
PROJECT NO. 05850-22-02

FOR

SPECTRUM PEDESTRIAN BRIDGE
3115 MERRYFIELD ROW AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

PROJECT NO. G1813-52-07

PROJECT NO. 05850-22-02

BORING B 1

ELEV. (MSL.) 355 DATE COMPLETED 10/8/97

EQUIPMENT IR A-300

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-1			SM	**TOPSOIL** Loose, damp, dark reddish brown, Silty, fine to medium SAND			
2	B1-2			CL	Medium stiff, moist, red brown, Sandy CLAY	25/12	116.9	16.7
4	B1-3			SM	**SCRIPPS FORMATION** Very dense, damp, yellow, very Silty, fine to medium SAND	50/8	119.8	13.8
6								
8								
10	B1-4					50/5	117.9	11.7
12								
14	B1-5					50/4		
16				ML	Very dense, damp, yellow, SILT-moderately cemented			
18				SM	Very dense, damp, yellow, Silty, fine to medium SAND			
20	B1-6					50/7	110.4	7.6
					BORING TERMINATED AT 20 FEET			

Figure A-1 Log of Boring B 1, page 1 of 1

OCC

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. 05850-22-02

BORING B 2

ELEV. (MSL.) 361 DATE COMPLETED 10/8/97

EQUIPMENT IR A-300

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				SM	**TOPSOIL** Loose, damp, red brown, Silty, fine to medium SAND			
4	B2-1			SM	**SCRIPPS FORMATION** Very dense, damp, yellow, Silty, very fine to medium SAND	50/5	115.8	7.3
6				SP	Very dense, damp, reddish orange, fine to coarse SAND -Gravel from 7 to 10 feet			
8								
10	B2-2					50/2		
12				SM				
14	B2-3				-Becomes yellow, silty, very fine to medium grained, cohesionless at 13 feet	50/5.5		7.7
					BORING TERMINATED AT 15 FEET			

Figure A-2 Log of Boring B 2, page 1 of 1

OCC

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. 05850-22-02

BORING B 3

ELEV. (MSL.) 371 DATE COMPLETED 10/8/97

EQUIPMENT IR A-300

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				SM	**TOPSOIL** Loose, damp, reddish brown, Silty, fine to medium SAND			
4	B3-1				**LINDAVISTA FORMATION** Very dense, damp, yellowish orange, Silty, fine to coarse SAND	50/5	99.7	5.9
6								
8				SM				
10	B3-2					50/6	113.6	7.1
12	B3-3							
14	B3-4				**SCRIPPS FORMATION** Very dense, damp, yellow, Silty, fine to medium SAND	50/5	118.5	13.2
16								
18				SM				
20	B3-5				-Becomes very silty at 19 feet	50/5		
22					-Becomes gravelly with cobble from 22 to 23 feet			
24	B3-6				-Becomes very dense, damp, brown to light olive brown, moderately cemented	50/4	93.2	19.2
					BORING TERMINATED AT 25 FEET			

Figure A-3 Log of Boring B 3, page 1 of 1

OCC

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. 05850-22-02

BORING B 4

ELEV. (MSL.) 376 DATE COMPLETED 10/8/97

EQUIPMENT IR A-300

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			SM	**TOPSOIL** Loose, moist, brown, Silty, fine to coarse SAND			
2								
4	B4-2			SC	**LINDAVISTA FORMATION** Dense, moist, red brown to orange brown, slightly Clayey, fine to coarse SAND			
6								
8								
10								
12								
14	B4-3					50/7	118.5	8.3
					BORING TERMINATED AT 15 FEET			

Figure A-4 Log of Boring B 4, page 1 of 1

OCC

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. 05850-22-02

BORING B 5

ELEV. (MSL.) 362 DATE COMPLETED 10/8/97

EQUIPMENT IR A-300

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
	B5-1			CL	**TOPSOIL** Soft, damp to moist, olive brown, Sandy CLAY, low to medium plasticity			
2	B5-2			SM	**LINDAVISTA FORMATION** Very dense, damp, orange, Silty, fine to coarse SAND with gravel	50/5		8.2
4	B5-3				**SCRIPPS FORMATION** Very dense, damp to moist, green, SILT	50/5	105.5	18.6
6								
8								
10	B5-4			ML	-Becomes yellowish gray at 9 feet	50/5.5		
12								
14	B5-5					50/5	106.8	17.9
					BORING TERMINATED AT 15 FEET			

Figure A-1 Log of Boring B 5, page 1 of 1

OCC

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. 05850-22-02

BORING B 6

ELEV. (MSL.) 354 DATE COMPLETED 10/8/97

EQUIPMENT IR A-300

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B6-1			SM	**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND			
4	B6-2			ML	**SCRIPPS FORMATION** Very dense, damp, gray to yellowish orange gray, SILT, moderately cemented	50/9	126.4	13.6
					BORING TERMINATED AT 5 FEET			

Figure A-6 Log of Boring B 6, page 1 of 1

OCC

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. 05850-22-02

BORING B 7

ELEV. (MSL.) 355 DATE COMPLETED 10/8/97

EQUIPMENT IR A-300

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B7-1			CL	**TOPSOIL** Soft, damp to moist, light brown, Sandy CLAY			
2	B7-2				**SCRIPPS FORMATION** Very dense, damp, light tan brown, SILT-moderately cemented	50/7	108.1	15.4
4	B7-3			ML		50/5	96.1	10.5
					BORING TERMINATED AT 5 FEET			

Figure A-7 Log of Boring B 7, page 1 of 1

OCC

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. 05850-22-02

BORING B 8

ELEV. (MSL.) 360 DATE COMPLETED 10/8/97

EQUIPMENT IR A-300

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B8-1			SM	**TOPSOIL** Loose, damp, reddish brown, Silty, fine to medium SAND			
2	B8-2			SM	**SCRIPPS FORMATION** Very dense, damp, yellow, Silty, very fine to fine SAND			
4					BORING TERMINATED AT 5 FEET			

Figure A-8 Log of Boring B 8, page 1 of 1

OCC

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. 05850-22-02

BORING B 9

ELEV. (MSL.) 366 DATE COMPLETED 10/8/97

EQUIPMENT IR A-300

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				SM	**TOPSOIL** Loose, damp, light orange brown, Silty, fine to very coarse SAND with gravel			
4	B9-1				**LINDAVISTA FORMATION** Very dense, damp, orange, Silty, fine to medium SAND			
6	B9-2			SM		50/7		
8								
10	B9-3				-Becomes fine to coarse grained at 9 feet	50/10		
					BORING TERMINATED AT 10 FEET			

Figure A-9 Log of Boring B 9, page 1 of 1

OCC

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.

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 their in-place dry density and moisture content. Bulk samples were tested to determine their maximum dry density and optimum moisture content. Portions of the bulk samples were remolded to selected densities and moisture contents and subjected to expansion index, direct shear, and resistance value tests. The results of these tests are summarized on Tables B-I through B-IV. The in-place density and moisture content test results are also presented on the logs of the exploratory borings, Appendix A.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557-91

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
1-1	Dark reddish brown, Silty, fine to medium SAND	123.7	11.5

TABLE B-II
SUMMARY OF DIRECT SHEAR TEST RESULTS

Sample No.	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
1-1*	110.0	13.0	45	30
1-2	116.9	16.7		
1-3	119.8	13.8		
1-4	117.9	11.7		
1-6	110.4	7.6		
2-1	115.8	7.3		
2-3	---	7.7		
3-1	99.7	5.9	1150	34

TABLE B-II (Continued)
SUMMARY OF DIRECT SHEAR TEST RESULTS

Sample No.	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
3-2	113.6	7.1		
3-4	118.5	13.2	2000	22
3-6	93.2	19.2		
4-3	118.5	8.3		
5-2	---	8.2		
5-3	105.5	18.6		
5-5	106.8	17.9		
6-2	126.4	13.6		
7-2	108.1	15.4		
7-3	96.1	10.5		

*Sample remolded to approximately 90 percent of maximum dry density at near optimum moisture content.

TABLE B-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS

Sample No.	Moisture Content		Dry Density (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
3-3	7.4	18.5	121.6	7
9-1	8.0	17.9	118.0	8

TABLE B-IV
SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS

Sample No.	R-Value
6-1	18

APPENDIX E

APPENDIX E

LOG OF EXPLORATORY BORINGS FROM PREVIOUS GEOTECHNICAL INVESTIGATION:

UPDATE GEOTECHNICAL LETTER
SPECTRUM BUILDING 2
3013 SCIENCE PARK ROAD
SAN DIEGO, CALIFORNIA
PREPARED BY GEOCON INCORPORATED
DATED JULY 9, 2015
PROJECT NO. G1655-52-02

FOR

SPECTRUM PEDESTRIAN BRIDGE
3115 MERRYFIELD ROW AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

PROJECT NO. G1813-52-07

PROJECT NO. G1655-52-02

BORING B 1

ELEV. (MSL.) **367'** DATE COMPLETED **02-06-2012**

EQUIPMENT **CME 55** BY: **M. ERTWINE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**2½" ASPHALT over 7½" BASE MATERIAL**			
	B1-1			SM	**PREVIOUSLY PLACED FILL** (Qpf) Medium dense, moist, olive brown, Silty SAND			
2	B1-2			SM	**VERY OLD PARALIC DEPOSITS** (Qvop) Dense, moist, reddish brown, Silty, fine- to medium-grained SANDSTONE	40	118.8	13.2
4								
6	B1-3				-Becomes very dense	73/11"	104.8	8.9
8								
10	B1-4				-Becomes gray and brown, fine-grained	73/10"	116.7	13.3
					BORING TERMINATED AT 11 FEET No groundwater encountered			

Figure A-1,
Log of Boring B 1, Page 1 of 1

G1655-52-02.GPJ

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.

GEOCON

PROJECT NO. G1655-52-02

BORING B 2

ELEV. (MSL.) **370'** DATE COMPLETED **02-06-2012**

EQUIPMENT **CME 55** BY: **M. ERTWINE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**4"ASPHALT over 6" BASE MATERIAL**			
2				SM	**VERY OLD PARALIC DEPOSITS** (Qvop) Dense, damp to moist, light reddish brown, Silty, fine- to medium-grained SANDSTONE			
4								
6	B2-1				-Becomes very dense, damp, reddish brown	77	107.1	5.9
8								
10	B2-2				-Becomes mottled grayish brown	45		
12	B2-3							
14								
16	B2-4				-Becomes moist, dark reddish brown	73	117.3	8.7
					BORING TERMINATED AT 16 FEET No groundwater encountered			

Figure A-2,
Log of Boring B 2, Page 1 of 1

G1655-52-02.GPJ

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.

GEOCON

PROJECT NO. G1655-52-02

BORING B 3

ELEV. (MSL.) **362'** DATE COMPLETED **02-06-2012**

EQUIPMENT **CME 55** BY: **M. ERTWINE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**3½" ASPHALT over 6½" BASE MATERIAL**			
2				SM	**PREVIOUSLY PLACED FILL** (Qpf) Medium dense, moist, reddish brown, Silty SAND; some gravel			
4								
6	B3-1			SC	Dense, damp to moist, reddish brown, Clayey, fine to medium SAND; some gravel; blow counts high due to gravel in sampler tip	50/6"	117.4	8.4
8					-Becomes dark brown; some organics; organic odor from about 8-10 feet			
10	B3-2					44		
12				SM	**VERY OLD PARALIC DEPOSITS** (Qvop) Dense, damp to moist, grayish brown, Silty, fine- to medium-grained SANDSTONE			
14								
16	B3-3				Becomes very dense, light reddish brown	90	111.6	8.4
18	B3-4				-Lenses of coarse gravel	93/11"		
					BORING TERMINATED AT 19.5 FEET No groundwater encountered			

Figure A-3,
Log of Boring B 3, Page 1 of 1

G1655-52-02.GPJ

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.

GEOCON

PROJECT NO. G1655-52-02

BORING B 4

ELEV. (MSL.) **370'** DATE COMPLETED **02-06-2012**

EQUIPMENT **CME 55** BY: **M. ERTWINE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**3" ASPHALT over 4" BASE MATERIAL**			
2	B4-1			SM	**PREVIOUSLY PLACED FILL** (Qpf) Medium dense, moist, reddish brown, Silty, fine to medium SAND			
4				SM	**VERY OLD PARALIC DEPOSITS** (Qvop) Very dense, moist, light reddish brown, Silty, fine-to medium-grained SANDSTONE; moderately cemented			
6	B4-2					83	125.6	11.8
8								
10	B4-3			CL	Hard, moist, grayish brown, Sandy CLAYSTONE	28		
12								
14								
16	B4-4			SM	Very dense, damp, light yellowish brown, Silty, fine-grained SANDSTONE	74	111.3	7.2
					BORING TERMINATED AT 16 FEET No groundwater encountered			

Figure A-4,
Log of Boring B 4, Page 1 of 1

G1655-52-02.GPJ

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.

GEOCON

PROJECT NO. G1655-52-02

BORING B 5

ELEV. (MSL.) **388'** DATE COMPLETED **02-06-2012**

EQUIPMENT **CME 55** BY: **M. ERTWINE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**3½" ASPHALT over 9½" BASE MATERIAL**			
2				SC	**VERY OLD PARALIC DEPOSITS** (Qvop) Medium dense to dense, moist, brown to reddish brown, Clayey, fine-to coarse SAND; abundant gravel and cobble			
4				SM	Very dense, moist, light reddish brown, Silty, fine- to medium-grained SANDSTONE			
6	B5-1					79		
8								
10	B5-2			SC	Very dense, moist, grayish brown, Clayey, fine-grained SANDSTONE	50/6"	114.7	15.4
					BORING TERMINATED AT 10.5 FEET Groundwater not encountered			

Figure A-5,
Log of Boring B 5, Page 1 of 1

G1655-52-02.GPJ

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. G1655-52-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B 6 ELEV. (MSL.) 369' DATE COMPLETED 06-25-2015 EQUIPMENT IRA-300 BY: L. RODRIGUES MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B6-1				**3" ASPHALT/CONCRETE over 5" BASE MATERIAL**			
				SM	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, damp, yellowish to reddish brown, Silty, fine to medium SAND; trace gravel			
2	B6-2				-Becomes very dense	72/11.5		
4								
	B6-3					42		
6				SM	**VERY OLD PARALIC DEPOSITS (Qvop)** Dense, damp, light reddish brown, Silty fine grained SANDSTONE			
8								
10	B6-4			SC	Very dense, moist, reddish to grayish brown, Clayey, fine to medium grained SANDSTONE	50/5"		
					BORING TERMINATED AT 10.5 FEET No groundwater encountered Backfilled with soil cuttings			

Figure A-6,
Log of Boring B 6, Page 1 of 1

G1655-52-02.GPJ

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.

GEOCON

PROJECT NO. G1655-52-02

BORING B 7

ELEV. (MSL.) **364'** DATE COMPLETED **06-25-2015**

EQUIPMENT **IRA-300** BY: **L. RODRIGUES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B7-1				**3" ASPHALT/CONCRETE over 5" BASE MATERIAL**			
				SC	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, moist, dark brown, Clayey, fine to medium SAND; trace gravel			
2	B7-2					36		
4								
6	B7-3			SM	Very dense, damp, dark brown, Silty, fine to medium SAND; trace gravel	83/11.5"		
8	B7-4			SC	Dense, moist, dark grayish brown, Clayey, fine to medium SAND; trace wood debris; odorous	52		
10	B7-5				Medium dense, moist, dark grayish brown, Clay, fine to medium SAND to Sandy CLAY; trace rootlets	35		
12								
14								
	B7-6				**VERY OLD PARALIC DEPOSITS (Qvop)** Very dense, moist, reddish to grayish brown, Silty, fine grained SANDSTONE to Sandy SILTSTONE; micaceous	85/11"		
16								
18								
	B7-7			SM/SW	Very dense, damp, light yellowish to grayish brown, Silty, fine to medium SANDSTONE to well-graded fine to medium SANDSTONE	50/6"		

BORING TERMINATED AT 19 FEET
No groundwater encountered
Backfilled with soil cuttings

Figure A-7,
Log of Boring B 7, Page 1 of 1

G1655-52-02.GPJ

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.

GEOCON

PROJECT NO. G1655-52-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 8** ELEV. (MSL.) **358'** DATE COMPLETED **06-29-2015** EQUIPMENT **TRIPOD** BY: **L. RODRIGUES**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**PREVIOUSLY PLACED FILL (Qpf)** Loose to medium dense, dry to damp, reddish to yellowish brown, Silty, fine to medium SAND; trace rootlets, trace gravel			
2	B8-1				-Becomes medium dense, damp	36		
4								
6	B8-2				**VERY OLD PARALIC DEPOSITS (Qvop)** Very dense, damp, gray mottled with yellow, Silty, fine to medium grained SANDSTONE	70		
					BORING TERMINATED AT 6 FEET No groundwater encountered Backfilled with soil cuttings			

Figure A-8,
Log of Boring B 8, Page 1 of 1

G1655-52-02.GPJ

SAMPLE SYMBOLS

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

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GEOCON

PROJECT NO. G1655-52-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 9** ELEV. (MSL.) **360'** DATE COMPLETED **06-29-2015** EQUIPMENT **TRIPOD** BY: **L. RODRIGUES**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PREVIOUSLY PLACED FILL (Qpf)** Loose to medium dense, damp, brown, Silty, fine to medium SAND; trace gravel; trace rootlets			
2	B9-1				-Becomes medium dense	42		
4								
6	B9-2				-Becomes very dense, light yellowish to reddish brown; trace rootlets	80		
8								
10	B9-3				-Becomes light brown	75/9"		
12	B9-4			SM	**VERY OLD PARALIC DEPOSITS (Qvop)** Very dense, damp, light yellowish to grayish brown, Silty, fine to coarse grained SANDSTONE	85/9"		
					BORING TERMINATED AT 12.25 FEET No groundwater encountered Backfilled with soil cuttings			

Figure A-9,
Log of Boring B 9, Page 1 of 1

G1655-52-02.GPJ

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.

GEOCON

PROJECT NO. G1655-52-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 10** ELEV. (MSL.) **360'** DATE COMPLETED **06-29-2015** EQUIPMENT **TRIPOD** BY: **L. RODRIGUES**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**PREVIOUSLY PLACED FILL (Qpf)** Loose to medium dense, damp, light yellowish to reddish brown, Silty, fine to coarse SAND; trace organics			
2	B10-1				-Becomes dense, finer grained, trace rootlets	53		
4								
6	B10-2				-Becomes very dense, dark yellowish brown	50/6"		
8								
10	B10-3				-Becomes dense light yellowish to reddish brown; trace gravel; trace rootlets	69		
12								
14								
	B10-4					82/9"3		
					BORING TERMINATED AT 15.75 FEET No groundwater encountered **Backfilled with soil cuttings**			

Figure A-10,
Log of Boring B 10, Page 1 of 1

G1655-52-02.GPJ

SAMPLE SYMBOLS

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

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GEOCON

APPENDIX F

APPENDIX F

LOG OF EXPLORATORY BORINGS FROM PREVIOUS GEOTECHNICAL INVESTIGATION:

UPDATE GEOTECHNICAL INVESTIGATION
SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA
PREPARED BY GEOCON INCORPORATED
DATED JULY 26, 2017
PROJECT NO. G1813-52-01

FOR

SPECTRUM PEDESTRIAN BRIDGE
3115 MERRYFIELD ROW AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

PROJECT NO. G1813-52-07

PROJECT NO. G1813-52-01

BORING B 1

ELEV. (MSL.) **354'** DATE COMPLETED **04-16-2015**

EQUIPMENT **CME 85** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**3 INCH AC OVER 4 INCH BASE**			
2				SC	**FILL (Qpf)** Medium dense, moist, olive brown, Clayey, fine to medium SAND			
4								
6	B1-1			SC	**VERY OLD PARALIC DEPOSITS (Qvop)** Very dense, damp, Clayey fine to medium SAND, cemented with round gravel and clay	90/9"	102.2	8.2
8					-Becomes fine to coarse			
10	B1-2				-Rock in sampler tip	74/9"	104.3	10.3
12	B1-3							
14								
16	B1-4					53	112.1	8.1
18								
20	B1-5					52	103.9	10.5
					BORING TERMINATED AT 20 FEET Backfilled with soil cuttings No groundwater encountered			

Figure A1,
Log of Boring B 1, Page 1 of 1

G1813-52-01 UPDATE.GPJ

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.

GEOCON

PROJECT NO. G1813-52-01

BORING B 2

ELEV. (MSL.) **353'** DATE COMPLETED **04-16-2015**

EQUIPMENT **CME 85** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**3 INCH AC OVER 4 INCH BASE**			
2	B2-1			SC	**FILL (Qpf)** Medium dense, moist, light brown to brown, Clayey, fine to medium SAND; some 2 inch rocks and few gravel			
4								
6	B2-2				-Some bark/organics	33	109.9	12.3
8								
10	B2-3				-Olive brown, micaceous	32	114.0	12.4
12								
14				SC	**VERY OLD PARALIC DEPOSITS (Qvop)** Medium dense, moist, olive brown, Clayey fine to medium SAND			
16	B2-4 B2-5					31	107.1	12.5
18								
20	B2-6				-Reddish brown to olive brown	44	99.1	9.2
22	B2-7				-Becomes damp			
24								
26	B2-8				-Becomes dense, moist	57	103.7	12.9
28								
30	B2-9				-Becomes medium dense, moist	41	101.1	12.9
					BORING TERMINATED AT 31 FEET Backfilled with 10.8 ft No groundwater encountered			

Figure A2,
Log of Boring B 2, Page 1 of 1

G1813-52-01 UPDATE.GPJ

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.

GEOCON

PROJECT NO. G1813-52-01

BORING B 3

ELEV. (MSL.) **348'** DATE COMPLETED **04-16-2015**

EQUIPMENT **CME 85** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**3 INCH AC OVER 4 INCH BASE**			
2	B3-1			SC	**FILL (Qpf)** Medium dense, moist, olive brown, Clayey, fine to medium SAND			
4								
6	B3-2			SC	**SCRIPPS FORMATION (Tsc)** Very dense, moist, yellowish brown, Clayey, fine to medium SANDSTONE	50/5"		
8								
10	B3-3							
12								
14					-Becomes fine			
16	B3-4				-No recovery in CAL sampler -No recovery in SPT	50/6"		
18								
20	B3-5				-No recovery in CAL sampler	50/6"		
22	B3-6				-Yellowish brown and gray mixed in color			
24								
26								
28								
30	B3-7				-Sample in rings looks disturbed -Olive brown mottled with yellowish brown in color	50/5'	89.0	16.9
					BORING TERMINATED AT 31 FEET Backfilled with 10.8ft³ No groundwater encountered			

Figure A3,
Log of Boring B 3, Page 1 of 1

G1813-52-01 UPDATE.GPJ

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.

GEOCON

PROJECT NO. G1813-52-01

BORING B 4

ELEV. (MSL.) **350'** DATE COMPLETED **04-16-2015**

EQUIPMENT **CME 85** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**3½ AC OVER 6 INCH BASE**			
	B4-1			SC	**FILL (Qpf)** Medium dense, moist to wet, olive brown, Clayey fine to medium SAND with little gravel; mottled with yellowish brown and light brown			
2								
4								
	B4-2					32	120.3	12.8
6								
8					-Rocks up to 3 inch diameter			
10	B4-3					21	111.0	17.5
	B4-4							
12								
14								
	B4-5					32	109.9	13.9
16	B4-6							
18					-Mulch in sample			
20	B4-7			SC	**SCRIPPS FORMATION (Tsc)** Very dense, moist, olive brown and yellowish brown, Clayey, fine to medium SANDSTONE; micaceous	50/6"	103.3	13.1
	B4-8							
22								
24								
	B4-9				-Becomes wet	50/6"	106.7	18.4
26	B4-10				-Top 2inch of sample disturbed -Olive gray to olive brown, breaks into layers			
28								
30	B4-11			SM	Dense, wet, olive brown, Silty fine to medium SANDSTONE; micaceous; ferrous; carbon concretions; visible fractures	62	110.9	15.2
					BORING TERMINATED AT 31 FEET Backfilled with 10.8ft³ bentonite No groundwater encountered			

Figure A4,
Log of Boring B 4, Page 1 of 1

G1813-52-01 UPDATE.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1813-52-01

BORING B 5

ELEV. (MSL.) **347'** DATE COMPLETED **04-15-2015**

EQUIPMENT **CME 85** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**3 INCH ASPHALT OVER 3 INCH BASE**			
2	B5-1			SC	**FILL (Qpf)** Medium dense, moist, olive brown, Clayey, fine to medium SAND; trace angular rocks up to 2 inch			
4	B5-2			SP	**SCRIPPS FORMATION (Tsc)** Very dense, damp, yellowish brown, Clayey, fine to medium SANDSTONE;			
6	B5-3				mica flakes	86/8"	102.8	7.2
10	B5-4				-Becomes mottled with light brown color	80/9"	99.7	7.8
16	B5-5 B5-6				-No recovery in CAL sampler	50/6"		7.9
20	B5-7					50/6"	90.2	11.6
24				SC	Very dense, wet, olive brown with yellowish brown mottling, Clayey, fine to medium SANDSTONE			
26	B5-8 B5-9					90/9"	110.8	15.5
30	B5-10				-Becomes moist	50/6"	101.4	16.5
34								

Figure A5,
Log of Boring B 5, Page 1 of 2

G1813-52-01 UPDATE.GPJ

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. G1813-52-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 5** ELEV. (MSL.) **347'** DATE COMPLETED **04-15-2015** EQUIPMENT **CME 85** BY: **K. JAMES**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
36	B5-11			SC	-Becomes olive brown -White sand seam in tip of sampler	50/4"	105.6	13.6
38					-Concretion; difficult drilling			
40	B5-12				-Becomes wet	50/6"	107.7	17.6
					BORING TERMINATED AT 40.5 FEET Backfilled with 14.4ft³ bentonite No groundwater encountered			

Figure A5,
Log of Boring B 5, Page 2 of 2

G1813-52-01 UPDATE.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1813-52-01

BORING B 6

ELEV. (MSL.) **332'** DATE COMPLETED **04-15-2015**

EQUIPMENT **CME 85** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**4 INCH AC OVER 4 INCH BASE**			
2	B6-1			SC	**FILL (Qpf)** Medium dense, moist, olive brown, Clayey fine to medium SAND with little gravel and rocks up to 2 inch diameter			
6	B6-2					15	109.1	14.1
10	B6-3				-Top of sample disturbed	15	107.0	10.1
12	B6-7				-Becomes dark brown, trace roots and organic odor			
16	B6-4					41	102.5	11.1
20	B6-5				-Becomes light olive brown fine to medium sand; ferrous few rocks, clayey sand, mulch, organics	11	100.7	12.7
26	B6-6			SP	**SCRIPPS FORMATION (Tsc)** Very dense, wet, olive gray and yellowish brown, fine to medium SANDSTONE	80	113.4	13.8
28	B6-8							
30	B6-9				-Becomes yellowish brown in color			
	B6-10					70/11"	102.5	23.0
					BORING TERMINATED AT 31 FEET Backfilled with 10.8ft³ bentonite No groundwater encountered			

Figure A6,
Log of Boring B 6, Page 1 of 1

G1813-52-01 UPDATE.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1813-52-01

BORING B 7

ELEV. (MSL.) **338'** DATE COMPLETED **06-16-2015**

EQUIPMENT **CME 75** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**3½ INCH AC over 4 INCH BASE**			
				SC	**PREVIOUSLY PLACED FILL (Qpf)**			
2	B7-1				Medium dense, moist, olive brown, Clayey, fine to medium SAND	28		
4				SM	**SCRIPPS FORMATION (Tsc)**			
	B7-2				Very dense, moist, light yellowish brown, Silty, fine to medium SANDSTONE; ferrous mica flakes	50/6"		
6								
8								
10	B7-3					50/4"		
					-Concretion; difficult drilling			
12								
14								
	B7-4					50/3"		
16					-Concretion; difficult drilling			
18					-Becomes yellowish brown			
	B7-5					50/4"		
					BORING TERMINATED AT 19.3 FEET Boring backfilled with soil cuttings No groundwater encountered			

Figure A7,
Log of Boring B 7, Page 1 of 1

G1813-52-01 UPDATE.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1813-52-01

BORING B 8

ELEV. (MSL.) **339'** DATE COMPLETED **06-16-2015**

EQUIPMENT **CME 75** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**3 INCH AC over 4 INCH BASE**			
2	B8-1			SC	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, moist, olive brown, Clayey, fine to medium SAND with little gravel	17		
4								
6	B8-2			SM	**SCRIPPS FORMATION (Tsc)** Very dense, moist, light brown, Silty, fine to medium SANDSTONE; micaceous	94/9"		
8								
10	B8-3				-Concretion; difficult drilling -Becomes yellowish brown	50/6"		
12					-Concretion; difficult drilling			
14								
16	B8-4				-Becomes light brown and yellowish brown mixed	50/3"		
18								
	B8-5					50/5"		
					BORING TERMINATED AT 19.4 FEET Boring backfilled with soil cuttings No groundwater encountered			

Figure A8,
Log of Boring B 8, Page 1 of 1

G1813-52-01 UPDATE.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1813-52-01

BORING B 9

ELEV. (MSL.) **339'** DATE COMPLETED **06-16-2015**

EQUIPMENT **CME 75** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**3 INCH AC over 4 INCH BASE**			
				SC	**PREVIOUSLY PLACED FILL (Qpf)**			
2	B9-1			SM	Medium dense, damp, olive brown, Clayey, fine to medium SAND	77/11"		
					SCRIPPS FORMATION (Tsc)			
4					Very dense, damp, light yellowish brown, Silty, fine to medium SANDSTONE; micaceous, little clay			
6	B9-2					76/11"		
8					-Becomes olive brown, some clay content			
10	B9-3					50/5"		
12								
14								
	B9-4					50/5"		
					BORING TERMINATED AT 15.4 FEET Boring backfilled with soil cuttings No groundwater encountered			

Figure A9,
Log of Boring B 9, Page 1 of 1

G1813-52-01 UPDATE.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G1813-52-01

BORING B 10

ELEV. (MSL.) **357.5** DATE COMPLETED **11-11-2016**

EQUIPMENT **CME 75** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**4 INCH AC over 10 INCH BASE**			
2				SC	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, moist, brown, Clayey, fine to coarse SAND			
4				GP	Medium dense, damp, brown angular GRAVEL with sand and clay			
6	B10-1 B10-2					18		2.3
8								
10	B10-3			SM	**SCRIPPS FORMATION (Tsc)** Medium dense, moist, olive brown, Silty, fine SANDSTONE	37	107.7	13.5
12								
14					-Becomes olive brown to reddish brown; wet			
16	B10-4 B10-5					40	104.1	23.3
18					-Cemented sandstone pieces in sampler tip			
20	B10-6				-Becomes dense, moist	77	112.7	16.1
22								
24								
26	B10-7 B10-8					56	119.3	8.1
28								
30	B10-9			SM	-Becomes very dense, trace rocks 1-inch in diameter	50/5"	109.8	11.3
32								
34								

Figure A10,
Log of Boring B 10, Page 1 of 2

G1813-52-01 UPDATE.GPJ

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. G1813-52-01

BORING B 10

ELEV. (MSL.) **357.5** DATE COMPLETED **11-11-2016**

EQUIPMENT **CME 75** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36	B10-10				-Becomes damp	88		
38								
40	B10-11					50/3"	111.6	8.2
	B10-12							
42								
44					-Weakly cemented			
	B10-13					50/3"		
					BORING TERMINATED AT 45.25 FEET No groundwater encountered Backfilled with approximately 15.8 cu. ft. bentonite grout			

Figure A10,
Log of Boring B 10, Page 2 of 2

G1813-52-01 UPDATE.GPJ

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. G1813-52-01

BORING B 11

ELEV. (MSL.) **361** DATE COMPLETED **11-11-2016**

EQUIPMENT **CME 75** BY: **K. JAMES**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B11-1				**4 INCH AC over 10 INCH BASE**			
2				SM	**PREVIOUSLY PLACED FILL (Qpf)** Dense, damp, olive brown to reddish brown, Silty, fine to coarse SAND; trace gravel			
4				SM	**SCRIPPS FORMATION (Tsc)** Very dense, damp, olive brown to light reddish brown, Silty, fine to coarse SANDSTONE; moderately cemented			
6	B11-2					80	114.3	7.6
8					-Becomes dense			
10	B11-3					50		
12								
14								
16	B11-4 B11-5				-Becomes very dense, moist, olive brown to brown	50/5"	123.1	9.6
18								
	B11-6				-Cemented sandstone pieces in sampler tip	50/4"		
					BORING TERMINATED AT 19.35 FEET No groundwater encountered Backfilled with approximately 6.8 cu. ft. bentonite grout			

Figure A11,
Log of Boring B 11, Page 1 of 1

G1813-52-01 UPDATE.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

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GEOCON

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. We tested selected samples for in-place dry density and moisture content, maximum dry density and optimum moisture content, shear strength, R-value, expansion index, water-soluble sulfate characteristics, pH and resistivity, water-soluble chloride content, correlated unconfined compressive strength, gradation and consolidation. The results of our laboratory tests are presented in Tables B-I through B-VIII and Figures B-1 through B-7. In addition, the in-place dry density and moisture content results are presented on the exploratory boring logs in Appendix A.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557-02

Sample No.	Description (Geologic Unit)	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B3-4	Yellowish brown, Clayey fine to medium SANDSTONE (Tsc)	126.0	10.1
B4-1	Olive brown, Clayey fine to medium SAND (Qpf)	130.2	9.1
B6-1	Olive brown, Clayey fine to medium SAND (Qpf)	131.0	8.8
B10-8	Olive Brown to Reddish Brown, Silty fine SANDSTONE (Tsc)	132.8	8.0
B10-12	Olive Brown to Reddish Brown, Silty fine SANDSTONE (Tsc)	134.4	7.5
B11-1	Olive Brown to Reddish Brown, Silty fine to coarse SAND (Qpf)	134.6	7.7

TABLE B-II
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080-03

Sample No.	Dry Density (pcf)	Moisture Content (%)		Peak [Ultimate*] Cohesion (psf)	Peak [Ultimate*] Angle of Shear Resistance (degrees)
		Initial	Final		
B1-4	112.1	8.1	15.1	330 [125]	33 [32]
B2-8	103.7	8.0	18.3	480 [375]	31 [31]
B4-3	111.0	17.5	19.2	680 [350]	33 [33]
B4-5	109.9	13.9	17.9	800 [500]	27 [26]
B10-8†	119.3	8.1	14.7	625 [625]	22 [22]
B10-12	120.9	7.4	13.1	585 [580]	28 [28]
B11-2	114.3	7.6	14.2	480 [250]	34 [34]

*Ultimate defined as the end-of-test strength after about 0.2 inches of deflection.
†Sample Remolded

TABLE B-III
SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS
ASTM D 2844

Sample No.	Depth (feet)	Description (Geologic Unit)	R-Value
B6-1	1 to 5	Olive brown, Clayey fine to medium SAND (Qpf)	50

TABLE B-IV
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829-03

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	2013 CBC Expansion Classification	Expansion Classification
	Before Test	After Test				
B3-4	8.7	14.0	114.2	1	Very Low	Non-Expansive
B4-1	9.1	16.7	112.3	19	Very Low	Non-Expansive
B6-1	9.0	16.6	112.4	17	Very Low	Non-Expansive
B10-8	8.8	16.8	115.3	21	Low	Expansive
B10-12	8.7	16.1	115.3	6	Very Low	Non-Expansive
B11-1	8.2	14.0	116.8	9	Very Low	Expansive

TABLE B-V
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Water-Soluble Sulfate (%)	Exposure Class	Sulfate Severity
B3-4	0.022	S0	Not Applicable (S0)
B4-1	0.055	S0	Not Applicable (S0)
B6-1	0.006	S0	Not Applicable (S0)
B10-8	0.033	S0	Not Applicable (S0)
B10-12	0.030	S0	Not Applicable (S0)
B11-1	0.014	S0	Not Applicable (S0)

TABLE B-VI
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (pH) AND RESISTIVITY TEST RESULTS
CALIFORNIA TEST NO. 643

Sample No.	pH	Minimum Resistivity (ohm-centimeters)
B3-4	7.04	360
B4-1	7.47	430
B6-1	8.06	1,700

TABLE B-VII
SUMMARY OF LABORATORY WATER-SOLUBLE CHLORIDE CONTENT TEST RESULTS
AASHTO TEST NO. T291-94

Sample No.	Chloride Content (ppm)	Chloride Content (%)
B3-4	1,416	0.142
B4-1	1,027	0.103
B6-1	395	0.039

TABLE B-VIII
SUMMARY OF HAND PENETROMETER TEST RESULTS
ASTM D 1558

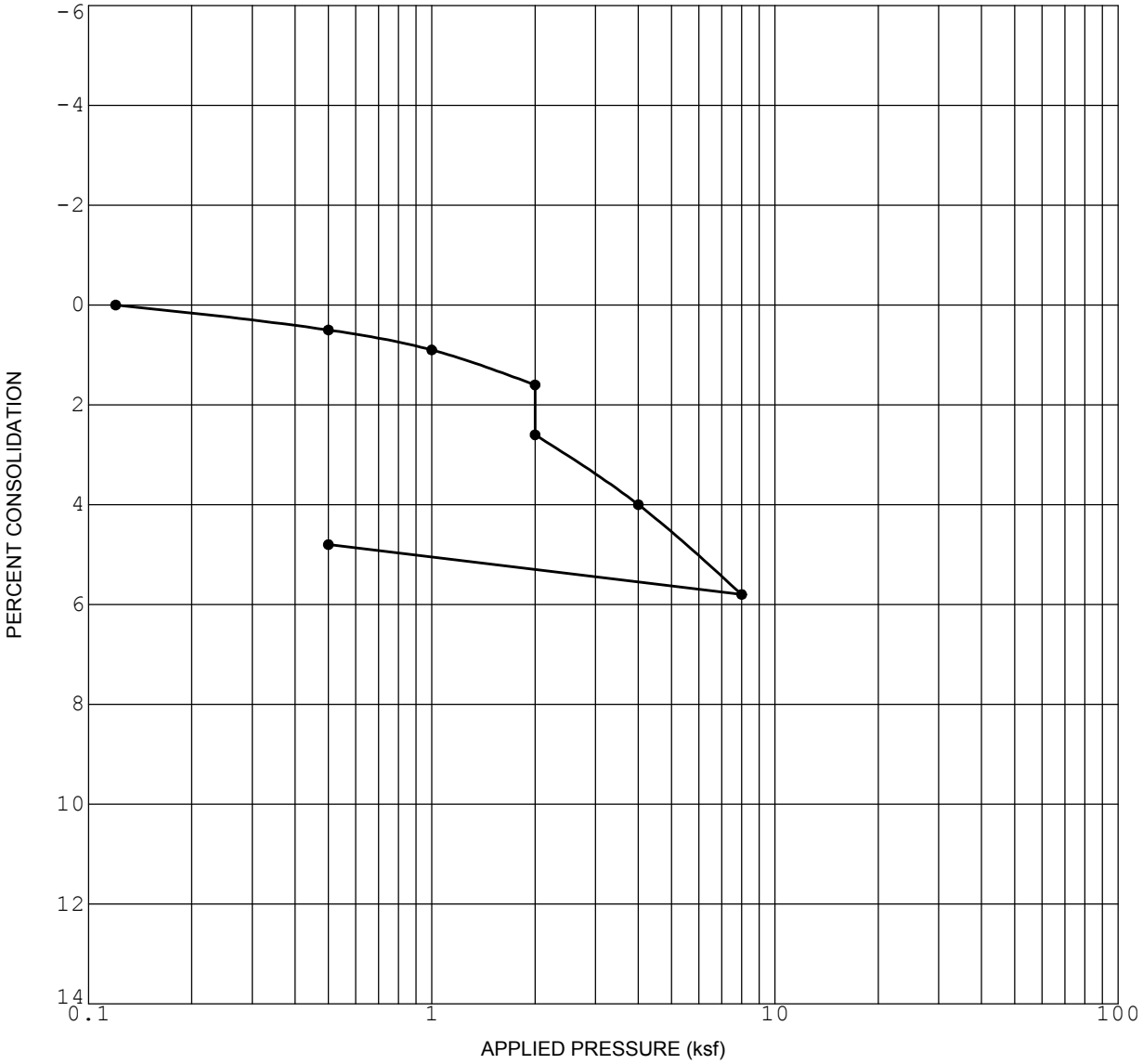
Sample No.	Depth (feet)	Geologic Unit	Hand Penetrometer Reading, Unconfined Compression Strength (tsf)	Undrained Shear Strength (ksf)
B1-1	5	Tsc	4.5+	4.5+
B1-2	10	Tsc	4.5	4.5
B1-4	15	Tsc	4.5+	4.5+
B1-5	19	Tsc	4.5+	4.5+
B2-2	5	Qpf	4.0	4.0
B2-3	10	Qpf	4.0	4.0
B2-4	15	Tsc	4.5+	4.5+
B2-6	20	Tsc	4.5+	4.5+
B2-8	25	Tsc	4.5+	4.5+
B2-9	30	Tsc	4.5+	4.5+
B3-2	5	Tsc	4.5+	4.5+
B3-7	30	Tsc	4.5+	4.5+
B4-2	5	Qpf	4.5	4.5
B4-3	10	Qpf	4.0	4.0
B4-5	15	Qpf	4.5	4.5
B4-7	20	Tsc	4.5+	4.5+
B4-9	25	Tsc	4.5+	4.5+
B4-11	30	Tsc	4.5+	4.5+
B5-3	5	Tsc	4.5+	4.5+
B5-4	10	Tsc	4.5+	4.5+
B5-7	20	Tsc	4.5+	4.5+
B5-8	25	Tsc	4.5+	4.5+
B5-10	30	Tsc	4.5+	4.5+
B5-11	35	Tsc	4.5+	4.5+
B5-12	40	Tsc	4.5+	4.5+

TABLE B-VIII (Concluded)
SUMMARY OF HAND PENETROMETER TEST RESULTS
ASTM D 1558

Sample No.	Depth (feet)	Geologic Unit	Hand Penetrometer Reading, Unconfined Compression Strength (tsf)	Undrained Shear Strength (ksf)
B6-2	5	Qpf	3.5	3.5
B6-3	10	Qpf	3.5	3.5
B6-4	15	Qpf	4.5+	4.5+
B6-5	19	Qpf	4.5+	4.5+
B6-6	25	Tsc	4.5+	4.5+
B6-10	30	Tsc	4.5+	4.5+
B7-1	2	Qpf	4.5+	4.5+
B7-2	5	Tsc	4.5+	4.5+
B7-3	10	Tsc	4.5+	4.5+
B7-4	15	Tsc	4.5+	4.5+
B7-5	19	Tsc	4.5+	4.5+
B8-1	2	Qpf	4.0	4.0
B8-2	5	Tsc	4.5+	4.5+
B8-3	10	Tsc	4.5+	4.5+
B8-4	15	Tsc	4.5+	4.5+
B8-5	19	Tsc	4.5+	4.5+
B9-1	2	Qpf	4.0	4.0
B9-2	5	Tsc	4.5+	4.5+
B9-3	10	Tsc	4.5+	4.5+
B9-4	15	Tsc	4.5+	4.5+
B10-6	20	Tsc	4.5	4.5
B11-4	15	Tsc	4.5	4.5

PROJECT NO. G1813-52-01

SAMPLE NO. B2-2



Initial Dry Density (pcf)	109.9	**Initial Saturation (%)**	64.2
Initial Water Content (%)	12.3	**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

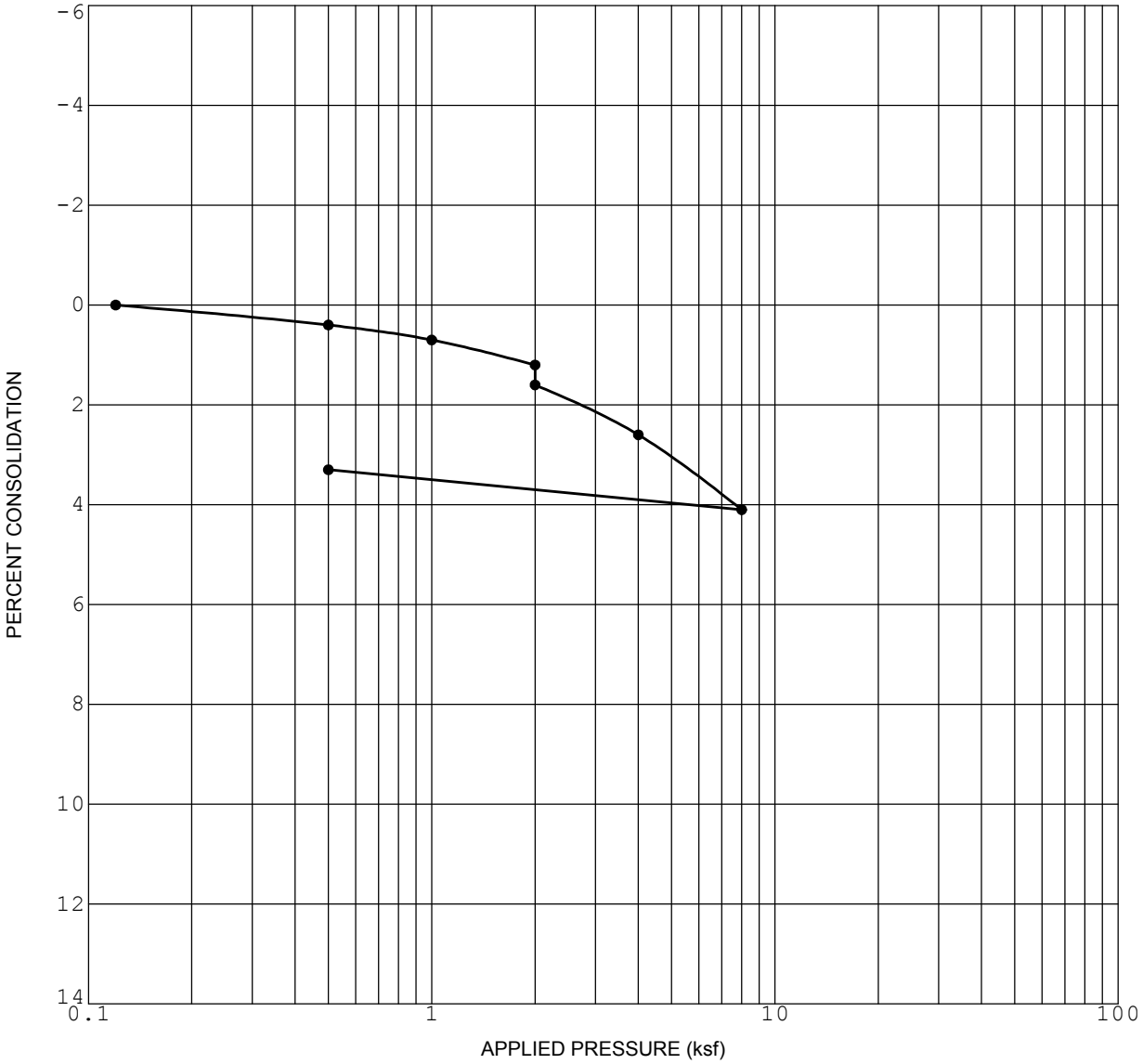
G1813-52-01 UPDATE.GPJ

Figure B-1

GEOCON

PROJECT NO. G1813-52-01

SAMPLE NO. B6-2



Initial Dry Density (pcf)	107.4
Initial Water Content (%)	14.1

Initial Saturation (%)	71.8
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

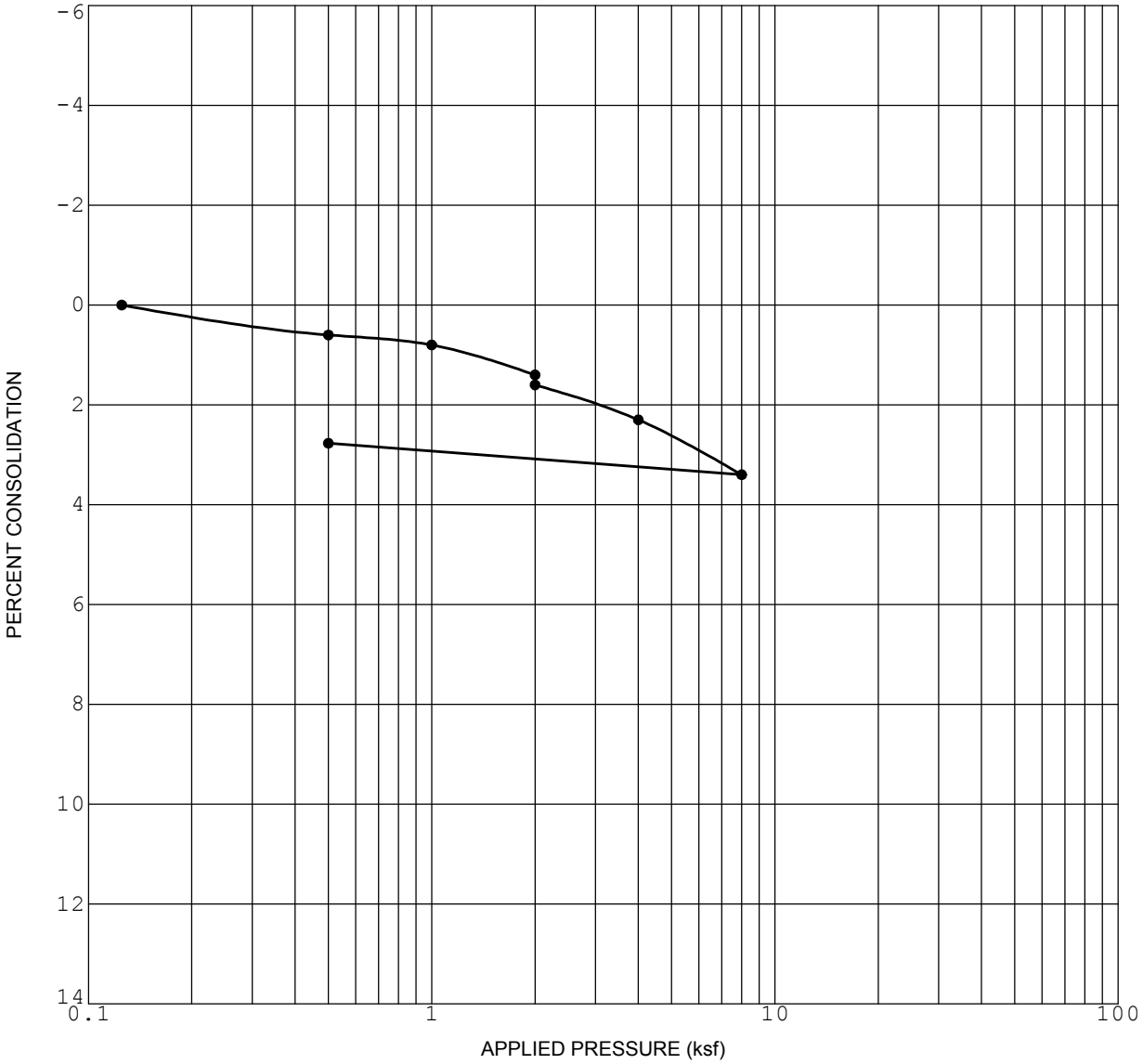
G1813-52-01 UPDATE.GPJ

Figure B-2

GEOCON

PROJECT NO. G1813-52-01

SAMPLE NO. B10-3



Initial Dry Density (pcf)	107.7
Initial Water Content (%)	13.5

Initial Saturation (%)	74
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

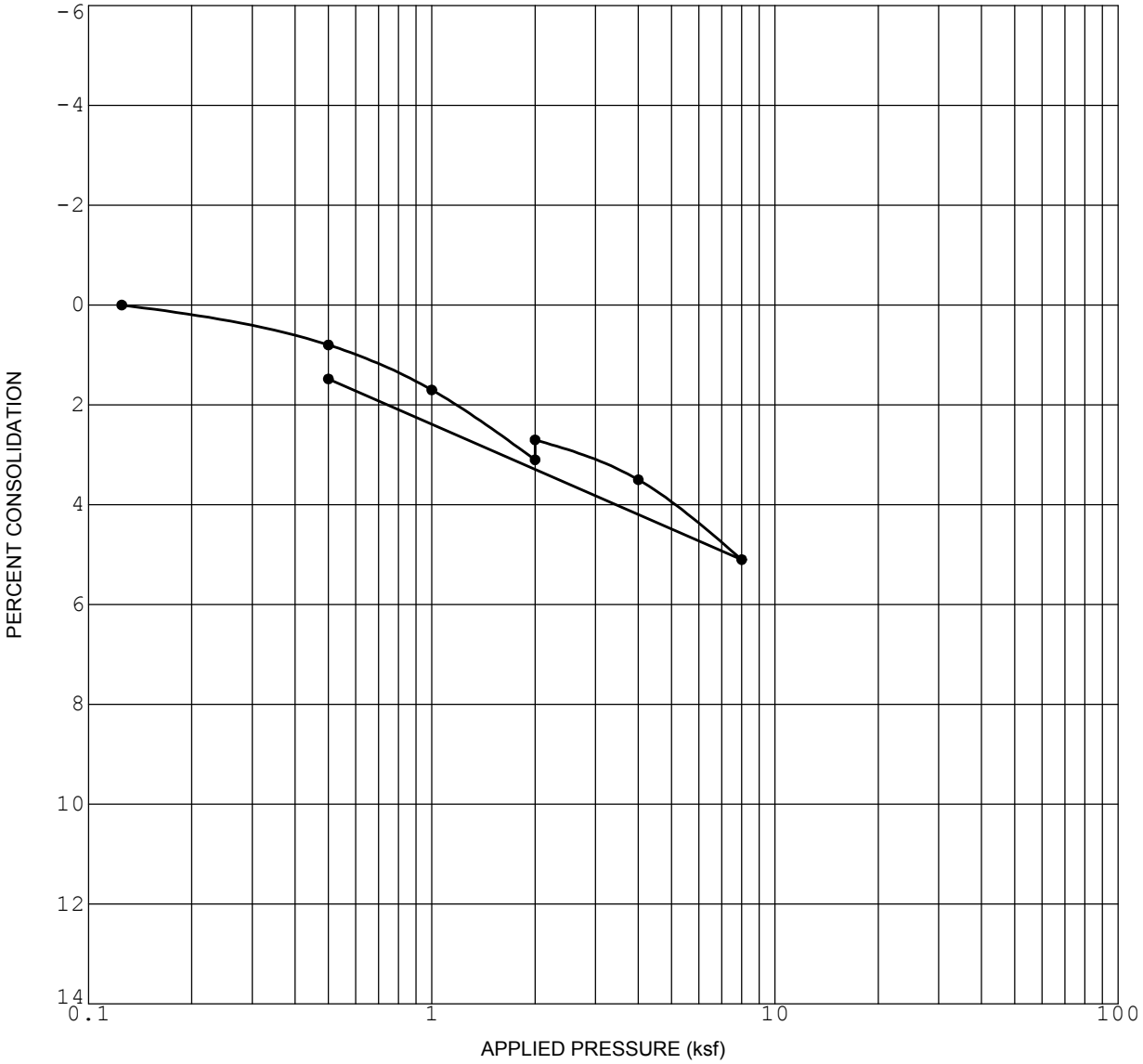
G1813-52-01 UPDATE.GPJ

Figure B-3

GEOCON

PROJECT NO. G1813-52-01

SAMPLE NO. B10-4



Initial Dry Density (pcf)	104.1
Initial Water Content (%)	23.3

Initial Saturation (%)	100
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

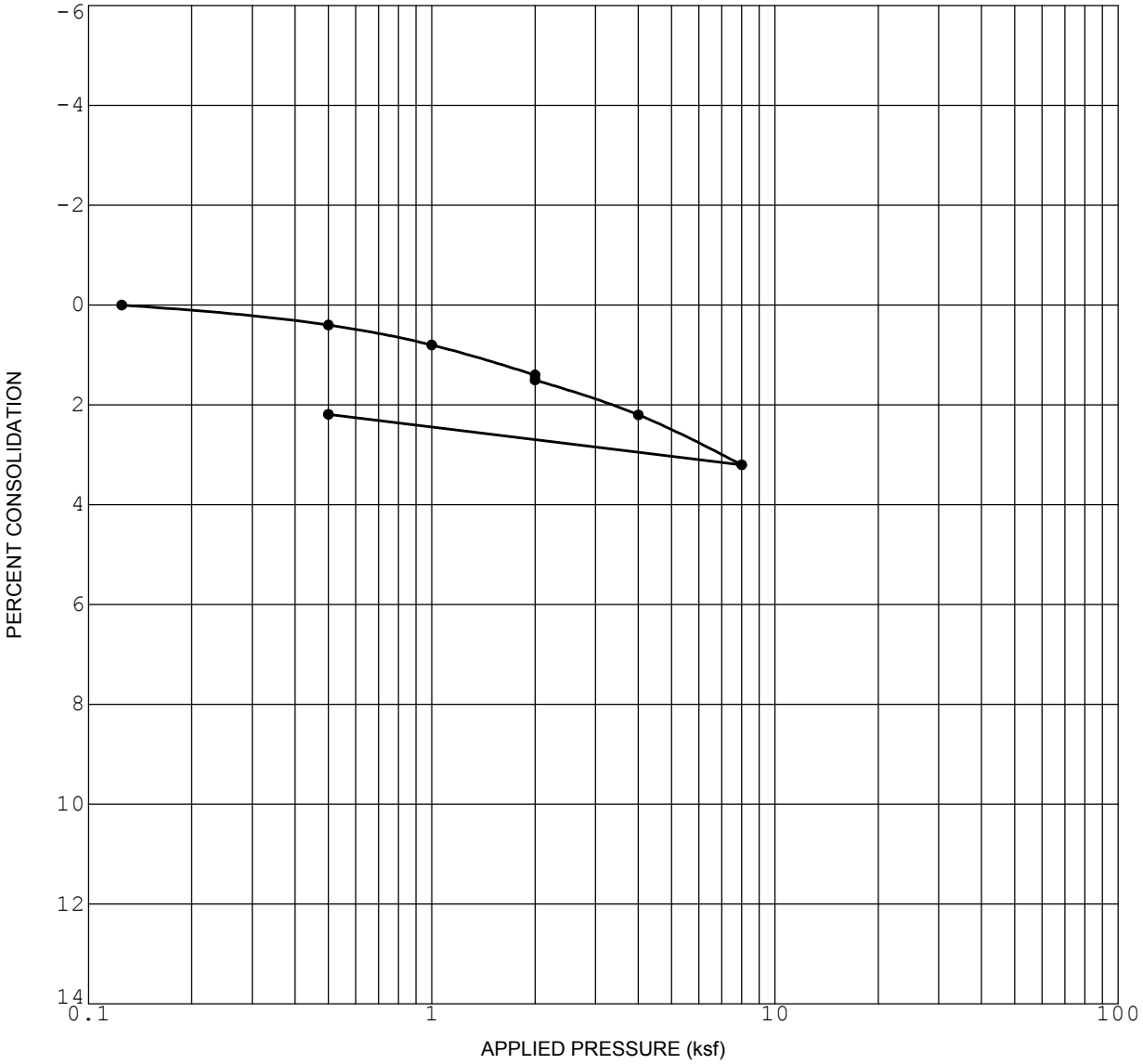
G1813-52-01 UPDATE.GPJ

Figure B-4

GEOCON

PROJECT NO. G1813-52-01

SAMPLE NO. B10-7



Initial Dry Density (pcf)	114.0
Initial Water Content (%)	14.7

Initial Saturation (%)	86.1
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

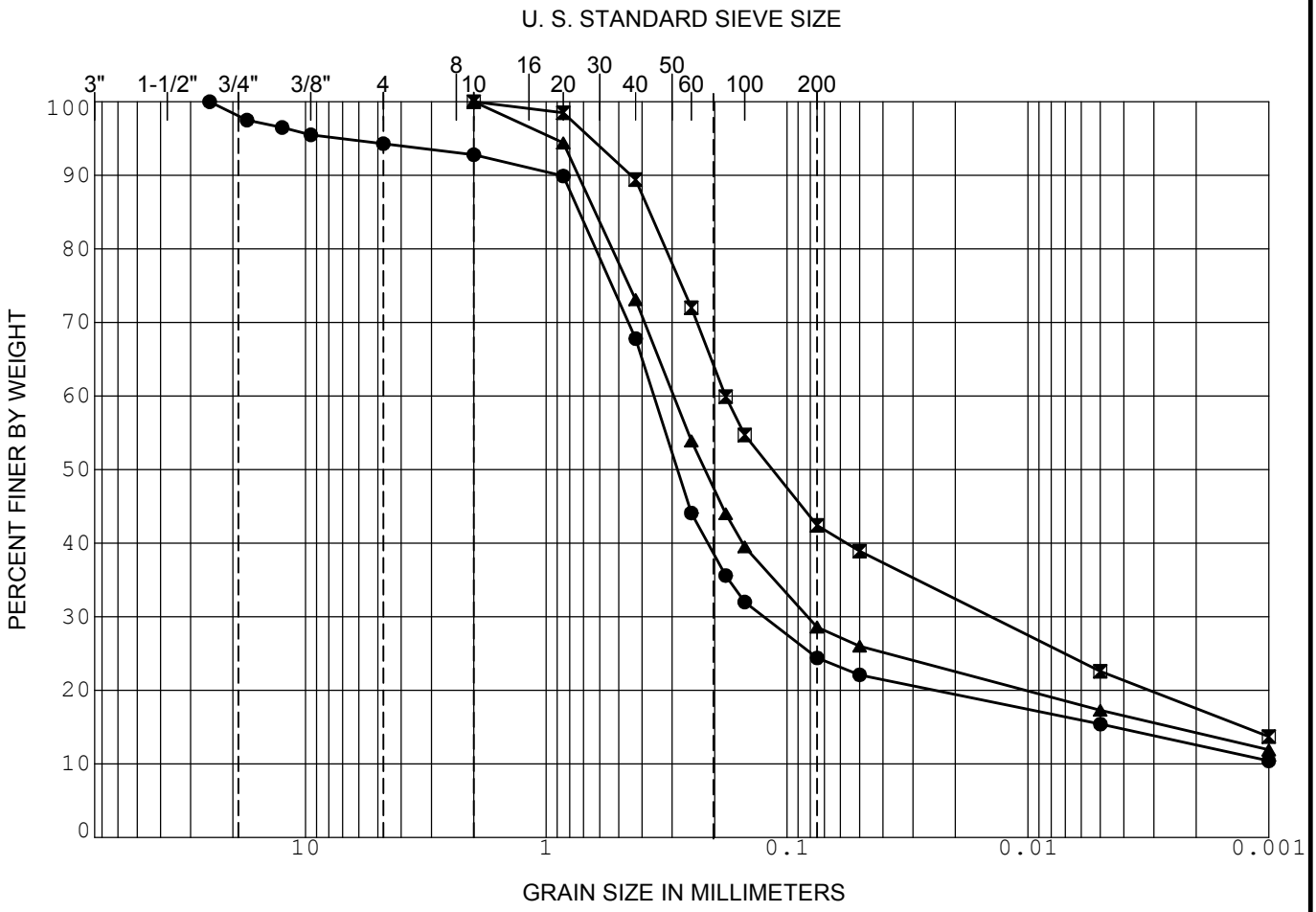
G1813-52-01 UPDATE.GPJ

Figure B-5

GEOCON

PROJECT NO. G1813-52-01

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B10-3	10.0	(SM) Silty SAND	13.5			
⊠	B10-4	15.0	(SM) Silty SAND	23.3			
▲	B10-7	25.0	(SM) Silty SAND	8.1			

GRADATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

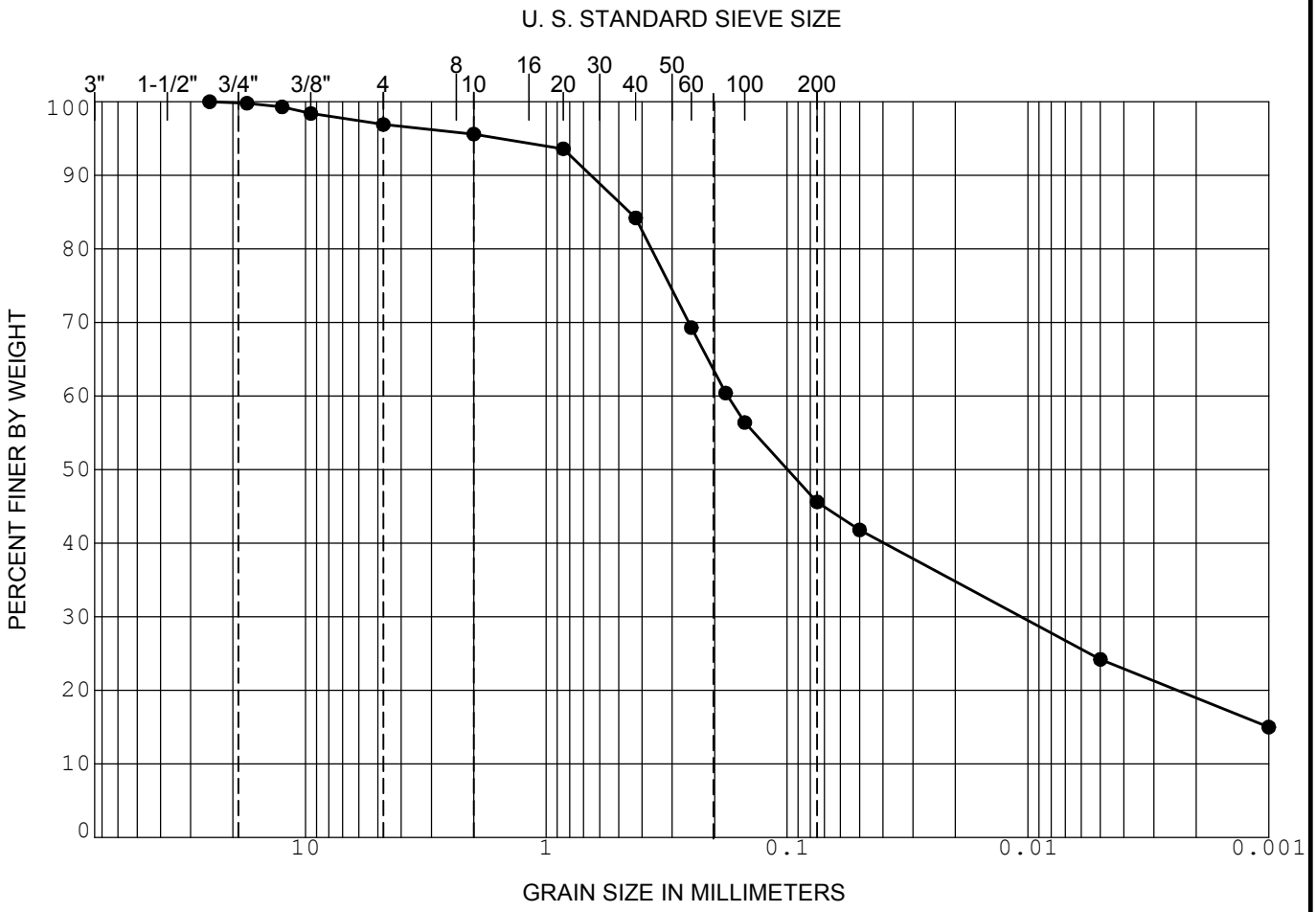
G1813-52-01 UPDATE.GPJ

Figure B-6

GEOCON

PROJECT NO. G1813-52-01

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B11-1	0.0	(SM) Silty SAND				
⊠							
▲							

GRADATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

G1813-52-01 UPDATE.GPJ

Figure B-7

GEOCON

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. We tested selected samples for in-place dry density and moisture content, maximum dry density and optimum moisture content, shear strength, R-value, expansion index, water-soluble sulfate characteristics, pH and resistivity, water-soluble chloride content, correlated unconfined compressive strength, gradation and consolidation. The results of our laboratory tests are presented in Tables B-I through B-VIII and Figures B-1 through B-7. In addition, the in-place dry density and moisture content results are presented on the exploratory boring logs in Appendix A.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557-02

Sample No.	Description (Geologic Unit)	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B3-4	Yellowish brown, Clayey fine to medium SANDSTONE (Tsc)	126.0	10.1
B4-1	Olive brown, Clayey fine to medium SAND (Qpf)	130.2	9.1
B6-1	Olive brown, Clayey fine to medium SAND (Qpf)	131.0	8.8
B10-8	Olive Brown to Reddish Brown, Silty fine SANDSTONE (Tsc)	132.8	8.0
B10-12	Olive Brown to Reddish Brown, Silty fine SANDSTONE (Tsc)	134.4	7.5
B11-1	Olive Brown to Reddish Brown, Silty fine to coarse SAND (Qpf)	134.6	7.7

TABLE B-II
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080-03

Sample No.	Dry Density (pcf)	Moisture Content (%)		Peak [Ultimate*] Cohesion (psf)	Peak [Ultimate*] Angle of Shear Resistance (degrees)
		Initial	Final		
B1-4	112.1	8.1	15.1	330 [125]	33 [32]
B2-8	103.7	8.0	18.3	480 [375]	31 [31]
B4-3	111.0	17.5	19.2	680 [350]	33 [33]
B4-5	109.9	13.9	17.9	800 [500]	27 [26]
B10-8†	119.3	8.1	14.7	625 [625]	22 [22]
B10-12	120.9	7.4	13.1	585 [580]	28 [28]
B11-2	114.3	7.6	14.2	480 [250]	34 [34]

*Ultimate defined as the end-of-test strength after about 0.2 inches of deflection.
†Sample Remolded

TABLE B-III
SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS
ASTM D 2844

Sample No.	Depth (feet)	Description (Geologic Unit)	R-Value
B6-1	1 to 5	Olive brown, Clayey fine to medium SAND (Qpf)	50

TABLE B-IV
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829-03

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	2013 CBC Expansion Classification	Expansion Classification
	Before Test	After Test				
B3-4	8.7	14.0	114.2	1	Very Low	Non-Expansive
B4-1	9.1	16.7	112.3	19	Very Low	Non-Expansive
B6-1	9.0	16.6	112.4	17	Very Low	Non-Expansive
B10-8	8.8	16.8	115.3	21	Low	Expansive
B10-12	8.7	16.1	115.3	6	Very Low	Non-Expansive
B11-1	8.2	14.0	116.8	9	Very Low	Expansive

TABLE B-V
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Water-Soluble Sulfate (%)	Exposure Class	Sulfate Severity
B3-4	0.022	S0	Not Applicable (S0)
B4-1	0.055	S0	Not Applicable (S0)
B6-1	0.006	S0	Not Applicable (S0)
B10-8	0.033	S0	Not Applicable (S0)
B10-12	0.030	S0	Not Applicable (S0)
B11-1	0.014	S0	Not Applicable (S0)

TABLE B-VI
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (pH) AND RESISTIVITY TEST RESULTS
CALIFORNIA TEST NO. 643

Sample No.	pH	Minimum Resistivity (ohm-centimeters)
B3-4	7.04	360
B4-1	7.47	430
B6-1	8.06	1,700

TABLE B-VII
SUMMARY OF LABORATORY WATER-SOLUBLE CHLORIDE CONTENT TEST RESULTS
AASHTO TEST NO. T291-94

Sample No.	Chloride Content (ppm)	Chloride Content (%)
B3-4	1,416	0.142
B4-1	1,027	0.103
B6-1	395	0.039

TABLE B-VIII
SUMMARY OF HAND PENETROMETER TEST RESULTS
ASTM D 1558

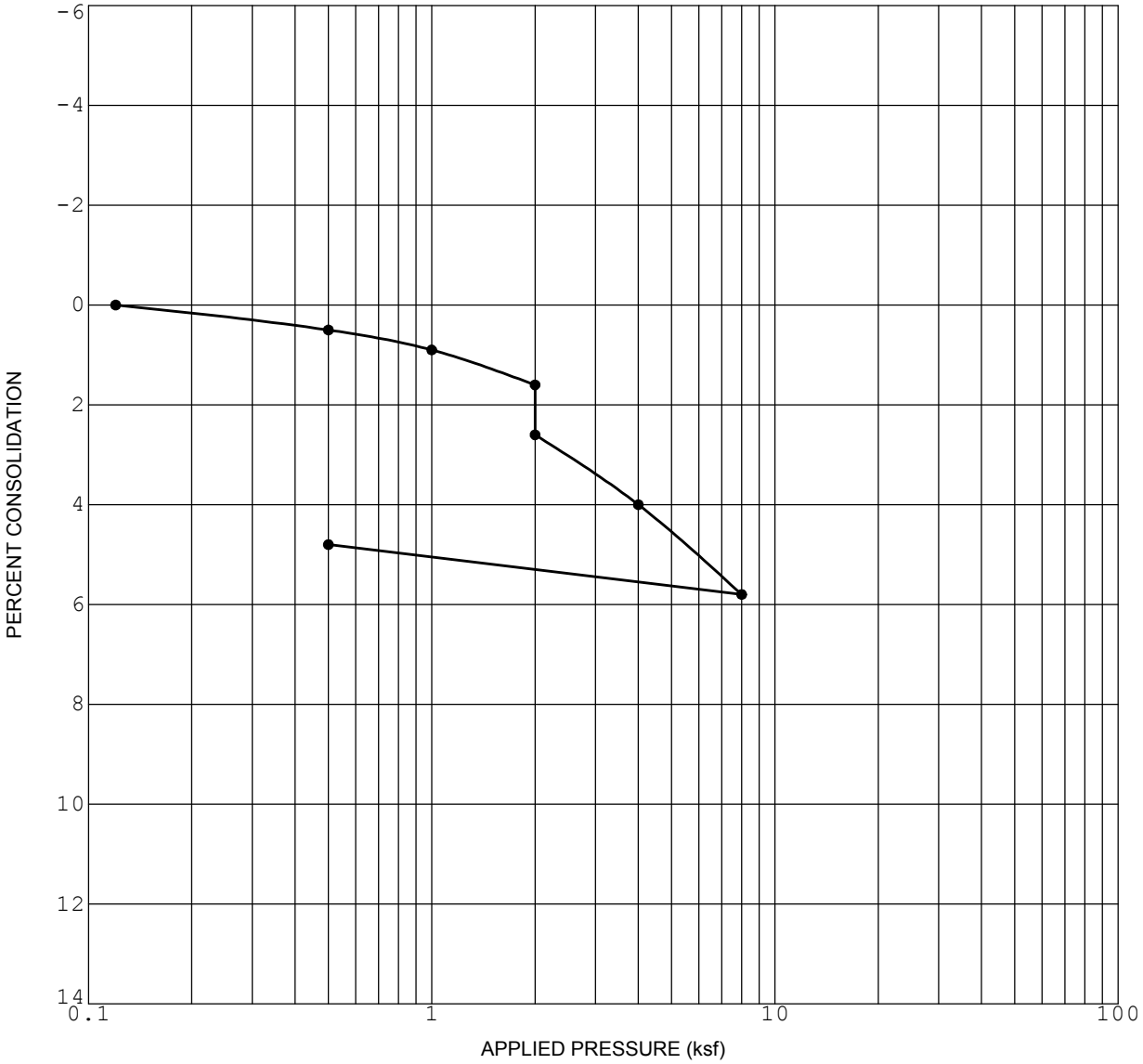
Sample No.	Depth (feet)	Geologic Unit	Hand Penetrometer Reading, Unconfined Compression Strength (tsf)	Undrained Shear Strength (ksf)
B1-1	5	Tsc	4.5+	4.5+
B1-2	10	Tsc	4.5	4.5
B1-4	15	Tsc	4.5+	4.5+
B1-5	19	Tsc	4.5+	4.5+
B2-2	5	Qpf	4.0	4.0
B2-3	10	Qpf	4.0	4.0
B2-4	15	Tsc	4.5+	4.5+
B2-6	20	Tsc	4.5+	4.5+
B2-8	25	Tsc	4.5+	4.5+
B2-9	30	Tsc	4.5+	4.5+
B3-2	5	Tsc	4.5+	4.5+
B3-7	30	Tsc	4.5+	4.5+
B4-2	5	Qpf	4.5	4.5
B4-3	10	Qpf	4.0	4.0
B4-5	15	Qpf	4.5	4.5
B4-7	20	Tsc	4.5+	4.5+
B4-9	25	Tsc	4.5+	4.5+
B4-11	30	Tsc	4.5+	4.5+
B5-3	5	Tsc	4.5+	4.5+
B5-4	10	Tsc	4.5+	4.5+
B5-7	20	Tsc	4.5+	4.5+
B5-8	25	Tsc	4.5+	4.5+
B5-10	30	Tsc	4.5+	4.5+
B5-11	35	Tsc	4.5+	4.5+
B5-12	40	Tsc	4.5+	4.5+

TABLE B-VIII (Concluded)
SUMMARY OF HAND PENETROMETER TEST RESULTS
ASTM D 1558

Sample No.	Depth (feet)	Geologic Unit	Hand Penetrometer Reading, Unconfined Compression Strength (tsf)	Undrained Shear Strength (ksf)
B6-2	5	Qpf	3.5	3.5
B6-3	10	Qpf	3.5	3.5
B6-4	15	Qpf	4.5+	4.5+
B6-5	19	Qpf	4.5+	4.5+
B6-6	25	Tsc	4.5+	4.5+
B6-10	30	Tsc	4.5+	4.5+
B7-1	2	Qpf	4.5+	4.5+
B7-2	5	Tsc	4.5+	4.5+
B7-3	10	Tsc	4.5+	4.5+
B7-4	15	Tsc	4.5+	4.5+
B7-5	19	Tsc	4.5+	4.5+
B8-1	2	Qpf	4.0	4.0
B8-2	5	Tsc	4.5+	4.5+
B8-3	10	Tsc	4.5+	4.5+
B8-4	15	Tsc	4.5+	4.5+
B8-5	19	Tsc	4.5+	4.5+
B9-1	2	Qpf	4.0	4.0
B9-2	5	Tsc	4.5+	4.5+
B9-3	10	Tsc	4.5+	4.5+
B9-4	15	Tsc	4.5+	4.5+
B10-6	20	Tsc	4.5	4.5
B11-4	15	Tsc	4.5	4.5

PROJECT NO. G1813-52-01

SAMPLE NO. B2-2



Initial Dry Density (pcf)	109.9	**Initial Saturation (%)**	64.2
Initial Water Content (%)	12.3	**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

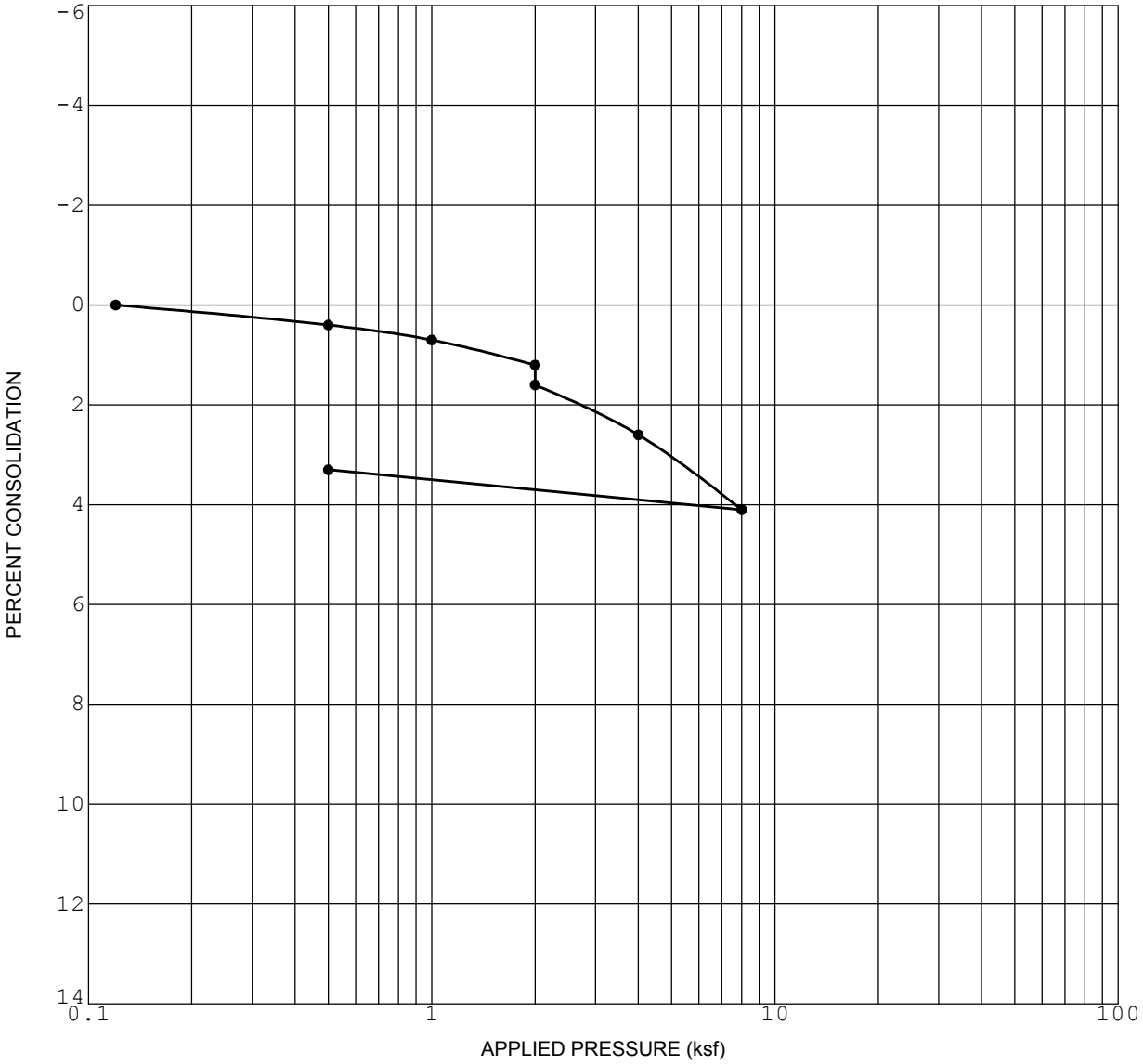
G1813-52-01 UPDATE.GPJ

Figure B-1

GEOCON

PROJECT NO. G1813-52-01

SAMPLE NO. B6-2



Initial Dry Density (pcf)	107.4
Initial Water Content (%)	14.1

Initial Saturation (%)	71.8
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

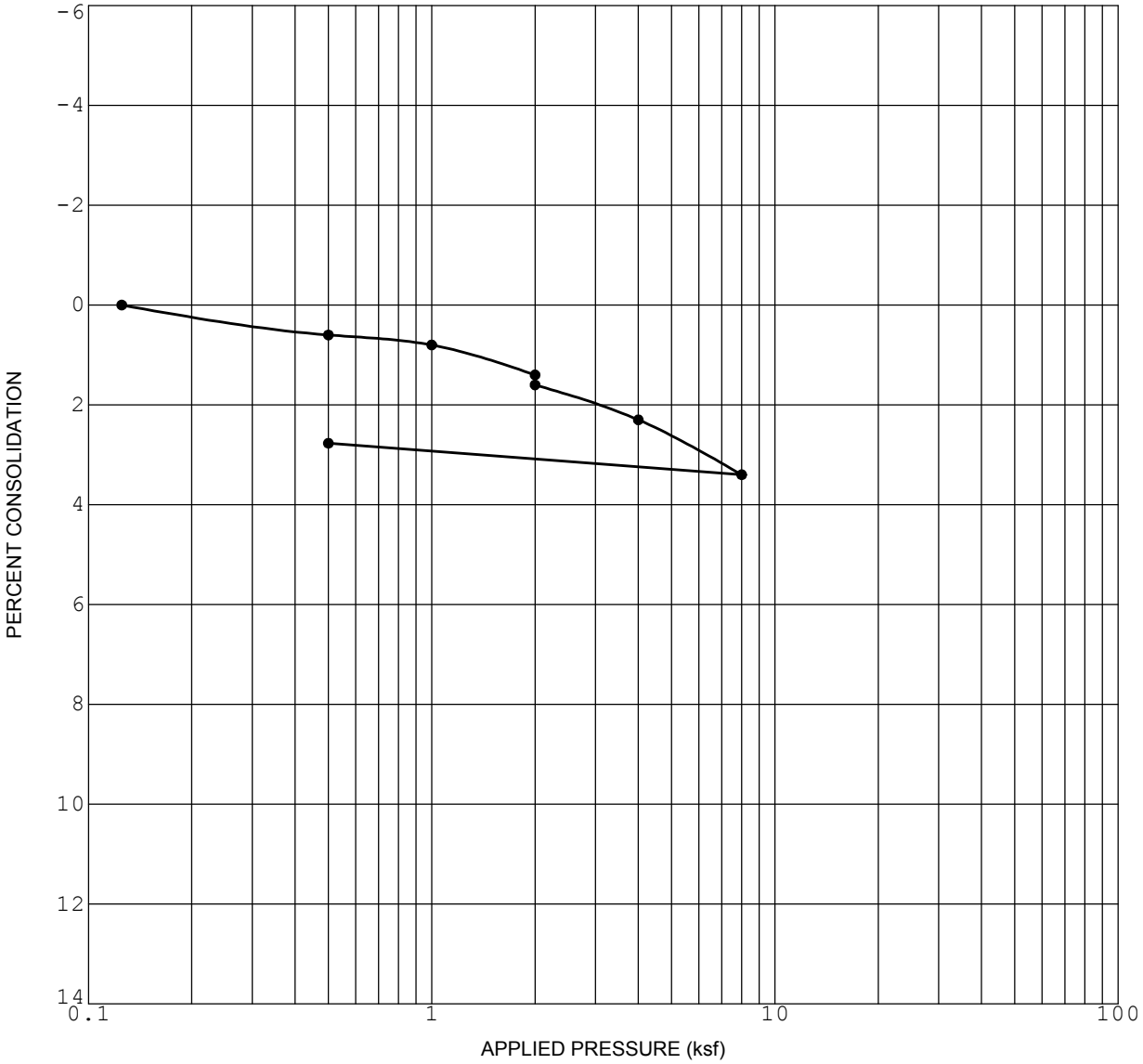
G1813-52-01 UPDATE.GPJ

Figure B-2

GEOCON

PROJECT NO. G1813-52-01

SAMPLE NO. B10-3



Initial Dry Density (pcf)	107.7
Initial Water Content (%)	13.5

Initial Saturation (%)	74
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

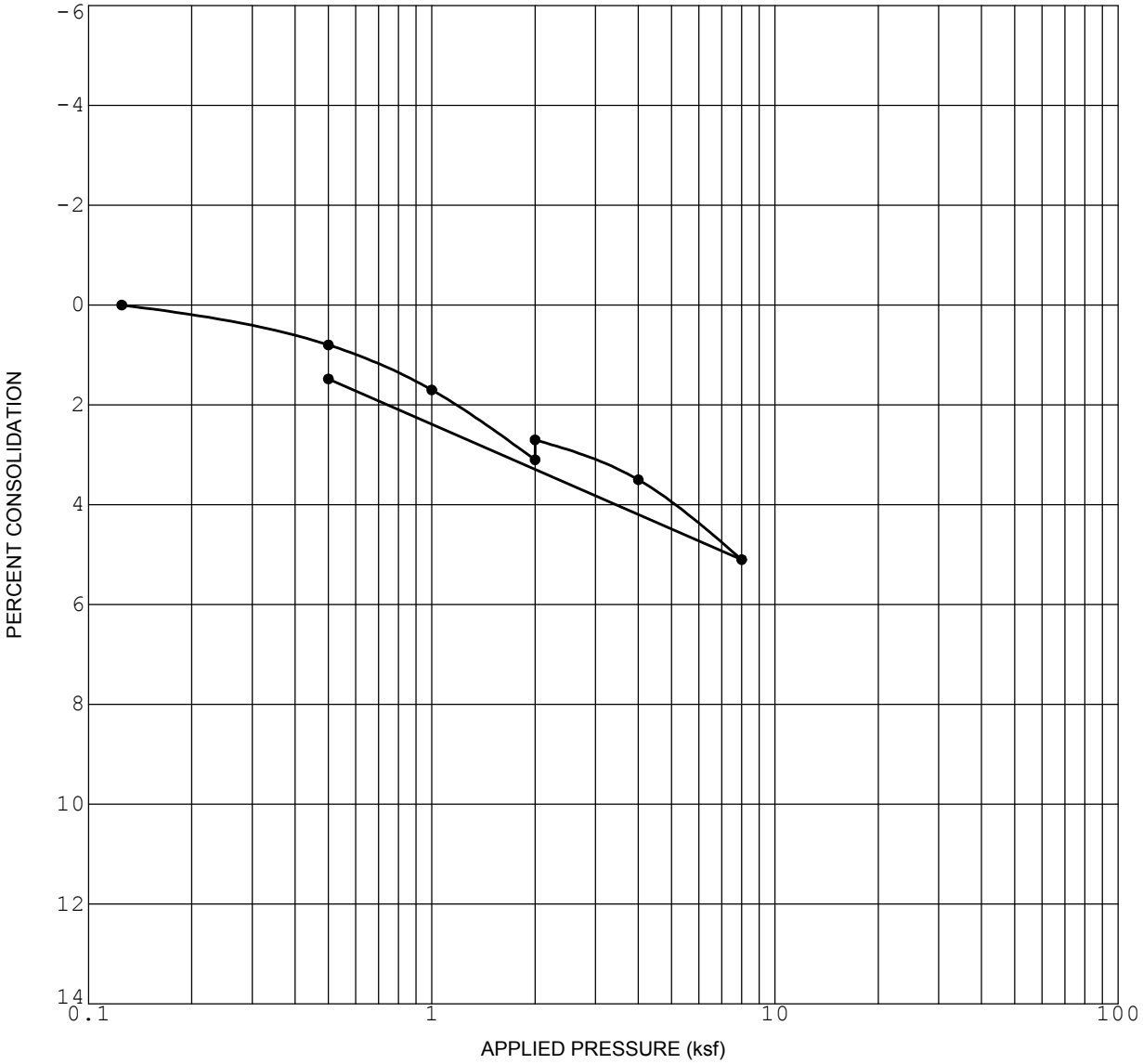
G1813-52-01 UPDATE.GPJ

Figure B-3

GEOCON

PROJECT NO. G1813-52-01

SAMPLE NO. B10-4



Initial Dry Density (pcf)	104.1
Initial Water Content (%)	23.3

Initial Saturation (%)	100
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

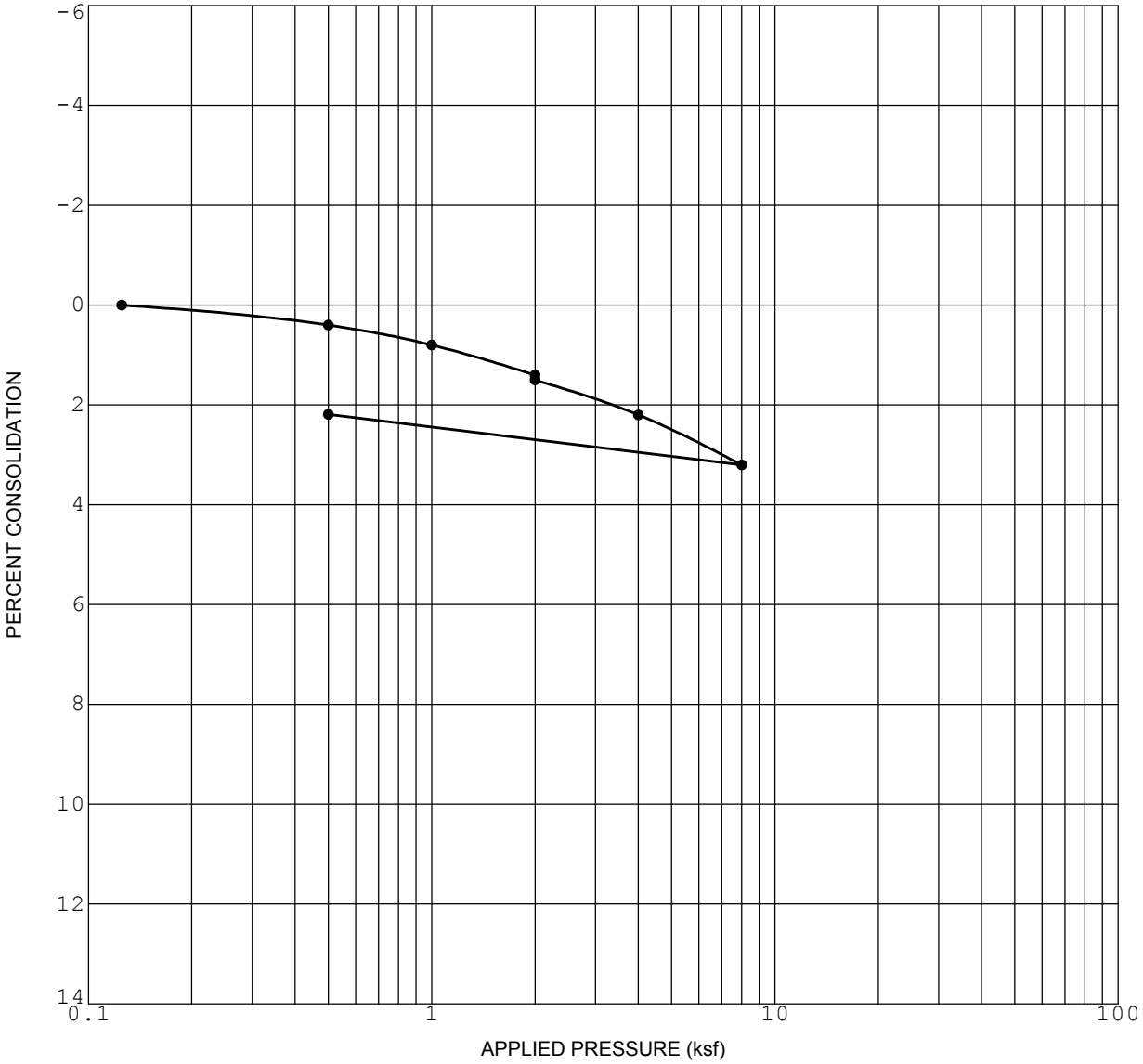
G1813-52-01 UPDATE.GPJ

Figure B-4

GEOCON

PROJECT NO. G1813-52-01

SAMPLE NO. B10-7



Initial Dry Density (pcf)	114.0
Initial Water Content (%)	14.7

Initial Saturation (%)	86.1
Sample Saturated at (ksf)	2.0

CONSOLIDATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

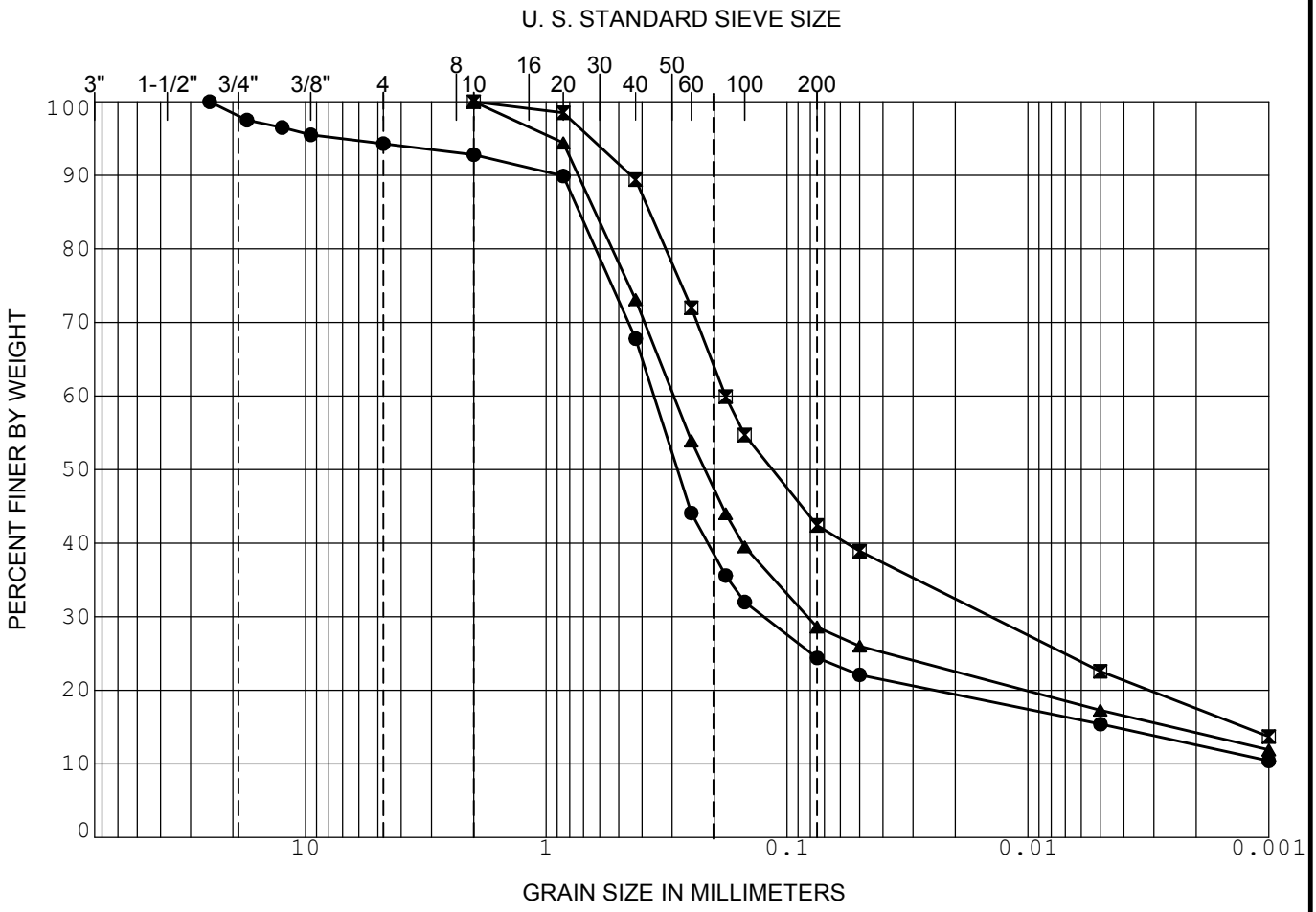
G1813-52-01 UPDATE.GPJ

Figure B-5

GEOCON

PROJECT NO. G1813-52-01

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B10-3	10.0	(SM) Silty SAND	13.5			
⊠	B10-4	15.0	(SM) Silty SAND	23.3			
▲	B10-7	25.0	(SM) Silty SAND	8.1			

GRADATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

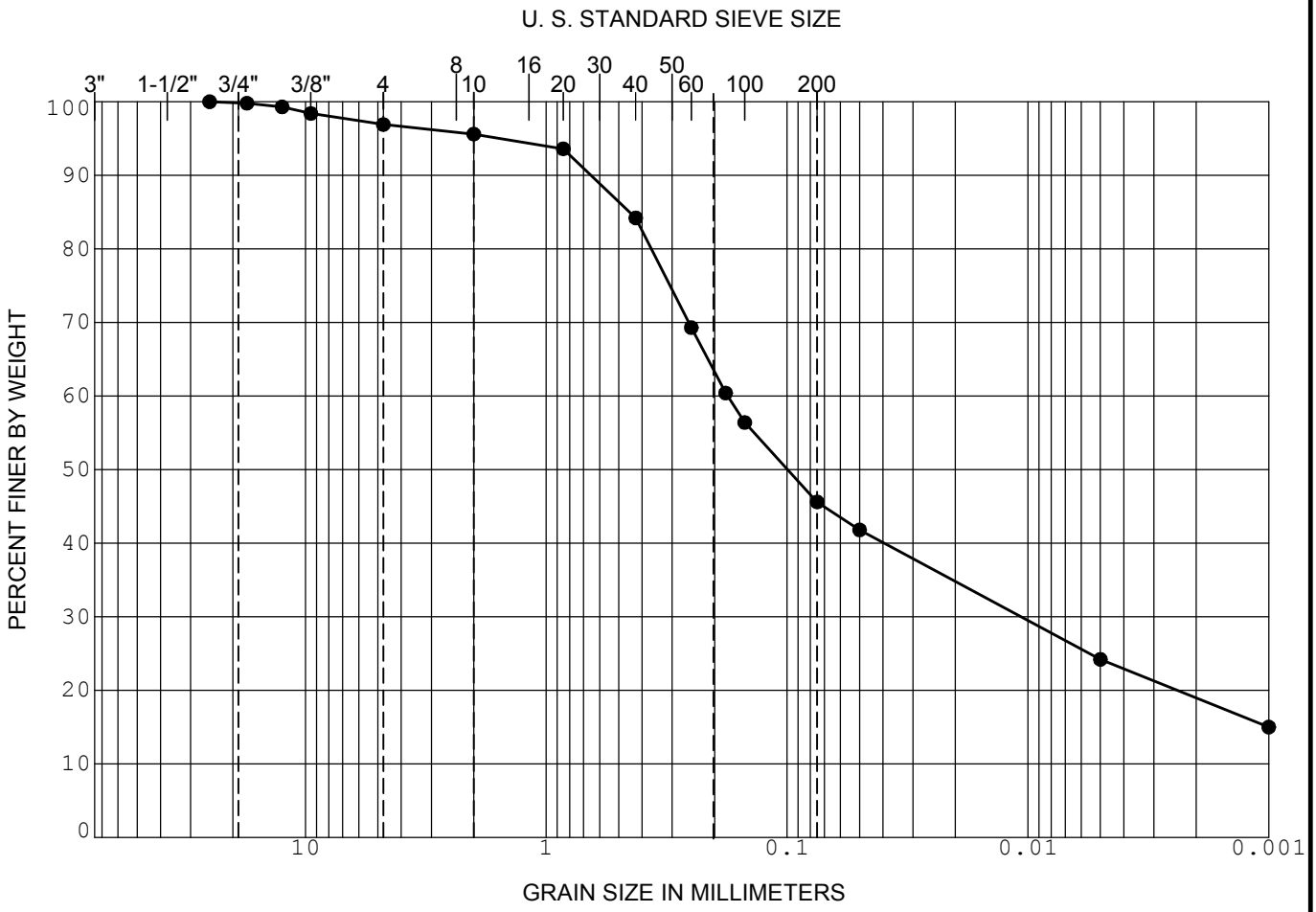
G1813-52-01 UPDATE.GPJ

Figure B-6

GEOCON

PROJECT NO. G1813-52-01

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B11-1	0.0	(SM) Silty SAND				
⊠							
▲							

GRADATION CURVE

SPECTRUM 3
3115 MERRYFIELD ROW
SAN DIEGO, CALIFORNIA

G1813-52-01 UPDATE.GPJ

Figure B-7

GEOCON

APPENDIX G

APPENDIX G

LOG OF EXPLORATORY BORINGS FROM PREVIOUS GEOTECHNICAL INVESTIGATION:

GEOTECHNICAL INVESTIGATION LA JOLLA SPECTRUM
PREPARED BY ICG INCORPORATED
DATED AUGUST 27, 1990

FOR

SPECTRUM PEDESTRIAN BRIDGE
3115 MERRYFIELD ROW AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

PROJECT NO. G1813-52-07

DATE OBSERVED: 7-30-90 METHOD OF DRILLING: 8" Hollow Stem Auger
140 lb Hammer, 30" Drop
LOGGED BY: KRC GROUND ELEVATION: 346.0 LOCATION: See Geotechnical Map

LOG OF BORING NO. 1

Sheet 1 of 1

DEPTH (FEET)	CLASSIF-ICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0							FILL: Olive brown, silty fine SAND, moist, dense	
		40						Sieve Analysis
5							gravel @ 4'	
								Maximum Density, Expansion Index, Sulfate Content
		47					Olive yellow brown, silty fine SAND, moist, dense	
10								
		37					Mottled olive brown, silty fine SAND, some clay, moist, dense	
15								
		34					Increase in drilling resistance Mottled olive brown with layers of dark gray, silty fine SAND, organic material (pieces of burned wood)	
20								
		72/11"						
25							SCRIPPS FORMATION: Light gray-green, silty fine SAND, moist, very dense	
		93/10"					Orange brown, silty fine SAND to fine sandy SILT, moist, very dense	
30							Total Depth - 28.0' No Water Backfilled 7/30/90	
35								

JOB NO.: 05-2675-034-00-00

ICG Incorporated

FIGURE: B-2

DATE OBSERVED: 7-30-90 METHOD OF DRILLING: 8" Hollow Stem Auger
140 lb Hammer, 30" Drop

LOGGED BY: KRC GROUND ELEVATION: 345.0 LOCATION: See Geotechnical Map

LOG OF BORING NO. 2

Sheet 1 of 1

DEPTH (FEET)	CLASSIF-ICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0							SCRIPPS FORMATION: Light yellow brown, silty SANSTONE with gravel, humid, dense	Expansion Index
5		50/3"					Yellow brown, silty SANDSTONE, moist, very dense	
		50/3"					as above	
10		50/4"					no sample recovery	
15							Total Depth - 11.5' No Water Backfilled 7/30/90	
20								
25								
30								
35								

JOB NO.: 05-2675-034-00-00

ICG Incorporated

FIGURE: B-3

DATE OBSERVED: 7-30-90 METHOD OF DRILLING: 8" Hollow Stem Auger
140 lb Hammer, 30" Drop

LOGGED BY: KRC GROUND ELEVATION: 341.0 LOCATION: See Geotechnical Map

LOG OF BORING NO. 3

Sheet 1 of 1

DEPTH (FEET)	CLASSIF-ICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0		68					SCRIPPS FORMATION: Orange brown, silty SANDSTONE, moist, dense	
5		50/3"					as above, with 3" gravel layer White gray, silty SANDSTONE, moist, very dense	
10		50/4"					Dark brown, silty SANDSTONE Light gray and orange, silty SANDSTONE, moist, very dense	
15							Total Depth - 11.5' No Water Backfilled 7.30/90	
20								
25								
30								
35								

JOB NO.: 05-2675-034-00-00

ICG Incorporated

FIGURE: B-4

DATE OBSERVED: 7-30-90 METHOD OF DRILLING: 8" Hollow Stem Aug.
140 lb Hammer, 30" Drop
LOGGED BY: KRC GROUND ELEVATION: 330.0 LOCATION: See Geotechnical Map

LOG OF BORING NO. 4

Sheet 1 of 1

DEPTH (FEET)	CLASSIF-ICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0		81	■				SCRIPPS FORMATION: Orange brown, silty fine to medium SANDSTONE with gravel, moist, very dense	Sieve Analysis
5							gravel @ 6.5' refusal @ 9.5'	
10							Total Depth - 9.5' No Water Backfilled 7/30/90	
15								
20								
25								
30								
35								

JOB NO.: 05-2675-034-00-00

ICG Incorporated

FIGURE: B-5

APPENDIX H

APPENDIX H

LOG OF EXPLORATORY BORINGS FROM PREVIOUS GEOTECHNICAL INVESTIGATION:

REPORT OF GEOTECHNICAL INVESTIGATION
LA JOLLA SPECTRUM OFFICE PARK, LOTS 9-12
PREPARED BY KLEINFELDER, INC.
DATED JUNE 11, 1997

FOR

SPECTRUM PEDESTRIAN BRIDGE
3115 MERRYFIELD ROW AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

PROJECT NO. G1813-52-07

PROJECT NO. 51-4475-01	LOG OF BORING 1	SHEET 1 OF 1
DRILLING EQUIPMENT CME 55 (W/AUTOHAMMER)	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SEE SITE PLAN
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 345' / TOTAL DEPTH OF HOLE 24'

DATE			
STARTED: 5/19/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 5/19/97	LOGGED BY KRW		
BACKFILLED: 5/19/97	SURFACE CONDITIONS SPARSE GRASS/2"ROOT ZONE		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-1		ARTIFICIAL FILL VERY DENSE, YELLOW SILTY SAND, FINE GRAINED, SLIGHTLY MOIST.	SM		59				
1-2		VERY DENSE, YELLOW-BROWN CLAYEY SAND, FINE TO MEDIUM GRAINED, MOIST.	SC						
2-3			SM						
3-4		VERY DENSE, YELLOW TO YELLOW-BROWN SILTY SAND, FINE GRAINED, SLIGHTLY MOIST			71	10	107		
4-5									
5-6									
6-7									
7-8									
8-9									
9-10		VERY DENSE, W/LENSES OF DARK BROWN SANDY CLAY			58				
10-11									
11-12									
12-13									
13-14									
14-15					50/5"				
15-16		SCRIPPS FORMATION GRAY TO OLIVE-BROWN SANDSTONE EXCAVATES AS "VERY DENSE, GRAY TO OLIVE-BROWN SILTY SAND, FINE GRAINED, MOIST"	"SM"						
16-17									
17-18									
18-19									
19-20		OLIVE-BROWN			50/6"				
20-21									
21-22									
22-23									
23-24		YELLOW-BROWN			50/5"				
24-25		BORING STOPPED AT 24 FT. NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
25-26									
26-27									
27-28									
28-29									
29-30									

FN: LOGS1-11

KLEINFELDER 9585 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A2

PROJECT NO. 51-4475-01	LOG OF BORING 2	SHEET 1 OF 1
DRILLING EQUIPMENT CME 55 (W/AUTOHAMMER)	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SEE SITE PLAN
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 355' / TOTAL DEPTH OF HOLE 14'
DATE: STARTED 5/19/97; COMPLETED 5/19/97; BACKFILLED 5/19/97	DRILLING AGENCY SCOTT'S DRILLING; LOGGED BY KRW; SURFACE CONDITIONS BARE SOIL	GROUNDWATER ELEVATION ____ DATE ____

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		SCRIPPS FORMATION							
1		YELLOW SANDSTONE, FINE GRAINED	"SM"						
2		EXCAVATES AS "VERY DENSE, YELLOW SILTY SAND,			48/5"				
3		FINE-GRAINED, DRY, SOME GRAVEL"							
4					50/3"				
5									
6									
7									
8									
9		YELLOW-BROWN			50/3"				
10									
11									
12									
13									
14		EFFECTIVE AUGER REFUSAL AT 14FT.							
15		NO CAVING OBSERVED							
16		NO FREE WATER OBSERVED							
17		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

FN: LOGS1-11

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A3

PROJECT NO. 51-4475-01	LOG OF BORING 3	SHEET 1 OF 1
DRILLING EQUIPMENT CME 55 (W/AUTOHAMMER)	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SEE SITE PLAN
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 338'
		TOTAL DEPTH OF HOLE 20'

DATE			
STARTED: 5/19/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 5/19/97	LOGGED BY KRW		
BACKFILLED: 5/19/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-2		ARTIFICIAL FILL DENSE, BROWN SILTY SAND, FINE TO MEDIUM GRAINED, DRY	SM		53				
3-8		SCRIPPS FORMATION YELLOW-BROWN SANDSTONE, FINE GRAINED EXCAVATES AS "VERY DENSE, YELLOW-BROWN SILTY SAND, FINE GRAINED, MOIST, MODERATELY CEMENTED"	"SM"		75				
9-13		DARK BROWN MIXED W/YELLOW-BROWN			62/6"				
14-19		TRACE GRAVEL			50/6"				
20-30		BORING STOPPED AT 20FT. NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS			50/6"				

FN: LOGS1-11	KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123	FIGURE NO.: A4

PROJECT NO. 51-4475-01	LOG OF BORING 4	SHEET 1 OF 1
DRILLING EQUIPMENT CME 55 (W/AUTOHAMMER)	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SEE SITE PLAN
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 350' / TOTAL DEPTH OF HOLE 20'

DATE			
STARTED: 5/19/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 5/19/97	LOGGED BY KRW		
BACKFILLED: 5/19/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-3		ARTIFICIAL FILL DENSE, BROWN TO OLIVE-BROWN CLAYEY SAND, FINE TO MEDIUM GRAINED, SOME GRAVEL, MOIST, WITH LENSES OF CLAY	SC		53	8	110		
3-20		SCRIPPS FORMATION YELLOW-BROWN SANDSTONE, FINE GRAINED EXCAVATES AS "VERY DENSE, YELLOW SILTY SAND, FINE GRAINED, MOIST, MODERATELY CEMENTED" HARD DRILLING; CHATTER	"SM"		50/4" 50/5"				
20-30		BORING STOPPED AT 20FT. NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							

FN: LOGS1-11

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A5

PROJECT NO. 51-4475-01	LOG OF BORING 5	SHEET 1 OF 1
DRILLING EQUIPMENT CME 55 (W/AUTOHAMMER)	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SEE SITE PLAN
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 348'
TOTAL DEPTH OF HOLE 5.5'		

DATE
STARTED: 5/19/97
COMPLETED: 5/19/97
BACKFILLED: 5/19/97

DRILLING AGENCY SCOTT'S DRILLING
LOGGED BY KRW
SURFACE CONDITIONS BARE SOIL

GROUNDWATER ELEVATION _____ DATE _____

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-5		ARTIFICIAL FILL DENSE, LIGHT BROWN SILTY SAND, FINE TO MEDIUM GRAINED, MOIST WITH LAYERS OF DARK BROWN SANDY CLAY	SM		42 62	15	113		
5-6		SCRIPPS FORMATION YELLOW-BROWN TO BROWN SANDSTONE, FINE TO MEDIUM GRAINED	"SC"						
6-7		EXCAVATES AS "DENSE, YELLOW-BROWN TO BROWN CLAYEY SAND, FINE TO MEDIUM GRAINED, MOIST"							
8-10		EFFECTIVE AUGER REFUSAL AT 5.5FT. NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							

FN: LOGS1-11

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A6

PROJECT NO. 51-4475-01	LOG OF BORING 6	SHEET 1 OF 1
DRILLING EQUIPMENT MOBILE B-61	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SEE SITE PLAN
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 339' / TOTAL DEPTH OF HOLE 17'

DATE			
STARTED: 5/7/97	DRILLING AGENCY F & C DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 5/7/97	LOGGED BY KRW		
BACKFILLED: 5/7/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		SCRIPPS FORMATION	'SM'						
1		YELLOW-BROWN SILTY SANDSTONE							
2		EXCAVATES AS "VERY DENSE, YELLOW-BROWN SILTY SAND, FINE TO MEDIUM GRAINED, MOIST, SOME GRAVEL"			83				
3									
4		YELLOW BROWN TO LIGHT BROWN			95				
5									
6									
7									
8									
9					85/6"				
10									
11									
12									
13									
14					62/6"				
15									
16		GRAVELLY AND COBBLY							
17		EFFECTIVE AUGER REFUSAL AT 17FT. NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A7

PROJECT NO. 51-4475-01	LOG OF BORING 7	SHEET 1 OF 1
DRILLING EQUIPMENT MOBILE B-61	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SEE SITE PLAN
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 337' / TOTAL DEPTH OF HOLE 20'

DATE			
STARTED: 5/7/97	DRILLING AGENCY F & C DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 5/7/97	LOGGED BY KRW		
BACKFILLED: 5/7/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		SCRIPPS FORMATION							
1		YELLOW-BROWN SILTY SANDSTONE	"SM"		50/3"				
2		EXCAVATES AS "VERY DENSE, YELLOW-BROWN SILTY SAND, FINE GRAINED, MOIST, WEAKLY CEMENTED"							
3									
4					72/6"				
5									
6									
7									
8									
9					100/6"				
10									
11									
12									
13									
14					72/6"				
15									
16									
17									
18									
19		GRAVELLY AND COBBLY							
20					100/6"				
21		BORING STOPPED AT 20FT.							
22		NO CAVING OBSERVED							
23		NO FREE WATER OBSERVED							
24		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
25									
26									
27									
28									
29									
30									

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A8

PROJECT NO. 51-4475-01	LOG OF BORING 8	SHEET 1 OF 1
DRILLING EQUIPMENT MOBILE B-61	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SEE SITE PLAN
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 335' / TOTAL DEPTH OF HOLE 20'

DATE			
STARTED: 5/7/97	DRILLING AGENCY F & C DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 5/7/97	LOGGED BY KRW		
BACKFILLED: 5/7/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		SCRIPPS FORMATION	"SM"						
1		YELLOW-BROWN SILTY SANDSTONE			77/6"				
2		EXCAVATES AS "VERY DENSE, YELLOW-BROWN SILTY SAND, FINE TO MEDIUM GRAINED, MOIST, MODERATELY CEMENTED"							
3									
4					60/6"				
5									
6									
7									
8					50/3"				
9									
10									
11									
12									
13									
14		LIGHT BROWN			90				
15									
16									
17									
18									
19									
20		YELLOW-BROWN			70/4"				
21		BORING STOPPED AT 20FT. NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
22									
23									
24									
25									
26									
27									
28									
29									
30									

FN: LOGS1-11

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A9

PROJECT NO. 51-4475-01	LOG OF BORING 9	SHEET 1 OF 1
DRILLING EQUIPMENT MOBILE B-61	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SEE SITE PLAN
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 333' / TOTAL DEPTH OF HOLE 20'
DATE: STARTED 5/7/97; COMPLETED 5/7/97; BACKFILLED 5/7/97	DRILLING AGENCY F & C DRILLING; LOGGED BY KRW; SURFACE CONDITIONS BARE SOIL	GROUNDWATER ELEVATION ____ DATE ____

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		ARTIFICIAL FILL	SM						
1		DENSE, YELLOW-BROWN TO DARK BROWN SILTY SAND, FINE TO MEDIUM GRAINED, SOME GRAVEL, WITH BRICK FRAGMENTS			54				
2									
3									
4		MEDIUM DENSE			37				
5									
6		COBBLE/GRAVEL ENCOUNTERED AT 6FT.							
7		SCRIPPS FORMATION	"SM"						
8		YELLOW-BROWN SILTY SANDSTONE							
9		EXCAVATES AS "VERY DENSE, YELLOW-BROWN SILTY SAND, FINE TO MEDIUM GRAINED, MOIST"			75/5"				
10									
11									
12									
13									
14		YELLOW			100/6"				
15									
16									
17									
18									
19									
20					100/5"				
21		BORING STOPPED AT 20FT.							
22		NO CAVING OBSERVED							
23		NO FREE WATER OBSERVED							
24		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
25									
26									
27									
28									
29									
30									

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A10

PROJECT NO. 51-4475-01	LOG OF BORING 10	SHEET 1 OF 1
DRILLING EQUIPMENT MOBILE B-61	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SEE SITE PLAN
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 336'
TOTAL DEPTH OF HOLE 20'		

DATE			
STARTED: 5/7/97	DRILLING AGENCY F & C DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 5/7/97	LOGGED BY KRW		
BACKFILLED: 5/7/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		SCRIPPS FORMATION	"SM"						
1		YELLOW-BROWN SILTY SANDSTONE			52/5"	9	110		
2		EXCAVATES AS "VERY DENSE, YELLOW-BROWN SILTY SAND, MEDIUM GRAINED, WITH GRAVEL, MOIST"							
3									
4		FINE TO MEDIUM GRAINED W/LENSES OF OLIVE SILTY CLAY			22/4"				
5									
6									
7									
8									
9		FINE GRAINED			100/5"				
10									
11									
12									
13									
14		FINE TO MEDIUM GRAINED			100/5"				
15									
16									
17									
18									
19									
20					80/6"				
21		BORING STOPPED AT 20FT.							
22		NO CAVING OBSERVED							
23		NO FREE WATER OBSERVED							
24		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
25									
26									
27									
28									
29									
30									

FN: LOGS1-11

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A11

PROJECT NO. 51-4475-01	LOG OF BORING 11	SHEET 1 OF 1
DRILLING EQUIPMENT CME 55 (W/AUTOHAMMER)	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SEE SITE PLAN
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 332' / TOTAL DEPTH OF HOLE 7'

DATE			
STARTED: 5/19/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 5/19/97	LOGGED BY KRW		
BACKFILLED: 5/19/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-3		ARTIVICIAL FILL DENSE, YELLOW SILTY SAND, FINE GRAINED, MOIST	SM		57	5	118		
3-7		SCRIPPS FORMATION YELLOW SANDSTONE, FINE GRAINED EXCAVATES AS "VERY DENSE, YELLOW SILTY SAND, FINE GRAINED, DRY"	"SM"		62/4"				
7-30		BORING STOPPED AT 7FT. NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A12

PROJECT NO. 51-4008-00-001	LOG OF BORING LEGEND	SHEET 1 OF 1
DRILLING EQUIPMENT	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION
TYPE OF BIT	HAMMER DATA: WT. LBS. DROP INCHES	SURFACE ELEVATION / TOP OF CASING ELEVATION
DATE: STARTED: / COMPLETED: / BACKFILLED:	DRILLING AGENCY / LOGGED BY / SURFACE CONDITIONS	GROUNDWATER ELEVATION _____ DATE _____

DEPTH (FEET)	GEOLOGIC LOG	SOIL DESCRIPTION	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0									
1									
2		WELL-GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	GW		BENTONITE				CONTINUOUS SAMPLER
3									
4		POORLY GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	GP		CAVED AREA				GRAB SAMPLE
5									
6		SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	GM		CEMENT				CALIFORNIA SAMPLER
7		CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	GC		CONCRETE				
8									MODIFIED CALIFORNIA SAMPLER
9		WELL-GRADED SANDS AND GRAVELLY SANDS, LITTLE OR NO FINES	SW		NATURAL BACKFILL				
10		POORLY GRADED SANDS AND GRAVELLY SANDS, LITTLE OR NO FINES	SP		BENTONITE PACKER				NO RECOVERY
11									
12		SILTY SANDS, SAND-SILT MIXTURES	SM		SAND BACKFILL				PITCHER SAMPLER
13		CLAYEY SANDS, SAND-CLAY MIXTURES	SC		SAND				
14									SHELBY TUBE SAMPLER
15		INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS	ML		VOLCLAY GROUT				
16		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	CL		PIPE				STANDARD PENETRATION SAMPLER
17									
18		ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	OL		SLOTTED PIPE				
19		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDS OR SILTS, ELASTIC SILTS	MH						
20									
21		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	CH						
22		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY	OH						
23									
24		PEAT, MUCK AND OTHER HIGHLY ORGANIC SOILS	PT						
25									
26		▽ ATD WATER LEVEL AT TIME OF DRILLING							
27									
28		WATER LEVEL MEASURED IN WELL							
29									
30									

FN: LOGKEY

KLEINFELDER 9555 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO. A1

APPENDIX I

APPENDIX I

LOG OF EXPLORATORY BORINGS FROM PREVIOUS GEOTECHNICAL INVESTIGATION:

ADDENDUM 1: LETTER REPORT OF ADDITIONAL EXPLORATORY BORINGS TO FURTHER EVALUATE LATERAL AND VERTICAL EXTENT OF POTENTIALLY UNDOCUMENTED ARTIFICIAL FILL PROPOSED BUILDINGS A AND B AT LA JOLLA SPECTRUM, LOTS 9-12

PREPARED BY KLEINFELDER, INC.

DATED JANUARY 23, 1998

FOR

SPECTRUM PEDESTRIAN BRIDGE
3115 MERRYFIELD ROW AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

PROJECT NO. G1813-52-07

PROJECT NO. 51-4475-01	LOG OF BORING 11B	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 350' / TOTAL DEPTH OF HOLE 29'

DATE
- STARTED: 12/11/97
- COMPLETED: 12/11/97
- BACKFILLED: 12/11/97

DRILLING AGENCY SCOTT'S DRILLING
LOGGED BY GMB
SURFACE CONDITIONS BARE SOIL

GROUNDWATER ELEVATION _____ DATE _____

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		ARTIFICIAL FILL:	SM		60	12	112		
1		DENSE, YELLOW SILTY SAND, FINE GRAINED, TRACE CLAY, TRACE GRAVEL, MOIST							
2		MEDIUM DENSE							
3									
4		MEDIUM DENSE			35	15	111		
5									
6									
7									
8									
9					41	11	105		
10									
11									
12			SC						
13		DENSE, BROWN CLAYEY SAND, FINE GRAINED, TRACE GRAVEL AND COBBLE, MOIST							
14					46	9	111		
15									
16									
17			SM						
18		DENSE, YELLOW-BROWN MOTTLED WITH OLIVE SILTY SAND, FINE GRAINED, MOIST							
19					47	12	–		
20		SCRIPPS FORMATION:	"SM"						
21		YELLOW-BROWN SANDSTONE EXCAVATES AS: "YELLOW-BROWN SILTY SAND, FINE							
22		GRAINED, WITH OLIVE SPOTS, SLIGHTLY MOIST"							
23		HARD DRILLING AT 22'			79/ 10.5"				
24									
25									
26		"VERY DENSE, YELLOW-BROWN MIXED WITH DARK BROWN"							
27									
28		BORING STOPPED @ 29'			50/ 5"				
29		NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
30									

FN: LOG11-29

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A2

PROJECT NO.	LOG OF BORING 12	SHEET
51-4475-01		1 OF 1

DRILLING EQUIPMENT	PROJECT NAME	LOCATION
INGERSOLL-RAND A-300	LA JOLLA SPECTRUM, LOTS 9-12	SAN DIEGO, CALIFORNIA

TYPE OF BIT	HAMMER DATA	SURFACE ELEVATION	TOTAL DEPTH OF HOLE
8" HSA	WT. 140 LBS. DROP 30 INCHES	353'	20'

DATE			
STARTED:	12/11/97	DRILLING AGENCY	SCOTT'S DRILLING
COMPLETED:	12/11/97	LOGGED BY	GMB
BACKFILLED:	12/11/97	SURFACE CONDITIONS	BARE SOIL

GROUNDWATER ELEVATION _____ DATE _____

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-3		ARTIFICIAL FILL: MEDIUM DENSE, DARK BROWN CLAYEY SAND, FINE GRAINED, TRACE GRAVEL, MOIST	SC		25	8	117		
3-9		ALTERNATING LAYERS OF: 1.) YELLOW-BROWN CLAYEY SAND, FINE-GRAINED, MOIST 2.) YELLOW-BROWN SILTY SAND, FINE GRAINED, MOIST, MIXED WITH OLIVE SILTY CLAY DEPOSITS LAYER OF FINE GRAVEL	SM		28	13	106		
9-16					33	10	100		
14		LAYER OF HARD DARK BROWN SANDY CLAY, MOIST			70/10"	9	127		
15-16		VERY DENSE, BROWN SILTY SAND, FINE GRAINED, WEAKLY CEMENTED, MOIST							
17-20		SCRIPPS FORMATION: BROWN SANDSTONE EXCAVATES AS: "VERY DENSE, BROWN SILTY SAND, FINE GRAINED, SLIGHTLY MOIST, CEMENTED WITH RED-BROWN CIRCULAR STAINS"	"SM"		73/9"				
20		BORING STOPPED @ 20' NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
21-30									

FN: LOG11-29

KLEINFELDER 9555 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A3

PROJECT NO. 51-4475-01	LOG OF BORING 13	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 355'
		TOTAL DEPTH OF HOLE 14'

DATE			
STARTED: 12/11/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/11/97	LOGGED BY GMB		
BACKFILLED: 12/11/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-6		ARTIFICIAL FILL: MEDIUM DENSE, BROWN SILTY SAND, FINE GRAINED, TRACE GRAVEL, MOIST, DARK BROWN, TRACE ROOTS @ 1 FT.	SM		35 27	9 7	109 107		
7-14		SCRIPPS FORMATION: BROWN SANDSTONE EXCAVATION AS: "VERY DENSE, BROWN SILTY SAND, FINE TO MEDIUM GRAINED, WEAKLY TO MODERATELY CEMENTED, MOIST" WITH LAYER OF RED-BROWN GRAVELLY CLAY, MOIST	"SM"		81/11" 50/6"				
15-30		BORING STOPPED @ 14' NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							

FN: LOG11-29

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A4

PROJECT NO. 51-4475-01	LOG OF BORING 14	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 353' / TOTAL DEPTH OF HOLE 9'

DATE			
STARTED: 12/11/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/11/97	LOGGED BY GMB		
BACKFILLED: 12/11/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-7		ARTIFICIAL FILL: MEDIUM DENSE, BROWN TO DARK BROWN CLAYEY SAND, VERY FINE GRAINED, MOIST, SOME FINE GRAVEL	SM		23	9	108		
4-7		DENSE (TERRACE DEPOSITS: BROWN CLAYEY SAND, FINE TO MEDIUM GRAINED, MOIST, WITH ROUNDED, FINE GRAVEL)			43	11	116		
7-9		SCRIPPS FORMATION: OLIVE SANDSTONE EXCAVATES AS: "VERY DENSE OLIVE TO MEDIUM GRAINED, WITH QUARTZ, SLIGHTLY MOIST, WEAKLY CEMENTED"	"SM"		50/5"				
9		BORING STOPPED @ 9' NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							

FN: LOG11-29

KLEINFELDER 9555 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A5

PROJECT NO. 51-4475-01	LOG OF BORING 15	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 349' / TOTAL DEPTH OF HOLE 14'

DATE			
STARTED: 12/11/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/11/97	LOGGED BY GMB		
BACKFILLED: 12/11/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-10		ARTIFICIAL FILL: MEDIUM DENSE, BROWN SILTY SAND, FINE GRAINED, SOME GRAVEL, TRACE ROOTS, SOME DARK BROWN MOTTLING, MOIST DENSE, TRACE ROOTS MIXED WITH CHUNKS OF CEMENTED OLIVE SANDSTONE	SM		23 43 50/5"	7 11	123 113		
10-14		SCRIPPS FORMATION: OLIVE SANSTONE EXCAVATES AS: "VERY DENSE, OLIVE SILTY SAND, FINE GRAINED WITH RED-BROWN STREKS/STAINS, WEAKLY CEMENTED, SLIGHTLY MOIST"	"SM"						
14-30		BORING STOPPED @ 14' NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							

FN: LOG11-29

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A6

PROJECT NO. 51-4475-01	LOG OF BORING 16	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 365'
TOTAL DEPTH OF HOLE 5'		

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0									
1		ARTIFICIAL FILL:	SM		34				
2		MEDIUM DENSE, BROWN SILTY SAND, FINE GRAINED							
3		SOME FINE GRAVEL, MOIST WITH LENSES OF							
4		CLAYEY SAND							
5		GRAVELLY LAYER (FINE ANGULAR GRAVEL)							
6		BORING STOPPED @ 5'							
7		NO CAVING OBSERVED							
8		NO FREE WATER OBSERVED							
9		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
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KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A7

PROJECT NO. 51-4475-01	LOG OF BORING 17	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 359' / TOTAL DEPTH OF HOLE 5'

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-5		ARTIFICIAL FILL: MEDIUM DENSE, BROWN SILTY SAND, FINE GRAINED, MOIST, TRACE FINE ROUNDED GRAVEL, WITH LAYERS OF BROWN CLAYEY SAND, FINE TO MEDIUM GRAINED, MOIST	SM		42				
5-30		BORING STOPPED @ 5' NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							

FN: LOG11-29

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A8

PROJECT NO. 51-4475-01	LOG OF BORING 18	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 349'
TOTAL DEPTH OF HOLE 5'		

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0									
1		ARTIFICIAL FILL: MEDIUM DENSE, BROWN SILTY SAND, FINE GRAINED, MOIST, SOME GRAVEL, SOME OLIVE-BROWN MOTTLED IN SAMPLE	SM		36				
2									
3									
4		SCRIPPS FORMATION: BROWN SANDSTONE EXCAVATES AS: "BROWN SILTY SAND, FINE GRAINED, WEAKLY TO WELL CEMENTED, SLIGHTLY MOIST"	"SM"						
5									
6		BORING STOPPED @ 5' NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
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22									
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28									
29									
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KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A9

PROJECT NO. 51-4475-01	LOG OF BORING 19	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 346'
TOTAL DEPTH OF HOLE 5'		

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-5		ARTIFICIAL FILL: MEDIUM DENSE, BROWN SILTY SAND, FINE GRAINED, MOIST, TRACE GRAVEL	SM		35				
5-30		BORING STOPPED @ 5' NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A10

PROJECT NO. 51-4475-01	LOG OF BORING 20	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 334' / TOTAL DEPTH OF HOLE 14'

DATE
- STARTED: 12/12/97
- COMPLETED: 12/12/97
- BACKFILLED: 12/12/97

DRILLING AGENCY SCOTT'S DRILLING
LOGGED BY GMB
SURFACE CONDITIONS BARE SOIL

GROUNDWATER ELEVATION _____ DATE _____

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0									
1		ARTIFICIAL FILL: MEDIUM DENSE, BROWN SILTY SAND, FINE GRAINED, MOIST, WITH GRAVEL, TRACE CLAY, TRACE ROOT FIBERS	SM		40	9	109		
2									
3		GRAVELLY							
4		DENSE, BROWN SILTY SAND, MIXED WITH CLAYEY SANDS, FINE GRAINED, SLIGHTLY MOIST, WITH COBBLE AND GRAVEL			44	7	112		
5									
6									
7		RED-GRAY							
8									
9		VERY MOIST LAYER OF OLIVE, SAND CLAY @ 9.5' TRACE DECOMPOSED ROOTS			62/10"	6	119		
10									
11		SCRIPPS FORMATION: YELLOW-BROWN SANDSTONE EXCAVATES AS: "YELLOW-BROWN TO BROWN SILTY SAND, FINE GRAINED, MOIST"	"SM"						
12									
13									
14					50/6"				
15		BORING STOPPED @ 14' NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A11

PROJECT NO. 51-4475-01	LOG OF BORING 21	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 354'
TOTAL DEPTH OF HOLE 10'		

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		RESIDUAL SOIL:	SM						
1		BROWN SILTY SAND, TRACE CLAY, FINE GRAINED, TRACE GRAVEL, MOIST			91			■	
2		SCRIPPS FORMATION:	"SM"						
3		YELLOW-BROWN SANDSTONE							
4		EXCAVATES AS: "VERY DENSE, YELLOW-BROWN SILTY SAND, VERY FINE GRAINED, SLIGHTLY MOIST TO DRY"			50/ 5.5"			■	
5									
6		HIGHLY WEATHERED							
7									
8									
9									
10					50/4"			■	
10		BORING STOPPED @ 10'							
11		NO CAVING OBSERVED							
12		NO FREE WATER OBSERVED							
13		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

FN: LOG11-29	KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123	FIGURE NO.: A12

PROJECT NO. 51-4475-01	LOG OF BORING 22	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 353'
TOTAL DEPTH OF HOLE 10'		

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		RESIDUAL SOIL:	SM						
1		DENSE, BROWN SILTY SAND, FINE GRAINED, MOIST			49				
2		SCRIPPS FORMATION:	"SM"						
3		YELLOW-BROWN SANDSTONE, HIGHLY WEATHERED							
4									
5		EXCAVATES AS: "VERY DENSE, YELLOW-BROWN SILTY SAND, VERY FINE GRAINED, SLIGHTLY MOIST TO DRY, WEAKLY CEMENTED"			50/5"				
6									
7									
8									
9									
10					50/4"				
11		BORING STOPPED @ 10'							
12		NO CAVING OBSERVED							
13		NO FREE WATER OBSERVED							
14		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A13

PROJECT NO. 51-4475-01	LOG OF BORING 23	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 355' / TOTAL DEPTH OF HOLE 10'

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-3		ARTIFICIAL FILL: DENSE, BROWN TO DARK BROWN, MIXED WITH OLIVE BROWN CLAYEY SAND, SLIGHTLY MOIST, FINE GRAINED, MOIST, TRACE DECOMPOSED ROOT FIBERS	SM / "SM"		65	9	109		
3-10		SCRIPPS FORMATION: YELLOW-BROWN SANDSTONE EXCAVATES AS: "VERY DENSE YELLOW BROWN SILTY SAND, VERY FINE GRAINED, SLIGHTLY MOIST, WEAKLY TO WELL CEMENTED"			50/3" / 50/3"				
10		BORING STOPPED @ 10' NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOL CUTTINGS							

FN: LOG11-29	KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123	FIGURE NO.: A14

PROJECT NO. 51-4475-01	LOG OF BORING 24	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 357' / TOTAL DEPTH OF HOLE 10.5'

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		3" ROOT ZONE (DEBRIS STOCKPILE FROM STRIPPING AND GRUBBING SITE)	SM		68/10"				
1		RESIDUAL SOIL:							
2		YELLOW-BROWN SILTY SAND, FINE GRAINED, MOIST, TRACE OF CLAY	"SM"						
3		SCRIPPS FORMATION:							
4		YELLOW-BROWN SANDSTONE			50/5"				
5		EXCAVATES AS: "YELLOW-BROWN SILTY SAND, VERY FINE-GRAINED, SLIGHTLY MOIST, WEAKLY CEMENTED"							
6									
7									
8									
9									
10		SILTSTONE AND CLAYSTONE LENSES			50/3"				
11		BORING STOPPED @ 10.5'							
12		NO CAVING OBSERVED							
13		NO FREE WATER OBSERVED							
14		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

FN: LOG11-29

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A15

PROJECT NO. 51-4475-01	LOG OF BORING 25	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 341' / TOTAL DEPTH OF HOLE 5'

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		SCRIPPS FORMATION:	"SM"						
1		BROWN SANDSTONE							
2		EXCAVATES AS "BROWN SILTY SAND, VERY FINE GRAINED, DRY TO SLIGHTLY MOIST"							
3									
4		VERY DENSE, WEAKLY TO WELL CEMENTED			50/ 5.5"			■	
5		BORING STOPPED @ 5'							
6		NO CAVING OBSERVED							
7		NO FREE WATER OBSERVED							
8		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A16

PROJECT NO. 51-4475-01	LOG OF BORING 26	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 342'
TOTAL DEPTH OF HOLE 5'		

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		ARTIFICIAL FILL:	SM		48				
1		DENSE, BROWN SILTY SAND, MEDIUM GRAINED, MOIST							
2		GRAVELLY LAYER (SUBROUNDED TO ANGULAR)							
3		SCRIPPS FORMATION:	"SM"						
4		BROWN SANDSTONE							
5		EXCAVATES AS; "VERY DENSE, BROWN SILTY SAND, FINE GRAINED, SLIGHTLY MOIST							
6		BORING STOPPED @ 5'							
7		NO CAVING OBSERVED							
8		NO FREE WATER OBSERVED							
9		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A17

PROJECT NO. 51-4475-01	LOG OF BORING 27	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 332' / TOTAL DEPTH OF HOLE 5'

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-5		ARTIFICIAL FILL: DENSE, BROWN SILTY SAND, FINE TO MEDIUM GRAINED, MOIST, WITH GRAVEL LAYER WITH ROOTS, TREE BARK AND POLY FIBER ROPE @ 0.5 FT.	SM		44				
5-30		BORING STOPPED @ 5' NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							

FN: LOG11-29

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A18

PROJECT NO. 51-4475-01	LOG OF BORING 28	SHEET 1 OF 1
DRILLING EQUIPMENT INGERSOLL-RAND A-300	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 8" HSA	HAMMER DATA: WT. 140 LBS. DROP 30 INCHES	SURFACE ELEVATION 329'
TOTAL DEPTH OF HOLE 4'		

DATE			
STARTED: 12/12/97	DRILLING AGENCY SCOTT'S DRILLING	GROUNDWATER ELEVATION	DATE
COMPLETED: 12/12/97	LOGGED BY GMB		
BACKFILLED: 12/12/97	SURFACE CONDITIONS BARE SOIL		

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0-3		ARTIFICIAL FILL: BROWN CLAYEY SAND, FINE TO MEDIUM GRAINED, MOIST, GRAVELLY, (FINE TO COARSE GRAVEL, ROUNDED TO SUBANGULAR)	SC						
3-4		SCRIPPS FORMATION: BROWN SANDSTONE EXCAVATES AS; "VERY DENSE, BROWN TO YELLOW-BROWN SILTY SAND, WITH GRAVEL AND COBBLE, DRY, MODERATELY CEMENTED"	"SM"		50/5"				
4-30		BORING STOPPED @ 4' NO CAVING OBSERVED NO FREE WATER OBSERVED BOREHOLE BACKFILLED WITH SOIL CUTTINGS							

KLEINFELDER 9555 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A19

PROJECT NO. 51-4475-02	LOG OF BORING 29	SHEET 1 OF 2
DRILLING EQUIPMENT EZ BORE 120	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 30" BUCKET	HAMMER DATA: WT. N/A LBS. DROP N/A INCHES	SURFACE ELEVATION 350' / TOTAL DEPTH OF HOLE 28'
DATE STARTED: 1/20/98	DRILLING AGENCY DAVE'S DRILLING	GROUNDWATER ELEVATION ____ DATE ____
DATE COMPLETED: 1/20/98	LOGGED BY GMB/M. HART	
DATE BACKFILLED: 1/20/98	SURFACE CONDITIONS BARE SOIL	

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0		ARTIFICIAL FILL (NEW):							
1		COMPACT BROWN SILTY SAND, FINE GRAINED, MOIST, TRACE CLAY; FEW DARK BROWN CLAY LUMPS, FEW COBBLES	SM						
2									
3									
4		FEW ANGULAR CHUNKS OF SANDSTONE. (4" MAX. DIAMETER)							
5									
6		LAYER OF GRAY-BROWN, SLIGHTLY ORGANIC FROM 5.5 FT. TO 6.5 FT., YELLOW-BROWN WITH 1" TO 2" ANGULAR SILTSTONE AND SANDSTONE CLASTS							
7									
8									
9									
10									
11		ARTIFICIAL FILL (OLDER):							
12		3" THICK, HORIZONTAL LAYER OF DARK BROWN SILTY SAND WITH ORGANIC TOPSOIL (CONTINUOUS AROUND HOLE), COMPACT DARK BROWN SILTY SAND, FINE GRAINED, MOIST, (HORIZONTAL LAYERING, APPROX. 3" TO 6" LIFTS), TRACE ROOTS AND ORGANICS, SOME CLAYEY SAND/SANDY CLAY LUMPS MIXED IN, FEW COBBLES AND GRAVEL (ROUNDED), STRONG ODOR, CEMENTED SANDSTONE CLAST AT 14 FT. APPROX. 10 FT. IN LENGTH							
13									
14									
15		AT 15 FT. THIN BROWN SANDY CLAY LENSES IN MATRIX OF COMPACT, MOIST, SILTY MEDIUM GRAINED SAND, FEW ROUNDED PEBBLES,							
16		COMPACT, DAMP, YELLOW-BROWN TO DARK BROWN SILTY SAND WITH FEW ANGULAR SANDSTONE FRAGMENTS, ZONE OF INTER BEDDED, DAMP TO DRY, SILTY SAND, COMPACT TO LOOSE WITH SANDSTONE FRAGMENTS							
17									
18		AT 18 FT. COMPACT, MOIST, MOTTLED YELLOW-BROWN AND GRAY-BROWN SILTY SAND, MEDIUM GRAINED WITH FEW PEBBLES AND SILTSTONE CLASTS UP TO 4" IN LENGTH							
19									
20									

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A20

PROJECT NO. 51-4475-02	LOG OF BORING 29	SHEET 2 OF 2
DRILLING EQUIPMENT EZ BORE 120	PROJECT NAME LA JOLLA SPECTRUM, LOTS 9-12	LOCATION SAN DIEGO, CALIFORNIA
TYPE OF BIT 30" BUCKET	HAMMER DATA: WT. N/A LBS. DROP N/A INCHES	SURFACE ELEVATION 350' / TOTAL DEPTH OF HOLE 28'
DATE STARTED: 1/20/98	DRILLING AGENCY DAVE'S DRILLING	GROUNDWATER ELEVATION ____ DATE ____
DATE COMPLETED: 1/20/98	LOGGED BY GMB/M. HART	
DATE BACKFILLED: 1/20/98	SURFACE CONDITIONS BARE SOIL	

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
20		SCRIPPS FORMATION:							
21		HORIZONTAL CONTACT, CLEAN, NO DEBRIS AT 20 FT.; BENCH STEPS DOWN 18"; LOWER BENCH AT 21.5 FT.; 5 FT. HORIZONTAL, DENSE, DAMP, LIGHT GRAY TO YELLOW-BROWN SANDSTONE, FINE GRAINED, MICACEOUS, WELL CEMENTED, MASSIVE BEDDING	"SM"						
22									
23		EXCAVATES AS; "RED-YELLOW SITLY SAND, FINE GRAINED, SLIGHTLY MOIST, WEAKLY CEMENTED WITH SOME WELL CEMENTED PIECES"							
24									
25									
26		LIGHT OLIVE							
27									
28		BORING STOPPED @ 28'							
29		BOREHOLE DOWN HOLE LOGGED TO 26.5'							
30		NO CAVING OBSERVED							
31		NO FREE WATER OBSERVED							
32		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
33									
34									
35									
36									
37									
38									
39									
40									

KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123

FIGURE NO.: A21

APPENDIX J

APPENDIX J

LOG OF EXPLORATORY BORINGS FROM PREVIOUS GEOTECHNICAL INVESTIGATION:

ADDENDUM 2: LETTER REPORT OF ADDITIONAL EXPLORATORY BORING TO FURTHER EVALUATE LATERAL AND VERTICAL EXTENT OF POTENTIALLY UNDOCUMENTED ARTIFICIAL FILL PROPOSED BUILDING A AT LA JOLLA SPECTRUM

PREPARED BY KLEINFELDER, INC.

DATED JULY 24, 1998

FOR

SPECTRUM PEDESTRIAN BRIDGE
3115 MERRYFIELD ROW AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

PROJECT NO. G1813-52-07

PROJECT NO. 51-4475-02	LOG OF BORING 1	SHEET 1 OF 2
DRILLING EQUIPMENT EARTH DRILL 45L	PROJECT NAME LA JOLLA SPECTRUM	LOCATION BUILDING A (SEE PLAN)
TYPE OF BIT 30" BUCKET	HAMMER DATA: WT. N/A* LBS. DROP N/A INCHES	SURFACE ELEVATION ~352' / TOTAL DEPTH OF HOLE 40'
DATE: STARTED: 7/15/98	DRILLING AGENCY LARIVE DRILLING	GROUNDWATER ELEVATION _____ DATE _____
COMPLETED: 7/15/98	LOGGED BY G. BINGER/M. HART	
BACKFILLED: 7/15/98	SURFACE CONDITIONS BARE SOIL	

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	*BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
0									
1		FILL:	SM						
2		BROWN FINE GRAINED SILTY SAND, SOME CLAY, LUMPS, TRACE ORGANICS (ROOTS), MOIST							
3									
4					3/18"	13	118		
5		YELLOW-BROWN SILTY SAND, TRACE COBBLE, MOIST	SM						
6					3/18"	12	115		
7									
8									
9					3/18"	11	107		
10		PEBBLES AND ANGULAR CLASTS OF SILTSTONE							
11					3/18"	15	105		
12									
13		1" HORIZONTAL LAYER, DARK GRAY SILTY SAND SOME ORGANICS (FEW TWIGS; GREEN GRASS), MOIST	SM		3/18"				
14									
15		YELLOW-BROWN, MEDIUM GRAINED SAND, SOME SILT, FEW ANGULAR CLASTS OF CEMENTED SANDSTONE	SM						
16					2/18"	10	108		
17		6" LAYER, DARK GRAY-BROWN ORGANIC SILTY SAND, MOIST	SM						
18		YELLOW BROWN SILTY SAND WITH ANGULAR SANDSTONE AND SILTSTONE CLASTS, MOIST	SM						
19					4/18"	12	118		
20		6" BLACK ORGANIC SAND LAYER, MOIST	SM						
21		OLIVE BROWN CLAYEY SAND, TRACE BURNED TWIGS, MOIST	SC		4/18"	14	115		
22		BLACK TO DARK OLIVE-GRAY CLAYEY SAND, SOME ORGANICS (BURNED TWIGS/ROOTS), MOIST	SC						
23									
24		DARK GRAY BROWN SANDY CLAY/CLAYEY SAND, SOME ORGANICS (BURNED TWIGS/ROOTS), MOIST	SC		3/12"	9	125		
25		PATCH OF CHARRED WOOD FRAMENTS AT 25'							
26					1/12"	17	110		
27		BASE OF FILL @ 28', 4" WIDE X 2" THICK PATCH OF BURNED BRUSH IN LOOSE GRAY SAND							
28		SCRIPPS FORMATION:							
29		MEDIUM DENSE, LIGHT BROWN, MEDIUM GRAINED, MASSIVE SANDSTONE WITH FEW COBBLES			8/18"	5	114		
30									

PROJECT NO. 51-4475-02	LOG OF BORING 1	SHEET 2 OF 2
DRILLING EQUIPMENT EARTH DRILL 45L	PROJECT NAME LA JOLLA SPECTRUM	LOCATION BUILDING A (SEE PLAN)
TYPE OF BIT 30" BUCKET	HAMMER DATA: WT. N/A* LBS. DROP N/A INCHES	SURFACE ELEVATION ~352' / TOTAL DEPTH OF HOLE 40'
DATE: STARTED 7/15/98; COMPLETED 7/15/98; BACKFILLED 7/15/98	DRILLING AGENCY LARIVE DRILLING; LOGGED BY G. BINGER/M. HART; SURFACE CONDITIONS BARE SOIL	GROUNDWATER ELEVATION ____ DATE ____

DEPTH (FEET)	SYMBOL	LOG OF MATERIAL	U.S.C.S.	WELL DETAILS	*BLOW COUNTS	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	SAMPLE TYPE	NOTES
30–40		HORIZONTAL BEDDING @ 31'			15/18"				
		CONGLOMERATE COBBLES IN LIGHTLY TO UNCEMENTED MEDIUM GRAINED SAND MATRIX			20/12"				
		LIGHT BROWN MASSIVE SILTY SANDSTONE, TRACE CLAY, WITH GRAVEL AND COBBLES			20/10"				
					20/11"				
		BORING STOPPED @ 40 FT.			20/13"				
		BOREHOLE DOWN HOLE LOGGED TO 35 FT.							
		NO CAVING OBSERVED							
		NO FREE WATER OBSERVED							
		BOREHOLE BACKFILLED WITH SOIL CUTTINGS							
		*CALIFORNIA SAMPLER DRIVEN WITH VARIABLE WEIGHT KELLY BAR							
		3,500 LBS. FROM 0 TO 27 FT.							
		2,400 LBS. FROM 27 TO 40 FT.							

FN: 4475LOG	KLEINFELDER 9565 CHESAPEAKE DRIVE, SUITE 101 SAN DIEGO, CALIFORNIA 92123	FIGURE NO.: A3

APPENDIX K

APPENDIX K

RECOMMENDED GRADING SPECIFICATIONS

FOR

SPECTRUM PEDESTRIAN BRIDGE
3115 MERRYFIELD ROW AND 3545 CRAY COURT
SAN DIEGO, CALIFORNIA

PROJECT NO. G1813-52-07

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9

and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition.

4. CLEARING AND PREPARING AREAS TO BE FILLED

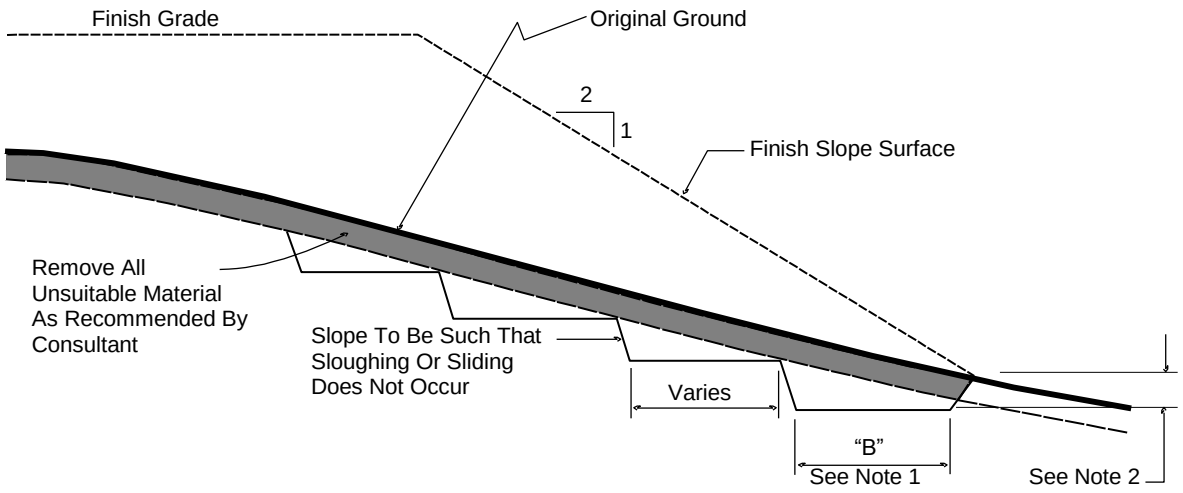
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES:

(1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection

variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

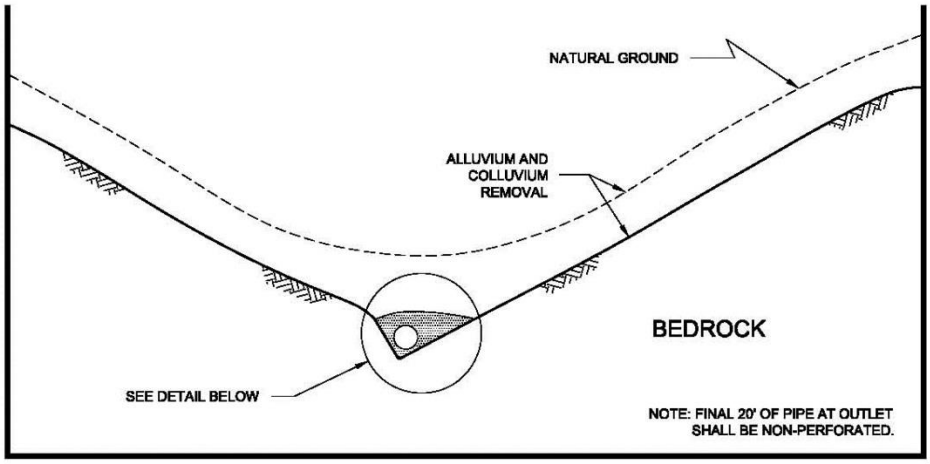
6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

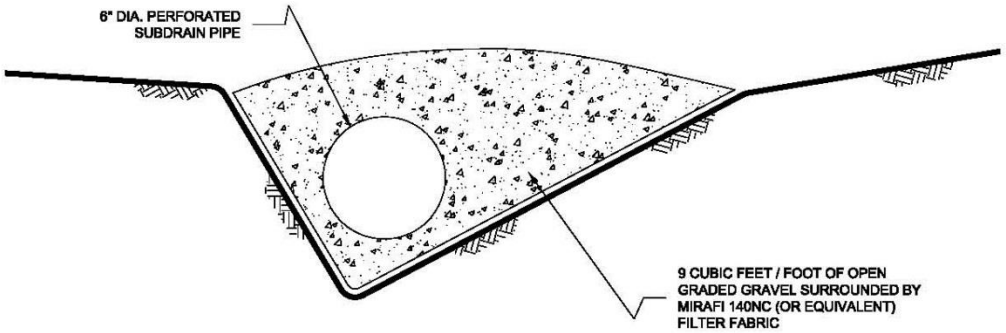
6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





NOTES:

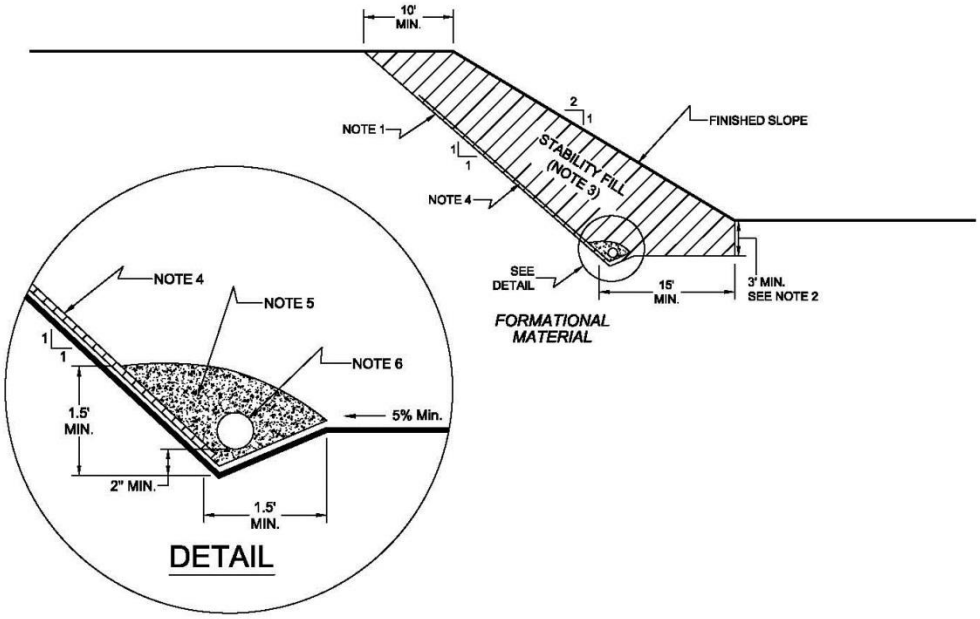
1.....6-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS
IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2.....6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS
LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

NO SCALE

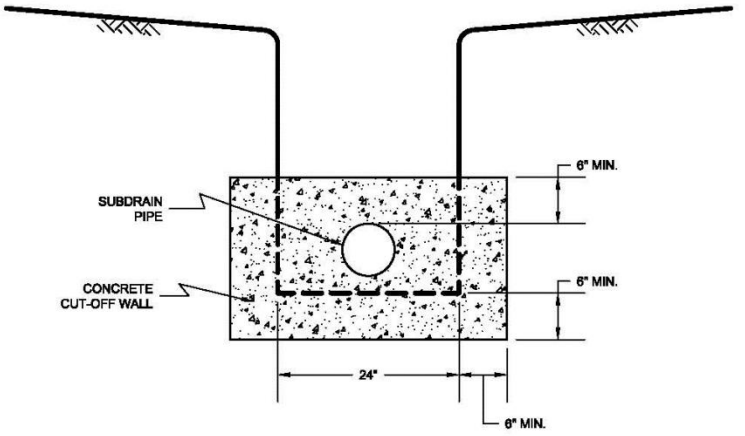
7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

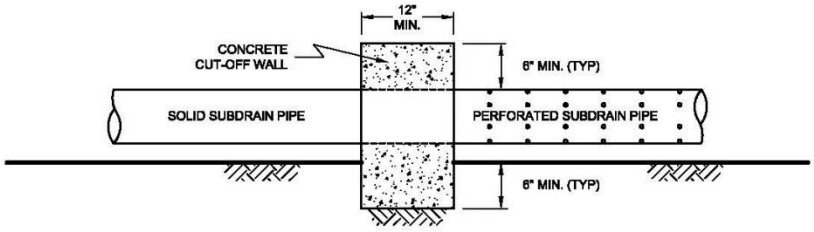
TYPICAL CUT OFF WALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW

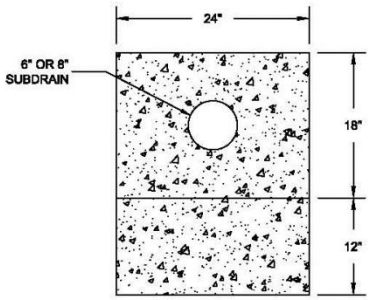


NO SCALE

7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

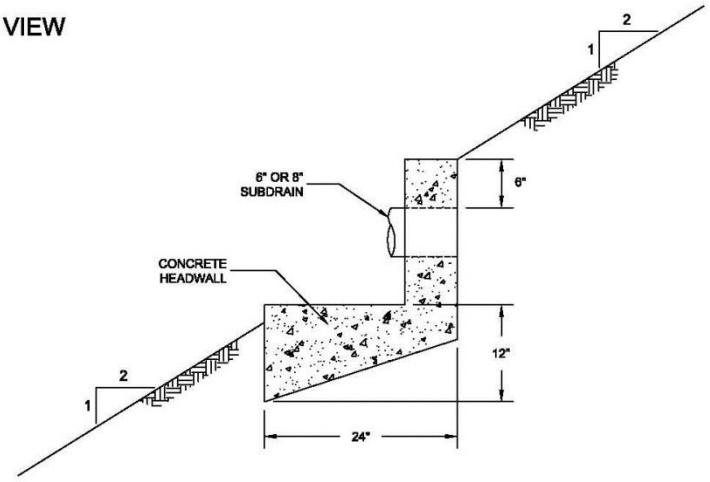
TYPICAL HEADWALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW



NOTE: HEADWALL SHOULD OUTLET AT TOE OF FILL SLOPE OR INTO CONTROLLED SURFACE DRAINAGE

NO SCALE

7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an "as-built" map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop*.

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

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