PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED TRI-CITY MEDICAL CENTER EXPANSION
4002 VISTA WAY
OCEANSIDE, CALIFORNIA

Prepared for:

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1.0 INTRODUCTION AND SCOPE OF SERVICES

1.1 Introduction

This report presents the results of the geotechnical investigation, performed by Construction Testing and Engineering, Inc. (CTE), and provides conclusions and preliminary recommendations for the proposed various expansions currently planned at the existing Tri-City Medical Center campus in Oceanside, California. This investigation was performed to supplement previous field investigations performed by Soil Testing Lab (1968), Baseline Consultants (1988), Geotechnical Professionals (2006), Leighton Consulting (2008), and an environmental site assessment report prepared by Global Hydrology (2013). The applicable boring logs and geophysical survey data from the previous studies are incorporated into this report and are attached in Appendix B. This investigation was performed in general accordance with the terms of CTE proposal G-3715, dated February 5, 2016.

While detailed plans were not available at the time the recent investigation and preparation of this report, CTE understands that the currently proposed improvements are to consist of the following:

1. Central Plant Emergency Upgrade
2. New West Side Surface Parking
3. New Entry Road & Signage
4. New Parking Structure
5. Relocation of Receiving Dock
6. Relocation of Utilities & Re-Grading of Building Pad
7. South Tower SPC-4D Upgrade
8. New Phase I Tower
9. New Bridge & Elevator to Medical Office Building (MOB)
10. Central Plant Expansion
11. New Main Lobby & Dining & MOB Expansion
12. North Wing Conversion to Forensic
13. Relocation of Main Electrical Service to Central

14. New Phase II Tower
15. SPC Separation of Central Tower
16. NPC Upgrade of Existing Buildings

CTE's understanding of the proposed improvements is based upon conceptual plans that do not include topography and detailed elevations and/or specific building locations. Furthermore, the exploration locations are based upon extrapolation from the conceptual plans. As such, CTE should review additional project plans as they are developed, and the information provided herein could require updating or modification based on current proposed improvement plans.

Attached appendices include:

Appendix A, References
Appendix B, Boring Logs
Appendix C, Laboratory Test Results
Appendix D, Standard Specifications for Grading
Appendix E, Site Specific Ground Motion Study
Appendix F, Geophysical Survey

1.2 Scope of Services

The scope of services provided included:

- Review of referenced geologic and soils reports.
- Coordination of utility mark-out and location for Underground Services Alert (USA) and a private utility locating company.
- Obtaining a San Diego County Department of Environmental Health (DEH) Boring Permit.
- Exploration of subsurface conditions utilizing a truck mounted CME-75 drill rig and limited-access manually advanced equipment, as well as a 30-ton Cone Penetration Test (CPT) rig.
- Laboratory testing of selected soil samples.
- Percolation testing in accordance with local guidelines for infiltration purposes.
- Description of the geology and evaluation of potential geologic hazards.
- Engineering and geologic analysis.
- Preparation of this summary report.

2.0 SITE DESCRIPTION

The site is located at 4002 Vista Way within the existing Tri-City Medical Center Complex in Oceanside, California (Figure 1). The improvement area is bounded to the south by Vista Way, to the east by Thunder Drive, to the north by medical facilities, and to the west by commercial businesses. The general layout of the site and currently proposed improvements is shown on Figure 2. The majority of the proposed improvements are to be constructed throughout the southern portion of the existing medical center that currently supports portions of the existing medical facility, parking lots, drive areas, utilities, landscaping, and other ancillary structures. We also understand that improvements are proposed adjacent to the existing facility buildings, the parking structure is proposed on the western portion of the existing parking lot, and surface parking is proposed on the undeveloped building pad to the west.

Based on the recent reconnaissance, investigation, and review of area topography, the improvement areas are located on terrain that generally descends to the southwest. Improvement area elevations range from approximately 290 feet above mean sea level (msl) in the northern portion of the site to approximately 230 feet above msl in the southwestern portion of the site.

3.0 FIELD INVESTIGATION AND LABORATORY TESTING

3.1 Field Investigation

Previous site investigations were performed by others between 1968 and 2013. These previous investigations included the use of truck-mounted drill rigs equipped with hollow-stem augers to collect soil samples, drill rigs equipped with 18-inch diameter bucket augers to enable down-hole logging, backhoe-excavated test pits for the purpose of shallow direct observation, and geophysical equipment to obtain shear wave data and further characterize subsurface characteristics. The recent investigation, performed by CTE from July 12 through 15, 2016, consisted of visual reconnaissance and excavation of 31 exploratory borings, 13 CPT advancements, and six percolation tests. The borings were excavated with a CME-75 truck-mounted drill rig equipped with eight-inch-diameter, hollow-stem augers that extended to a maximum depth of approximately 50.5 feet below the ground surface (bgs) in Boring B-18. Due to limited access, explorations B-41 and B-42 were excavated utilizing a manually operated three-inch diameter auger to depths of approximately 6.5 and 5.0 feet bgs, respectively. Bulk and relatively undisturbed samples were collected from the cuttings, and by driving Standard Penetration Test (SPT) and Modified California samplers.

The CPT advancements were performed with a 30-ton Cone Penetration Test (CPT) rig to further evaluate the density and geologic strata underling the site. The CPT explorations were advanced to a maximum depth of approximately 44.5 feet bgs in CPT-30.

The percolation test holes were advanced with a truck-mounted drill rig where feasible and a six-inch diameter hand auger where access was limited. As a result, only percolation test hole I-3 was advanced with the drill rig and all others were advanced with the manually operated hand auger.

The soils were logged in the field by a CTE Certified Engineering Geologist and were visually classified in general accordance with the Unified Soil Classification System. The field descriptions have been modified, where appropriate, to reflect laboratory test results. Boring logs, including descriptions of the soils encountered, are included in Appendix B. The approximate locations of the explorations by CTE and others are presented on Figure 2.

3.2 Laboratory Testing

Laboratory tests were conducted on selected soil samples for classification purposes, and to evaluate physical properties and engineering characteristics. Laboratory tests included: Expansion Index (EI), Grain Size Distribution, Atterberg Limits, Direct Shear, Consolidation, Resistance “R”-Value, and select Chemical Characteristics. Test descriptions and laboratory test results for the selected soils are included in Appendix C.

3.3 Percolation Testing

As requested, six percolation tests were performed throughout the site for the purpose of designing bioretention basins and permeable pavements for storm water BMPs or similar. These tests were performed in general accordance with the County of San Diego Department of Environmental Health (SD DEH) procedures. The percolation test holes were excavated on July 12 and 14, 2016 to depths ranging from approximately 3.9 to 5.0 feet below existing grades. The tests were performed in accordance with SD DEH Case I and III methods. Case I method is performed when the presoak water remains in the hole overnight and Case III method is performed when the presoak water fully percolates through the hole overnight. The approximate percolation test locations are presented on Figure 2. The percolation test results are presented in the table below. The infiltration rates indicated below have been calculated without a factor of safety applied.

TABLE 3.3					
Test Location	Soil Type	San Diego County Percolation Procedure	Depth (ft)	Percolation Rate (minutes/inch)	Infiltration Rate (inches per hour)
I-1	Tsa	Case III	4.7	160	0.060
I-2	Residual Soil	Case I	5.1	Did Not Percolate	-
I-3	Qppf	Case III	4.8	120	0.10
I-4	Qppf	Case III	4.7	480	0.020
I-5	Tsa	Case III	4.9	160	0.060
I-6	Qppf	Case III	5.0	240	0.040

Tsa = Tertiary Santiago Formation
Qppf = Quaternary Previously Placed Fill

The percolation test results were obtained in accordance with City and County standards and performed with the standard of care utilized by other professionals practicing in the area. However, percolation test results can vary significantly laterally and vertically due to slight changes in soil type, degree of weathering, secondary mineralization, and other physical and chemical variabilities. As such, the test results are considered to be an estimate of percolation and converted infiltration rates for design purposes. No guarantee is made based on the percolation testing related to the actual functionality or longevity of associated infiltration basins or other storm water BMP devices designed from the presented infiltration rates.

4.0 GEOLOGY

4.1 General Setting

Oceanside is located within the Peninsular Ranges physiographic province that is characterized by northwest-trending mountain ranges, intervening valleys, and predominantly northwest trending regional faults. The San Diego Region can be subdivided into the coastal plain area, central mountain–valley area and eastern mountain valley area. The project site is located within the coastal plain area that is characterized by Cretaceous, Tertiary, and Quaternary sedimentary deposits that onlap an eroded basement surface consisting of Jurassic and Cretaceous crystalline rocks.

4.2 Geologic Conditions

Based on the regional geologic map prepared by Kennedy and Tan (2005), the near surface geologic unit underlying the site consists of the Tertiary Santiago Formation (Figure 3). Based on recent site explorations Quaternary Previously Placed Fill, Alluvium, and Residual Soil are also present at the site. Descriptions of the geologic units observed during the recent investigation are presented below. Surficial geologic materials are depicted on Figure 2, and generalized geologic cross-sections are presented on Plates 1 and 2.

4.2.1 Quaternary Previously Placed Fill

Quaternary Previously Placed Fill was encountered throughout the site. Where encountered, this unit was observed to generally consist of loose to medium dense, brown to olive brown, silty to clayey fine to medium grained sand and sandy clay. This unit was found to thicken at the southern portion of the existing building pads. Isolated areas with deeper fill may also be encountered during grading and construction. The time and conditions of fill placement are unknown and as-graded documentation has not been obtained for this soil unit. Therefore, for the purposes of this report this fill is considered to be undocumented. As such, it is recommended that the Undocumented Fill be overexcavated and properly processed and compacted beneath proposed improvement areas, if shallow spread foundations are to be utilized for structure support. However, this material, where competent and undisturbed, may be suitable for support of improvements, if proper observation and compaction testing documentation become available. Limited overexcavation and recompaction to a depth of two to three feet below existing or proposed grades, or to the depth of competent materials (whichever is deeper) is anticipated to be adequate for support of proposed minor or shallow surface improvements such as pavements and flatwork.

4.2.2 Quaternary Alluvium

Quaternary Alluvium was encountered in Boring B-43 in the eastern portion of the site. Where encountered, this unit was observed to generally consist of loose to medium dense, grayish brown, poorly graded fine grained sand. This unit is anticipated to thicken down-gradient to the southeast. Alluvium may also be encountered at the base of the infilled north-south drainage in the central portion of the site. These materials are not anticipated to be suitable for support of proposed structures or significant additional fill materials.

4.2.4 Residual Soil

Residual Soil was encountered throughout the site. Where encountered, this unit was observed to generally consist of medium dense or very stiff, olive brown, silty to clayey fine grained sand sandy clay. This unit is a relatively thin layer that has developed on the underlying Santiago formation. These materials are not anticipated to be suitable for support of proposed structures or significant additional fill materials.

4.2.5 Santiago Formation

The Santiago Formation comprises the geologic unit underlying the entire site. Where encountered, this unit was found to consist of hard or very dense, light gray to olive, silty to clayey fine grained sandstone and sandy claystone. These materials are anticipated to be suitable for support of proposed structures upon deep foundations, where utilized, and significant additional fill materials.

4.3 Groundwater Conditions

Groundwater seepage was encountered in Boring B-34 at a depth of approximately 14 feet. During the previous investigations groundwater was encountered at depths ranging from approximately 19 to 20 feet (Western Soil and Foundation Engineering, 1996) and 14.5 to 15.9 (Global Hydrogeology, 2013). Groundwater was only encountered on the eastern portion of the site during the subsurface investigations; however, groundwater may be encountered within the drainage in the central portion of the site. Groundwater conditions are anticipated to vary, especially during and after periods of sustained precipitation or irrigation. Therefore, subsurface water may impact deeper excavations on the eastern portion of the site or other areas at lower elevations. During earthwork for the proposed development, removal of collected water from excavations and drying of site soils may be necessary. Installation of typical subdrains during grading is not generally anticipated to be necessary or overly beneficial, but cannot be completely precluded.

Site drainage should be designed, installed, and maintained as per the recommendations of the project civil engineer. However, once detailed grading and/or improvement plans have been developed, CTE could potentially recommend conceptual subsurface cutoff, blanket, and/or subdrains, but actual locations and elevations would likely be determined in the field during grading and construction, as necessary.

4.4 Geologic Hazards

Geologic hazards that were considered to have potential impacts to site development were evaluated based on field observations, literature review, and laboratory test results. It appears that geologic hazards at the site are primarily limited to those caused by shaking from earthquake-generated ground motions. The following paragraphs discuss the geologic hazards considered and their potential risk to the site.

4.4.1 Surface Fault Rupture

Based on the site reconnaissance and review of referenced literature, the site is not within a State of California-designated Alquist-Priolo Earthquake Fault Studies Zone or Local Special Studies Zone and no known active fault traces underlie or project toward the site. According to the California Division of Mines and Geology, a fault is active if it displays evidence of activity in the last 11,000 years (Hart and Bryant, revised 2007). Therefore, the potential for surface rupture from displacement or fault movement beneath the proposed improvements is considered to be low.

4.4.2 Local and Regional Faulting

The California Geological Survey (CGS) and the United States Geological Survey (USGS) broadly group faults as “Class A” or “Class B” (Cao, 2003; Frankel et al., 2002). Class A faults are generally identified based upon relatively well-defined paleoseismic activity, and a fault-slip rate of more than 5 millimeters per year (mm/yr). In contrast, Class B faults have comparatively less defined paleoseismic activity and are considered to have a fault-slip rate less than 5 mm/yr. The nearest known Class B fault is the Newport-Inglewood Fault, which is approximately 13.7 kilometers west of the site (Blake, T.F., 2000). The nearest known Class A fault is the Temecula segment of the Elsinore Fault, which is located approximately 33.4 kilometers northeast of the site. The following Table 4.4.2 presents the known faults nearest to the site, including estimated magnitude and fault classification. The attached Figure 4 shows regional faults and seismicity with respect to the site.

TABLE 4.4.2
NEAR-SITE FAULT PARAMETERS

FAULT NAME	APPROXIMATE DISTANCE FROM SITE (KM)	MAXIMUM ESTIMATED EARTHQUAKE MAGNITUDE	CLASSIFICATION
Newport-Inglewood	13.6	7.1	B
Rose Canyon	13.7	7.2	B
Elsinore-Temecula	33.4	6.8	A
Elsinore-Julian	33.6	7.1	A
Coronado Bank	39.5	7.6	B
Elsinore-Glen Ivy	51.3	6.8	A

The site could be subjected to significant shaking in the event of a major earthquake on any of the faults listed above or other faults in the southern California or northern Baja California area.

4.4.3 Historic Seismicity

The level of seismicity within recent history (last 50 years) of the San Diego area is relatively low compared to other areas of southern California and northwestern Baja California. Only a few small to moderate earthquakes have been reported in the greater San Diego area during the period of instrumental recordings, which began in the early 1900s. Most of the high seismic activity in the region is associated with the Elsinore Fault Zone and the San Jacinto Fault Zone, located approximately 29 and 65 kilometers northeast of the site respectively. In the western portion of San Diego County a series of small-to-moderate earthquakes in July 1985 were reportedly associated with the Rose Canyon Fault Zone (Reichle, 1985). The largest event in that series was M4.7, which was centered within San Diego Bay. A similar series of earthquakes in coastal San Diego occurred in 1964 (Simons, 1979).

Based on review of the USGS Earthquake Archives (http://earthquake.usgs.gov/earthquakes/search/) significant earthquakes within 100 kilometers of the site with magnitudes greater than M5.5 are provided in Table 4.4.3.

TABLE 4.4.3
Regional Earthquake History

EARTHQUAKE DATE (yr-mo-day)	EARTHQUAKE TIME (UTC)	MAGNITUDE	ESTIMATED DEPTH (km)	GENERAL LOCATION
1918-04-21	22:32:29	6.7	10.0	Southern California
1933-03-11	01:54:09	6.4	6.0	WNW Newport Beach
1937-03-25	16:49:02	6.0	6.0	WSW of Oasis
1951-12-26	00:46:54	5.8	6.0	NNE of San Clemente Island

4.4.4 Liquefaction and Seismic Settlement Evaluation

Liquefaction occurs when saturated fine-grained sands or silts lose their physical strengths during earthquake-induced shaking and behave as a liquid. This is due to loss of point-to-point grain contact and transfer of normal stress to the pore water. Liquefaction potential varies with water level, soil type, material gradation, relative density, and probable intensity and duration of ground shaking. Seismic settlement can occur with or without liquefaction; it results from densification of loose soils.

The site is underlain by relatively well compacted fill above groundwater levels and at relatively shallow depths by the very dense Santiago Formation. Therefore, the potential for liquefaction or significant seismic settlement at the site is considered to be low.

4.4.5 Tsunamis and Seiche Evaluation

According to State of California Emergency Management Agency mapping, the site is not located within a tsunami inundation zone based on distance from the coastline and elevation above sea level. Damage resulting from oscillatory waves (seiches) is considered unlikely due to the absence of nearby confined bodies of water.

4.4.6 Flooding

Based on Federal Emergency Management Agency mapping (FEMA 2012), site improvement areas are located within Zone X, which is defined as: “Areas determined to be outside of the 0.2% annual chance floodplain”.

4.4.7 Landsliding

According to mapping by Tan (1995), the site is considered “Generally Susceptible” to landsliding. However, no landslides are mapped in the site area and no evidence of landsliding was encountered during the recent field exploration. Therefore, based on the site conditions and investigation findings, landsliding is not anticipated to be a significant geologic hazard within the subject site.

4.4.8 Compressible and Expansive Soils

Based on observations and testing, the disturbed near surface, Previously Placed Fill, Alluvium and Residual Soil are considered to be potentially compressible in their current condition. Therefore, it is recommended that these soils be overexcavated to the depth of competent underlying natural materials, and properly compacted as recommended herein where they will support structures using shallow spread footings (as opposed to deep foundations that extend through these materials and into the underlying competent formational materials). Based on the site observations and testing, the underlying Santiago

Formation is not anticipated to be subject to significant compressibility under the proposed loads or significant additional compacted fill, if proposed.

Based on observation and laboratory testing, soils at the site are generally anticipated to exhibit a Very Low to High expansion potential (Expansion Index of 130 or less). Recommendations presented herein are intended to reduce the potential adverse impacts of highly expansive soils. Additional evaluation of potential expansive soil conditions should be conducted during grading to confirm that the soils encountered or placed as compacted fill are as anticipated.

4.4.9 Corrosive Soils

Chemical testing was performed to evaluate the potential effects that site soils may have on concrete foundations and various types of buried metallic utilities. Soil environments detrimental to concrete generally have elevated levels of soluble sulfates and/or pH levels less than 5.5. According to American Concrete Institute (ACI) Table 318 4.3.1, specific guidelines have been provided for concrete where concentrations of soluble sulfate (SO_4) in soil exceed 0.1 percent by weight. These guidelines include low water: cement ratios, increased compressive strength, and specific cement type requirements.

Based on the results of the Sulfate testing performed, onsite soils are anticipated to generally have a moderate corrosion potential to Portland cement concrete improvements. As such, Type II Portland cement, minimum compressive strength of 4,000 psi, and maximum water to cement ratio of 0.50 are generally anticipated to be appropriate for proposed improvements, subject to the review and determination of the project Structural Engineer(s) and/or or Architect(s).

A minimum resistivity value less than approximately 5,000 ohm-cm, and/or soluble chloride levels in excess of 200 ppm generally indicate a corrosive environment to buried metallic utilities and untreated conduits. Based on the obtained resistivity values ranging from 2,030 to 4,790 ohm-cm and soluble chloride levels ranging from 39.9 to 107.3 ppm, onsite soils are locally anticipated to have a moderate corrosion potential for buried uncoated/unprotected metallic conduits. Based on these results, at a minimum, the use of buried plastic piping or conduits would appear beneficial, where feasible.

The results of the chemical tests performed are presented in the attached Appendix C. CTE does not practice corrosion engineering. Therefore, a corrosion engineer or other qualified consultant could be contacted if site specific corrosivity issues are of concern.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 General

Although significant details are not available at this time, the proposed improvements at the site are anticipated to be feasible from CTE's geotechnical standpoint, provided the preliminary recommendations in this report are incorporated into the design and construction of the proposed projects. Preliminary recommendations for the proposed earthwork and improvements are included in the following sections and Appendix D. However, recommendations in the text of this report supersede those presented in Appendix D, should variations exist. These preliminary recommendations should be further evaluated as project grading, shoring, and/or foundation plans are further developed.

5.2 Site Preparation

Although this report does not pertain to site environmental conditions, it is anticipated that an appropriate soil management plan and associated documents could be required due to impacted soils that have been previously documented for the subject site. Prior to grading, the site should be cleared of any existing building materials or improvements that are not to remain. Objectionable materials, such as construction debris and vegetation, not suitable for structural backfill should be properly disposed of offsite. Site preparation will likely be dependent upon specific siting of proposed structures with respect to geotechnical conditions as follows.

5.2.1 Shallow Formation Areas

Distress sensitive structures that will utilize shallow spread foundations (as opposed to deep foundations that extend into formational materials for full support) with shallow underlying (generally less than five feet) Santiago Formation, should be overexcavated to a depth of at least 24 inches below proposed foundation depths or to the depth of suitable formation materials, whichever is greater. Overexcavation should extend at least five feet beyond the building perimeter, or the distance resulting from a 1:1 (horizontal: vertical) extended from the bottom edge of the footings, whichever is greater and where feasible with respect to existing improvements that are to remain.

Utility corridors in dense formational materials/areas should be overexcavated to at least one foot below invert elevation so as to utilize heavy duty equipment in an more open or unobstructed environment. Alternatively, utility corridors may be founded in formational materials, but more difficult excavation and potential for perched groundwater or seepage should be anticipated.

It is not generally necessary to overexcavate below subgrade for pavements and hardscape in competent formation material areas. However, rising water or seepage areas could require overexcavation, as necessary, to place cutoff, blanket, and/or subdrains to control and convey collected water to an appropriate dispersal area.

5.2.2 Undocumented Fill Soil and Residual Soil Areas

Undocumented fill soils should be overexcavated to the depth of suitable native soils in areas of distress-sensitive structures or facilities that will utilize shallow spread foundations (as opposed to deep foundations that develop support entirely within the competent underlying formational materials). Overexcavation for distress-sensitive structures or facilities located entirely on residual soils should extend to a depth of at least two feet below rough pad grade. However, structures supported on shallow foundations and located across transitions between residual soil and formational materials, should also be overexcavated to a depth of five feet below pad grade to allow more uniform soil conditions below foundations. Such overexcavation should extend at least five feet beyond the improvement limits, where feasible.

For other proposed improvements, such as pavement and hardscape areas, existing soils should be excavated to the depth of competent materials, or to a minimum of 24 inches below proposed subgrade elevation, whichever is deeper and subject to recommendations by CTE during grading. Subdrainage devices may be recommended should rising water or seepage be encountered during excavation or should it be considered likely to occur based on the exposed conditions observed.

5.2.3 Structures to be Supported by Deep Foundations

Proposed structure areas that will be supported entirely upon deep foundations extended well into competent formational materials should be overexcavated to a minimum depth of three feet below existing or proposed grades, and to reasonably competent materials, whichever is deepest, in order to provide a suitable building pad for minor to moderate additional compacted fill or proposed building improvements. Reasonably competent materials are anticipated to consist of previously placed fill or formational materials that are firm enough to support placement of additional compacted fill materials.

5.2.4 General

Exposed subgrades should be scarified, moisture conditioned, and properly compacted, as described below, prior to placement of compacted fill. Overexcavations adjacent to existing structures should generally not extend below a 1:1 plane extended down from the bottom outer edge of the existing building footings that are to remain or as recommended during grading based on the exposed conditions. Depending on the depth and proximity of existing building footings to remain, alternating slot excavations could be recommended during earthwork.

Existing below-ground utilities should be redirected around proposed structures. Existing utilities at an elevation to extend through the proposed footings should generally be sleeved and caulked to minimize the potential for moisture migration below the building slabs. Abandoned pipes exposed by grading should be securely capped or filled with minimum two-sack cement/sand slurry to help prevent moisture from migrating beneath foundation and slab soils.

An engineer or geologist from CTE should observe the exposed bottom of overexcavations prior to placement of compacted fill or improvements. Overexcavation should extend to a depth of suitable competent soil as observed by a CTE representative. Deeper excavations or overexcavations may be necessary depending upon encountered conditions.

5.3 Site Excavation

Generally, excavation of site materials may be accomplished with heavy-duty construction equipment under normal conditions; however the underlying Tertiary Santiago Formation will become increasingly difficult to excavate with depth.

5.4 Fill Placement and Compaction

Following recommended removals of loose or disturbed soils, the areas to receive fills should be scarified a minimum of nine inches, moisture conditioned, and properly compacted. Fill soils should be compacted to a relative compaction of at least 90 percent as evaluated by ASTM D 1557 at moisture contents at least three percent above optimum. In pavement areas, granular soils within one foot of subgrade and all aggregate base materials should be compacted to at least 95 percent compaction relative to maximum dry density.

The optimum lift thickness for fill soil will depend on the type of compaction equipment used. Generally, backfill should be placed in uniform, horizontal lifts not exceeding eight inches in loose thickness. Fill placement and compaction should be conducted in conformance with local ordinances.

5.5 Fill Materials

Properly moisture-conditioned very low to high expansion potential soils derived from the on-site excavations are considered suitable for reuse as compacted fill on the site if prepared and placed as recommended herein. However, moderately and highly expansive soils should be placed at depths greater than five feet below proposed grades, or thoroughly blended with very low to low expansion potential soils to create materials with Expansion Index generally less than 50. Soils should also be screened of organics and materials generally greater than three inches in maximum dimension, as recommended. Irreducible materials greater than three inches in maximum dimension generally should not be used in shallow fills (within three feet of proposed grades). In utility trenches, adequate bedding should surround pipes.

Imported fill beneath structures and flatwork should have an Expansion Index of 20 or less (ASTM D 4829) with less than 30 percent passing the No. 200 sieve. Proposed fill soils for use in structural or slope areas should be evaluated by CTE before being imported to the site. It is anticipated that imported soils will be screened, sampled, and tested in accordance with applicable guidelines. Although this report does not pertain to site environmental conditions, it is anticipated that an appropriate soil management plan and associated documents could be required due to the presence of impacted soils that have been previously documented for the subject site. Laboratory screen testing of proposed import soils could require more than one week to complete, depending on the testing that is determined to be necessary.

Retaining wall backfill located within a 45-degree wedge extending up from the heel of the wall should consist of soil having an Expansion Index of 20 or less (ASTM D 4829) with less than 30 percent passing the No. 200 sieve. On site soil gradation and Atterberg Limit laboratory tests indicate that localized site soils may not meet these recommendations. As such selective grading and/or import of select soil could be necessary. The upper 12 to 18 inches of wall backfill could consist of lower permeability soils, in order to reduce surface water infiltration behind walls. The project structural engineer and/or architect should detail proper wall backdrains, including gravel drain zones, fills, filter fabric and perforated drain pipes. A conceptual wall backdrain detail that may be appropriate for specific proposed retaining walls is provided in Figure 5.

5.6 Temporary Construction Slopes

The following recommended temporary slopes should be relatively stable against deep-seated failure, but may experience localized sloughing. On-site soils are considered Type B and Type C soils with recommended slope ratios as set forth in Table 5.6.

TABLE 5.6
RECOMMENDED TEMPORARY SLOPE RATIOS

SOIL TYPE	SLOPE RATIO (Horizontal: vertical)	MAXIMUM HEIGHT
B (Tertiary Santiago Formation)	1:1 (OR FLATTER)	20 Feet
C (Previously Placed Fill, Alluvium and Residual Soil)	1.5:1 (OR FLATTER)	10 Feet

The above noted temporary slopes are generally anticipated to be appropriate above a maximum four foot vertical excavation. However, actual field conditions and soil type designations must be verified by a "competent person" while excavations exist, according to Cal-OSHA regulations. In addition, the above sloping recommendations do not allow for surcharge loading at the top of slopes by vehicular traffic, equipment or materials. Joints and fractures in all temporary and cut slopes should be evaluated for stability by CTE, and could modify temporary slope ratios shown on Table 5.6. Appropriate surcharge setbacks must be maintained from the top of all unshored slopes.

5.7 Construction Shoring

Deep excavations for below grade levels are anticipated for at least some of the proposed improvements/buildings at the site. Therefore, temporary construction shoring recommendations are provided. Groundwater/dewatering is not generally anticipated, but cannot be precluded. Although not generally expected, localized perched groundwater may also be encountered during construction of the shoring, especially if depths greater than 15 feet are anticipated to be exceeded. Disposal of collected water should be performed in accordance with pertinent regulatory requirements. The shoring designer and contractor should also anticipate locally saturated and/or cohesionless materials subject to sloughing. Tiebacks could also locally encounter low cohesion soils, or very hard cemented sands, gravel and cobbles, and installation may become difficult.

Typical soldier beam and lagging shoring systems are anticipated to be suitable for use at the subject site. However, other shoring systems may also be feasible. Therefore, it is recommended that the project coordinators contact a qualified shoring contractor to discuss the most feasible and economic shoring and/or underpinning system(s). Active or at-rest pressures provided herein may be used for design of permanent shoring. Temporary shoring design may be based on the active or at-rest pressures provided herein, but may be reduced by 30 percent as they are not for permanent use.

Typically, underpinning of adjacent existing improvements or structures could be required where the foundations of these improvements impinge upon the active wedge, which can be defined by a 1.25:1 (horizontal: vertical) plane from the bottom of the deepest proposed excavation. If necessary, underpinning can obtain allowable end bearing loads on the order of 15,000 pounds per square foot (psf), with additional allowable skin friction on the order of 800 psf, both for the portions of the underpinning element located more than 10 feet into competent dense to very dense formational materials.

For conventional soldier beam and lagging shoring systems, soldier beams, spaced at least three diameters on center, may be designed using an allowable passive pressure of 500 psf per foot of depth, up to a maximum of 5,000 psf, for the portion of the soldier beam embedded in competent dense to very dense formational materials below the proposed bottom of excavation. Provisions should be made to assure firm contact between the beam and the surrounding soils. Concrete placed in soldier beams below the proposed excavation should have adequate strength to transfer the imposed pressures. A lean concrete mix may be used in the soldier pile above the base of the proposed excavation. Soldier beam installations should be observed by CTE.

Continuous timber or precast concrete lagging between soldier beams is recommended. Lagging should be designed for the recommended earth pressures, but may be limited to a maximum pressure of 400 psf due to arching in the soils. Voids created behind lagging by sloughing of locally cohesionless soil layers shall be grouted or slurry filled, as feasible. In addition, generally the upper two to four feet of lagging shall be grouted or slurry-filled to assist in diverting surface water from migrating behind the shoring walls. Adequate surface protection from drainage should be maintained at all times.

For design purposes, it may be estimated that drilled friction anchors will develop an average friction of 3,000 psf for the portion of the anchor extending beyond the active wedge and embedded in the effective zone. However, additional capacities may be developed based on the installation technique. Friction anchors should extend a minimum of 20 feet beyond the active wedge. However, greater depths may be required to develop the desired capacities. The active wedge can be defined by a 1.25:1 (horizontal: vertical) plane from the bottom of the deepest proposed excavation.

Friction anchors may generally be installed at angles of 15 through 40 degrees below horizontal. Anchors should be filled from the tip outward to the approximate plane where the active wedge begins. The portion of anchor in the active wedge should not be filled with concrete or should remain unbonded. Localized caving of cohesionless soils may occur during tieback drilling and the contractor should have adequate means for mitigation.

To verify the friction value used in design, all of the anchors should be load tested to at least 133% of the design load in accordance with the Post Tensioning Institute (PTI). Performance testing shall also be performed as per PTI recommendations. CTE should observe the installation of the anchors and all load testing. The shoring contractor should supply information on the hydraulic jacks verifying that they have been recently calibrated before their use.

It is likely that the City will require that temporary construction shoring tieback anchors extending into the upper 20 feet of the public right-of-way be disengaged or removed following construction of the proposed improvements. Disengaging temporary shoring tieback anchors should have no adverse effects on proposed or existing improvements, provided proposed permanent improvements are designed in accordance with the recommendations contained in this report. In addition, the geotechnical consultant shall observe the disengaging or removal of tieback anchors in order to provide the necessary certification at the completion of the project.

Monitoring of settlement and horizontal movement of the shoring system and adjacent improvements should generally occur on a weekly basis during installation and excavation in order to confirm that actual movements are within tolerable limits. The number and location of monitoring points shall be indicated on the shoring plans; CTE will review such locations and the proposed monitoring schedule once prepared and provided by the shoring contractor.

Additional shoring and underpinning recommendations can be provided in an update geotechnical report(s), to be submitted under separate cover as structural plans develop. Hydrostatic hold-down or similar anchors are not anticipated to be required. However, should they become necessary or desired, our office should be contacted for additional design recommendations.

5.8 Foundations and Slab Recommendations

The following recommendations are for preliminary design purposes only. These foundation recommendations should be re-evaluated after review of the project grading, shoring, and/or foundation plans, and after completion of rough grading of the building pad areas. During completion of rough pad grading, Expansion Index of near surface soils should be evaluated, and recommendations updated, as necessary. Lightly loaded upright structures such as flagpoles and other supports may be designed in accordance with the current California Building Code, or applicable standards assuming code minimum design values or as per the recommendations provided herein.

Preliminary recommendations are provided herein for shallow spread foundations, mat foundations, and deep foundations. It is anticipated the shallow spread foundations and/or mat foundations would be suitable for support of proposed improvements that are founded either entirely upon proposed compacted fill materials or entirely upon competent dense formational materials. It is anticipated that deep foundations would be suitable for support of proposed improvements that are to be constructed in areas where existing deep previously placed fill areas without proper documentation are present or where heavier loads or uplift loads will be present.

Although additional deep foundation types are feasible for the subject site, we anticipate that traditional drilled piers or caissons, or auger cast piles will likely be the most economical. It is further anticipated that driven piles will not be feasible at the subject site due to the disruptive noise and vibration that would result to the active hospital site. Similarly, ground modification via aggregate piers, Geopiers, Stone Columns, or similar are anticipated to be unacceptably disruptive to the adjacent active hospital site.

5.8.1 Shallow Spread & Mat Foundations

Preliminary foundation recommendations presented herein are based on the anticipated very low to medium expansion potential of near surface site soils following preparatory grading or appropriate formational materials (Expansion Index generally less than 50).

Following the recommended preparatory grading, continuous and isolated spread or mat foundations are anticipated to be suitable for use at this site. It is anticipated that the proposed footings will be founded entirely in properly engineered fill or formational materials as recommended herein. Footings should not straddle cut-fill interfaces; in these cases the cut grade areas should be overexcavated and a compacted fill placed as previously detailed herein. Foundations for structures in dense formational terrain should be placed entirely on cut materials.

Foundation dimensions and reinforcement should be based on a net dead plus live load bearing value of 2,500 pounds per square foot for footings founded in suitable compacted fill or formational materials and embedded a minimum of 24 inches below the lowest adjacent rough subgrade elevation. If utilized, continuous footings should be at least 15 inches wide. Isolated footings should be at least 24 inches in least dimension.

The above bearing values may be increased by 250 psf for each additional six inches of width or embedment beyond the minimums recommended, for an additional increase of up to 2,000 psf. The above bearing values may also be increased by one third for short duration loading which includes the effects of wind or seismic forces. Since the bearing values are net values, the weight of concrete in the foundations can be taken as 50 pcf, and the weight of any soil backfill on foundations can be neglected. If elastic foundation is designed, an uncorrected subgrade modulus of 145 pci is anticipated to be appropriate.

Minimum footing reinforcement for continuous footings should consist of four No. 6 reinforcing bars; two placed near the top and two placed near the bottom, or as per the project structural engineer. However, the project structural engineer should design and detail all footing reinforcement. Footing excavations in fill areas should be maintained at, or be brought to, a minimum moisture content of 120 percent of the optimum moisture content just prior to concrete placement.

5.8.2 Foundation Settlement

The maximum total static settlement is expected to be on the order of one inch and the maximum differential static settlement is expected to be on the order of 0.7 inch over a distance of approximately 50 feet. Due to the absence of a shallow and uniformly distributed groundwater table and the dense to very dense nature of underlying materials, dynamic settlement is not expected to adversely affect the proposed improvements.

5.8.3 Foundation Setback

Footings for structures should be designed such that the horizontal distance from the face of adjacent slopes to the outer edge of footings is at least 15 feet. In addition, footings should be founded beneath a 1:1 plane extended up from the nearest bottom edge of adjacent trenches and/or excavations generally within approximately 15 lateral feet. Deepening of affected footings may be a suitable means of attaining the prescribed setbacks.

5.8.4 Lateral Resistance

Lateral loads acting against structures may be resisted by friction between the footings and the supporting compacted fill soil or passive pressure acting against structures. If frictional resistance is used, an allowable coefficient of friction of 0.28 (total frictional resistance equals the coefficient of friction multiplied by the dead load) is recommended for concrete cast directly against compacted fill. A design passive resistance value of 250 pounds per square foot per foot of depth (with a maximum value of 3,500 pounds per square foot) may be used. The allowable lateral resistance can be taken as the sum of the frictional resistance and the passive resistance without reduction.

5.8.5 Interior Slabs-On-Grade

Concrete slabs should be designed based on the anticipated loading, but measure at least 5.5 inches thick due to the anticipated soil conditions. Slab reinforcement should at least consist of No. 4 reinforcing bars, placed on maximum 16-inch centers, each way, at or above mid-slab height, but with proper concrete cover.

Slabs subjected to heavier loads may require thicker slab sections and/or increased reinforcement. A 125-pci subgrade modulus is considered suitable for elastic design of minimally embedded improvements such as slabs-on-grade. Slab on grade areas should be maintained at a minimum 120 percent of the optimum moisture content or be brought to such moisture contents just prior to placement of slab underlayments or concrete.

In moisture-sensitive floor areas, a suitable vapor retarder of at least 15-mil thickness (with all laps or penetrations sealed or taped) overlying a four-inch layer of consolidated crushed aggregate or gravel (with SE of 30 or more) should be installed, as per the 2013 or 2016 CBC/Green Building Code. An optional maximum two-inch layer of similar material could be placed above the vapor retarder to help protect the membrane during steel and concrete placement. However, per ACI guidelines, better protection from moisture intrusion would be expected from the concrete being placed directly upon the vapor retarder. This recommended protection is generally considered typical in the industry. If proposed floor areas or coverings are considered especially sensitive to moisture emissions, additional recommendations from a specialty consultant could be obtained. CTE is not an expert at preventing moisture penetration through slabs. Therefore, a qualified architect or other experienced professional should be contacted if moisture penetration is a more significant concern.

5.8.6 Auger Cast Pile Deep Foundations

As indicated herein, deep foundations are suitable for support of proposed building improvements. Loads on deep foundations for the proposed building improvements are anticipated to be large. Therefore, we anticipate auger pressure grouted (APG) piles are suitable to be utilized as needed or as desired.

APG piles should be designed and constructed with tip elevations extending a minimum ten feet into competent dense formational materials and a minimum ten feet below proposed rough grades. Prior to in-situ testing, preliminary auger cast pile design should be completed by a qualified design build specialty contractor based on allowable end bearings on the order of 15,000 psf and 800 psf skin friction for the portion of the APG in competent dense formational materials. A one third increase in the capacities is considered appropriate for evaluation of short-duration loads such as those resulting from wind or seismic forces. A load testing program is also to be designed and detailed by the pile installation contractor. However, the pile testing program should be reviewed and approved by CTE prior construction.

Fixed or free head lateral capacities for auger cast piles are anticipated to be on the order of 10 or five kips per pile, respectively, depending on the structural capacities of the piles themselves. If more precise design parameters are required, CTE can perform lateral pile analyses on piles, once rough cross-sections have been determined.

5.8.7 Caisson and Grade Beam Foundation System

Deep drilled pier or caisson foundation systems are also anticipated to be suitable for support of proposed improvements at the subject site. Minimum 18-inch diameter caissons should be embedded a minimum of 10 feet below grade and 10 feet into competent dense formational materials. Caissons shall be spaced a minimum of three diameters, center to center.

For preliminary planning purposes, caissons should be designed for an allowable end bearing pressure of 13,000 psf plus 500-psf skin friction for the portion of the caisson in competent formational materials. A one-third increase for short duration load evaluation may also be used. Uplift capacity should be equal to the weight of the caisson itself and skin friction. The weight of the concrete may be ignored when determining downward capacity.

All caisson excavations should be inspected by the geotechnical representative to verify material competency and proper embedment depth. The bottom of each caisson should be devoid of any loose debris, slough or water prior to steel cage placement and should remain clean until placement of the concrete. Excessive caving of caisson drill holes during drilling is not generally anticipated, but cannot be precluded; therefore, the use of a slip liner or alternative drilling techniques could also be required.

Load testing of an indicator or production caisson should be anticipated. The test caisson should be embedded to similar depths as the proposed production caissons, but could be of lesser diameter in order to reduce the actual test load that will be required.

Grade beams may be installed to distribute structure loads or resist lateral loads as necessary. Grade beam reinforcement should be designed as per the structural engineer. Grade beams may be depended upon for bearing and lateral support of imposed loads in accordance with the design parameters previously provided for shallow spread foundations *only* if the building pad has been prepared in accordance with the recommendations herein for shallow formation areas or if the building pad is entirely in competent cut materials.

To provide resistance for design lateral loads, we recommend using an equivalent passive fluid weight of 250 pounds per cubic foot, up to a maximum pressure of 4,000 psf, for caissons placed against competent compacted fill or formational materials. Due to arching in soils against a round foundation element, the effective width for lateral caisson resistance calculations can be assumed to be twice the caisson diameter. These values assume a horizontal surface for the soil mass extending at least 15 feet.

5.8.8 General for Deep Foundations

Total and differential static settlement of deep foundations is anticipated to be well less than 1.0 and 0.5 inches, respectively.

Design and detailing of all deep foundations, grade beams, and concrete slab reinforcement should be provided by the project structural or specialty engineer(s); especially where deep foundation supported buildings will abut or connect to existing buildings. However, in general, more robust structural connections are recommended at critical pathways and building connections.

5.9 Code Derived Seismic Design Criteria

The seismic ground motion values listed in the table below were derived in accordance with the ASCE 7-10 Standard and the 2013 and 2016 CBC for and Essential Facility. This was further accomplished by establishing the Site Class based on the soil properties at the site, and then calculating the site coefficients and parameters using the United States Geological Survey Seismic Design Maps application using the site coordinates of 33.1849 degrees latitude and -117.2902 degrees longitude. These values are intended for the design of structures to resist the effects of earthquake generated ground motions.

TABLE 5.9
SEISMIC GROUND MOTION VALUES

PARAMETER	VALUE	CBC REFERENCE (2013)
Site Class	C	ASCE 7, Chapter 20
Mapped Spectral Response Acceleration Parameter, S_S	1.057g	Figure 1613.3.1 (1)
Mapped Spectral Response Acceleration Parameter, S_1	0.411g	Figure 1613.3.1 (2)
Seismic Coefficient, F_a	1.000	Table 1613.3.3 (1)
Seismic Coefficient, F_v	1.389	Table 1613.3.3 (2)
MCE Spectral Response Acceleration Parameter, S_{MS}	1.057g	Section 1613.3.3
MCE Spectral Response Acceleration Parameter, S_{M1}	0.570g	Section 1613.3.3
Design Spectral Response Acceleration, Parameter S_{DS}	0.705g	Section 1613.3.4
Design Spectral Response Acceleration, Parameter S_{D1}	0.380g	Section 1613.3.4
PGA_M	0.401g	ASCE 7, Equation 11.8-1

5.10 Site Specific Ground Motion Study

A site specific risk-targeted maximum considered earthquake (MCE_R) ground motion hazard analysis was performed in accordance with Chapter 21 of ASCE/SEI 7-10, Section 1613 of the California Building Code (CBC), and the 2008 USGS Ground Acceleration Maps. The software package EZ-FRISK (version 7.65) was used to facilitate the analysis. The seismic ground motion values listed in Table 5.10 below were derived in accordance with the site-specific ground motion analysis. Response spectra, output data, and a description of the ground motion study are provided in Appendix E.

TABLE 5.10 SITE-SPECIFIC DESIGN ACCELERATION PARAMETERS (EZFRISK)	
PARAMETER	ACCELERATION VALUE
S_{MS}	1.120g
S_{M1}	0.510g
S_{DS}	0.747g
S_{D1}	0.340g

5.11 Earth Pressures

Retaining walls up to approximately 20 feet high and backfilled using granular soils may be designed using the equivalent fluid weights given below. As indicated and/or implied, some onsite soils will not be suitable for use as wall backfill due to expansion potential and/or fine grained soil contents. As such, importing of select granular materials is anticipated to be required for traditional excavation and backfill retaining walls.

TABLE 5.11 EQUIVALENT FLUID UNIT WEIGHTS (pounds per cubic foot)		
WALL TYPE	LEVEL BACKFILL	SLOPE BACKFILL 2:1 (HORIZONTAL: VERTICAL)
CANTILEVER WALL (YIELDING)	30	50
RESTRAINED WALL	60	80

Lateral pressures on cantilever retaining walls (yielding walls) due to earthquake motions may be calculated based on work by Seed and Whitman (1970). The total lateral thrust against a properly drained and backfilled cantilever retaining wall above the groundwater level can be expressed as:

$$P_{AE} = P_A + \Delta P_{AE}$$

For non-yielding (or "restrained") walls, the total lateral thrust may be similarly calculated based on work by Wood (1973):

$$P_{KE} = P_K + \Delta P_{KE}$$

Where P_A = Static Active Thrust (determined via Table 5.11)
P_K = Static Restrained Wall Thrust (determined via Table 5.11)
ΔP_{AE} = Dynamic Active Thrust Increment = $(3/8)\ k_h\ \gamma H^2$
ΔP_{KE} = Dynamic Restrained Thrust Increment = $k_h\ \gamma H^2$
k_h = 2/3 Peak Ground Acceleration = $2/3(PGA_M)$
H = Total Height of the Wall
γ = Total Unit Weight of Soil ≈ 130 pounds per cubic foot

The increment of dynamic thrust may be distributed triangularly with a line of action located at H/3 above the bottom of the wall (SEAOC, 2013).

These values assume non-expansive backfill and free-draining conditions. The majority of the onsite soils may not be suitable for use as wall backfill. Measures should be taken to prevent moisture buildup behind all retaining walls. Figure 5 attached herewith shows a conceptual wall backdrain that may be suitable for use at the subject site depending on the specifics of the proposed retaining wall(s). Waterproofing should be as specified by the project architect or specialty design consultant(s).

In addition to the recommended earth pressure, subterranean structure walls adjacent to the streets or other traffic loads should be designed to resist a uniform lateral pressure of 100 psf. This is the result of an assumed 300-psf surcharge behind the walls due to normal street traffic. If the traffic is kept back at least 10 feet or a distance equal to the retained soil height from the subject walls, whichever is less, the traffic surcharge may be neglected. The project architect or structural engineer should determine the necessity of waterproofing the subterranean structure walls to reduce moisture infiltration.

5.12 Exterior Flatwork

To reduce the potential for cracking in exterior flatwork caused by minor movement of subgrade soils and typical concrete shrinkage, it is recommended that such flatwork be installed with crack-control joints at appropriate spacing as designed by the project architect, and measure a minimum 4.5 inches in thickness. Additionally, it is recommended that flatwork be installed with at least number 3 reinforcing bars on maximum 18-inch centers, each way, at above mid-height of slab but with proper concrete cover. Flatwork, which should be installed with crack control joints, includes driveways, sidewalks, and architectural features. Doweling of flatwork joints at critical pathways or similar could also be beneficial in resisting minor subgrade movements.

Before concrete placement, all subgrade preparation and soil moisture conditioning should be conducted according to the earthwork recommendations previously provided. Positive drainage should be established and maintained next to all flatwork. Subgrade materials shall be maintained at, or be elevated to a minimum 130 percent of the optimum moisture content prior to concrete placement.

While the flatwork recommendations presented herein are anticipated to perform adequately, the City of Oceanside (should this site be under their authority) will typically require a minimum six-inch thick layer of Class 2 Aggregate Base under all concrete site work.

5.13 Vehicular Pavements

The proposed improvements include paved vehicle drive and parking areas. Presented in Table 5.12 are preliminary minimum pavement sections utilizing laboratory determined "R"-Value and estimated Traffic Index Values.

TABLE 5.13
RECOMMENDED PAVEMENT THICKNESS

Traffic Area	Assumed Traffic Index	Preliminary Subgrade "R"-Value	Asphalt Pavements		Portland Cement Concrete Pavements On Subgrade Soils (inches)
			AC Thickness (inches)	Aggregate Base Thickness (inches)	
Moderate Drive Areas & Fire Lanes	6.0	10+	5.0	10.0	8.5
Parking & Light Drive Areas	5.0	10+	4.0	8.0	7.5

1 Caltrans class 2 aggregate base or "Greenbook" Processed Miscellaneous Base
2 Concrete should have a modulus of rupture of at least 600 psi
3 Alternative asphalt concrete sections can generally be proposed by substituting 0.5 inches of asphalt for 1.0 inch of aggregate base, if desired.
4 PCC pavement sections may be decreased by 0.5 inches if six inches of aggregate base is used to underlie these pavements.
5 If permeable pavers are used in either of the above traffic areas, they should be underlain by a relatively impermeable liner, a perforated drain pipe to suitable outlet, and Class 2 Permeable Material with thicknesses equal to 20% greater than the above Class 2 Aggregate Base.

Following rough site grading, CTE recommends laboratory testing of representative at-grade soils for as-graded "R"-Value as laboratory testing of collected samples can indicate a variation of "R" value results. The local public agency, as applicable, should be involved in the design and construction of any improvements within their respective rights-of-way, and for onsite pavements as required.

All subgrade and aggregate base materials beneath pavement areas should be compacted to 95% relative compaction in accordance with ASTM D1557, at a minimum of two percent above optimum moisture content.

Asphalt paved areas should be designed, constructed, and maintained in accordance with the recommendations of the Asphalt Institute or other widely recognized authority. Concrete paved areas should be designed and constructed in accordance with the recommendations of the American Concrete Institute or other widely recognized authority, particularly with regard to thickened edges, joints, and drainage. The Standard Specifications for Public Works construction ("Greenbook") or Caltrans Standard Specifications may be referenced for pavement materials specifications.

5.14 Drainage

Surface runoff should be collected and directed away from improvements by means of appropriate erosion-reducing devices and positive drainage should be established around the proposed improvements. Positive drainage should be directed away from improvements and slope areas at a gradient of at least two percent for a distance of at least five feet. However, the project civil engineers should evaluate the on-site drainage and make necessary provisions to keep surface water from affecting the site.

Generally, CTE recommends against allowing water to infiltrate building pads or adjacent to slopes and improvements. However, we understand that some agencies are encouraging the use of storm-water cleansing devices. Therefore, if storm water cleansing devices must be used, it is generally recommended that they be underlain by an impervious barrier and that the infiltrate be collected via subsurface piping and discharged off site.

5.15 Slopes

Based on anticipated soil strength characteristics, fill and cut slopes should be constructed at slope ratios of 2:1 (horizontal: vertical) or flatter. These fill slope inclinations should exhibit factors of safety greater than 1.5.

Although properly constructed slopes on this site should be grossly stable, the soils will be somewhat erodible. Therefore, runoff water should not be permitted to drain over the edges of slopes unless that water is confined to properly designed and constructed drainage facilities. Erosion-resistant vegetation should be maintained on the face of all slopes. Typically, soils along the top portion of a fill slope face will creep laterally. CTE recommends against building distress-sensitive hardscape improvements within five feet of slope crests.

As indicated, site slopes are generally considered to be stable provided site drainage is implemented as described herein and is constructed and maintained in accordance with the recommendations of the project Civil Engineer

5.16 Plan Review

CTE should be authorized to review the project grading, shoring, and foundation plans, and the grading or earthwork specifications (as applicable), prior to commencement of earthwork. Recommendations contained herein may be modified depending upon development plans.

5.17 Construction Observation

The recommendations provided in this report are based on conceptual design information for the proposed construction and the subsurface conditions observed in the explorations performed by CTE and previously by others. The interpolated subsurface conditions should be checked in the field during construction. Foundation and pavement recommendations may be revised upon review of development plans and completion of grading and as-built laboratory test results.

6.0 LIMITATIONS OF INVESTIGATION

The field evaluation, laboratory testing, and geotechnical analysis presented in this report have been conducted according to current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations and opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered during construction.

The recommendations presented herein have been developed in order to reduce the potential adverse impacts of differential bearing, previously placed fills, and expansive soil conditions associated with the subject site. However, even with the design and construction precautions herein, some differential movement and associated distress can occur and should be anticipated. In addition, observation, evaluation, and update recommendations provided once project specific plans are developed and during grading or construction are absolutely essential and CTE cannot accept responsibility for plans not reviewed or conditions not observed during grading or construction if such services are provided by others.

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

CTE's conclusions and recommendations are based on an analysis of the observed conditions. If conditions different from those described in this report are encountered, this office should be notified and additional recommendations, if required, will be provided.

This report is prepared for the project client as described. It is not applicable to any other site. No other party can rely on this report without the express permission of CTE.

The opportunity to be of service on this project is appreciated. If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

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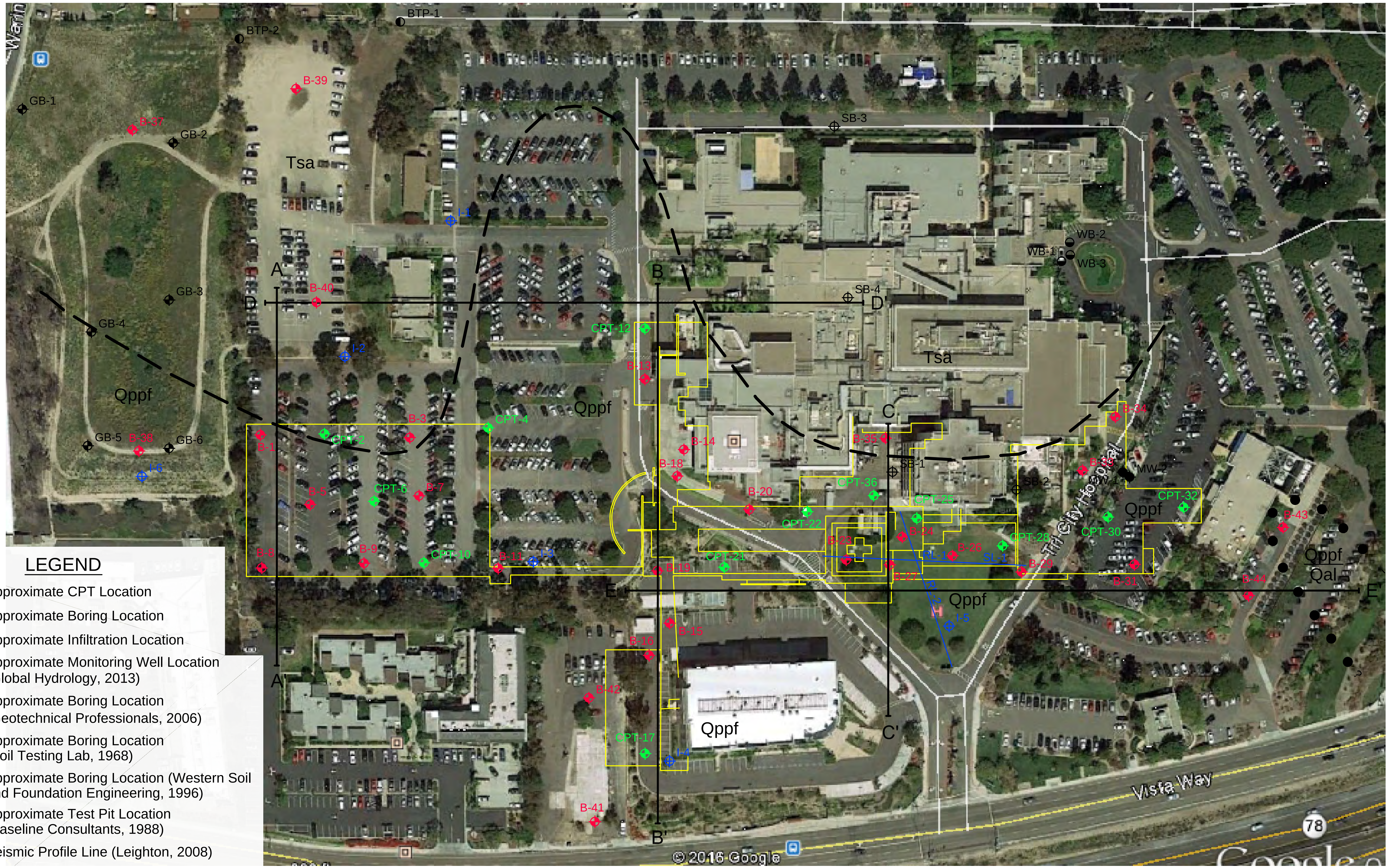
SITE INDEX MAP

PROPOSED TRI-CITY MEDICAL CENTER EXPANSION
4002 VISTA WAY
OCEANSIDE, CALIFORNIA

SCALE: AS SHOWN	DATE: 8/16
CTE JOB NO.: 10-13000G	FIGURE: 1



120' 0 60' 120'

LEGEND

CPT-46	Approximate CPT Location
B-46	Approximate Boring Location
I-6	Approximate Infiltration Location
MW-2	Approximate Monitoring Well Location (Global Hydrology, 2013)
GB-6	Approximate Boring Location (Geotechnical Professionals, 2006)
SB-4	Approximate Boring Location (Soil Testing Lab, 1968)
WB-3	Approximate Boring Location (Western Soil and Foundation Engineering, 1996)
BTP-4	Approximate Test Pit Location (Baseline Consultants, 1988)
SL-1 RL-1	Seismic Profile Line (Leighton, 2008)
Qppf	Previously Placed Fill
Tsa	Santiago Formation
Qal	Alluvial Deposits
?	Approximate Geologic Contact
E—E'	Approximate Cross Section Location

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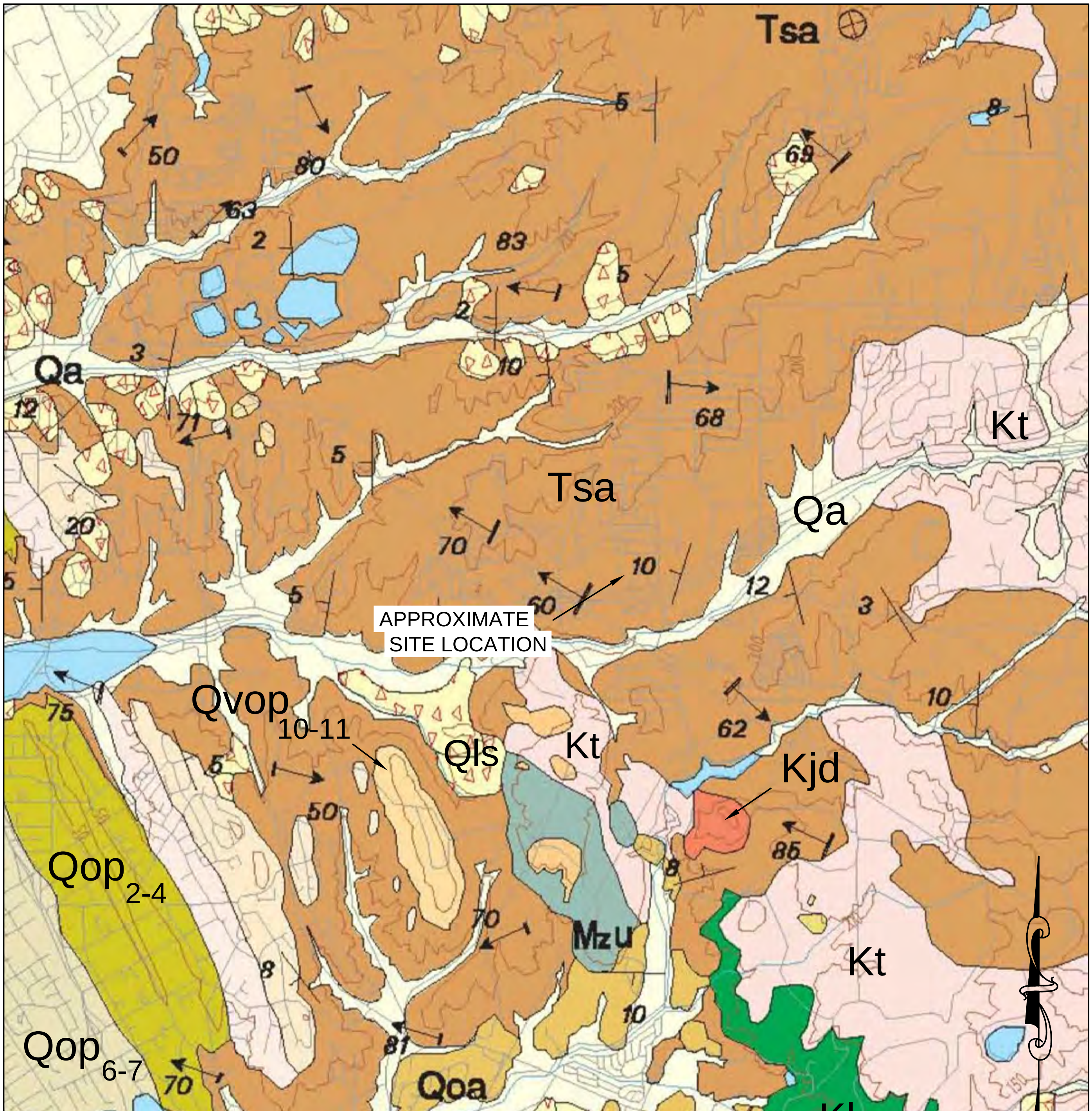
GEOLOGIC/EXPLORATION LOCATION MAP

PROPOSED TRI-CITY MEDICAL CENTER EXPANSION
4002 VISTA WAY
OCEANSIDE, CALIFORNIA

CTE JOB NO:	10-13000G
SCALE:	1" = 120'
DATE: 9/16	FIGURE: 2



LEGEND

Qa	Alluvial Flood Plain Deposits
Qls	Landslide Deposits
Qop	Old Paralic Deposits
Qvop	Very Old Paralic Deposits
Tsa	Santiago Formation
Kp	Point loma Formation
Kt	Tonalite
Mzu	Metasedimentary and Metavolcanic Rock

NOTE: Base Map by Kennedy and Tan, 2005, Geologic Map of the Oceanside 30' x 60' Quadrangle, California.

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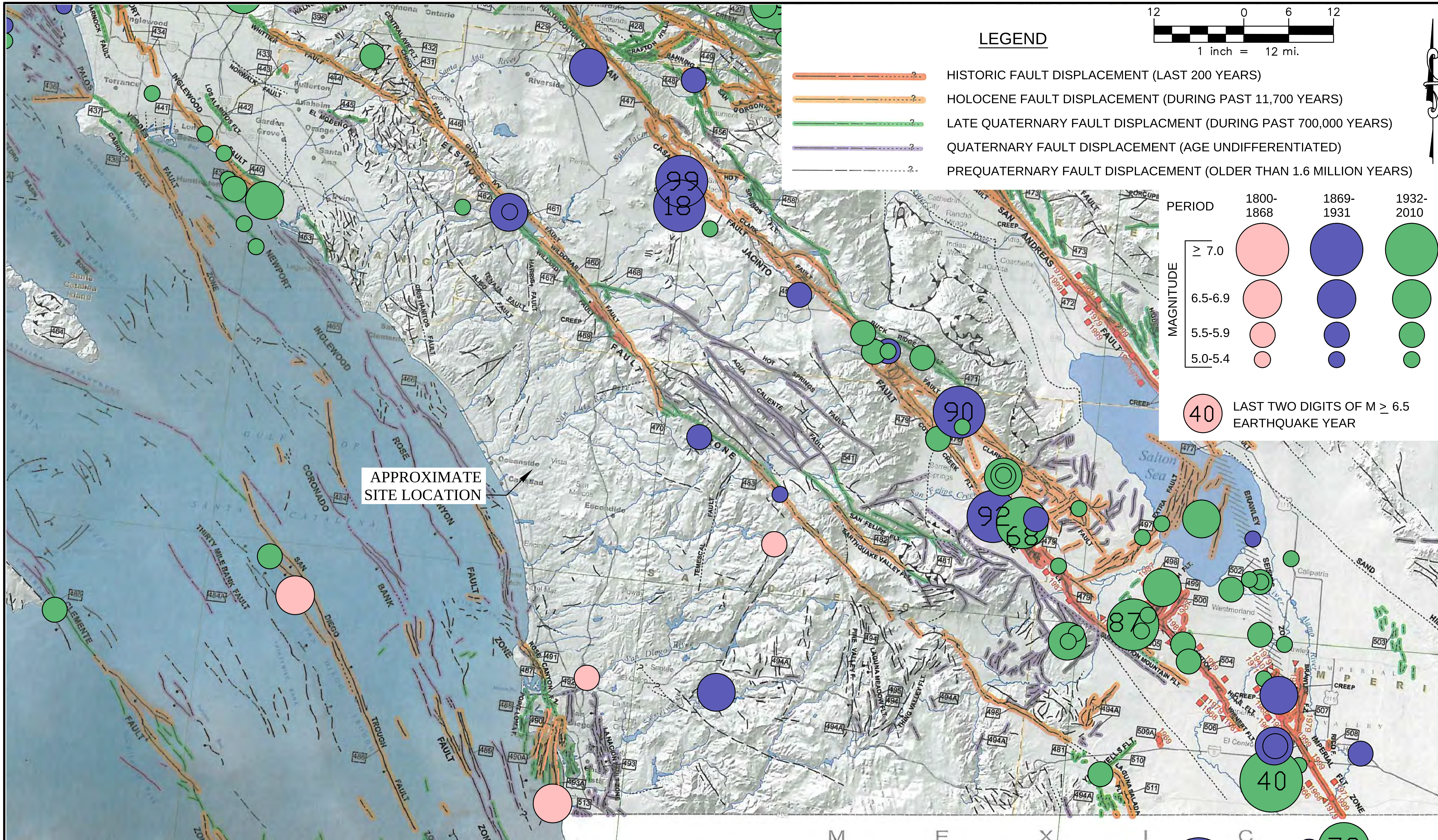
REGIONAL GEOLOGIC MAP
PROPOSED PALOMAR COLLEGE EXPANSION
1140 WEST MISSION ROAD
SAN MARCOS, CALIFORNIA

SCALE: 1"~4,000'	DATE: 9/16
CTE JOB NO.: 10-13000G	FIGURE: 3

\\Esc_server\projects\10-13000G\Figure 3 (Geo Map).dwg



NOTES: FAULT ACTIVITY MAP OF CALIFORNIA, 2010, CALIFORNIA GEOLOGIC DATA MAP SERIES MAP NO. 6;
EPICENTERS OF AND AREAS DAMAGED BY M≥5 CALIFORNIA EARTHQUAKES, 1800-1999 ADAPTED AFTER TOPPOZADA, BRANUM, PETERSEN, HALLSTORM, CRAMER, AND REICHLE, 2000, CDMG MAP SHEET 49
REFERENCE FOR ADDITIONAL EXPLANATION; MODIFIED WITH CISN AND USGS SEISMIC MAPS

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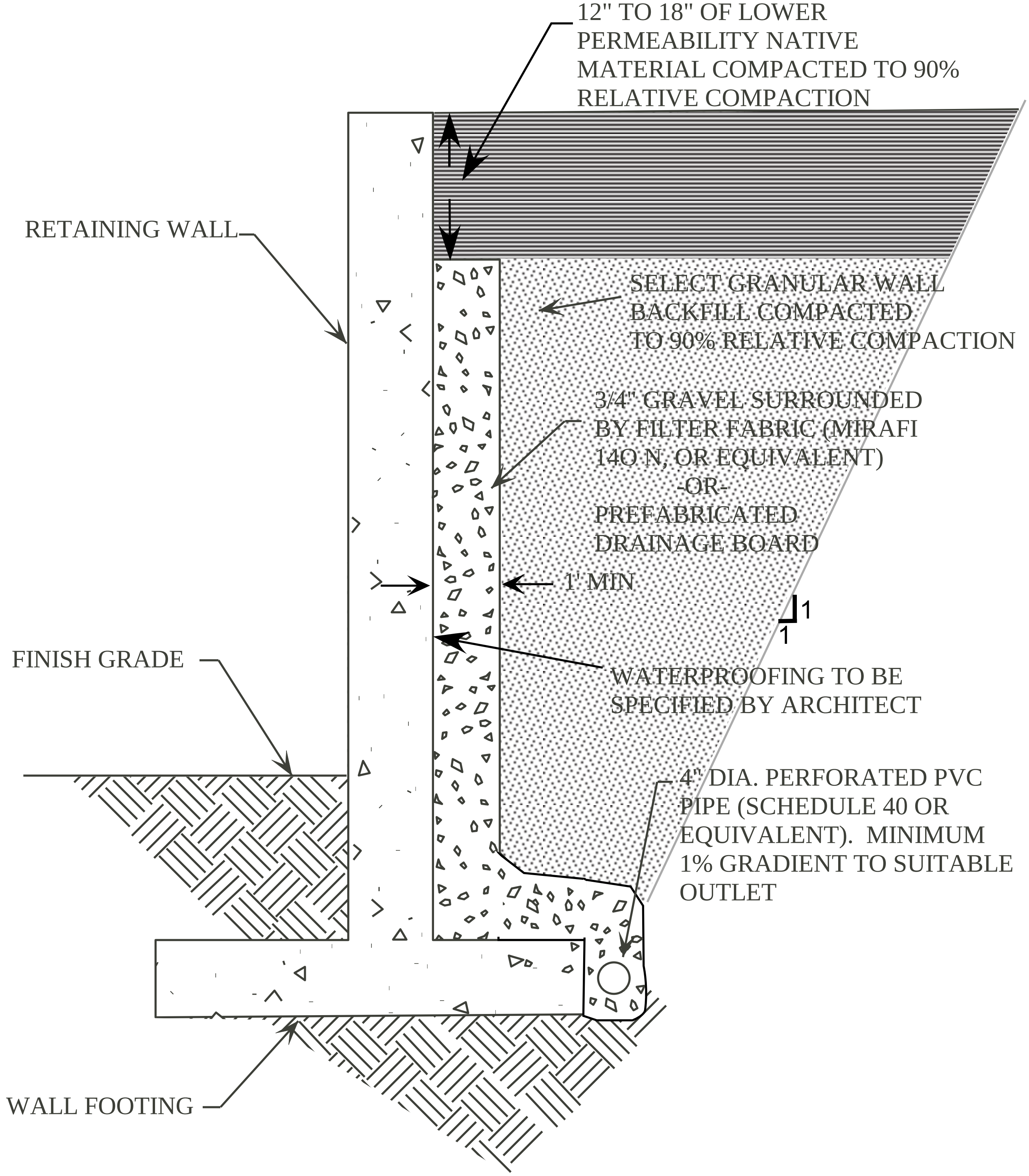
REGIONAL FAULT AND SEISMICITY MAP
PROPOSED TRI-CITY MEDICAL CENTER EXPANSION
4002 VISTA WAY
OCEANSIDE, CALIFORNIA

CTE JOB NO:	10-13000G
SCALE:	1 inch = 12 miles
DATE: 9/16	FIGURE: 4



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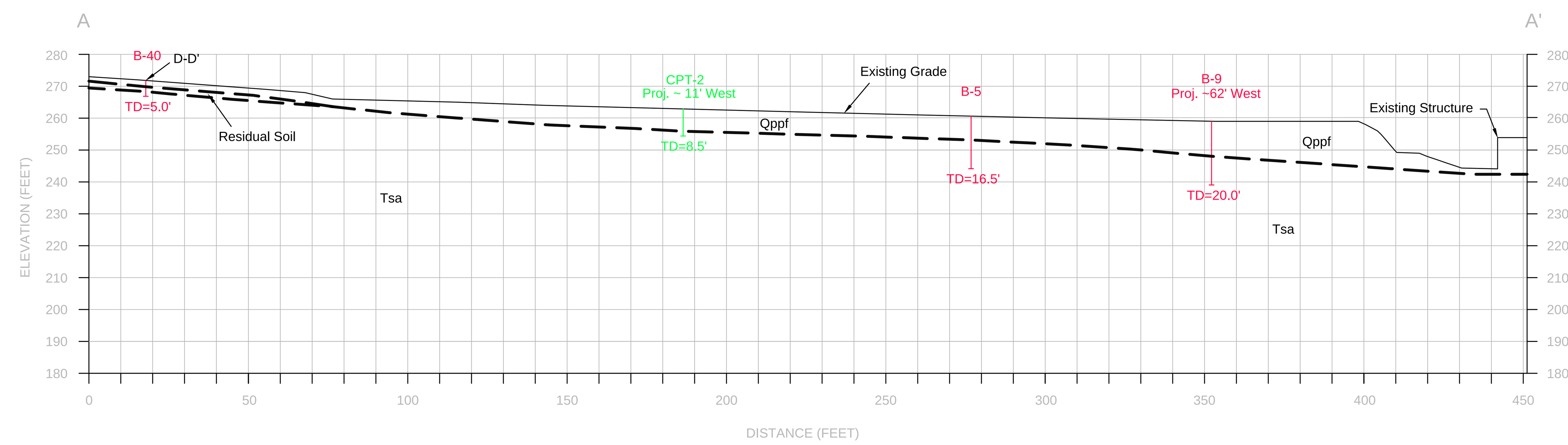
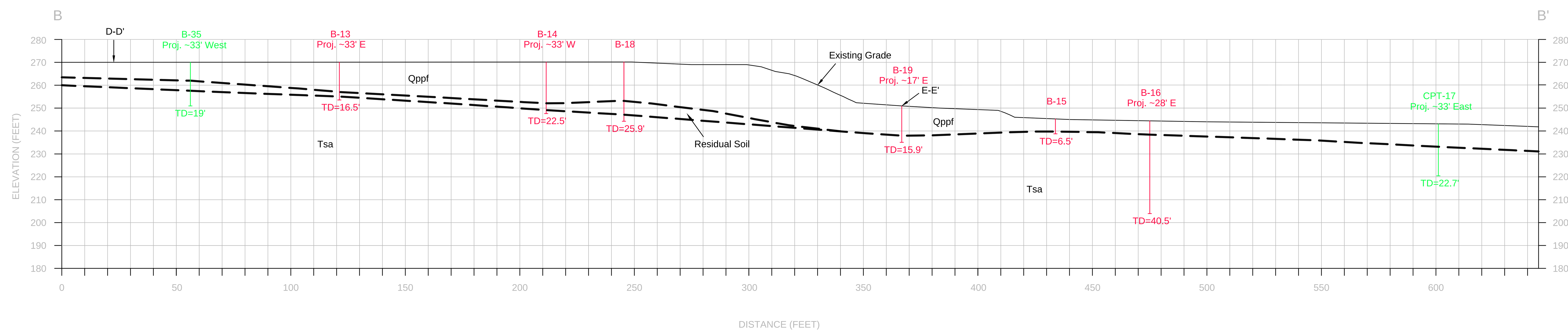
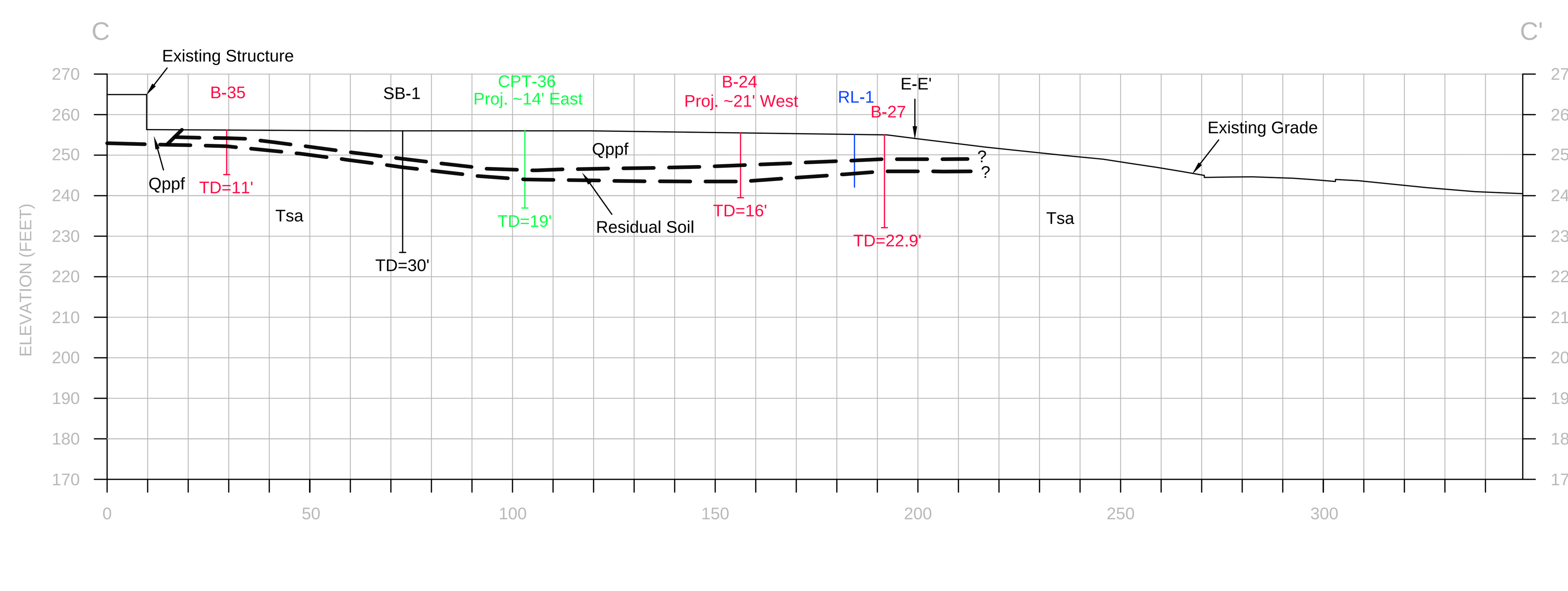
RETAINING WALL DRAINAGE DETAIL	CTE JOB NO: 10-13000G
	SCALE: NO SCALE
	DATE: 09/16
	FIGURE: 5



CROSS SECTION A-A'



CROSS SECTION B-B'



CROSS SECTION C-C'

LEGEND

Qppf	QUATERNARY PREVIOUSLY PLACED FILL
Tsa	TERTIARY SANTIAGO FORMATION
Qal	QUATERNARY ALLUVIUM
(dashed line)	APPROXIMATE GEOLOGIC CONTACT

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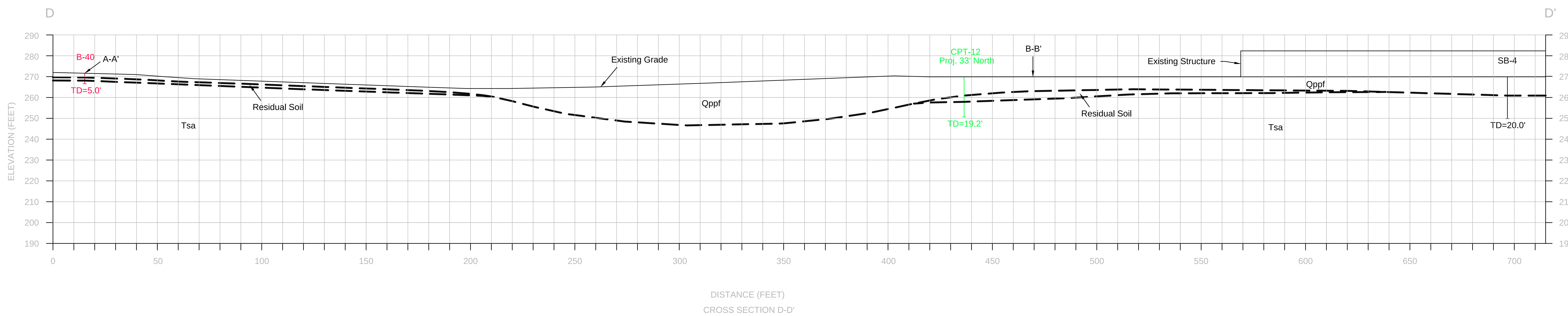
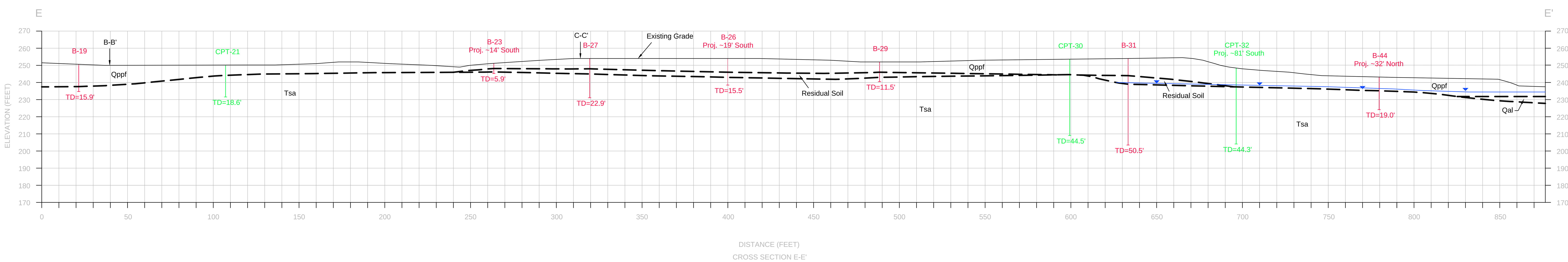
CROSS SECTIONS A-A', B-B' and C-C'

PROPOSED TRI-CITY MEDICAL CENTER EXPANSION
4002 VISTA WAY
SAN DIEGO, CALIFORNIA

SCALE: 1"=30'	DATE: 9/16
CTE Job No.: 10-13000G	PLATE: 1

\\Esc_server\projects\10-13000G\Plates 1 and 2 (Cross Sections).dwg





LEGEND

Qppf	QUATERNARY PREVIOUSLY PLACED FILL
Tsa	TERTIARY SANTIAGO FORMATION
Qal	QUATERNARY ALLUVIUM
(dashed line)	APPROXIMATE GEOLOGIC CONTACT
(blue line)	APPROXIMATE GROUNDWATER ELEVATION

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CROSS SECTIONS D-D and E-E'

PROPOSED TRI-CITY MEDICAL CENTER EXPANSION
4002 VISTA WAY
SAN DIEGO, CALIFORNIA

SCALE: 1"=30'	DATE: 9/16
CTE Job No.: 10-13000G	PLATE: 2

\\Esc_server\projects\10-13000G\Plates 1 and 2 (Cross Sections).dwg

APPENDIX A

REFERENCES

REFERENCES

1. American Society for Civil Engineers, 2010, "Minimum Design Loads for Buildings and Other Structures," ASCE/SEI 7-10.

2. ASTM, 2002, "Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort," Volume 04.08

3. Blake, T.F., 2000, "EQFAULT," Version 3.00b, Thomas F. Blake Computer Services and Software.

4. California Building Code, 2013, "California Code of Regulations, Title 24, Part 2, Volume 2 of 2," California Building Standards Commission, published by ICBO, June.

5. California Division of Mines and Geology, CD 2000-003 "Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region," compiled by Martin and Ross.

6. California Emergency Management Agency/California Geological Survey, "Tsunami Inundation Maps for Emergency Planning."

7. FEMA, 2012, Flood Insurance Rate Map, Panel 766 of 2375 Map Number 06073C0766G, San Diego County, California and Incorporated Areas.

8. Frankel, A.D., Petersen, M.D., Mueller, C.S., Haller, K.M., Wheeler, R.L., Leyendecker, E.V., Wesson, R. L., Harmsen, S.C., Cramer, C.H., Perkins, D.M., Rukstales,K.S.,2002, Documentation for the 2002 update of the National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 2002-420, 39p

9. Hart, Earl W., Revised 2007, "Fault-Rupture Hazard Zones in California, Alquist Priolo, Special Studies Zones Act of 1972," California Division of Mines and Geology, Special Publication 42.

10. Jennings, Charles W., 1994, "Fault Activity Map of California and Adjacent Areas" with Locations and Ages of Recent Volcanic Eruptions.

11. Kennedy, M.P. and Tan, S.S., 2005, "Geologic Map of the Oceanside 30' x 60' Quadrangle, California", California Geological Survey, Map No. 2, Sheet 1 of 2.

12. Reichle, M., Bodin, P., and Brune, J., 1985, The June 1985 San Diego Bay Earthquake swarm [abs.]: EOS, v. 66, no. 46, p.952.

13. SEAOC, Blue Book-Seismic Design Recommendations, "Seismically Induced Lateral Earth Pressures on Retaining Structures and Basement Walls," Article 09.10.010, October 2013.

14. Seed, H.B., and R.V. Whitman, 1970, "Design of Earth Retaining Structures for Dynamic Loads," in Proceedings, ASCE Specialty Conference on Lateral Stresses in the Ground and Design of Earth-Retaining Structures, pp. 103-147, Ithaca, New York: Cornell University.

15. Simons, R.S., 1979, Instrumental Seismicity of the San Diego area, 1934-1978, in Abbott, P.L. and Elliott, W.J., eds., Earthquakes and other perils, San Diego region: San Diego Association of Geologists, prepared for Geological Society of America field trip, November 1979, p.101-105.

16. Tan, Siang S., 1995 "Landslide Hazards in the Northern Part of The San Diego Metropolitan Area, San Diego County, California, Relative Landslide Susceptibility and Landslide Distribution Map, Oceanside and San Luis Rey Quadrangles", Map No. 35, Plate 35A.

17. Wood, J.H. 1973, Earthquake-Induced Soil Pressures on Structures, Report EERL 73-05. Pasadena: California Institute of Technology.

APPENDIX B

EXPLORATION LOGS

CTE BORING LOGS
CURRENT SITE INVESTIGATION

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DEFINITION OF TERMS

PRIMARY DIVISIONS			SYMBOLS	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	**GRAVELS** MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS < 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES, LITTLE OF NO FINES
		GRAVELS WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS < 5% FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	**SILTS AND CLAYS** LIQUID LIMIT IS LESS THAN 50		ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SLIGHTLY PLASTIC CLAYEY SILTS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, SILTS OR LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTY CLAYS
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILTS AND CLAYS
		COARSE	FINE	COARSE	MEDIUM	FINE	

12" 3" 3/4" 4 10 40 200

CLEAR SQUARE SIEVE OPENING U.S. STANDARD SIEVE SIZE

ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density
GS- Grain Size Distribution
SE- Sand Equivalent
EI- Expansion Index
CHM- Sulfate and Chloride
Content , pH, Resistivity
COR - Corrosivity
SD- Sample Disturbed

PM- Permeability
SG- Specific Gravity
HA- Hydrometer Analysis
AL- Atterberg Limits
RV- R-Value
CN- Consolidation
CP- Collapse Potential
HC- Hydrocollapse
REM- Remolded

PP- Pocket Penetrometer
WA- Wash Analysis
DS- Direct Shear
UC- Unconfined Compression
MD- Moisture/Density
M- Moisture
SC- Swell Compression
OI- Organic Impurities

FIGURE: BL1

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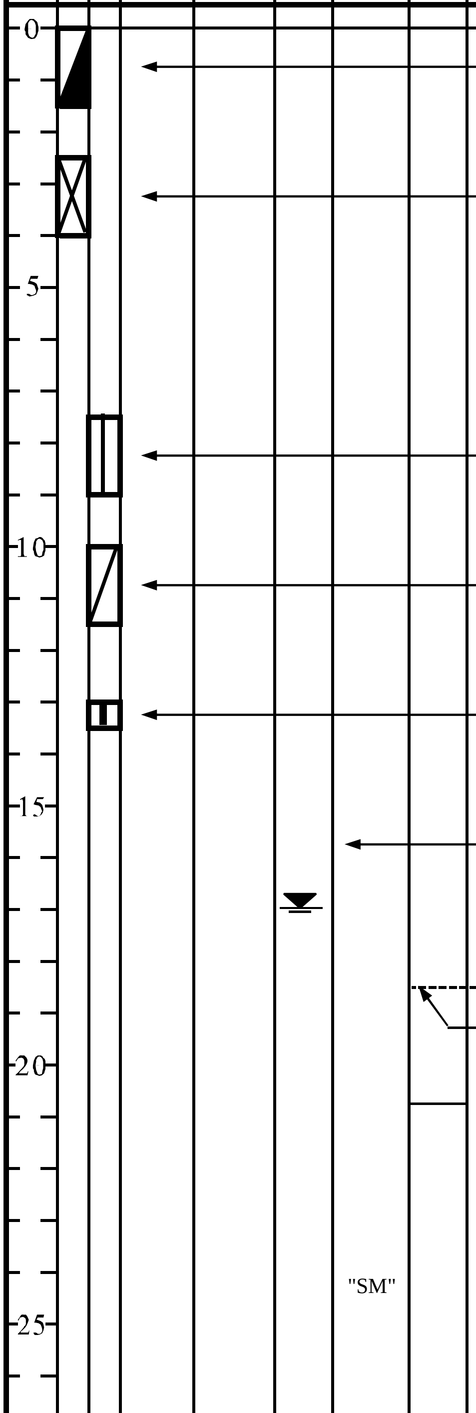
PROJECT:	DRILLER:	SHEET: of
CTE JOB NO:	DRILL METHOD:	DRILLING DATE:
LOGGED BY:	SAMPLE METHOD:	ELEVATION:

Depth (Feet) | Bulk Sample | Driven Type | Blows/Foot | Dry Density (pcf) | Moisture (%) | U.S.C.S. Symbol | Graphic Log

BORING LEGEND

DESCRIPTION

Laboratory Tests



Block or Chunk Sample

Bulk Sample

Standard Penetration Test

Modified Split-Barrel Drive Sampler (Cal Sampler)

Thin Walled Army Corp. of Engineers Sample

Groundwater Table

Soil Type or Classification Change

? — ? — ? — ? — ? — ? — ? —

Formation Change [(Approximate boundaries queried (?)]

"SM" Quotes are placed around classifications where the soils exist in situ as bedrock

FIGURE: BL2

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/12/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~268 FEET

BORING: B-1

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		Asphalt: 0-3" Base Material: 3-6" **<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Medium dense, dry to slightly moist, brown, clayey fine grained SAND.	
						"SM"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Very dense, slightly moist, reddish gray, silty fine grained SANDSTONE, oxidized mottling, massive.	
5		Ring	22 50/5"						
								Becomes less oxidized	
10		SPT	50/6"						DS
								Total Depth: 10.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/13/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~264 FEET

BORING: B-3

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SC		Asphalt: 0-3" Base Material: 3-6" **QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, moist, brown, clayey fine grained SAND.	CHM
	X					CL		**RESIDUAL SOIL:** Very stiff, moist, olive brown, fine grained sandy CLAY, oxidized.	
5						"SC"		**TERTIARY SANTIAGO FORMATION:** Very dense, slightly moist, light olive gray, clayey fine grained SANDSTONE, oxidized mottling, massive.	
		X	50/5"						
10								Total Depth: 8.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/12/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~264 FEET

BORING: B-5

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0–5	X					CL		Asphalt: 0-3" Base Material: 3-6" **QUATERNARY PREVIOUSLY PLACED FILL:** Stiff, moist, brown, fine grained sandy CLAY.	EI
5		X	13 12 18						CN
7.5						"SM"		**TERTIARY SANTIAGO FORMATION:** Very dense, slightly moist, light gray, silty fine grained SANDSTONE, oxidized nodules, massive.	
10		Ring	18 36 50/5"						
15		Ring	24 50/4"						
16.5								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/13/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~260 FEET

BORING: B-7

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		Asphalt: 0-3" Base Material: 3-8" **QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, moist, olive brown, clayey fine grained SAND.	
5		SPT	6 12 14						CN
						"SM"		**TERTIARY SANTIAGO FORMATION:** Very dense, moist, light gray, silty fine grained SANDSTONE, oxidized mottling, massive.	
10		Ring	17 27 50/5"						GS
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 2
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/12/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~262 FEET

BORING: B-8

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SC		Asphalt: 0-3" Base Material: 3-8" **QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, moist, brown, clayey fine grained SAND.	
5		SPT	20 27 50/6"						
						"SM"		**TERTIARY SANTIAGO FORMATION:** Very dense, slightly moist, light gray, silty fine grained SANDSTONE with trace clay, oxidized blebs, massive.	
10		Ring	15 35 50/4"						
15		SPT	50/6"						
20		Ring	18 32 50/4"						
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	2 of 2
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/12/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~262 FEET

BORING: B-8

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25						"SM"		Very dense, slightly moist, light gray, silty fine grained SANDSTONE with trace clay, oxidized blebs, massive.	
30		▯	19 50/5"						
35									
								Becomes less oxidized	
40		▯	19 50/2"						
45									
								Total Depth: 50.2' No Groundwater Encountered Backfilled with Bentonite Grout Capped with Chips and Concrete	
50		▯	50/2"						

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/12/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~258 FEET

BORING: B-9

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		Asphalt: 0-2" Base Material: 2-5" **<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Medium dense, moist, brown, clayey fine grained SAND.	
5		SPT	10 13 14						
						CL		Very stiff, moist, olive brown, fine grained sandy CLAY, trace roots.	
10		Ring	12 18 48			"SM"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Very dense, moist, light gray, silty fine grained SANDSTONE, oxidized mottling, massive.	
15		SPT	18 50/6"						
20								Total Depth: 20.0' No Groundwater Encountered	
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/13/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~254 FEET

BORING: B-11

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		Asphalt: 0-6" Base Material: 6-10" **QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, slightly moist, light brown, clayey fine grained SAND.	
						SM		Medium dense, moist, light gray, silty fine grained SAND.	
5		Ring	10 12 13						
						CL		Stiff, moist, olive, fine grained sandy CLAY.	
10		SPT	8 11 18			CL		**RESIDUAL SOIL:** Stiff, moist, olive, fine grained sandy CLAY.	CN
						"SC"		**TERTIARY SANTIAGO FORMATION:** Very dense, slightly moist, light olive gray, clayey fine grained SANDSTONE, oxidized mottling, massive.	
15		Ring	26 50/5"						
								Total Depth: 15.9' No Groundwater Encountered	
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/13/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~267 FEET

BORING: B-13

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		Asphalt: 0-3" Base Material: 3-24" **QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, slightly moist, olive brown, clayey fine grained SAND.	
5			6 8 11						
10			9 12 10						CN
						CL		**RESIDUAL SOIL:** Stiff, moist, olive, fine grained sandy CLAY, oxidized mottling, massive.	
15			16 27 50/6"			"SM"		**TERTIARY SANTIAGO FORMATION:** Very dense, slightly moist, light gray, silty fine grained SANDSTONE, oxidized mottling, massive.	
								Total Depth: 16.5' No Groundwater Encountered	
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/13/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~264 FEET

BORING: B-14

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						CL		Concrete: 0-8" **QUATERNARY PREVIOUSLY PLACED FILL:** Stiff, moist, olive brown, fine grained sandy CLAY.	
5									
10									
15									
						CL		**RESIDUAL SOIL:** Stiff, moist, olive, fine grained sandy CLAY, oxidized mottling.	
20									
		X	15 25 50/5"			"SM"		**TERTIARY SANTIAGO FORMATION:** Very dense, moist, light gray, silty fine grained SANDSTONE, oxidized mottling, massive.	
								Total Depth: 22.5' No Groundwater Encountered Backfilled with Bentonite Chipps Capped with Concrete	
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/14/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~246 FEET

BORING: B-15

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						CL		Asphalt: 0-4" Base Material: 4-9" **QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, moist, dark olive, fine grained sandy CLAY.	
5			7 25 50/5"			"SM"		**TERTIARY SANTIAGO FORMATION:** Very dense, moist, light gray, silty fine grained SANDSTONE, oxidized blebs, massive.	
								Total Depth: 6.5' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 2
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/14/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~242 FEET

BORING: B-16

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X (0-5)					CL		Asphalt: 0-4" Base Material: 4-9" **<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Stiff, moist, dark olive, fine grained sandy CLAY.	EI
5		SPT	8 14 32			"SC"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Very dense, moist, light gray, clayey fine grained SANDSTONE with trace clay, oxidized mottling, massive.	
						"SM"		Very dense, moist, light reddish gray, silty fine grained SANDSTONE, oxidized mottling, massive.	
10		Ring	18 50/5"						
								Becomes more oxidized	
15									
						"SC"		Very dense, moist, light gray, clayey fine grained SANDSTONE with trace clay, oxidized blebs, massive.	
20		Ring	17 50/5"						
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	2 of 2
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/14/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~242 FEET

BORING: B-16

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25						"SC"		Very dense, slightly moist, light gray, clayey fine grained SANDSTONE with trace clay, oxidized mottling, massive.	
30									
								Seepage	
35									
40		⊓	50/6"						
								Total Depth: 40.5' Seepage Encountered at Approximately 32' Backfilled with Bentonite Grout Capped with Chips and Concrete	
45									
50									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 2
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/13/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~263 FEET

BORING: B-18

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		Concrete: 0-8" Base Material: 8-18" **QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, moist, olive brown, clayey fine grained SAND with trace gravel.	
						CL		Stiff, moist, olive brown, fine grained sandy CLAY.	
5									
10			6 7 7					Asphalt	CN
15									
						CL		**RESIDUAL SOIL:** Stiff, moist, olive, fine grained sandy CLAY, oxidized mottling. carbonate blebs.	
20			5 5 7						GS
						"SM"		**TERTIARY SANTIAGO FORMATION:** Very dense, moist, light gray, silty fine grained SANDSTONE, massive.	
25			25						

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	2 of 2
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/13/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~263 FEET

BORING: B-18

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25		▯				"SM"		**TERTIARY SANTIAGO FORMATION:** Very dense, moist, light gray, silty fine grained SANDSTONE, massive.	
								Total Depth: 25.9' No Groundwater Encountered Backfilled with Bentonite Chips Capped with Concrete	
30									
35									
40									
45									
50									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/13/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~254 FEET

BORING: B-19

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SC		Asphalt: 0-3" Base Material: 3-7" **QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, moist, olive brown, clayey fine grained SAND.	
5		Ring	5 5 9						
						CL		Stiff, moist, olive, fine grained sandy CLAY.	
10		SPT	7 15 17						
						SC		Medium dense, moist, light gray, clayey fine grained SAND.	CN
						"SM"		**TERTIARY SANTIAGO FORMATION:** Very dense, slightly moist, light gray, silty fine grained SANDSTONE, oxidized blebs, massive.	
15		Ring	20 50/5"						
								Total Depth: 15.9' No Groundwater Encountered	
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/13/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~258 FEET

BORING: B-20

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					CL		Asphalt: 0-3" Base Material: 3-9" **<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Stiff, moist, olive brown, fine grained sandy CLAY.	
	X					SC		Medium dense, moist, olive, clayey fine grained SAND.	
5		SPT	11 12 13						
						CL		Roots Very stiff, moist, brown, fine grained sandy CLAY, trace gravel.	
10		Ring	8 9 13			SC		Medium dense, moist, light grayish brown, clayey fine grained SAND.	
						CL		Very stiff, moist, olive brown, fine grained sandy CLAY.	
15		SPT	7 13 16						
		Ring	22 27 50/6"			"SC/SM"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Very dense, slightly moist, light gray, silty to clayey fine grained SANDSTONE, oxidized mottling.	AL
20								Total Depth: 20.0' No Groundwater Encountered Backfilled with Bentonite Chips Capped with Concrete	
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/14/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~256 FEET

BORING: B-23

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						CL		**QUATERNARY PREVIOUSLY PLACED FILL:** Stiff, slightly moist, light olive brown, fine grained sandy CLAY.	
						SM		**RESIDUAL SOIL:** Medium dense, moist, olive brown, silty fine grained SAND.	
						CL		Very stiff, moist, olive, fine grained sandy CLAY.	
5		X	26 50/4"			"SC"		**TERTIARY SANTIAGO FORMATION:** Very dense, slightly moist, light gray, silty fine to medium grained SANDSTONE, massive.	
								Total Depth: 5.9' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/14/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~259 FEET

BORING: B-24

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, slightly moist, light olive gray, clayey fine grained SAND.	
						CL		Stiff, moist, dark brown, fine grained sandy CLAY.	
5			5 6 7						AL
						SM		**RESIDUAL SOIL:** Medium dense, moist, olive, silty fine grained SAND.	
10			8 8 9			SC		Medium dense, moist, olive, clayey fine grained SAND.	CN
						"CL"		**TERTIARY SANTIAGO FORMATION:** Hard, moist, olive, fine grained sandy CLAYSTONE, oxidized mottling.	EI
15			20 50/6"			"SC"		Very dense, moist, light olive, clayey fine grained SANDSTONE, oxidized mottling, massive.	
								Total Depth: 16.0' No Groundwater Encountered	
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/14/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~257 FEET

BORING: B-26

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, moist,olive brown, clayey fine grained SAND.	
						SM		Medium dense, moist, gray to dark olive, silty fine grained SAND.	
5			18 18 21						CN
						CL		**RESIDUAL SOIL:** Stiff, moist, dark brown, fine grained sandy CLAY.	
10			8 13 20			"SC"		**TERTIARY SANTIAGO FORMATION:** Dense, moist, olive, clayey fine grained SAND. mottling. Becomes very dense	
15			50/6"						
								Total Depth: 15.5' No Groundwater Encountered	
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/14/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~257 FEET

BORING: B-27

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SC		**<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Medium dense, slightly moist, light yellowish brown, clayey fine grained SAND.	CHM
5		Ring	7 11 12						GS
						SM		**<u>RESIDUAL SOIL</u>:** Medium dense, moist, dark grayish brown, silty fine grained SAND, oxidized mottling.	
						CL		Very stiff, moist, dark olive gray, fine grained sandy CLAY, oxidized mottling.	
						"CL"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Hard, moist, olive, fine grained sandy CLAYSTONE, oxidized mottling.	
10		Ring	12 16 19						GS
						"SC"		Very dense, slightly moist, light olive, clayey fine grained SANDSTONE, oxidized mottling.	
15		SPT	34 50/6"					Increased density	
20									
		Ring	26 50/6"						
25								Total Depth: 22.9' (Refusal in Dense Sandstone) No Groundwater Encountered Backfilled with Bentonite Chips Capped with Concrete	

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/14/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~251 FEET

BORING: B-29

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Medium dense, moist, brown, clayey fine grained SAND.	
						CL		Stiff, moist, brown, fine grained sandy CLAY.	
5			7 8 7						
						SM		**RESIDUAL SOIL:** Medium dense, moist, olive, silty fine grained SAND.	
						CL		Very stiff, moist, olive, fine grained sandy CLAY.	
						"SC"		**TERTIARY SANTIAGO FORMATION:** Very dense, moist, light olive gray, clayey fine grained SANDSTONE, massive.	
10			20 24 50/6"						
								Total Depth: 11.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 2
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/15/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~258 FEET

BORING: B-31

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X (0–5)					CL		Asphalt: 0-3" Base Material: 3-8" **<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Stiff, moist, olive, fine grained sandy CLAY.	EI
5		SPT	9 9 9						
10		Ring	1 2 4			SM		**<u>RESIDUAL SOIL</u>:** Loose, very moist, light gray, silty fine grained SAND.	
						CL		Stiff, moist, light olive, fine grained sandy CLAY.	
15		SPT	14 17 31			"SC"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Very dense, moist, light olive, clayey fine grained SANDSTONE, oxidized mottling, massive.	
20		Ring	17 50/5"						
						"SC/CL"		Very dense or hard, moist, light olive, clayey fine grained SANDSTONE/ sandy CLAYSTONE, oxidized mottling, massive.	
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	2 of 2
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/15/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~258 FEET

BORING: B-31

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
25						"SC/CL"		Very dense or hard, moist, light olive, clayey fine grained SANDSTONE/ sandy CLAYSTONE, oxidized mottling, massive.	
30		X	19 50/5"					Becomes interbedded clayey SANDSTONE and sandy CLAYSTONE.	
35									
						"ML"		Hard, slightly moist, olive, fine grained SILTSTONE with trace clay, oxidized mottling.	
40		X	17 20 39						AL
45									
								Total Depth: 50.5' No Groundwater Encountered Backfilled with Bentonite Grout Capped with Chips and Concrete	
50		X	50/6"						AL

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/14/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~260 FEET

BORING: B-33

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						CL		Asphalt: 0-4" Base Material: 4-8" **QUATERNARY PREVIOUSLY PLACED FILL:** Stiff, moist, dark brown, fine grained sandy CLAY.	
5			2 2 3			SM		**RESIDUAL SOIL:** Loose to medium dense, very moist, dark grayish brown, silty fine grained SAND.	
						CL		Very stiff, moist, brown, fine grained sandy CLAY.	
						"CL"		**TERTIARY SANTIAGO FORMATION:** Hard, moist, olive, fine grained sandy CLAYSTONE, oxidized mottling, massive.	
10			50/6"			"SC"		Very dense, moist, light olive gray, clayey fine to medium grained SANDSTONE, oxidized mottling, massive.	DS
								Total Depth: 10.5' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/14/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~261 FEET

BORING: B-34

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						CL/SC		Asphalt: 0-3" Base Material: 3-7" **QUATERNARY PREVIOUSLY PLACED FILL:** Stiff or medium dense, moist, brown, fine grained sandy CLAY/ clayey SAND.	
5		Ring	5 5 6			CL		Stiff, moist, brown, fine grained sandy CLAY.	
10		SPT	6 9 11						
						SP		Medium dense, moist, dark brown, poorly graded fine grained SAND. Odorius soil Seepage	
15		Ring	11 17 44			"CL"		**TERTIARY SANTIAGO FORMATION:** Hard, moist, olive, fine grained sandy CLAYSTONE, oxidized mottling.	
						"SM"		Very dense, moist, light olive gray, silty fine grained SANDSTONE, massive.	
								Total Depth: 16.5' Seepage Encountered at Approximately 14 feet Backfilled with Bentonite Chips Capped with Concrete	
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/14/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~263 FEET

BORING: B-35

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					CL		Asphalt: 0-4" Base Material: 4-7" **<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Stiff, moist, olive brown, fine grained sandy CLAY.	
	X					CL		**<u>RESIDUAL SOIL</u>:** Very stiff, moist, reddish olive, fine grained sandy CLAY, oxidized.	
	X					"SM/SC"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Very dense, slightly moist, light olive, silty to clayey fine grained SANDSTONE, oxidized mottling, massive.	
5		SPT	15 50/6"						
10		Ring	16 50/6"						
								Total Depth: 11.0' No Groundwater Encountered	
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/12/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~283 FEET

BORING: B-37

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					CL		**RESIDUAL SOIL:** Very stiff, dry to slightly moist, brown, fine grained sandy CLAY, oxidized.	
	X					"SC"		**TERTIARY SANTIAGO FORMATION:** Very dense, slightly moist, gray, clayey fine grained SANDSTONE, massive. Increased oxidation	RV
5								Total Depth: 5.0' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/12/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~273 FEET

BORING: B-38

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X (0–5)					SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, moist, olive brown, clayey fine grained SAND with trace gravel and concrete.	
5									
						CL		Stiff, moist, brown, fine grained sandy CLAY.	
10						"SC"		**RESIDUAL SOIL:** Medium dense to dense, moist, olive gray, clayey fine grained SAND.	
						"SM"		**TERTIARY SANTIAGO FORMATION:** Very dense, moist, light gray, silty to clayey fine grained SANDSTONE, oxidized mottling, massive.	
15								Total Depth: 14.0' No Groundwater Encountered	
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/12/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~287 FEET

BORING: B-39

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					CL		**<u>RESIDUAL SOIL</u>:** Very stiff, dry to slightly moist, brown to dark brown, fine grained sandy CLAY, oxidized.	
	X					"SC"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Very dense, moist, olive gray, clayey fine grained SANDSTONE, oxidized, massive.	
5								Total Depth: 5.0' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/12/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~272 FEET

BORING: B-40

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SC		Asphalt: 0-3" Base Material: 3-6" **<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Medium dense, moist, dark brown, clayey fine grained SAND.	
	X					CL		**<u>RESIDUAL SOIL</u>:** Very stiff, moist, brown, fine grained sandy CLAY.	RV
	X					"SC"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Very dense, moist, olive gray, clayey fine grained SANDSTONE, oxidized, massive.	
5								Total Depth: 5.0' No Groundwater Encountered	
10									
15									
20									
25									

CTE INC. Construction Testing & Engineering, Inc.
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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	7/12/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~232 FEET

BORING: B-41

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X (0–5)					SC		**QUATERNARY PREVIOUSLY PLACED FILL:** Loose to medium dense, slightly moist, light brown, clayey fine grained SAND.	
5						"SM"		**RESIDUAL SOIL:** Medium dense to dense, moist, dark olive gray, silty fine grained SAND, oxidized nodules.	
								Total Depth: 6.5' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HAND AUGER	DRILLING DATE:	7/12/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~237 FEET

BORING: B-42

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SC		Asphalt: 0-3" Base Material: 3-6" **<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Loose to medium dense, dry to slightly moist, brown, clayey fine grained SAND.	
	X					"SM"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Very dense, moist, light reddish gray, silty fine grained SANDSTONE, massive.	RV
5								Total Depth: 5.0' No Groundwater Encountered	
10									
15									
20									
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/15/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~244 FEET

BORING: B-43

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					CL		Asphalt: 0-3" Base Material: 3-7" **<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Stiff, moist, olive brown, fine grained sandy CLAY.	EI, CHM
5		SPT	6 7 8			SP		**<u>QUATERNARY ALLUVIUM</u>:** Medium dense, moist, grayish brown, poorly graded fine grained SAND, micaceous, friable.	
10		Ring	11 15 18			"CL"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Hard, moist, olive, fine grained sandy CLAYSTONE, oxidized mottling.	
15		Ring	18 26 50/5"						
		Ring	23 50/5"			"SM"		Very dense, slightly moist, light olive, silty fine grained SANDSTONE, massive.	
20								Total Depth: 18.9' No Groundwater Encountered Backfilled with Bentonite Chips Capped with Concrete	
25									

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PROJECT:	TRI-CITY MEDICAL CTR. EXPANSION	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13000G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	7/15/2016
LOGGED BY:	AJB	SAMPLE METHOD:	RING, SPT and BULK	ELEVATION:	~237 FEET

BORING: B-44

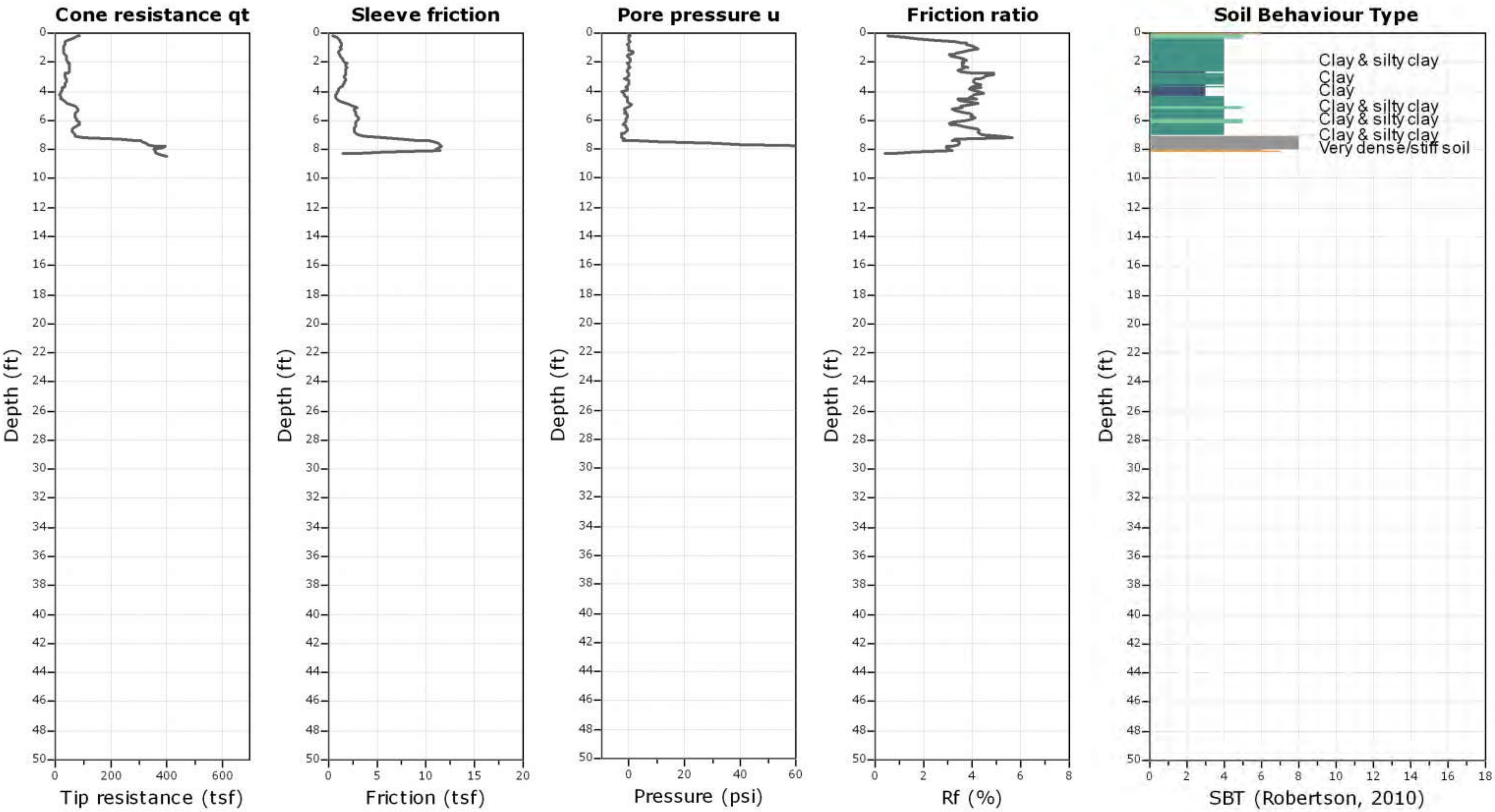
Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		Asphalt: 0-3" Base Material: 3-7" **<u>QUATERNARY PREVIOUSLY PLACED FILL</u>:** Medium dense, moist, brown, clayey fine grained SAND.	
						SM		Medium dense, moist, brown, silty fine grained SAND.	
						CL		Stiff, moist, brown, fine grained sandy CLAY.	
						SC		Medium dense, moist, reddish olive, clayey fine grained SAND.	
5		Ring	3 3 3						
						"CL"		**<u>TERTIARY SANTIAGO FORMATION</u>:** Hard, moist, olive, fine grained sandy CLAYSTONE, oxidized mottling.	
10		SPT	47 50/4"			"SC"		Very dense, moist, light olive, clayey fine grained SANDSTONE, oxidized mottling, massive.	
						"SM"		Very dense, slightly moist, light olive, silty fine grained SANDSTONE, massive.	
15		Ring	17 50/6"						
								Total Depth: 19.0' No Groundwater Encountered	
20									
25									

Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

CPT: CPT-2

Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**
Location: **4002 Vista Way Oceanside, CA**

Total depth: 8.48 ft, Date: 7/13/2016
Cone Type: Vertek



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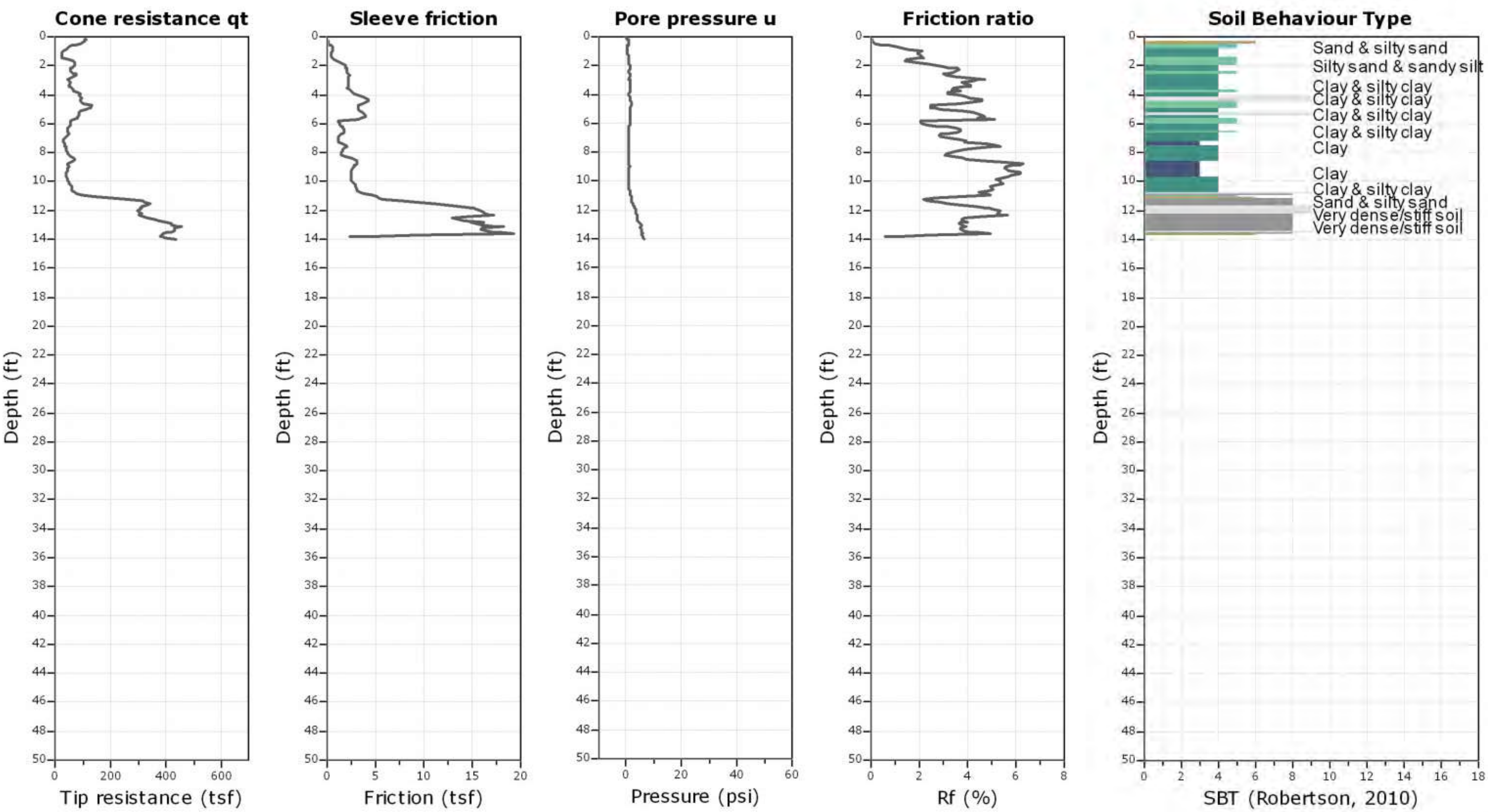
CPT: CPT-4

Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**
Location: **4002 Vista Way Oceanside, CA**

Total depth: 13.99 ft, Date: 7/13/2016
Cone Type: Vertek



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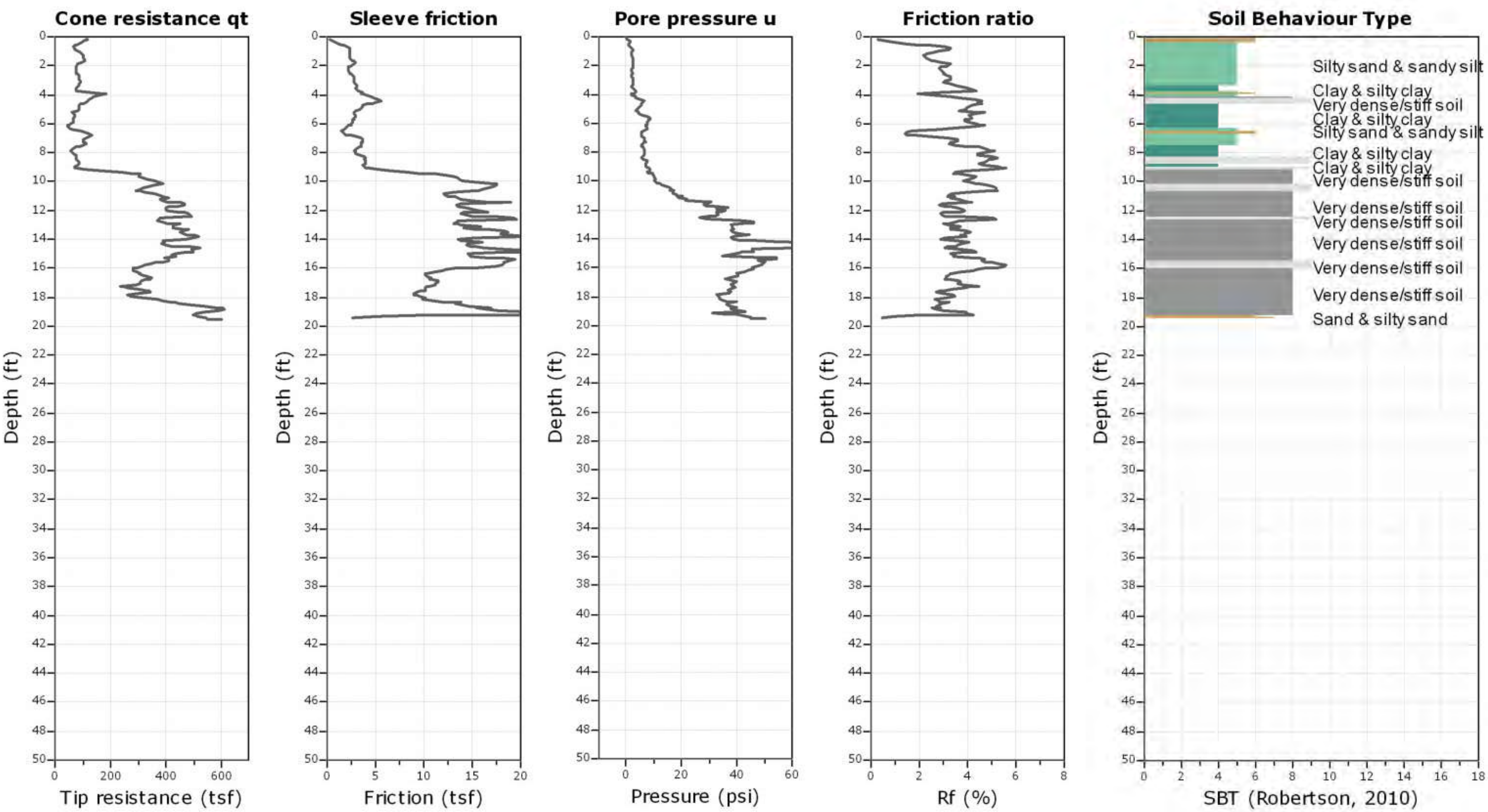
CPT: CPT-6

Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**
Location: **4002 Vista Way Oceanside, CA**

Total depth: 19.56 ft, Date: 7/13/2016
Cone Type: Vertek



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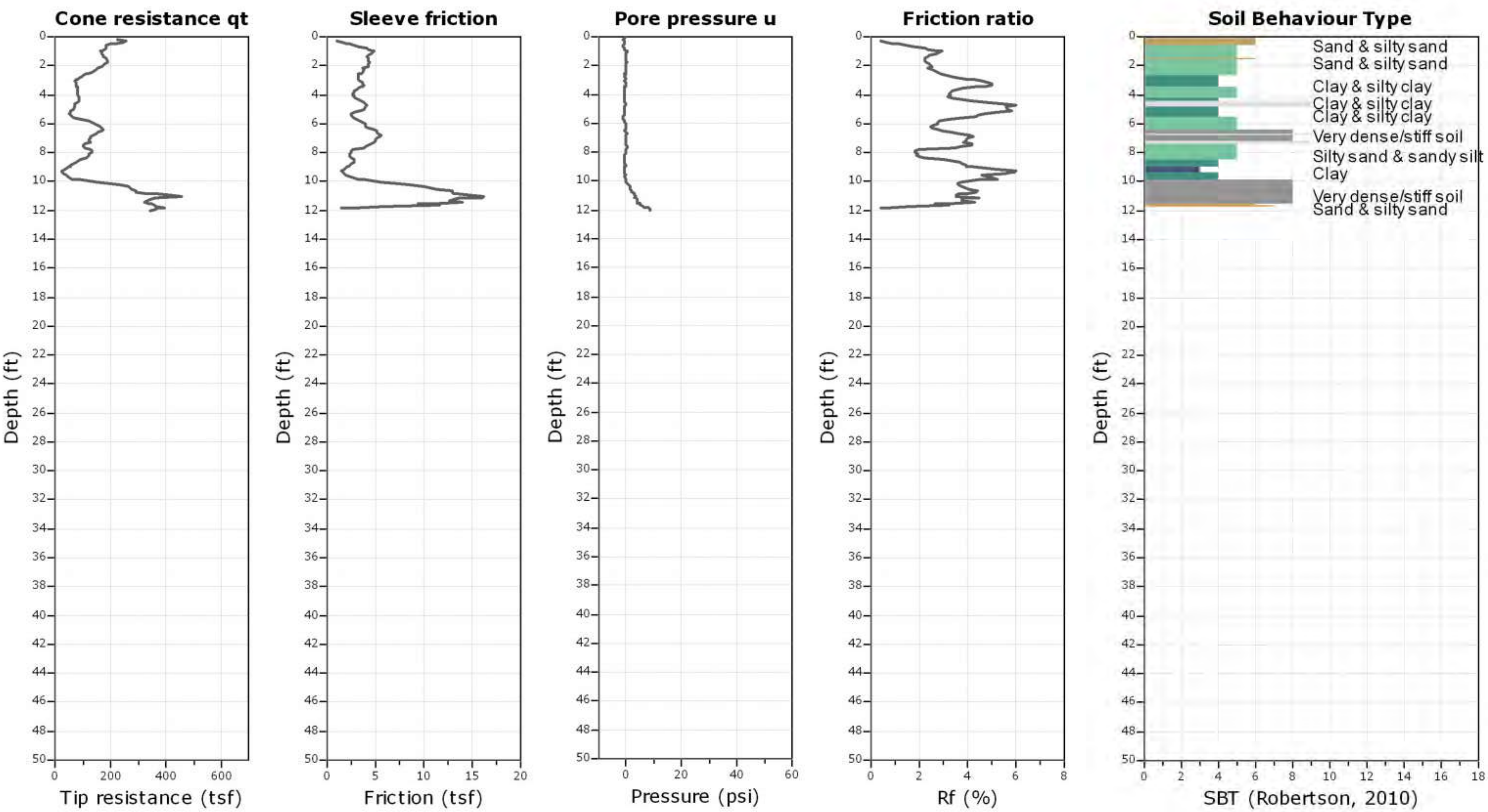
CPT: CPT-10

Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**
Location: **4002 Vista Way Oceanside, CA**

Total depth: 12.04 ft, Date: 7/13/2016
Cone Type: Vertek



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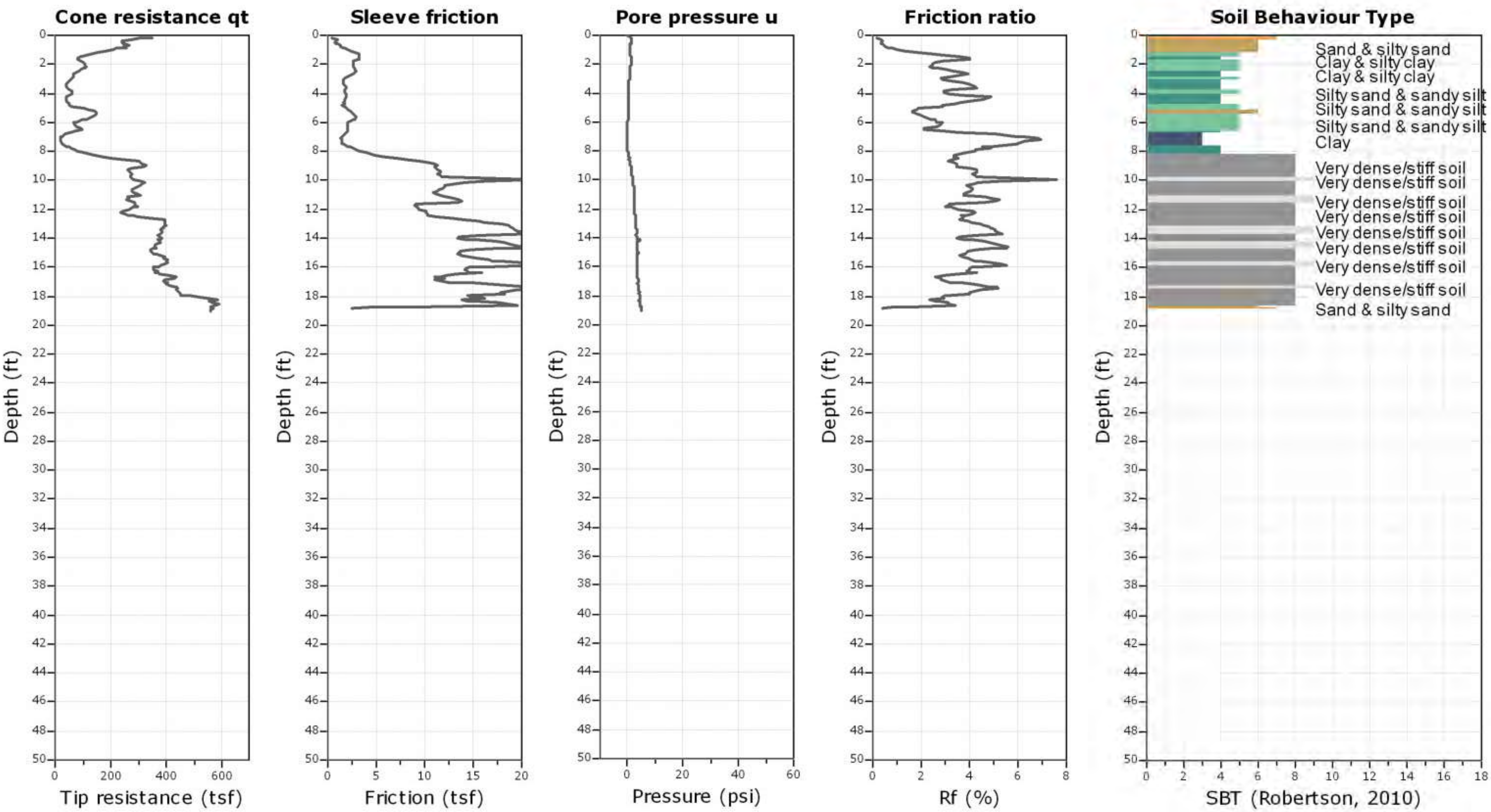
CPT: CPT-12
Total depth: 19.02 ft, Date: 7/13/2016
Cone Type: Vertek

Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**
Location: **4002 Vista Way Oceanside, CA**



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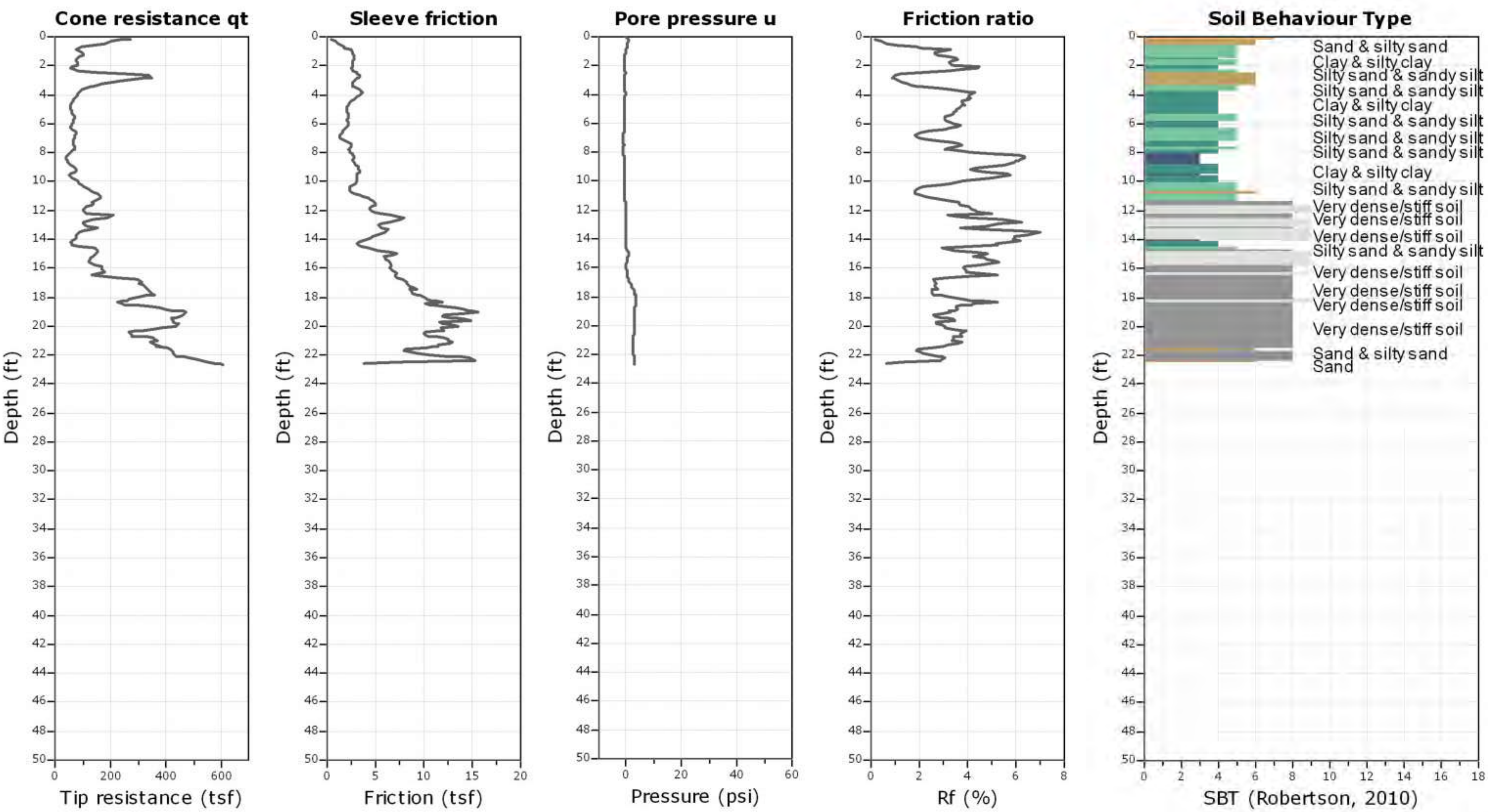
CPT: CPT-17

Total depth: 22.70 ft, Date: 7/13/2016

Cone Type: Vertek

Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**

Location: **4002 Vista Way Oceanside, CA**



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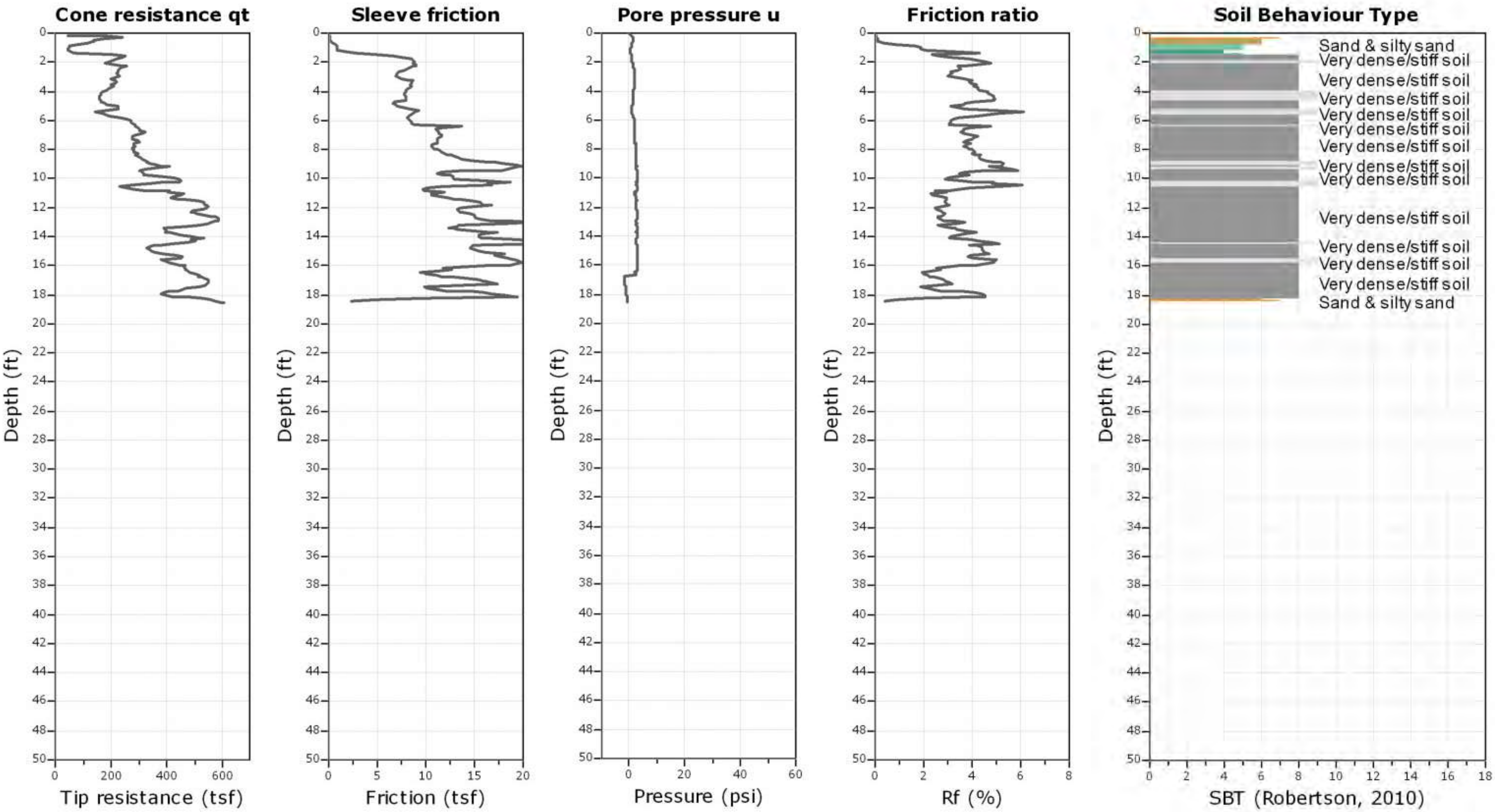
CPT: CPT-21

Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**
Location: **4002 Vista Way Oceanside, CA**

Total depth: 18.59 ft, Date: 7/13/2016
Cone Type: Vertek



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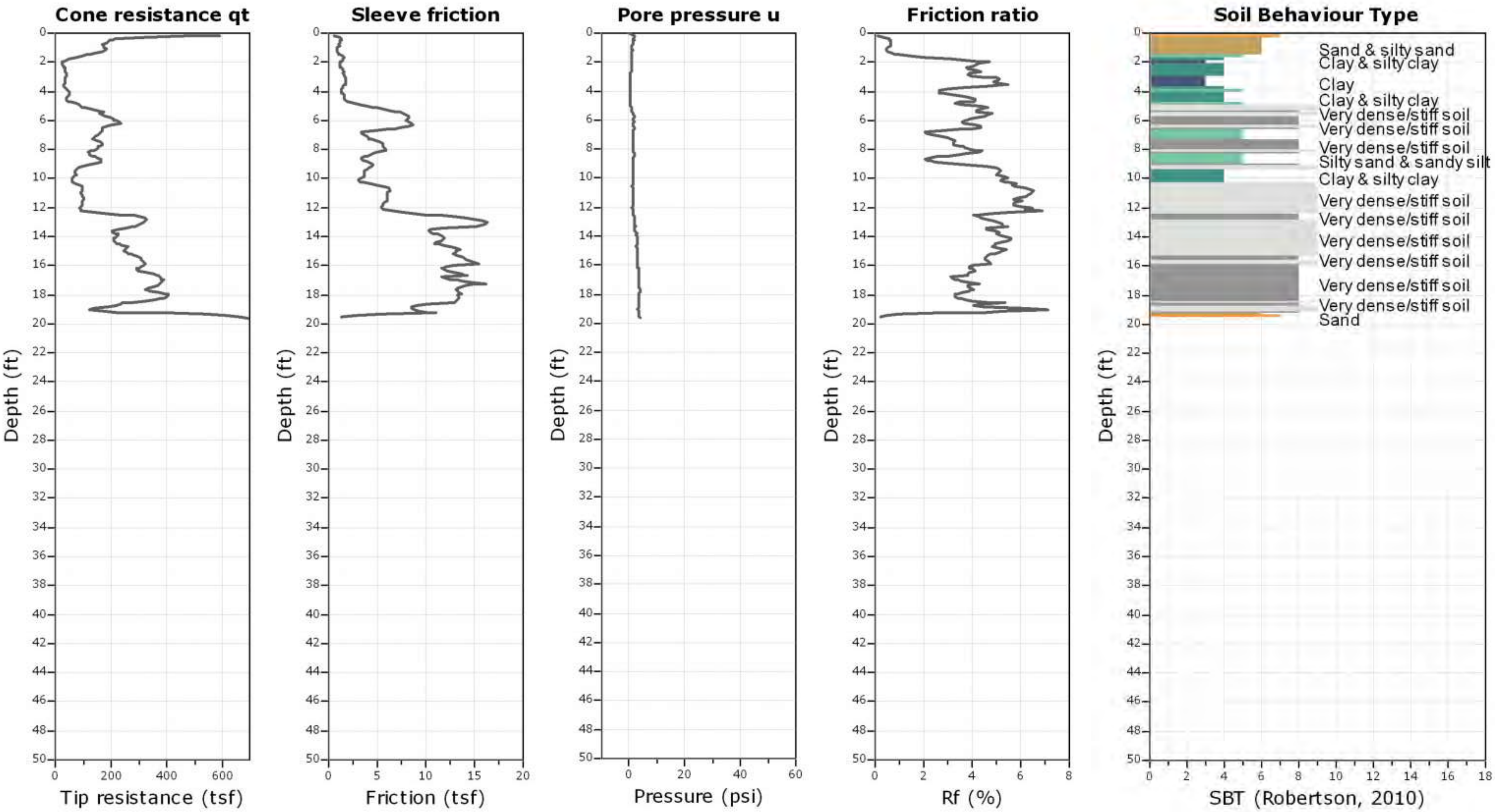
CPT: CPT-22
Total depth: 19.67 ft, Date: 7/13/2016
Cone Type: Vertek

Project: CTE (Construction Testing & Eng.)/Tri-City Medical Center
Location: 4002 Vista Way Oceanside, CA



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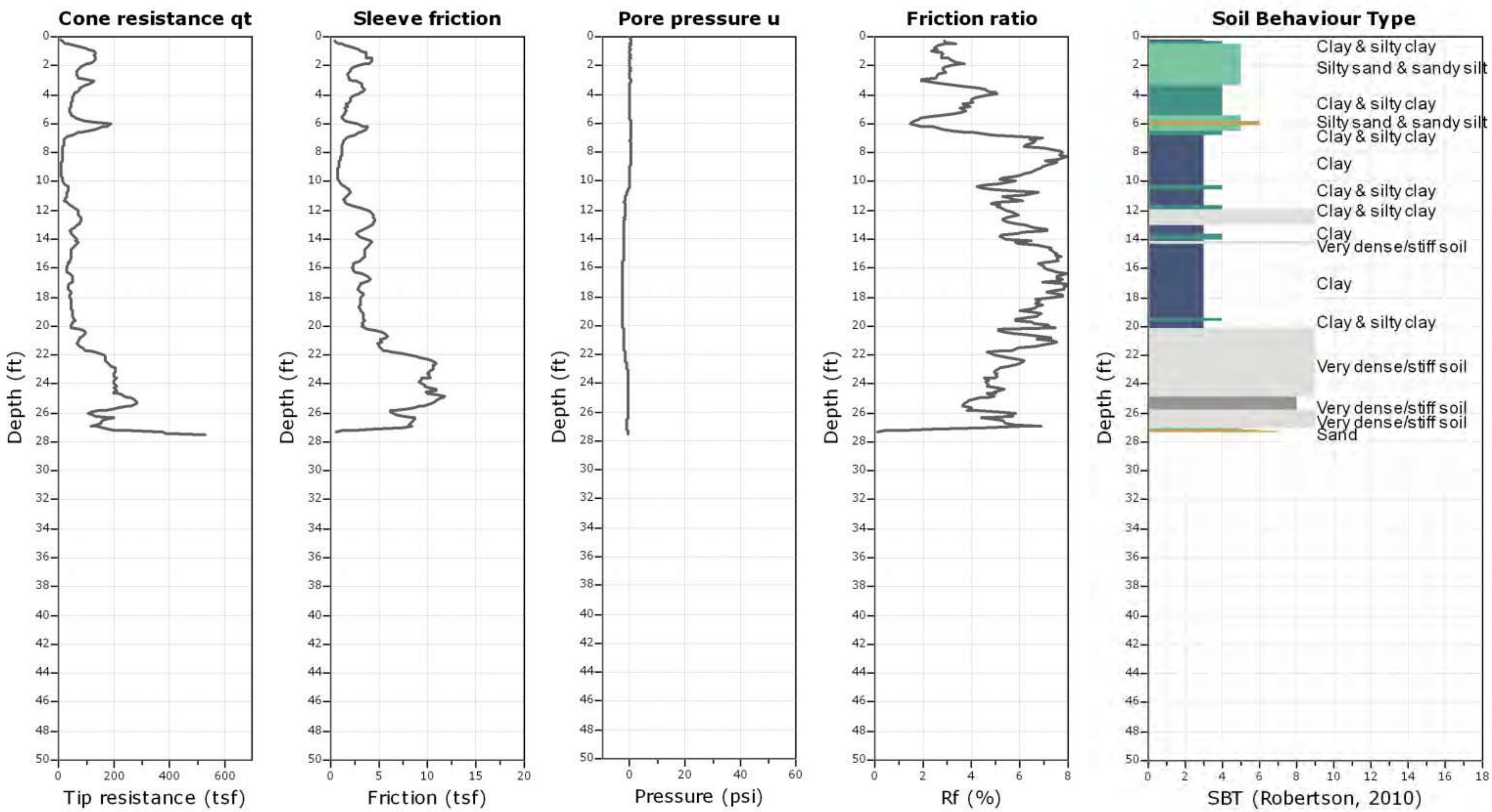
CPT: CPT-25

Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**
Location: **4002 Vista Way Oceanside, CA**

Total depth: 27.49 ft, Date: 7/13/2016
Cone Type: Vertek



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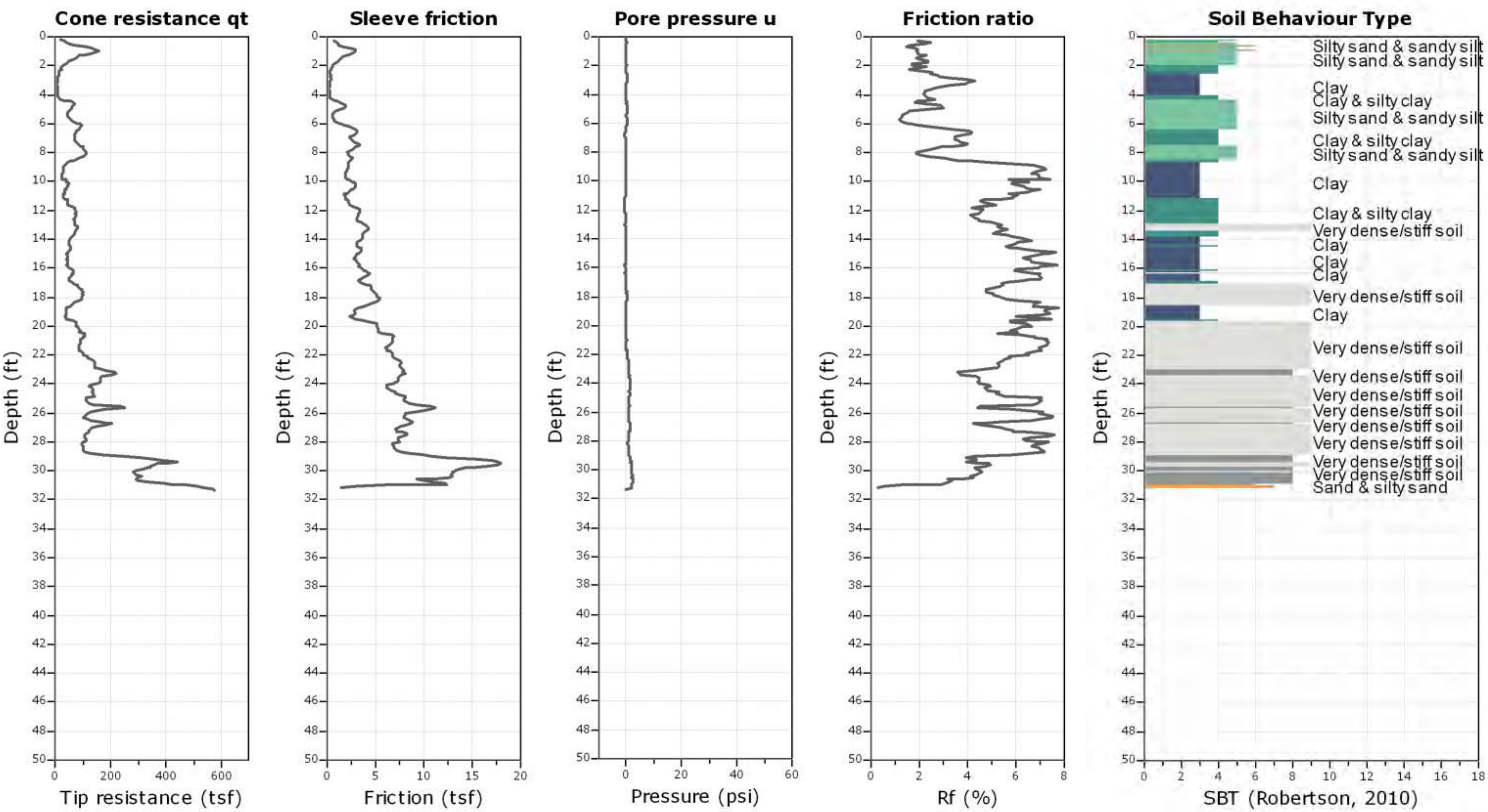
CPT: CPT-28

Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**
Total depth: 31.32 ft, Date: 7/13/2016

Location: **4002 Vista Way Oceanside, CA**
Cone Type: Vertek



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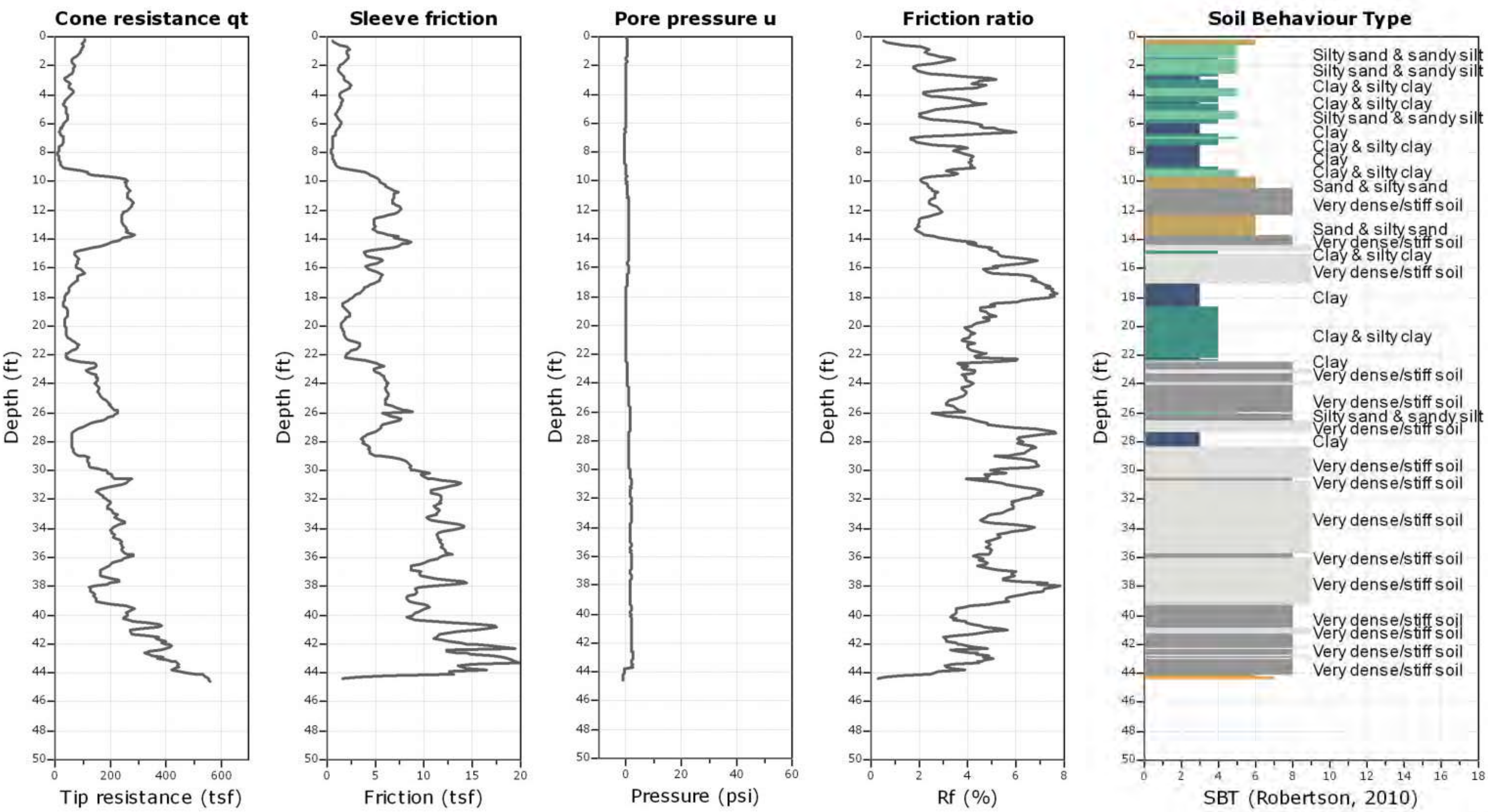
CPT: CPT-30

Total depth: 44.53 ft, Date: 7/13/2016
Cone Type: Vertek

Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**
Location: **4002 Vista Way Oceanside, CA**



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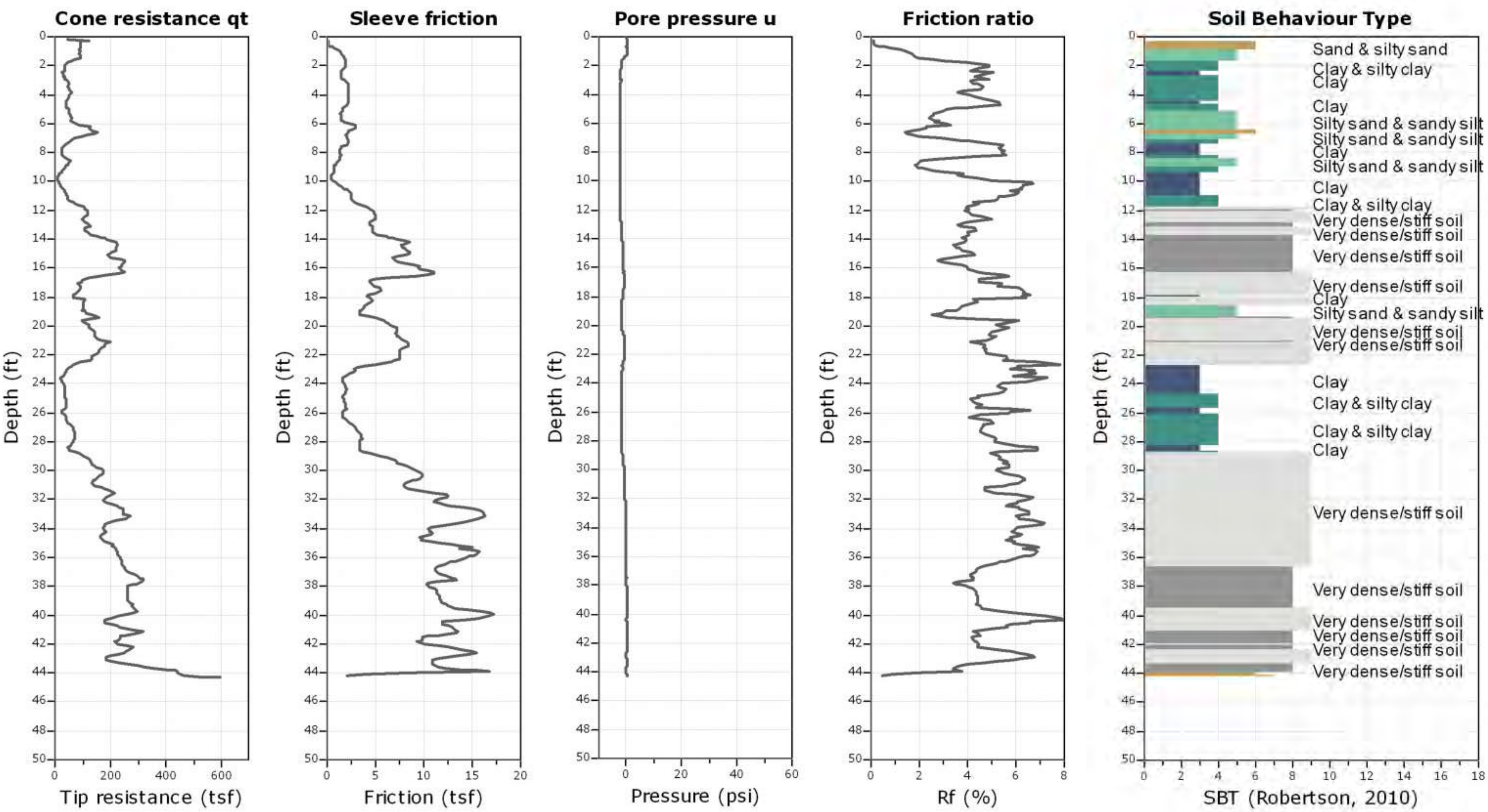
CPT: CPT-32
Total depth: 44.33 ft, Date: 7/13/2016
Cone Type: Vertek

Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**
Location: **4002 Vista Way Oceanside, CA**



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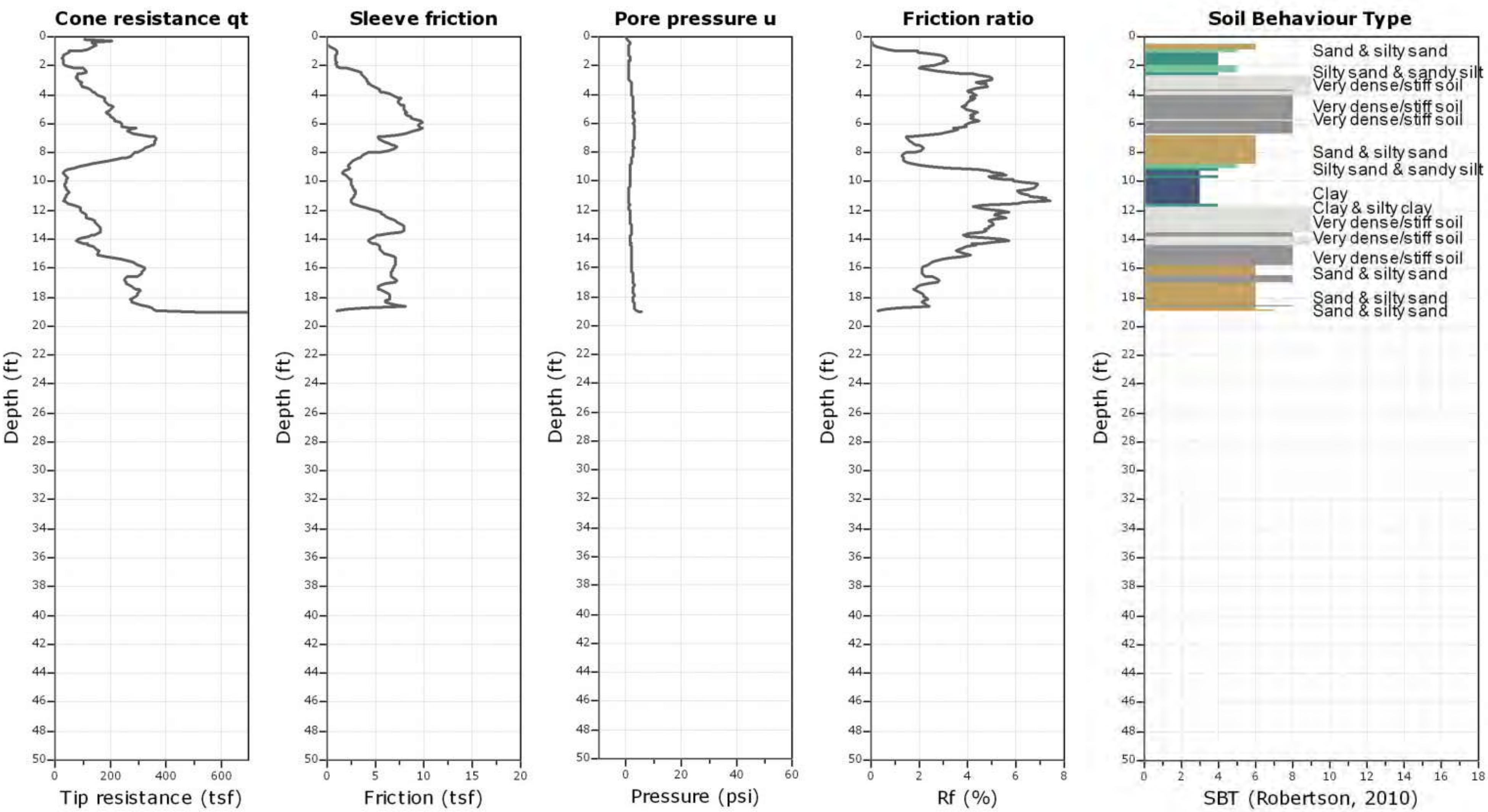
Project: **CTE (Construction Testing & Eng.)/Tri-City Medical Center**
Location: **4002 Vista Way Oceanside, CA**

CPT: CPT-36
Total depth: 19.06 ft, Date: 7/13/2016
Cone Type: Vertek



GLOBAL HYDROLOGY BORING LOGS
FROM 2013 ENVIRONMENTAL SITE ASSESSMENT

GLOBAL HYDROGEOLOGY — LOG OF TEST BORING

BORING NO.	PROJECT NO.	PROJECT	SHEET
MW-1	TCMC	TCMC Monitoring Well	1 OF 3

MFG. DESIGNATION OF DRILL	LOCATION
CME 85 HSA	4002 Vista Way, Oceanside, CA ~6' E. of curb & 10' S. of Tank Concrete PAD

TYPE OF BIT 10" HSA	HAMMER DATA: WT. 140 LBS. DROP 30* INCHES	ELEV. TOC 256.90
TOTAL DEPTH OF HOLE	47'	
DATE — STARTED	10:45 8 Oct '11	DRILLING AGENCY ABC Liovin
DATE — COMPLETED	1700 8 Oct '11	INSPECTOR R. HARRIS; CREW Conrad, Mark, Jesse
DATE — BACKFILLED	MW	

GROUNDWATER DEPTH	TIME
~20 enc	11:50 8 Oct
19.61 TOC	14:45 "
16.02 TOC	14:05 15 Oct

SU = -0.30

SURFACE CONDITIONS: Flat asphalt parking lot w/ sl. slope to east & sl. more slope to S.

*downhole hammer on sand line

DIST. FROM SURF.	LEGEND	SAMPLE TYPE	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL	PID/FID ppm	% LEL
							ambient PID = 0.1 ppm		
0						Asphalt	Asphalt		
1	G					GP	Base, gravel ½-3/4 w/ sand, dens, moist, no odor		
2							FILL		
3							ambient		
5	G			0	5	SM	Silty Sand, fn, lt olive brn 2.5Y 5/3, loose, moist, v. sl calc, no odor		
6		CA	TCMC	0	6				
		mod	[illegible]	6	11			0.2	
7			11:10						
10				6	7			0.4	
11		CA		6	14	SC			
		mod	[illegible]	6	17	CL			
12	G		11:25				Silty Clay w/ trace lt fn snd, drk gry brn 2.5Y 4/2, m stiff, moist, v sl calc in rare areas, no odor		
13						SM		2.2	
14							Silty Sand w/ trace clay,		
15				3	7		Santiago Fm		
16		CA	TCMC	6	10	SM/SS	Silty Sand / Sandstone, fn pale yl 5Y 8/3, mdns, moist, no calc, no odor, abund orange Fe staining, wthrd	0.3	
		mod	MW2-16	6	12				
17			11:35				color change & harder, white 5Y 8/1, dense, moist, non-calc no odor,		
19							▽	19.6	
20							▽ ~ enc 20'		
				4	12	SS	Sandstone, fn w/ trac med,	6.9	
21		CA	TCMC	6	15				
			MW2-21	6	17				
			11:50						

GLOBAL HYDROGEOLOGY LOG OF TEST BORING

BORING NO.	PROJECT NO.	PROJECT	SHEET
MW-1	TCMC	Monitoring Wells	2 OF 3

DIST. FROM SURF.	LEGEND	SAMPLE TYPE	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL	PID/ FID ppm	% LEL
22									
25	G	skip sample					Skip to attempt get thru upper H2O zone more quickly & shutoff upper zone; grab only	0.5	
30		CA	TCMC MW1-30 12:15	6"	6/50	Sltst	Siltstone w/ltl clay & trace fn snd, pale olive 5Y 6/3, v dns but poorly indur, moist-wet, not sat, non calc, no odor, abund orange Fe staining 10-15%	2.0	
35			TCMC MW1-35 1230	6	6/50	SS	Silty Sandstone, fn, lt gray 5Y 7/2, v dns, w. compacted but v.p. indur, moist-wet, not sat, no free H2O, non calc, no odor	2.6	
40			TCMC MW1-40 12:40	6	5/50	SS	Silty Sandstone, fn w/10-15% silt, lt grn gray, 10Y 8/1, v. dns, v.p. indur, moist, non calc, no odor; v. sl. wthrd, rare Fe micro staining	19.4	
45			TCMC MW1-45 1300	6	6/50	SS	Sandstone, fn w/ trace silt, lt greenish gray 5GY 7/1, v. dns, v.p. ind, moist, non calc, no odor, sl. wthrd, rare micro Fe staining - only visible w/ hnd lens	4.4	
						TD 47'			

GLOBAL HYDROGEOLOGY LOG OF TEST BORING

BORING NO.	PROJECT NO.	PROJECT	SHEET 3 OF 3
MW-1	TCMC	TCMC Monitoring Wells	

DIST. FROM SURF.	LEGEND	SAMPLE TYPE	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL	PID/FID ppm	% LEL
							Well Construction		
							Screen casing susp. in hole @ 45		
							47-45 Sand #2/12 100# (2)		
							45-35 Screen 0.020, 4" PVC		
							w/ cap		
							35 – Surf Blank Casing, 4"Ø, F.T PVC		
							45 - 33 Sand #2/12 silica 700# (14)		
							33 - 30.5 Bentonite Pellets 100# (2)		
							30.5 - 3' Bentonite Grout 30 gal		
							3 - 0 Concrete Pad 3'Ø x 0.3'		
							add 0.3' pup to well head		
							Total csg + screen 45.0 + 0.28 + 0.3		
							= 45.58		
							w/ SU = 0.30'		

GLOBAL HYDROGEOLOGY LOG OF TEST BORING

BORING NO.	PROJECT NO.	PROJECT	SHEET 1 OF 2
MW-2	TCMC-II	MONITORING WELLS	

MFG. DESIGNATION OF DRILL: CME 85 HSA

LOCATION: Facilities Mngmt Bldg Park Lot 4002 Vista Way Oceanside.

TYPE OF BIT: 10" HSA

HAMMER DATA: WT. 140 LBS. DROP 30" * INCHES

ELEV. TOC: 256.64

TOTAL DEPTH OF HOLE: 10' (TTD) 27½

DATE — STARTED: 0800 29Sept11; COMPLETED: 1600 8Oct11; BACKFILLED: M.W.

DRILLING AGENCY: ABC Liovin Drlg

INSPECTOR: R HARRIS

CREW: Conrad, Mark, Jesse

GROUNDWATER DEPTH: 15.22 TOC @14:30 16Oct; enc 20' gs; 20.3 gs.; 19.6 TOC

TIME: 0910 8Oct; 0930 6Oct 27½; 1730 8Oct

SURFACE CONDITIONS: Asphalt Park Lot; Flat; Slopes sl. So. & v. sl. to E. 10' S/o conc. Paledge *sand line hammer su=0.45

DIST. FROM SURF.	LEGEND	SAMPLE TYPE	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL	PID/FID ppm	% LEL
							mod CA Sampler 2" ss sleeves		
							asphalt 0.3' H.A. to 5½'		
1	G					GP	sub grade 3/4" gravel w/sand Fill		
2						SP	Sand w/ lt-some silt, fn, pale yl 2.5Y 8/4, loose, damp-moist, non-calc, no odor	0.5	
3	G					SM	Silty Sand w/trace clay, fn, lt olv brn 2.5Y 5/3, loose, damp-moist, non-calc, no odor		
4								0.3	
5	G							0.2	
6	G					SC	Clayey Silty Sand, fn, drk olive brn, 2.5Y 3/3, m dns, moist, non calc, no odor		
7									
8									
9							STOP @10', 29Sept11 - break down restart 8Oct		
10	G	CA		3	7	CL	Sandy Silty Clay, fn, ~20:30:50		
11		Mod	TCMC	5	12			0.5	
		2"	MW-2-11	6	14	ML	Sandy Clayey Silt, fn, Holic. gray, 5Y 6/2, m. st. f.c, moist, non-calc, no odor		
12			08:55						
13									
14									
15							Santiago Fm		
		CA		4	8	SM	Silty Sand, fn 10% silt, lt gray 5Y 7/1, m dns, moist-wet, non calc, sl-m diesel odor		
16		mod	TCMC	6	9			5.5	
			MW2-16	6	12				
17			0900						
18									
19									
20		CA		4	10	SP	Sand w/ trace silt, fn, pale yl. 5Y 8/2, m dns, sat, free H₂O on core barrel, non-calc, no odor		
21		mod	TCMC	6	14			0.7	
			MW2-21	6	16				
			09:10						

GLOBAL HYDROGEOLOGY LOG OF TEST BORING

BORING NO.	MW-2
PROJECT NO.	TCMC-II
PROJECT	Monitoring Wells
SHEET	1 OF 2
MFG. DESIGNATION OF DRILL	CME 85 HSA
LOCATION	Facilities Mngmt Bldg Park Lot 4002 Vista Way Oceanside
TYPE OF BIT	10" HSA
HAMMER DATA: WT.	140 LBS. DROP 30' * INCHES
ELEV.	TOC 256.64
TOTAL DEPTH OF HOLE	10' (TTD) 27½
DATE STARTED	0800 29Sept11
DATE COMPLETED	1600 8Oct11
DATE BACKFILLED	M.W.
DRILLING AGENCY	ABC Liovin Drlg
INSPECTOR	R. Harris
CREW	Coriena, Mark, Jesse
GROUNDWATER DEPTH / TIME	enc 20' gs — 0910 8Oct; 20.3 gs — 0930 ? 27½; 15.22 TOC @14:30 16Oct; 19.6 TOC — 1730 8Oct
SURFACE CONDITIONS	Asphalt Park Lot; Flat; slopes sl So. & v. sl. to E. 10'S/o conc. Paledge *sand line hammer SU = 0.45

DIST. FROM SURF.	LEGEND	SAMPLE TYPE	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL	PID/FID ppm	% LEL
							mod CA Sampler 2" SS sleeves		
							asphalt 0.3' H.A. to 5½'		
1	G					GP	sub grade 3/4" gravel w/ sand Fill		
2						SP	Sand w/ lt-some silt, fn, pale yl 2.5 Y 8/4, loose, damp-moist, non-calc, no odor	0.5	
3	G					SM	Silty Sand w/ trace clay, fn, lt olive brn 2.5Y 5/3, loose, damp-moist, non-calc, no odor		
4								0.3	
5	G							0.2	
6	G					SC	Clayey Silty Sand, fn, drk olive brn, 2.5 Y 3/3, m dns, moist, non calc, no odor		
7									
8									
9							STOP @10', 29 Sept 11 - break down		
10	G					Cl	restart 8 Oct		
		CA		3	7		Sandy Silty Clay, fn, ~20:30:50		
11		Mod	TCMC	5	12			0.5	
		2"	MW-2	6	14		Sandy Clayey Silt, fn, lt olive		
12			-11			ml	gray, 5Y 6/2, m. st. f.c, moist,		
			08:55				non-calc, no odor		
13									
14									
15							Santiago Fm		
		CA		4	8	Sm	Silty Sand, fn 10% silt, lt gray		
16		mod	TCMC-	6	9		5Y 7/1, m dns, moist-wet, non	5.5	
			MW2-16	6	12		calc, sl-m diesel odor		
17			0900						
18									
19									
20									
		CA		4	10	SP	Sand w/ trace silt, fn,		
21		mod	TCMC	6	14		pale yl. 5Y 8/2, m dns, sat,	0.7	
			MW-2-21	6	16		free H2O on core barrel, non-		
			09:10				calc, no odor		

GLOBAL HYDROGEOLOGY LOG OF TEST BORING

BORING NO.	PROJECT NO.	PROJECT	SHEET 2 OF 2
MW-2	TCMC	TCMC Mont wells	

DIST. FROM SURF.	LEGEND	SAMPLE TYPE	SAMPLE NO.	RECOVERY	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL	PID/FID ppm	% LEL
22									
			TCMC-, *				/sandstone		
25		I	MW-2-25	6"	50/5"	SP/SS	Sand w/ trace silt, fn, white	0.6	
							5Y 8/1, v dns, sat, free H_2O		
			09:20				on top of recov tube. Sl-m calc		
							v sl. diesel odor; mod-v calc		
	G						on Fe stained sand	0.5	
						TD	Suspend casing & screen @ 25'		
						27½	backfill w/ #2/12 sand (50# SKS)		
							27-25 Sand 2/12 silica 100# (12)		
							25-15 Screen 0.020, 4" PVC w/ F.T. CAP		
							15 - Surf Blank Csg 4" PVC F.T.		
							25 - 13 Sand 2/12 silica 650# (13)		
							13 - 8 Bentonite pellets med, hydrate		
							8 - 3 Bentonite grout		
							3 - 0 Concrete seal & pad		
							36" Ø x 0.3' pad w/		
							12" Ø Emco well vault		
							cut 0.45' pup for well head		
							∴ Total casing length is		
							25.0 + 28 + 0.45 = 25.73'		
							w/ -0.67 Su.		
							* overdrill by 1' to get full 6" tube		

GEOTECHNICAL PROFESSIONALS BORING LOGS
FROM 2006 SITE INVESTIGATION

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	ELEVATION (FEET)
				0	Fill (Qf): **SANDY CLAY (CL)** brown, slightly moist, soft, asphalt concrete and rock fragments	275
			B			
					Residual Soils (Qr): **SANDY CLAY (CL)** brown, slightly moist, soft	
11.6	112	5	D	5	Total Depth 5 feet	270

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED: 4-19-06

EQUIPMENT USED: 18" Bucket Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2098.I

TRI-CITY MEDICAL

LOG OF BORING NO. B-1

FIGURE A-1

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill (Qf):	
			B		**SANDY CLAY (CL)** brown, slightly moist, soft, asphalt concrete and rock fragments	
8.4	111	5	D		Residual Soils (Qr):	275
				5	**SANDY CLAY (CL)** brown, slightly moist, soft	
					Total Depth 5 feet	

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED:
4-19-06

EQUIPMENT USED:
18" Bucket Auger

GROUNDWATER LEVEL (ft):
Not Encountered

GPI

PROJECT NO.: 2098.I

TRI-CITY MEDICAL

LOG OF BORING NO. B-2

FIGURE A-2

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill (Qf):	
9.5	114		B		**SILTY SAND (SM)** brown, moist, loose, asphalt concrete and rock fragments	
14.9	112	Push	D			
					@ 3 feet, trace clay	275
18.6	104	6/8"	D	5		
					Santiago Formation (Tsa):	
					SANDSTONE (SP) tan, moist, very dense	
9.8	102	8/11"	D			270
7.5	110	8/11"	D	10		
						265
8.5	109	8/10"	D	15		
						260
6.1	108	8/10"	D	20		
					Total Depth 20 feet	
					Backfilled and tamped: *0-5 ft cuttings* *5-10 ft cuttings mixed with 25 bags bentonite* *10-18 ft cuttings mixed with 5 bags bentonite* *18-20 ft 10 bags bentonite*	

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED:
4-19-06

EQUIPMENT USED:
18" Bucket Auger

GROUNDWATER LEVEL (ft):
Not Encountered

GPI

PROJECT NO.: 2098.I
TRI-CITY MEDICAL

LOG OF BORING NO. B-3

FIGURE A-3

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill (Qf):	
			B		**CLAYEY SAND (SC)** brown, moist to very moist, very loose, asphalt concrete and rock fragments	275
15.8	108	Push	D			
23.5	97	Push	D	5	Residual Soils (Qr): **SANDY CLAY (CL)** brown, very moist, soft	270
12.8	114	5	D		Santiago Formation (Tsa): **SANDSTONE (SP)** tan, moist, dense	
10.3	115	9	D	10	@ 10 feet, very dense	265
8.8	109	6	D	15		260
8.9	116	9/11"	D	20		255
8.9	107	9	D	25	Total Depth 25 feet	

Backfilled and tamped:
0-5 ft cuttings
5-10 ft cuttings mixed with 25 bags bentonite
10-19 ft cuttings
19-20 ft cuttings mixed with 5 bags bentonite
20-23 ft cuttings
23-25 feet 10 bags bentonite

SAMPLE TYPES
[C] Rock Core
[S] Standard Split Spoon
[D] Drive Sample
[B] Bulk Sample
[T] Tube Sample

DATE DRILLED: 4-19-06
EQUIPMENT USED: 18" Bucket Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2098.I
TRI-CITY MEDICAL

LOG OF BORING NO. B-4

FIGURE A-4

	MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					0	**Fill (Qf):** **SILTY SAND (SM)** brown, moist to very moist, loose, trace clay, asphalt concrete and rock fragments	
	13.3	105	1	D			
	11.7	111	2	D	5	@ 5 feet, medium dense	270
	12.0	113	3	D		@ 7 feet, dark brown/grey	
	25.8	96	2/6"	D	10	**Residual Soils (Qr):** **SILTY SAND (SM)** light brown, moist, fine grained, with clay	265
						Santiago Formation (Tsa): **SANDSTONE (SP)** tan, moist, very dense, massive	260
			8/10"	D	15	@ 14.5 feet, fracture, calcium filled. F: N30E, 81SE B: N60E, 6SE	
	7.6	114	8/10"	D	20	@ 20 feet, golden red	255
						@ 23 feet, 3-inch thick, gray and brown laminated silt and sand B: N60W, 8NE	250
	11.9	119	8/10"	D	25	@ 24.5 ft B:N60W, 6-8NE	
	7.7	113	15/11"	D			245
					30	Total Depth 30 feet No water or caving *Backfilled and tamped:* *0-5 ft cuttings* *5-10 ft cuttings mixed with 25 bags bentonite* *19-20 ft cuttings mixed with 5 bags bentonite* *20-24 ft cuttings* *24-25 ft cuttings mixed with 5 bags bentonite* *25-28 ft cuttings* *28-30 ft 10 bags bentonite*	

This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED: 4-18-06
EQUIPMENT USED: 18" Bucket Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2098.I
TRI-CITY MEDICAL

LOG OF BORING NO. B-5

FIGURE A-5

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill (Qf):	275
			B		**SANDY CLAY (CL)** brown, slightly moist, soft, asphalt concrete and rock fragments	
					Residual Soils (Qr):	
11.6	112	5	D	5	**SANDY CLAY (CL)** brown, slightly moist, soft	270
					Total Depth 5 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 4-19-06

EQUIPMENT USED: 18" Bucket Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2098.I

TRI-CITY MEDICAL

LOG OF BORING NO. B-1

FIGURE A-1

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	ELEVATION (FEET)
				0	Fill (Qf): **SANDY CLAY (CL)** brown, slightly moist, soft, asphalt concrete and rock fragments	
			B			
8.4	111	5	D		Residual Soils (Qr): **SANDY CLAY (CL)** brown, slightly moist, soft	275
				5	Total Depth 5 feet	

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED: 4-19-06

EQUIPMENT USED: 18" Bucket Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2098.I

TRI-CITY MEDICAL

LOG OF BORING NO. B-2

FIGURE A-2

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	ELEVATION (FEET)
				0	
9.5	114		B		
14.9	112	Push	D		275
18.6	104	6/8"	D	5	
9.8	102	8/11"	D		270
7.5	110	8/11"	D	10	
					265
8.5	109	8/10"	D	15	
					260
6.1	108	8/10"	D	20	

DESCRIPTION OF SUBSURFACE MATERIALS

This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Fill (Qf):
SILTY SAND (SM) brown, moist, loose, asphalt concrete and rock fragments

@ 3 feet, trace clay

Santiago Formation (Tsa):
SANDSTONE (SP) tan, moist, very dense

Total Depth 20 feet

Backfilled and tamped:
0-5 ft cuttings
5-10 ft cuttings mixed with 25 bags bentonite
10-18 ft cuttings mixed with 5 bags bentonite
18-20 ft 10 bags bentonite

SAMPLE TYPES
C Rock Core
S Standard Split Spoon
D Drive Sample
B Bulk Sample
T Tube Sample

DATE DRILLED: 4-19-06
EQUIPMENT USED: 18" Bucket Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2098.I
TRI-CITY MEDICAL

LOG OF BORING NO. B-3

FIGURE A-3

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0	Fill (Qf):	
			B		**CLAYEY SAND (SC)** brown, moist to very moist, very loose, asphalt concrete and rock fragments	275
15.8	108	Push	D			
23.5	97	Push	D	5	Residual Soils (Qr): **SANDY CLAY (CL)** brown, very moist, soft	270
12.8	114	5	D		Santiago Formation (Tsa): **SANDSTONE (SP)** tan, moist, dense	
10.3	115	9	D	10	@ 10 feet, very dense	265
8.8	109	6	D	15		260
8.9	116	9/11"	D	20		255
8.9	107	9	D	25	Total Depth 25 feet	

Backfilled and tamped:
0-5 ft cuttings
5-10 ft cuttings mixed with 25 bags bentonite
10-19 ft cuttings
19-20 ft cuttings mixed with 5 bags bentonite
20-23 ft cuttings
23-25 feet 10 bags bentonite

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED: 4-19-06
EQUIPMENT USED: 18" Bucket Auger
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2098.I
TRI-CITY MEDICAL

LOG OF BORING NO. B-4

FIGURE A-4

	MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	ELEVATION (FEET)
					0	Fill (Qf): **SILTY SAND (SM)** brown, moist to very moist, loose, trace clay, asphalt concrete and rock fragments	
	13.3	105	1	D			
							270
	11.7	111	2	D	5	@ 5 feet, medium dense	
	12.0	113	3	D		@ 7 feet, dark brown/grey	
							265
	25.8	96	2/6"	D	10	Residual Soils (Qr): **SILTY SAND (SM)** light brown, moist, fine grained, with clay	
						Santiago Formation (Tsa): **SANDSTONE (SP)** tan, moist, very dense, massive	260
			8/10"	D	15	@ 14.5 feet, fracture, calcium filled. F: N30E, 81SE B: N60E, 6SE	
							255
	7.6	114	8/10"	D	20	@ 20 feet, golden red	
						@ 23 feet, 3-inch thick, gray and brown laminated silt and sand	250
	11.9	119	8/10"	D	25	B: N60W, 8NE @ 24.5 ft B:N60W, 6-8NE	
	7.7	113	15/11"	D			245
					30	Total Depth 30 feet No water or caving *Backfilled and tamped:* *0-5 ft cuttings* *5-10 ft cuttings mixed with 25 bags bentonite* *19-20 ft cuttings mixed with 5 bags bentonite* *20-24 ft cuttings* *24-25 ft cuttings mixed with 5 bags bentonite* *25-28 ft cuttings* *28-30 ft 10 bags bentonite*	

SAMPLE TYPES
- [C] Rock Core
- [S] Standard Split Spoon
- [D] Drive Sample
- [B] Bulk Sample
- [T] Tube Sample

DATE DRILLED: 4-18-06

EQUIPMENT USED: 18" Bucket Auger

GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2098.I

TRI-CITY MEDICAL

LOG OF BORING NO. B-5

FIGURE A-5

WESERN SOIL AND FOUNDATION ENGINEERING BORING LOGS
FROM 1996 SITE INVESTIGATION

BORING NO. B - 1
ELEVATION 270

SAMPLING METHOD 8 INCH DIAMETER AUGER

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	DESCRIPTION	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %
			4" ASPHALT PAVEMENT - OVER 6" DECOMPOSED GRANITE					
2	R	CH	FILL - Brown, Sandy Clay	Very Moist	Stiff	108.4	11.7	CAL 16/12
	B							
4		SP	SANTIAGO FORMATION - Pale Yellow, Slightly Silty, Fine Grained to Medium Grained Sandstone	Moist	Dense			
6			grades to					
8	R	SM	Very Pale Green, Silty, Fine Grained Sandstone	Moist	Dense	96.4	15.0	CAL 53/6
10	R	ML	SANTIAGO FORMATION - Dark Green, Sandy Siltstone, Fissile, Thinly Laminated	Very Moist	Hard			SPT 55/12
	B							
15	R	SP	SANTIAGO FORMATION - White, Slightly Silty, Medium Grained Sandstone	Very Moist	Very Dense	117.7	14.0	CAL 50/4
20			GROUNDWATER SEEPAGE @ 20.0 FEET	∇				
	R	ML	SANTIAGO FORMATION - Grayish-Brown, Siltstone	Very Moist	Hard	103.6	17.3	CAL 50/6
			grades to					
25			Green, Sandy Siltstone	Very Moist	Hard			SPT 93/12
			BOTTOM OF BORING @ 25 FEET					
30								
35								

SAMPLE LEGEND

B = Bulk Sample
R = Ring Sample
SPT = Standard Penetration
CAL = California Sampler

JOB NUMBER		DATE LOGGED	LOGGED BY
96-18A	LOBBY EXPANSION TRI-CITY MEDICAL CENTER	6-27-96	V.G.

SUBSURFACE EXPLORATION LOG

BORING NO. B - 2
ELEVATION 268

SAMPLING METHOD 8 INCH DIAMETER AUGER

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	DESCRIPTION	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %
			3" ASPHALT PAVEMENT - OVER 6" DECOMPOSED GRANITE					
2		CH	FILL - Dark Brown, Sandy Clay	Very Moist	Medium Stiff		17.3	SPT - 7/12
4	R	SC	SANTIAGO FORMATION - Pale Gray, Clayey, Fine Grained Sandstone grades to	Very Moist	Stiff		16.3	SPT 93/10
6	B	SM	Pale Green, Silty, Fine Grained Sandstone grades to	Moist	Very Dense		16.6	SPT 77/12
8			Pale Gray, Very Silty, Very Fine Grained Sandstone, localized cementation	Very Moist	Very Dense			
10	B	ML	SANTIAGO FORMATION - Dark Lavender with Green Mottling, Sandy Siltstone, Fissile, Thinly Laminated	Very Moist	Hard		16.6	SPT 78/12
			grades to					
15	B	ML	Dark Green, Slightly Sandy, Siltstone, Thinly Laminated	Very Moist	Very Stiff		25.7	SPT 32/12
			GROUNDWATER @ 19.0 FEET	▽				
20	R	SP	SANTIAGO FORMATION - Pale Gray, Medium to Coarse Grained Sandstone	Very Moist	Very Dense			CAL 54/6
25	R					114.8	14.6	CAL 56/6
	R	ML	SANTIAGO FORMATION - Brownish-Red, Slightly Sandy, Siltstone	Very Moist	Hard	109.3	21.8	CAL 50/4
30			BOTTOM OF BORING @ 30.0 FEET					
35								

JOB NUMBER		DATE LOGGED	LOGGED BY
96-18A	LOBBY EXPANSION TRI-CITY MEDICAL CENTER	6-27-96	V.G.

SUBSURFACE EXPLORATION LOG

DEPTH (FEET)	SAMPLE TYPE	SOIL CLASSIFICATION	BORING NO. B - 3 ELEVATION 269 SAMPLING METHOD 8 INCH DIAMETER AUGER DESCRIPTION	APPARENT MOISTURE	APPARENT CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	RELATIVE COMPACTION %
0–2	R	SC	FILL - Dark Brown, Clayey Sand	Very Moist	Loose			
2–4		CH	Very Dark Brownish-Gray, Sandy Clay	Very Moist	Soft			CAL - 9/12
4–10	R	ML	SANTIAGO FORMATION - Pale Greenish-Gray, Silty, Very Fine to Fine Grained Sandstone grades to	Moist	Very Dense		16.3	CAL 93/0
10–12	R	SM	Dark Green, Very Silty, Fine Grained Sandstone	Very Moist	Very Dense	106.4	15.0	CAL - 64/6
12–14		ML	SANTIAGO FORMATION - Dark Brownish-Lavender, Sandy Siltstone	Very Moist	Hard			
15–16	R	SP	SANTIAGO FORMATION - Pale Yellow, Medium to Coarse Grained Sandstone	Very Moist	Very Dense			CAL - 64/6
			BOTTOM OF BORING @ 16.0 FEET					

Depth scale: 2, 4, 6, 8, 10, 15, 20, 25, 30, 35

JOB NUMBER		DATE LOGGED	LOGGED BY
96-18A	LOBBY EXPANSION TRI-CITY MEDICAL CENTER	6-27-96	V.G.

SUBSURFACE EXPLORATION LOG

BASELINE CONSULTANTS TEST PIT LOGS
FROM 1988 SITE INVESTIGATION

SUMMARY OF TEST PIT № 1

Elev. 281

DEPTH	Samples	Dry Density	Field Moisture	Consist-ency	Color		DESCRIPTION
	■	105	18.9	Fm/Hard	Brown		TOPSOIL: SAND - fine to medium, clayey
							BEDROCK - SANDSTONE
	■	102	10.1		Tan		
5	■	108	10.5		Yellow Tan		
	■	103	11.5	Very Hard	Yellow		Refusal @ 7 feet
10							No Caving
							No Water

SUMMARY OF TEST PIT № 2

Elev. 281

DEPTH	Samples	Dry Density	Field Moisture	Consist-ency	Color		DESCRIPTION
	■	109	14.8	Firm	Brown		SAND - fine to medium, clayey
	■	105	9.6	Hard	Tan		
5	■	106	9.1		Yellow Tan		BEDROCK - SANDSTONE
	■	105	8.7	Very Hard			Refusal @ 7 feet
10							No Caving
							No Water

Proposed Day Care Center
Tri-City Medical Center
4002 West Vista Way
Oceanside, California

JOB № 789-127

PLATE — 3

BASELINE CONSULTANTS

SUMMARY OF TEST PIT Nº 3

Elev. 280

DEPTH	Samples	Dry Density	Field Moisture	Consist-ency	Color		DESCRIPTION
				Soft			FILL: SAND, CLAY - roots and wood chips
	■	115	13.8	Firm	Brown		SAND - fine to medium, clayey
5	■	103	12.1	Hard to Very Hard	Tan		BEDROCK - SANDSTONE
	■	99	9.6		Yellow Tan		Refusal @ 6 feet No caving No WAter
10							

SUMMARY OF TEST PIT Nº 4

Elev. 275

DEPTH	Samples	Dry Density	Field Moisture	Consist-ency	Color		DESCRIPTION
	■						FILL: Mix with Native Soil
		107	12.9	Firm	Brown		RESIDUAL SOIL: SAND -fine to medium, clayey
5	■	108	9.8	Hard	Yellow Tan		BEDROCK - SANDSTONE
	■	100	5.2	Very Hard	Yellow Tan		Refusal @ 7 feet No Caving No Water
10							

Proposed Day Care Center
Tri-City Medical Center
4002 West Vista Way
Oceanside, California

JOB Nº 789-127

PLATE — 4

BASELINE CONSULTANTS

SOIL TESTING LAB BORING LOGS
FROM 1968 SITE INVESTIGATION

LOGS OF BORINGS

BORING NO 1

ELEVATION 255'±

Depth in Feet	Sample No.	Description	Soil Classification	Field Moist. % Dry Wt.	Dry Density Lbs./Cu. Ft.	Shear Resistance Kips/Sq. Ft.	Drive Ener Ft Kips/Ft
0–9		Light grey, silty fine sand. Moist. Firm.					
9–10		Grey sandstone, Very Firm.					
10–24.5	1	White, silty fine sand. Moist. Firm.		11.7	118.0		56.
24.5–30	2	Grey sandy silt. Moist. Very Firm.		16.4	110.1		132.1

End of Boring

Date: 11-29-67	TRI-CITY HOSPITAL	Job No.	67-120
By: RRE	OCEANSIDE, CALIFORNIA	Plate No.	2

SOIL TESTING LABORATORY
OF NORTH COUNTY INC.

LOGS OF BORINGS

BORING NO 2

ELEVATION 256'+

DEPTH IN FEET	SAMPLE NO.	DESCRIPTION	SOIL CLASSIFICATION	FIELD MOIST. % DRY WT.	DRY DENSITY LBS./CU. FT.	SHEAR RESISTANCE KIPS/SQ. FT.	Drive Ener[gy]
0–2		Grey, clayey fine sand. Moist. Firm. (Fill material)					
2–6	1	Brown fine sandy silt. Moist. Loose. (Fill material)		8.7	100.4		6.
6–7		Grey-blue sandy clay. Very moist. Soft.					
7–12	2	Light brown silty fine sand. Very Moist. Firm.		16.9	104.6	2.15	24.
12–14	3	Grey clayey fine sand with thin lenses red-brown sand. Moist. Firm.		19.4	107.8	2.65	59.
14–22	4	Grey, Clayey fine sand. Moist. Very Firm.		15.9	108.2		87.[illegible]
22–23		Purple siltstone. Very Firm.					
23–29	5	Grey silty fine sand. Firm.		8.5	122.6	3.04	67.
29–31	6	White fine to coarse silica sand. Moist. Very Firm.		10.5	116.1		83.0
		End of Boring					

Date: 11-28-67	TRI-CITY HOSPITAL	Job No. 67-120
By: J & RRE	OCEANSIDE, CALIFORNIA	Plate No. 3

SOIL TESTING LABORATORY
OF NORTH COUNTY INC.

LOGS OF BORINGS

BORING NO 3

ELEVATION 280'±

Depth in Feet	Sample No.	Description	Soil Classification	Field Moist. % Dry Wt.	Dry Density Lbs./Cu. Ft.	Shear Resistance Kips/Sq. Ft.	Drive Energy Ft. Kips/Ft.
0–13	1	Light grey, silty fine sand. Moist. Very Firm.		8.8	110.7	3.42	108.
13–18	2	Yellow silty fine sand with thin lenses of grey siltstone. Moist. Very Firm.		7.7	113.7		67.5
18–20		Light grey, silty fine sand. Moist. Very firm,					
20		End of Boring					

Date: 11-29-67	By: RRE

TRI-CITY HOSPITAL
OCEANSIDE, CALIFORNIA

Job No. 67-120

Plate No. 4

SOIL TESTING LABORATORY
OF NORTH COUNTY INC.

LOGS OF BORINGS

BORING NO 4

ELEVATION 271.3'±

Depth in Feet	Sample No.	Description	Soil Classification	Field Moist. % Dry Wt.	Dry Density Lbs./Cu. Ft.	Shear Resistance Kips/Sq. Ft.	Drive Ener[...] Ft Kips/F[...]
0		A. C. Pavement/ Grey silty fine sand.					
2–4	1	Yellowish-brown silty fine sand. Very Firm.		8.4	111.6	3.32	110.
6–8	2	Light brownish grey silty fine sand. Very firm.		8.4	117.5		
10	3	Tan silty fine sand with lenses of purple siltstone. Moist. Very Firm.		14.6	112.7	2.95	203.
12–14	4			14.7	113.3		
16–18	5	Light brown silt with thin strata of siltstone. Moist. Very Firm.		20.7	101.1	2.56	81.0
20		End of Boring					

Date: 11-29-67	TRI-CITY HOSPITAL	Job No. 67-120
By: RRE	OCEANSIDE, CALIFORNIA	Plate No. 5

SOIL TESTING LABORATORY
OF NORTH COUNTY INC.

APPENDIX C

LABORATORY METHODS AND RESULTS

APPENDIX C
LABORATORY METHODS AND RESULTS

Laboratory Testing Program

Laboratory tests were performed on representative soil samples to detect their relative engineering properties. Tests were performed following test methods of the American Society for Testing Materials or other accepted standards. The following presents a brief description of the various test methods used.

Classification

Soils were classified visually according to the Unified Soil Classification System. Visual classifications were supplemented by laboratory testing of selected samples according to ASTM D2487. The soil classifications are shown on the Exploration Logs in Appendix B.

Expansion Index

Expansion testing was performed on selected samples of the matrix of the on-site soils according to ASTM D 4829.

Particle-Size Analysis

Particle-size analyses were performed on selected representative samples according to ASTM D 422.

Atterberg Limits

The procedure of ASTM D4518-84 was used to measure the liquid limit, plastic limit and plasticity index of representative samples.

Direct Shear

Direct shear tests were performed on either samples direct from the field or on samples recompacted to a specific density. Direct shear testing was performed in accordance with ASTM D 3080. The samples were inundated during shearing to represent adverse field conditions.

Consolidation

To assess their compressibility and volume change behavior when loaded and wetted, relatively undisturbed samples of representative samples from the investigation were subject to consolidation tests in accordance with ASTM D 2435.

Resistance “R” Value

The resistance “R”-value was measured by the California Test. 301. The graphically determined “R” value at an exudation pressure of 300 pounds per square inch is the value used for pavement section calculation.

Chemical Analysis

Soil materials were collected with sterile sampling equipment and tested for Sulfate and Chloride content, pH, Corrosivity, and Resistivity.

EXPANSION INDEX TEST

ASTM D 4829

LOCATION	DEPTH (feet)	EXPANSION INDEX	EXPANSION POTENTIAL
B-31	0-5	28	LOW
B-16	0-5	22	LOW
B-24	12-15	98	HIGH
B-43	0-5	8	VERY LOW
B-5	0-5	65	MEDIUM

IN-PLACE MOISTURE AND DENSITY

LOCATION	DEPTH (feet)	% MOISTURE	DRY DENSITY
B-1	10	7.5	109.2
B-5	5	14.0	108.6
B-11	10	14.7	111.7
B-13	10	10.4	103.2
B-33	10	13.3	111.9
B-18	10	12.2	108.9
B-19	10	15.8	111.5
B-26	5	10.3	113.5

RESISTANCE "R"-VALUE

CALTEST 301

LOCATION	DEPTH (feet)	R-VALUE
B-40	0-5	7
B-42	0-5	16

SULFATE

CALIFORNIA TEST 417

LOCATION	DEPTH (feet)	RESULTS ppm
B-3	0-5	280.2
B-27	0-5	402.6
B-43	0-5	187.8

CHLORIDE

CALIFORNIA TEST 422

LOCATION	DEPTH (feet)	RESULTS ppm
B-3	0-5	107.3
B-27	0-5	69.3
B-43	0-5	39.9

p.H.

CALIFORNIA TEST 643

LOCATION	DEPTH (feet)	RESULTS
B-3	0-5	8.09
B-27	0-5	7.61
B-43	0-5	8.78

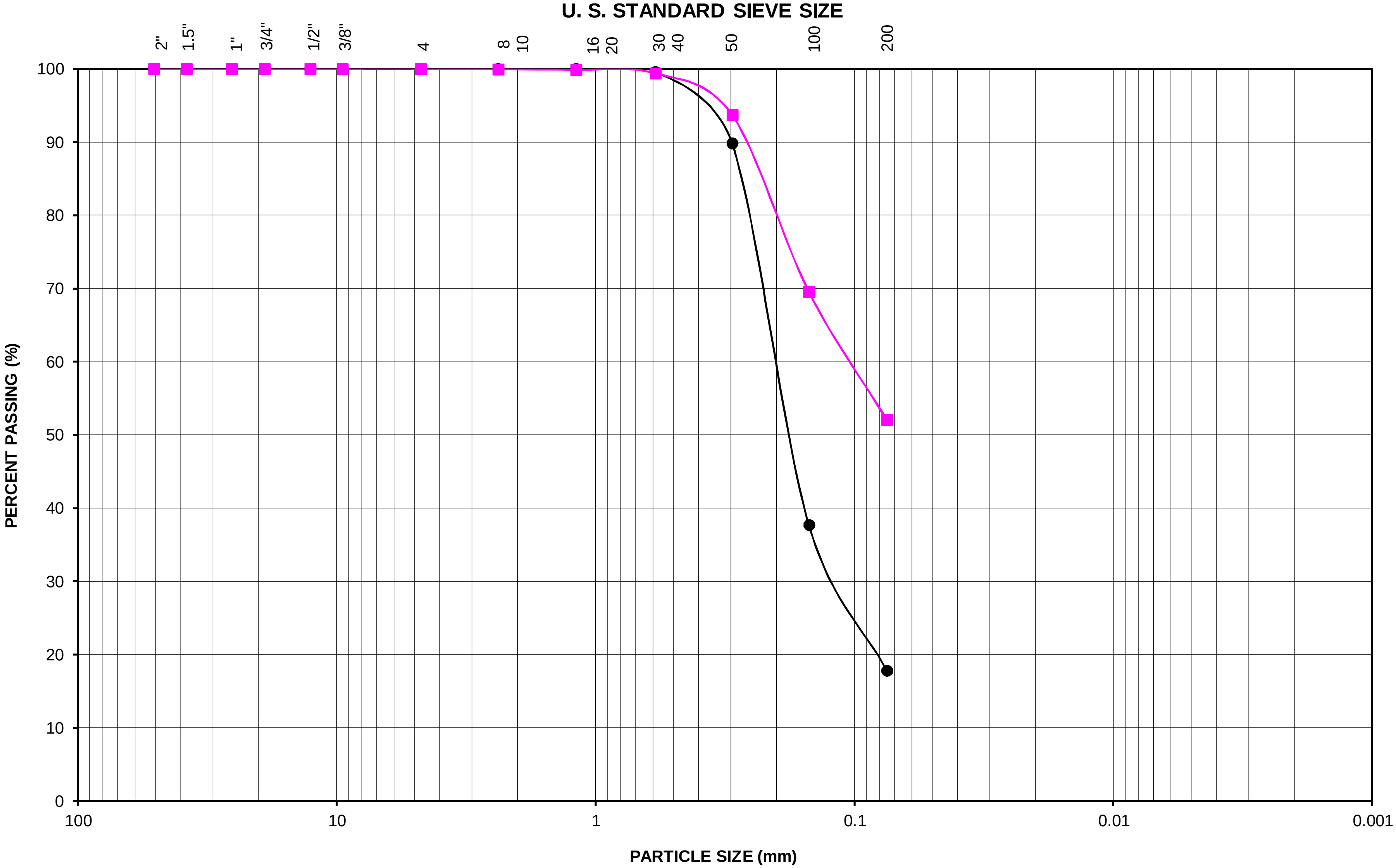
RESISTIVITY

CALIFORNIA TEST 643

LOCATION	DEPTH (feet)	RESULTS ohms-cm
B-3	0-5	2030
B-27	0-5	2180
B-43	0-5	4790

ATTERBERG LIMITS

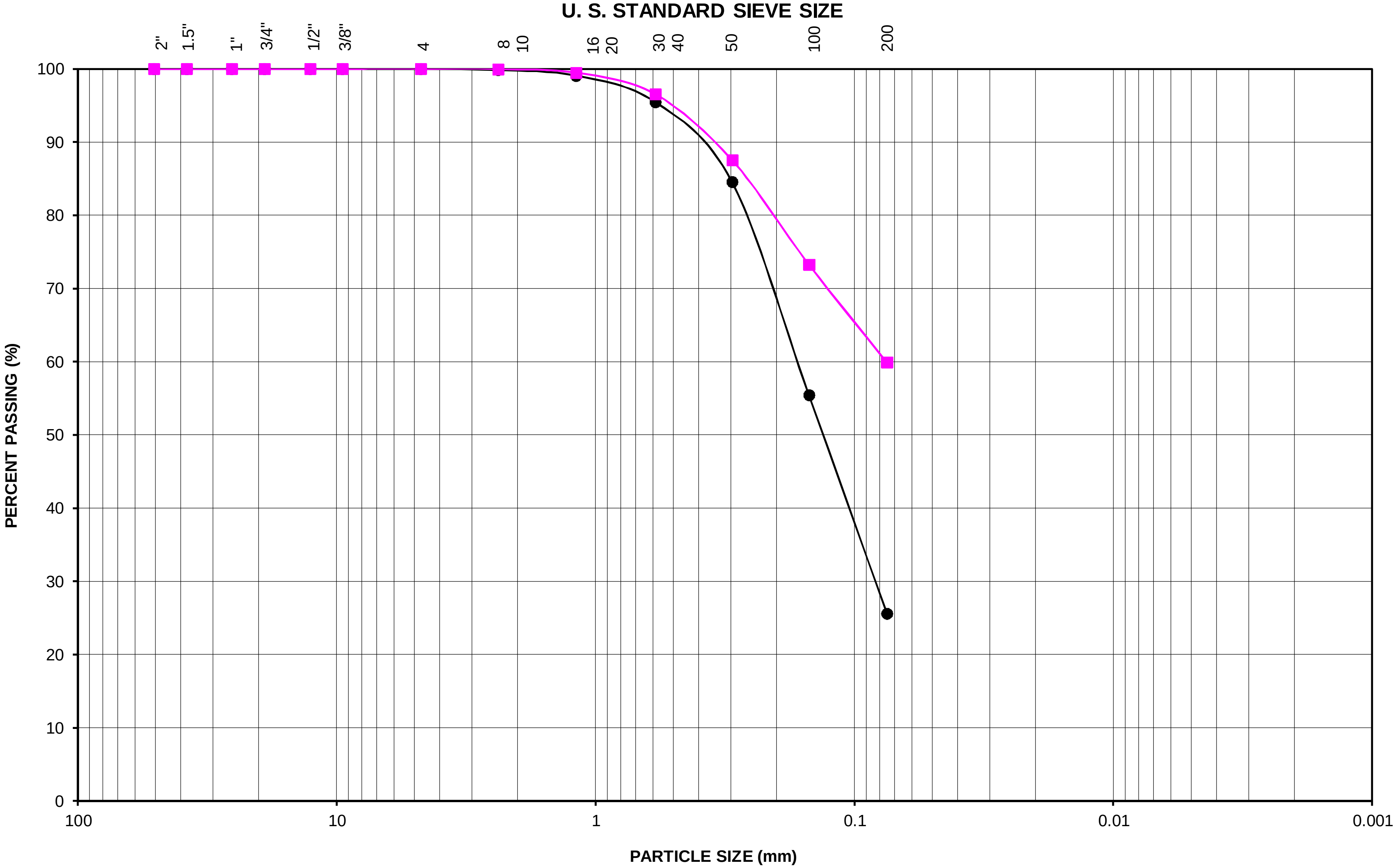
LOCATION	DEPTH (feet)	LIQUID LIMIT	PLASTICITY INDEX	CLASSIFICATION
B-18	20	31	16	CL
B-20	20	24	7	CL-ML
B-24	5	26	12	CL
B-31	40	50	24	CL
B-31	50	NP	NP	Non-Plastic



PARTICLE SIZE ANALYSIS

Construction Testing & Engineering, Inc.
1441 Montiel Rd Ste 115, Escondido, CA 92026 Ph (760) 746-4955

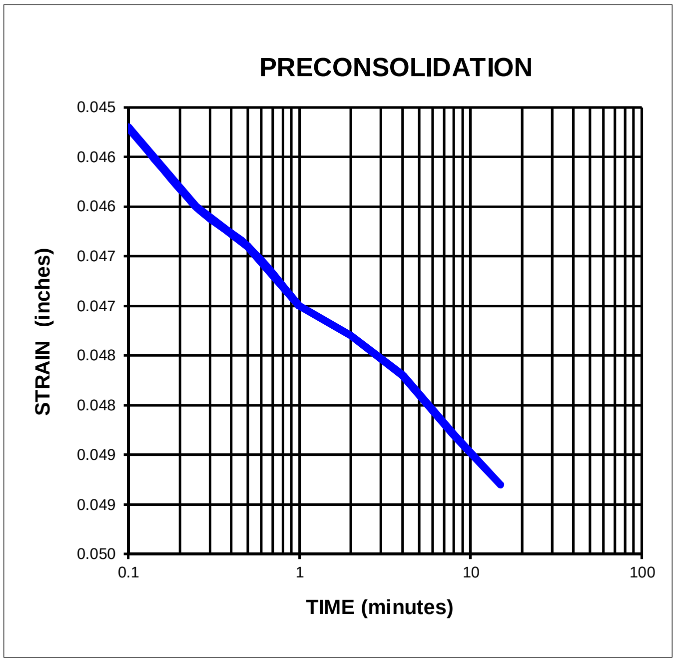
Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-7	10	●	-	-	SM
B-18	20	■	-	-	SC/CL
CTE JOB NUMBER:		10-13000G		FIGURE:	C-1

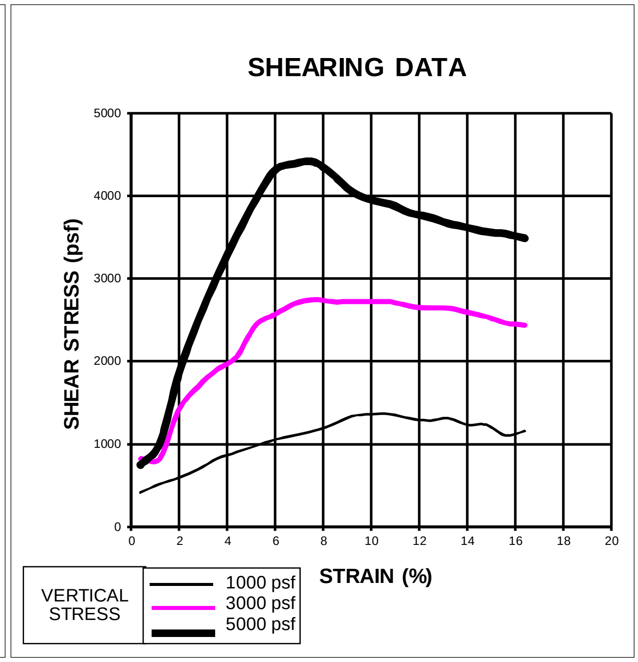


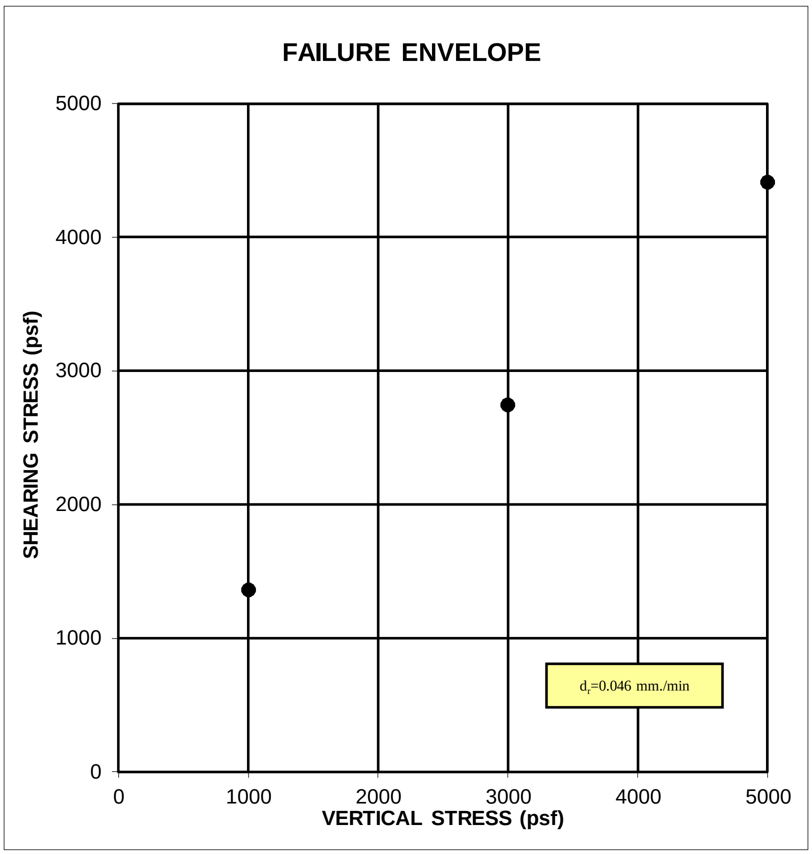
PARTICLE SIZE ANALYSIS

Construction Testing & Engineering, Inc.
1441 Montiel Rd Ste 115, Escondido, CA 92026 Ph (760) 746-4955

Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-27	5	●	-	-	SC/SM
B-27	10	■	-	-	CL
CTE JOB NUMBER:		10-13000G		FIGURE:	C-2

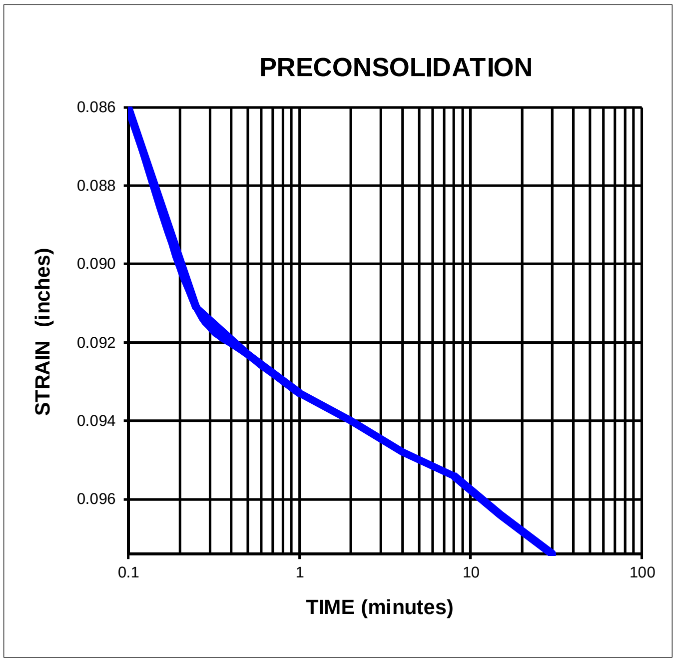


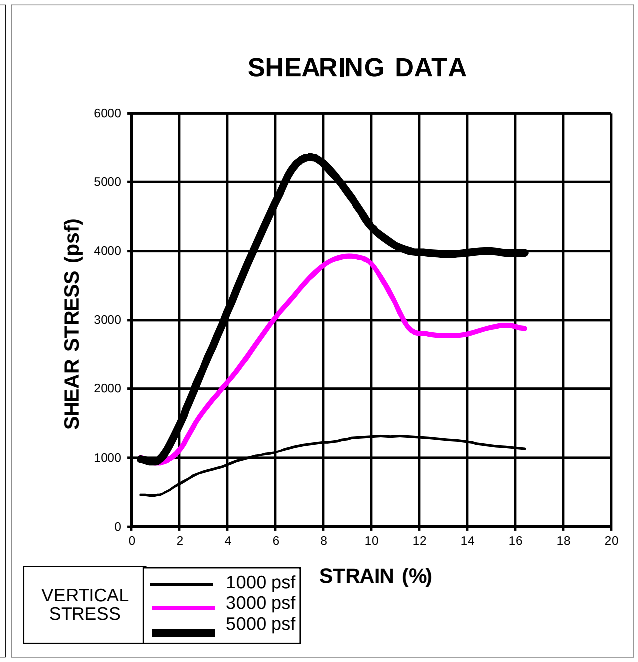


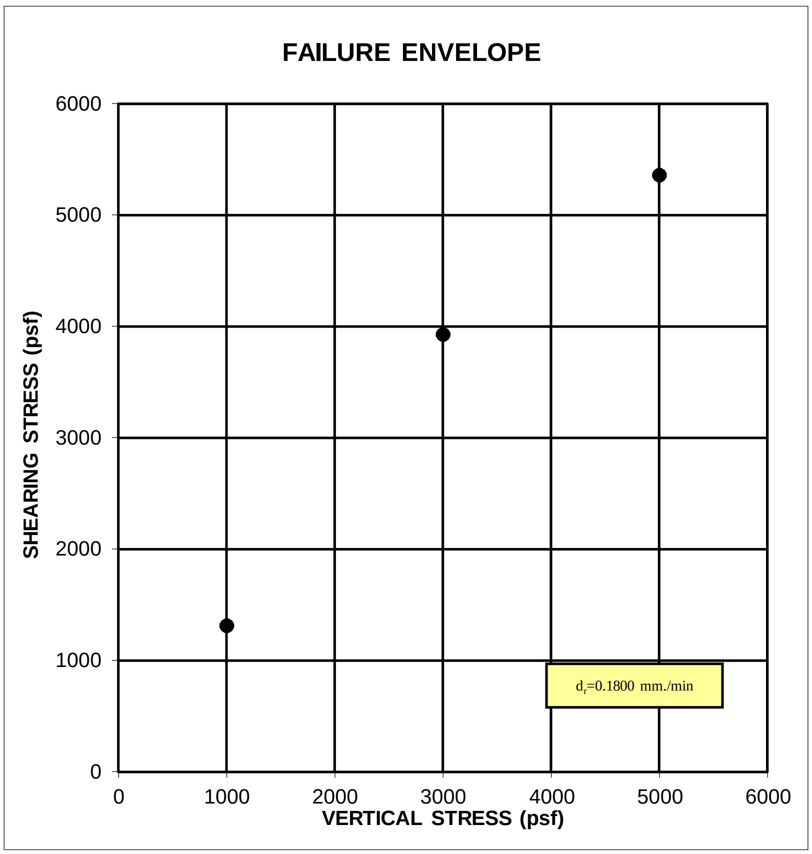


SHEAR STRENGTH TEST - ASTM D3080

Job Name:	Tri-City Medical Center			Initial Dry Density (pcf):	109.2
Project Number:	10-13000G	Sample Date:	7/12/2016	Initial Moisture (%):	7.5
Lab Number:	26462	Test Date:	7/29/2016	Final Moisture (%):	27.4
Sample Location:	B-1 @ 10'	Tested by:	Julian Carmona	Cohesion:	550 psf
Sample Description:	Greyish White SM			Angle Of Friction:	37.3







CTE INC.

SHEAR STRENGTH TEST - ASTM D3080

Job Name:	Tri-City			Initial Dry Density (pcf):	111.9
Project Number:	10-13000G	Sample Date:	7/15/2016	Initial Moisture (%):	13.3
Lab Number:	26462	Test Date:	8/9/2016	Final Moisture (%):	17.2
Sample Location:	B-33 @ 10'	Tested by:	Julian C.	Cohesion:	490 psf
Sample Description:	Light gray SP-SM			Angle Of Friction:	45.3

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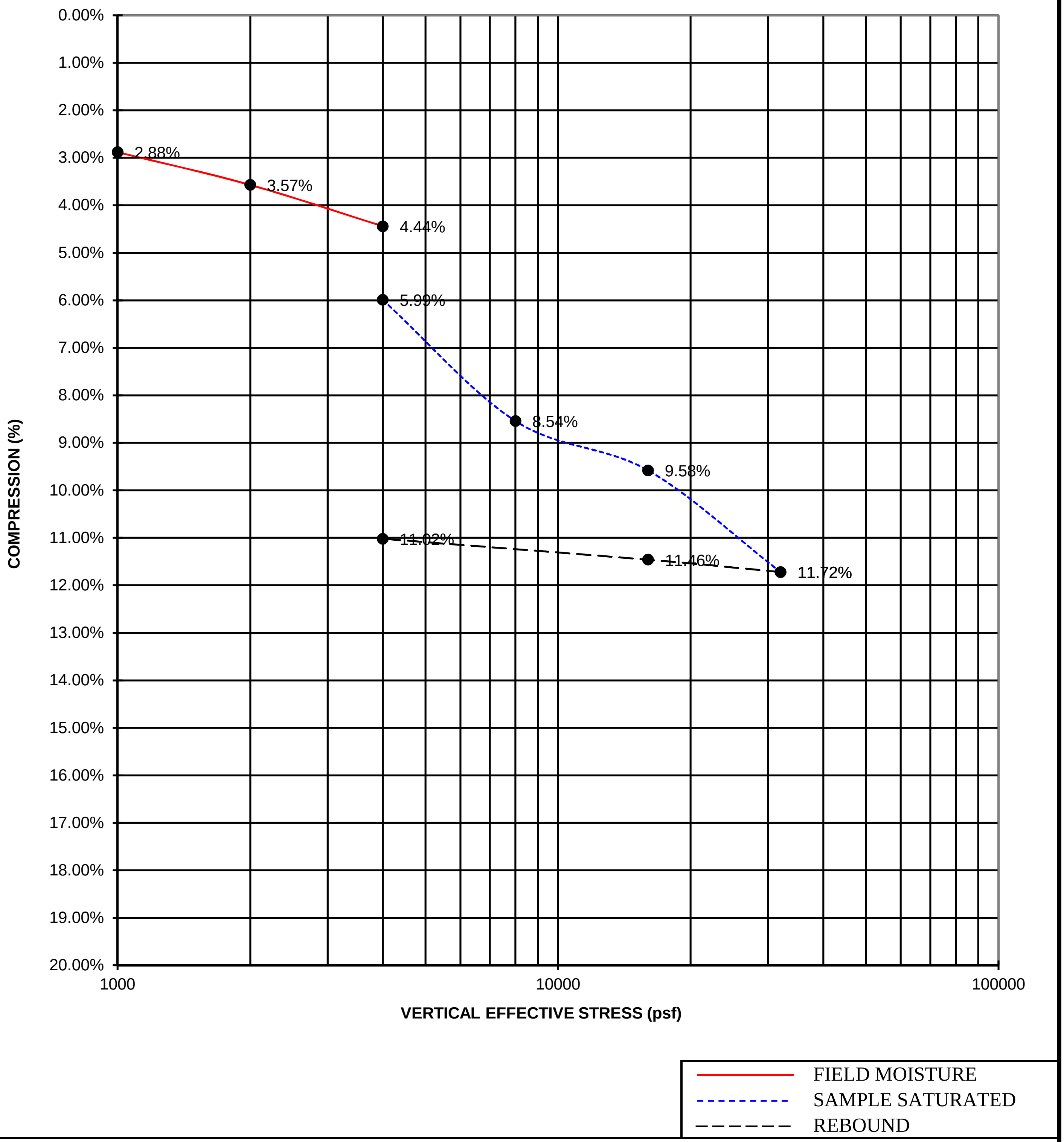
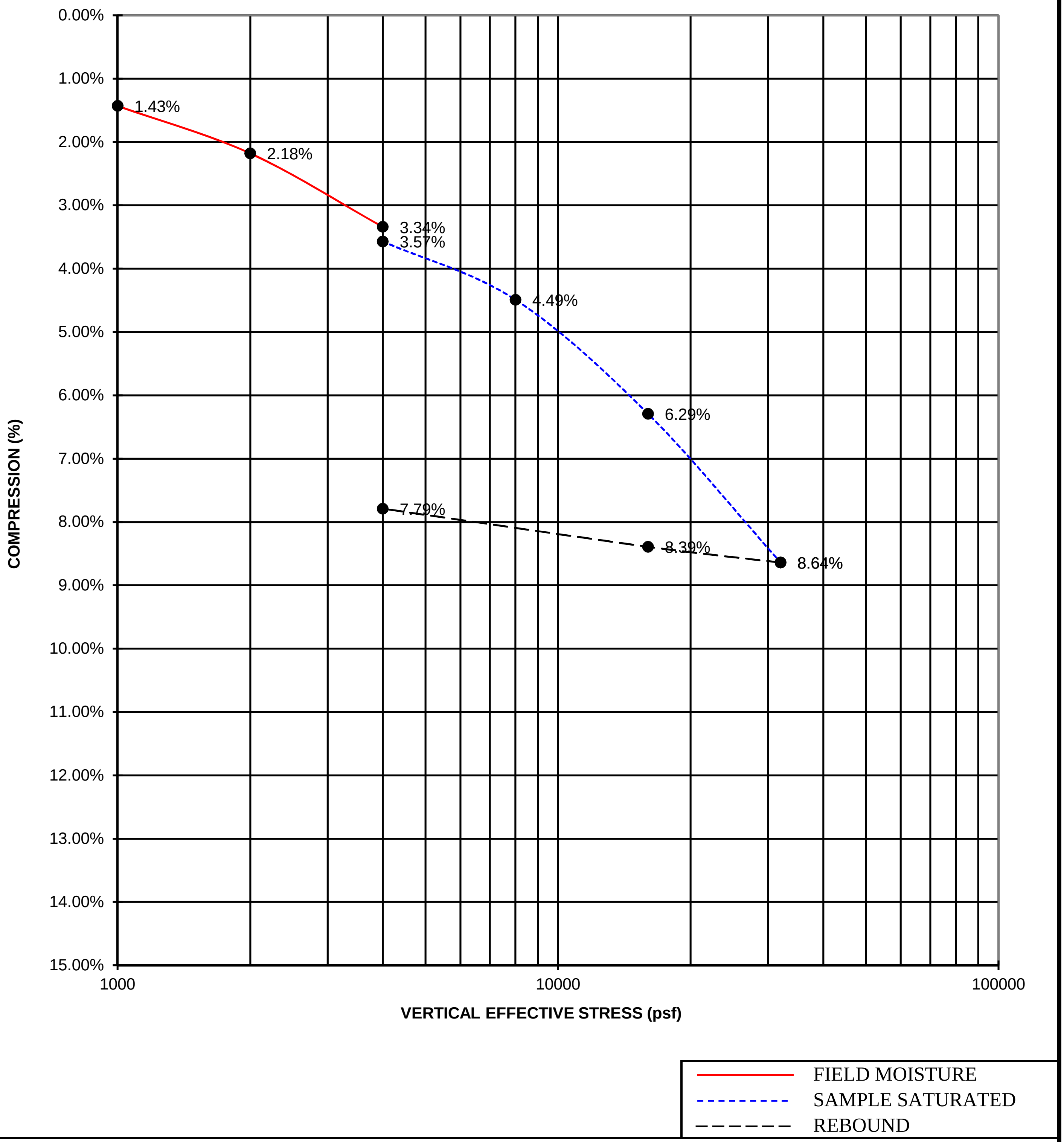


Swell/Consolidation Test ASTM D2435

Project Name:	Tri-City Medical Center				
Project Number:	10-13000G	Sample Date:	7/12/2016	Initial Moisture (%):	10.4
Lab Number:	26462	Test Date:	8/8/2016	Final Moisture (%):	18.5
Sample Location:	B-13 @ 10'	Tested By:	Chase Velarde	Initial Dry Density (PCF):	103.2
Sample Description:	Gray SC			Final Dry Density (PCF):	108.0

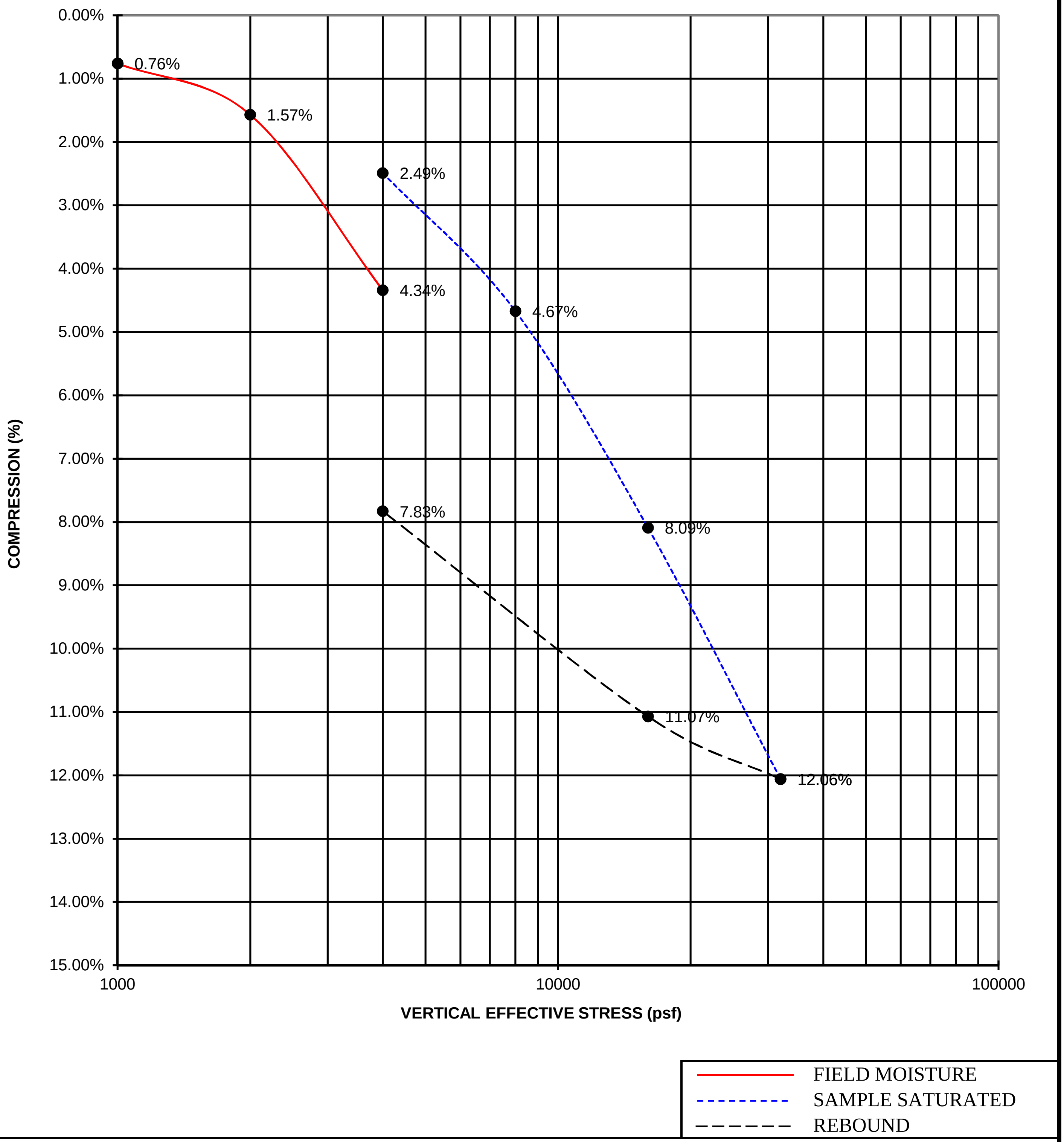
Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying



Swell/Consolidation Test ASTM D2435

Project Name:	Tri-City Medical Center				
Project Number:	10-13000G	Sample Date:	7/12/2016	Initial Moisture (%):	14.7
Lab Number:	26462	Test Date:	8/8/2016	Final Moisture (%):	14.0
Sample Location:	B-11 @ 10'	Tested By:	Chase Velarde	Initial Dry Density (PCF):	111.7
Sample Description:	Grey SC			Final Dry Density (PCF):	121.9



Swell/Consolidation Test ASTM D2435

Project Name:	Tri-City				
Project Number:	10-13000G	Sample Date:	7/12/2016	Initial Moisture (%):	14.8
Lab Number:	26462	Test Date:	9/6/2016	Final Moisture (%):	24.4
Sample Location:	B-24 @ 10'	Tested By:	JC	Initial Dry Density (PCF):	103.3
Sample Description:	Olive-gray CL			Final Dry Density (PCF):	112.1

Construction Testing & Engineering, Inc.

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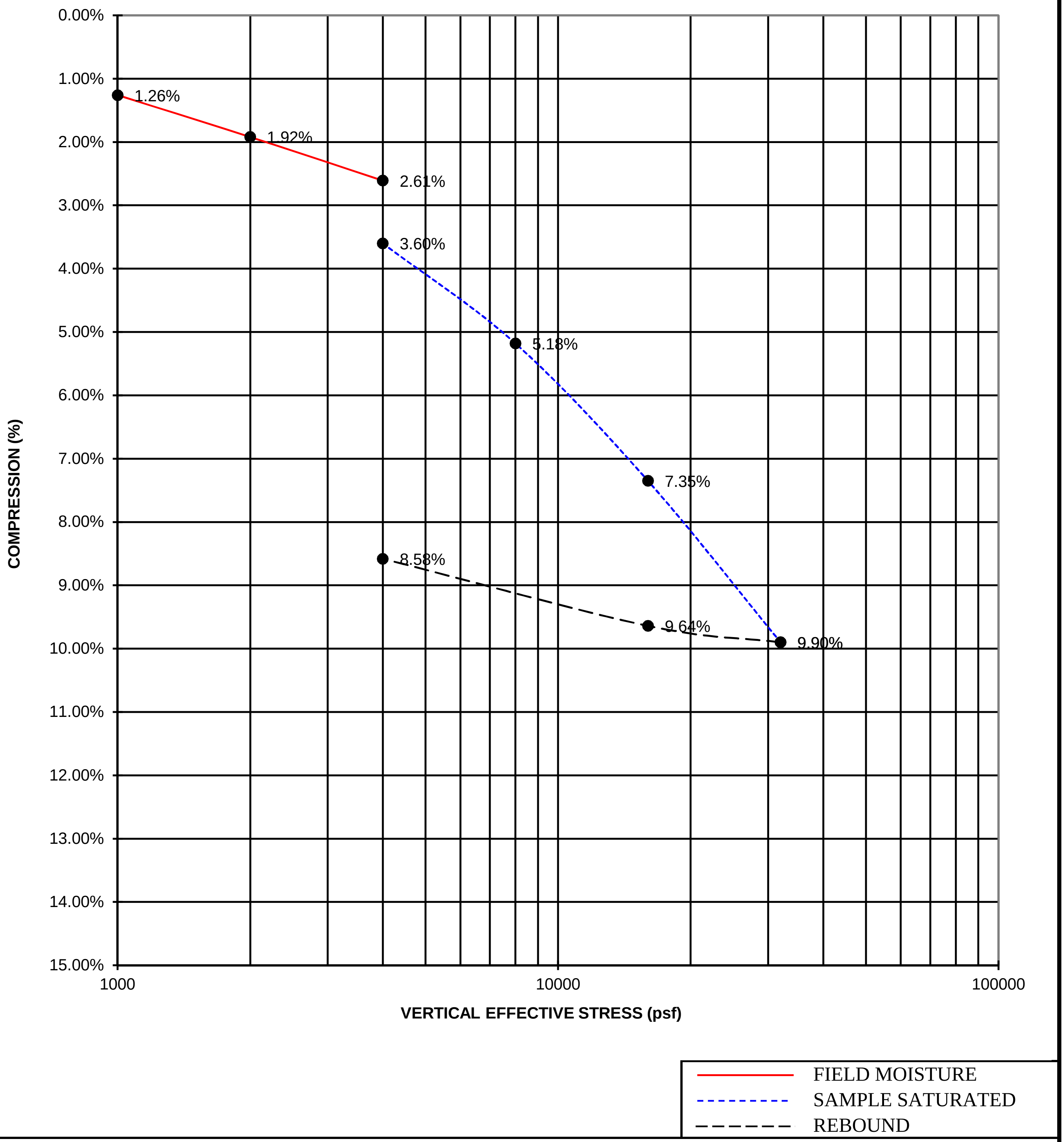
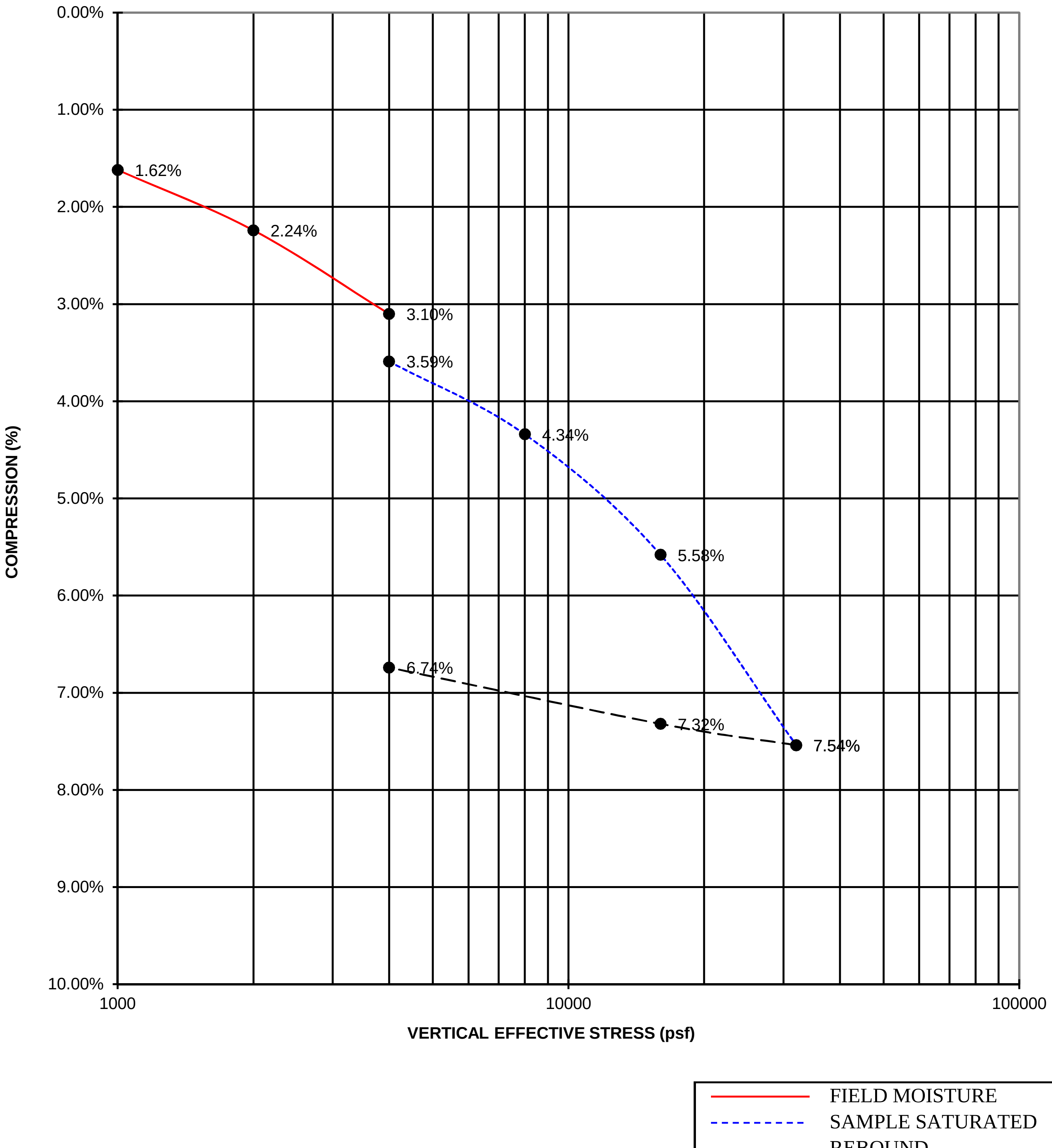


Swell/Consolidation Test ASTM D2435

Project Name:	Tri-City Medical Center				
Project Number:	10-13000G	Sample Date:	7/12/2016	Initial Moisture (%):	14.0
Lab Number:	26462	Test Date:	8/1/2016	Final Moisture (%):	15.0
Sample Location:	B-5 @ 5'	Tested By:	Julian Carmona	Initial Dry Density (PCF):	108.6
Sample Description:	Light Grey SC			Final Dry Density (PCF):	117.8

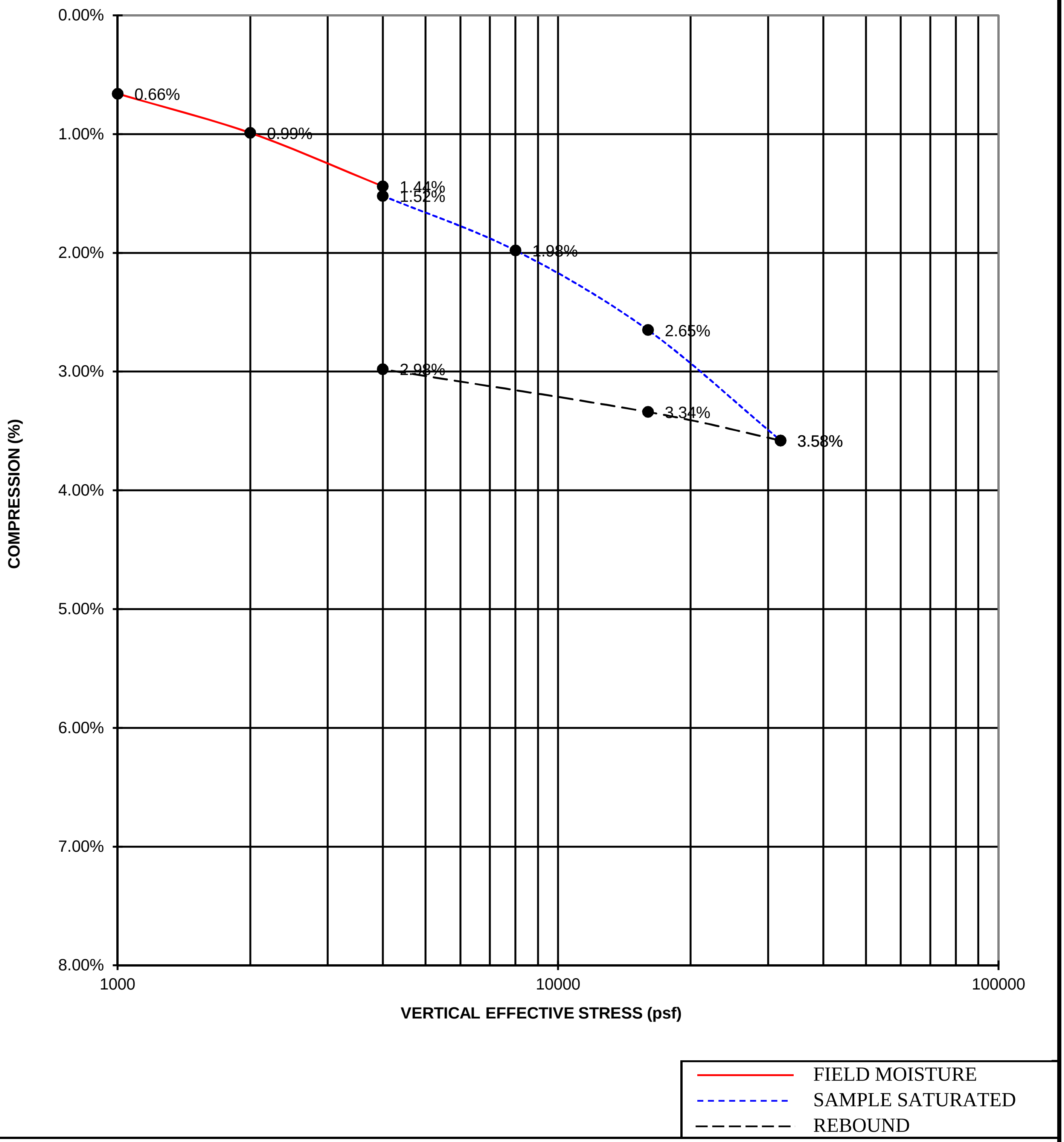


Swell/Consolidation Test ASTM D2435

Project Name:	Tri-City Medical Center				
Project Number:	10-13000G	Sample Date:	7/12/2016	Initial Moisture (%):	12.2
Lab Number:	26516	Test Date:	8/17/2016	Final Moisture (%):	13.1
Sample Location:	B-18 @ 10'	Tested By:	Chase V.	Initial Dry Density (PCF):	108.9
Sample Description:	Moderate Gray SC			Final Dry Density (PCF):	115.8

Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying



Swell/Consolidation Test ASTM D2435

Project Name:	Tri-City Medical Center				
Project Number:	10-13000G	Sample Date:	7/12/2016	Initial Moisture (%):	15.8
Lab Number:	26516	Test Date:	8/17/2016	Final Moisture (%):	13.4
Sample Location:	B-19 @ 10'	Tested By:	Chase V.	Initial Dry Density (PCF):	111.5
Sample Description:	Light Gray SM			Final Dry Density (PCF):	117.3

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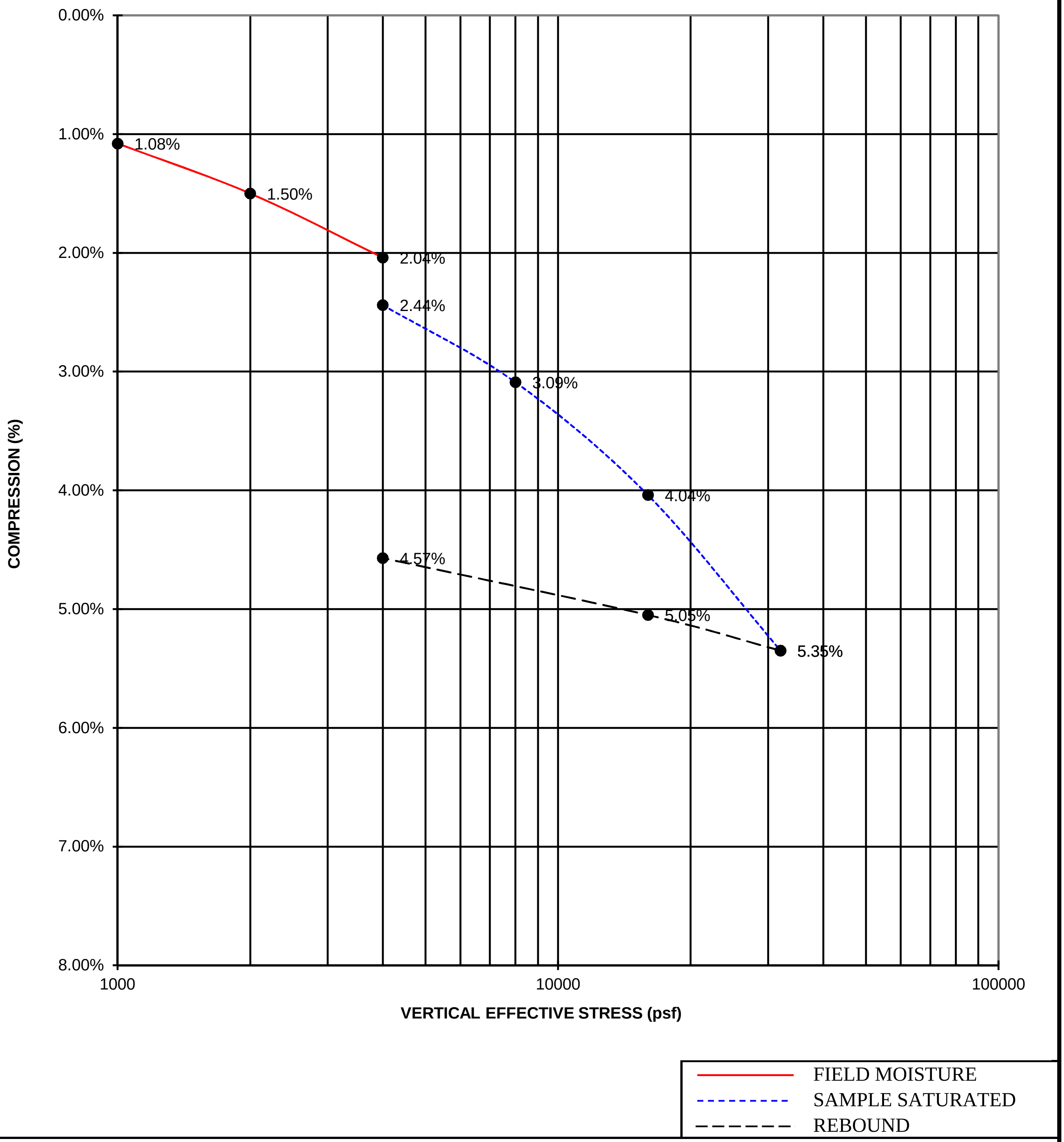


Swell/Consolidation Test ASTM D2435

Project Name:	Tri-City Medical Center				
Project Number:	10-13000G	Sample Date:	7/12/2016	Initial Moisture (%):	10.3
Lab Number:	26516	Test Date:	8/17/2016	Final Moisture (%):	11.7
Sample Location:	B-26 @ 5'	Tested By:	Chase V.	Initial Dry Density (PCF):	113.5
Sample Description:	Light Gray SM			Final Dry Density (PCF):	117.4

APPENDIX D

STANDARD SPECIFICATIONS FOR GRADING

Section 1 - General

Construction Testing & Engineering, Inc. presents the following standard recommendations for grading and other associated operations on construction projects. These guidelines should be considered a portion of the project specifications. Recommendations contained in the body of the previously presented soils report shall supersede the recommendations and or requirements as specified herein. The project geotechnical consultant shall interpret disputes arising out of interpretation of the recommendations contained in the soils report or specifications contained herein.

Section 2 - Responsibilities of Project Personnel

The geotechnical consultant should provide observation and testing services sufficient to general conformance with project specifications and standard grading practices. The geotechnical consultant should report any deviations to the client or his authorized representative.

The Client should be chiefly responsible for all aspects of the project. He or his authorized representative has the responsibility of reviewing the findings and recommendations of the geotechnical consultant. He shall authorize or cause to have authorized the Contractor and/or other consultants to perform work and/or provide services. During grading the Client or his authorized representative should remain on-site or should remain reasonably accessible to all concerned parties in order to make decisions necessary to maintain the flow of the project.

The Contractor is responsible for the safety of the project and satisfactory completion of all grading and other associated operations on construction projects, including, but not limited to, earth work in accordance with the project plans, specifications and controlling agency requirements.

Section 3 - Preconstruction Meeting

A preconstruction site meeting should be arranged by the owner and/or client and should include the grading contractor, design engineer, geotechnical consultant, owner's representative and representatives of the appropriate governing authorities.

Section 4 - Site Preparation

The client or contractor should obtain the required approvals from the controlling authorities for the project prior, during and/or after demolition, site preparation and removals, etc. The appropriate approvals should be obtained prior to proceeding with grading operations.

Clearing and grubbing should consist of the removal of vegetation such as brush, grass, woods, stumps, trees, root of trees and otherwise deleterious natural materials from the areas to be graded. Clearing and grubbing should extend to the outside of all proposed excavation and fill areas.

Demolition should include removal of buildings, structures, foundations, reservoirs, utilities (including underground pipelines, septic tanks, leach fields, seepage pits, cisterns, mining shafts, tunnels, etc.) and other man-made surface and subsurface improvements from the areas to be graded. Demolition of utilities should include proper capping and/or rerouting pipelines at the project perimeter and cutoff and capping of wells in accordance with the requirements of the governing authorities and the recommendations of the geotechnical consultant at the time of demolition.

Trees, plants or man-made improvements not planned to be removed or demolished should be protected by the contractor from damage or injury.

Debris generated during clearing, grubbing and/or demolition operations should be wasted from areas to be graded and disposed off-site. Clearing, grubbing and demolition operations should be performed under the observation of the geotechnical consultant.

Section 5 - Site Protection

Protection of the site during the period of grading should be the responsibility of the contractor. Unless other provisions are made in writing and agreed upon among the concerned parties, completion of a portion of the project should not be considered to preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete as identified by the geotechnical consultant, the client and the regulating agencies.

Precautions should be taken during the performance of site clearing, excavations and grading to protect the work site from flooding, ponding or inundation by poor or improper surface drainage. Temporary provisions should be made during the rainy season to adequately direct surface drainage away from and off the work site. Where low areas cannot be avoided, pumps should be kept on hand to continually remove water during periods of rainfall.

Rain related damage should be considered to include, but may not be limited to, erosion, silting, saturation, swelling, structural distress and other adverse conditions as determined by the geotechnical consultant. Soil adversely affected should be classified as unsuitable materials and should be subject to overexcavation and replacement with compacted fill or other remedial grading as recommended by the geotechnical consultant.

The contractor should be responsible for the stability of all temporary excavations. Recommendations by the geotechnical consultant pertaining to temporary excavations (e.g., backcuts) are made in consideration of stability of the completed project and, therefore, should not be considered to preclude the responsibilities of the contractor. Recommendations by the geotechnical consultant should not be considered to preclude requirements that are more restrictive by the regulating agencies. The contractor should provide during periods of extensive rainfall plastic sheeting to prevent unprotected slopes from becoming saturated and unstable. When deemed appropriate by the geotechnical consultant or governing agencies the contractor shall install checkdams, desilting basins, sand bags or other drainage control measures.

In relatively level areas and/or slope areas, where saturated soil and/or erosion gullies exist to depths of greater than 1.0 foot; they should be overexcavated and replaced as compacted fill in accordance with the applicable specifications. Where affected materials exist to depths of 1.0 foot or less below proposed finished grade, remedial grading by moisture conditioning in-place, followed by thorough recompaction in accordance with the applicable grading guidelines herein may be attempted. If the desired results are not achieved, all affected materials should be overexcavated and replaced as compacted fill in accordance with the slope repair recommendations herein. If field conditions dictate, the geotechnical consultant may recommend other slope repair procedures.

Section 6 - Excavations

6.1 Unsuitable Materials

Materials that are unsuitable should be excavated under observation and recommendations of the geotechnical consultant. Unsuitable materials include, but may not be limited to, dry, loose, soft, wet, organic compressible natural soils and fractured, weathered, soft bedrock and nonengineered or otherwise deleterious fill materials.

Material identified by the geotechnical consultant as unsatisfactory due to its moisture conditions should be overexcavated; moisture conditioned as needed, to a uniform at or above optimum moisture condition before placement as compacted fill.

If during the course of grading adverse geotechnical conditions are exposed which were not anticipated in the preliminary soil report as determined by the geotechnical consultant additional exploration, analysis, and treatment of these problems may be recommended.

6.2 Cut Slopes

Unless otherwise recommended by the geotechnical consultant and approved by the regulating agencies, permanent cut slopes should not be steeper than 2:1 (horizontal: vertical).

The geotechnical consultant should observe cut slope excavation and if these excavations expose loose cohesionless, significantly fractured or otherwise unsuitable material, the materials should be overexcavated and replaced with a compacted stabilization fill. If encountered specific cross section details should be obtained from the Geotechnical Consultant.

When extensive cut slopes are excavated or these cut slopes are made in the direction of the prevailing drainage, a non-erodible diversion swale (brow ditch) should be provided at the top of the slope.

6.3 Pad Areas

All lot pad areas, including side yard terrace containing both cut and fill materials, transitions, located less than 3 feet deep should be overexcavated to a depth of 3 feet and replaced with a uniform compacted fill blanket of 3 feet. Actual depth of overexcavation may vary and should be delineated by the geotechnical consultant during grading, especially where deep or drastic transitions are present.

For pad areas created above cut or natural slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm drainage swale and/or an appropriate pad gradient. A gradient in soil areas away from the top-of-slopes of 2 percent or greater is recommended.

Section 7 - Compacted Fill

All fill materials should have fill quality, placement, conditioning and compaction as specified below or as approved by the geotechnical consultant.

7.1 Fill Material Quality

Excavated on-site or import materials which are acceptable to the geotechnical consultant may be utilized as compacted fill, provided trash, vegetation and other deleterious materials are removed prior to placement. All import materials anticipated for use on-site should be sampled tested and approved prior to and placement is in conformance with the requirements outlined.

Rocks 12 inches in maximum and smaller may be utilized within compacted fill provided sufficient fill material is placed and thoroughly compacted over and around all rock to effectively fill rock voids. The amount of rock should not exceed 40 percent by dry weight passing the 3/4-inch sieve. The geotechnical consultant may vary those requirements as field conditions dictate.

Where rocks greater than 12 inches but less than four feet of maximum dimension are generated during grading, or otherwise desired to be placed within an engineered fill, special handling in accordance with the recommendations below. Rocks greater than four feet should be broken down or disposed off-site.

7.2 Placement of Fill

Prior to placement of fill material, the geotechnical consultant should observe and approve the area to receive fill. After observation and approval, the exposed ground surface should be scarified to a depth of 6 to 8 inches. The scarified material should be conditioned (i.e. moisture added or air dried by continued discing) to achieve a moisture content at or slightly above optimum moisture conditions and compacted to a minimum of 90 percent of the maximum density or as otherwise recommended in the soils report or by appropriate government agencies.

Compacted fill should then be placed in thin horizontal lifts not exceeding eight inches in loose thickness prior to compaction. Each lift should be moisture conditioned as needed, thoroughly blended to achieve a consistent moisture content at or slightly above optimum and thoroughly compacted by mechanical methods to a minimum of 90 percent of laboratory maximum dry density. Each lift should be treated in a like manner until the desired finished grades are achieved.

The contractor should have suitable and sufficient mechanical compaction equipment and watering apparatus on the job site to handle the amount of fill being placed in consideration of moisture retention properties of the materials and weather conditions.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal: vertical), horizontal keys and vertical benches should be excavated into the adjacent slope area. Keying and benching should be sufficient to provide at least six-foot wide benches and a minimum of four feet of vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill should be placed in an area after keying and benching until the geotechnical consultant has reviewed the area. Material generated by the benching operation should be moved sufficiently away from the bench area to allow for the recommended review of the horizontal bench prior to placement of fill.

Within a single fill area where grading procedures dictate two or more separate fills, temporary slopes (false slopes) may be created. When placing fill adjacent to a false slope, benching should be conducted in the same manner as above described. At least a 3-foot vertical bench should be established within the firm core of adjacent approved compacted fill prior to placement of additional fill. Benching should proceed in at least 3-foot vertical increments until the desired finished grades are achieved.

Prior to placement of additional compacted fill following an overnight or other grading delay, the exposed surface or previously compacted fill should be processed by scarification, moisture conditioning as needed to at or slightly above optimum moisture content, thoroughly blended and recompacted to a minimum of 90 percent of laboratory maximum dry density. Where unsuitable materials exist to depths of greater than one foot, the unsuitable materials should be over-excavated.

Following a period of flooding, rainfall or overwatering by other means, no additional fill should be placed until damage assessments have been made and remedial grading performed as described herein.

Rocks 12 inch in maximum dimension and smaller may be utilized in the compacted fill provided the fill is placed and thoroughly compacted over and around all rock. No oversize material should be used within 3 feet of finished pad grade and within 1 foot of other compacted fill areas. Rocks 12 inches up to four feet maximum dimension should be placed below the upper 10 feet of any fill and should not be closer than 15 feet to any slope face. These recommendations could vary as locations of improvements dictate. Where practical, oversized material should not be placed below areas where structures or deep utilities are proposed. Oversized material should be placed in windrows on a clean, overexcavated or unyielding compacted fill or firm natural ground surface. Select native or imported granular soil (S.E. 30 or higher) should be placed and thoroughly flooded over and around all windrowed rock, such that voids are filled. Windrows of oversized material should be staggered so those successive strata of oversized material are not in the same vertical plane.

It may be possible to dispose of individual larger rock as field conditions dictate and as recommended by the geotechnical consultant at the time of placement.

The contractor should assist the geotechnical consultant and/or his representative by digging test pits for removal determinations and/or for testing compacted fill. The contractor should provide this work at no additional cost to the owner or contractor's client.

Fill should be tested by the geotechnical consultant for compliance with the recommended relative compaction and moisture conditions. Field density testing should conform to ASTM Method of Test D 1556-00, D 2922-04. Tests should be conducted at a minimum of approximately two vertical feet or approximately 1,000 to 2,000 cubic yards of fill placed. Actual test intervals may vary as field conditions dictate. Fill found not to be in conformance with the grading recommendations should be removed or otherwise handled as recommended by the geotechnical consultant.

7.3 Fill Slopes

Unless otherwise recommended by the geotechnical consultant and approved by the regulating agencies, permanent fill slopes should not be steeper than 2:1 (horizontal: vertical).

Except as specifically recommended in these grading guidelines compacted fill slopes should be over-built two to five feet and cut back to grade, exposing the firm, compacted fill inner core. The actual amount of overbuilding may vary as field conditions dictate. If the desired results are not achieved, the existing slopes should be overexcavated and reconstructed under the guidelines of the geotechnical consultant. The degree of overbuilding shall be increased until the desired compacted slope surface condition is achieved. Care should be taken by the contractor to provide thorough mechanical compaction to the outer edge of the overbuilt slope surface.

At the discretion of the geotechnical consultant, slope face compaction may be attempted by conventional construction procedures including backrolling. The procedure must create a firmly compacted material throughout the entire depth of the slope face to the surface of the previously compacted firm fill intercore.

During grading operations, care should be taken to extend compactive effort to the outer edge of the slope. Each lift should extend horizontally to the desired finished slope surface or more as needed to ultimately established desired grades. Grade during construction should not be allowed to roll off at the edge of the slope. It may be helpful to elevate slightly the outer edge of the slope. Slough resulting from the placement of individual lifts should not be allowed to drift down over previous lifts. At intervals not exceeding four feet in vertical slope height or the capability of available equipment, whichever is less, fill slopes should be thoroughly dozer trackrolled.

For pad areas above fill slopes, positive drainage should be established away from the top-of-slope. This may be accomplished using a berm and pad gradient of at least two percent.

Section 8 - Trench Backfill

Utility and/or other excavation of trench backfill should, unless otherwise recommended, be compacted by mechanical means. Unless otherwise recommended, the degree of compaction should be a minimum of 90 percent of the laboratory maximum density.

Within slab areas, but outside the influence of foundations, trenches up to one foot wide and two feet deep may be backfilled with sand and consolidated by jetting, flooding or by mechanical means. If on-site materials are utilized, they should be wheel-rolled, tamped or otherwise compacted to a firm condition. For minor interior trenches, density testing may be deleted or spot testing may be elected if deemed necessary, based on review of backfill operations during construction.

If utility contractors indicate that it is undesirable to use compaction equipment in close proximity to a buried conduit, the contractor may elect the utilization of light weight mechanical compaction equipment and/or shading of the conduit with clean, granular material, which should be thoroughly jetted in-place above the conduit, prior to initiating mechanical compaction procedures. Other methods of utility trench compaction may also be appropriate, upon review of the geotechnical consultant at the time of construction.

In cases where clean granular materials are proposed for use in lieu of native materials or where flooding or jetting is proposed, the procedures should be considered subject to review by the geotechnical consultant. Clean granular backfill and/or bedding are not recommended in slope areas.

Section 9 - Drainage

Where deemed appropriate by the geotechnical consultant, canyon subdrain systems should be installed in accordance with CTE’s recommendations during grading.

Typical subdrains for compacted fill buttresses, slope stabilization or sidehill masses, should be installed in accordance with the specifications.

Roof, pad and slope drainage should be directed away from slopes and areas of structures to suitable disposal areas via non-erodible devices (i.e., gutters, downspouts, and concrete swales).

For drainage in extensively landscaped areas near structures, (i.e., within four feet) a minimum of 5 percent gradient away from the structure should be maintained. Pad drainage of at least 2 percent should be maintained over the remainder of the site.

Drainage patterns established at the time of fine grading should be maintained throughout the life of the project. Property owners should be made aware that altering drainage patterns could be detrimental to slope stability and foundation performance.

Section 10 - Slope Maintenance

10.1 - Landscape Plants

To enhance surficial slope stability, slope planting should be accomplished at the completion of grading. Slope planting should consist of deep-rooting vegetation requiring little watering. Plants native to the southern California area and plants relative to native plants are generally desirable. Plants native to other semi-arid and arid areas may also be appropriate. A Landscape Architect should be the best party to consult regarding actual types of plants and planting configuration.

10.2 - Irrigation

Irrigation pipes should be anchored to slope faces, not placed in trenches excavated into slope faces.

Slope irrigation should be minimized. If automatic timing devices are utilized on irrigation systems, provisions should be made for interrupting normal irrigation during periods of rainfall.

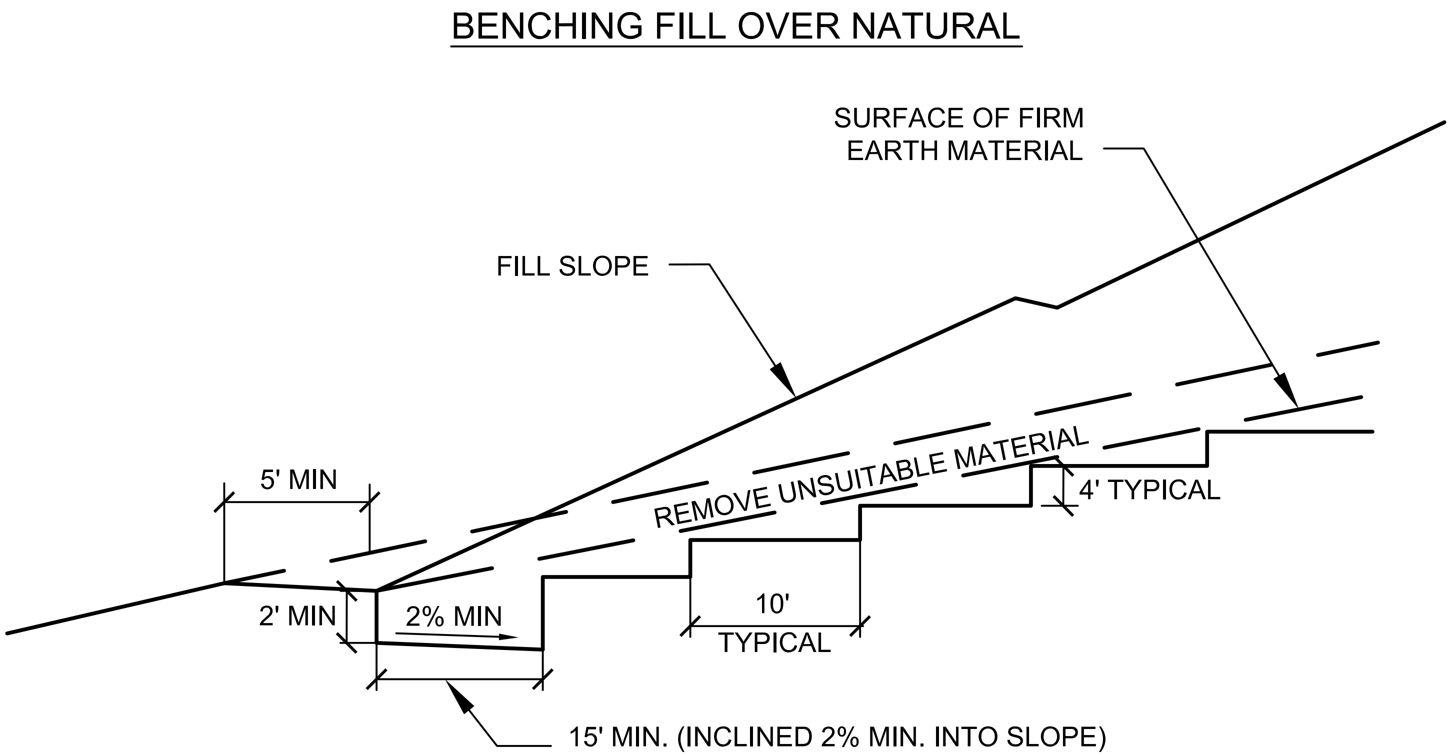
10.3 - Repair

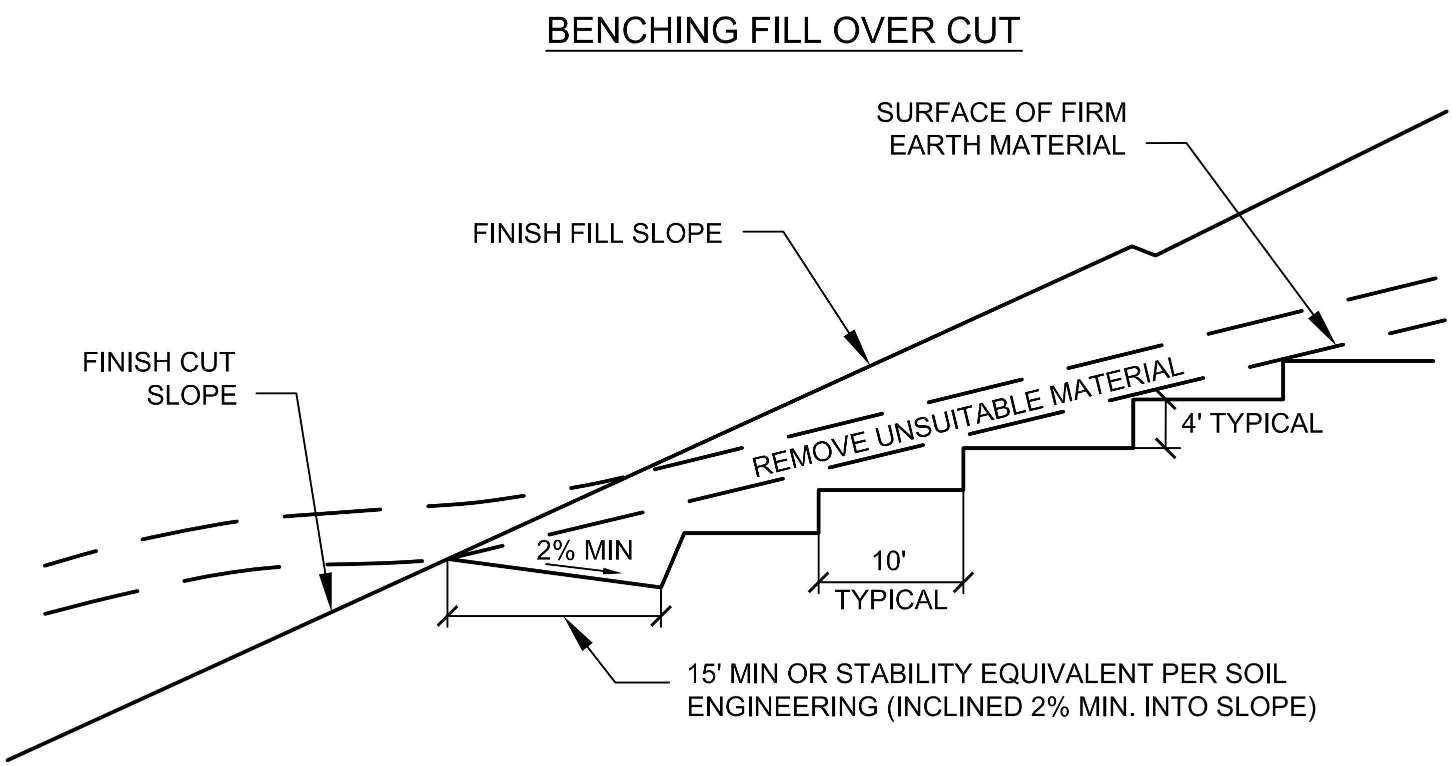
As a precautionary measure, plastic sheeting should be readily available, or kept on hand, to protect all slope areas from saturation by periods of heavy or prolonged rainfall. This measure is strongly recommended, beginning with the period prior to landscape planting.

If slope failures occur, the geotechnical consultant should be contacted for a field review of site conditions and development of recommendations for evaluation and repair.

If slope failures occur as a result of exposure to period of heavy rainfall, the failure areas and currently unaffected areas should be covered with plastic sheeting to protect against additional saturation.

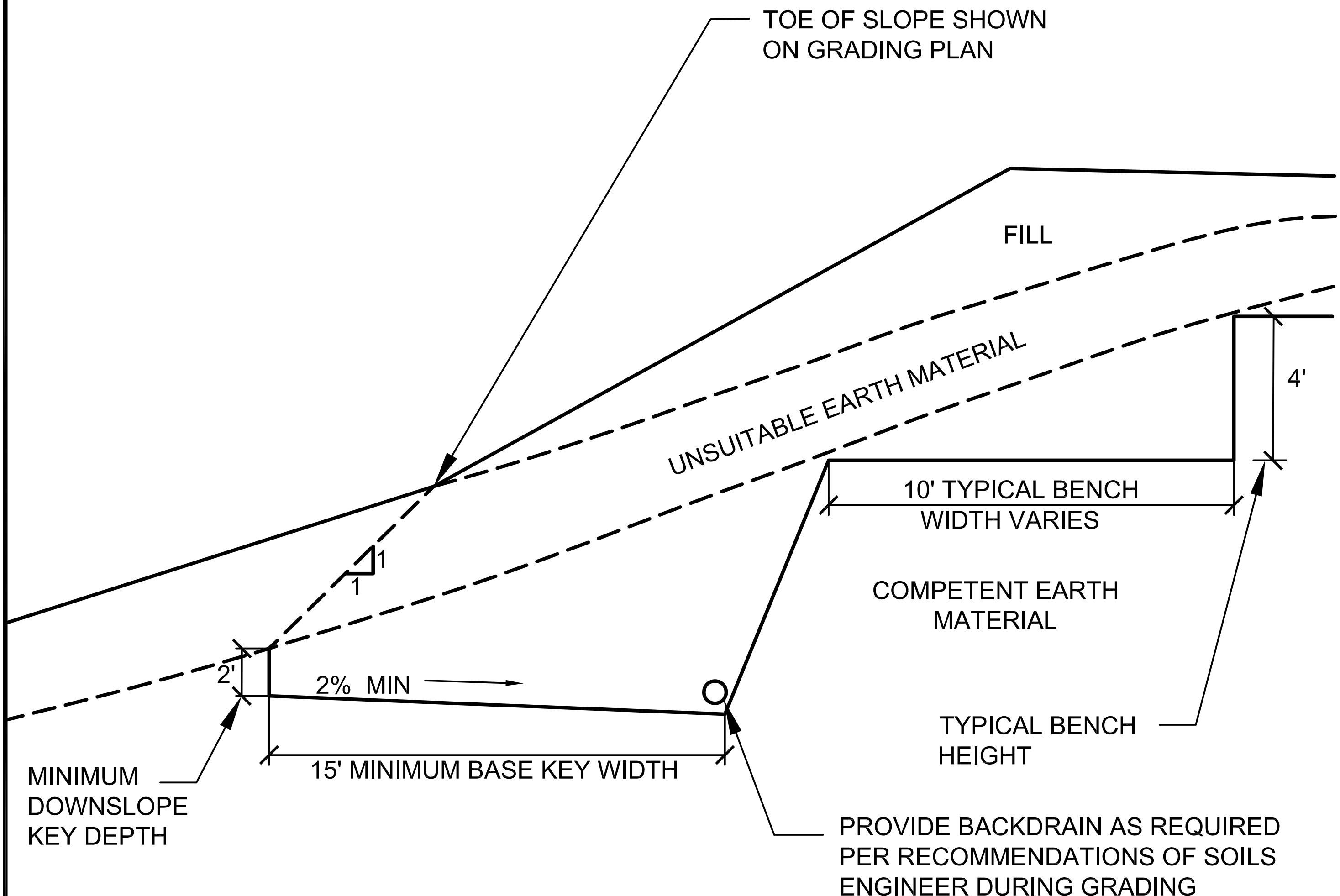
In the accompanying Standard Details, appropriate repair procedures are illustrated for superficial slope failures (i.e., occurring typically within the outer one foot to three feet of a slope face).





NOT TO SCALE

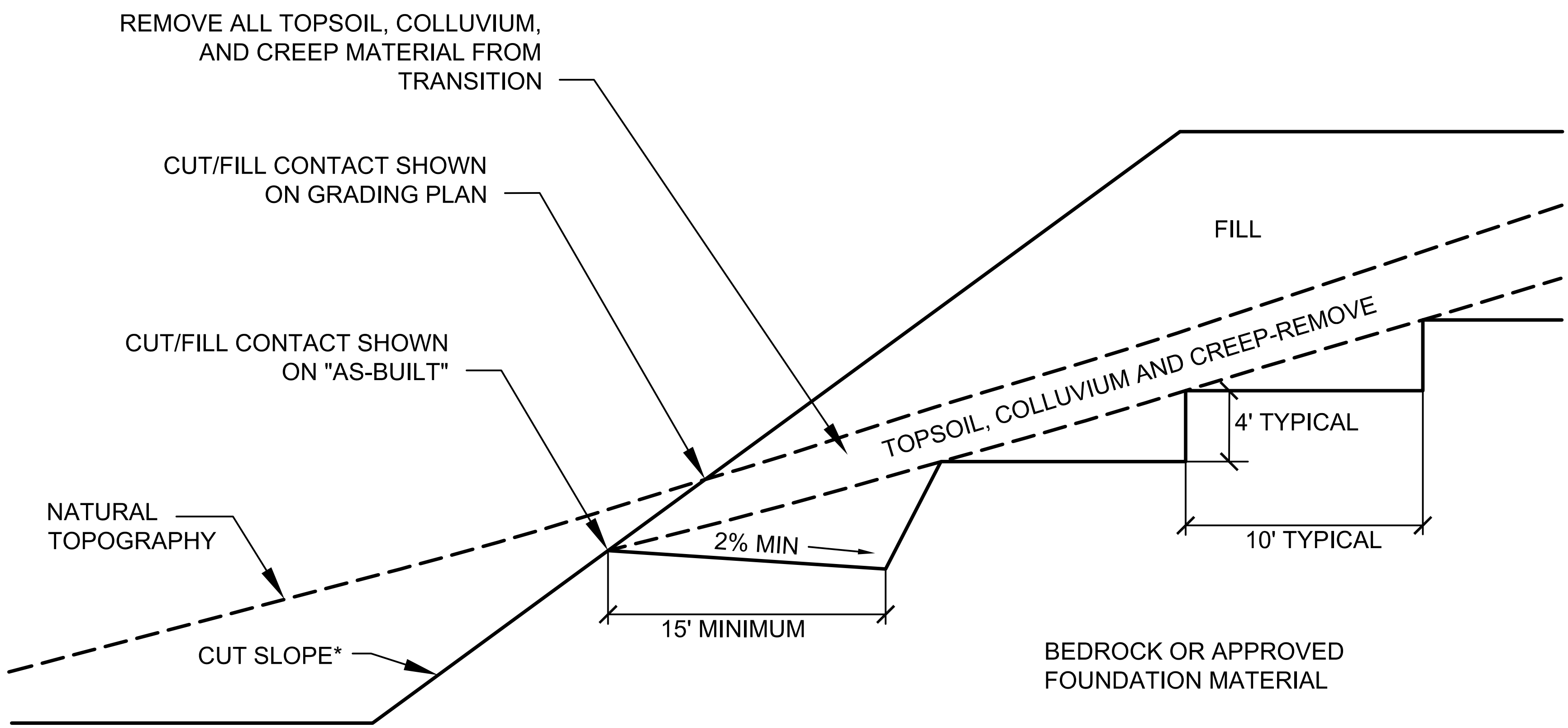
BENCHING FOR COMPACTED FILL DETAIL



WHERE NATURAL SLOPE GRADIENT IS 5:1 OR LESS, BENCHING IS NOT NECESSARY. FILL IS NOT TO BE PLACED ON COMPRESSIBLE OR UNSUITABLE MATERIAL.

NOT TO SCALE

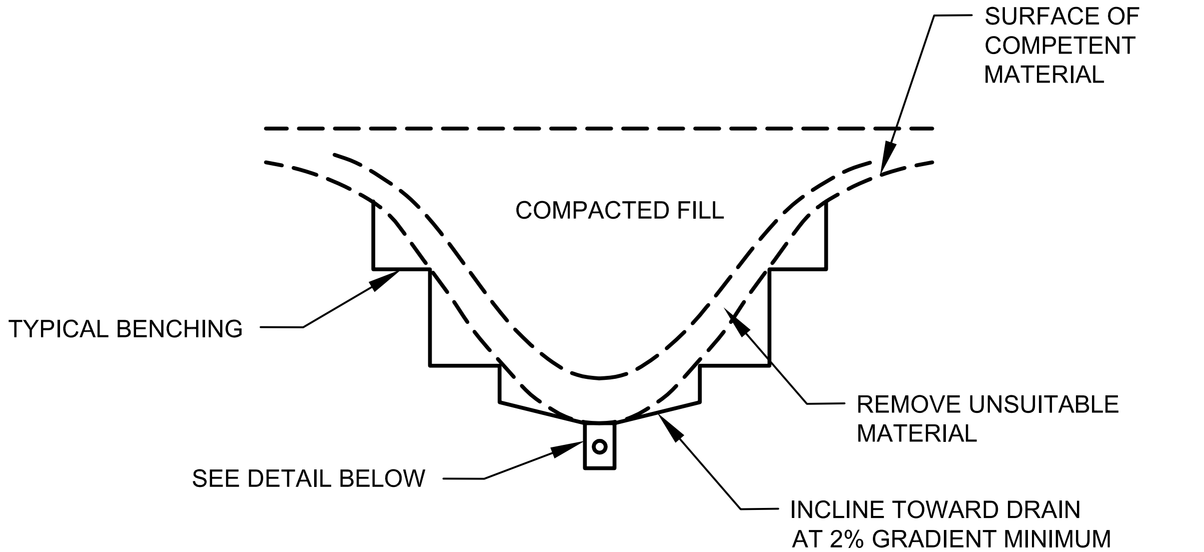
FILL SLOPE ABOVE NATURAL GROUND DETAIL



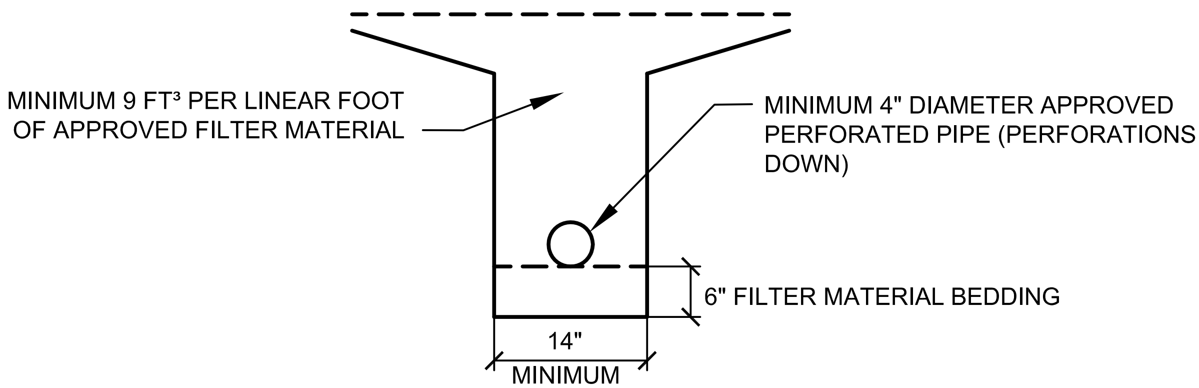
*NOTE: CUT SLOPE PORTION SHOULD BE
MADE PRIOR TO PLACEMENT OF FILL

NOT TO SCALE

FILL SLOPE ABOVE CUT SLOPE DETAIL



DETAIL



CALTRANS CLASS 2 PERMEABLE MATERIAL
FILTER MATERIAL TO MEET FOLLOWING
SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1"	100
¾"	90-100
⅜"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi

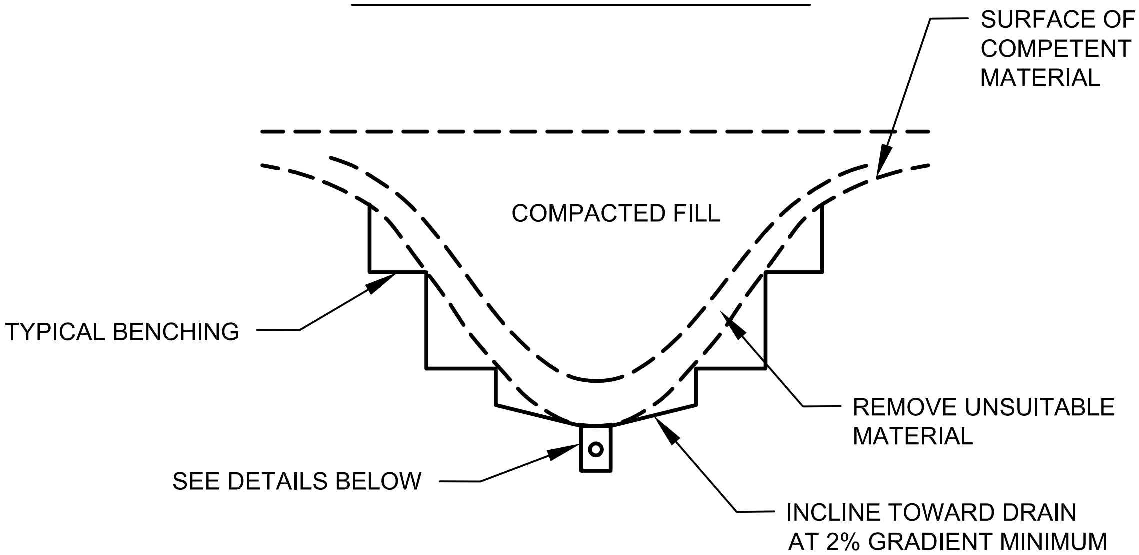
PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA, SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING

LENGTH OF RUN	PIPE DIAMETER
INITIAL 500'	4"
500' TO 1500'	6"
> 1500'	8"

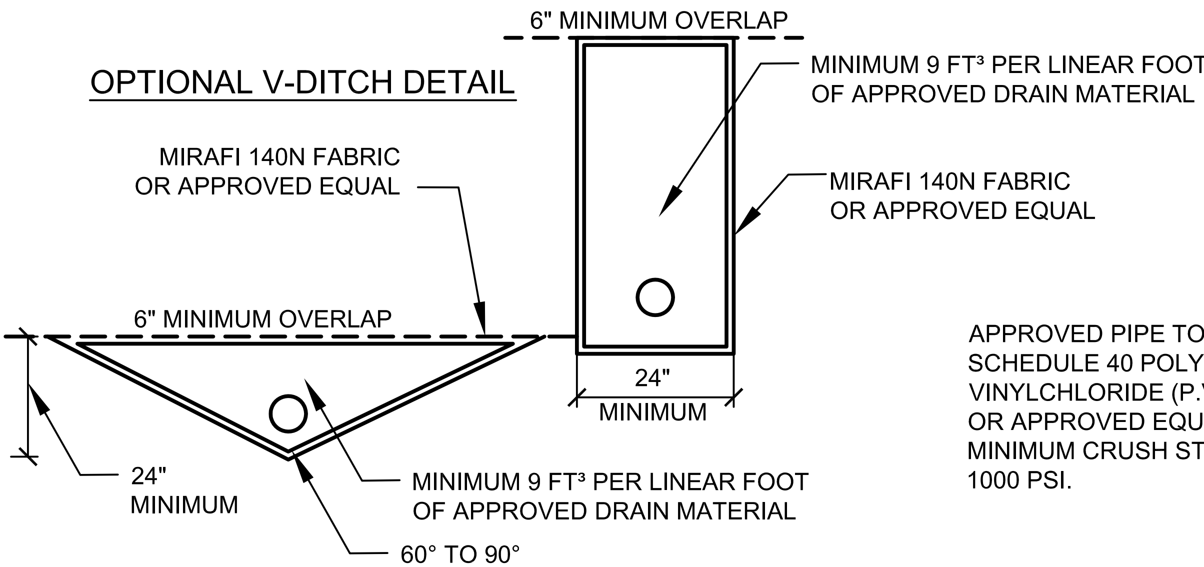
NOT TO SCALE

TYPICAL CANYON SUBDRAIN DETAIL

CANYON SUBDRAIN DETAILS



TRENCH DETAILS



APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYLCHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 PSI.

DRAIN MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1 ½"	88-100
1"	5-40
¾"	0-17
⅜"	0-7
NO. 200	0-3

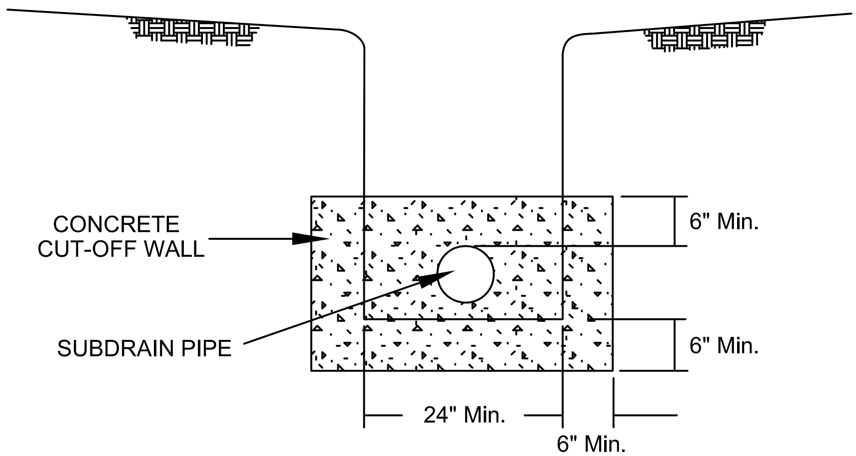
PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA, SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING

LENGTH OF RUN	PIPE DIAMETER
INITIAL 500'	4"
500' TO 1500'	6"
> 1500'	8"

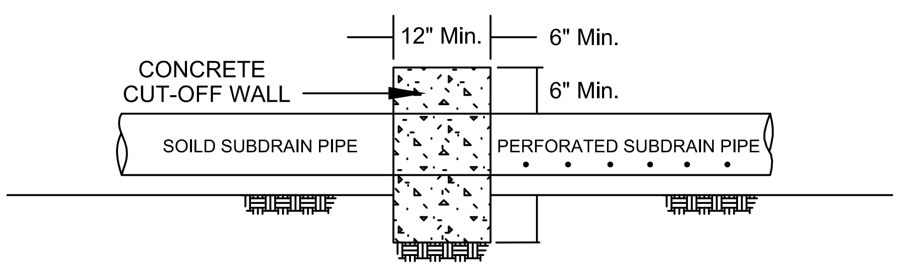
NOT TO SCALE

GEOFABRIC SUBDRAIN

FRONT VIEW



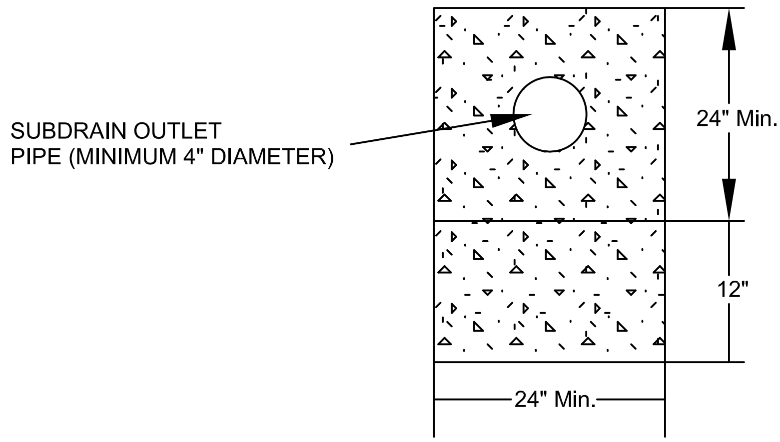
SIDE VIEW



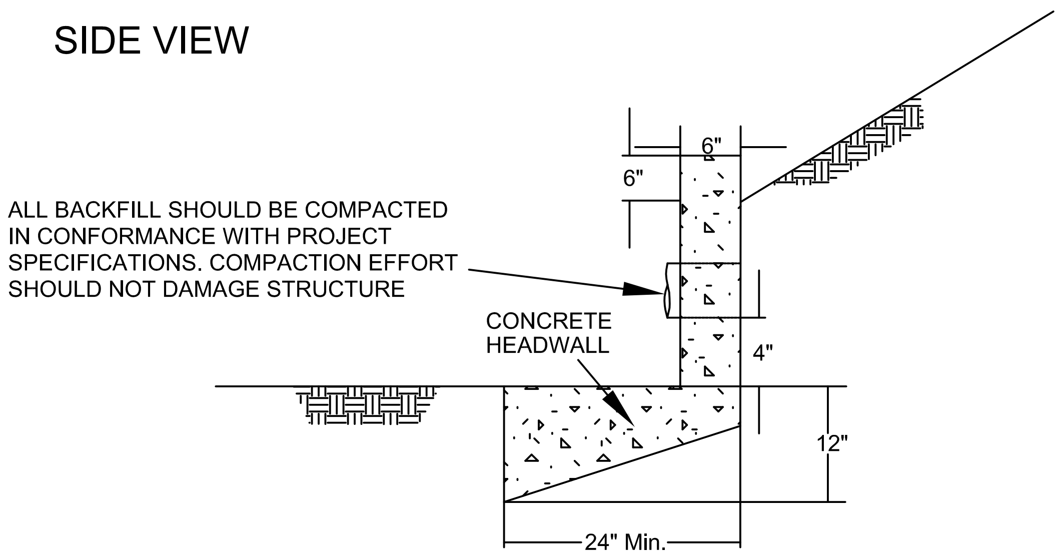
NOT TO SCALE

RECOMMENDED SUBDRAIN CUT-OFF WALL

FRONT VIEW



SIDE VIEW



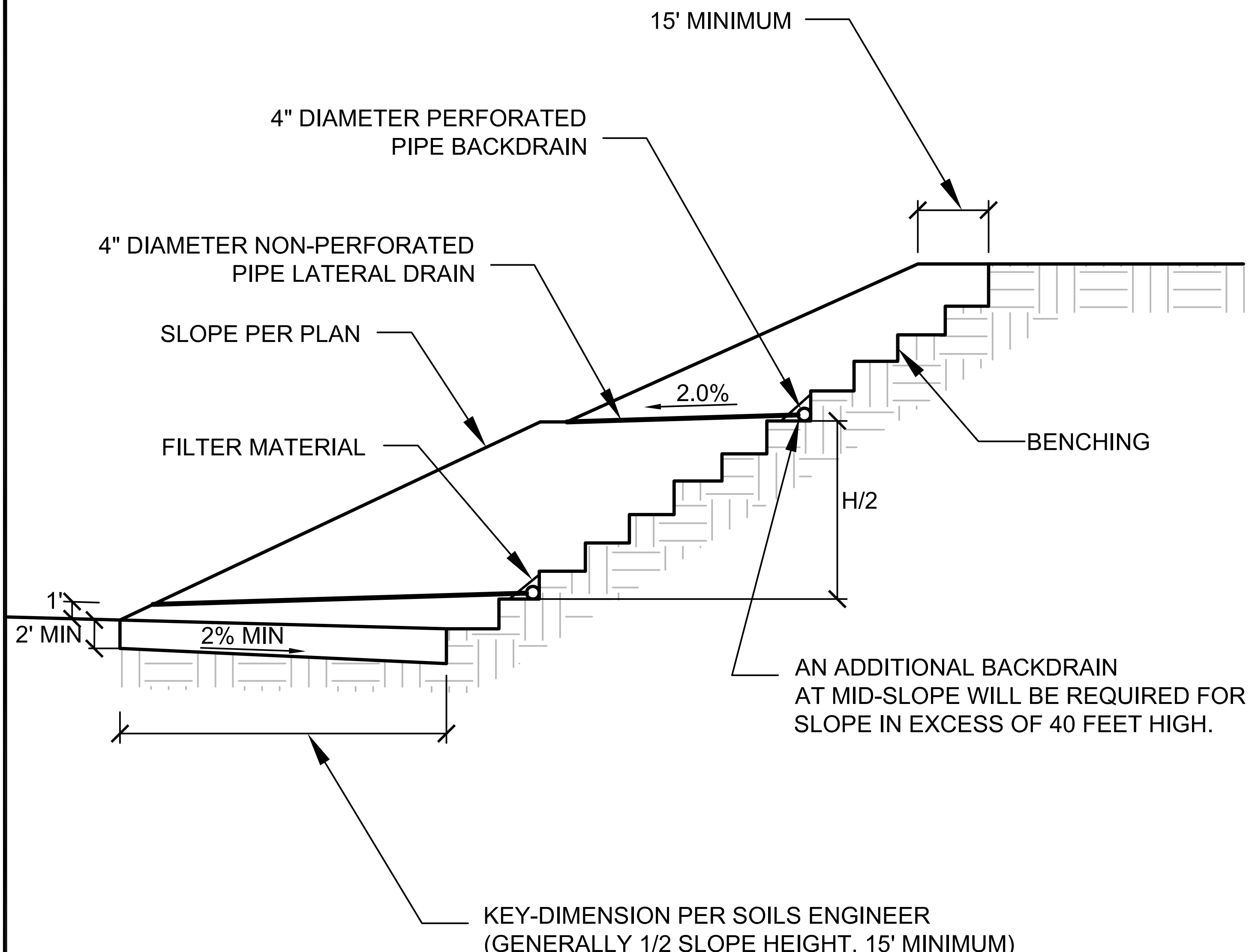
NOTE: HEADWALL SHOULD OUTLET AT TOE OF SLOPE OR INTO CONTROLLED SURFACE DRAINAGE DEVICE

ALL DISCHARGE SHOULD BE CONTROLLED

THIS DETAIL IS A MINIMUM DESIGN AND MAY BE MODIFIED DEPENDING UPON ENCOUNTERED CONDITIONS AND LOCAL REQUIREMENTS

NOT TO SCALE

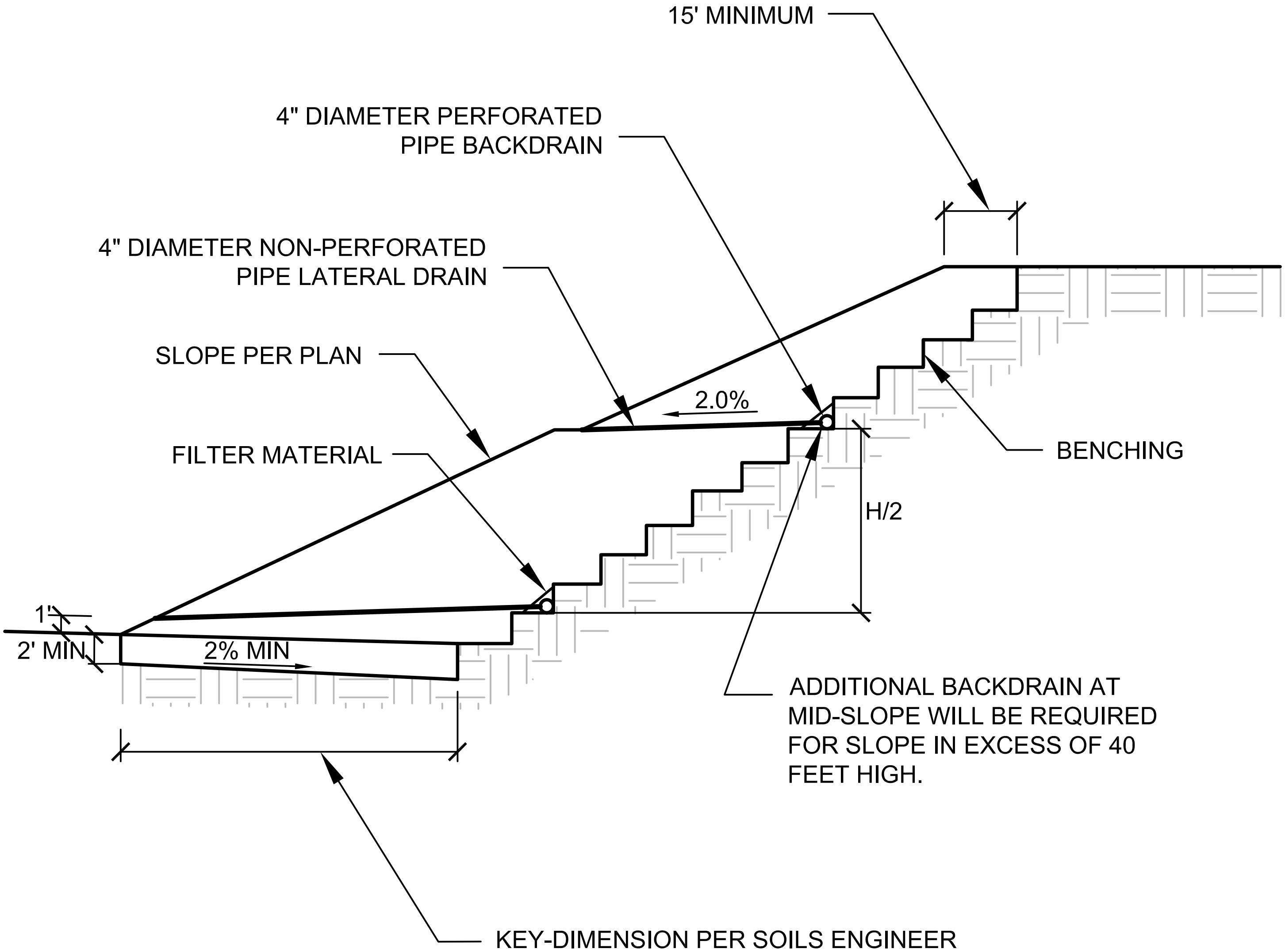
TYPICAL SUBDRAIN OUTLET HEADWALL DETAIL



DIMENSIONS ARE MINIMUM RECOMMENDED

NOT TO SCALE

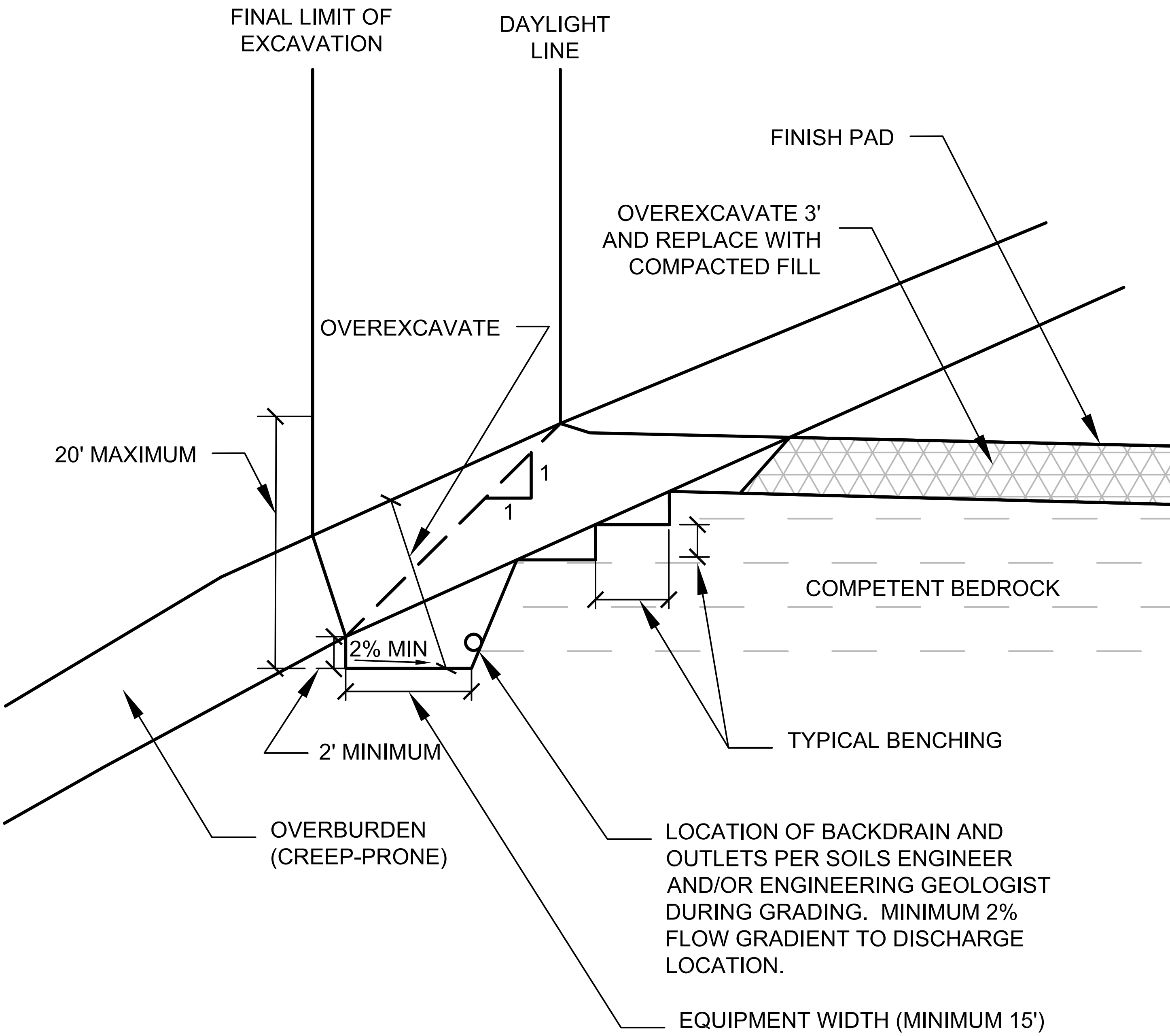
TYPICAL SLOPE STABILIZATION FILL DETAIL



DIMENSIONS ARE MINIMUM RECOMMENDED

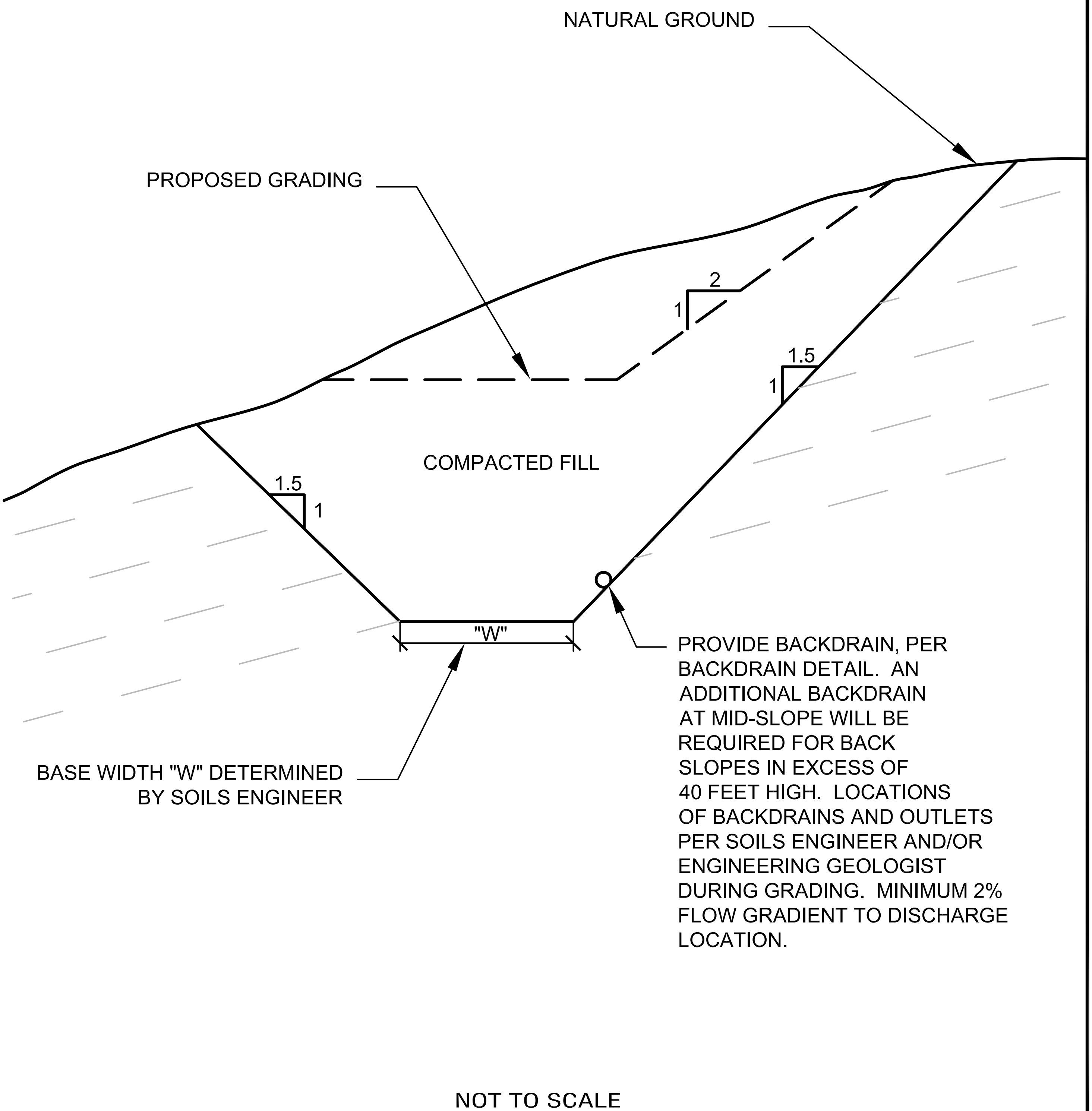
NOT TO SCALE

TYPICAL BUTTRESS FILL DETAIL

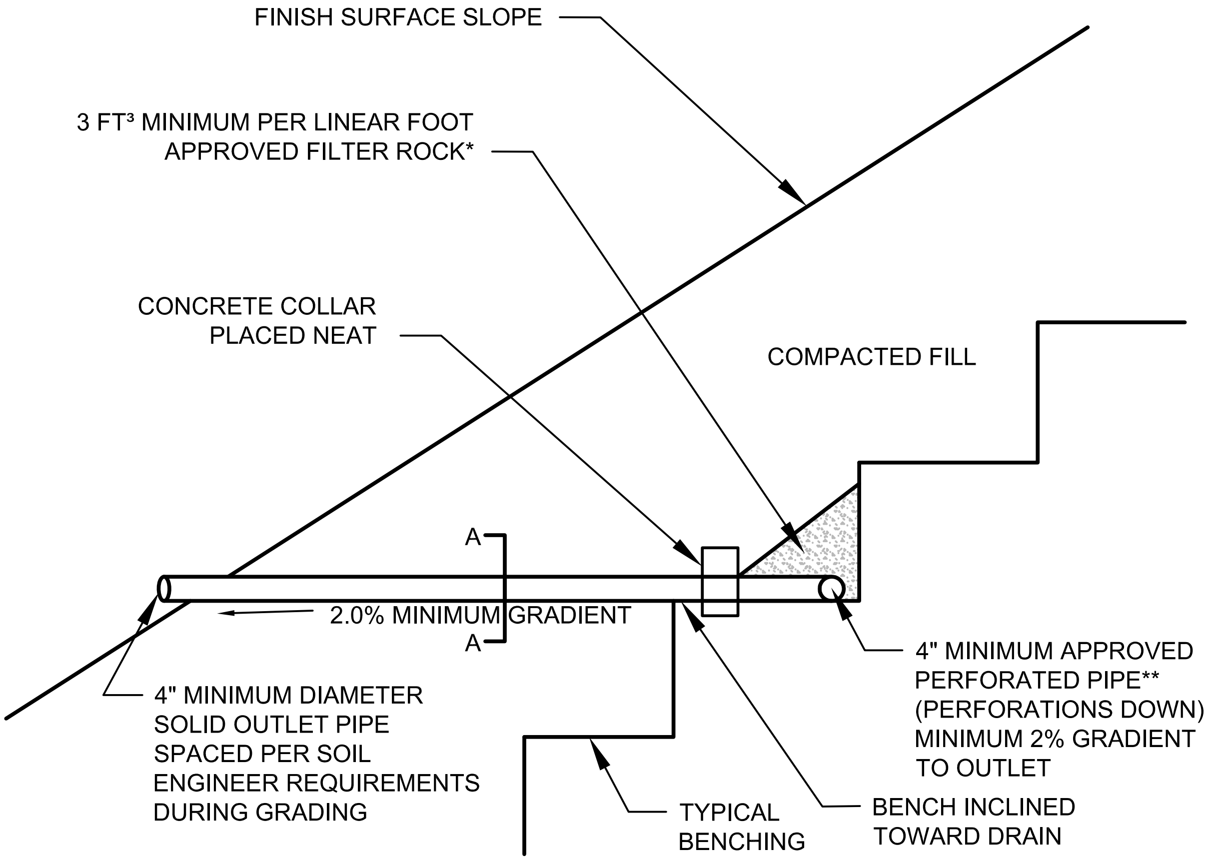


NOT TO SCALE

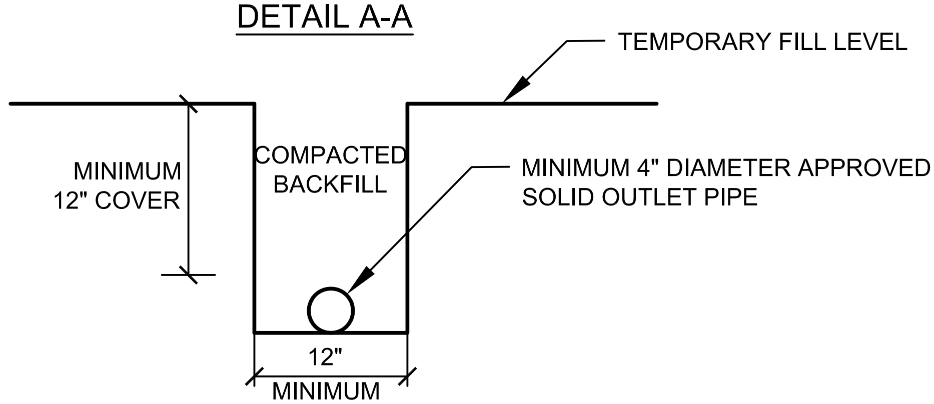
DAYLIGHT SHEAR KEY DETAIL



TYPICAL SHEAR KEY DETAIL



DETAIL A-A



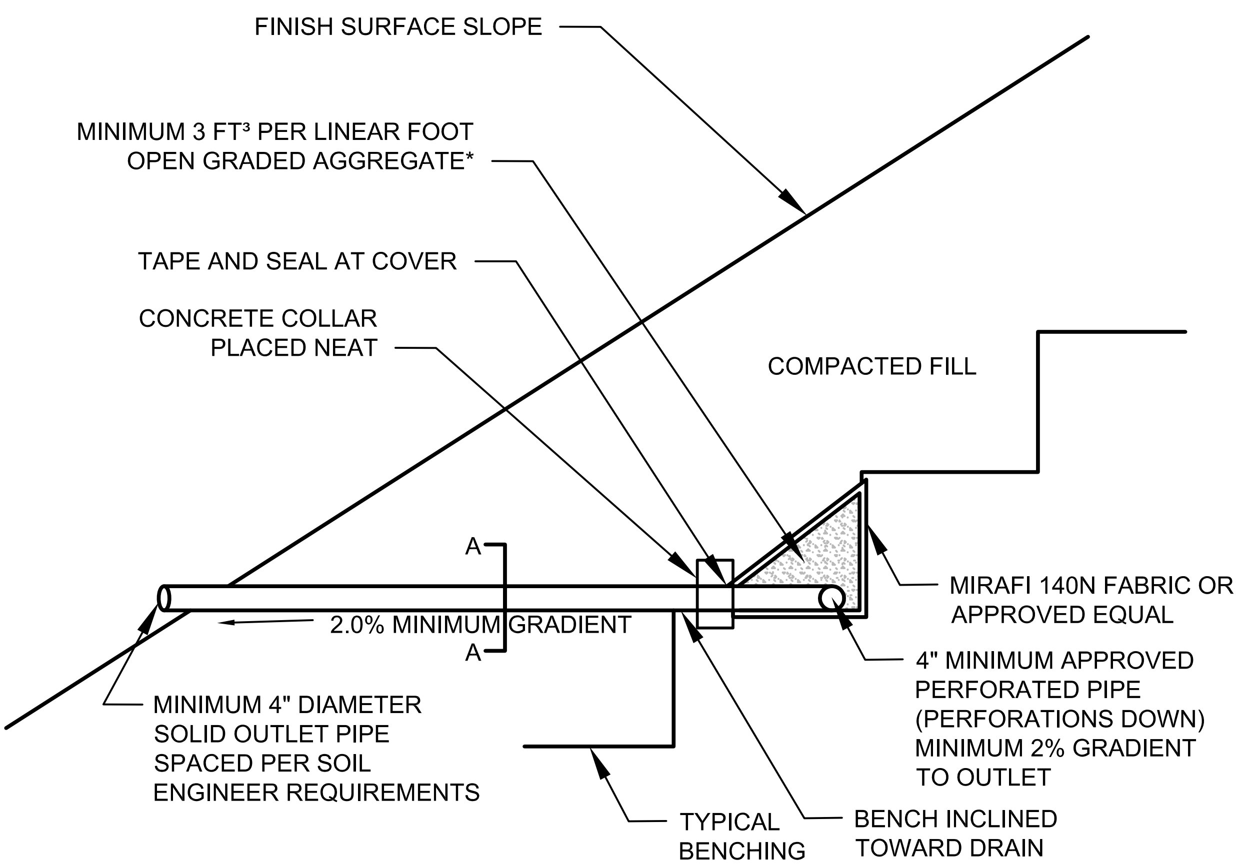
**APPROVED PIPE TYPE:
SCHEDULE 40 POLYVINYL CHLORIDE (P.V.C.) OR APPROVED EQUAL.
MINIMUM CRUSH STRENGTH 1000 PSI

*FILTER ROCK TO MEET FOLLOWING SPECIFICATIONS OR APPROVED EQUAL:

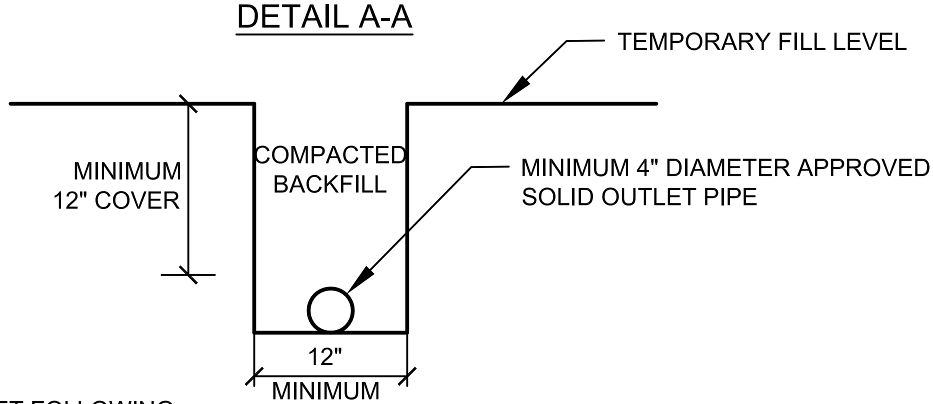
SIEVE SIZE	PERCENTAGE PASSING
1"	100
¾"	90-100
⅜"	40-100
NO. 4	25-40
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

NOT TO SCALE

TYPICAL BACKDRAIN DETAIL



DETAIL A-A

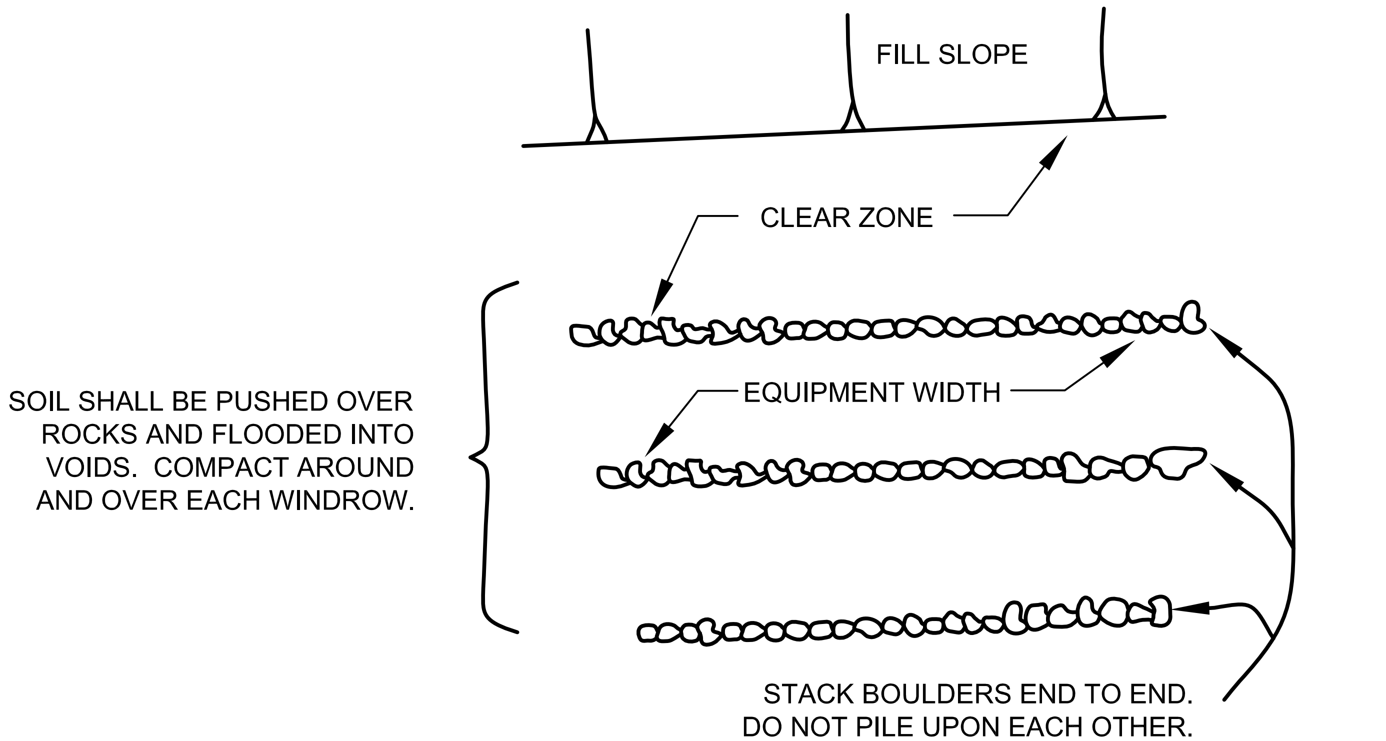


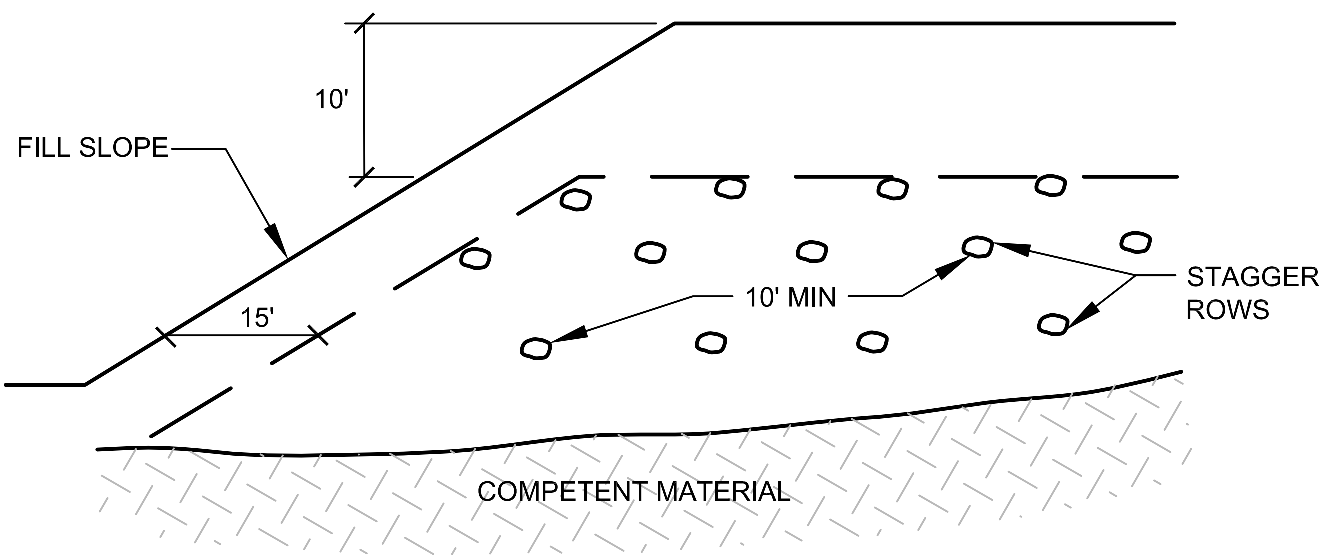
*NOTE: AGGREGATE TO MEET FOLLOWING SPECIFICATIONS OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1 ½"	100
1"	5-40
¾"	0-17
⅜"	0-7
NO. 200	0-3

NOT TO SCALE

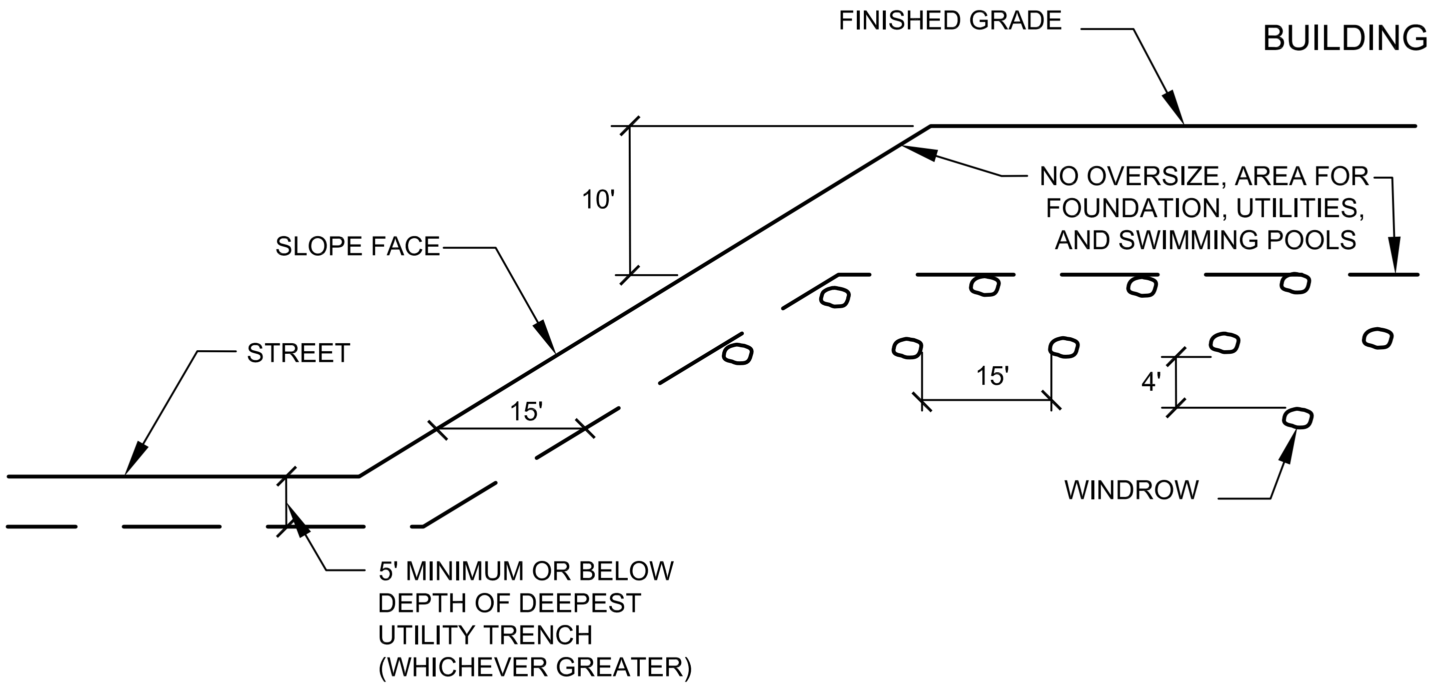
BACKDRAIN DETAIL (GEOFRABIC)



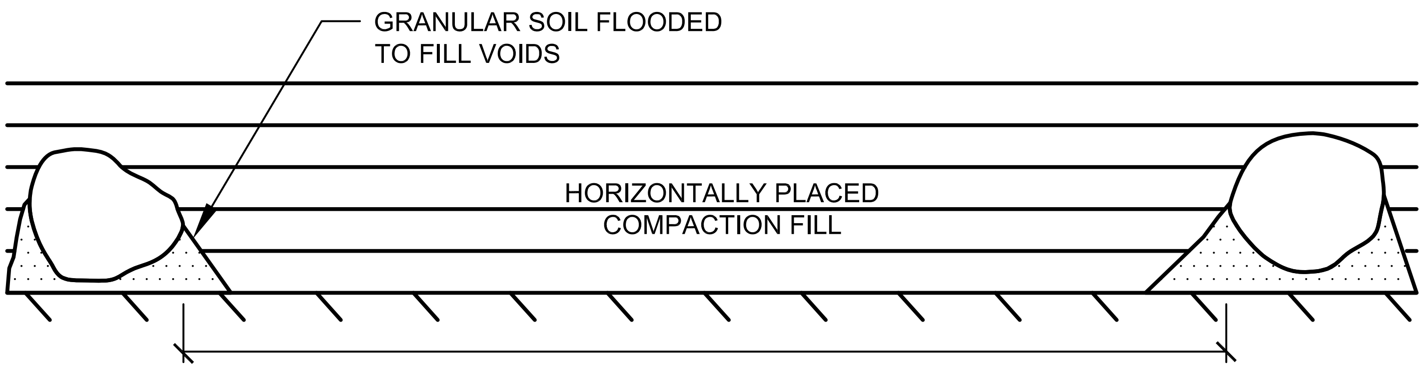


NOT TO SCALE

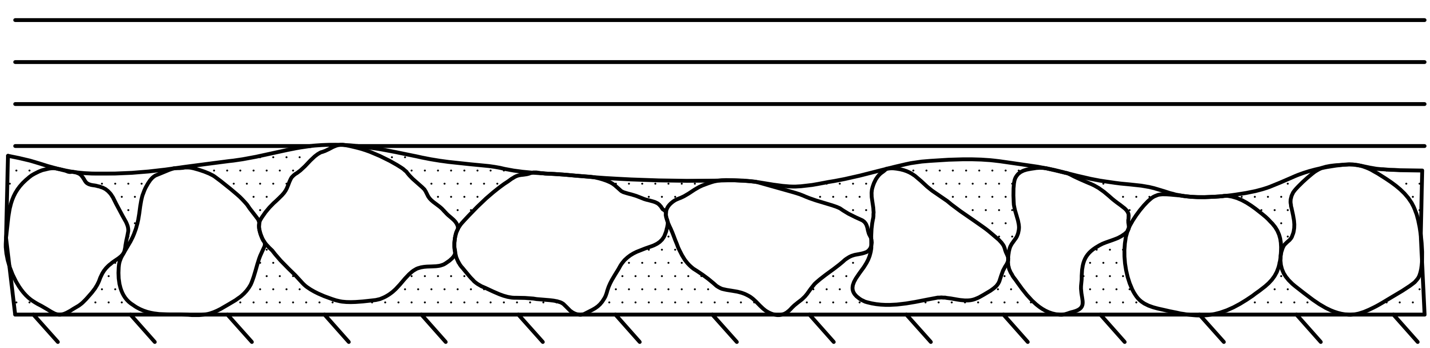
ROCK DISPOSAL DETAIL



TYPICAL WINDROW DETAIL (EDGE VIEW)



PROFILE VIEW

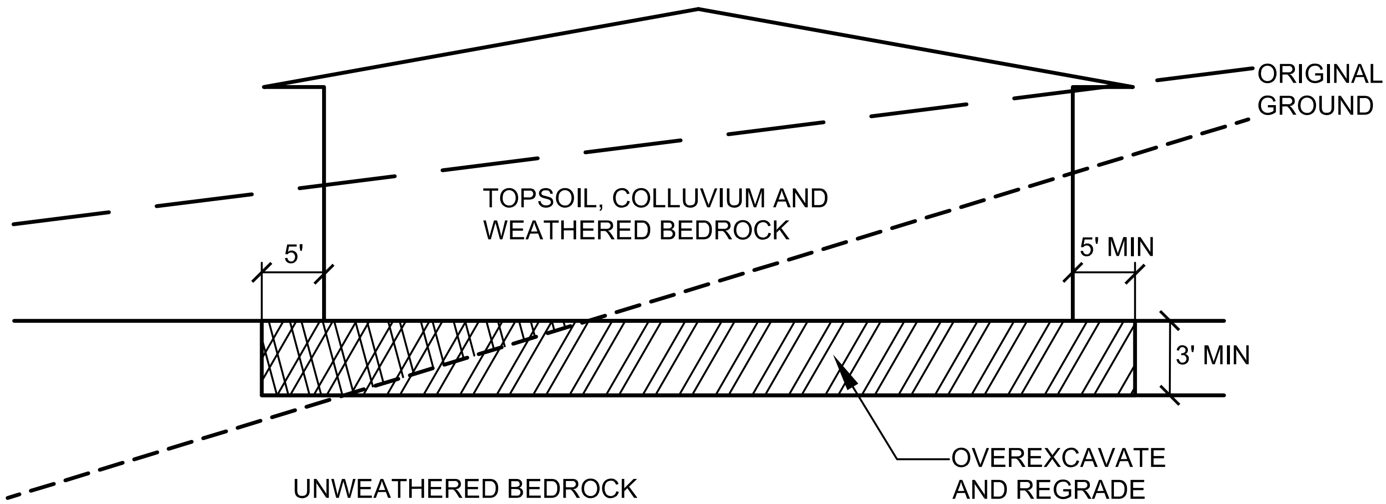


NOT TO SCALE

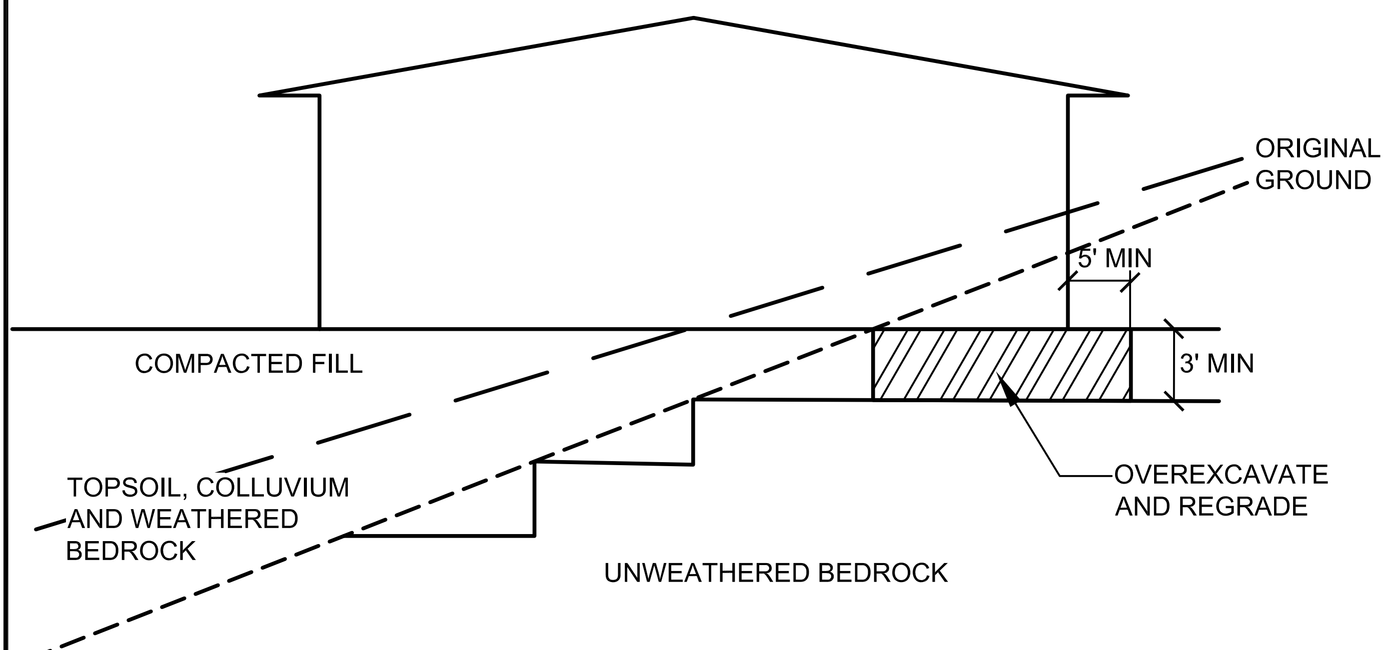
ROCK DISPOSAL DETAIL

GENERAL GRADING RECOMMENDATIONS

CUT LOT



CUT/FILL LOT (TRANSITION)



NOT TO SCALE

TRANSITION LOT DETAIL

APPENDIX E

SITE SPECIFIC GROUND MOTION STUDY

SITE-SPECIFIC SEISMIC GROUND MOTION STUDY
TRI-CITY MEDICAL CENTER EXPANSION
OCEANSIDE, CALIFORNIA

CTE has conducted a site-specific ground motion analysis for the proposed Expansion of the Tri-City Medical Center in accordance with Chapter 21 of ASCE/SEI 7-10, Section 1613 of the 2013 California Building Code (CBC), and the 2008 USGS Ground Acceleration Maps.

The software package EZ-FRISK (version 7.65) was used to facilitate the seismic response analysis. This software enabled the use of all seismic sources within 200 kilometers of the site, as cataloged by the United States Geological Survey (USGS) 2008 National Seismic Hazard Map source model. Each seismic source is characterized by its location, fault mechanism, geometry, probability of activity, magnitude recurrence distribution, and deterministic magnitude. The maximum rotated component of ground motion was used in the site-specific probabilistic and deterministic analyses that incorporate the selected Next Generation Attenuation (NGA) relationships.

Equally weighted NGA relationships by Abrahamson and Silva (2008), Atkinson and Boore (2008), Campbell and Bozorgnia (2008), and Chiou and Youngs (2008) were used for the analysis. The resulting site specific spectral accelerations calculated from these NGA relationships were averaged for both the probabilistic and deterministic analyses. As required, the 84th-percentile spectral acceleration values were averaged to conservatively calculate the deterministic spectral accelerations (in lieu of 150 percent of the median spectral accelerations). Deterministic maximum considered earthquake (MCE) lower limit spectral response acceleration values have been determined from ASCE 7 Figure 21.2-1. The probabilistic analysis data represent a two-percent probability of exceedance in fifty years.

Each of the NGA relationships used for the response analysis account for site-specific soil affects using V_{S30}, the shear wave velocity averaged over the upper 30 meters. The site shear wave velocity value was obtained from regional and site resistance data. For the Campbell and Bozorgnia NGA, the depth to rock having a shear wave velocity of at least 2.5 kilometers per second ($Z_{2.5}$) was estimated. Using regional geologic map relationships, $Z_{2.5}$ appears to be on the order of 0.35 kilometers. The Abrahamson and Silva, and Chiou and Youngs NGA relationships require a similar parameter, $Z_{1.0}$, which is anticipated to be on the order of 60 meters. Based on soil conditions beneath the site area, and shear wave velocity of 490 meters per second, Site Class C is considered to be appropriate for evaluation.

The site specific MCE spectral response acceleration at any period is taken as the lesser of the spectral response accelerations from the probabilistic MCE and the deterministic MCE. The design spectral response acceleration at any period is calculated as 2/3 of the corresponding ordinate from the site-specific MCE, which should not be less than 80 percent of the spectral response acceleration from the design response spectrum determined in accordance with ASCE 7 Section 11.4.5.

The probabilistic MCE, risk coefficient, and adjusted probabilistic spectral acceleration ordinates are shown on Figure E1. The site specific risk-based probabilistic MCE_R representing 1% probability of collapse in 50 years was calculated using ASCE 7-10 Section 21.2.1.1 Method 1: (C_R) (S_a 2% PE in 50 years). The deterministic MCE, and the deterministic lower limit on MCE response spectra are shown on Figure E2. The site-specific MCE response spectrum, 2/3 of site-specific MCE response spectrum and 80 percent of NEHRP/ASCE design response spectrum are shown on Figure E3. The site-specific design response spectrum is presented on Figure E4 and a summary of spectral acceleration data is shown on Figure E5.

In Accordance with section 21.4 of ASCE/SEI 7-10, the resulting site specific acceleration parameters are shown below. ASCE Section 21.4 requires that the parameter S_{DS} not be taken less than 90 percent of the peak spectral acceleration, S_a, at any period larger that 0.2s. In this case the value at 0.2s (0.747g) exceeded the 90 percent values at larger periods. In addition, Section 21.4 requires that S_{D1} be taken as the greater of the design spectral acceleration, S_a, at a period of 1 second (0.339g), or two times the spectral acceleration, S_a, at a period of 2 seconds (0.340g). In this case, the value representing two times the spectral acceleration, S_a, at a period of 2 seconds was greater than the design spectral acceleration value at a period of 1 second.

Site-specific parameters are provided below.

Site-Specific Ground Motion Values	Code-Based Seismic Values (ASCE 7-10)
S_{DS} = 0.747g	S_{DS} = 0.705g
S_{D1} = 0.340g	S_{D1} = 0.380g
S_{MS} =1.120g	S_{MS} = 1.058g
S_{M1} =0.510g	S_{M1} = 0.571g

Attachments:

Figure E1	Probabilistic MCE Response Spectra
Figure E2	Deterministic MCE and Lower Limit Spectra
Figure E3	Site-Specific MCE Response Spectra
Figure E4	Design Response Spectrum
Figure E5	Table of Spectral Acceleration Values”

Tri-City Medical Center Expansion

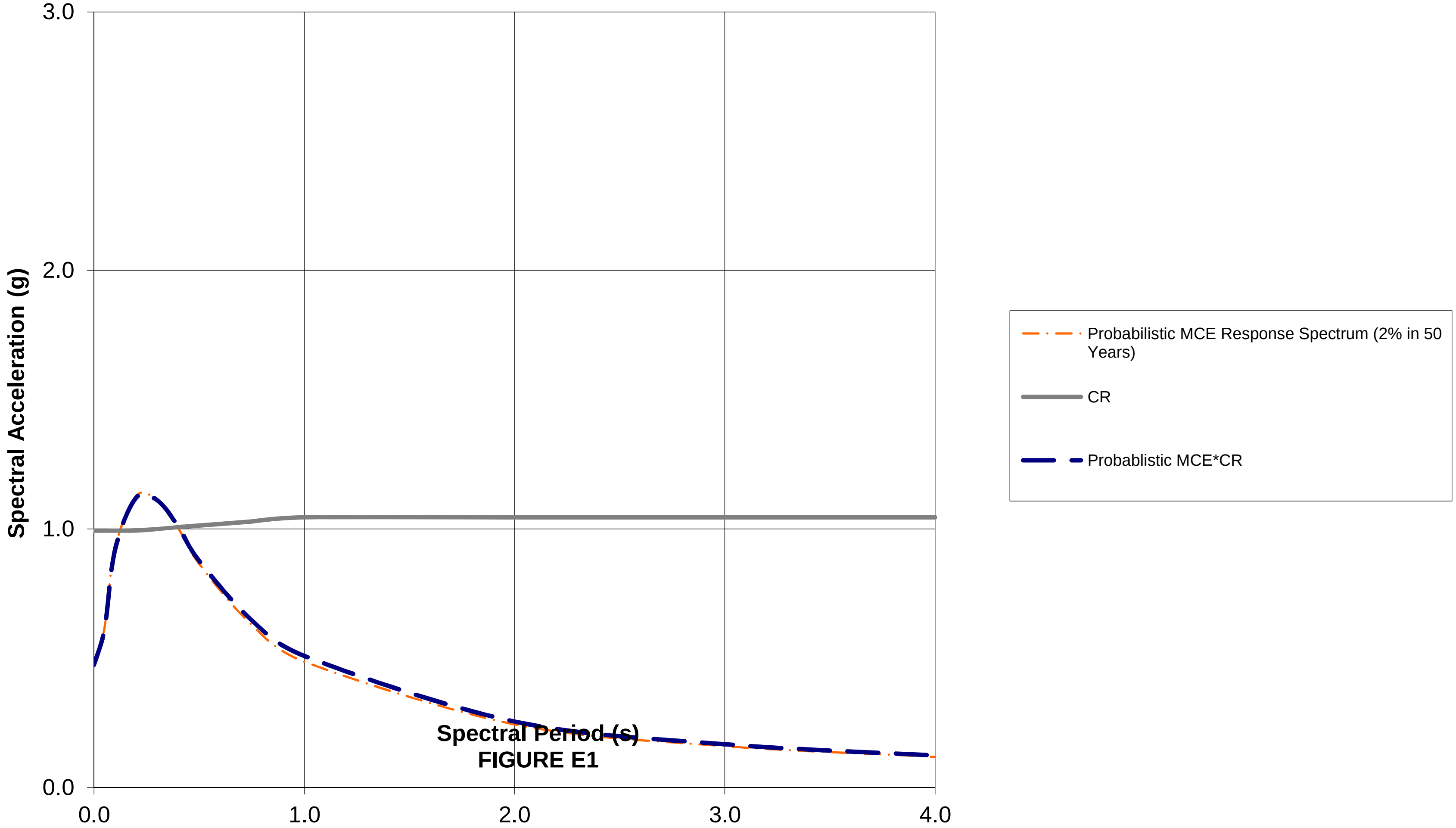


FIGURE E1

Tri-City Medical Center Expansion

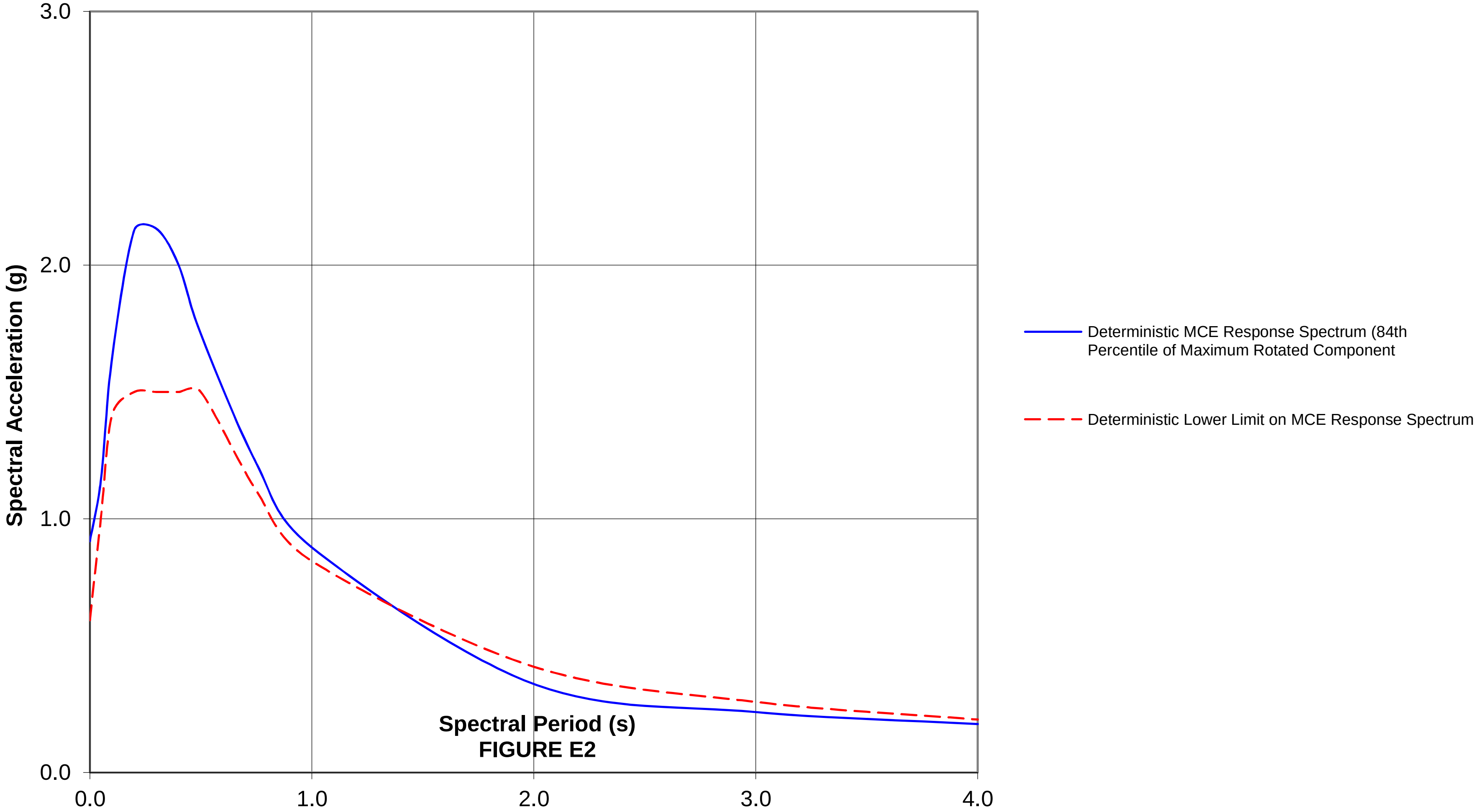
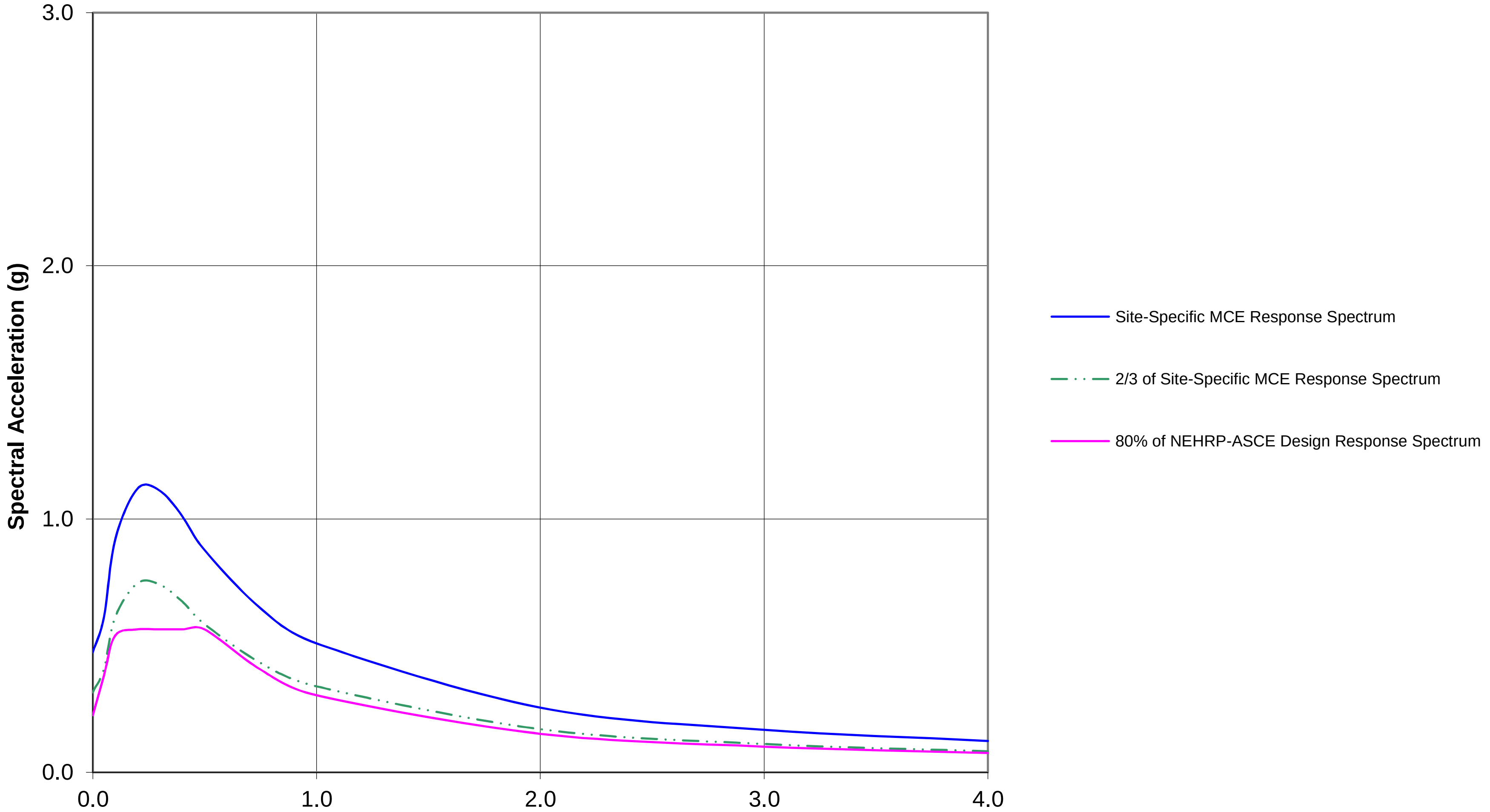


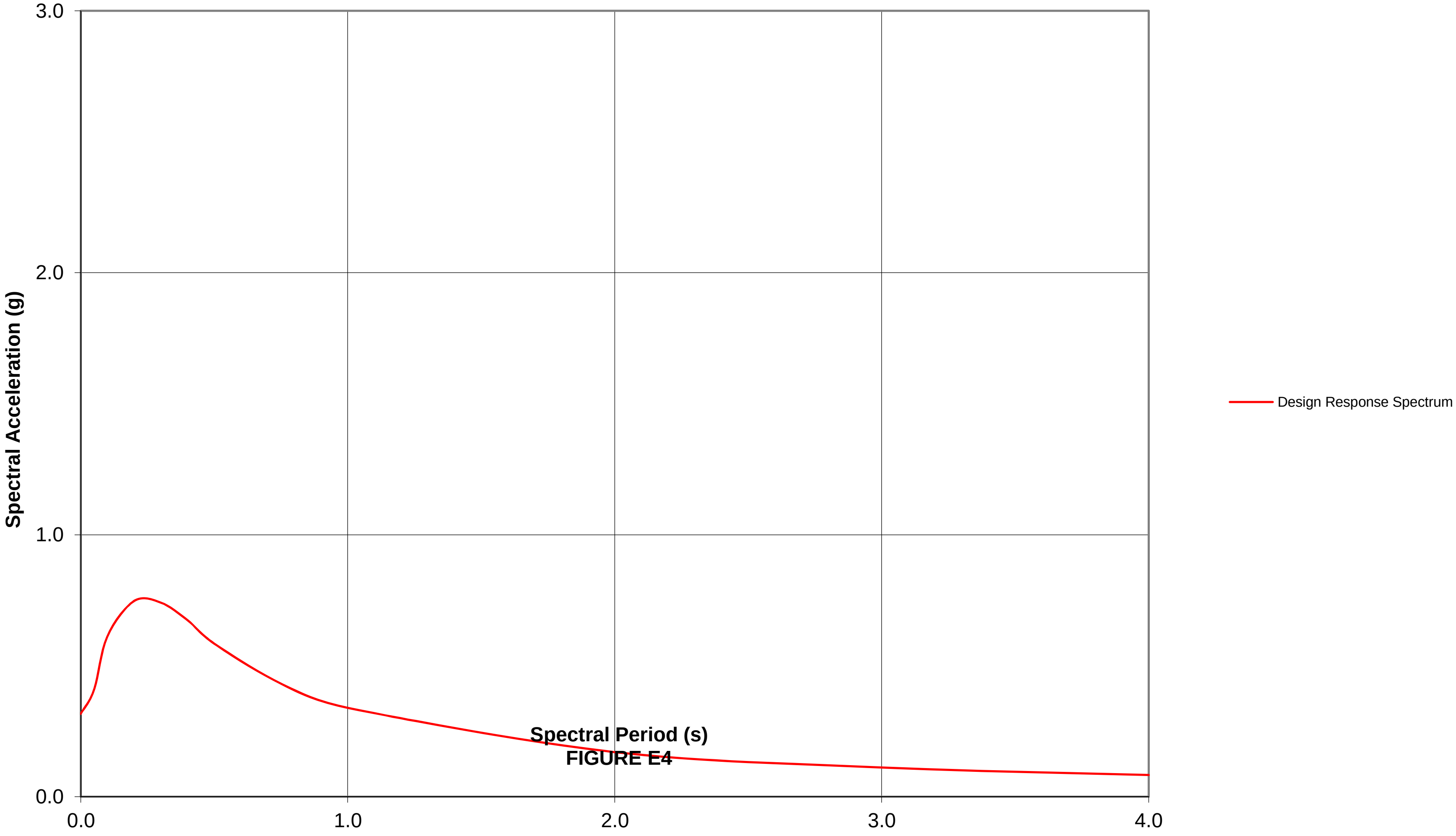
FIGURE E2

Tri-City Medical Center Expansion



Spectral Period (s)
FIGURE E3

Tri-City Medical Center Expansion



Spectral Period (sec)	Spectral Acceleration (g)										
	Probabilistic MCE Response Spectrum (2% in 50 Years)	C_R	Probablistic MCE*C_R	Deterministic MCE Response Spectrum (84th Percentile of Maximum Rotated Component	Deterministic Lower Limit on MCE Response Spectrum	Site-Specific MCE Response Spectrum	2/3 of Site-Specific MCE Response Spectrum	NEHRP-ASCE Design Response Spectrum	80% of NEHRP-ASCE Design Response Spectrum	Design Response Spectrum	0.9*DRS
0.000	0.477	0.994	0.474	0.911	0.600	0.474	0.316	0.282	0.226	0.316	
0.050	0.616	0.994	0.612	1.155	1.005	0.612	0.408	0.478	0.383	0.408	
0.100	0.924	0.994	0.918	1.636	1.410	0.918	0.612	0.674	0.540	0.612	
0.200	1.127	0.994	1.120	2.138	1.500	1.120	0.747	0.705	0.564	0.747	
0.300	1.111	1.000	1.111	2.144	1.500	1.111	0.741	0.705	0.564	0.741	0.667
0.400	1.004	1.007	1.011	2.000	1.500	1.011	0.674	0.705	0.564	0.674	0.606
0.500	0.865	1.013	0.877	1.728	1.500	0.877	0.585	0.705	0.564	0.585	0.526
0.750	0.629	1.029	0.647	1.219	1.111	0.647	0.432	0.507	0.405	0.432	0.388
1.000	0.487	1.045	0.509	0.888	0.833	0.509	0.339	0.380	0.304	0.339	0.305
2.000	0.244	1.045	0.255	0.349	0.417	0.255	0.170	0.190	0.152	0.170	0.153
3.000	0.160	1.045	0.167	0.238	0.278	0.167	0.112	0.127	0.101	0.112	0.100
4.000	0.119	1.045	0.124	0.190	0.208	0.124	0.083	0.095	0.076	0.083	0.074

Figure E5

APPENDIX F

PREVIOUS GEOPHYSICAL SURVEY

GEOPHYSICAL SURVEY
4002 VISTA WAY
OCEANSIDE, CALIFORNIA

PREPARED FOR:
Leighton Consulting, Inc.
3934 Murphy Canyon Road, Suite B205
San Diego, CA 92123

PREPARED BY:
Southwest Geophysics, Inc.
7438 Trade Street
San Diego, California 92121

February 29, 2008
Project No. 108036

SOUTHWEST
GEOPHYSICS, INC.
YOUR SUBSURFACE SOLUTION

February 29, 2008
Project No. 108036

Mr. Sean Colorado
Leighton Consulting, Inc.
3934 Murphy Canyon Road, Suite B205
San Diego, CA 92123

Subject: Geophysical Survey
4002 Vista Way
Oceanside, California

Dear Mr. Colorado:

In accordance with your authorization, we have performed a geophysical evaluation of a portion of the Tri-City Medical Center property located at 4002 Vista Way in Oceanside, California. Specifically, our survey consisted of performing one seismic P-wave refraction profile and two refraction microtremor (ReMi) profiles at the site. The purpose of the study was to characterize the subsurface conditions and develop a velocity profile of the project site.

We appreciate the opportunity to be of service on this project. Should you have any questions related to this report, please contact the undersigned at your convenience.

Sincerely,
SOUTHWEST GEOPHYSICS, INC.

Patrick Lehrmann, P.G., R.Gp.
Principal Geologist/Geophysicist

Hans van de Vrugt, C.E.G., R.Gp.
Principal Geologist/Geophysicist

SEW/HV/PFL/hv
Distribution: Addressee (electronic)

7438 Trade Street • San Diego • California 92121 • Telephone 858-527-0849 • Fax 858-527-0851

TABLE OF CONTENTS

1. INTRODUCTION

In accordance with your authorization, we have performed a geophysical evaluation of a portion of the Tri-City Medical Center property located at 4002 Vista Way in Oceanside, California (Figure 1). Specifically, our survey consisted of performing one seismic P-wave refraction profile and two refraction microtremor (ReMi) profiles at the project site. The purpose of the study was to characterize the subsurface conditions and develop a velocity profile of the project site.

2. SCOPE OF SERVICES

Our scope of services included:

- Performance of a seismic P-wave refraction profile.
- Performance of two ReMi profiles.
- Compilation and analysis of the data collected.
- Preparation of this report presenting our findings and conclusions.

3. SITE AND PROJECT DESCRIPTION

The subject property is located along the north side of Vista Way, east of College Boulevard in Oceanside, California. The specific study area was located in an open grass area just south of the Tri-City Medical Center tower. The site is currently occupied by grass and trees (Figure 3). Several utility vaults and signs are also present in the study area. Terrain at the site is generally flat, with a slight gradient to the north.

4. SURVEY METHODOLOGY

As previously indicated, the purpose of our services was to develop a velocity profile of the study area. The following sections provide an overview of the methodologies used during our study.

4.1. Seismic P-wave Refraction Survey

A seismic P-wave (compression wave) refraction traverse (SL-1) was conducted at the site to evaluate the general characteristics of the subsurface materials. The location of the line is depicted on Figure 2. The line was approximately 240 feet long and shot points were conducted at each end of the line and at the midpoint. Shots consisted of impacting an aluminum plate, placed on the ground surface, with a 16-pound hammer in order to generate a seismic P-wave.

The seismic refraction method uses first-arrival times of refracted seismic waves to estimate the thicknesses and seismic velocities of subsurface layers. Seismic P-waves generated at the surface are refracted at boundaries separating materials of contrasting velocities. These refracted seismic waves are then detected by a series of surface vertical component geophones, and recorded with a 24-channel Geometrics StrataView seismograph. The travel times of the seismic P-waves are used in conjunction with the shot-to-geophone distances to obtain thicknesses and velocities of the subsurface materials. It should be noted that the refraction method requires that subsurface velocities increase with depth. Therefore, a layer having a velocity lower than that of the layer above will not be detectable by the seismic refraction method.

4.2. ReMi Survey

Two near perpendicular ReMi traverses were conducted at the site (RL-1 & RL-2). The locations of the lines are illustrated on Figure 2. RL-1 was approximately 230 feet long and was located along SL-1. RL-2 was approximately 207 feet long and crossed RL-1 near its center. Fifteen records, 24 seconds long, were recorded for each line. The data were downloaded to a laptop computer and later processed using the SeisOpt® ReMi™ software (© Optim LLC, 2005), which uses the refraction microtremor method (Louie, 2001). The refraction microtremor technique uses the recorded surface waves (specifically Rayleigh waves) which are contained in the background noise to develop a shear wave velocity profile of the site down to a depth, in this case, of approximately 100 feet. It should be noted that the ReMi method does not require that subsurface velocities increase with depth. Therefore, low velocity layers can be detected with this method.

5. RESULTS

The following is a summary of our findings:

- The results of the P-wave refraction survey indicate that the site is underlain by approximately 5 to 15 feet of relatively low velocity material over a layer of higher velocity material (Figure 4). The P-wave velocity for layer one is roughly 1,200 feet/second and the velocity for layer 2 is approximately 3,750 feet/second.

- As depicted on Figures 5a and 5b, the results of the ReMi survey reveal the presence of alternating layers of low and high velocity materials in the upper 100 feet. The shear wave velocity of Layer 1 ranges from 500 to 550 feet/second and extends to a depth of roughly 10 feet. Layer 2 extends to a depth ranging from 30 to 40 feet and has a shear wave velocity ranging from 1,900 to 2,200 feet/second. Beneath Layer 2 is a "low velocity" layer (Layer 3) which extends to a depth on the order of 55 to 60 feet. The shear wave velocity of Layer 3 ranges from roughly 1,000 to 1,250 feet/second. Layer 3 is underlain by a material with a shear wave velocity of roughly 2,200 to 2,500 feet/second.

6. FINDINGS AND CONCLUSIONS

As previously discussed, the purpose of our study was to develop a velocity profile of the site to be used in the design and construction of proposed site improvements. Based on our discussions with you and the results of our seismic study, the subsurface geology consists of alternating layers of low and high velocity materials. The uppermost layer (Layer 1) likely represents fill/alluvium. The deeper layers likely represent beds within the Santiago Formation. In general, the results from the P-wave and ReMi surveys are consistent, with the exception of the low velocity layer which is not detectable with the P-wave refraction method. Some variations in layer depth and velocity were noted between the RL-1 and RL-2. These variations are attributed to lateral variations in the subsurface geology (please note that RL-1 and RL-2 were near perpendicular to each other).

The results of the ReMi surveys indicate that per IBC (International Building Code, 2000) the Vs100 calculated for RL-1 is 1,617 feet/second and 1,263 feet/second for RL-2. Both results equate to a Site Class C. It should be noted that the variability of the ReMi method is typically on the order of 5 percent, but may be as high as 10 percent.

7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Southwest Geophysics, Inc. should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

8. SELECTED REFERENCES

International Conference of Building Officials, 2000, International Building Code (IBC).

Iwata, T., Kawase, H., Satoh, T., Kakehi, Y., Irikura, K., Louie, J. N., Abbott, R. E., and Anderson, J. G., 1998, Array microtremor measurements at Reno, Nevada, USA (abstract): Eos, Trans. Amer. Geophys. Union, v. 79, suppl. to no. 45, p. F578.

Louie, J, N., 2001, Faster, Better: Shear-wave velocity to 100 meters depth from refraction microtremor arrays: Bulletin of the Seismological Society of America, v. 91, p. 347-364.

Mooney, H.M., 1976, Handbook of Engineering Geophysics, dated February.

Optim, 2005, SeisOpt ReMi Analysis Software, V-3.0.

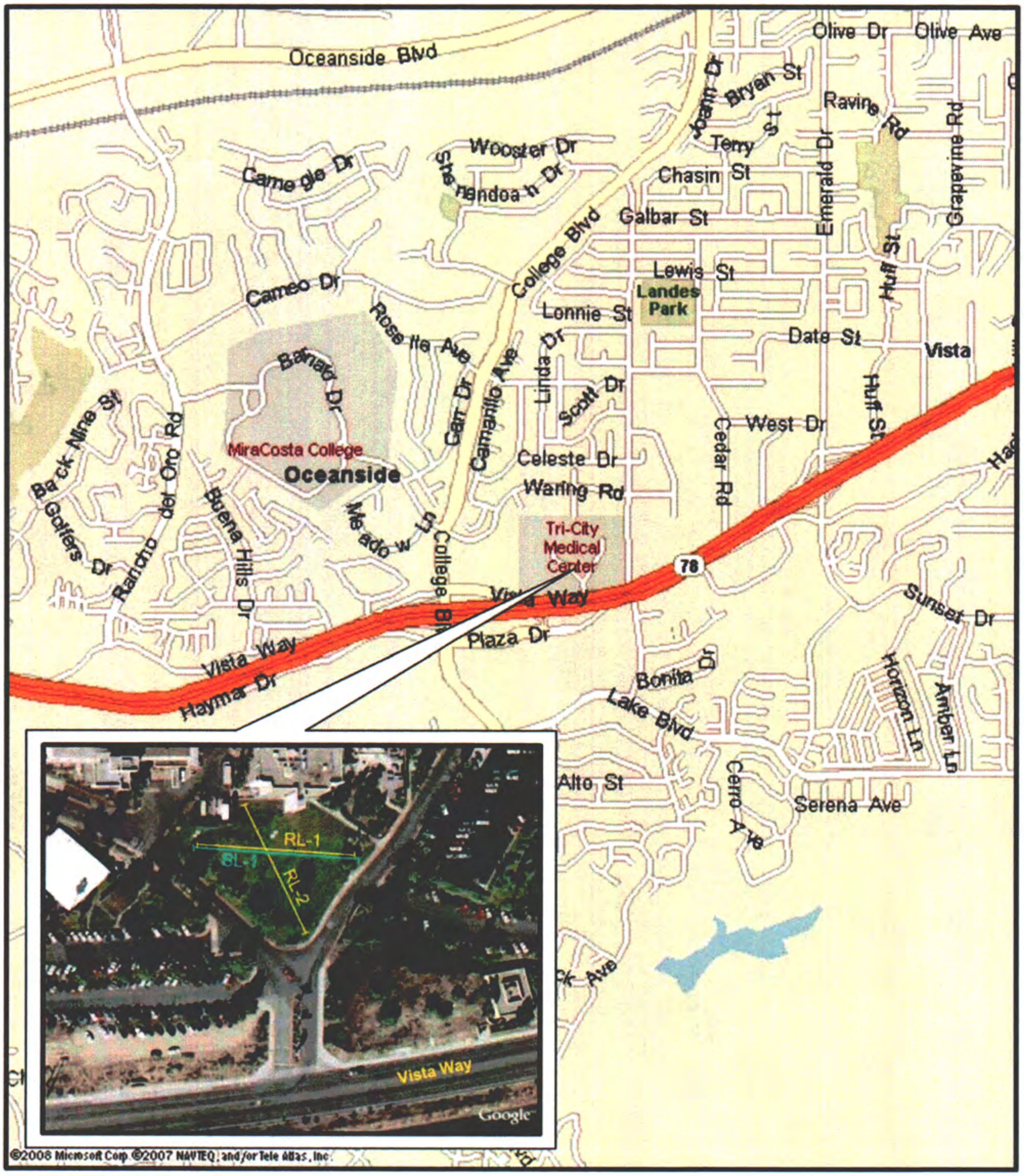
Rimrock Geophysics, 2003, Seismic Refraction Interpretation Programs (SIPwin), V-2.76.

Saito, M., 1979, Computations of reflectivity and surface wave dispersion curves for layered media; I, Sound wave and SH wave: Butsuri-Tanko, v. 32, no. 5, p. 15-26.

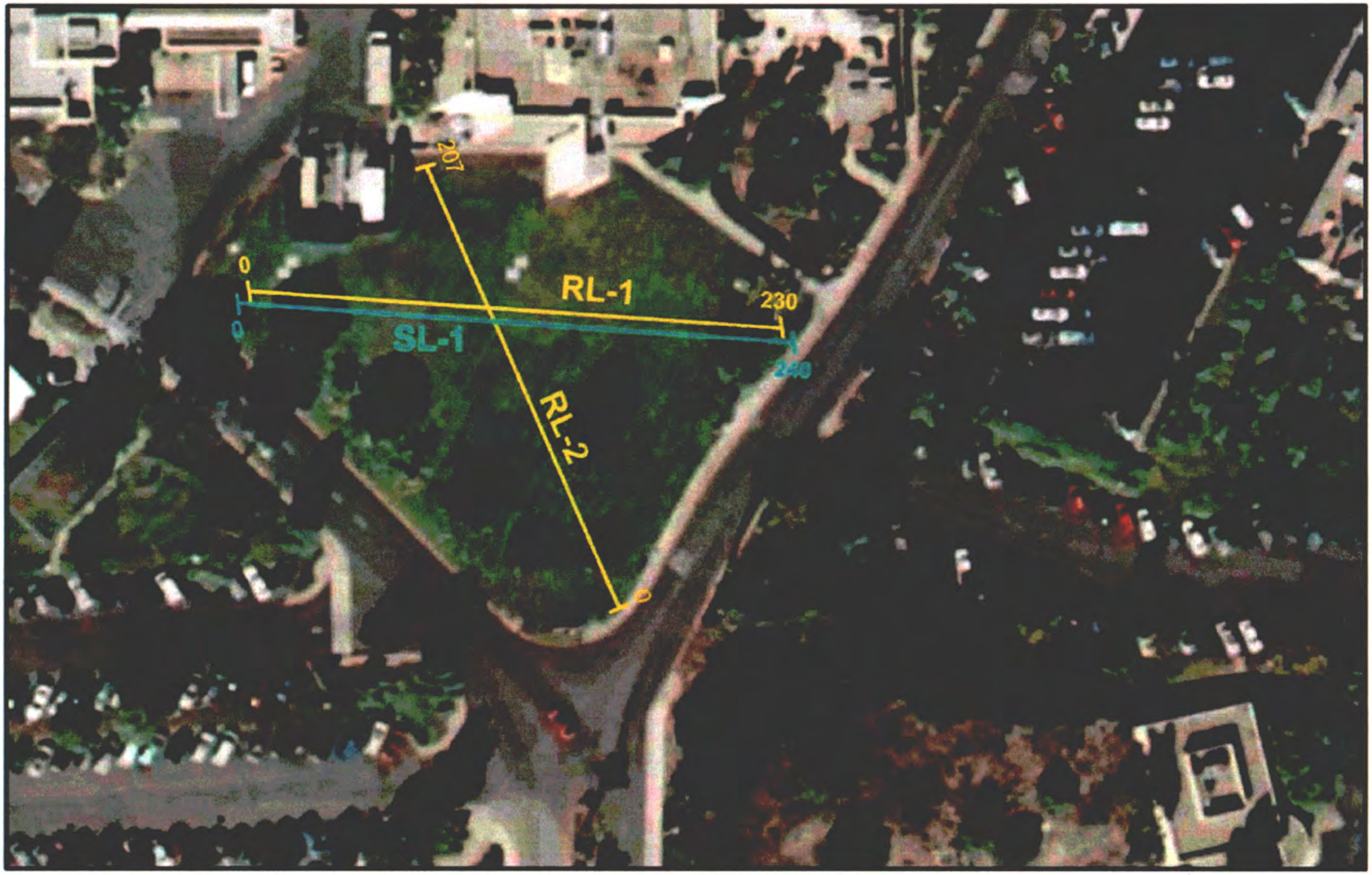
Saito, M., 1988, Compound matrix method for the calculation of spheroidal oscillation of the Earth: Seismol. Res. Lett., v. 59, p. 29.

Telford, W.M., Geldart, L.P., Sheriff, R.E., and Keys, D.A., 1976, Applied Geophysics, Cambridge University Press.

Xia, J., Miller, R. D., and Park, C. B., 1999, Estimation of near-surface shear-wave velocity by inversion of Rayleigh wave: Geophysics, v. 64, p. 691-7.



SITE LOCATION MAP	N	4002 Vista Way Oceanside, California		SOUTHWEST GEOPHYSICS INC. Figure 1
		Project No.: 108036	Date: 02/08	



LEGEND

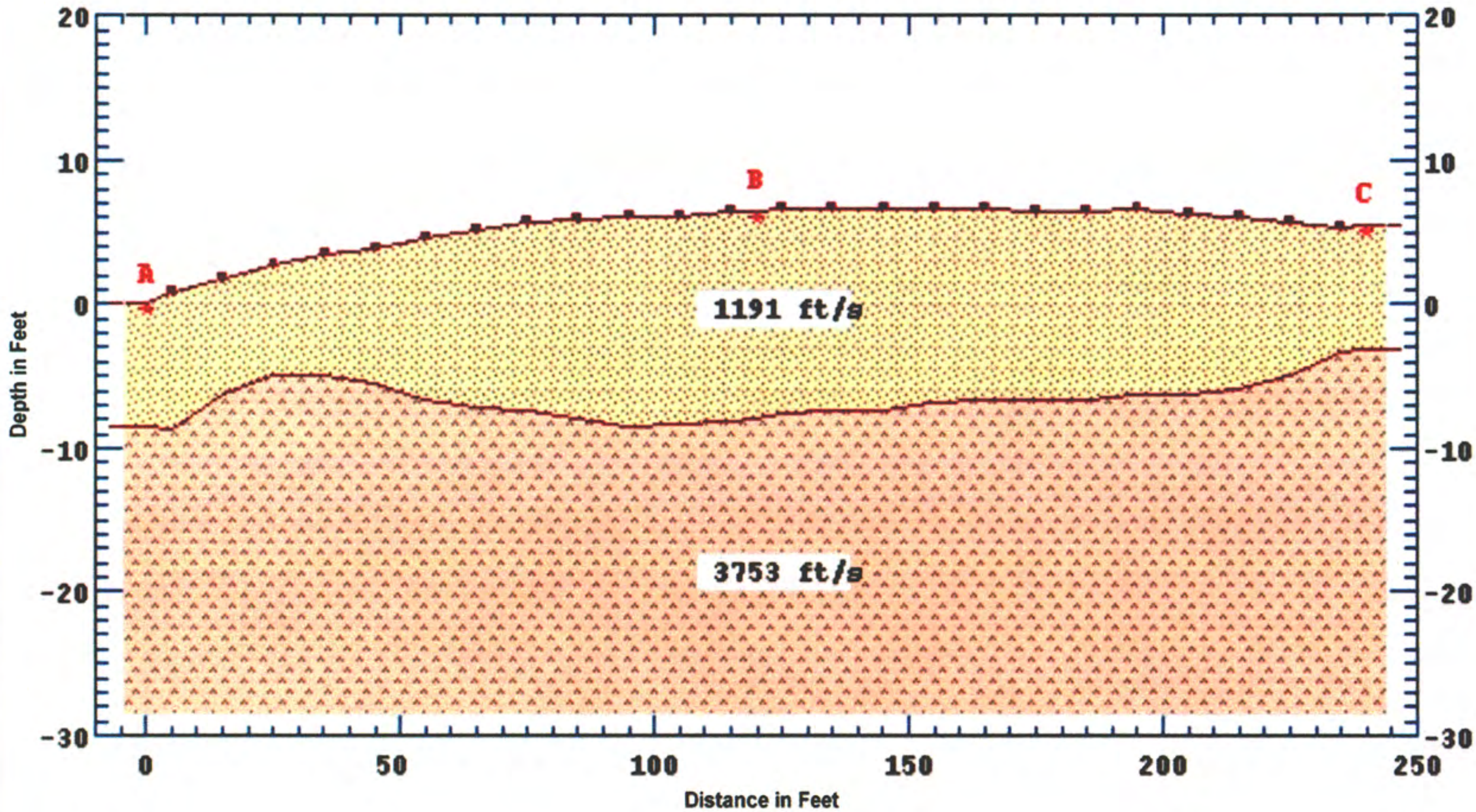
Seismic Line SL-1 | ReMi Line RL-1

0 | 60 | 120

approximate scale in feet

SEISMIC LINE LOCATION MAP	N	4002 Vista Way Oceanside, California	SOUTHWEST GEOPHYSICS INC Figure 2
		Project No.: 108036 · Date: 02/08	

SITE PHOTOGRAPHS	4002 Vista Way Oceanside, California	SOUTHWEST GEOPHYSICS INC.
	Project No.: 108036 / Date: 02/08	Figure 3



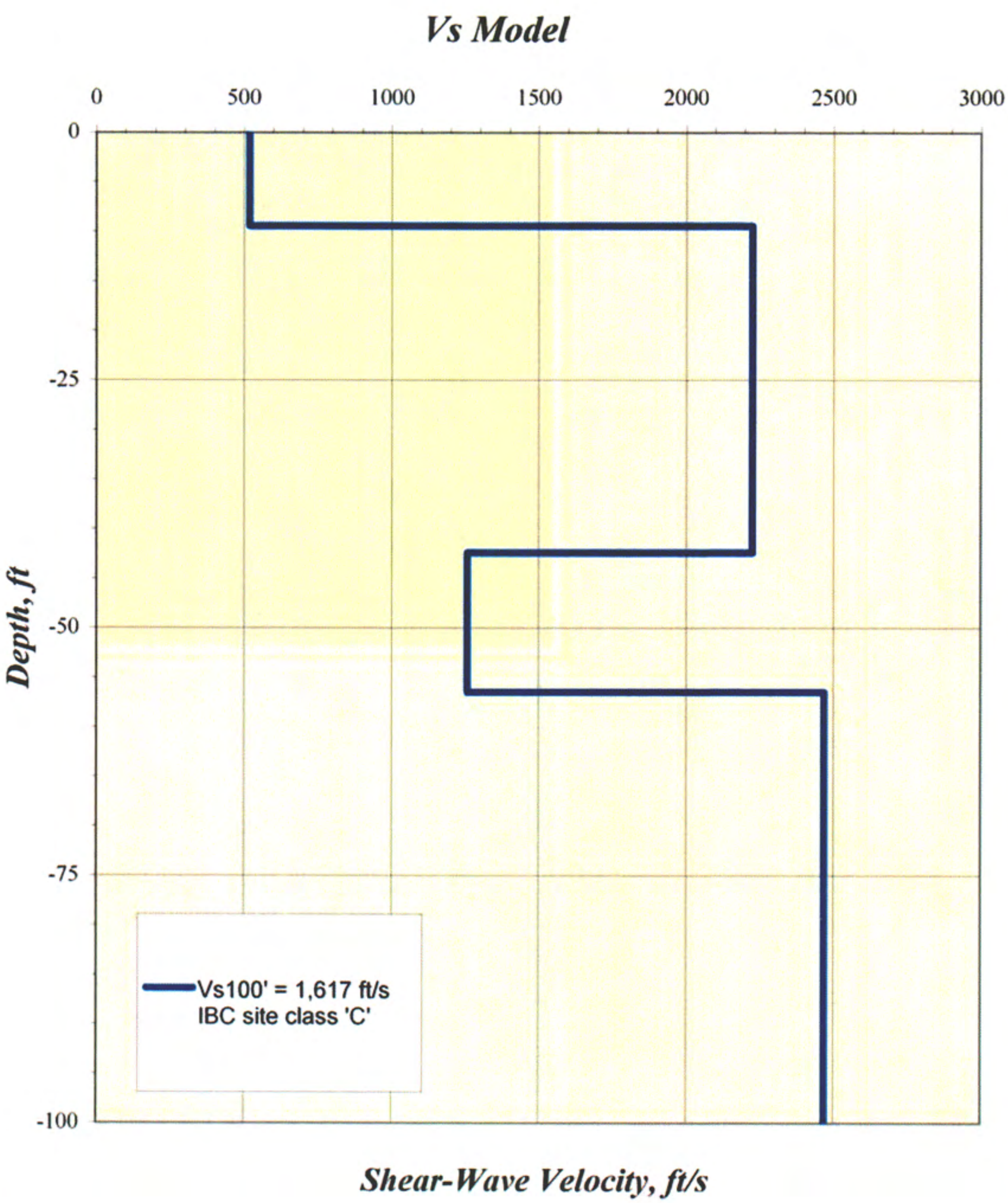
SEISMIC PROFILE, SL-1

4002 Vista Way
Oceanside, California

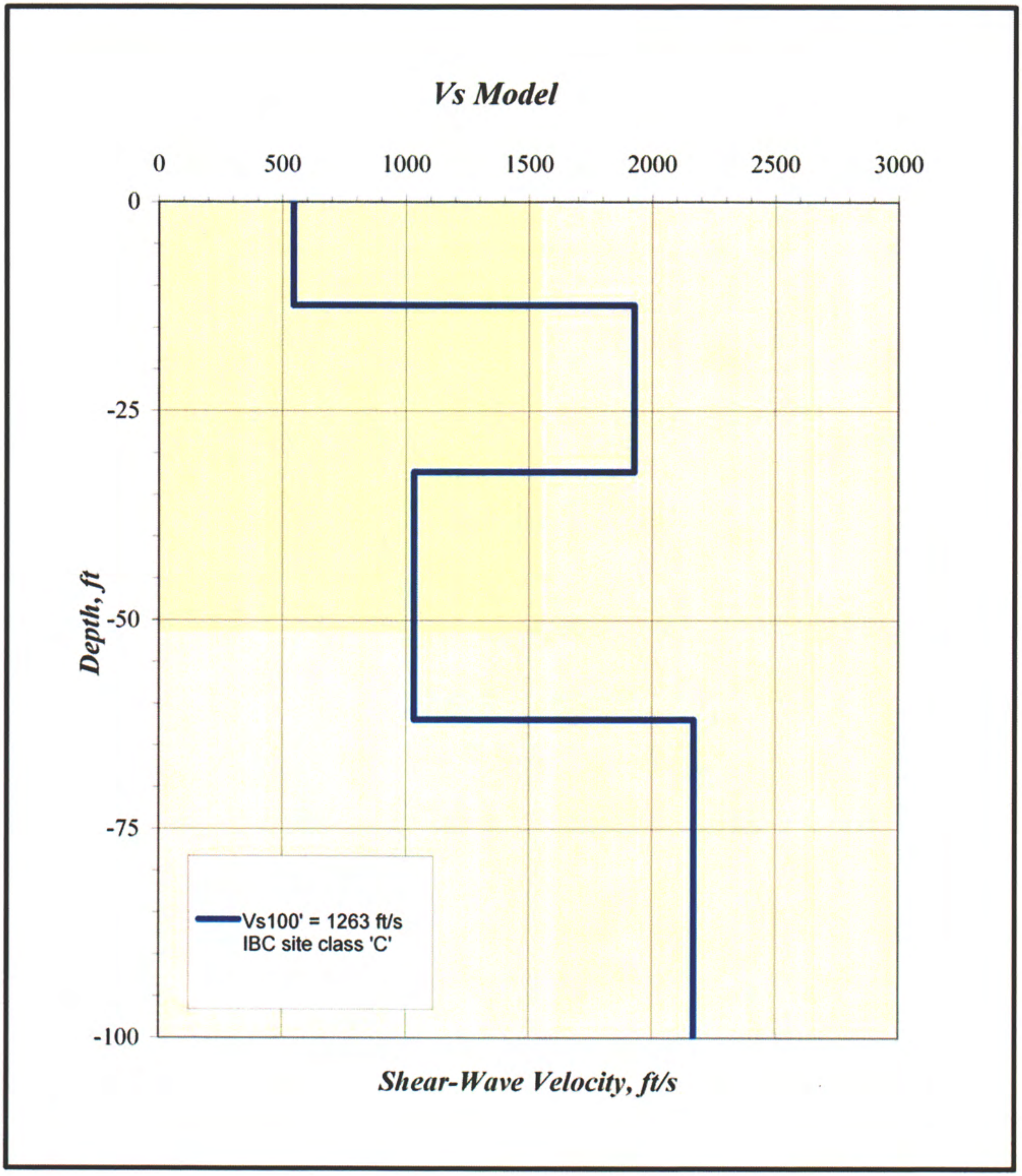
Project No.: 108036 | Date: 02/08

SOUTHWEST GEOPHYSICS INC

Figure 4



ReMi Results, RL-1	4002 Vista Way Oceanside, California Project No.: 108036 — Date: 02/08	SOUTHWEST GEOPHYSICS INC. Figure 5a



ReMi Results, RL-2	4002 Vista Way Oceanside, California Project No.: 108036 — Date: 02/08	SOUTHWEST GEOPHYSICS INC Figure 5b