LGC Valley, Inc.

Geotechnical Consulting

REVISED GEOTECHNICAL STUDY FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT FOR THE PROPOSED DEVELOPMENT LOCATED AT 21845 MAGNOLIA STREET WITHIN THE CITY OF HUNTINGTON BEACH, CALIFORNIA,

Project No. 164011-01

Dated: March 14, 2018
Revised November 15, 2018

Prepared For:

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March 14, 2018, Revised November 15, 2018 Project No. 164011-01

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Subject: ***Revised Geotechnical Study for Preparation of an Environmental Impact Report for the Proposed Development Located at 21845 Magnolia Street, within the City of Huntington Beach, California.***

In accordance with your request, LGC Valley, Inc. (LGC) has performed a geotechnical study for preparation of an Environmental Impact Report (EIR) for the proposed development located on the 29-acre parcel at the northwest corner of Magnolia Street and Banning Avenue within the City of Huntington Beach.

The purpose of our work was to review the available literature provided to us regarding previous geotechnical work done at the site, analyze the proposed site design for geotechnical stability, and provide a summary of the potential geotechnical/geologic impacts to this site, and the surrounding areas due to the development of this site.

The work provided herein is intended to be as comprehensive an analysis as possible without reiterating in great detail the intricacies of the site. Thus, by its nature, the information provided herein is incomplete, but should provide a useful understanding for the purposes of the EIR.

If you have any questions regarding our report, please contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LGC VALLEY, INC.

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1.0 EXECUTIVE SUMMARY

Based on our review of the available geotechnical reports of the site and applicable nearby sites, it is our opinion that the proposed 29-acre development located at 21845 Magnolia Street is feasible from a geotechnical standpoint. However, there are several significant potential geotechnical constraints at the site that should be taken into consideration during the design and construction phases of the proposed project. These constraints include: 1) a shallow groundwater table; 2) the potential for active faulting near the site; 3) the potential for liquefiable soils; 4) seismic slope displacement/lateral spreading along the northern, western, and eastern margins of the site; and 5) potentially compressible near-surface fine-grained soils. These geotechnical constraints along with preliminary mitigation measures to these potential hazards are discussed in greater detail in this report.

During this review, the potential for liquefaction, slope instability and settlement of site soils was performed using the site design shown on the Magnolia Tank Farm Mass Grading Exhibit, prepared by Fuscoe Engineering (Fuscoe, 2018) and data from previous site reviews and subsequent site studies (EEI, 2016). Once the final design becomes available, LGC should be consulted to provide final geotechnical engineering recommendations based on the results of our studies and specific to the final project design. Geotechnical engineering solutions used for site enhancement should be implemented under our supervision during grading and construction.

The geotechnical impacts due to the proposed development will be limited to the site. If our recommendations are followed, the site and slopes on the margin of the property will be stable, therefore, we do not anticipate any adverse impacts to Magnolia Street, the ASCON landfill, the neighboring residential developments, or to the Huntington Beach Channel. It is our opinion that the recommendations implemented at the site will render the potential geotechnical constraints listed above to an insignificant impact.

2.0 INTRODUCTION

2.1 Purpose and Scope of Services

In accordance with your request, this report presents the results of our geologic and geotechnical background study and geotechnical engineering analyses of the 29-acre property located at 21845 Magnolia Street in the City of Huntington Beach, California (Figure 1). The purpose of this study was to analyze the existing geotechnical conditions of the site as they pertain to the site configuration shown on the Mass Grading Exhibit (Fuscoe, 2018). Within this report we identify potential geohazards and provide preliminary mitigating measures to these hazards, as necessary.

With the exception of installing four groundwater monitoring wells on the site, no subsurface fieldwork or laboratory testing was performed by LGC as part of this study, rather, the existing on-site data and laboratory testing performed by the previous geotechnical firm, EEI Geotechnical and Environmental Solutions (EEI), along with data from other nearby sites (Appendix A) was used in our calculations and analyses. Appendix B presents the exploration map, boring logs, and CPT logs performed by the previous geotechnical consultant.

It should be noted that within the EEI report, they reference all elevations relative to grades shown on the Preliminary Site Plan by Fuscoe Engineering, dated December 12, 2015. Elevations within their report reference mean sea level; however, LGC has confirmed with Fuscoe Engineering that the Preliminary Site Plan elevations were actually based on NAVD 88.

Our report presents a comprehensive analysis of the reviewed documents contained within Appendix A, synthesized with our knowledge of local and regional geologic conditions within southern California. The results of this review are outlined herein and include our conclusions and the possible geotechnical recommendations to be employed at the site to meet or exceed the standard of practice in southern California for site development from a geotechnical perspective.

2.2 Site Description and Existing conditions

The site is approximately 29 acres in size and is located to the west/northwest of the intersection of Magnolia Street and Banning Avenue in the City of Huntington Beach, California. The site is roughly triangular in shape and bounded by Magnolia Street and residential development(s) on the east. The western boundary of the site is the Huntington Beach Flood Control Channel. A sheet pile retaining wall located at the top of the channel slope extends the length of this boundary. West of the channel are wetlands, and the AES Generating Facility. The ASCON landfill is located directly to the north. The center of the site is situated at approximately N 33.645200° and W -117.972813° (Google Earth, 2017).

The site was previously used as a fuel storage facility for a Southern California Edison power plant located to the west of the site. Three large storage tanks were located on the site, as well as associated pumps and transport pipes, all of which have subsequently been removed. Each tank was approximately 300 feet in diameter with a height of approximately 40-50 feet, with a storage

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Figure 1
Site Location Map
21845 Magnolia Street
Huntington Beach, California

Project Name	SLF-HB Magnolia, LLC
Project Number	164011-01
Eng./Geo.	TL/MS
Date	

0 1,000 Feet

capacity of approximately 25 million gallons (TAIT, 2016). The base of the tanks were located between, 4 feet, to 6 feet, NAVD (EEI, 2016).

Within the last year, the tanks have been demolished and the resulting waste was transported off site. Based on discussions with representatives from SLF HB Magnolia, this work was conducted by permit from the City of Huntington Beach, under the supervision of Patriot Environmental Services, Inc. After the tanks and appurtenant structures were removed from the site, the site was sheet graded to the general configuration shown on the Rough Grading and Site Demo Plan (Robin B. Hamers & Associates, 2017). The site was turned over to AES, who is leasing the property as a construction staging area for the neighboring Huntington Beach Generating Facility, located across the channel to the west of the site. Any undocumented fill resulting from the temporary staging operations will be removed or remediated during grading of the subject development.

Though plans are still being finalized, it is our understanding that the southwest portion of the property is planned for a three- to four-story luxury hotel with one floor of subterranean parking; a pool and spa facility will also be incorporated into this area. The remainder of the site will be composed of three- to four-story townhome units, and two- to three- story single family residences. Private drives, parking lots and alleyways, wet and dry utilities, and other appurtenant structures will be installed to support this development.

3.0 GEOTECHNICAL/GEOLOGIC CONDITIONS

3.1 Regional Geology

The subject site is located within the northwestern portion of the Peninsular Ranges Geomorphic Province, which extends over 1,400 km from just south of the San Gabriel and Santa Monica mountains, and the Channel Islands into Mexico where it forms the Baja California peninsula. The province extends to the west offshore to the continental margin and the eastern boundary is the west side of the Salton Trough. Both the submerged and exposed parts of the province are characterized by elongate northwest trending mountain ranges separated by straight-sided sediment-floored valleys (Morton and Miller, 2006).

The dominant structural features of the Peninsular Ranges province are northwest-trending mountain ranges and faults. Most of the faults either die out to the northwest, or merge with, or are terminated by the east trending steep reverse faults that form the southern margin of the Transverse Ranges province. In the northern part of the province the major faults appear to be late Cenozoic in age, and many are seismically active (Yerkes et.al, 1965).

The subject site is located in the Santa Ana quadrangle. In the San Bernardino and Santa Ana quadrangles, the Peninsular Ranges Province can be divided into a series of fault-bounded blocks each of which has a uniform set of characteristics. The topographic Los Angeles Basin, where the site is located, makes up the northwest end of the Peninsular Ranges Province (Morton and Miller, 2006).

3.2 Local Geologic Setting

The site is within a feature locally termed the Santa Ana Gap, or Talbert Gap, and is characterized by a broad alluvial fan complex dominated and laid down by the late Quaternary-age Santa Ana River. As a result of sea level rise between 15,000 and 8,000 years ago, the environment of deposition transitioned from shallow marine to coastal estuary. The shallow marine deposits consist of sands with silts and some shell fragments and various fossils, whereas the lagoonal deposits consist of finer-grained sands, silts, and clays typically with abundant organic material. The near-shore marine deposits that fill in the gap are water bearing, that is, the spaces between grains is filled with water, and make up the Talbert aquifer; the fine-grained lagoonal sediments form a semi-confining layer above this aquifer (CDWR, 1966).

3.3 Geologic Units

The geologic map of the Santa Ana 30’ x 60’Quadrangle have three units mapped on the site (Morton and Miller, 2006), however, these units are generally difficult to differentiate in the field. The three units are:

- Very Young Eolian Deposits (Qe), consisting of unconsolidated medium to fine-grained sand and silt that form active or recently active sand dune deposits along the coast in the Huntington-Newport Beach area.

- Young Axial-Channel Deposits (Holocene and late Pleistocene) (Qya), Slightly to moderately consolidated silt and sand, with local gravel deposits. These deposits may include some young

alluvial-fan deposits (Qf and Qyf) emanating from tributary canyons and gulches adjacent to and feeding into various channels including the nearby Santa Ana River

- Young Alluvial-Fan Deposits (Holocene and late Pleistocene) (Qyf). Unconsolidated to moderately consolidated silt, sand, and pebbly to cobbly sand that is located near the base of shallow to steeply-sided slopes.

The descriptions below are based on site-specific review performed by EEI Geotechnical and Environmental Solutions (EEI), who reported encountering two units in their borings and CPTs (EEI, 2016). These units were undocumented artificial fill, and young axial channel deposits (Qya). Based on our review of the descriptions in these site-specific reports, we agree with this conclusion regarding site geologic units. These units are described in more detail below.

3.3.1 Undocumented Artificial Fill

Hollow stem auger borings were excavated in the area of the tank basin bottoms, and undocumented fill was encountered in each boring. Fill was generally encountered to a depth of approximately 2 feet, NAVD, but may extend deeper in localized areas of the site.

Fill is described as very moist, grey-brown silty clay, elastic silt, and sandy silt with clay. The fill was found to be loose, and very soft to stiff, increasing in relative density with depth.

3.3.2 Young Axial Channel Deposits

Quaternary-age young axial channel deposits (Qya) extend from the bottom of the artificial fill to the maximum depth explored of 51.5 feet below the ground surface. These deposits consist of an upper layer of clay, silty clay, and silt, which was found be approximately 7 to 12 feet in thickness, the bottom of this layer is approximately located between -4 and -8 feet, NAVD, and described as very soft to stiff, and very moist to saturated.

Below this is a thicker layer of interbedded sand and silt, which extends to the maximum depth explored. This layer was found to be loose near the top, transitioning to dense with depth.

3.4 Groundwater

3.4.1 Groundwater Quality

During the Groundwater Remedial Investigation conducted in 2004 at the ASCON site directly north of this project, total dissolved solids (TDS) were measured by the environmental consultant to determine how groundwater at the site is affected by seawater intrusion (Geosyntec Consultants, 2007). It was found that shallow groundwater beneath the site contains concentrations of TDS up to approximately 80% of typical concentrations found in seawater. The highest TDS concentrations were found in monitoring wells closest

to the Huntington Beach Channel, and the lowest concentrations were found in the wells located farthest from the channel. Based on results presented in this report, groundwater ranges from brackish (4600 mg/l TDS) to saline (26000 mg/l TDS) as classified by the Water Quality Association. We anticipate the TDS concentrations within the groundwater at the subject site will have a similar range as those found at the ASCON site.

Salinity of the groundwater may increase the corrosive potential to buried metal and concrete in contact with underlying soils. Concrete and metal in direct contact with underlying soils, should be designed in accordance with the latest adopted edition of the California Building Code (CBC, 2016) and applicable sections of ACI publication 318: Building Code Requirements for Structural Concrete (ACI, 2014).

3.4.2 Groundwater Depth

Between December 14 and December 28, 2017, LGC monitored the groundwater levels within four wells advanced across the site using transducers adjusted for variations in barometric pressure. Groundwater levels were found to vary by location across the site with 1.3 feet of difference between the well with the lowest and the well with the highest groundwater level. Groundwater levels were also determined to be impacted by tidal surges. During the monitoring period, groundwater depth across the site ranged between approximately -0.2 feet to 1.7 feet, NAVD (LGC, 2018).

In the Sea Level Rise Vulnerability Assessment and Adaptation Plan prepared for this development, a conservative estimate for the groundwater elevation at the project site of 2.6 feet, NAVD was suggested to allow for the possibility that the measured groundwater levels would be higher if the measurements were conducted over a longer time period; thereby capturing the effects of factors (e.g., less pumping, increased rainfall, high ocean levels due to sea-level anomalies such as El Nino) that may increase groundwater levels compared to the levels measured during the monitoring period (Anchor QEA, 2018). Therefore, groundwater on the site is not expected to exceed 2.6 feet, NAVD during grading and construction operations.

3.4.3 Soil Surcharging

We anticipate remedial removals will be performed within 1 to 2 feet above groundwater surface elevation across the site (approximately 3 to 4 feet, NAVD). The removal bottoms may be stabilized with geogrid or gravel, and consolidation/compaction of underlying soils will be performed where necessary by surcharging the area with fill. Surcharge fill is placed on the area of concern, accelerating consolidation of the compressible materials. Installation of a wick drain system is commonly used in conjunction with surcharge loading to eliminate some free water within the area that may contribute to settlement.

For this project, we anticipate approximately 10 feet of fill material will be placed up to 4 months in duration. As such, it is not anticipated that the groundwater at the site will be a significant geotechnical constraint during construction and normal construction practices will be utilized for this type of construction close to the water table.

3.4.4 Driven Piles

The deepest design cuts at the site are in the location of the proposed subterranean basement parking structure below the hotel. The pad elevation in this area is at an elevation of 4 feet, NAVD. Stabilization for the hotel is anticipated to be achieved by driven piles. Based on the CPT and boring logs from the previous geotechnical field investigation (EEI, 2016), it is our recommendation that the piles be approximately 30 feet in length to reach competent bearing material. For the preparation of the project EIR, A structural engineer from KPFF was consulted in an effort to estimate the approximate number of driven piles needed to support the proposed structure. LGC provided the engineering parameters of onsite soils, then using these parameters, KPFF provided a preliminary estimate of approximately 3100 driven piles, 8 feet on center will be needed for stabilization of the hotel (KPFF, 2017).

3.4.5 Dewatering

The majority of the site grading will not require excavation below the groundwater level, and therefore, large-scale dewatering is not anticipated at the site; however, minor construction dewatering may be required for isolated excavations which extend below the water table for such structures as pile caps or elevator pits within the hotel.

Construction dewatering may be achieved by isolated well points if the groundwater is only encountered in isolated areas, or may be removed uniformly across the entire basement with a perimeter dewatering system. Should construction dewatering be necessary, it would be limited to the time period in which excavations were open below the basement area. Based on a reasonable construction schedule, this can be estimated to last between 1 and 6 months, during which the groundwater would be lowered approximately 2 to 4 feet in the area of the basement. Based on the observed and recorded groundwater levels across the site, we anticipate that groundwater levels outside of the immediate vicinity of the dewatering operation would be unaltered. Local construction dewatering is not anticipated to have any significant impact on surrounding improvements.

The pumped water from the dewatering operation is the purview of the contractor in accordance with local construction dewatering regulations of the City of Huntington Beach. Typically, depending on the volumes encountered, construction water is either ponded on the site and allowed to evaporate, or pumped to the local sewer or storm drain.

3.5 Seismicity, Faulting, and Secondary Effects

3.5.1 Faulting

The site is located within the Newport-Inglewood fault zone (NIFZ), a series of northwest-southeast trending faults and associated folds. This zone is made up of a series of en-

echelon, primarily strike slip faults, that extends from Santa Monica to Newport Beach, at which point the zone of faulting continues off shore and extends to the southeast, where it joins the Rose Canyon fault, which continues through San Diego, down through Baja Mexico (Grant and Rockwell, 2002).

In this area of Huntington Beach, the primary active trace within the NIFZ is referred to as the North Branch Fault (NBF). Paleoseismic investigations by others indicate that the North Branch fault is considered active, and as such, it is located within an Alquist-Priolo Earthquake Fault Zone (EFZ) by the State of California. EFZs are regulatory areas around the surface traces of active faults as mapped by the State Geologist. Based on our review of state maps, the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. The closest portion of the North Branch fault that is considered active is located approximately 1-mile north-northeast of the site (CDMG, 1986).

3.5.2 Ground Rupture

Ground surface rupture can occur during an earthquake that has some combination of vertical or lateral offset, causing differential movement at the surface trace of the active fault. The purpose of the Alquist-Priolo Earthquake Fault Zoning Act is to identify active fault traces, and provide setbacks for buildings intended for human occupancy. Because this site is not located within an Alquist-Priolo Earthquake Fault Zone, the potential for ground rupture is considered low.

3.5.3 Ground Shaking and Secondary Effects from Earthquakes

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the southern California region include soil liquefaction and dynamic settlement, seiches and tsunamis. In general, these secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and the causative fault and the on-site geology. The maximum magnitude earthquake relative to this site is from the active North Branch of the Newport-Inglewood Fault Zone, which is located approximately 1-mile away from the site and has a potential maximum magnitude of 7.2 (EEI, 2016).

The impacts of shaking from a maximum magnitude earthquake at the site to buildings and other improvements can be significantly reduced by using the maximum accelerations in the engineering design of the project. Secondary effects of earthquake shaking are discussed in more detail below.

3.5.4 Liquefaction

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions exist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Liquefaction is typified by a buildup of pore-water pressure in the affected soil layer to a point where a total loss of shear

strength occurs, causing the soil to behave as a liquid. Studies indicate that saturated, loose to medium dense, near surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential.

Seismically induced settlements can occur as a result of ground shaking and redistribution of the soil particles. Uniform seismically induced settlements beneath a structure may cause minimal damage; however, due to variations in soil stratigraphy, soil densities, and confining conditions of the soils, seismic settlement is generally non-uniform (i.e. causes differential settlement) and can cause serious structural damage.

Based on the Seismic Hazard Zone Maps for the Anaheim and Newport Beach 7.5-Minute Quadrangle, the site is located within a liquefaction zone, which requires an investigation to evaluate the potential seismic-induced settlement caused by liquefaction (CDMG,1997). In their liquefaction study, EEI calculated up to two inches of settlement could occur onsite due to liquefaction. Because finished grades at the site have changed since the original study, and because we now have a more accurate groundwater elevation, LGC also ran a liquefaction analysis using the updated design slopes and finish grades shown on the Mass Grading Exhibit. Our analysis also yielded potential settlements up to 2 inches. Potential effects of seismically-induced settlement can be mitigated using post-tensioned foundations designed in accordance with the latest adopted edition of the California Building Code, Chapter 18 (CBC, 2016) and the Post Tension Institute Slab-On-Ground design section referenced in the CBC.

3.5.5 Seismic Slope Displacement and Lateral Spread

Seismic slope displacement evaluates the potential displacement of a slope or elevated land mass during the shaking of an earthquake. Lateral spreading involves the lateral displacement of large surface blocks atop liquefiable soil due to liquefaction of subsurface layers. Lateral spread generally develops on gentle slopes that move toward a free face such as a stream or channel. The evaluation of lateral spreading represents the stability of the slope after earthquake. Factors of Safety of at least 1.3 are considered stable.

LGC ran a lateral spread analysis for three slope conditions: the slope located along the northwestern pad, adjacent to Huntington Beach Flood Channel; the slope along the northern edge of the property that ascends to the ASCON site; and the slope along the eastern edge of the project adjacent to Magnolia Street. Results of our analysis indicate that ground improvements will likely be needed for stabilization of the slope located between the northwestern pad and the channel, as well as below the slope ascending to the ASCON site. The improved area will likely be between 20 and 35 feet in width and 15 to 20 feet in depth below existing grade. Areas of the proposed ground improvement are shown on Plate 1.

Possible impacts from seismic slope displacement and lateral spread can be mitigated using improvements that would increase the shear strength within the slope, and typically involve

densification, mixing, or replacement. Possible ground improvement options are listed below.

3.5.5.1 Ground Improvement Options

Ground improvement design is typically performed by a specialty contractor with coordination of the design team. Based on the liquefaction and slope stability analyses, ground improvement methods that may be considered at this site include stone columns (vibro replacement), compaction or jet grouting, and deep soil mixing.

Stone Columns

Stone columns (also known as vibro-replacement) is a technique where a vibratory probe is inserted into the soil in order to densify the loose soil on a designated grid pattern. As the probe is removed at each location, gravel is placed as backfill into the void created by the probe. This procedure densifies and strengthens the soil. The stone columns are typically installed on a spacing of 6- to 10-foot on centers to the required mitigation depths of 15 to 20 feet below the existing ground surface for this project.

Compaction Grouting

Compaction grouting, also known as Low Mobility Grouting, is a grouting technique that displaces and densifies loose granular soils and strengthens fine grained soils. An injection pipe is advanced to the maximum treatment depth. The low mobility grout is then injected as the pipe is slowly extracted in lifts, creating a column of overlapping grout bulbs. The expansion of the low mobility grout bulbs displaces the surrounding soils. When performed in granular soil, compaction grouting increases the surrounding soils density, friction angle and stiffness. In all soils, the high modulus grout column reinforces the soils within the treatment zone. Compaction grouting has been used to increase bearing capacity and decrease settlement and liquefaction potential.

Jet Grouting

Jet grouting is a grouting technique that creates soilcrete (grouted soil) columns, using a grouting monitor attached to the end of a drill stem. The jet grout monitor is advanced to the maximum treatment depth, at which time high velocity grout jets are initiated. The jets erode and mix the in-place soil as the drill stem and jet grout monitor are rotated and raised. Jet grouting is effective in silts and most clay.

Wet Soil/Deep Soil Mixing

Wet soil/deep soil-mixing is a technique involving mixing of cement/slurry materials with the in-place soils using either a hollow-stem auger with mixing tool to create soil cement columns or a rotary mixing tool at the end of a track hoe arm creating 100% mass stabilization. Soil cement columns of up to 3 feet or more in diameter are used to mix the soil to the recommended mitigation depth of 15 to 20 feet for this project. As the augers are advanced into the soil, the hollow stem is

used as conduits to pump grout and inject into the soil at the tip, or through the feeder pipe attached to the track hoe arm. This ground improvement method mitigates the sandy liquefiable soils and strengthens clayey soils.

3. 6 Tsunami Hazard

According to the State of California Emergency Management Agency Tsunami Inundation Map for Emergency Planning, Newport Beach Quadrangle, the site is located within a tsunami inundation area (Cal EMA, 2009). Impacts of tsunamis are addressed in detail within the SLR VAAP (Anchor QEA, 2018).

3.7 Landslides

Landslides are downhill movement of soil or rock caused by gravity and a destabilized slope. Common examples of destabilizing factors are ground shaking caused by earthquakes, saturated soil conditions, and over-steepened slopes. According to the updated Huntington Beach General Plan Figure HAZ-3 (Huntington Beach, 2017), this site is not located within an area identified to have earthquake-induced landslide potential.

The site is relatively flat with engineered slopes along the edges of the property composed of a combination of fill and young axial channel deposits, which are generally flat-lying and massive, without bedding that could provide planes of weakness for sliding.

The proposed development is anticipated to include raising grades to accomplish the final site design, and therefore, no over-steepened slopes are expected to be excavated as part of grading operations. Landslides should not be considered a hazard at this site.

3.8 Flooding

Review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map, Map number 06059C0263J, Panel 263 of 539 of the Huntington Beach area indicates the site is located in Zone X defined as an area subject to inundation by the 0.2% annual chance flood, areas of 1% chance annual flood with average depths of less than 1-foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood (FEMA, 2009). The SLR VAAP addresses the potential for flooding at the site in detail (Anchor QEA, 2018).

3.9 Subsidence

Subsidence is defined within the Natural and Environmental Hazards Element of the Updated City of Huntington Beach General Plan as a drop in ground surface (Huntington Beach, 2017). The topic is addressed in more detail in the Environmental Hazard Element of the previous Huntington Beach General Plan from 1996, which explains that the location of major oil drilling areas are considered to have subsidence potential (Huntington Beach, 1996). The highest amount of subsidence in the city has been measured in the area that corresponds to the Huntington Beach Oil

Field in the central coast portion of the city. Based on the figures shown within the Natural and Environmental Hazard Element of the updated General Plan, the amount of observed subsidence decreases roughly radially outward from the location of the oil field. Based on Figure HAZ-4, the subject site is located in a zone of subsidence designated as 0 to -0.1 inch, or the lowest possible hazard level shown on the figure. Subsidence is not considered to be a hazard at this site.

3.10 Static Settlement

Some settlement may be expected due to consolidation of the of onsite soils caused by the load of fill required to reach proposed grade, combined with the limitations of remedial grading resulting from the high groundwater levels on the site. Due to the size of the fuel tanks and amount of time they were on the site prior to removal, the areas where the tanks were located, are not likely to settle, but the adjacent tank basin bottoms are subject to settlement, causing possible differential settlement for improvements spanning these two areas.

Impacts from static settlement may be mitigated using combinations of remedial site removals and surcharging (as described in section 3.4.3), post-tensioned or reinforced mat foundations, geogrid, piles, and ground improvements (described in section 3.5.5.1). Settlement in the area will be monitored until primary settlement is complete. After primary settlement is complete, construction may begin.

As there are many options available for controlling or redistributing loads on the underlying soils, static settlement due to loading is not considered a significant hazard to the site.

3.11 Expansive Soils

Expansive soils expand with increases in moisture content and shrink with decreases in moisture content, and clayey soils are most susceptible to expansion and contraction. The upper site soils consist of fill and axial channel deposits that contain expansive soils. These upper soils consist of varying proportions of sand, silt, and clay, which through laboratory testing performed as a part of EEI's geotechnical investigation, indicate the expansion potential is medium.

Per the Mass Grading Exhibit, 94,500 cubic yards of material will be imported to the site to achieve design grades (Fuscoe, 2018). Impacts of expansive soils on structures can be mitigated by importing soils that have a very low to low expansion potential. In the event expansive soils are used to cap the proposed lots, mitigation can include using post-tensioned or reinforced mat foundations designed in accordance with the latest adopted edition of the California Building Code (CBC, 2016), and the Post Tension Institute Slab-On-Ground design section referenced in the CBC.

Expansive soils are common throughout southern California and a variety of techniques are available to control the potential effects from flexing ground. The optimum technique(s) will be determined based on input from the geotechnical consultant, structural engineer, foundation engineer, general contractor and others and employed during site improvement. As such, expansive soils are not considered at significant hazard to the site.

3.12 Corrosivity of Soils

A severely corrosive designation will occur when any of the following conditions exist: the soil contains more than 500 ppm of chlorides, more than 2,000 ppm (0.2 percent) of sulfates, a minimum resistivity of less than 1,000 ohm-centimeters, or a pH of 5.5 or less. Based on the reviewed report, site soils generally have a negligible soluble sulfate content, meaning they are negligible to moderately corrosive to concrete. They are considered severely corrosive to ferrous metals and have a pH that indicates samples are slightly to moderately alkaline.

Though not a major constraint to construction, corrosive soils can add additional time and cost to site development in order to protect construction materials that come in contact with corrosive soils. At the completion of grading, site specific testing should be performed to verify these preliminary results. Concrete and metal in direct contact with underlying soils, should be designed in accordance with the latest adopted edition of the California Building Code (CBC, 2016) and applicable sections of ACI publication 318 (ACI, 2014). A corrosion engineer should provide the final recommendations for concrete design mix and protection of buried metals, as necessary.

3.13 Soil Erosion

Erosion can be caused by wave action, wind moving soil particles, surface runoff, and sea level rise. Due to the anticipated finished grade elevation of the site, wave action and sea level rise will not be a factor for site erosion. However, the rate of erosion due to wind and surface runoff can increase as land is cleared and disturbed during development if proper measures are not taken to mitigate these effects.

During grading operations, we anticipate there will be material imported to the site for the purpose of raising the grades to the proposed design configuration, as well as surcharging the existing underlying fill and alluvial material in order to compact it in areas where removals are precluded by the groundwater elevation. This stock piling of import as well as fill placement, foundation excavation, and utility installation will cause temporary disturbance to site soils, but during these grading operations, it is assumed that the development will be in compliance with Chapter 33 of the California Building Code (CBC), the City of Huntington Beach Grading and Excavation Code, and the State Water Resources Control Board (SWRCB), all of which will require measures that minimize the impacts of construction with respect to erosion.

For the past several decades, the subject site has been used as a fuel storage tank facility. The previous "tank farm" development included clearing the majority of the area of topsoil and vegetation, which is considered to be a disturbed state. After construction of this development is complete, improvements including roads, flatwork, and landscaping will render the site significantly less impacted by erosion than it was during its past use. Soil erosion is not considered a significant hazard as a result of this development.

4.0 CONCLUSIONS AND RECOMMENDATIONS

From a geotechnical perspective, the future development should include the following types of considerations prior to grading and construction:

- Prior to issuance of a grading permit, a geotechnical report evaluating the existing geotechnical conditions as they pertain to the final design must be submitted to and approved by the City's geotechnical reviewers. The report shall specify mitigation measures for potential liquefaction, slope displacement, lateral spread, and static settlement, and provide recommendations for foundation designs based on the results of these analyses plus the field and laboratory studies.
- Geotechnical observation and testing must be performed during grading and construction operations, to ensure that mitigation measures are properly implemented in the field.
- All other relevant building code requirements must be met.

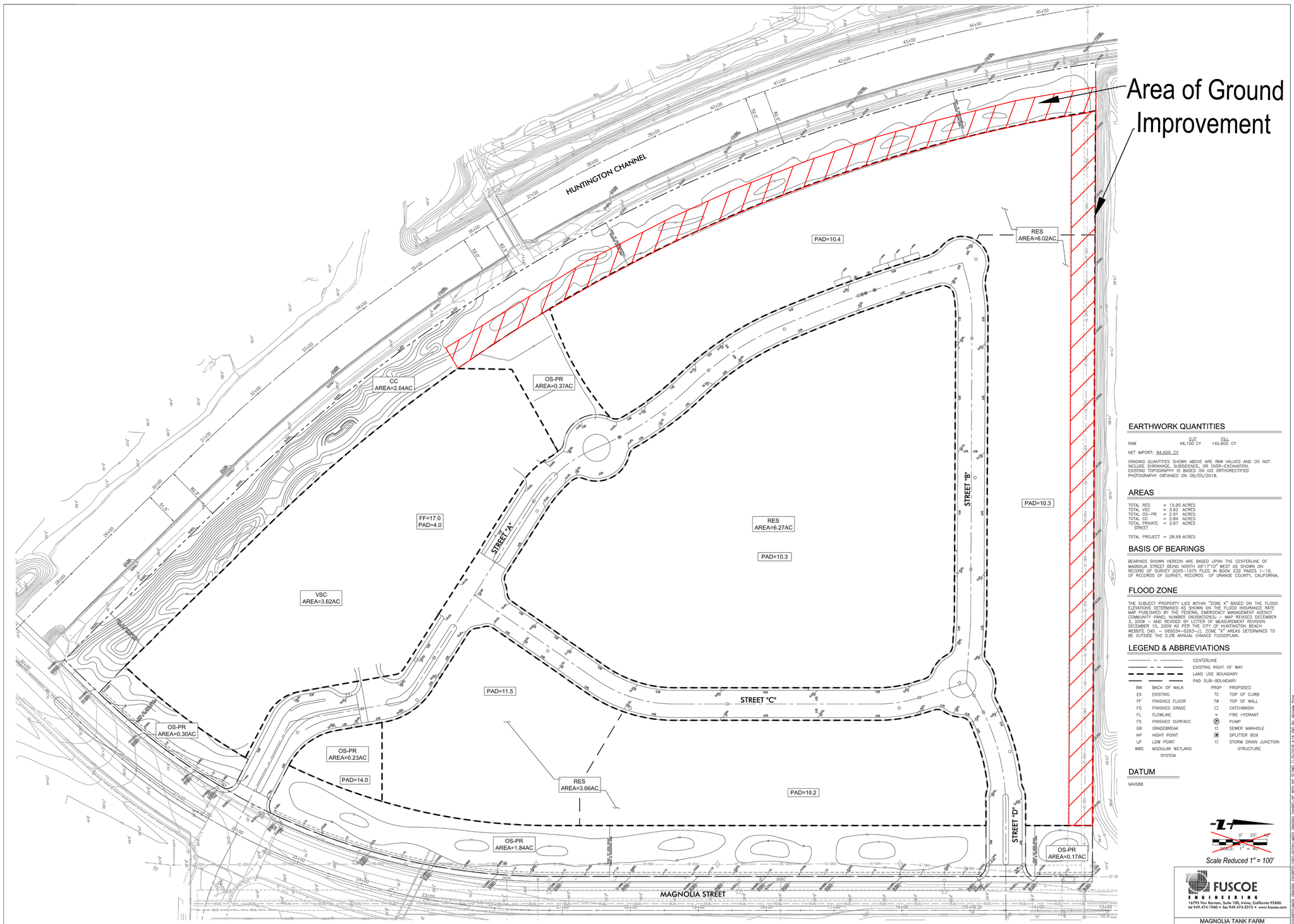
If these conditions are met, it is our conclusion that the development of this 29-acre site will result in a geotechnically stable project, which will not have a negative impact on any of the adjacent streets, residential developments, or flood channel.

5.0 LIMITATIONS

Our geotechnical/geologic services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control.



EARTHWORK QUANTITIES

	CUT	FILL
RAW	46,100 CY	140,600 CY

NET IMPORT: 94,500 CY

GRADING QUANTITIES SHOWN ABOVE ARE RAW VALUES AND DO NOT INCLUDE SHRINKAGE, SUBSIDENCE, OR OVER-EXCAVATION. EXISTING TOPOGRAPHY IS BASED ON GIS ORTHORECTIFIED PHOTOGRAPHY OBTAINED ON 09/05/2018.

AREAS

TOTAL RES = 15.95 ACRES
TOTAL VSC = 3.62 ACRES
TOTAL OS-PR = 2.91 ACRES
TOTAL OS = 2.84 ACRES
TOTAL PRIVATE STREET = 3.67 ACRES

TOTAL PROJECT = 28.99 ACRES

BASIS OF BEARINGS

BEARINGS SHOWN HEREON ARE BASED UPON THE CENTERLINE OF MAGNOLIA STREET BEING NORTH 00°17'10" WEST AS SHOWN ON RECORD OF SURVEY 2005-1075 FILED IN BOOK 232 PAGES 1-10, OF RECORDS OF SURVEY, RECORDS OF ORANGE COUNTY, CALIFORNIA.

FLOOD ZONE

THE SUBJECT PROPERTY LIES WITHIN "ZONE X" BASED ON THE FLOOD ELEVATIONS DETERMINED AS SHOWN ON THE FLOOD INSURANCE RATE MAP PUBLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY COMMUNITY PANEL NUMBER 06059C0263J - MAP REVISED DECEMBER 3, 2009 - AND REVISED BY LETTER OF MEASUREMENT REVISION DECEMBER 15, 2009 AS PER THE CITY OF HUNTINGTON BEACH WEBSITE (NO. - 065034-0263-J). ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.

LEGEND & ABBREVIATIONS

CENTERLINE
EXISTING RIGHT OF WAY
LAND USE BOUNDARY
PAD SUB-BOUNDARY

BW	BACK OF WALK	PROP	PROPOSED
EX	EXISTING	TC	TOP OF CURB
FF	FINISHED FLOOR	TW	TOP OF WALL
FG	FINISHED GRADE		CATCHBASIN
FL	FLOWLINE		FIRE HYDRANT
FS	FINISHED SURFACE	P	PUMP
GB	GRADEBREAK		SEWER MANHOLE
HP	HIGHT POINT		SPLITTER BOX
LP	LOW POINT		STORM DRAIN JUNCTION STRUCTURE
MWS	MODULAR WETLAND SYSTEM		

DATUM

NAVD88

0' 20' 40'
SCALE 1" = 40'

Scale Reduced 1" = 100'

FUSCOE ENGINEERING
16795 Von Karman, Suite 100, Irvine, California 92606
tel 949.474.1960 • fax 949.474.5315 • www.fuscoe.com

MAGNOLIA TANK FARM
MASS GRADING EXHIBIT
SUPER PAD & INTERIOR STREETS
HUNTINGTON BEACH, CA

JANUARY 5, 2017

F:\PROJECTS\1393\07\CAD\BTS\MMS GRADING EXHIBIT\1393-07FIN-MMS GRADING EXHIBIT.DWG 1/5/2018 4:15 PM By: Michelle Price

Area of Ground Improvement Location Map
21845 Magnolia Street
Huntington Beach, California

PLATE 1

LGC Valley, Inc.
2420 Grand Avenue, Suite F2
Vista, CA 92081
TEL. (760) 599-7000 FAX (760) 599-7007

PROJECT NAME	Magnolia Tank Farm
PROJECT NO.	1640011-01
ENG. / GEOL.	TJL/MS
SCALE	1" = 100'
DATE	November, 2018

APPENDIX A

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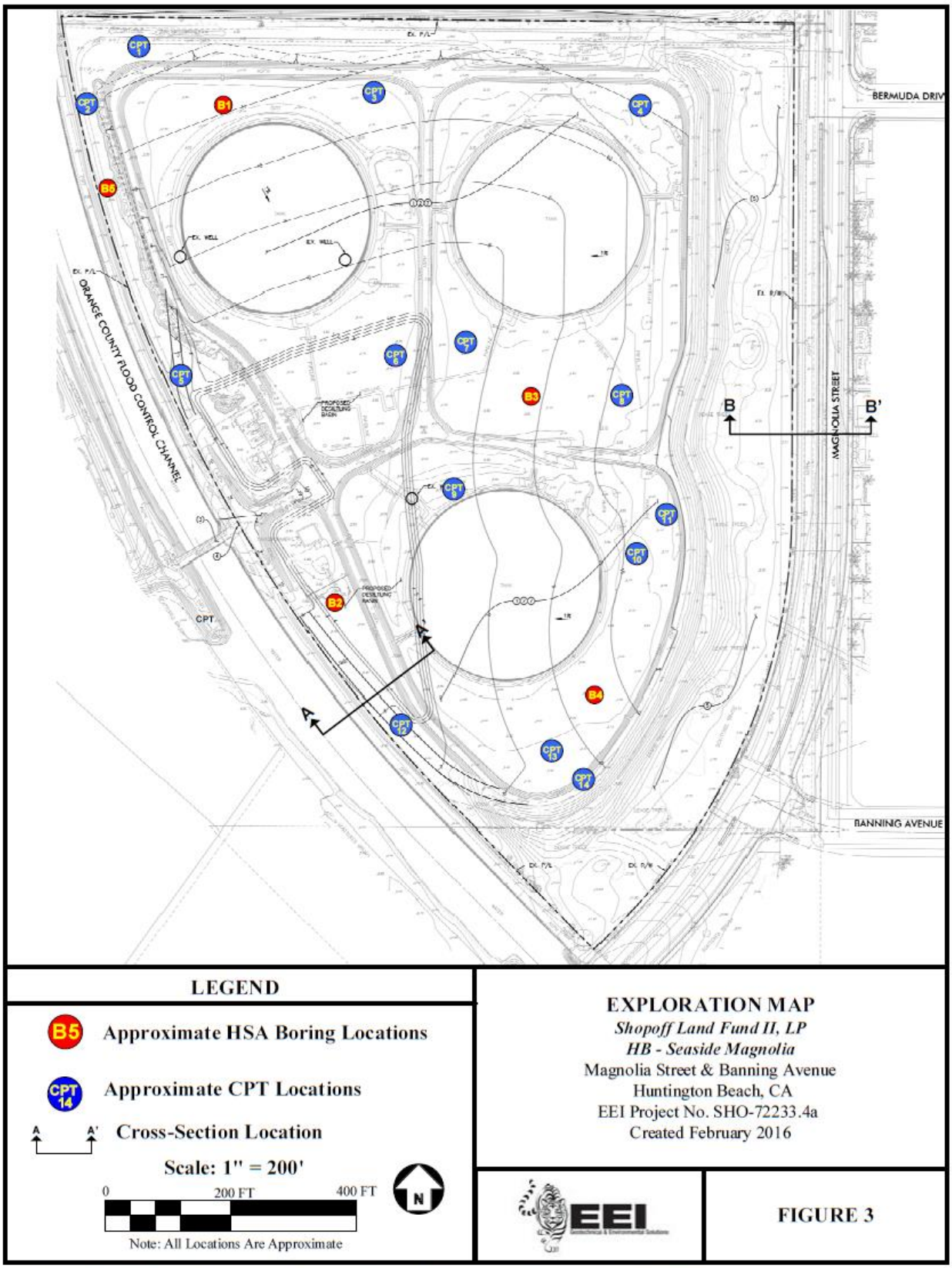
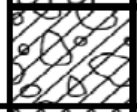
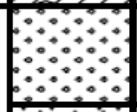
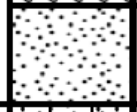
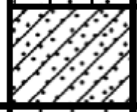
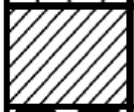
APPENDIX B

<u>Exploration Map, Boring Logs, and CPT Logs</u>
<u>by EEI Geotechnical and Environmental Solutions</u>



Source: Fuscoe Engineering, Preliminary Site Plan, Magnolia Street, Huntington Beach, Ca. dated 12/11/2015

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SEIVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION REATINED ON NO. 4 SEIVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS,GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY-SANDS, SAND – SILT MIXTURES
				SC	CLAYEY SANDS, SAND – CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

BORING NUMBER B-1

CLIENT Shopoff Land Fund II, LP
PROJECT NAME HB-Seaside Magnolia
PROJECT NUMBER SHO-72233.4
PROJECT LOCATION Magnolia St. & Banning Ave., Huntington Beach, CA
DATE STARTED 1/14/16 **COMPLETED** 1/14/16
GROUND ELEVATION 4.5 feet **BORING DIAMETER** 6-inch
EQUIPMENT / RIG L-10-T Track Rig
HAMMER EFFICIENCY (%) 68
METHOD 140 lb Auto Hammer
SPT CORRECTION 1.13 **CAL CORRECTION** 0.62
LOGGED BY BM **CHECKED BY**
GROUNDWATER DEPTH (ft) 5
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0		**FILL**										
1		SILTY-CLAY, dark gray-brown, very moist, soft	CL-ML									
2				BULK								
3		**YOUNG AXIAL CHANNEL DEPOSITS**		SPT	1 2 1	3		49				
4		@ 2.5' CLAY, brownish-gray and orange mottled, very moist to wet, soft; calcium carbonate stringers	CL									
5												
6		@ 5' SILTY-CLAY, dark gray-brown, wet, soft; groundwater encountered; push with spt sampler	CL-ML	SPT	P P P	0						
7												
8		@ 7.5' SILTY-SAND, dark gray, very fine grained, wet, loose; common marine shell fragments		SPT	2 2 3	6						
9												
10				SPT	3 4 4	9						
11			SM									
12												
13												
14												
15		@ 15' SAND, dark gray fine to medium grained, trace silt, medium dense; trace marine shell fragments		SPT	4 8 13	24					3	SA
16												
17			SP									
18												
19												
20		@ 20' SILTY-SAND, dark gray, very fine grained, wet, loose; abundant marine shell fragments		SPT	8 11 13	27					19	WS
21												
22												
23												
24												
25		@ 25' Becomes dense	SM	SPT	6 13 15	32						
26												
27												
28												
29												
30		@ 30' Decrease to trace marine shell fragments		SPT	3 14 27	46						
31												

(Continued Next Page)

GEOTECH LOG - COLUMNS BORING LOGS.GPJ GINT STD US LAB.GDT 2/17/16

BORING NUMBER B-1

CLIENT Shopoff Land Fund II, LP **PROJECT NAME** HB-Seaside Magnolia

PROJECT NUMBER SHO-72233.4 **PROJECT LOCATION** Magnolia St. & Banning Ave., Huntington Beach, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
32		@ 20' SILTY-SAND, dark gray, very fine grained, wet, loose; abundant marine shell fragments *(continued)*										
33												
34												
35		@ 35' No sample recovered		NR	10 23 33	35						
36												
37												
38												
39												
40				SPT	10 17 25	48						
41			SM									
42												
43												
44												
45				SPT	11 19 22	46						
46												
47												
48												
49												
50				SPT	5 13 24	42						
51												

Total depth: 51.5-feet
Groundwater encountered @ 5-feet
Boring backfilled with bentonite grout

GEOTECH LOG - COLUMNS BORING LOGS.GPJ GINT STD US LAB.GDT 2/17/16

BORING NUMBER B-2

CLIENT Shopoff Land Fund II, LP
PROJECT NAME HB-Seaside Magnolia
PROJECT NUMBER SHO-72233.4
PROJECT LOCATION Magnolia St. & Banning Ave., Huntington Beach, CA
DATE STARTED 1/14/16 **COMPLETED** 1/14/16
GROUND ELEVATION 5 feet **BORING DIAMETER** 6-inch
EQUIPMENT / RIG L-10-T Track Rig
HAMMER EFFICIENCY (%) 68
METHOD 140 lb Auto Hammer
SPT CORRECTION 1.13 **CAL CORRECTION** 0.62
LOGGED BY BM **CHECKED BY**
GROUNDWATER DEPTH (ft) 6
NOTES

DEPTH (ft)	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0	**FILL**										
1	SANDY-SILT with CLAY, mixed brown, very moist, loose	ML									
2			BULK								COR
3	**YOUNG AXIAL CHANNEL DEPOSITS**		SPT	5 4 4	9		46				
4	@ 2.5' CLAY, brownish-gray and orange mottled, very moist to wet, soft; calcium carbonate stringers	CL									
5	@ 5' SILTY-CLAY, dark gray-brown, wet, soft; shelby tube push										
6	▼ @ 6' Groundwater encountered	CL-ML	SH	1300psi							CON DS
7											
8	@ 7.5' SILTY-SAND, dark gray, trace clay, very fine grained, wet, medium dense; common marine shell fragments		SPT	2 4 7	12						
9											
10	@ 10' Becomes loose; trace marine shell fragments		SPT	3 3 3	7						
11											
12											
13											
14											
15	@ 15' Becomes dense		SPT	7 10 17	31					14	WS
16											
17											
18											
19		SM									
20	@ 20' Increase to abundant marine shell fragments		SPT	8 13 19	36						
21											
22											
23											
24											
25	@ 25' No sample recovered; drill to 27' and re-sampled		NR	14 23 24	29						
26											
27			SPT	14 31 38	78						
28											
29											
30	@ 30' Decrease to trace marine shell fragments		SPT	5 17 27	50						
31											

GEOTECH LOG - COLUMNS BORING LOGS.GPJ GINT STD US LAB.GDT 2/17/16

(Continued Next Page)

BORING NUMBER B-2

CLIENT Shopoff Land Fund II, LP **PROJECT NAME** HB-Seaside Magnolia

PROJECT NUMBER SHO-72233.4 **PROJECT LOCATION** Magnolia St. & Banning Ave., Huntington Beach, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
32		@ 32" SILTY-SAND, dark gray, trace clay, very fine grained, wet, dense; common marine shell fragments	SM									
33												
34												
35		@ 35' No sample recovered		NR	23 18 23	26						
36												

Total depth: 36.5-feet
Groundwater encountered @ 6-feet
Refusal while sampling; heaving sands
Boring backfilled with bentonite grout

GEOTECH LOG - COLUMNS BORING LOGS.GPJ GINT STD US LAB.GDT 2/17/16

BORING NUMBER B-3

CLIENT Shopoff Land Fund II, LP
PROJECT NAME HB-Seaside Magnolia
PROJECT NUMBER SHO-72233.4
PROJECT LOCATION Magnolia St. & Banning Ave., Huntington Beach, CA
DATE STARTED 1/15/16 **COMPLETED** 1/15/16
GROUND ELEVATION 5 feet **BORING DIAMETER** 6-inch
EQUIPMENT / RIG L-10-T Track Rig
HAMMER EFFICIENCY (%) 68
METHOD 140 lb Auto Hammer
SPT CORRECTION 1.13 **CAL CORRECTION** 0.62
LOGGED BY BM **CHECKED BY**
GROUNDWATER DEPTH (ft) 5
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0		**FILL**										
1		ELASTIC SILT, dark gray-brown, very moist, very soft	MH									
2				BULK						32:66	94	COR
3		**YOUNG AXIAL CHANNEL DEPOSITS**		SPT	1 1 1	2		59		28:65		
4		@ 2.5' ELASTIC SILT, brownish-gray and orange mottled, very moist to wet, very soft; calcium carbonate stringers										
5	▼		MH									
6				SH	1200psi			40		17:50		CON DS
7												
8		@ 7.5' SILTY-SAND, dark gray, very fine grained, wet, medium dense; abundant marine shell fragments		SPT	4 6 7	15					13	WS
9												
10				SPT	2 3 9	14						
11			SM									
12												
13												
14												
15		@ 15' SAND with SILT, dark gray, very fine grained, wet, dense; decrease to scattered marine shell fragments		SPT	6 11 16	31					9	SA
16												
17												
18												
19												
20				SPT	8 12 20	36						
21												
22												
23			SP-SM									
24												
25				SPT	9 16 22	43						
26												
27												
28												
29												
30		@ 30' Decrease to trace marine shell fragments		SPT	6 16 23	44						
31												

GEOTECH LOG - COLUMNS BORING LOGS.GPJ GINT STD US LAB.GDT 2/17/16

(Continued Next Page)

BORING NUMBER B-3

CLIENT Shopoff Land Fund II, LP **PROJECT NAME** HB-Seaside Magnolia

PROJECT NUMBER SHO-72233.4 **PROJECT LOCATION** Magnolia St. & Banning Ave., Huntington Beach, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
32		@ 32' SILTY-SAND, dark gray, very fine grained, wet, dense; abundant marine shell fragments	SM									
35				SPT	4 12 26	43						
40				SPT	2 7 27	39						
45		@ 45' Becomes very dense		SPT	11 28 47	85						
50				SPT	16 30 46	86						

Total depth: 51.5-feet
Groundwater encountered @ 5-feet
Boring backfilled with bentonite grout

GEOTECH LOG - COLUMNS BORING LOGS.GPJ GINT STD US LAB.GDT 2/17/16

BORING NUMBER B-4

CLIENT Shopoff Land Fund II, LP
PROJECT NAME HB-Seaside Magnolia
PROJECT NUMBER SHO-72233.4
PROJECT LOCATION Magnolia St. & Banning Ave., Huntington Beach, CA
DATE STARTED 1/15/16 **COMPLETED** 1/15/16
GROUND ELEVATION 5 feet **BORING DIAMETER** 6-inch
EQUIPMENT / RIG L-10-T Track Rig
HAMMER EFFICIENCY (%) 68
METHOD 140 lb Auto Hammer
SPT CORRECTION 1.13 **CAL CORRECTION** 0.62
LOGGED BY BM **CHECKED BY**
GROUNDWATER DEPTH (ft) 6
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0		**FILL**										
1		SILTY-CLAY, dark gray-brown, very moist, soft	CL-ML									
2				BULK								
3		**YOUNG AXIAL CHANNEL DEPOSITS**		SPT	1 2 2	5						
4		@ 2.5' CLAY, brownish-gray and orange mottled, very moist to wet, soft; calcium carbonate stringers	CL									
5		@ 5' SILTY-CLAY, dark gray-brown, wet, soft; shelby tube push		SH	1700psi							
6	▼	@6' Groundwater encountered at 6-feet	CL-ML									
7												
8		@ 7.5' SILTY-SAND, dark gray, very fine grained, wet, loose; abundant marine shell fragments	SM	SPT	2 3 6	10					28	WS
9												
10		@ 10' SAND with SILT, dark gray, very fine grained, wet, medium dense; trace marine shell fragments		SPT	1 4 6	11					8	SA
11												
12												
13												
14												
15		@ 15' Becomes dense		SPT	8 17 26	49						
16												
17												
18			SP-SM									
19												
20				SPT	7 14 29	49						
21												
22												
23												
24												
25				SPT	10 15 25	45						
26												

Total depth:26.5-feet
Groundwater encountered @ 6-feet
Refusal while sampling; heaving sands
Boring backfilled with bentonite grout

GEOTECH LOG - COLUMNS BORING LOGS.GPJ GINT STD US LAB.GDT 2/17/16

BORING NUMBER B-5

CLIENT Shopoff Land Fund II, LP
PROJECT NAME HB-Seaside Magnolia
PROJECT NUMBER SHO-72233.4
PROJECT LOCATION Magnolia St. & Banning Ave., Huntington Beach, CA
DATE STARTED 1/15/16 **COMPLETED** 1/15/16
GROUND ELEVATION 4.7 feet **BORING DIAMETER** 6-inch
EQUIPMENT / RIG L-10-T Track Rig
HAMMER EFFICIENCY (%) 68
METHOD 140 lb Auto Hammer
SPT CORRECTION 1.13 **CAL CORRECTION** 0.62
LOGGED BY BM **CHECKED BY**
GROUNDWATER DEPTH (ft) 7
NOTES

DEPTH (ft)	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0	**FILL**										
1	SILTY-CLAY, dark gray-brown, very moist, stiff	CL-ML									
2			BULK								
3	**YOUNG AXIAL CHANNEL DEPOSITS**		MC	4 4 5	6		41	81	14:46	97	SA
4	@ 2.5' SILT, brownish-gray and orange mottled, very moist to wet, soft; calcium carbonate stringers										
5		ML									
6	@ 5' shelby tube push		SH	1900psi							
7	@ 7' Groundwater encountered at 7-feet										
8	@ 7.5' SILTY-SAND with CLAY, dark gray, very fine grained, wet, loose; abundant marine shell fragments	SC-SM	SPT	2 3 5	9						
9											
10	@ 10' SILTY-SAND, dark gray, very fine grained, wet, loose; common marine shell fragments		SPT	2 3 3	7					20	SA
11											
12											
13											
14											
15	@ 15' Becomes fine to medium grained, medium dense; trace marine shell fragments	SM	SPT	2 8 13	24						
16											
17											
18											
19											
20	@ 20' SAND, dark gray, fine to medium grained, wet, loose to medium dense; common marine shell fragments		SPT	4 6 7	15						
21											
22											
23											
24											
25		SP	SPT	14 7 3	11						
26											
27											
28											
29											
30	@ 30' SILTY-SAND, dark gray, very fine grained, wet, dense; scattered marine shell fragments	SM	SPT	P 10 17	31						
31											

GEOTECH LOG - COLUMNS BORING LOGS.GPJ GINT STD US LAB.GDT 2/17/16

(Continued Next Page)

BORING NUMBER B-5

CLIENT Shopoff Land Fund II, LP **PROJECT NAME** HB-Seaside Magnolia

PROJECT NUMBER SHO-72233.4 **PROJECT LOCATION** Magnolia St. & Banning Ave., Huntington Beach, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
32		@ 30' SILTY-SAND, dark gray, very fine grained, wet, dense; scattered marine shell fragments*(continued)*										
33												
34												
35				SPT	14 15 20	40						
36												
37												
38												
39												
40				SPT	12 20 21	46						
41			SM									
42												
43												
44												
45				SPT	10 19 19	43						
46												
47												
48												
49												
50		@ 50' SILTY-CLAY, dark gray, wet, very stiff	CL-ML	SPT	5 6 10	18						
51												

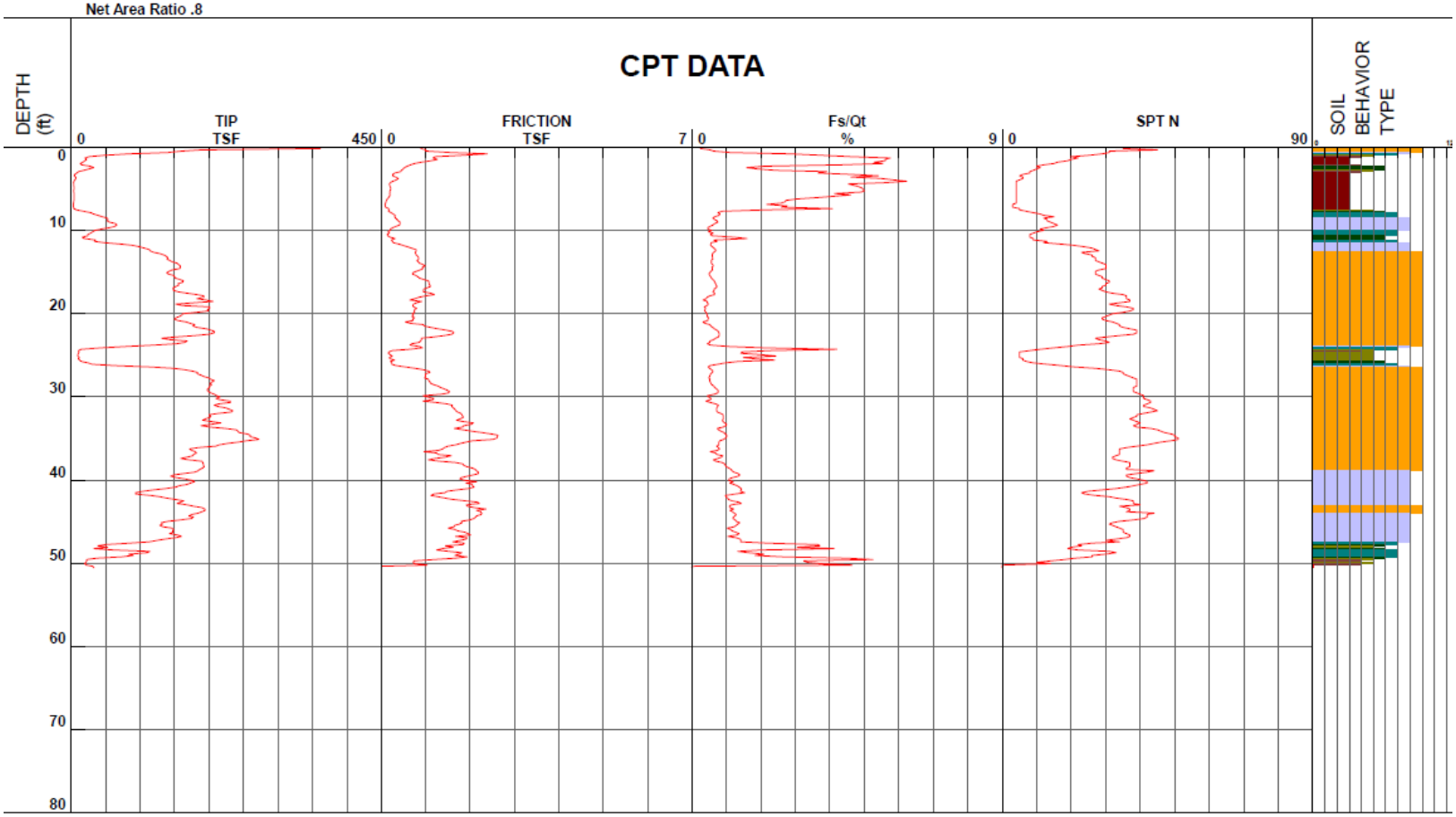
Total depth: 51.5-feet
Groundwater encountered @ 7-feet
Boring backfilled with bentonite grout

GEOTECH LOG - COLUMNS BORING LOGS.GPJ GINT STD US LAB.GDT 2/17/16

EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(020).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-01	Date and Time	1/15/2016 8:41:23 AM	Maximum Depth	50.52 ft
EST GW Depth During Test		3.10 ft			

Net Area Ratio .8



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

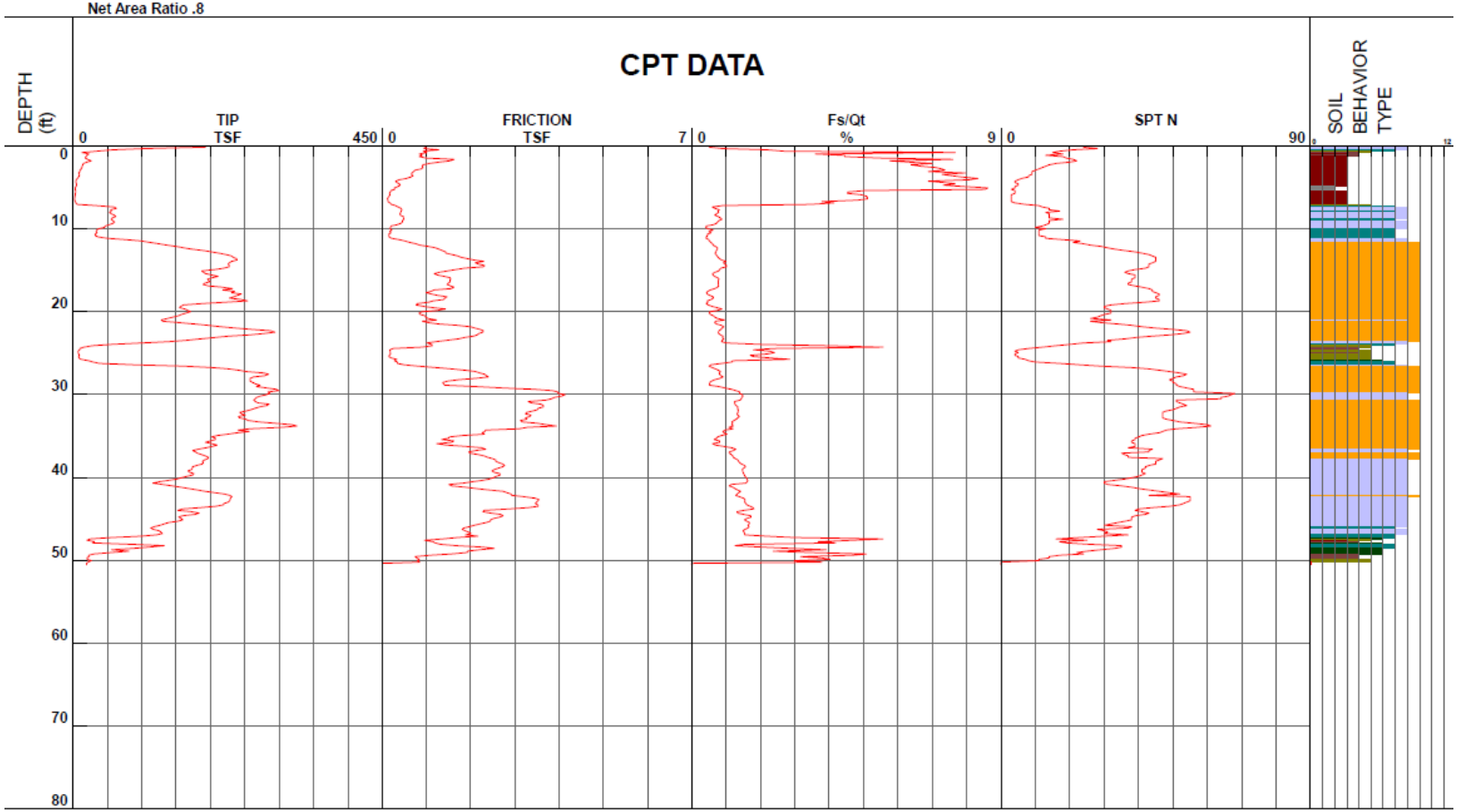
Cone Size 10cm squared

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

EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(019).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-02	Date and Time	1/15/2016 7:55:34 AM	Maximum Depth	50.52 ft
EST GW Depth During Test		5.47 ft			

Net Area Ratio .8



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

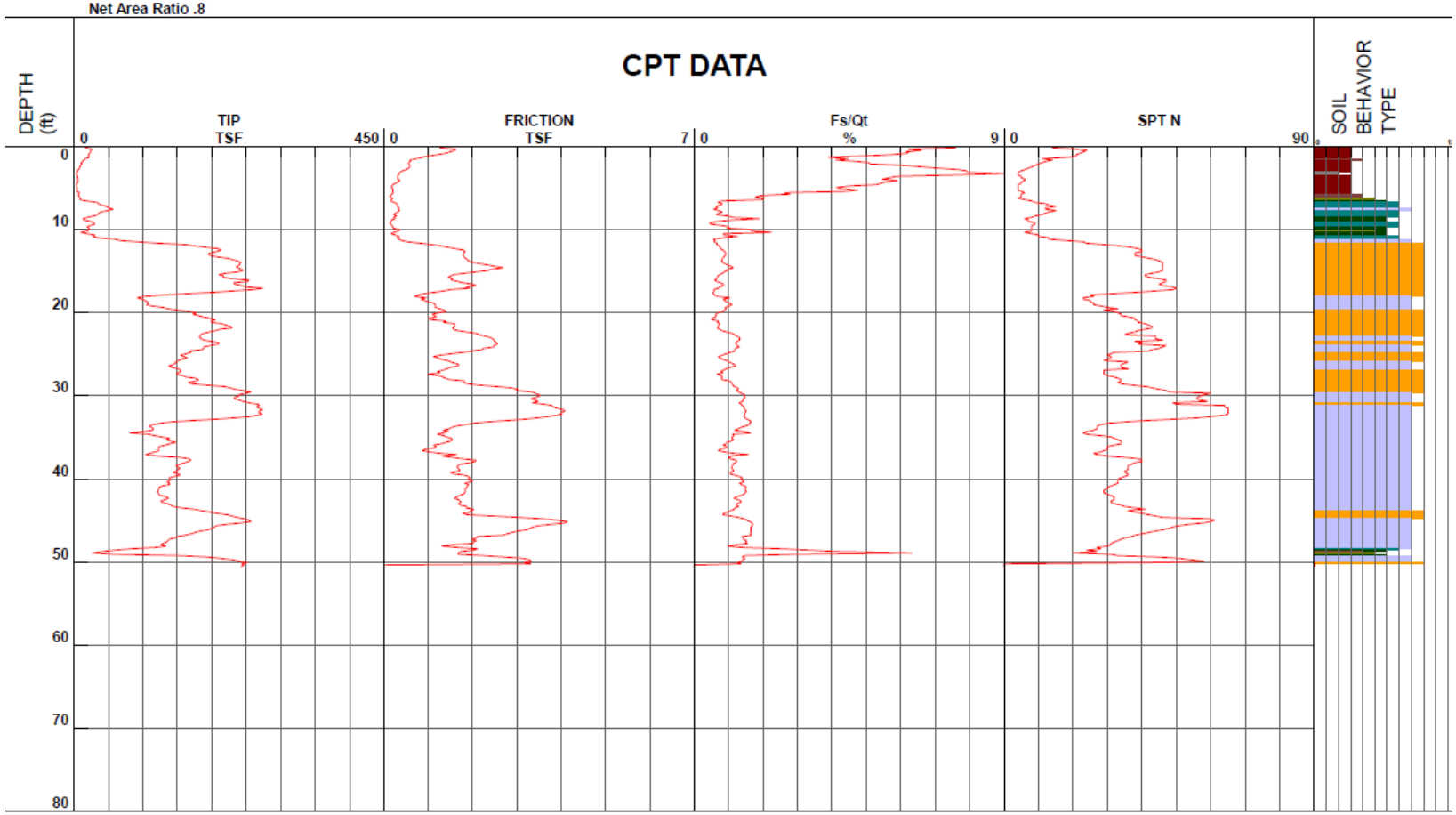
Cone Size 10cm squared

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

EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(027).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-03	Date and Time	1/15/2016 2:59:41 PM	Maximum Depth	50.52 ft
EST GW Depth During Test		0.40 ft			

Net Area Ratio .8



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

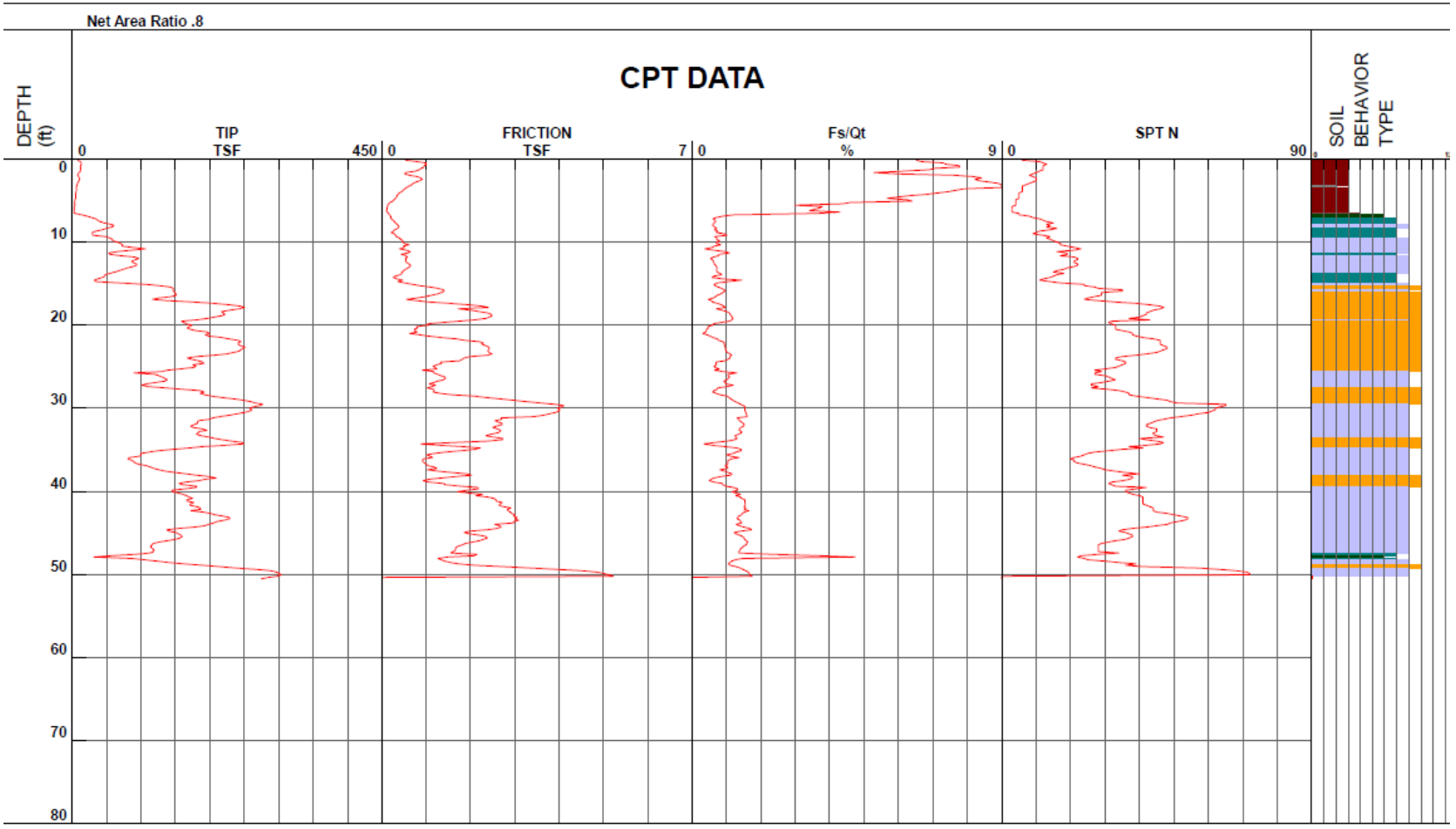
Cone Size 10cm squared

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

EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(028).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-04	Date and Time	1/15/2016 3:46:17 PM	Maximum Depth	50.52 ft
EST GW Depth During Test		1.35 ft			

Net Area Ratio .8

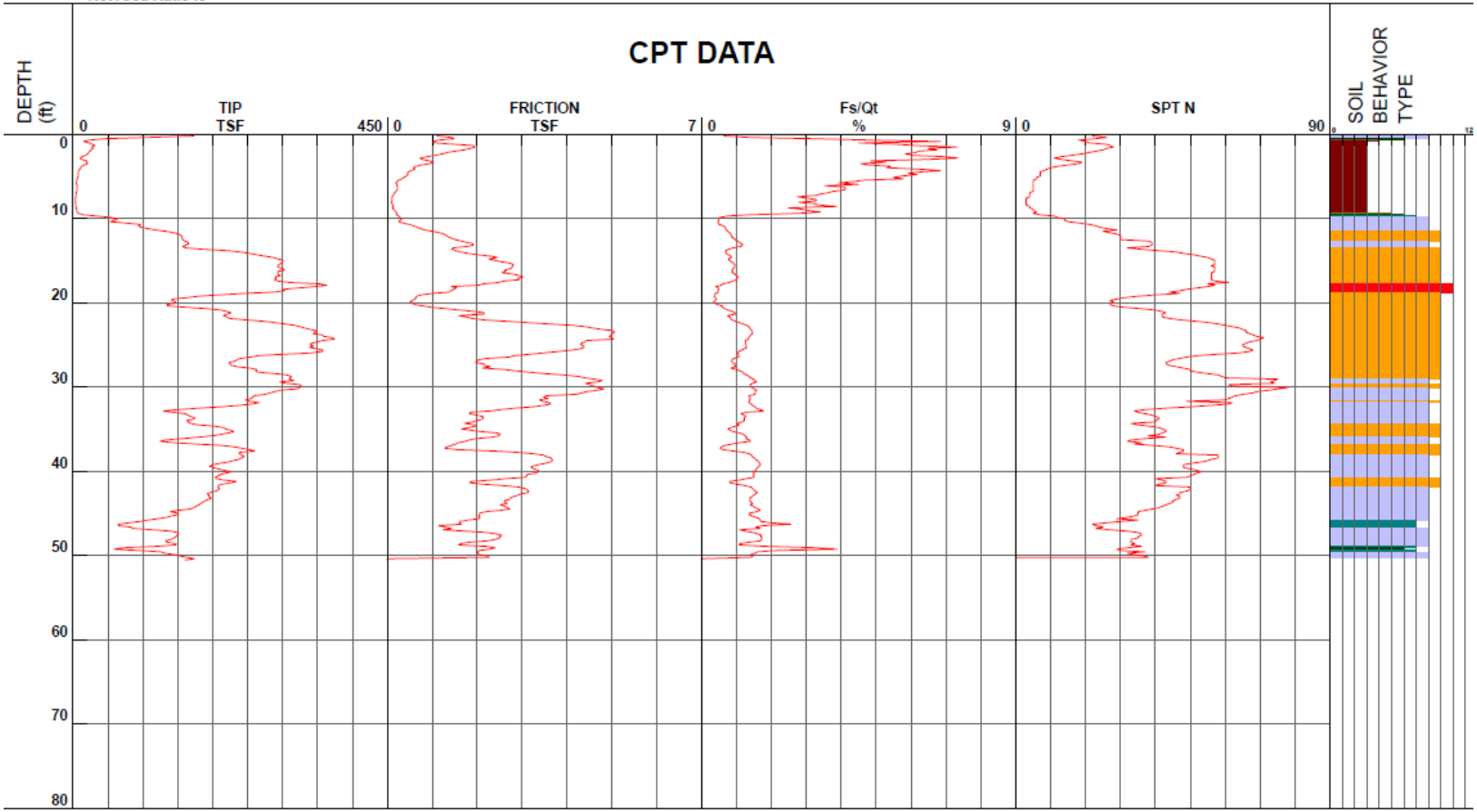


1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(021).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-05	Date and Time	1/15/2016 9:38:05 AM	Maximum Depth	50.52 ft
EST GW Depth During Test		3.00 ft			

Net Area Ratio .8



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

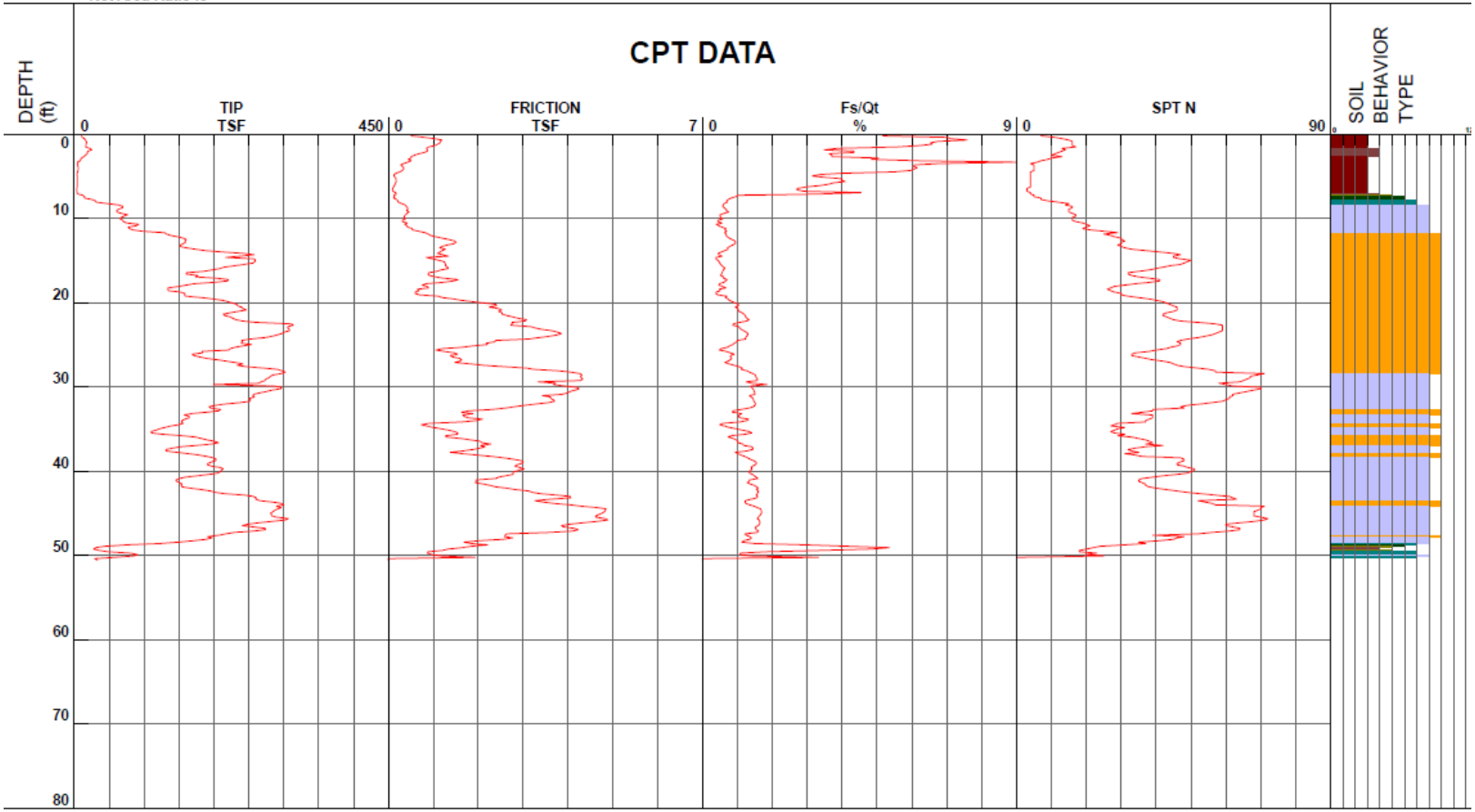
Cone Size 10cm squared

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

EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(026).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-06	Date and Time	1/15/2016 2:13:37 PM	Maximum Depth	50.52 ft
EST GW Depth During Test		1.70 ft			

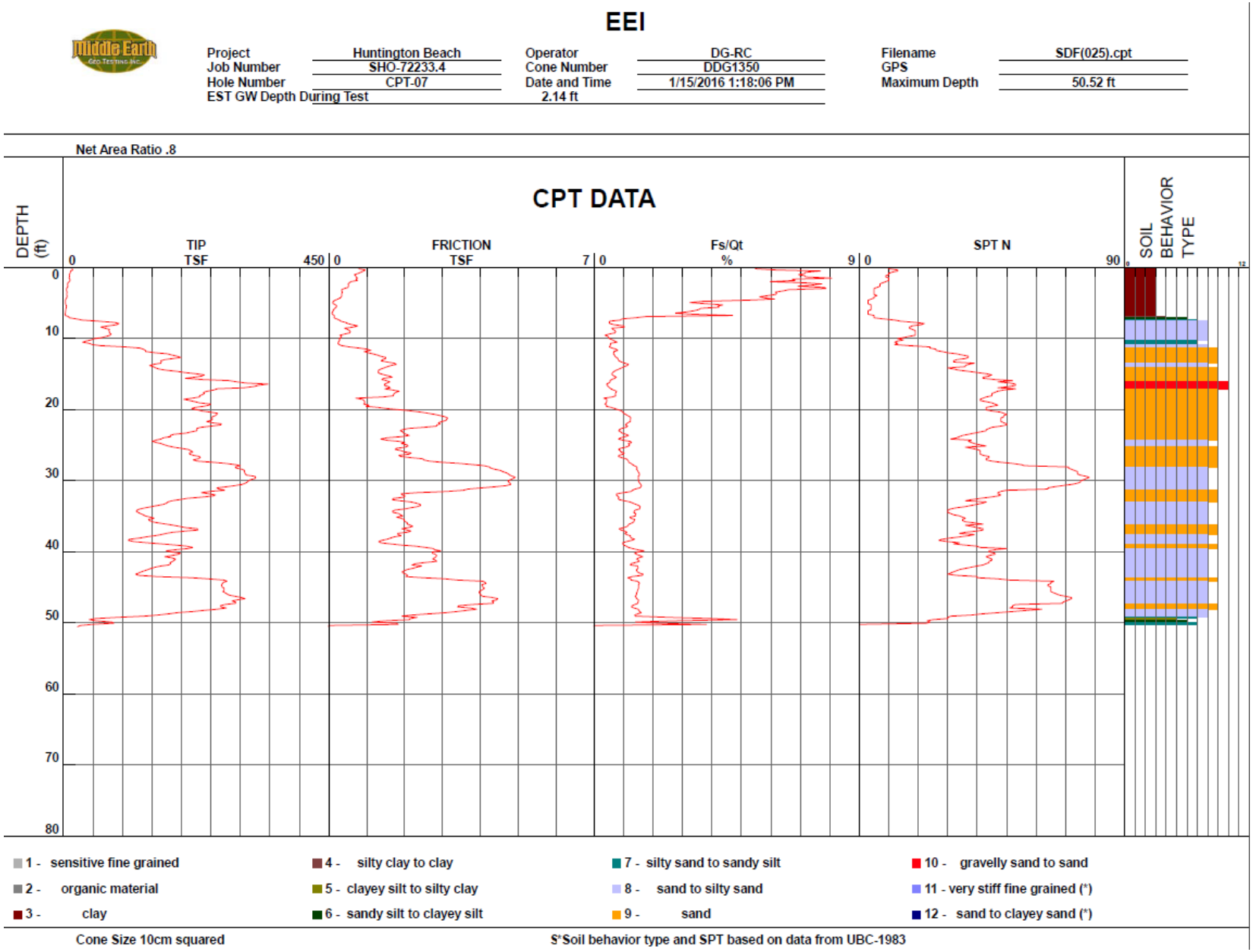
Net Area Ratio .8



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

Cone Size 10cm squared

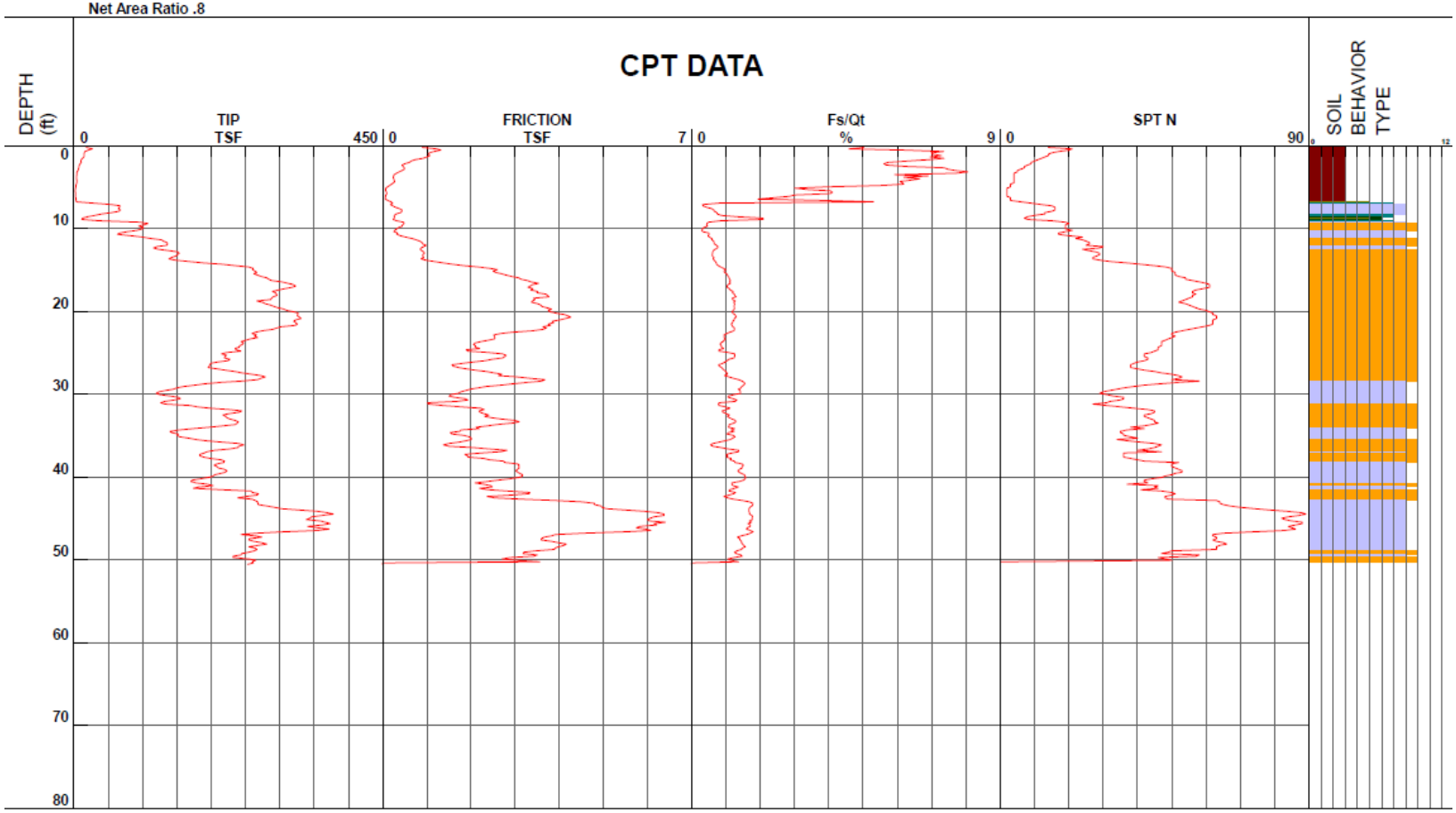
S*Soil behavior type and SPT based on data from UBC-1983


EEI
Project
Huntington Beach
Job Number
SHO-72233.4
Hole Number
CPT-07
EST GW Depth During Test
2.14 ft
Operator
DG-RC
Cone Number
DDG1350
Date and Time
1/15/2016 1:18:06 PM
Filename
SDF(025).cpt
GPS
Maximum Depth
50.52 ft
Net Area Ratio .8
CPT DATA
DEPTH (ft)
TIP TSF
FRICTION TSF
Fs/Qt %
SPT N
SOIL BEHAVIOR TYPE
1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)
Cone Size 10cm squared
S*Soil behavior type and SPT based on data from UBC-1983

EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(013).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-08	Date and Time	1/14/2016 11:03:43 AM	Maximum Depth	50.52 ft
EST GW Depth During Test		5.10 ft			

Net Area Ratio .8



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

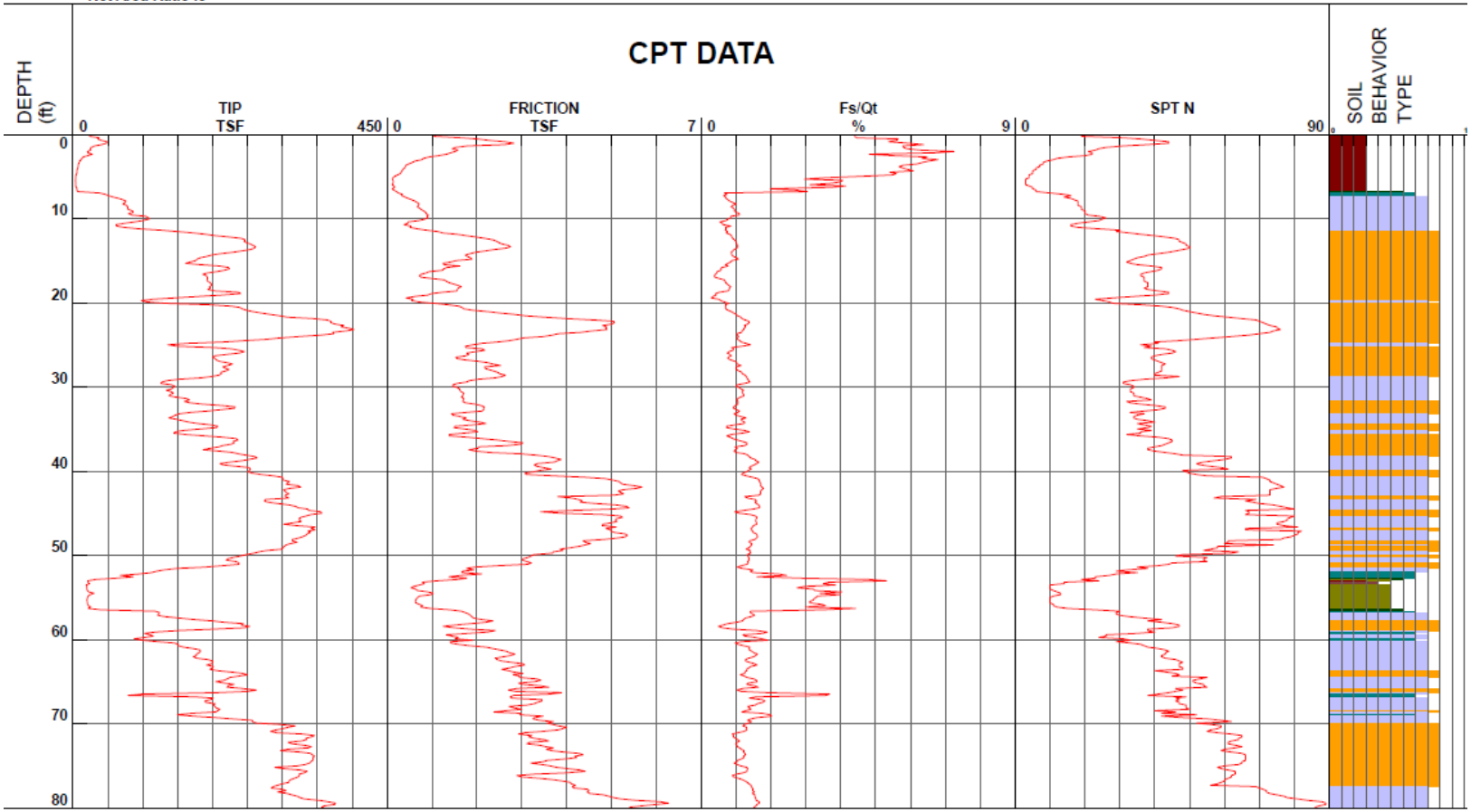
Cone Size 10cm squared

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

EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(015).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-09	Date and Time	1/14/2016 12:35:23 PM	Maximum Depth	80.54 ft
EST GW Depth During Test	2.80 ft				

Net Area Ratio .8



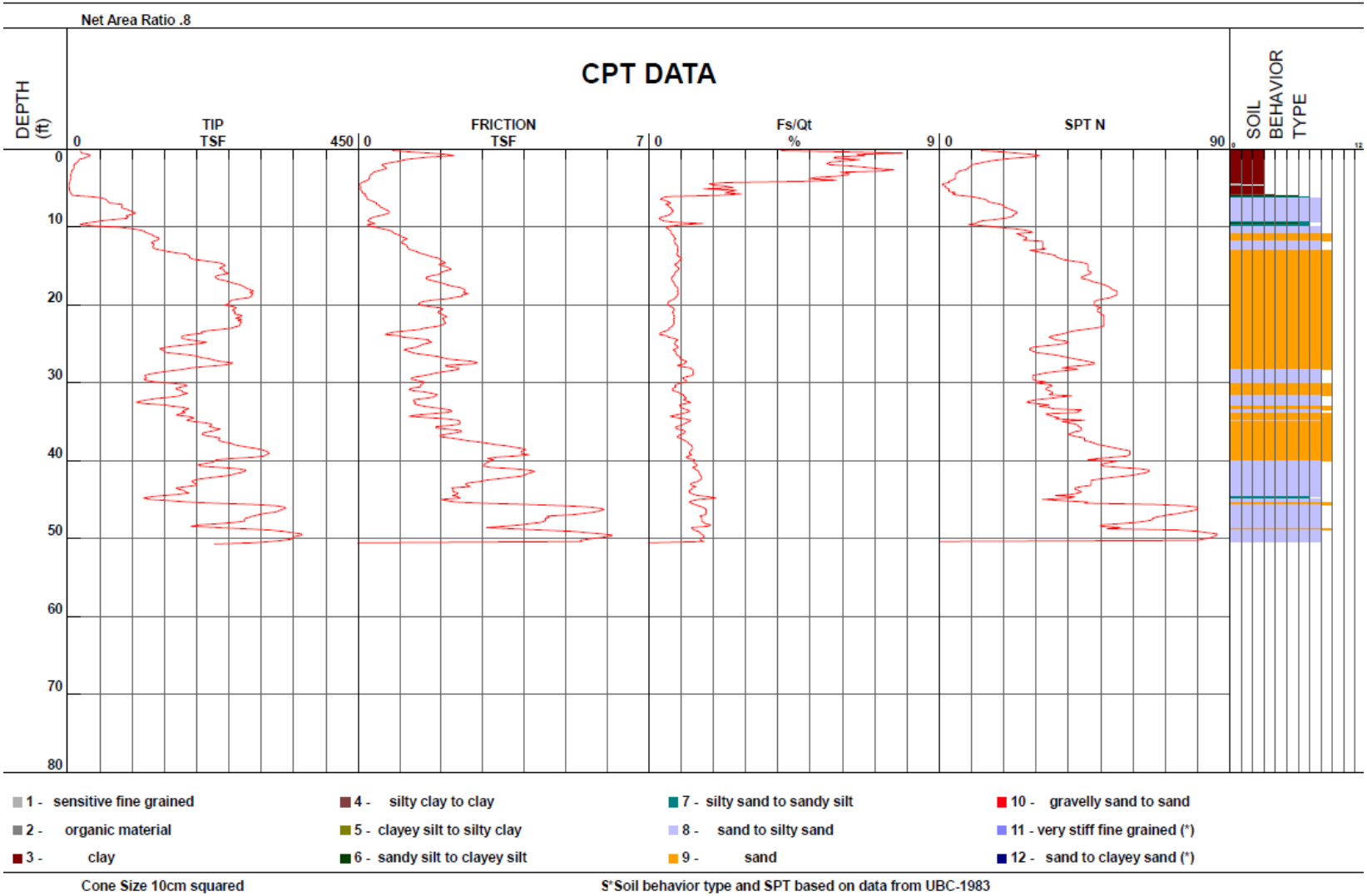
1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

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

EEI

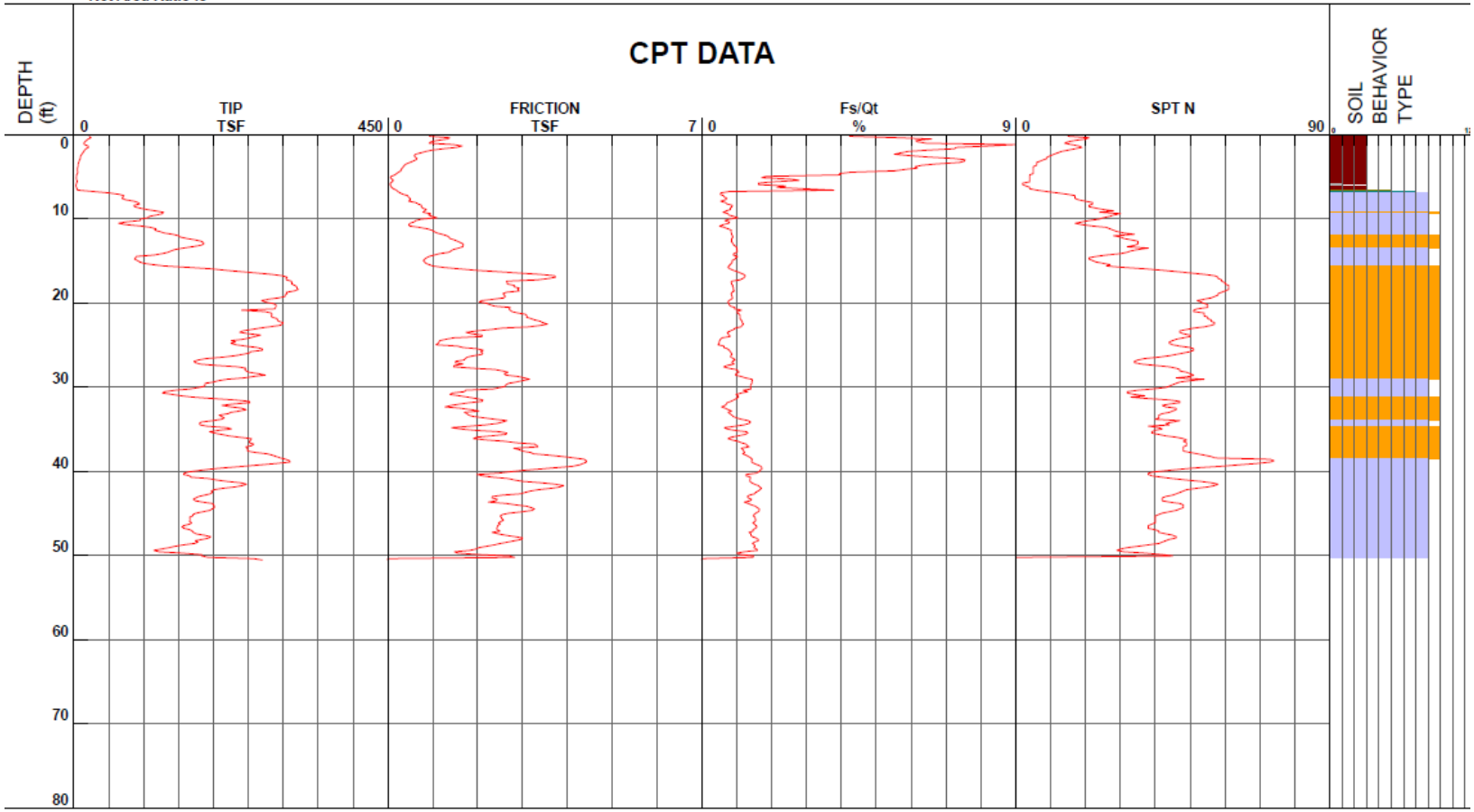
Project	Huntington Beach	Operator	DG-RC	Filename	SDF(023).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-10	Date and Time	1/15/2016 11:33:37 AM	Maximum Depth	50.69 ft
EST GW Depth During Test		2.58 ft			



EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(022).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-11	Date and Time	1/15/2016 10:19:30 AM	Maximum Depth	50.52 ft
EST GW Depth During Test		3.40 ft			

Net Area Ratio .8



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

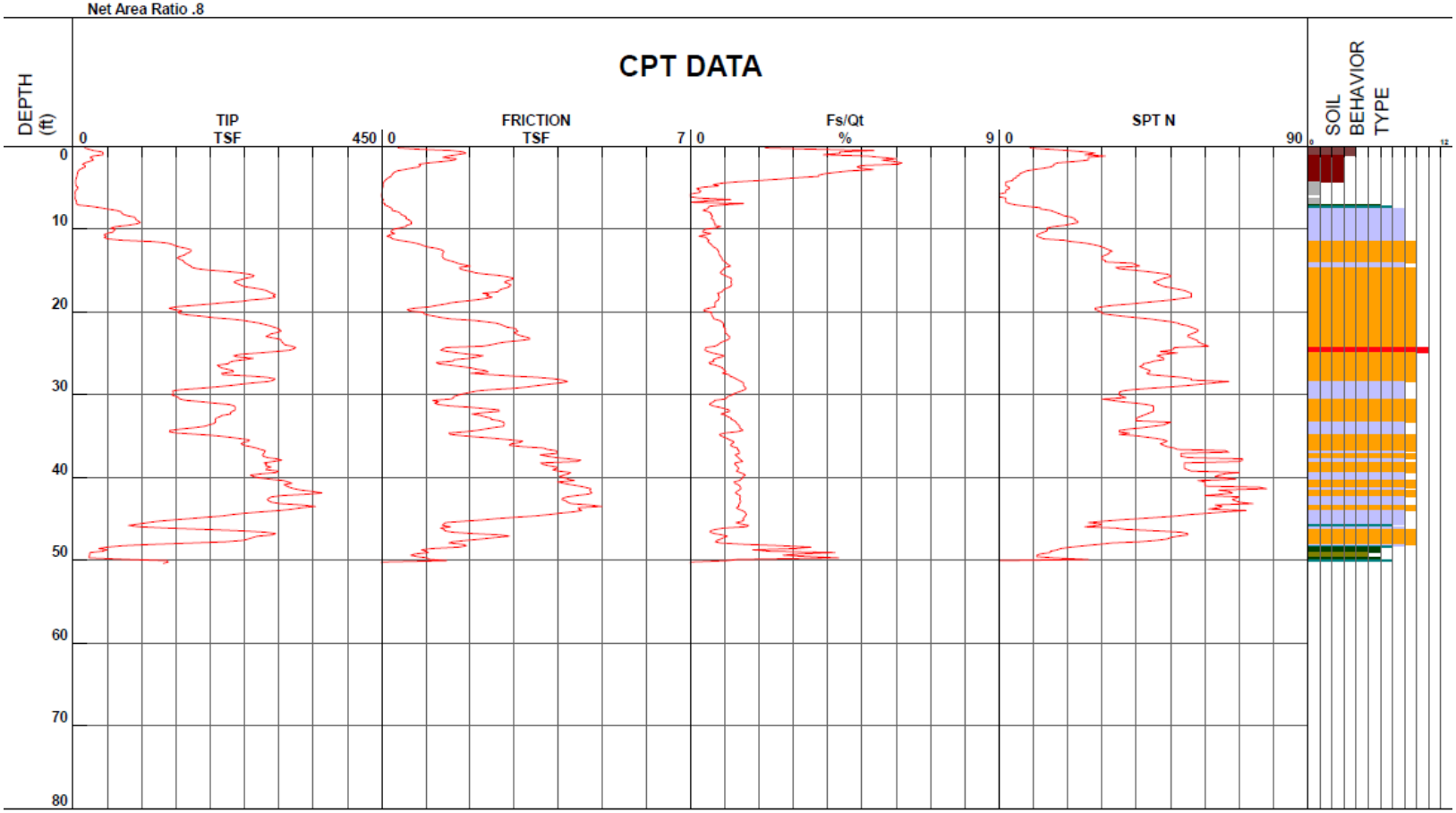
Cone Size 10cm squared

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

EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(018).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-12	Date and Time	1/14/2016 3:50:48 PM	Maximum Depth	50.36 ft
EST GW Depth During Test		0.66 ft			

Net Area Ratio .8



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

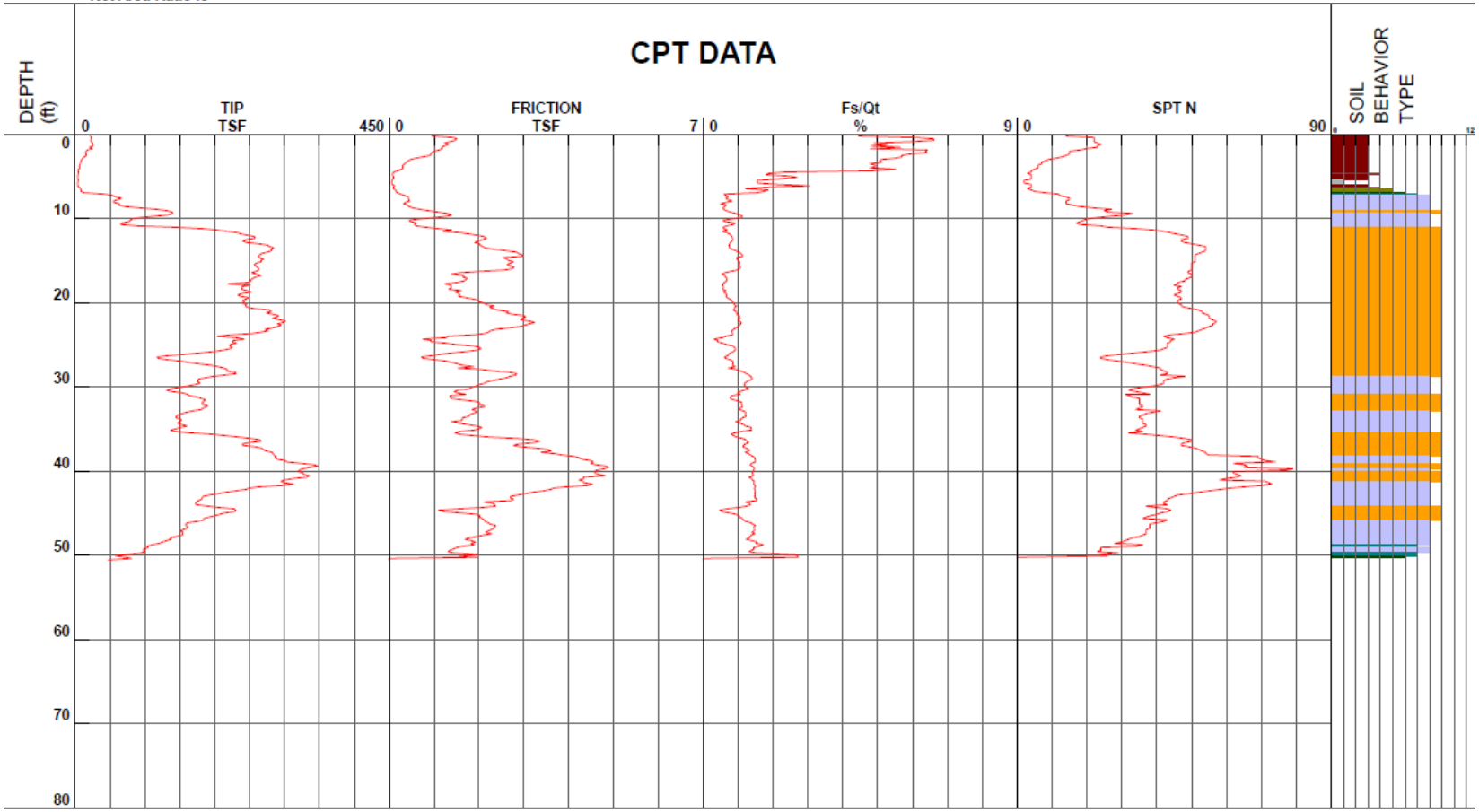
Cone Size 10cm squared

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

EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(024).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-13	Date and Time	1/15/2016 12:19:55 PM	Maximum Depth	50.52 ft
EST GW Depth During Test		0.62 ft			

Net Area Ratio .8



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

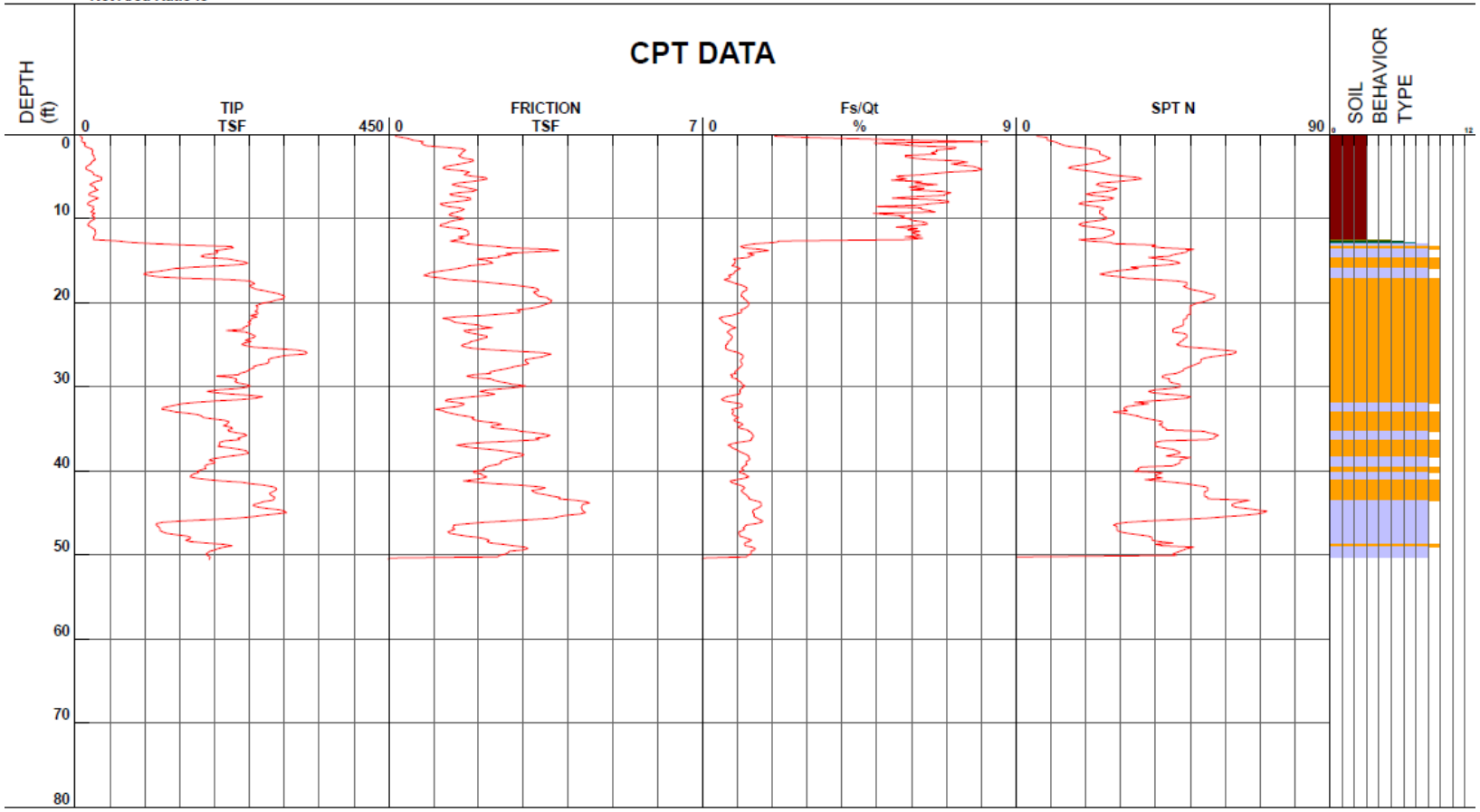
Cone Size 10cm squared

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

EEI

Project	Huntington Beach	Operator	DG-RC	Filename	SDF(017).cpt
Job Number	SHO-72233.4	Cone Number	DDG1350	GPS	
Hole Number	CPT-14	Date and Time	1/14/2016 2:49:09 PM	Maximum Depth	50.52 ft
EST GW Depth During Test		9.40 ft			

Net Area Ratio .8



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

Cone Size 10cm squared

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