APPENDIX D1-D5

Geotechnical Reports

APPENDIX D1

60% DESIGN DEVELOPMENT REPORT

GEOTECHNICAL REPORT
PUMP STATION AND CUT & COVER SECTIONS
MORENA PUMP STATION, WW FORCE MAIN, AND BRINE/CENTRATE CONVEYANCE PREDESIGN (NC01)

SAN DIEGO, CALIFORNIA

Prepared for

City of San Diego
Public Utilities Department
San Diego, California

September 19, 2017
AECOM Project No. 60530732

Prepared by

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September 19, 2017

Ms. Laila Nasrawi
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Subject: 60% Design Development Report
Geotechnical Report
Pump Station and Cut & Cover Sections
Morena Pump Station, WW Force Main, and
Brine/Centrate Conveyance Predesign (NC01)
San Diego, California
AECOM Project No. 60530732

Dear Ms. Nasrawi:

AECOM Technical Services Inc. (AECOM) has prepared this Geotechnical Report to support the 60 percent Design Development for Morena Pump Station and the cut and cover portions of the pipeline for the above referenced project. This report provides the findings from previous and recent subsurface explorations, a discussion of geologic and geotechnical conditions, and conclusions and recommendations pertaining to the geotechnical aspects of design and construction.

The purpose of this report is to provide geologic and geotechnical information for 60% design of the Morena Pump Station, connections with the existing sewer main, and the cut and cover pipeline sections. Results of field subsurface explorations completed to date are described in this report. The report will be supplemented based on additional explorations planned within the pump station property limits once the property is available for ongoing design. Geotechnical and geologic conclusions and recommendations related to fault hazards and the specific tunneled portions of the pipeline alignment are presented under separate cover.

We appreciate the opportunity to work with you on this project. If you have any questions, please contact us.

Sincerely,

AECOM Technical Services, Inc.

Steven M. Fitzwilliam, G.E. 2501
Principal Geotechnical Engineer

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Principal Engineering Geologist

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LIST OF ACRONYMS AND ABBREVIATIONS

AECOM	AECOM Technical Services, Inc.
ASCE	American Society of Civil Engineers
ASTM	ASTM International, formerly American Society for Testing and Materials
bgs	below ground surface
BMPs	Best Management Practices
CBC	California Building Code
CDSM	Cement Deep Soil Mixing
CGS	California Geological Survey
CPTs	Cone Penetration Tests
CRR	cyclic resistance ratio
CSM	Cutter Soil Mixing
CSR	cyclic stress ratio
EI	Expansion Index
EPA	Environmental Protection Agency
EQFZ	Earthquake Fault Zone
FS	Factor of Safety
ft	feet
g	Gravitational Acceleration
IBC	International Building Code
MCE	Maximum Considered Earthquake
mgd	million gallons per day
MPS	Morena Pump Station
MWWD	Metropolitan Waste Water Department
NCWPF	North City Water Purification Facility
NCWRP	North City Water Reclamation Plant
NGVD 29	National Geodetic Mean Datum of 1929
NPDES	National Pollutant Discharge Elimination System
OCPs	organochlorine pesticides
PCBs	polychlorinated biphenyls
pcf	pounds per cubic foot
PGA	Peak Ground Acceleration
pci	pounds per cubic inch
PLWTP	Point Loma Wastewater Treatment Plant
psf	pounds per square foot
PVC	polyvinyl chloride
RCFZ	Rose Canyon Fault Zone
SAM	Site Assessment and Mitigation
SPT	Standard Penetration Test
SVOC	semi-volatile organic compound
TPH	total petroleum hydrocarbons
URS	URS Corporation
USA	Underground Service Alert
USGS	United States Geological Survey
VOCs	volatile organic compounds
WW	Wastewater

1.0 INTRODUCTION

This geotechnical report prepared by AECOM Technical Services, Inc. (AECOM) supports 60% Design Development for the Morena Pump Station (MPS), Wastewater (WW) Force Main, and Brine/Centrate Conveyance Predesign (NC01) Project ("Project") for Pure Water San Diego. Specifically, the report provides a summary of geotechnical conditions and design considerations for the Morena Pump Station, connections to the existing sewer main (including tunnels) via diversion structure pipelines, and the cut-and-cover (open trench) portions of the pipeline alignments. Geotechnical recommendations for the design and construction of the project are provided. The planned locations of the pump station and pipelines are shown on Figure 1.

This report does not address the fault hazards associated with the project, or the tunnel crossings at Interstate-805 (I-805), San Clemente Canyon, and Rose Creek/North County Transit District (NCTD) Railroad Crossing that are proposed for portions of the pipeline alignments. The field explorations for the tunnel crossings and fault investigation are discussed below as they are related to the other portions of the alignment as well; however, these topics are addressed in greater detail under separate cover (Faulting Report and Tunnel Report).

1.1 PROJECT DESCRIPTION

The planned Project will convey an average of 37.7 million gallons per day (mgd) of raw wastewater to the North City Water Reclamation Plant (NCWRP). Wastewater will be conveyed from MPS via a new 48-inch-diameter force main approximately 10.7 miles north to NCWRP. A new 30-inch-diameter brine/centrate pipeline will convey 13.5 mgd of brine/centrate (generated from the North City Water Purification Facility [NCWPF]) south, by gravity flow (by way of MPS) for treatment at the Point Loma Wastewater Treatment Plant (PLWTP). The brine/centrate line will run parallel to the force main in a joint trench for approximately 95 percent of the overall alignment. A detailed description of the Project is provided in the Draft Final Design Development Basis of Design Report. A summary of the planned foundations and below-grade features is provided below as it relates to the geotechnical considerations discussed in this report.

The layout of the primary components of the Morena Pump Station is shown on Figure 2. The planned finished grade for the Morena Pump Station is approximately Elevation 16 feet Natinal Geodetic Vertical Datum of 1929 (NGVD 29). The Intake Screening Building has a planned bottom of foundation elevation of -18.25 feet, which will require an approximate excavation depth of 34 feet. The Pump Station Building will require an excavation depth of about 51 feet to accommodate the foundation (bottom elevation of -32.5 feet NGVD 29) and underlying base layer. The Energy Dissipator Structure has a planned bottom of foundation elevation of -7.33 feet NGVD 29, which will require an excavation of about 25 feet deep. Other supporting facilities, including the Electrical Building, Maintenance Building, transformers, Odor Control structures and High Purity Oxygen Injection Skid will be constructed at or near finished grade.

The general alignment of the wastewater and brine/centrate pipelines is shown on Figure 1. Shorter stretches of cut-and-cover pipeline and jack and bore installation will be constructed extending south of the planned pump station site to connect with existing infrastructure. The planned pipe invert depths for the cut-and-cover portions of the pipelines generally range from 10 to 30 feet below grade.

1.2 SUBSURFACE INFORMATION

The conclusions and recommendations presented in this report are based on previous data performed by others and additional subsurface data collected by AECOM as part of the ongoing geotechnical investigation.

Previous studies include the “Desktop Geotechnical Study Report, Pure Water Program Task 7, Morena Pump Station, WW Force Main and Brine Conveyance Pre-Design, City of San Diego” prepared by Allied Geotechnical Engineers (Allied, 2015), as well as other geotechnical reports available in AECOM’s files. The references reviewed are listed in Section 7 of this report. The geotechnical evaluation also included a review of published geologic maps, and City and County of San Diego hazard maps.

1.2.1 Current Subsurface Explorations

The field explorations for this 60% Design phase of the project were conducted between March and August 2017. Field explorations and geologic reconnaissance were performed for the tunnel crossings, the pump station, the diversion structure, and the trench portions of the alignment.

1.2.1.1 Summary

AECOM prepared a Safe Work Plan for our work prior to commencing our field investigation. Underground Service Alert was notified prior to advancing all the borings.

Logs of the borings are provided in Appendix A, which also provides details of the field exploration program. A summary of the borings is provided as Table A-1 in Appendix A. The borings were numbered based on spacing along the project alignment. Some of the planned boring locations were eliminated based on nearby available information or due to utility conflicts, and therefore the numbering of the borings is not sequential.

1.2.1.2 Pump Station

The initial explorations were focused at the Morena Pump Station to investigate the general subsurface and ground conditions, as well as the potential for fault hazards. Three soil borings PS-1 through PS-3 were advanced around the perimeter of the MPS. Boring PS-2 was converted to a monitoring well. Boring logs are attached to this report. Cone Penetration Tests (CPTs) were also performed around the perimeter of the pump station site; CPT logs are provided in the Faulting Report. Approximate locations of the borings and CPTs adjacent to the MPS are shown on Figure 2. Due to access restrictions, recent explorations for the pump station were performed in the streets around the perimeter of the site. Additional explorations are planned within the pump station property once access to the site is available.

The borings were extended to depths ranging between 61.5 and 81 feet. Drilling was performed with a truck-mounted drill rig equipped to drill with hollow-stem augers methods. The test borings were drilled, logged, sampled and backfilled under supervision of an AECOM engineering geologist. The borings were located in the City right-of-way in accordance with City Traffic Control Permits. The borings were backfilled in accordance with County of San Diego

Department of Environmental Health requirements, and the surfaces were restored with concrete to match existing conditions.

1.2.1.3 Tunnel Borings

Borings were advanced for the four originally planned tunnel crossings, including the I-805 tunnel crossing, the Rose Creek/NCTD tunnel crossing, the San Clemente Canyon tunnel crossing, and the Tecolote Creek tunnel crossing. The Tecolote Creek tunnel crossing has been modified to be a conventional cut and cover (open trench) construction crossing. The field investigation for the tunnels consisted of advancing eight exploratory borings (EX-1; RC-1, RC-2, RC-3 and RC-4; and SC-1, SC-2 and SC-3) and collecting soil/core samples for more detailed review and laboratory testing. The field investigation for the tunnel crossings is described in more detail in our tunnel report.

The borings for the Tecolote Creek crossing (TC-1 and TC-2) were drilled to depths 96.5 feet. Drilling was performed with a truck-mounted drill rig equipped to drill with hollow-stem augers and mud rotary drilling methods. Hollow-stem auger methods were used until groundwater was encountered. Mud rotary drilling methods were used below the groundwater. Test borings were drilled, logged, sampled and backfilled under supervision of an AECOM engineering geologist.

These borings were located in the City right-of-way in accordance with City Traffic Control Permits. Monitoring wells were constructed and borings were backfilled in accordance with County of San Diego Department of Environmental Health requirements. Disturbed surfaces were restored to match existing conditions.

1.2.1.4 Cut-and-Cover (Open Trench)

AECOM advanced 67 borings along the Morena Pipeline alignment where conventional cut-and-cover, open trenching methods are planned for construction of the force main, the water main, and the smaller water lines. The borings were extended to depths up to 19.5 or 20 feet. Drilling was performed with truck-mounted drill rigs equipped to drill with hollow-stem auger methods. The test borings were drilled, logged, sampled and backfilled under supervision of an AECOM engineering geologist or engineer. The borings were located in the City right-of-way in accordance with City Traffic Control Permits. The borings were backfilled with a combination of soil cuttings and hydrated bentonite. The surface was capped with concrete.

1.2.1.5 Diversion Structures

Four borings were advanced along Friars Road, south of the Morena Pump Station location, for the diversion structure tie-ins. The borings were extended to depths ranging between 20 and 61.5 feet. Drilling was performed with a truck-mounted drill rig equipped to drill with hollow-stem augers methods. The test borings were drilled, logged, sampled and backfilled under supervision of an AECOM engineer. The borings were located in the City right-of-way in accordance with City Traffic Control Permits. The borings were backfilled in accordance with County of San Diego Department of Environmental Health requirements, and the surfaces were restored with concrete to match existing conditions.

1.2.2 Laboratory Testing

Geotechnical laboratory tests were performed on selected samples to aid in estimating soil properties and validate visual classifications of the materials. The tests include grain size, plasticity characteristics, strength and corrosivity. Test results are presented in Appendix B and are summarized at the corresponding sample location on the logs of the borings in Appendix A.

1.2.3 Groundwater Sampling

Groundwater sampling was performed three days after the installation of the monitoring well to evaluate the groundwater for construction dewatering and groundwater disposal. Analytical laboratory testing was performed on the selected groundwater sample for total petroleum hydrocarbons (TPH) extended range by EPA Modified Method 8015B, title 22 metals including mercury by EPA Methods 6010B and 7470A, organochlorine pesticides (OCPs) by EPA Method 8081A, polychlorinated biphenyls (PCBs) by EPA Method 8082, semi-volatile organic compounds (SVOCs) by EPA Method 8270C, and volatile organic compounds (VOCs) by EPA Method 8260B. The results of the analytical testing are presented in Appendix C.

Additional sampling and testing will be performed as the geotechnical investigation for the Project progresses and additional monitoring wells are installed within the pump station property.

1.2.4 Previous Ground Improvement

We understand that ground improvement was performed for other projects in the area south of the MPS. Stone columns were installed across the San Diego River Valley for the North Metro Interceptor Sewer to improve the ground. Stone columns may be encountered for the diversion tie-in structures. In addition, we understand that grouting may have been performed for the Mid-Coast Trolley project along Friars Road. Grouting may be encountered in the subsurface near the Diversion Structures for the Project. Records of these ground improvement projects are not available but these ground improvement projects are suspected in the area.

2.0 SITE CONDITIONS

This section of the report summarizes the site and subsurface conditions at the Morena Pump Station and along the pipeline alignments. Additional detail on geologic and seismic setting is provided in the Fault Hazard Report and the Tunnel Report

2.1 GEOLOGIC AND SEISMIC SETTING

The project physiographic/geologic setting includes the 1) former floodplain of the San Diego River and 2) upland mesas with canyons.

Historically, the San Diego River deposited thick alluvium over a broad floodplain delta extending from Old Town north along the easterly margins of Mission Bay. Land development over the years, including freeways and railroads, required raising and leveling the former floodplain surface with fill soil, locally more than 10 feet deep. Along most of the southerly reach of the planned pipeline (between Ingulf Street and Friars Road) the combined thickness of fill and alluvium is greater than pipeline trench depths, except for short reaches within the Bay Point Formation, a soft Pleistocene age sedimentary formation consisting mostly of dense sand, hard clay and gravel.

The Morena Pump Station and the southern portion of the pipeline alignment are considered to lie within the Rose Canyon Fault Zone (RCFZ). The on-shore portion of the RCFZ extends along the northeast flank of Mount Soledad at La Jolla and continues southward along the eastern margins of Mission Bay (just west of Interstate 5) towards downtown San Diego. Between Mission Bay and San Diego Bay, the zone appears to widen and diverge. Active faults (i.e. Holocene-age fault rupture) and potentially active faults (i.e. Quaternary-age fault rupture) are present in the Project area.

The RCFZ has been known for years to have the potential to produce a large damaging earthquake (M7 or greater). The pipeline and pump station will likely experience strong seismic shaking, and possibly fault rupture during their design life. The saturated alluvium below the groundwater table is potentially liquefiable under strong seismic shaking from a local or distant earthquake.

2.2 GEOLOGIC UNITS

The geologic units present across the Project alignment include fill soil, recent alluvium, Quaternary older alluvium/Bay Point Formation, and older formational materials. These units are described below. The surface geology along the planned pipeline route is shown on Figures 3a through 3e.

2.2.1 Fill

Fill soils are present at the ground surface at many locations across the Project, due to the construction of both public infrastructure and private development. Most of the Morena/West Morena Boulevard reach is underlain by varying thicknesses of fill. The fill has been placed in conjunction with land-filling along former low-lying areas, road grading and underground utility construction. Fill soils tend to be erratic mixtures of sand, clay, gravel and sometimes construction debris. The fill contains a wide range of particle sizes, up to boulder sized. The fill along the alignment is considered undocumented, i.e. compaction records are not available. The fill may have been hydraulically placed at the southern end of the alignment and in the vicinity of the pump station.

2.2.2 Alluvium

Alluvial deposits, predominantly loose to dense silty sands, clean sands and sandy gravels underlie the former floodplain areas and the inland canyon-creek crossings. The Morena/West Morena Boulevard pipeline reach is underlain by alluvium at greater depth than the pipeline. Between the Morena Pump Station and Ingulf Street, the composition of the alluvium varies considerably, with more fine-grained silts and some clays present within the alluvium near the pump station. In the vicinity of Tecolote Creek, the alluvium was characterized as loose to medium dense sand and stiff clay, although in nearby previous borings, young estuarine deposits (primarily silts and clays with some sands and organic deposits) were logged above the alluvium. Toward the northern portion of the Morena Boulevard stretch, the material below the fill may be more colluvial in nature due to its proximity to the hills to the east.

The inland natural canyons at San Clemente Creek and Rose Creek are mapped as underlain by alluvium (Kennedy, 1975). Recent borings suggest alluvium is relatively thin, less than about 15 feet thick.

2.2.3 Older Deposits and Formational Materials

The other materials present along the Project alignment, arranged from younger to older deposits, are briefly described below:

> Old Paralic Deposits (formerly called Bay Point Formation) – late to middle Pleistocene aged, marine and non-marine poorly consolidated sandstone (medium dense to very dense sand, silty sand and clayey sand, some localized zones of gravel and cobbles).
>
> Very Old Paralic Deposits (formerly called Lindavista Formation) – middle to early Pleistocene, interfingered strandline, beach, estuarine and colluvial deposits (siltstone, sandstone, conglomerate), can have strong cementation, cobbles.
>
> Stadium Conglomerate – Eocene aged, cobble conglomerate in silty sand matrix with some sandstone, strongly cemented.
>
> Friars Formation – middle to late Eocene aged, marine and non-marine sandstone, siltstone and claystone. Claystone portions can be highly expansive and prone to landslide hazards.
>
> Scripps Formation – Eocene aged, silty sandstone and sandy siltstone with occasional cobble conglomerate beds, strong cementation/concretions.
>
> Ardath Shale – lower to middle Eocene aged, sandy siltstone and claystone with local concreted zones, claystone portions are potentially expansive and prone to landslide hazards.

Old Paralic Deposits, Very Old Paralic Deposits, and Scripps Formation were encountered in borings performed for the project.

2.3 SUBSURFACE CONDITIONS – MORENA PUMP STATION

The preliminary available data indicates that within the depth of the explorations (maximum depth about 80 feet below ground surface [bgs]), the site is underlain by a thin fill layer over alluvium. The fill ranges from about 3 to 5 feet in depth and consists primarily of silty sand. The underlying alluvium varies significantly, and is highly interlayered in some locations.

Within the upper portion of the alluvium to depths ranging from about 19 to 29 feet, the soil is mostly poorly graded sand to silty sand that is primarily loose with some zones of very loose and medium dense material. At some exploration locations, significant interbeds of low-plasticity silt were present within this upper zone of the alluvium.

The upper sandy zone is generally underlain by a fine-grained zone that extends to a depth of about 50 feet bgs. It consists primarily of silt, with interbeds of clay, as well as silty sand. The consistency ranges from soft to stiff.

A deeper granular zone of sand to silty sand is present below a depth of about 50 feet. It is generally medium dense to dense, with some looser zones. There are some zones of fine-grained soil within the deeper granular layer, and in many locations, there is a bed approximately 5 feet thick of stiff silt at depths that range from 55 to 65 feet bgs. Boring PS-3 encountered gravel at a depth of 76 feet bgs. Some of the CPTs reached practical refusal between depths of about 60 to 80 feet, possibly in gravel layers or denser portions of the lower sand layer.

2.4 SUBSURFACE CONDITIONS – PIPELINE ALIGNMENT

Along most of the southerly pipeline reach (Morena/West Morena Boulevard between Friars Road and Ingulf Street), planned trench depths are expected to be within fill over alluvium and/or estuarine deposits, except for short reaches within the Bay Point Formation. In general, fill thicknesses range from about 5 to 10 feet and are generally silty and clayey sands with some gravel. Alluvium (and colluvium, within the northern portion of the stretch) is generally very loose to dense sands with some silts and clays, and potentially some cobbles and boulders. Estuarine-type deposits consisting mostly of sands, clays and some very soft organic soil are present below the fill along West Morena/Morena Boulevard between Dorcas Street on the south and Savannah Street on the north. Bay Point Formation has been logged as shallow as 2 feet bgs along the northern portion of the Morena Boulevard reach, and as shallow as about 2 feet bgs along Ingulf Street as ground elevations rise.

From where the pipeline route ascends up to the coastal mesa at Clairemont Drive toward the NCWRP, the route is mostly within dense sedimentary formations including the Lindavista Formation and the Scripps Formation. Trenches may be classified as CalTrans Class A soils for trench stability (to be verified by the contractor’s geotechnical engineer), although these formations are known to contain cemented zones and cobble intervals that can pose difficult excavation conditions for trenching. Some canyon fill will be encountered along discreet sections of the alignment.

Subsurface conditions along the cut-and-cover portions of the pipeline alignment are summarized in Table 1 and presented in Appendix D.

2.5 GROUNDWATER

Within the mesas, groundwater is assumed to be deeper than 100 feet bgs, with shallow perched water present at varying depths along the alignment. Throughout the portion of the alignment along the coastal plain, groundwater has been measured at depths ranging from 10 to 20 feet bgs. Groundwater was measured at depths of about 9 to 10 feet bgs in the recent pump station borings during drilling, and the initial stabilized reading in monitoring well PS-2 measured groundwater at a depth of about 8 feet bgs (about Elevation 5 to 6 feet NGVD 29). Groundwater was measured at a depth of 15 feet near Tecolote Creek. Groundwater can be assumed to be as shallow as 2 feet within the active stream channel. Groundwater depths will vary with rainfall and seasonal influences.

The groundwater table is mostly above anticipated trench depths along the southern coastal portion of the pipeline alignment and will require dewatering for construction. Groundwater (and soil) contamination may be present along West Morena Boulevard associated with former leaking underground storage tanks.

3.0 GEOLOGIC AND SEISMIC HAZARDS

3.1 FAULTING

Active and potentially active faults are present in the Project vicinity. The planned pipeline alignment generally parallels the active RCFZ along east Mission Bay. Locations of active strands of the RCFZ are known near Balboa Avenue, at Buenos Avenue, and at Old Town; otherwise active faults in the southern Project area are generally mapped as suspected or "concealed" (i.e., not well located) on geologic and fault maps by the City of San Diego. Active faults are not mapped or suspected within the Project area east of the RCFZ; fault rupture does not present a potential geologic hazard in these areas. The potential for faulting as it relates to the planned Project is discussed in the Faulting Report.

Faults crossing the pipeline alignment may require the use the flexible connections or other measures to accommodate fault-related displacement. Fault hazards and mitigations are discussed further in the Faulting Report.

3.2 LIQUEFACTION

Liquefaction is a phenomenon in which loose to medium dense, saturated, granular materials undergo matrix rearrangement, develop high pore water pressure, and lose shear strength because of cyclic ground vibrations induced by earthquakes. This rearrangement and strength loss is followed by a reduction in bulk volume of the liquefied soils. The effects of liquefaction can include the loss of bearing capacity below foundations, settlement in level ground, large horizontal deformations of relatively level ground with an unconfined vertical face (referred to as lateral spreading) and instability in areas of sloping ground (also known as flow sliding).

A potential for liquefaction exists at the Morena Pump Station site within the alluvial sand and silt layers present below the groundwater table (about 9 feet bgs). The borings and CPTs within Sherman Street and Custer Street were used to evaluate liquefaction potential at the pump station site. The evaluation methodology and the results of the evaluations are presented below. The evaluations will be refined pending the results of laboratory testing and additional subsurface explorations within the pump station property.

A potential for liquefaction also exists within the fill and alluvium present along the southern portion of the pipeline alignment (south of Ingulf Street and crossing Tecolote Creek), and potentially within some of the canyon crossings (Rose Creek and San Clemente Creek). Liquefaction potential and possible effects within the cut-and-cover portions of the pipeline alignment are discussed in this report in a qualitative manner. Liquefaction potential within the planned tunnel segments is discussed in the Tunnel Report.

3.2.1 Methodology

The procedure for evaluating liquefaction potential is empirical and is based on data and observations at sites that have, and have not, liquefied during an earthquake. In the procedure, the capacity of the soil to resist liquefaction is expressed as the cyclic resistance ratio (CRR). The seismic demand is a function of the anticipated Peak Ground Acceleration (PGA) at the site and is termed the cyclic stress ratio (CSR). The potential for liquefaction was assessed at each sample (or CPT measurement) depth for the pump station site in terms of a Factor of Safety (FS). This factor of safety is defined as the CRR divided by the CSR generated by the design ground motion. A potential for liquefaction was interpreted to exist at each subsurface layer where the FS against liquefaction is less than 1.1. Settlement in each layer where the FS was less than 1.1 was then calculated using empirical correlations of the liquefaction potential to volumetric strain.

The potential for liquefaction and the amount of associated settlement are evaluated differently for the borings and CPTs, as described below:

> SPT Method – This method uses penetration resistance of the sampler (blow counts per foot) from the borings to obtain the resistance of the soil to liquefaction. SPT N-Values are obtained from the blow counts. A correction factor of 0.65 was applied to blow counts obtained from the 2.5-inch inner diameter sampler to account for the difference in size from the SPT sampler. Laboratory test results provided fines contents for use in the analyses.
>
> CPT Method - The analysis was performed using the CLiq software (developed by GeoLogismiki, in collaboration with Gregg Drilling and Dr. Peter Robertson). The software uses the tip resistance and sleeve friction obtained from the CPT soundings to interpret soil type, relative density/consistency and other properties to calculate the FS against liquefaction and assess secondary effects.

The SPT method incorporates the procedures outlined by Idriss and Boulanger (2008) for liquefaction triggering and the empirical method proposed by Ishihara and Yoshimine (1992) to estimate liquefaction induced settlements. Within the CLiq program, the CPT method used the updated procedures in Boulanger and Idriss (2014) for liquefaction triggering and the calibrated procedures for estimating liquefaction-induced ground settlement by Zhang et al. (2002).

The following input parameters were used in the liquefaction analysis for the MPS:

- Earthquake Magnitude, Mw: 7.0
- Peak Ground Acceleration ($PGA_{)}$): 0.59g
- Depth to groundwater: 9 feet bgs

The PGA used for liquefaction analyses is the Risk-Targeted PGA adjusted for Site Class D from the 2016 California Building Code. The PGA is roughly equivalent to a ground motion with a 1% probability of exceedance in 50 years and is intended to correspond to the ground motion associated with structure collapse. PGA was evaluated for both Site Classes D and E, with Site Class D resulting in a higher PGA of 0.59g, which was used in the analyses, compared to 0.53g for Site Class E. See Section 4.3 of this report for additional discussion.

3.2.2 Results

The results of the analyses for the MPS site suggest that liquefaction is expected to occur within the very loose to medium dense sand layer that is present from near the ground surface to depths generally ranging from 19 to 29 feet bgs. Other underlying sandy layers are also subject to liquefaction and are expected to contribute to a smaller extent to liquefaction-induced settlement.

Surface expression of liquefaction is generally considered to occur as a result of liquefaction within soil layers present within about 50 feet of the ground surface. Engineering analyses of the recent borings and CPTs around the Morena Pump Station perimeter suggest that surface expression of liquefaction could result in ground surface settlements ranging from about 5 to 11 inches. Differential settlement over relatively short horizontal distances could occur due to the highly variable subsurface conditions. Settlements at the lower end of this range are expected to occur at the locations where more layering of fine-grained soils is present in the upper, potentially liquefiable layer.

The below-grade portions of some of the planned structures will extend through the upper granular layer where much of the liquefaction is expected to occur. The excavation for the Pump Station Building is expected to extend to a depth of about 50 feet bgs. However, some of the subsurface explorations around the site perimeter indicate that the sand layer that is present below about 50 feet is sufficiently loose and has a relatively low fines content, such that liquefaction could also occur in the soil at this depth. Engineering analyses suggest that settlement within this lower granular layer could result in settlement up to about 5 inches that could impact the deeper structures.

Detailed results of the liquefaction analyses are presented in Appendix E.

Although no detailed analyses were performed, the potential for soil liquefaction is suspected along the southern portion of the pipeline alignments south of Ingulf Street within the alluvial soils. Mitigation of potential liquefaction along the pipeline alignments south of Ingulf Street and north of the MPS is not planned.

3.2.3 Performance of Fine-Grained Soils

The loss of shear strength in fine-grained soil from strong ground shaking can also cause potential surface deformations and adversely impact the performance of foundations. A potential for liquefaction susceptibility in fine-grained soils can be evaluated using the criteria presented by Idriss and Boulanger (2008). The majority of the fine-grained soils encountered in our explorations are silts that are expected to exhibit sand-like behavior and hence considered to potentially liquefy. Preliminary visual observations of soil samples indicate that there are likely to be limited soil layers that exhibit clay-like behavior, which should not be susceptible to liquefaction.

Strength loss in the fine-grained soils was estimated using the correlation between plasticity characteristics and soil sensitivity (Idriss and Boulanger, 2008). However, due to the relatively limited presence of clays, it is unlikely that significant surface deformations will arise from cyclic softening of quick clays.

3.3 LATERAL SPREADING

Lateral spreading is a phenomenon where surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported downslope or in the direction of a free face by earthquake and gravitational forces. Lateral spreading is thought to occur on slopes as level as ½ percent, or on level ground with a "free face", such as a stream bank.

The pump station site itself is relatively flat, and a levee about 8 to 10 feet high borders the site on the south. However, south of the berm, the ground surface slopes down about 13 feet to Friars Road. South of Friars Road, a more gradual slope is present between the road and the San Diego River.

It is expected that the potentially liquefiable layers present at the pump station site may be laterally continuous to the south in the vicinity of the river. Engineering evaluations suggest that there is a potential for lateral spreading to impact the Morena Pump Station and surrounding pipelines, particularly to those to the south of the pump station site. Engineering considerations associated with lateral spreading are discussed in Sections 4 and 5.

3.4 SEISMIC SETTLEMENT OF DRY SAND/SEISMIC COMPACTION

Strong ground motion can also cause the densification of soils above the groundwater level, resulting in settlement of the ground surface. This phenomenon is known as seismically-induced settlement or seismic compaction, which typically occurs in dry, loose cohesionless soils. During an earthquake, soil grains may become more tightly packed due to the collapse of voids or pore spaces, resulting in a reduction in the thickness of the soil column. Several feet of loose alluvial soils are present between the thin surficial fill layer and the groundwater table; however, considering the relatively large liquefaction-induced settlements expected, the amount of seismic compaction should be relatively low compared to the estimated liquefaction-induced settlement. Further, any liquefaction mitigation performed at the site should also mitigate the potential for liquefaction-induced settlement.

3.5 OTHER HAZARDS

Other seismic and geologic hazards that could impact the Project have been considered. In general, the local geologic conditions indicate that other seismic and geologic hazards are not likely to affect the site. Slopes in the Project vicinity are generally sufficiently flat and/or far enough from the improvements that stability is not expected to be a significant issue. Static loading from new improvements could initiate settlement within the underlying deposits; however, surface loading is relatively small and settlement should occur within relatively short time frames. Settlement is further discussed within the context of foundation design (Section 4.4). Potentially expansive and/or collapsible soil has not been identified in significant quantities along the project alignment, and should not impact Project design.

Given the location of the site, the potential for seiches or tsunamis affecting the site is considered low (County of San Diego, 2009). While the Morena Pump Station site is protected from flooding of the San Diego River by the adjacent levee, some flooding potential exists along West Morena/Morena Boulevard to the north of the pump station. From West Morena Boulevard at Tecolote Creek (just north of the Tecolote Road overcrossing) approximately 2,000 feet north along West Morena/Morena Boulevard, the Project area is within the 100-year floodplain (Federal Emergency Management Agency, 2012). This area could experience flood depths between 1 to 2 feet, however, this hazard should not constitute constraints to the planned pipelines in this area.

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4.0 CONCLUSIONS & RECOMMENDATIONS – PUMP STATION

The primary geotechnical considerations for the design of the Morena Pump Station are the presence of potentially liquefiable soil and the need for deep excavations to facilitate construction of below-grade facilities, combined with the presence of a relatively shallow groundwater table. These considerations are discussed below. Geotechnical recommendations for design are also provided.

Based on our geotechnical investigation and analyses, it is our opinion that the site location shown on Figure 2 is suitable for development of the pump station and associated structures from a geotechnical and geologic standpoint provided the recommendations provided below are incorporated into the design and construction of the project.

4.1 LIQUEFACTION MITIGATION

As discussed in Section 3, ground surface settlements ranging from about 5 to 11 inches could occur at the MPS site during the design seismic ground motion. These settlements could be erratic with large differential settlement occurring within short horizontal distances. Some lateral movements could also occur due to lateral spreading toward the San Diego River.

Possible structural solutions to mitigate the effects of liquefaction settlement include supporting the structures on stiffened shallow foundations (mats) or deep foundations such as drilled piers or piles. Relatively thick stiffened shallow or mat foundations would limit differential settlement across the foundation, and may reduce total settlements slightly, however, significant settlement and some tilting could still occur, and it is understood that structure settlements of this magnitude are not considered acceptable from a structural standpoint. Deep foundations to support the numerous facilities would need to extend to depths estimated to range from 60 to 100 feet bgs, which could be costly. In addition, considering the large amount of below-grade infrastructure planned for the pump station site (in addition to the main structures), it is expected that it would be difficult to accommodate differential settlement between the structures and the other infrastructure.

Ground improvement is considered the most feasible approach to limit total settlement of structures to acceptable levels, provide improved foundation support, and limit differential settlement between structures and interconnected utilities and structures. At a minimum, the treatment would need to improve the potentially liquefiable sandy layer that extends to depths ranging from 19 to 29 feet. Deeper treatment is recommended to address deeper granular layers that were encountered in some locations, as well as below the Pump Station Building and other below-grade structures.

The soil liquefaction mitigation (ground improvement) will mitigate the potential for lateral spreading and seismic settlement of dry sands at the pump station property. Total post-liquefaction and dry sand seismic settlements are estimated to be less than 2 inches, which is within the tolerable settlement limits for the structures provided by the project structural engineer.

Selection of the type of ground improvement depends on the soil conditions, surface conditions, and the desired level of improvement. Some options are discussed below. Regardless of the option selected, flexible connections on pipelines exiting the pump station site will be required. If the entire pump station site is not improved, flexible connections on utilities within the site would also be needed. Due to the presence of nearby buildings, strong vibration-induced densification techniques were not considered because of the possibility of settlement of those structures.

The ground improvement methods discussed below are all considered technically feasible for the soil conditions present at the site. Cost, schedule, and plan area to be improved (below individual structures vs. entire site) should be considered to select the most appropriate method. It may also be possible to combine shoring of the deep excavations with the ground improvement system. The recommended method (vibro-replacement) is considered the most technically appropriate and cost-effective, however, other techniques can be considered based on discussions with the selected ground improvement contractor.

4.1.1 Compaction Grouting

Compaction grouting injects a low-mobility grout under relatively high pressures into the soil to displace and compact soils, improve shear strength and reinforce fine-grained soils. Each depth increment of grout injection is called a “stage” and is typically on the order of 1 to 2 feet. The process can be optimized by sequencing primary and secondary injection points, which are grouted in an alternating pattern. The injection points are typically located within planned building footprints, with the treatment area extending a minimum of five feet horizontally outside the edge of the planned foundations.

The purpose of the compaction grouting would be to increase the relative density of the potentially liquefiable layers to reduce the estimated settlement to an amount that can be tolerated by the structures. The design of compaction grouting program, which is typically executed by a specialty geotechnical contractor, is typically dependent on the following criteria: 1) allowable post-improvement settlement (liquefaction-induced); 2) depth of soil improvement; 3) lateral limits of soil improvement, 4) construction monitoring tolerances and requirements, and 5) verification testing acceptance criteria (e.g., post improvement CPTs). It is common to design a compaction grouting program such that the post-improvement liquefaction-induced settlement is limited to less than an inch.

4.1.2 Vibro-Replacement

Vibro-replacement involves inserting a probe into the ground to densify the surrounding soils and filling the void created with gravel to create a “stone column” or “aggregate pier”. The procedure is repeated along a grid pattern over the area to be improved. The minimum diameter of the stone columns is typically 3 feet. The column spacing is typically 6 to 10 feet.

Vibro-replacement can mitigate the potential for liquefaction by: 1) densifying the soils, 2) reinforcing the soil mass with columns of gravel, and 3) providing increased drainage to alleviate the excess pore pressures developed by strong ground shaking (Idriss and Boulanger 2008).

Vibro-replacement is suitable for sands, silts and clays (Idriss and Boulanger 2008), although drainage and liquefaction mitigation are maximized in sands. The method improves bearing capacity and typically allows for shallow foundations for support of structures due to the reduced potential for liquefaction-induced settlement.

A specialty geotechnical contractor designs and constructs the vibro-replacement using performance criteria specified by the Geotechnical Engineer. The criteria are typically:

- Allowable vertical bearing pressure (post improvement).
- Allowable liquefaction-induced settlement (post improvement).
- Depth of soil improvement.
- Lateral limits of soil improvement.
- Acceptance Testing (e.g., post improvement CPTs).

4.1.3 Soil Mixing

Various methods and types of soil mixing are available and typically involve in-situ mixing of cement slurry with existing soil to create columns of improved soil.

Deep Soil Mixing produces relatively large diameter soil-cement columns (up to about 9 feet in diameter). It can typically extend to depths of about 80 feet, and is well suited to liquefaction mitigation. Variations of this method can be used to construct reinforced and/or tied-back secant and tangent pile walls for basement excavations.

Other methods use multiple cutting heads or augers to create overlapping or continuous columns of improved soil. Cement Deep Soil Mixing (CDSM) is often used to create “cells” of improved soil to mitigate liquefaction. Cutter Soil Mixing (CSM) is generally used to create soil-cement panels, similar to a diaphragm wall, which, when reinforced, can be used as basement wall excavations. The selection of the appropriate cutting tool should consider the presence of the gravel layers in the subsurface.

4.1.4 Selected Ground Improvement Option

Based on the site constraints (limited site size and surrounding improvements), the subsurface conditions, and cost considerations, we recommend bottom feed vibro-replacement (stone columns) be utilized to improve the ground conditions for mitigation of liquefaction potential. Due to the numerous planned below-grade utility connections within the pump station facility, ground improvement should extend across the entire pump station site (to the property line) as shown on Figure 4a. We understand that flexible connections are also planned between the underground utilities and buildings within the pump station facility. We further understand that the flexible connections will allow for approximately 1 inch of differential movement between these utilities and the buildings.

To reduce total and differential liquefaction-induced settlement to acceptable levels, stone columns should be installed on a grid pattern of approximately 10 feet by 10 feet. The recommended stone column depths across the site are shown on Cross Section A-A’ on Figure

4b. Across the majority of the pump station site, stone columns should be installed to a depth of 50 feet to limit ground surface settlement and associated impacts to at-grade structures and near-surface utilities. Within the footprint of the Pump Station Dry Well/Wet Well (foundation depth of about 50 feet) and the Intake Screening Building (foundation depth of about 33 feet), stone columns should be installed to approximately 75 feet bgs to densify sand layers that are present below those relatively deep foundations. Stone column recommendations will be refined based on additional planned field exploration and engineering analyses, and a pre-production ground improvement test program will be implemented to define the actual stone column spacing for production.

Evaluation of the test section and acceptance of the ground improvement will be based on the results of post-ground improvement CPTs, which should be performed on a grid pattern of about 40 feet by 40 feet in between the stone columns. The calculated post-liquefaction settlement based on the CPTs will be required to be less than 2 inches, which should provide a differential settlement of less than 1 inch over a 20 foot horizontal distance. The post ground improvement CPT results will be evaluated using the procedures outlined by Idriss and Boulanger (2008) for liquefaction triggering and the empirical method proposed by Ishihara and Yoshimine (1992) to estimate liquefaction induced settlements.

4.2 Below Grade Design & Construction

The three main planned below-grade structures at the Morena Pump Station, the Intake Screening Building (excavation depth of about 34 feet), Pump Station Building (about 51 feet) and Energy Dissipator Structure (about 25 feet deep) will require significant excavation depths that will extend into the alluvium and below the groundwater table. Due to the depths and the presence of surrounding structures, the below-grade excavations will require temporary or permanent shoring and temporary groundwater control during construction. The permanent below-grade walls will need to be designed to resist lateral earth pressures, groundwater and seismic effects. Several feasible shoring and dewatering methods, as well as recommendations for below-grade wall design, are presented in the following sections.

4.2.1 Shoring Types

Much of the below-grade construction in previous developments in and near downtown San Diego has used soldier piles (driven steel H-piles or drilled and concreted H-piles) with wood or steel lagging between the soldier piles to provide temporary support for “bottom-up” construction. Soldier pile and lagging shoring systems generally require global dewatering (discussed further in the following section), which could require significant pumping to achieve acceptable conditions at the pump station site due to the predominantly sandy conditions. While the shallower Energy Dissipator Structure may be practical to construct with soldier piles and lagging, the deeper structures may require excessive dewatering using this method. Further, the length of the soldier piles needed for the Pump Station Building may be impractical. If used, soldier piles should be drilled rather than driven due to presence of gravel layers and to minimize the potential for settlement of adjacent structures due to densification of loose sand layers during pile driving.

Shoring generally requires lateral support to construct a basement that extends more than one level. Most San Diego based contractors use temporary ground anchors (tiebacks) behind the wall, rather than internal bracing (struts and walers) in front of the wall to maximize accessibility within the excavation, however, internal bracing could be practical for some of the structures planned for this site. The most common anchors are auger drilled and pressure grouted tendons. The number of levels of tiebacks would depend on the depth of excavation, lateral and other loads, and the serviceability requirements of nearby infrastructure.

Sheet pile walls may also be feasible to retain the shallower excavations planned for the site. Structural sections of piles, typically panels of interlocking “Z” or “W” shapes, are driven into the ground sequentially to form a relatively water-tight excavation. Dewatering would still be required within the excavation. The sands and silts present at the site should result in acceptable installation conditions for sheet pile walls, although additional investigation is needed to determine the depth and extent of gravel layers at the site. Installation is typically accomplished by vibrating or driving the sheet piles into the ground. Care would be needed to avoid damaging nearby structures due to vibrations. While tiebacks can be used to provide lateral restraint of sheet piles, this type of shoring is typically used for shallow excavations where lateral restraint is not needed. Alternatively, internal bracing could be used for smaller excavations.

For the Pump Station Building and the Intake Screening Building, several types of reinforced concrete walls, such as diaphragm walls or secant/tangent walls, should be considered. These methods use various excavation techniques to create a water-tight shoring/cut-off wall that can also act as the permanent below-grade wall. Similar to sheet pile walls, dewatering is limited to within the excavation. For diaphragm walls, excavation is typically achieved using a clamshell excavator bucket to create a wall that is several feet thick. A secant or tangent wall is generally a series of overlapping drilled shafts. Considering the subsurface conditions and shallow groundwater level, excavation for both types of walls would likely be advanced using drilling fluid to maintain stability of the excavation until concrete is placed. Various types of reinforcement can be set in the concrete. As discussed previously, soil-cement can also be used to construct basement walls, and could be used in combination with liquefaction mitigation.

Regardless of the shoring method selected, monitoring of the infrastructure surrounding the site, including public roads, neighboring buildings, and the trolley tracks, will require careful monitoring to check that the excavation is not significantly impacting these features. Preliminary lateral earth pressures for the design of temporary tied-back shoring systems are presented on Figures 5 and 6 for excavation depths of 30 and 50 feet, respectively.

4.2.2 Dewatering

Considering the shallow depth to groundwater, dewatering of the area ahead of the major excavations will be required to reduce the possibility of soil instability at the bottom of the excavation and to allow for dry, firm working conditions. The groundwater surface should remain at least 5 feet below the bottom of the excavation until the foundations are poured and adequate structure loads are in place to resist hydrostatic uplift. Dewatering volumes could be substantial due to the predominate presence of sands and silts within the planned excavation depths.

The typical approach would be to globally dewater the excavation area with closely-spaced wells around the perimeter of the excavation and possibly within the excavation as well. This method would be required if soldier pile and lagging is used for shoring. Other shoring methods that create a water-tight shoring wall, such as sheet piles, diaphragm wall and contiguous pile or soil-cement walls, should require less pumping to lower the groundwater level within the excavation. Alternate dewatering methods such as ground freezing, which would reduce or eliminate groundwater discharge concerns, could be considered but are costly.

Dewatering for the Pump Station Building will likely need to consider permeabilities within both the upper and lower sandy alluvial layers. The excavations for the Intake Screening Building and Energy Dissipator Structure may extend into the finer grained intermediate layer between depths of about 20 to 30 feet and 50 feet; this layer is much siltier and will be less transmissive than the more sandy layers above and below this depth, which will be a factor in dewatering design.

We have performed a preliminary evaluation of the groundwater pumping rate for construction dewatering that will likely be required to provide dry excavation for below-grade construction. The subsurface stratigraphy used in this evaluation was based on Boring PS-2 advanced on March 28, 2017. The subsurface was modeled to include 4 layers as shown in Table 2 below:

Table 2
Subsurface Layering for Groundwater Pumping Rate Evaluation

Layer	Elevation (feet, NGVD 29)	Soil Description
1	+16 to -10	Poorly graded sand with silt (SP-SM)
2	-10 to -35	Silt/clay (ML/CL)
3	-35 to -55	Poorly graded sand with silt (SP-SM)
4	-55 to -100	Silt/clay (ML/CL)

The design groundwater elevation is +5 feet, NGVD 29 based on measurements for the well development on March 31, 2017 and the slug tests performed on July 26, 2017. Slug tests were performed to evaluate the hydraulic conductivity of the subsurface. Correlations with index properties were also used to evaluate the hydraulic conductivity.

We used the computer program GeoSlope SEEP/W to evaluate the water flow rate during dewatering. Various boundary conditions and subsurface conditions were modeled for both a cross sectional model and a plan model. The cross sectional models assumed a 100-foot wide excavation with a row of dewatering wells on each side of the excavation. The plan models assumed an 80 by 100 foot excavation with dewatering wells spaced at 20 feet around the perimeter of the excavation. A summary of the SEEP/W analyses is presented in Table 3 below, and the results of the analyses are presented in Appendix F.

Table 3
Model Assumptions and Flow Rates for Groundwater Pumping Rate Evaluation

Model	Model Conditions	Flow Rate (gpd[1])
1	Cross Sectional Model, 1000-ft model width and individual soil layers	93,070
2	Cross Sectional Model, 500-ft model width and individual soil layers	208,631
3	Cross Sectional Model, 500-ft model width and composite soil layer	56,876
4	Plan View Model with 500-ft width, composite soil layer, and K_h/K_v=1	168,689
5	Plan View Model with 500-ft width, composite soil layer, and K_h/K_v=5	430,447

Note:
1. gpd = gallons per day

Based on these evaluations, we recommend that a flow rate between 168,000 and 430,000 gpd be assumed for planning and permitting purposes. The flow rate and total volume of water extracted may be reduced depending on the shoring method used to perform the excavation. Different shoring methods can reduce the flow of water into the side walls of the excavation and reduce the dewatering requirements.

Pump tests and additional borings and laboratory testing may be performed within the pump station property once access is permitted. Pump tests may be performed to provide additional data on soil permeability at various depths for design of the dewatering system and estimation of disposal estimates.

Analytical laboratory testing was performed on the groundwater sample collected from the monitoring well PS-2. The metals barium and molybdenum were detected at concentrations of 0.142 and 0.0287 milligrams per liter (mg/l), respectively. Total TPH was detected at 73 micrograms per liter (µg/l); and the VOCs cis-1,2-dichloroethene (c-1,2-DCE) and trans-1,2-dichloroethene (t-1,2-DCE) were detected at 480 and 2.6 µg/l, respectively. No PCBs, OCPs or SVOCs were detected above their respective laboratory detection limits.

The analytical results were compared to State and Federal hazardous waste criteria. Based on the metals, VOCs and TPH concentrations detected, the wastewater is not considered Federal Resource Conservation and Recovery Act (RCRA) or California hazardous. However, for project dewatering purposes, pumped groundwater is anticipated to either be disposed to the municipal stormwater or sewer systems. Both disposal options will require a discharge permit and additional analytical testing to satisfy permit requirements. Additionally, because of the presence of VOCs and TPH, predisposal treatment of the wastewater from construction dewatering would likely be required. However, given the low concentration of contaminants detected, it is likely treatment will be successful in meeting permit requirements. Permit requirements will also include the identification of a discharge location, estimation of the volume and rate of discharge and discharge duration, and payment of related discharge fees. Dewatering will require a permit from the Metropolitan Waste Water Department (MWWD) to divert effluent to the sewer or a National Pollutant Discharge Elimination System (NPDES) permit if effluent is diverted to a storm drain. Further analytical testing of groundwater is planned as access to the pump station site is provided.

The dewatering contractor is responsible for designing, installing, and operating a dewatering system capable of lowering and maintaining the groundwater to the desired depths during construction. As part of final design, AECOM should be consulted to evaluate the depth of required drawdown to check that the shoring system is stable against geotechnical failure mechanisms, such as external stability, foundation heave and hydraulic failure, and also estimate settlement of the adjacent ground due to dewatering.

4.2.3 Below-Grade Wall Design

To construct the permanent subterranean walls, cast-in-place concrete walls can be placed within the shoring system, or a finished surface can be placed over the permanent shoring wall. Permanent subterranean walls should be designed for earth, hydrostatic, seismic, and surcharge pressures. A preliminary lateral pressure diagram for the design of below-grade walls is presented as Figure 7.

The subterranean walls along the streets will be subject to traffic loading (car and truck traffic). The vertical surcharge load to account for traffic was assumed to be the equivalent of 2 feet of soil overburden or 250 pounds per square foot (psf). While loading from the Trolley is not expected to impact below-grade wall design, considering the currently planned pump station layout, the vertical surcharge load from the Trolley is considered to be 1,880 psf, based on our previous experience working with similar projects in Downtown San Diego.

When designing the walls for the static case only, the restrained earth pressure increment should be added to the active earth pressure in addition to the hydrostatic and surcharge pressures. When designing the walls for seismic case only, the seismic pressure increment should be added to the active earth pressure in addition to the hydrostatic and surcharge pressures.

The recommended seismic pressure increment was estimated as an equivalent fluid, and was developed by considering recommendations by Lew and others (2010). They completed a comprehensive review of the methods used to assess seismic earth pressures on deep subterranean retaining walls and provided updated recommendations for design. The seismic pressure increment was developed using a conservative estimate of the pseudostatic acceleration coefficient (K_h) that is equal to 0.5 PGA (PGA=0.59G) as recommended by Lew and others (2010).

4.2.4 Subsurface Drainage and Waterproofing

Design of the portion of the permanent subterranean walls above the groundwater level should incorporate adequate drainage behind the wall to collect water from sources such as irrigation or surface runoff to reduce the potential for hydrostatic pressure to build up behind the wall. The wall drainage should extend at least 5 feet below the design groundwater elevation. The drainage system should consist of a prefabricated geocomposite drainage structure, such as Miradrain or equivalent, or filter material behind the wall. Filter materials should conform to the gradation requirements specified in Section 300-3.5.2 (Pervious Backfill) of the current "Standard Specifications for Public Works Construction." If filter material is used behind the wall, the horizontal width should be at least 18 inches and the material should extend up to within 18 inches of the ground surface.

Basement walls should be waterproofed for end use. Because of the potential for increased moisture from landscaping and underground utilities, it may be necessary to place the waterproofing over the entire height of the walls, depending on the functionality of the wall surface needed. A limited degree of waterproofing is expected to be required for the Project; this typically allows damp patches and minor leakage through construction joints. A high degree of waterproofing may be needed if functionality requires the interior of the basement wall surface to be free of all leakage, seepage and damp patches. The Project Architect and qualified waterproofing consultant should review and select waterproofing requirements relative to the desired functionality.

4.3 Seismic Design

The Project area will likely be subject to moderate to severe ground shaking in response to a local or more distant large-magnitude earthquake occurring during the expected life of the planned facilities. We understand seismic design parameters are required for design of the Morena Pump Station facilities. Parameters can also be provided for other locations along the pipeline alignment, if needed. For design in accordance with the 2016 CBC (based on ASCE 7-10), the following parameters should be used. These parameters are developed in the code based on Risk-Targeted Maximum Considered Earthquake (MCE_R) ground motion response accelerations.

Based on the presence of potentially liquefiable soils, the Site Class would be F in accordance with ASCE 7-10. However, since we understand the fundamental period of the structures will be 0.5 seconds or less, Site Class D may be used in lieu of F for structural design. In addition, if ground improvement is used to mitigate the potentially liquefiable soils, Site Class D may also be appropriate. Seismic design parameters for Site Class E were evaluated to aid in the evaluation of PGA for liquefaction studies; however since the short period acceleration for Site Class D is higher than Site Class E, the Site Class D acceleration was used for engineering evaluations. The seismic design coefficients for Site Classes D and E are summarized in Table 4.

Table 4
2016 CBC Seismic Coefficients

Parameter	Value	Value	Reference
Site Class	D	E	ASCE 7-10, Table 20.3-1
Mapped Spectral Acceleration - Short Period, S_s (g)	1.291	1.291	2016 CBC Figure 1613.3.1(2)[1]
Mapped Spectral Acceleration - 1 Sec. Period, S_1 (g)	0.500	0.500	2016 CBC Figure 1613.5(4)[1]
Site Coefficient - Short Period, F_a	1.000	0.900	2016 CBC Table 1613.3.3(1)[1]
Site Coefficient - 1 Sec. Period, F_v	1.500	2.400	2016 CBC Table 1613.3.3(2)[1]
MCE[2] Spectral Response Acceleration - Short Period, S_{MS} (g)	1.291	1.162	2016 CBC Equation 16-37, $S_{MS}=F_aS_S$
MCE[2] Spectral Response Acceleration - 1 Sec. Period, S_{M1} (g)	0.750	1.200	2016 CBC Equation 16-38, $S_{M1}=F_vS_1$
Design Spectral Response Acceleration - Short Period, S_{DS} (g)	0.861	0.775	2016 CBC Equation 16-39, $S_{DS}=2/3*S_{MS}$
Design Spectral Response Acceleration - 1 Sec. Period, S_{D1} (g)	0.500	0.800	2016 CBC Equation 16-40, $S_{D1}=2/3*S_{M1}$

Table 4
2016 CBC Seismic Coefficients

Parameter	Value	Value	Reference

Notes:
1. Calculated using U.S. Seismic Design Maps web application developed by USGS.
2. MCE – Maximum Considered Earthquake.
3. Site coordinates estimated from 'Google Earth' computer program used to evaluate coefficients: 32.76331; -117.20021.

4.4 FOUNDATION DESIGN

Structure foundations at the Morena Pump Station will vary between near-surface to depths of about 50 feet bgs. Therefore, foundation recommendations have been developed for the near-surface soil above the groundwater level, the upper sandy zone below the groundwater level, the finer grained/silty intermediate zone, and the (relatively denser) lower sandy zone.

Near-surface foundations may consist of conventional continuous strip and spread footings founded on existing, recompacted or improved fill or alluvium. Mat foundations may also be used to support near-surface structures. Foundations below the groundwater level should be supported on thick mat foundations. Tiedowns may be required if structure weights are insufficient to resist buoyancy effects due to the shallow groundwater level. Pad foundations (small mats) may be used to support lightly-loaded equipment at grade.

4.4.1 Continuous Strip and Spread Footings

Continuous strip and spread footings above the groundwater should be embedded at least 18 inches below lowest adjacent grade and should be at least 12 inches wide. Footings dimensioned as recommended may be designed using the following allowable soil bearing pressure.

Table 5
Allowable Bearing Pressures for Footing Design

Footing Depth (feet, bgs)	Allowable Bearing Pressure (psf) [a]	Increase per Foot of Embedment (psf) [b]	Increase per Foot of Width (psf) [c]	Maximum Allowable Bearing Pressure (psf)
0 to 6 (above groundwater)	2,000	1,000	500	3,000
6 to 9 (above groundwater)	1,800	NA	NA	1,800

Notes:
a. Allowable bearing pressure may be increased by one-third for loads that include wind or seismic forces.
b. Per foot of embedment beyond 18 inches below lowest adjacent grade.
c. Per foot of width beyond 12 inches.

Adjacent footings bearing at different elevations should be located such that the slope from bearing level to bearing level is flatter than 1:1 horizontal:vertical (H:V).

For foundations designed as recommended above, the total settlement due to foundation loads only is estimated to range from about ½ to 1 inch, with differential settlements approximately half that amount between adjacent columns. The majority of this settlement should occur when structure loads are applied. The estimated settlement should be re-evaluated by the Geotechnical Engineer when the structure design is complete, especially where the footings are not similarly proportioned, embedded, and loaded.

The upper 12 inches of material in areas not protected by hardscape should not be included in design for passive resistance. If friction is to be used to resist lateral loads, we recommend using an allowable coefficient of friction of 0.4 between the soil and foundation concrete. If it is desired to combine frictional and passive resistance in design, we recommend using an allowable friction coefficient of 0.3. Passive resistance may be increased by one-third for loads that include wind or seismic forces.

4.4.2 Mat Foundations

Mat foundations with a minimum width of 5 feet can be designed for the following allowable bearing pressures, based on the depth of the mat below grade.

Table 6
Allowable Bearing Pressures for Mat Foundation Design

Depth of Mat Foundation (feet, bgs)	Allowable Bearing Pressure (psf) [a,b]
0 to 55	4,000
>55	6,000

Notes:

a. Allowable bearing pressure may be increased by one-third for loads that include wind or seismic forces.

b. Based on an assumed foundation width of 10 feet.

The immediate settlement at the center of the mat subject to these bearing pressure is estimated to be ¾- to 1 inch.

The geotechnical analysis of large mat foundations typically uses the Modulus of Vertical Subgrade Reaction (k) developed from evaluations of settlement that consider actual loads, the plan layout of the mat and local variations in subsurface conditions. AECOM recommends a Modulus of Vertical Subgrade Reaction of 75 pounds per cubic inch (pci) for foundations below the groundwater level, if ground improvement techniques are not employed. The installation of stone columns, as recommended in the ground improvement section above, will densify the subsurface soils across the entire pump station site and below proposed foundations. Based on the presence of stone columns, we recommend that the mat foundations planned for the structures founded below the groundwater level be designed for a Modulus of Vertical Subgrade Reaction of 125 pounds per cubic inch (pci). Shallow mat foundations founded in fill soils above the groundwater may be designed for a Modulus of Vertical Subgrade Reaction of 150 pounds per cubic inch (pci). The densification of the sandy soils should be verified as part of the stone column program; the Modulus of Vertical Subgrade Reaction may need to be reevaluated at that time. We should review the plots of mat contact pressures and deflections for compatibility with the geotechnical assumptions used to develop the modulus and the strength and stiffness characteristics interpreted to exist within the materials supporting the foundation.

4.4.3 Lateral Resistance

Resistance to lateral loads on the foundations can be provided by passive resistance along the edge of the footings and by frictional resistance along the bottom of the footings. For passive resistance, we recommend using the following allowable equivalent fluid weights for footings or grade beams poured neat against the excavation or properly backfilled.

Table 7
Foundation Allowable Passive Resistance

Depth of Footing (feet, bgs)	Allowable Passive Resistance (pcf) [a, b]
0 to 9 (above groundwater)	250
9 to 25 (below groundwater)	115
25 to 55 (below groundwater)	100
>55 (below groundwater)	175

Notes:

a. Allowable bearing pressure may be increased by one-third for loads that include wind or seismic forces.

b. pcf – pounds per cubic foot.

4.5 Retaining Wall Design

We understand small gravity retaining walls may be used to retain surface improvements at the site. Retaining walls should be designed for earth, seismic, and surcharge pressures (seismic pressure can be neglected for walls less than 6 feet high). Hydrostatic pressures should not develop on the near-surface retaining walls considering the depth to groundwater and assuming proper drainage behind the walls. Foundations for retaining walls can be designed using the recommendations for continuous strip and spread footing presented in Section 4.4.1 of this report. The following sections provide specific recommendations for subsurface drainage and wall design.

4.5.1 Subsurface Drainage

Retaining walls should have adequate drainage behind the wall to avoid developing hydrostatic pressure from leaking underground utilities or surface runoff. Retaining walls should have a perimeter drain at the base of the wall. The base drain should be a minimum four-inch diameter perforated pipe. The pipe should be surrounded with at least one cubic foot per lineal foot of pipe of ¾-inch crushed rock wrapped with filter fabric, such as Mirafi 140NL, or approved equivalent.

Adequate weep holes or collector pipes need to be incorporated into the system to provide an outlet for the drained water. Drainage from collector pipes should be directed to a suitable outlet. Existing or proposed water bearing utilities, or surface conditions that could promote infiltration (e.g., irrigated landscaping) behind walls, may require additional subsurface drainage.

4.5.2 Lateral Earth Pressures

Lateral earth pressures behind retaining walls depend on the allowable wall movement, wall inclination, backfill material and backfill slope. Retaining walls that are free to deflect at the top should be designed for an equivalent fluid weighing 35 pcf for level backfill. This earth pressure assumes the free standing walls will have a vertical back and will mainly retain properly processed, placed and compacted coarse grained soils. They also assume compaction within four feet of the wall will be completed with light hand-held or equivalent equipment; the lateral pressures would be higher if heavy equipment is used for soil compaction next to the walls.

For typical car and truck traffic, the lateral pressure can be estimated as a vertical surcharge equivalent to 2 feet of soil overburden or 250 psf.

Walls with heights over 6 feet should be designed for a seismic pressure increment applied as an inverted triangular distribution equal to 27 pcf. To develop the seismic pressure, the seismic pressure increment should be added to the active earth pressure. The seismic pressure increment was developed using the Mononobe-Okabe pseudo-static approach and a repeatable ground acceleration of 0.3g.

4.6 Corrosivity

Analytical testing for corrosion potential was performed on select soil samples at the pump station and along the project alignment. The results of the analytical testing are presented in

Appendix B; sample locations are shown on the boring logs (Appendix A). Due to the marine depositional environment, it is expected that the on-site soil may be somewhat corrosive, and that concrete and steel design will need to consider potential effects of corrosion. We understand that a corrosion engineer is part of the project design team. The analytical tests for corrosion potential have been forwarded to the corrosion engineer for evaluation and development of design recommendations.

Additional testing of groundwater samples may be required to provide data on corrosivity as part of the application for groundwater disposal for dewatering.

4.7 STORMWATER INFILTRATION

Infiltration testing has not been performed, as access to the site will not be permitted by the current property owner until October 2017. Based on the AECOM field explorations near the Morena Pump Station, the soils underlying the site are shallow fills overlying alluvium consisting of interbedded silty sands, clays, and sands. These soils are most likely attributable to Hydraulic Group D soils (City of San Diego 2016 Storm Water Standards). These soils are expected to provide an infiltration rate between 0.01 and 0.5 inches per hour, consistent with partial infiltration. However, the measured groundwater at the site is approximately 9 feet below the existing ground surface. Based on the City of San Diego Storm Water Standards, Part 1: BMP Design Manual, the depth to the seasonal high groundwater table must be greater than 10 feet for infiltration Best Management Practices (BMPs) for stormwater infiltration to be allowed.

Soil and groundwater contamination have been mapped in the vicinity of the site. Analytical laboratory tests were performed on one groundwater sample recovered from the monitoring well developed in Custer Street near the pump station location. Total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs) were detected in the groundwater sample. The presence of on-site groundwater contamination further restricts the feasibility of stormwater infiltration at the site due to the potential for spreading contamination. Analytical test data are discussed in Section 4.2.2 above and presented in Appendix C. In addition, and as discussed above, groundwater was measured at 9 feet below the ground surface in the monitoring well installed in Custer Street. In accordance with Section C.3 of the Storm Water Standards, this should also preclude infiltration of stormwater at the site. Both of these issues are addressed in Criteria 3 and 7 of Worksheet C.4-1 (Appendix G).

Due to shallow groundwater and potential contaminants in the subsurface, infiltration of stormwater is not recommended at the pump station site. Infiltration of stormwater could also lead to mounding of groundwater in the area and increase the risk of soil liquefaction on neighboring properties. As indicated in Worksheet C.4-1, if any of the criteria "…from rows 5-8 is no then infiltration of any volume is considered to be infeasible within the drainage area."

The above evaluation is summarized in the attached Worksheet C.4-1 (Appendix D of the San Diego Storm Water Standards). Partial infiltration is indicated as feasible per this worksheet from a subsurface soil standpoint, however, due to the shallow groundwater, the potential liquefaction and the presence of groundwater contaminants, infiltration of stormwater is not recommended at this site.

5.0 CONCLUSIONS & RECOMMENDATIONS – CUT & COVER PIPELINES

The primary geotechnical considerations for the design of the pipelines are the presence of shallow groundwater at the southern end of the project and potential concretions in the formation soils. In addition, pipeline sections south of the MPS may be installed using trenchless techniques. These considerations are discussed below. Geotechnical recommendations for design are also provided.

Based on our geotechnical investigation and analyses, it is our opinion that the pipeline alignments shown on Figures 3a through 3e are suitable for pipeline development from a geotechnical and geologic standpoint provided the recommendations provided below are incorporated in the design and construction of the project.

5.1 LIQUEFACTION

A potential for liquefaction exists for the portions of the pipelines both south of the Morena Pump Station and extending north from the pump station along Morena/West Morena Boulevard to Ingulf Street, as shown in Table 1. Liquefaction-induced ground surface settlement is expected to vary across the alignment, but magnitudes could be as high as what is estimated at the pump station site (5 to 11 inches). Mitigation for soil liquefaction along the pipeline alignments outside of the MPS pump station facility will not be performed; some differential settlement may be experienced along the pipelines near the edge of the improved area adjacent to MPS.Liquefaction may also be experienced along the southern portions of the pipeline alignments in the Morena Blvd. and W. Morena Blvd. areas.

Generally, the pipelines will settle along with the ground surface, with the pipelines somewhat moderating the differential settlement that will occur along the alignment. In general, since liquefaction can essentially “fluidize” the soil, pipelines below the groundwater table can “float” during post-liquefaction conditions, typically resulting in apparent heave at the ground surface. However, we understand that the pipeline will essentially be continuously full of water/effluent. The weight of the filled pipeline will be similar to the weight of the liquefied soil displaced by the pipeline, if soil liquefaction occurs. Therefore, the potential for the pipe to float as a result of liquefaction is considered negligible. From an operational standpoint, we understand that the pumps will be shut-off in the event of a significant earthquake, reducing the volume of fluid that could leak if the pipe ruptures.

5.2 EXCAVATION AND SHORING

Considerations related to pipeline trench excavation, dewatering and shoring are presented in this section. While not discussed in this geotechnical report, trenchless technology could be considered in some of the areas of high groundwater to reduce the need for dewatering and addressing difficult shoring and excavation conditions. Trenchless technology may also be considered at crossings of major intersections to address logistical concerns.

5.2.1 Excavatibility

Trench excavatibility will vary along the alignment. Near the Morena Pump Station, the fill, alluvium, and Bay Point Formation should mostly be excavatible using conventional earth-moving equipment. Some cobbles and boulders or other obstructions could be present within the fill and alluvium; these could require hoe-rams or other equipment to break up the oversized material for removal. Excavation will also extend below the groundwater level in much of this area.

As the alignment extends east from Morena Boulevard and Ingulf Street into older formational material, excavation conditions will be more difficult. Larger equipment will likely be required for excavation. Hoe-rams and breaker bars will likely be required in some areas due to zones of cementation/concretions, as well as cobbles and boulders within the various units.

5.2.2 Dewatering

Excavation along much of the southern stretch of the alignment will require excavation below the groundwater table. It will be necessary to lower the groundwater level below the bottom of the trench a minimum of 2 feet. The method of dewatering will depend on the type of shoring selected (see next section), but options include installing dewatering wells along the alignment or placing sumps within the bottom of the excavation. The soil below the groundwater level along much of this stretch consists of granular material with relatively high permeability and therefore high flow rates. Estimated permeability is expected to be similar to conditions at the pump station site (see Section 4.2).

5.2.3 Shoring

Shoring east of the Morena Boulevard/Ingulf Street intersection will need to retain primarily dense formational material, with some areas of fill soil. The formational soils can likely be retained using standard trench shields. Some caving could occur within the fill soils as well as within zones of clean sand within the more granular formations. These sections will likely require continuous shoring to retain the soil.

South of the Morena Boulevard/Ingulf Street intersection, shoring will need to retain potentially loose and granular soil, with possible cobbles and boulders, and will extend below the groundwater level in some reaches of the pipeline alignments. Where cobbles and boulders are not present, sheet piles would likely be the most appropriate shoring method due to its relatively water-tight seal (with the benefit of reduced dewatering demands) and ease of installation in loose and soft soils. However, oversize rock could cause refusal to sheet pile installation. Where oversize rock is encountered or suspected, or where denser materials may be present within the excavation depths, pre-augering can be used in advance of sheet pile installation to disturb the ground and potentially remove obstructions. Sheet piles are typically driven or vibrated into place; settlement of nearby improvements due to vibrations should be considered and monitoring may be required.

In areas of denser ground, deeper excavations, or significant zones of oversize rock, other shoring methods should be considered. Driven or drilled soldier piles and lagging, with internal bracing or tiebacks as needed, would likely be an appropriate shoring method, although additional dewatering would be required. Other water-tight walls such as secant pile or tangent walls, while costly, could also be considered.

Trench box or braced shoring should be designed to resist at-rest soil pressures. An equivalent fluid pressure (EFP) of 60 pounds per cubic foot (pcf) may be assumed for at-rest lateral pressures above the water table. Below the water table, an EFP of 29 pcf and 30 pcf may be assumed for fill/alluvium and formational soils, respectively. A hydrostatic pressure of 62.4 pcf should be assumed below the water table if construction dewatering is not employed (i.e. use of sumps to control groundwater in the bottom of the trenches).

Lateral forces may be resisted by passive resistance. An EFP of 240 pcf, and 260 pcf may be assumed for fill/alluvium and formational soils above the water table, respectively. An EFP of 115 pcf, and 130 pcf may be assumed for fill/alluvium and formational soils below the water table, respectively.

5.3 EARTHWORK

Earthwork for the pipelines is expected to consist of trench excavation, placement of the pipe bedding and pipe, trench backfill, and replacement of the pavement section or other existing surface. Earthwork should be completed according to the applicable and most recent versions of the City of San Diego Grading requirements, the California Building Code and the Standard Specifications for Public Works Construction.

5.3.1 Trench Backfill Materials

Soil to be used as trench backfill outside of the pipe bedding zone should meet the criteria listed below:

- No oversize materials greater than 6 inches in maximum dimension.
- An Expansion Index (EI) less than 30 and a Plasticity Index less than 25.
- A relatively well-graded particle size distribution with at least 60 percent (by weight) passing a 1-inch sieve and fines content (percent, by weight, passing the No. 200 sieve) not exceeding 30 percent.

Most of the soil excavated from the trenches should meet the above requirements, although north of Ingulf Street, some of the native formational material may need to be screened to remove oversize material.

Bedding within the pipe bedding zone (12 inches below pipes to 6 inches above the pipes) should consist of clean sand in accordance with the Green Book. Class 2 Aggregate Base will be required within roadway sections. The Geotechnical Engineer should review and test all import sources.

Geotechnical laboratory R-value testing for the project is not complete. Pavement restoration above the pipe trenches will be addressed in an update to this report.

5.3.2 Excavation and Disposal Considerations

Prior to excavating trenches, any existing pavements, structures, abandoned utilities and improvements, vegetation, and other debris and rubble should be removed and disposed of offsite. Soils containing organic matter should be removed from the planned development area.

Following site preparation, excavated soil should be considered for re-use as trench backfill. See Section 5.3.1 for fill material requirements. Soil below the groundwater level will likely be too wet for use as backfill (even if the trench area has been dewatered) unless it can be spread out and dried before re-use, which may require a large processing area. Material that is suitable for re-use will require an area for stockpiling. Excess soil will need to exported or stored for future use.

5.3.3 Fill Placement and Compaction

Fill soils should be placed in loose horizontal lifts that do not exceed eight inches, or as needed to obtain adequate compaction. Each layer should be spread evenly and thoroughly mixed during spreading to uniformly obtain a moisture content that is above the optimum moisture content for compaction. After each layer has been mixed and spread, it should be compacted to a relative compaction of not less than 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry unit weight of the compacted fill divided by the maximum dry unit weight evaluated in accordance with ASTM D1557.

Within paved areas, the upper 12 inches of backfill (below the Class 2 Aggregate base and pavement) should be compacted to a minimum of 95 percent relative compaction. Class 2 Aggregate base for roadway pavement should be compacted to a minimum of 95 percent relative compaction.

5.4 TRENCHLESS INSTALLATION

We understand that several sections of the pipeline alignments for the influent and effluent connections to the existing sewer main south of the MPS along Friars Road may be installed using trenchless construction techniques (tunneling methods). These portions of the pipelines would be installed below the existing groundwater level in the area in loose alluvial soils. Due to the subsurface conditions, the use of an open-face tunneling method may not be appropriate. Below the groundwater, the Tunnelman's Ground Classification for Soils may be considered to be flowing sands. Above the groundwater level, the Tunnelman's Ground Classification for Soils may be considered to be running or slow raveling sands. The use of pressurized face microtunneling techniques are recommended for tunnels in this portion of the project.

6.0 GENERAL CONDITIONS AND LIMITATIONS

Geotechnical engineering and the geological sciences require interpretations based on limited subsurface data. A relatively small portion of the pertinent soil and groundwater conditions along the planned Project route have been observed. The recommendations made herein are based on the assumption that soil and groundwater conditions will not deviate appreciably from those found during our current field investigation and previous explorations. Professional judgment discussed herein is based on an understanding of the planned construction and partly on general experience. Actual subsurface conditions encountered during construction will likely vary from those discussed in this report. If variations in subsurface conditions are encountered during construction, AECOM should be consulted for further recommendations.

This report is intended for design purposes. If reviewed by building contractors they should make their own interpretation of the data contained and referenced in this report.

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7.0 REFERENCES

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FIGURES

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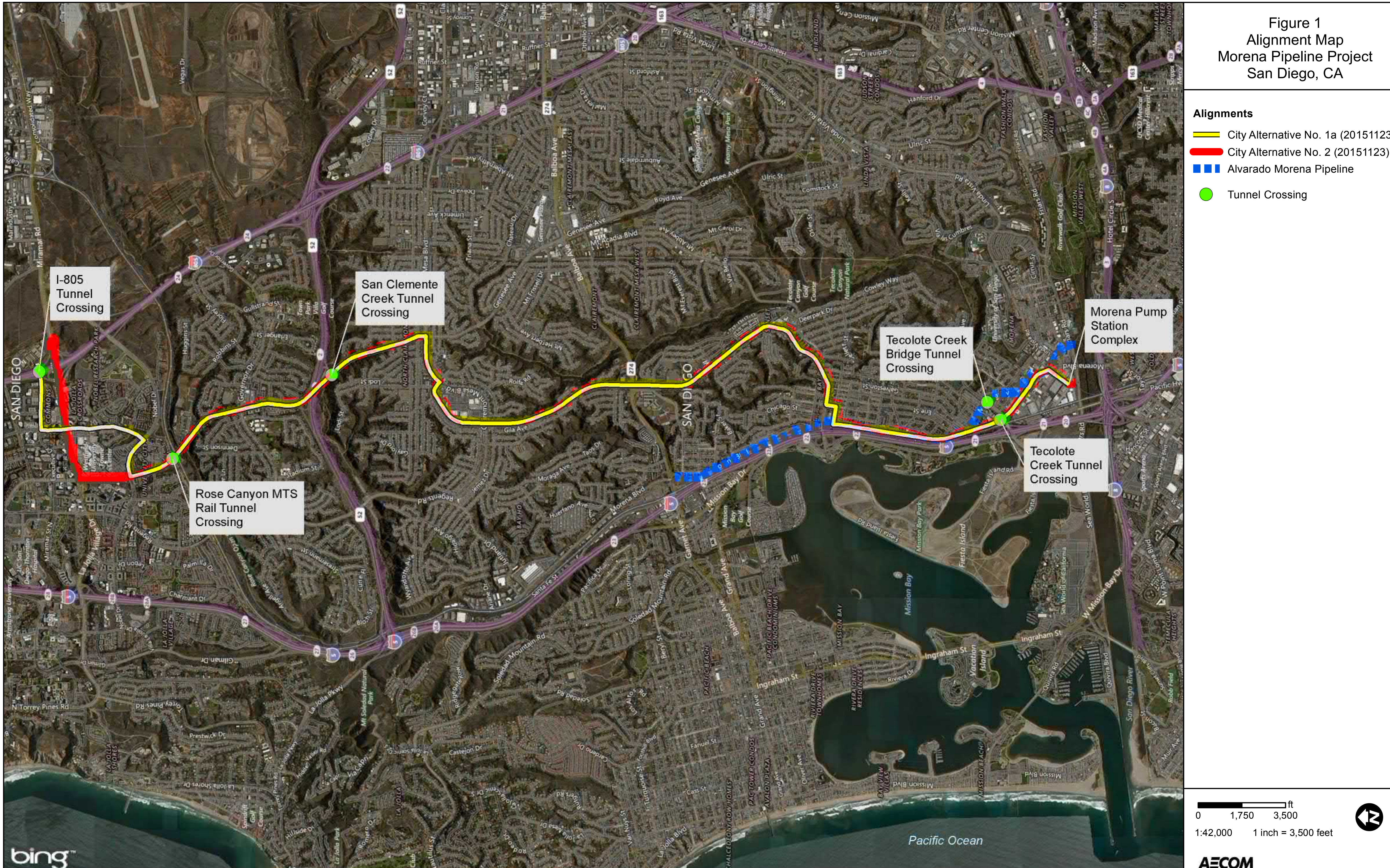

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Reference: KEH 30% Design 4-7-17

LEGEND

△	SH-01	Cone Penetration Test (CPT), 2017
⌖	PS-01	Exploratory Boring, 2017
◉	PS-02	Exploratory Boring with Monitoring Well, 2017

MORENA PUMP STATION SITE PLAN
MORENA PIPELINE PROJECT
SAN DIEGO, CALIFORNIA

AECOM

20 0 20 40 SCALE: 1"= 40'	CHECKED BY: MEH	DATE: 4-20-17	FIG. NO: 2
	PM: JL	PROJ. NO: 60530732	

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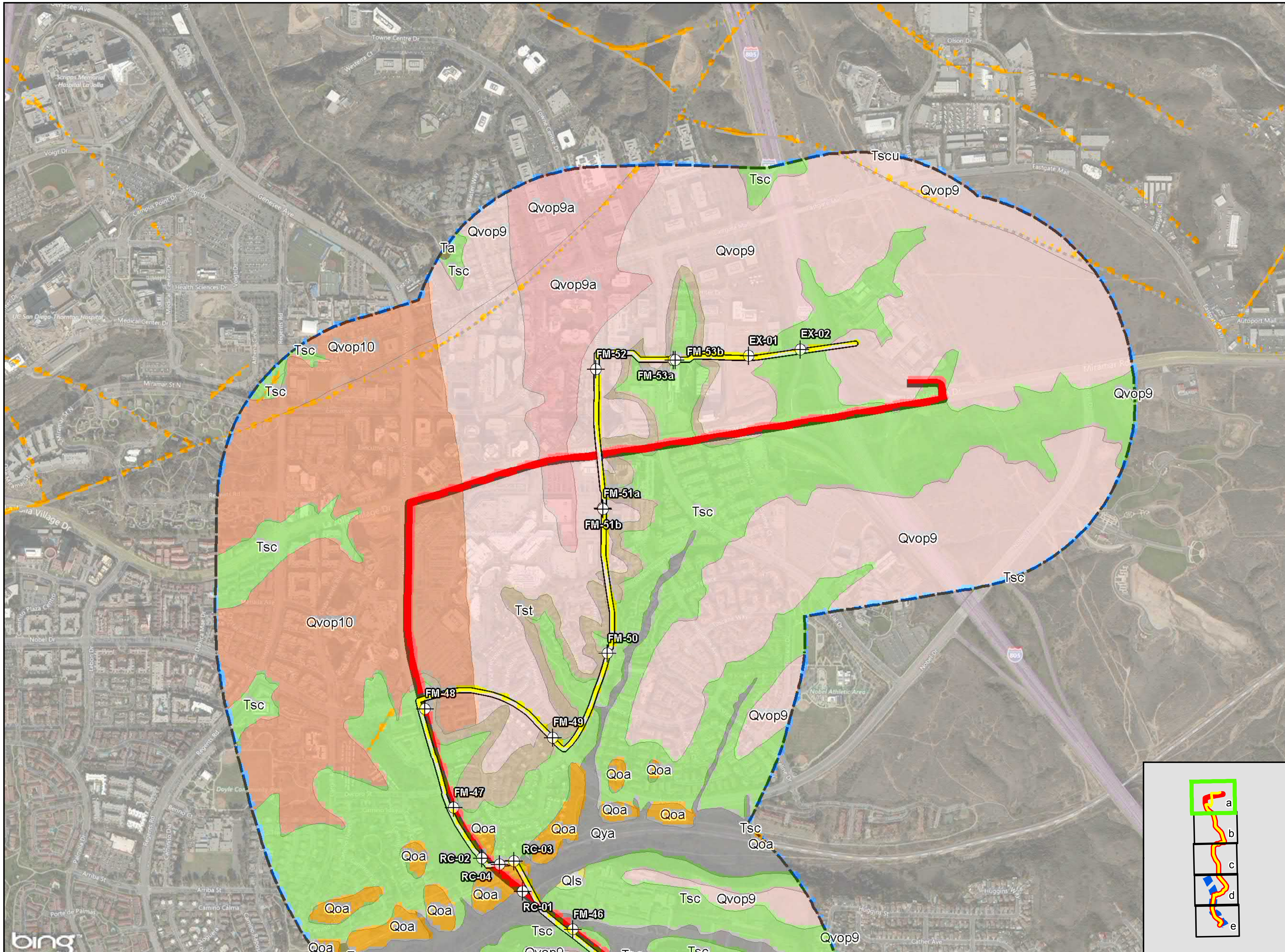
Figure 3a
Geologic Map of Project Alignment
Morena Pipeline Project
San Diego, CA



Alignments
- City Alternative No. 1a (20151123)
- City Alternative No. 2 (20151123)
- Alvarado Morena Pipeline
- 2,000-ft Buffer
- Geotechnical Boring

Alquist Priolo (EFZ) Faults
- Accurately Located Fault Trace
- Approximately Located Fault Trace
- Inferred Fault Trace
- Concealed Fault Trace
- Alquist-Priolo Earthquake Fault Zone

Faults (SanGIS)
- FAULT
- INFERRED FAULT
- CONCEALED ZONE
- SHEAR ZONE

Faults (Compiled interpretations)
- Distinct geomorphic features in historic aerial photos
- Moderately expressed geomorphic features in historic aerial photos
- Concealed
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Modern Surficial Deposits
- Qaf, Artificial fill
- Qls, Landslide deposits undivided
- Qmo, Undivided marine deposits in offshore region

Young Surficial Deposits
- Qya, Young alluvial flood plain deposits
- Qyc, Young colluvial deposits

Old Surficial Deposits
- Qoa, Old alluvial flood plain deposits undivided
- Qop6 and fault zone, Old paralic deposits Unit 6 and fault zone
- Qop6, Old paralic deposits Unit 6

Very Old Surficial Deposits
- Qvop10, Very old paralic deposits Unit 10
- Qvop10a, Very old paralic deposits Unit 10a
- Qvop11, Very old paralic deposits Unit 11
- Qvop9, Very old paralic deposits Unit 9
- Qvop9a, Very old paralic deposits Unit 9a

Sedimentary and Volcanic Bedrock Units
- Ta and fault zone, Ardath Shale and fault zone
- Ta, Ardath Shale
- Tf, Friars Formation
- Tmsc, Mount Soledad Formation cobble conglomerate
- Tmv, Mission Valley Formation
- Tp, Pomerado Conglomerate
- Tsc, Scripps Formation
- Tscu, Scripps Formation tongue in Carroll Canyon
- Tsd, San Diego Formation
- Tst, Stadium Conglomerate

Sources: SanGIS; Kennedy and Tan, 2008.

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Figure 3b
Geologic Map of Project Alignment
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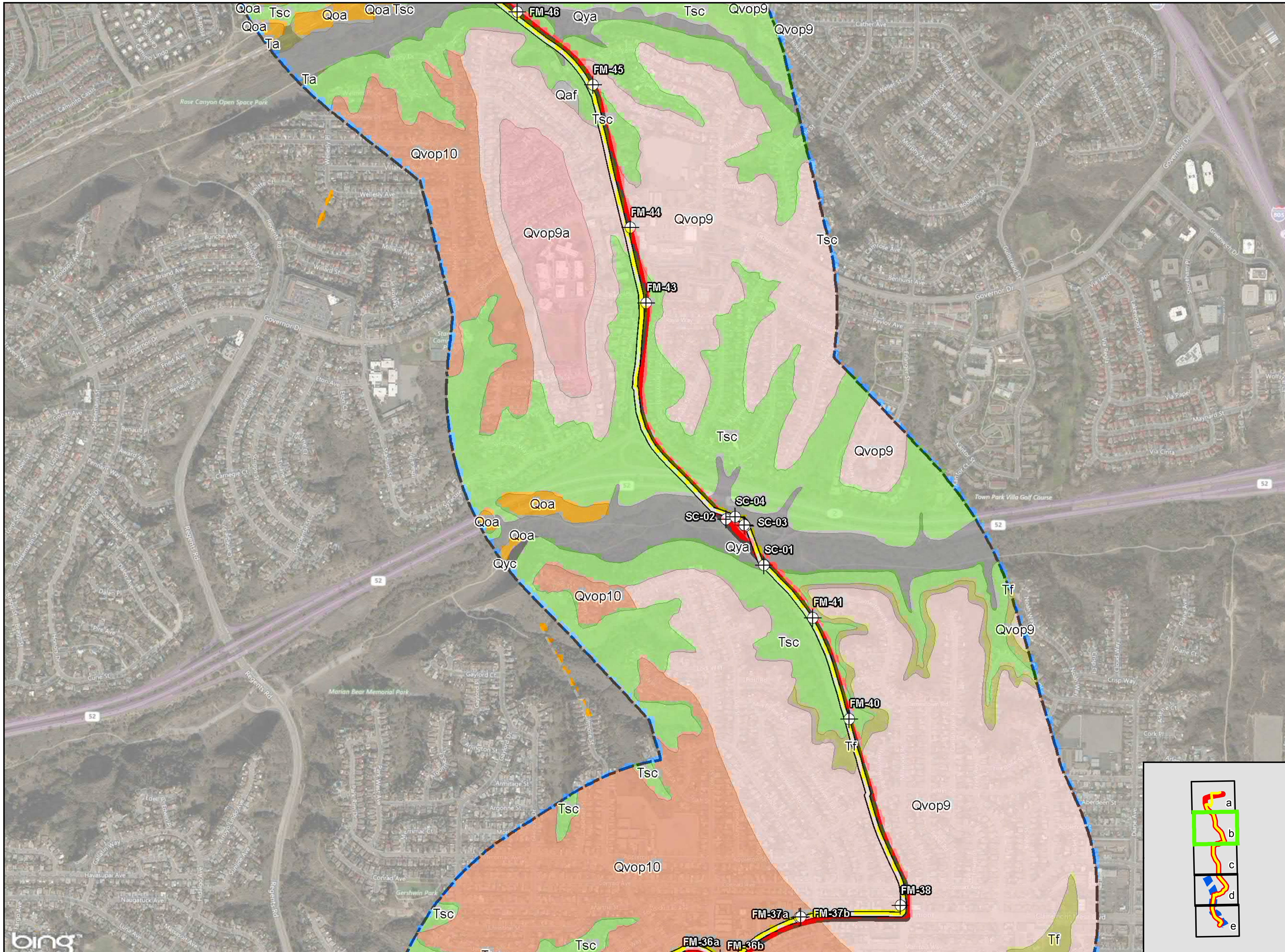

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Figure 3c
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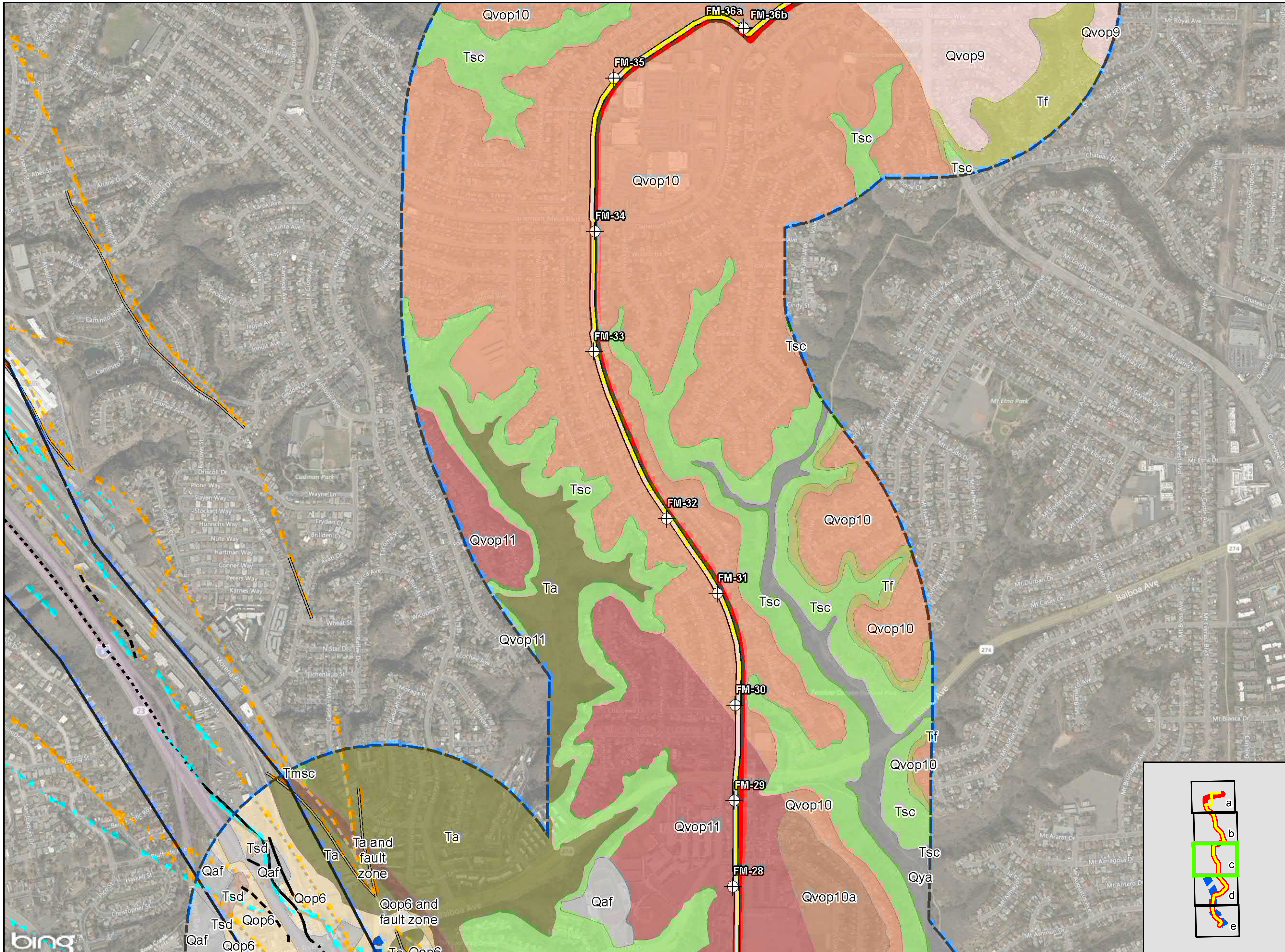

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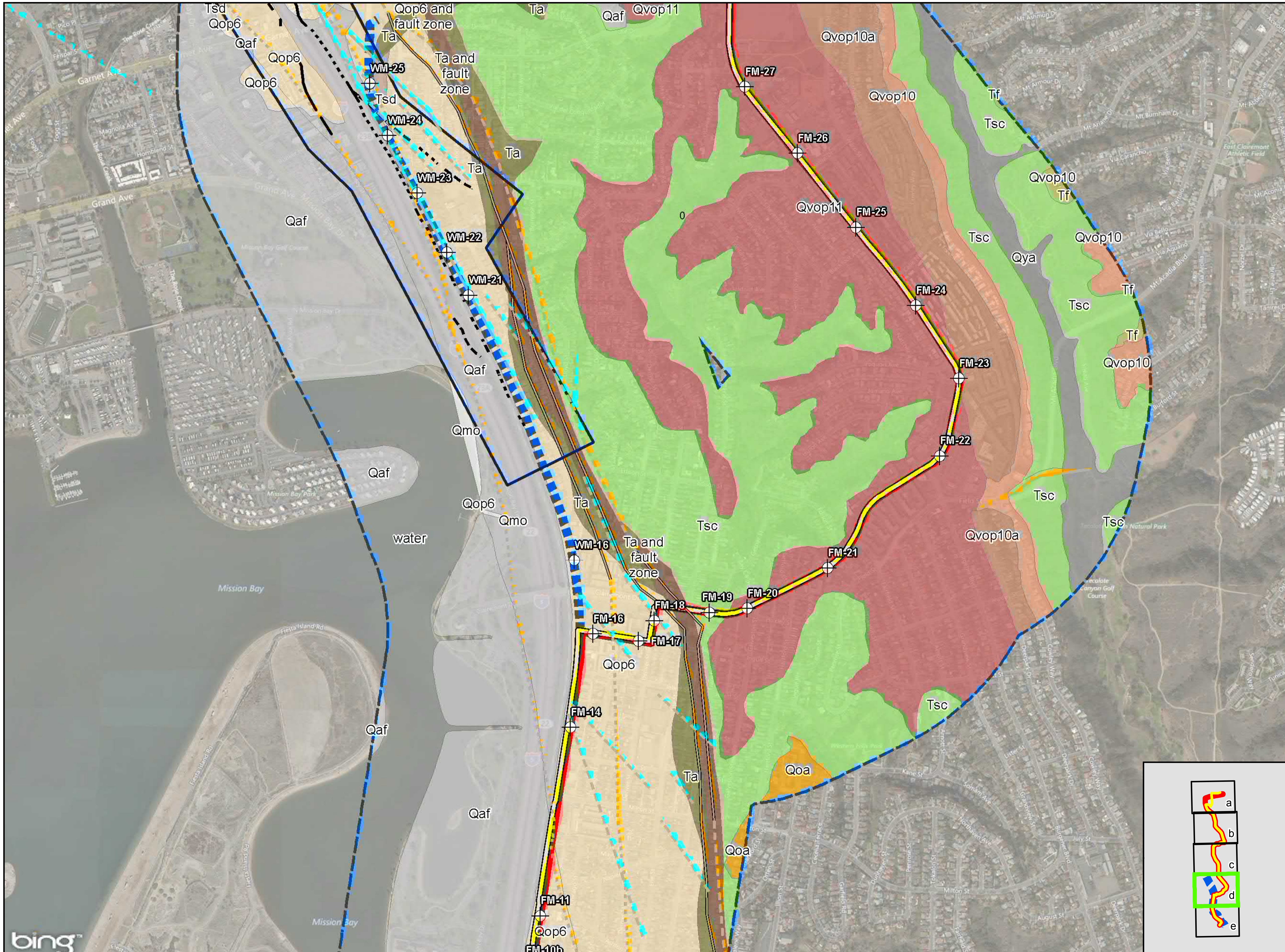

Figure 3d
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Figure 3e
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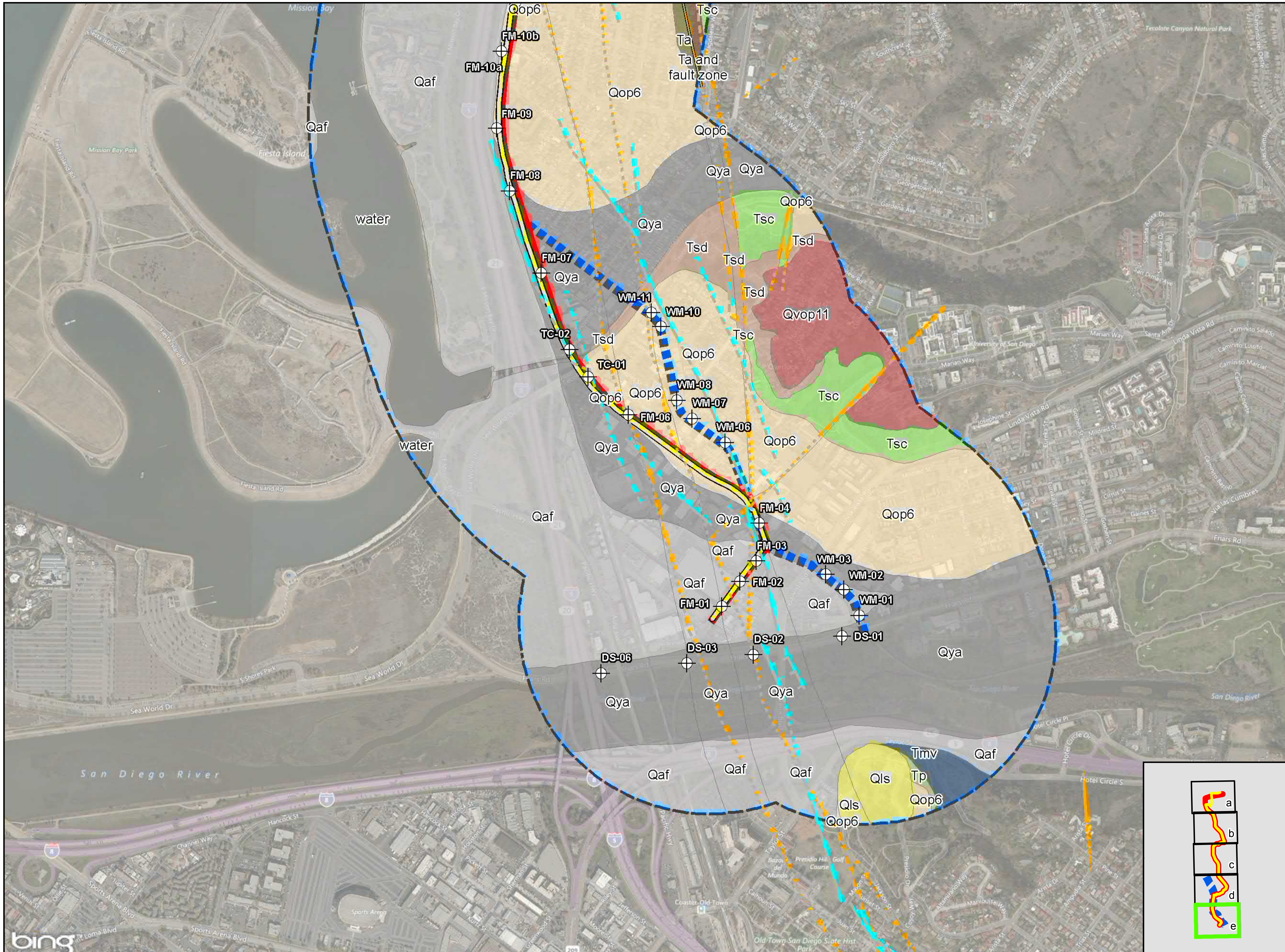

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- Graben

Modern Surficial Deposits
- Qaf, Artificial fill
- Qls, Landslide deposits undivided
- Qmo, Undivided marine deposits in offshore region

Young Surficial Deposits
- Qya, Young alluvial flood plain deposits
- Qyc, Young colluvial deposits

Old Surficial Deposits
- Qoa, Old alluvial flood plain deposits undivided
- Qop6 and fault zone, Old paralic deposits Unit 6 and fault zone
- Qop6, Old paralic deposits Unit 6

Very Old Surficial Deposits
- Qvop10, Very old paralic deposits Unit 10
- Qvop10a, Very old paralic deposits Unit 10a
- Qvop11, Very old paralic deposits Unit 11
- Qvop9, Very old paralic deposits Unit 9
- Qvop9a, Very old paralic deposits Unit 9a

Sedimentary and Volcanic Bedrock Units
- Ta and fault zone, Ardath Shale and fault zone
- Ta, Ardath Shale
- Tf, Friars Formation
- Tmsc, Mount Soledad Formation cobble conglomerate
- Tmv, Mission Valley Formation
- Tp, Pomerado Conglomerate
- Tsc, Scripps Formation
- Tscu, Scripps Formation tongue in Carroll Canyon
- Tsd, San Diego Formation
- Tst, Stadium Conglomerate

Sources: SanGIS; Kennedy and Tan, 2008.

0 1,000 Feet

1:12,000 1 inch = 1,000 feet

AECOM

AECOM San Diego U:\Projects_GIS\60530732\map_docs\mxd\geohazards_mapbook_1in1000ft.mxd, 8/29/2017, jason.sokol

Reference: KEH 60% Design 7-25-17

LEGEND

△	SH-01	Cone Penetration Test (CPT), 2017
⊕	PS-01	Exploratory Boring, 2017
⊕	PS-02	Exploratory Boring with Monitoring Well, 2017
A — A'		Location of Geologic Cross Section

Possible Fault Zone

With Setback

STONE COLUMNS TO 50 FEET BELOW GROUND SURFACE

STONE COLUMNS TO 80 FEET BELOW GROUND SURFACE

Q_{al} - FILL

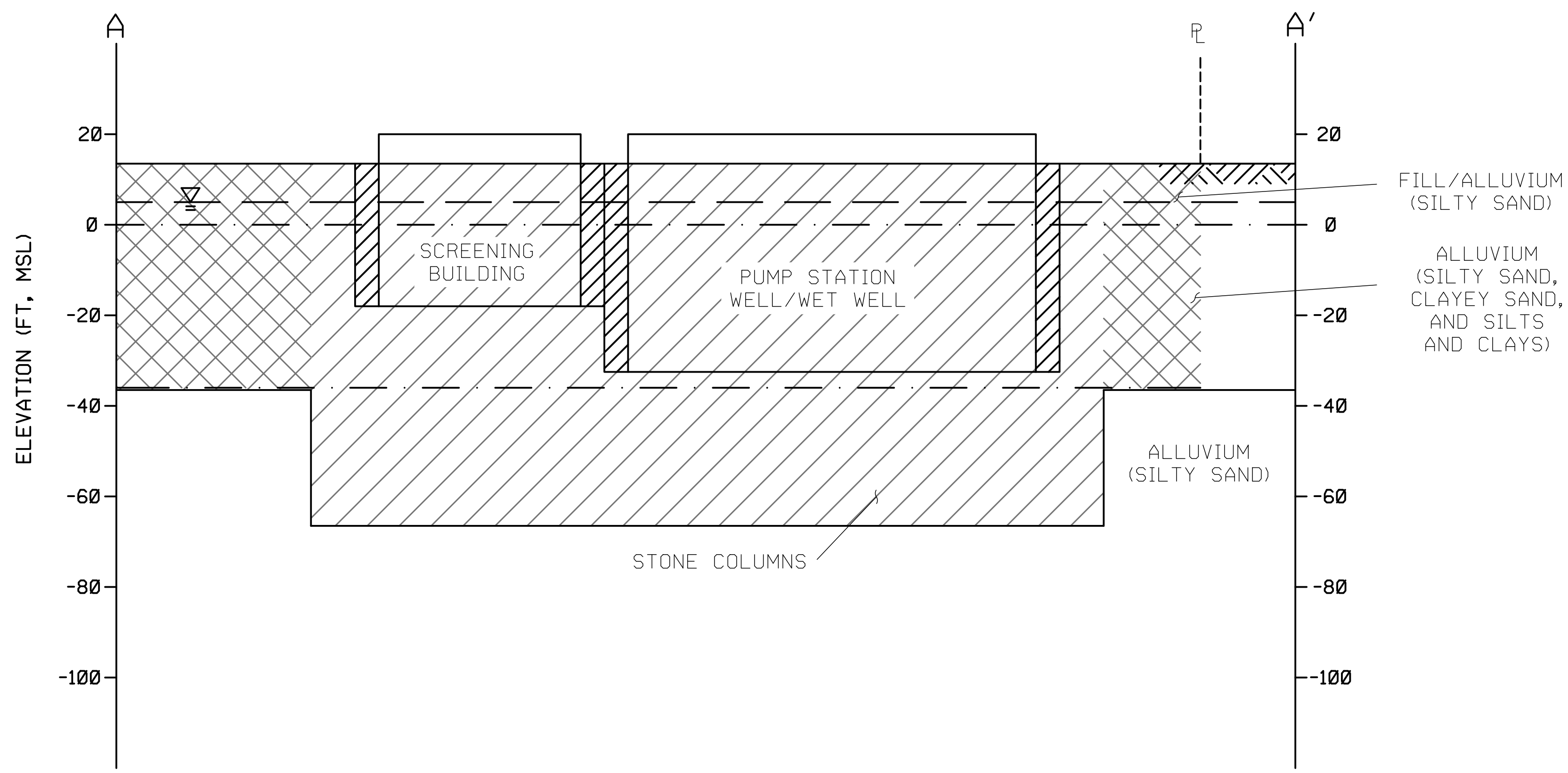
Q_f - ALLUVIUM (CIRCLED WHERE BURIED)

MORENA PUMP STATION LIQUEFACTION MITIGATION
MORENA PIPELINE PROJECT
SAN DIEGO, CALIFORNIA

AECOM

20 0 20 40
SCALE: 1"= 40'

CHECKED BY: SF	DATE: 7-31-17	FIG. NO:
PM: JL	PROJ. NO: 60530732	4a



LEGEND

GEOLOGIC CONTACT

STONE COLUMNS TO 50 FEET BELOW GROUND SURFACE

STONE COLUMNS TO 80 FEET BELOW GROUND SURFACE

CROSS SECTION A-A
MORENA PIPELINE PROJECT
SAN DIEGO, CALIFORNIA

AECOM

20 0 20 40
SCALE: 1"= 40'

CHECKED BY: SF | DATE: 7-31-17 | FIG. NO: 4b
PM: JL | PROJ. NO: 60530732

U:\Resources\GEOEng\GEO Proposal Resources\PURE Water\Maps and CAD\Figures\Fault Hazard Pump Station Site Plan_2017.09.12.dwg Sep 14, 2017 - 11:42am

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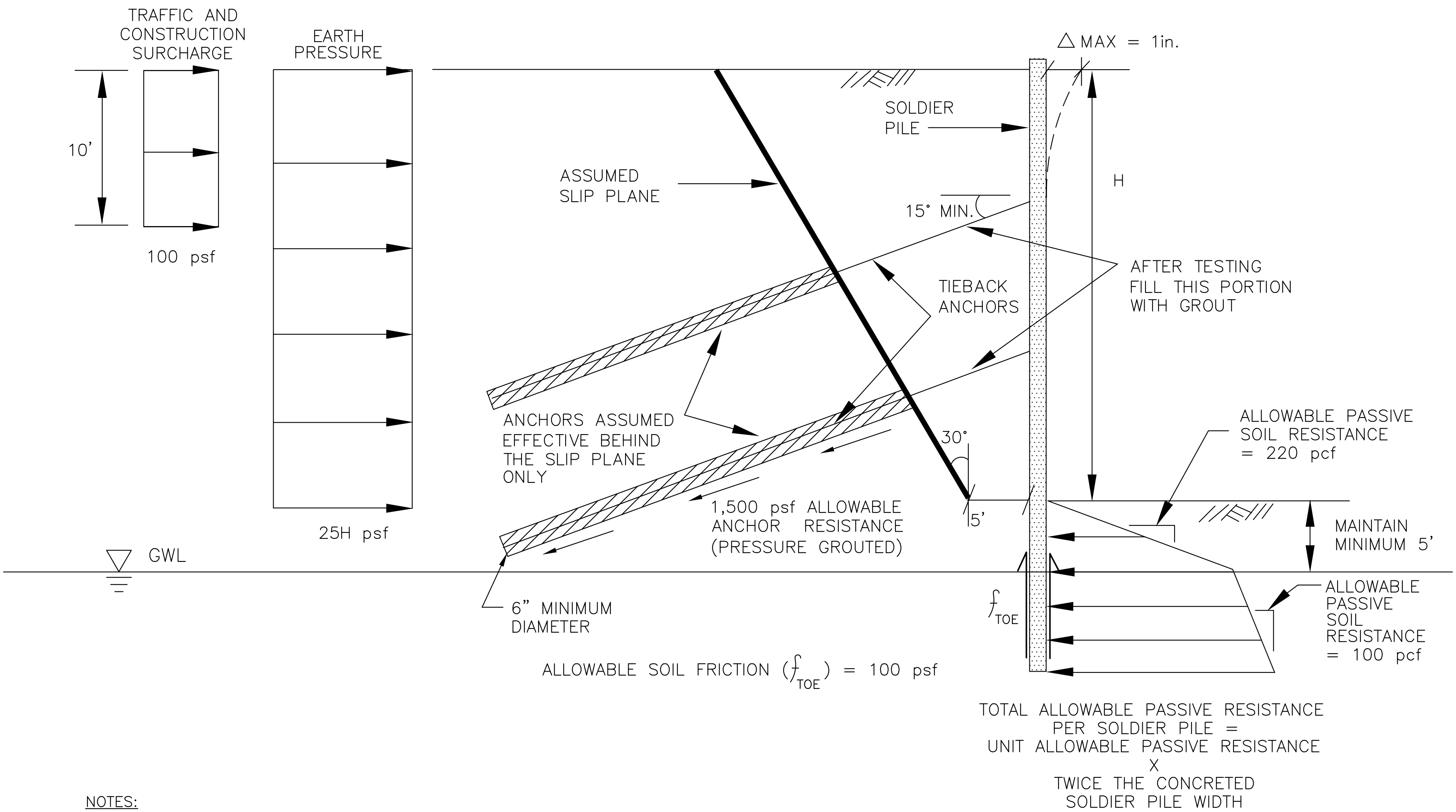


NOTES:

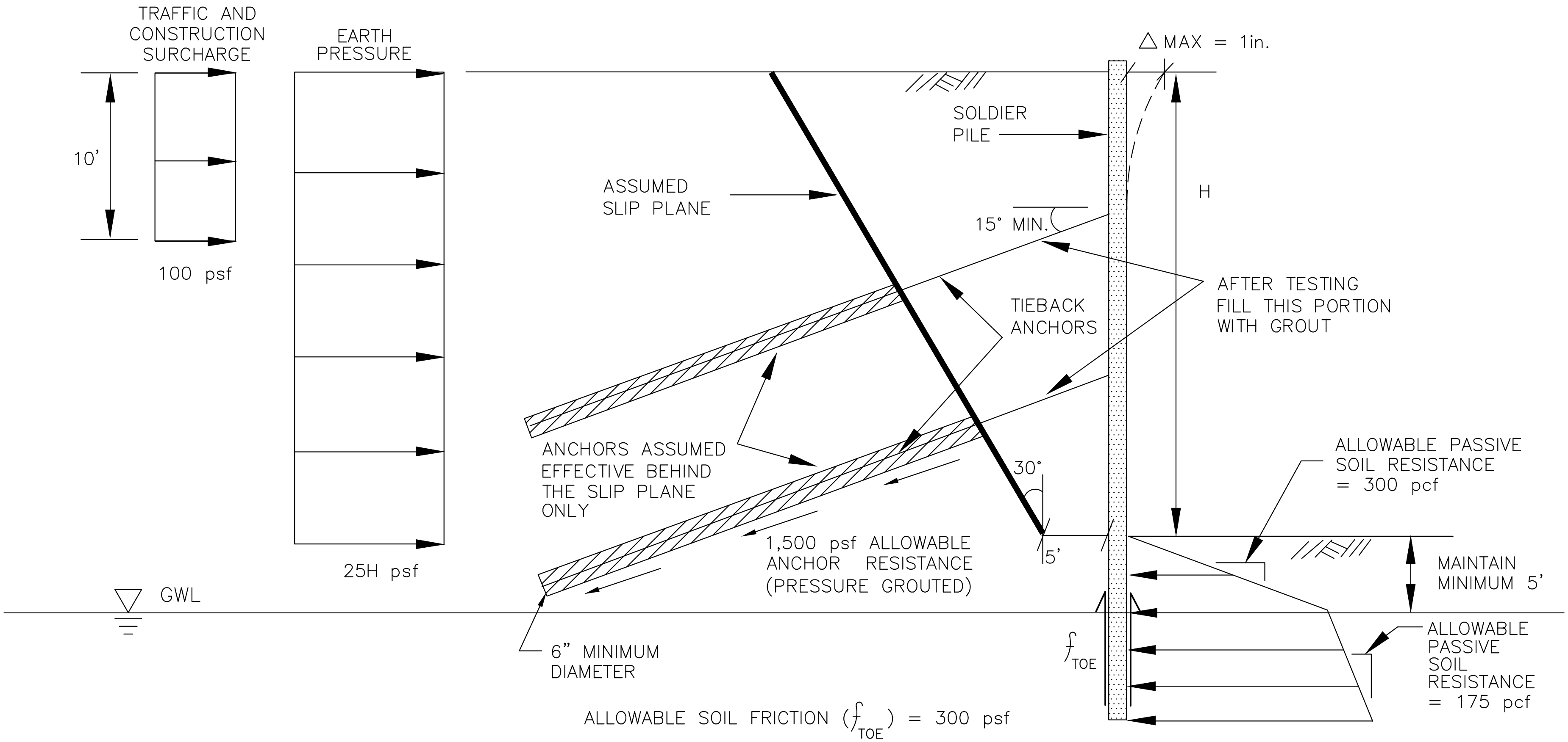
A. ASSUMES LEVEL BACKFILL AND NO HYDROSTATIC PRESSURE.

B. FOR PRELIMINARY DESIGN.

C. GWL – DESIGN GROUNDWATER LEVEL DURING CONSTRUCTION PER GEOTECHNICAL REPORT (5' BELOW BOTTOM OF EXCAVATION).

LATERAL EARTH PRESSURES AND RESISTANCES FOR TEMPORARY TIEBACK WALLS (0 '- 30' bgs)
MORENA PIPELINE PROJECT
SAN DIEGO, CALIFORNIA

AECOM	NOT TO SCALE	CHECKED BY: PB	DATE: 5–17–17	FIG. NO: 5
		PM: JL	PROJ. NO: 60530732	



TOTAL ALLOWABLE PASSIVE RESISTANCE PER SOLDIER PILE = UNIT ALLOWABLE PASSIVE RESISTANCE X TWICE THE CONCRETED SOLDIER PILE WIDTH

NOTES:

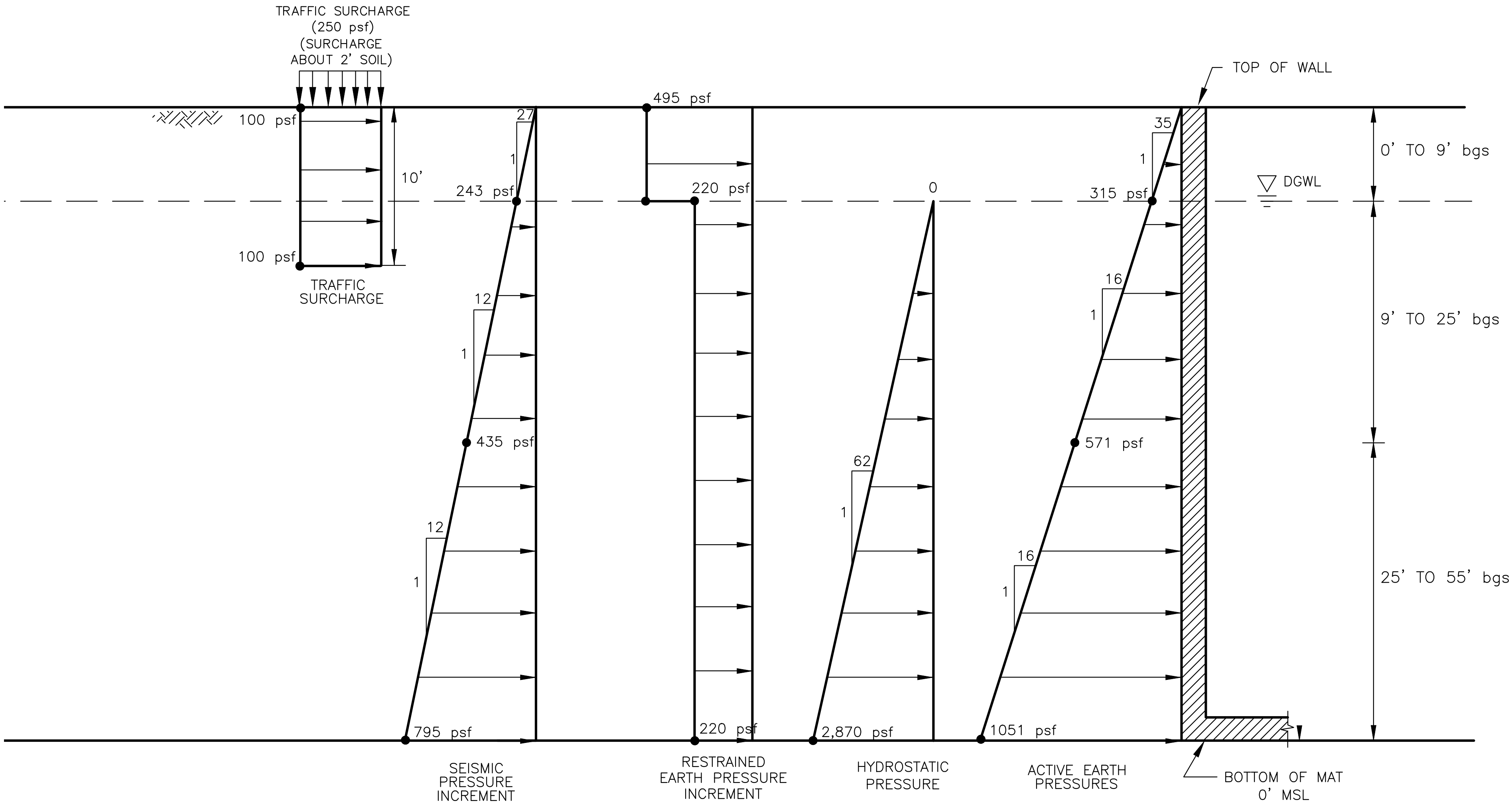
A. ASSUMES LEVEL BACKFILL AND NO HYDROSTATIC PRESSURE.

B. FOR PRELIMINARY DESIGN.

C. GWL – DESIGN GROUNDWATER LEVEL DURING CONSTRUCTION PER GEOTECHNICAL REPORT (5' BELOW BOTTOM OF EXCAVATION).

LATERAL EARTH PRESSURES AND RESISTANCES FOR TEMPORARY TIEBACK WALLS (0' - 50' bgs)
MORENA PIPELINE PROJECT
SAN DIEGO, CALIFORNIA

AECOM	NOT TO SCALE	CHECKED BY: PB	DATE: 5–17–17	FIG. NO:
		PM: JL	PROJ. NO: 60530732	**6**



NOTES:

1. DGWL: DESIGN GROUNDWATER LEVEL PER GEOTECHNICAL REPORT
2. STATIC AT REST PRESSURE = ACTIVE EARTH PRESSURE + RESTRAINED EARTH PRESSURE INCREMENT
3. SEISMIC PRESSURE = ACTIVE EARTH PRESSURE + SEISMIC PRESSURE INCREMENT

LATERAL EARTH PRESSURES FOR PERMANENT SUBTERRANEAN WALL
MORENA PIPELINE PROJECT
SAN DIEGO, CALIFORNIA

AECOM

NOT TO SCALE

CHECKED BY: PB | DATE: 5-17-17 | FIG. NO: 7

PM: JL | PROJ. NO: 60530732

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TABLES

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Table 1
Summary of Geotechnical Conditions Along Cut & Cover Pipeline Alignment

Location	Soils/Formations	Groundwater Depth (feet)	Geologic Hazards	Construction Considerations
Friars Rd. between the I-5 and Napa St.	Fill over deep alluvium	7 to 9 feet	Liquefaction, lateral spreading, flooding	Shallow groundwater, soft soils, shoring
South of Morena Pump Station	Fill over deep alluvium ~~(assumed)~~	6 to 10 feet (estimated)	Liquefaction, lateral spreading	Shallow groundwater, soft soils, shoring
Morena Pump Station to Morena Blvd.	Fill over alluvium	9 to 10 feet (at MPS) becoming deeper (10 to 15 feet) to the north	Liquefaction	Shallow groundwater, soft soils, shoring
Morena Blvd. near Napa St. to West Morena Blvd. near Vega St.	Fill over Bay Point Formation	10 to 14 feet	Flooding	Shallow groundwater, gravel & possible cobble layer
West Morena Blvd. near Vega St. to Morena Blvd. near Kane St.	Shallow to deep fill over alluvium or Bay Point Formation	10 to 18 feet	Liquefaction, flooding	Shallow groundwater, soft soils, shoring, possible cementation/concretions
Ingulf St. between Morena Blvd. and Denver St.	Shallow fill over Bay Point Formation	19.5 feet (near Morena), otherwise greater than trench depths	-	-
Denver St. and Clairemont Dr. to near Galveston St.	Shallow to deep fill over Scripps/Ardath Formation, some with Lindavista over Scripps Formation	Greater than trench depths	-	Possible cementation/concretions, gravel
Clairemont Dr. near Clairemont Ct. to Clairemont Mesa Blvd. and Genessee Ave.	Shallow to no fill over Lindavista Formation	19.5 feet (near Lakehurst Ave), otherwise greater than trench depths	-	Possible cementation/concretions, cobbles & boulders
Genessee Ave. near Appleton St. to near Radcliffe Ln.	Deep fill~~, with some~~ over Scripps Formation or alluvium	Greater than trench depths	-	Soft soils, shoring, possible cementation/concretions, cobbles & boulders
Genessee Ave. near Governor Dr. to near Centurion Square	Lindavista Formation, deep fill over alluvium, or shallow to deep fill over Scripps Formation	Greater than trench depths	-	Soft soils, shoring, possible cementation/concretions, cobbles & boulders
Genessee Ave. near Decoro St. to Towne Centre Dr. near Executive Dr.	Shallow to deep fill over Scripps Formation	Greater than trench depths	-	Possible cementation/concretions, cobbles & boulders, possible contamination (on Towne Centre Dr. near La Jolla Village Dr.)

~~Note:~~

1. ~~Subsurface data is based on preliminary sources.~~

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APPENDIX A

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Key to Logs

Sheet 1 of 1

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Dry Density, pcf	Dry Density, pcf	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10

COLUMN DESCRIPTIONS

1 **Elevation:** Elevation in feet referenced to NAVD88 or site datum.

2 **Depth:** Depth in feet below the ground surface.

3 **Sample Type:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

4 **Sample Number:** Sample identification number.

5 **Blows per foot:** Number of blows required to advance driven sampler 12 inches beyond first 6-inch interval, or distance noted, using a 140-lb hammer with a 30-inch drop.

6 **Graphic Log:** Graphic depiction of subsurface material encountered; typical symbols are explained below.

7 **Material Description:** Description of material encountered; may include relative density/consistency, moisture, color, particle size; texture, weathering, and strength of formation material. If shown, designation in parentheses denotes Munsell color classification.

8 **Water Content:** Water content of soil sample measured in laboratory, expressed as percentage of dry weight of specimen.

9 **Dry Unit Weight:** Dry density of soil sample measured in laboratory, in pounds per cubic foot.

10 **Remarks and Other Tests:** Comments and observations regarding drilling or sampling made by driller or field personnel.

SA	Sieve analysis, %<#200 sieve
WA	Three-point wash sieve, %<#200 sieve
LL	Liquid limit (from Atterberg limits test), %
PI	Plasticity Index [LL - PL], %; NP=nonplastic
DS	Direct Shear test
CORR	Corrosivity Test suite

TYPICAL MATERIAL GRAPHIC SYMBOLS

FILL

Lean CLAY (CL)

Fat CLAY (CH)

Silty CLAY (ML-CL)

Clayey SILT (CL-ML)

SILT (ML)

Elastic SILT (MH)

Clayey SAND (SC)

Silty SAND (SM)

Well-graded SAND with silt (SW-SM)

Well-graded SAND (SW)

Poorly-graded SAND with clay (SP-SC)

Poorly-graded SAND with silt (SP-SM)

Poorly-graded SAND (SP)

Well-graded GRAVEL with silt (GW-GM)

Poorly-graded GRAVEL with silt (GP-GM)

Poorly-graded GRAVEL (GP)

TYPICAL SAMPLER GRAPHIC SYMBOLS

2.5" I.D. sampler

Standard Penetration samper

Core Sample

Bulk Sample

OTHER GRAPHIC SYMBOLS

First water encountered at time of drilling and sampling (ATD)

Water level measured at specified time after completion of drilling and sampling

General change in material

Inferred or gradational contact between strata

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

Report: GEO_10_SNA_KEY; File: 60530732.GPJ; 8/31/2017 key soil

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	# Log of Boring DS-01 Sheet 1 of 2

Date(s) Drilled	**08/02/2017**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**51.5 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**18 feet**
Water Level Depth	**12 ft**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cement/Bentonite Grout**	Location	**N32.763304, W117.195882**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					7" AC over 12"AB over **Fill** Moist, red, poorly-graded fine SAND, trace clay			
15		Bulk	1						CORR
	5	SPT	2	9			9		
10									
	10	2.5" ID	3	5		**Alluvium** Loose, moist, mottled dark brown and red, clayey fine SAND (SC), trace fine to coarse gravel	13		
						Loose, moist, very dark brown, poorly-graded SAND (SP), trace fine gravel, trace silt ▽			
5									
	15	SPT	4	2		Soft, wet, dark brown, lean CLAY (CL), some fine sand, trace gravel	20	37	WA(37), LL(24), PI(8)
						Very loose, wet, silver-gray, clayey SAND (SC), some oxidation stains, interbeds of light gray clay			
0									
	20	SPT	5	7		Loose, wet, gray, poorly-graded fine to medium SAND (SP), trace silt	25		
-5									
	25	SPT	6	4		Loose, wet, gray, silty fine to medium SAND (SM)			
-10									
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 DS-01

AECOM

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	30		7	8		Decrease in fines content	28	14	WA(14)
-15									
	35		8	6		Becomes very micaceous, increase in fines content	38		
						Medium stiff, wet, gray, lean CLAY (CL), some fine sand, micaceous, interbeds of poorly-graded sand with silt			LL(39), PI(19)
-20									
	40		9	7		Increase in mica, increase in fine sand content			
-25									
	45		10	10		Stiff, wet, gray, SILT (ML), little fine sand, interbeds of clay	41		
-30									
	50		11	11		Stiff, wet, gray, clayey SILT (CL-ML), trace shells	35		
						Bottom of boring at 51.5 feet below ground surface			
-35									
	55								
-40									
	60								
-45									
	65								

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring DS-02

Date(s) Drilled	**08/02/2017**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**9 feet**
Water Level Depth	**8.4 ft**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.762757, W117.198883**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					7" AC over 7" AB over **Fill** Moist, red, poorly-graded fine SAND, trace silt, trace gravel and cobbles			
5									
	5		1	14		**Alluvium** Medium dense, moist, gray, clayey fine SAND (SC), trace small pockets of olive brown, poorly-graded sand	25	92	
						Medium dense, moist, very dark gray, silty fine SAND (SM), trace roots, micaceous			
0									
	10		2	1		Increase in mica content, decrease in silt content	49		WA(12)
-5									
	15		3	6			45		
						Loose, wet, gray, poorly-graded fine to medium SAND (SP-SM) with silt, micaceous			
-10			4	10		Trace shells, increase in mica content			
	20					Bottom of boring at 20.0 feet below ground surface			
-15									
	25								
-20									
	30								

AECOM

Figure A-3

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	# Log of Boring DS-03 Sheet 1 of 2

Date(s) Drilled	**08/03/2017**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**51.5 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**8 feet**
Water Level Depth	**8.3 ft**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cement/Bentonite Grout**	Location	**N32.76249, W117.201137**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0	Bulk	1			7" AC over 7" AB over **Fill** Moist, red, poorly-graded SAND, trace silt, trace gravel			
	5		2	28		**Alluvium** Very stiff, moist, mottled gray and olive, CLAY (CL), few fine sand, weakly cemented	28	95	
						Medium dense, moist, very dark gray, poorly-graded fine SAND (SP-SM) with silt, micaceous			
	10		3	3		becomes wet			
	15		4	6			33		SA(12)
						Loose, wet, gray, well-graded SAND with silt (SW-SM), few fine to coarse gravel			
	20		5	10		Wet, medium dense, gray, poorly-graded fine SAND (SP-SM) with silt			
						Trace shells			
	25		6	5		Increase in sand grain size	25		
						Medium stiff, wet, black, SILT (ML), few fine sand, micaceous			
	30								

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring DS-03

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	30		7	2		Soft, wet, very dark gray, lean CLAY (CL), few fine sand, trace shells	34		WA(42), LL(36), PI(15)
-25									
	35		8	6		Becomes medium stiff and micaceous			
-30									
	40		9	5		Medium stiff, wet, very dark gray, silty CLAY (ML-CL), trace shells	44		
-35									
	45		10	5		Medium stiff, wet, very dark gray, SILT (ML)			
-40									
	50		11	7		Increase in sand content 2" interbed of black lean CLAY (CL)	39		
						Medium stiff, wet, very dark gray, silty lean CLAY (ML-CL), gray and black thinly bedded			
						Bottom of boring at 51.5 feet below ground surface			
-45									
	55								
-50									
	60								
-55									
	65								

AECOM

Figure A-4

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	Log of Boring DS-06 Sheet 1 of 2

Date(s) Drilled	08/04/2017	Logged By	R. Bourdette	Checked By	S. Fitzwilliam
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	6-inch	Total Depth of Borehole	61.5 feet
Drill Rig Type	Unimog Marl M5	Drilling Contractor	Pacific Drilling	Approximate Surface Elevation	7 feet
Water Level Depth	7.8 ft	Sampling Method(s)	SPT / 2.5" ID / Bulk	Hammer Data	140 lbs / 30-inch
Borehole Completion	Cement/Bentonite Grout	Location	N32.76218, W117.20404		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0	Bulk	1			8" AC over 18" AB over **Fill** Moist, light brown,poorly-graded fine SAND with silt, few gravel	12		WA(39)
5									
	5	SPT/2.5" ID	2	26		**Alluvium** Medium dense, moist, very dark gray, silty fine SAND (SM), micaceous ← 1.5" interbed of very dark gray lean CLAY (CL)	23	102	
0						▽			
	10	SPT	3	11		Medium dense, wet, gray, poorly-graded fine to medium SAND (SP), trace silt, micaceous	28		
-5									
	15	SPT	4	12		Medium dense, wet, gray, poorly-graded fine SAND (SP-SM) with silt, micaceous	31		WA(8)
-10									
	20	SPT	5	6		← Increase in mica content	30		
						Medium stiff, wet, gray, SILT (ML), some fine sand			
-15									
	25	SPT	6	3		Soft, wet, black, lean CLAY (CL), trace sand, micaceous			
-20									
	30								

Figure A-5

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring DS-06

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	30		7	3		Becomes very dark gray, little fine sand, trace shells	36		LL(41), PI(16)
-25									
	35		8	4		Decrease in sand content			
-30									
	40		9	3			53		
-35									
	45		10	3		Increase in shell and sand content			
-40									
	50		11	7		Becomes medium stiff Decrease in sand content	43		
-45									
	55		12	35		Dense, wet, very dark gray, poorly-graded fine SAND (SP-SM) with silt, micaceous			
-50									
	60		13	13		Stiff, wet, very dark gray, silty lean CLAY (ML-CL), few fine sand, micaceous			
-55						Bottom of boring at 61.5 feet below ground surface			
	65								

AECOM

Figure A-5

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-01** Sheet 1 of 1

Date(s) Drilled	**04/27/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**11 feet**
Water Level Depth	**10 fbgs (during drilling)**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.76413, W117.19996**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0	Bulk				2"of AC over 6" of concrete over **Fill** Moist, dark grayish brown, silty fine SAND, few fine gravel, few chunks of intact formational soil			
10			1			Moist, brown, CLAY, mixed/disturbed structure	11		WA(31), COMP
	5	SPT	2	6		**Alluvium (Qal)** Loose, moist, grayish brown (2.5Y 5/3), poorly-graded fine SAND (SP), trace fines, few laminations of darker minerals, few thin silty SAND (SM) interbeds, micaceous			CORR
5									
	10	2.5" ID	3	12		becomes wet	24	98	
0									
	15	SPT	4	12		becomes medium dense, coarsens to predominantly fine to medium sand			
-5									
		SPT	5	6		becomes loose, few fines	22		WA(6)
	20					Bottom of boring at 20 feet below ground surface			
-10									
	25								
-15									
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-01

Figure A-6

AECOM

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring FM-02** Sheet 1 of 1

Date(s) Drilled	**04/27/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**13 feet**
Water Level Depth	**10 fbgs (during drilling)**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.76485, W117.19935**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					2" of AC over 6" of concrete over **Fill** Moist, dark grayish brown, silty fine SAND, trace fine gravel			
10			1				9		SA(23), COMP
	5		2	12			5	96	
						Alluvium (Qal) Medium dense, moist, brown (10YR 5/3), poorly-graded fine to medium SAND (SP), micaceous			
5									
	10		3	8		becomes wet, trace iron oxide staining, few laminations of darker minerals			CORR
0									
	15		4	7		few thin interbeds of silty SAND (SM)	30		WA(12)
-5						becomes loose			
			5	5					
	20					Bottom of boring at 20 feet below ground surface			
-10									
	25								
-15									
	30								

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-03** Sheet 1 of 1

Date(s) Drilled	**04/27/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**16 feet**
Water Level Depth	**15 fbgs (after drilling)**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.765444, W117.198803**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0	Bulk	1			5"of AC over **Fill** Moist, dark grayish brown, poorly-graded fine to medium SAND with silt contains chunks of intact formational soil, becomes light olive brown two 2" to 4" size chunks of rock becomes dark grayish brown			
15									
10	5	SPT	2	5			3		WA(11)
						Alluvium (Qal) Medium stiff, moist, very dark grayish brown (10YR 3/2), SILT (ML), micaceous, trace roots			
5	10	Ring	3	4					
		SPT	4	2		becomes soft			CORR
0	15	Ring	5	6		becomes medium stiff ▽			
						Very loose, wet, very dark gray (2.5YR 3/1), silty fine SAND (SM), micaceous			
		SPT	6	2					
-5	20					Bottom of boring at 20 feet below ground surface			
-10	25								
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-03

Figure A-8

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-04

Date(s) Drilled	**05/02/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**22 feet**
Water Level Depth	**14 fbgs (during drilling)**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.76653, W117.19873**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					7"of AC over 7" of AB over __Fill__ Moist, brown, silty fine SAND, trace fine gravel			
20									
	5								
15						few fine to coarse gravel			
	10		1	27		__Bay Point Formation (Qbp)__ Medium dense, moist, brown (7.5YR 4/3), silty fine SAND (SM), few fine gravel, material is oxidized	8		WA(38)
10									
	15		2	30		becomes wet, moderately cemented, few fine to coarse gravel	18	109	
5									
			3	20		Medium dense, wet, brown (7.5YR 5/3), well-graded SAND (SW-SM) with silt, few fine gravel, oxidized			
	20					Bottom of boring at 20 feet below ground surface			
0									
	25								
-5									
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-04

Figure A-9

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	# Log of Boring FM-06 Sheet 1 of 1

Date(s) Drilled	**05/02/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**16 feet**
Water Level Depth	**10.5 fbgs (during drilling)**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.769601, W117.203201**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
15	0					7" of AC over 7" of AB over **Fill** Moist, brown, silty fine to medium SAND			
	3					**Bay Point Formation (Qbp)** Medium dense, moist, brown (7.5YR 4/4), silty fine to medium SAND (SM), material is oxidized, few thin interbeds of finer grained soil			
10	5		1	13			7		SA(13)
	6–11					contains gravel / potentially few cobbles			
5	10		2	19 50/5"		▽			
	12					Medium dense, wet, brown (7.5YR 4/3), silty fine SAND (SM), micaceous, few thin interbeds of sandier material			
			3	22					CORR
0	15		4	34			22	108	
	18					Very loose, wet, brown (7.5YR 5/3), well-graded SAND (SW), trace to few fine gravel, trace fines, micaceous			
			5	1			19		WA(1)
-5	20					Bottom of boring at 20 feet below ground surface			
-10	25								
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-06

Figure A-10

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-07** Sheet 1 of 1

Date(s) Drilled	**05/02/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**12 feet**
Water Level Depth	**10 fbgs (during drilling)**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.77364, W117.2062**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" of AC over 6" of AB over **Fill** Moist, dark grayish brown, silty SAND, trace gravel, black staining			
10			1				15		WA(45), COMP
						Alluvium (Qal) Loose, moist, dark brown, silty fine SAND (SM) 6" thick interbed of sandy lean CLAY (CL)			
	5		2	10		Medium dense, moist, brown, poorly-graded fine SAND (SP)	8	104	
5									
	10		3	5		becomes wet, trace fine gravel, trace iron oxide staining	21		WA(5)
0									
	15		4	5		becomes loose			
-5									
			5	12		becomes medium dense, mostly fine to medium grained sand	20	105	
	20					Medium dense, wet, brown, silty fine SAND (SM) Bottom of boring at 20 feet below ground surface			
-10									
	25								
-15									
	30								

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-08

Sheet 1 of 1

Date(s) Drilled	**05/10/17**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch / 4" drag bit and tri-cone bit**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Diedrich D-50 Turbo**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**13 feet**
Water Level Depth	**17.5 fbgs (during drilling)**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.77599, W117.20729**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0	Bulk	1			17" AC over 3" AB over **Fill** Moist, brown, poorly graded SAND, some gravel			CORR
10						**Alluvium (Qal)** Moist, brown (7.5YR 3/3), lean CLAY (CL)			
	5	SPT	2	20		Very stiff, brown (7.5YR 4/4), silty fine SAND (SM), some iron oxide staining	12		
5									
	10	2.5" ID	3	40		Hard, moist, dark yellowish brown, sandy lean CLAY (CL), some fine to medium sand, some manganese oxide spots	9	123	SA(51)
0									
	15	SPT	4	8		Stiff, brown (7.5YR 3/3), lean CLAY (CL), iron oxide staining, manganese oxide spots	19		LL(28), PI(18)
						becomes wet			
-5		2.5" ID	5	9					
	20					Bottom of boring at 20.0 feet below ground surface			
-10									
	25								
-15									
	30								

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-09

Date(s) Drilled	**05/17/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**23 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.77778, W117.20776**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					9" AC over 11" of AB over **Fill** Moist, brown, clayey fine to medium SAND, trace fine gravel			
20									
						few fine to coarse gravel (trench backfill for sewer main)			
	5		1	4			8		
15						3/4" gravel			
	10		2	14		**Bay Point Formation (Qbp)** Medium dense, moist, brown (7.5YR 5/4), poorly-graded fine to coarse SAND with silt (SP-SM), trace to few fine to coarse gravel, oxidized	3		SA(10)
10									
	15		3	15		moist, brown, lean CLAY (CL) thin interbed	3		
5						Stiff, moist, brown (7.5YR 4/3), lean CLAY (CL), few fine sand, little iron oxide staining, trace manganese oxide spots			
			4	20					
	20					Bottom of boring at 20 feet below ground surface			
0									
	25								
-5									
	30								

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Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	# Log of Boring FM-10a Sheet 1 of 1

Date(s) Drilled	**05/10/17**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch / 4" drag bit and tri-cone bit**	Total Depth of Borehole	**7.5 feet**
Drill Rig Type	**Diedrich D-50 Turbo**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**20 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.77999, W117.20762**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
20	0	Bulk	1			14" AC over 3" AB over **Fill** Moist, brown, sandy SILT, some fine sand			CORR
						Alluvium (Qal) Medium dense, moist, brown (7.5YR 4/4), silty fine SAND (SM), iron oxide staining			
15	5	Drive	2	13		Medium dense, moist, brown (7.5YR 3/3), clayey fine to medium SAND (SC)	17		
						Bottom of boring at 7.5 feet below ground surface (refusal on hard material)			
10	10								
5	15								
0	20								
-5	25								
-10	30								

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-10b** Sheet 1 of 1

Date(s) Drilled	**05/10/17**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch / 4" drag bit and tri-cone bit**	Total Depth of Borehole	**7.5 feet**
Drill Rig Type	**Diedrich D-50 Turbo**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**20 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.78000, W117.207619**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
20	0					14" AC over 3" AB over **Fill** Moist, brown, clayey fine SAND (SC)			
						Alluvium (Qal) Moist, brown (7.5YR 4/4), silty fine SAND (SM), iron oxide staining			
15	5								
									No Recovery
						Bottom of boring at 7.5 feet below ground surface (refusal on hard material)			
10	10								
5	15								
0	20								
-5	25								
-10	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-10b

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-11

Date(s) Drilled	**05/09/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**18 feet**
Water Level Depth	**14.7 fbgs (during drilling)**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.78142, W117.20714**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0	Bulk	1			9" of AC over 6" of AB over **Fill** Moist, brown, sandy SILT			
15						**Alluvium (Qal)** Loose, moist, brown (7.5YR 4/4), silty fine SAND (SM), material is oxidized			
						Loose, moist, dark yellowish brown (10YR 4/4), poorly-graded fine SAND (SP-SM) with silt, trace iron oxide staining, trace clay films within soil, micaceous			
	5	SPT	2	7			7		SA(11)
10									
	10	2.5" ID	3	24		**Bay Point Formation (Qbp)** Very stiff, moist, olive brown (2.5Y 4/2), sandy lean CLAY (CL), few iron oxide staining, few manganese oxide spots	19	113	LL(32), PI(18)
5									
						Medium stiff, wet, dark grayish olive (10YR 4/2), SILT (ML), few fine sand, micaceous, little iron oxide staining, moderate hydrocarbon odor ▽			
	15	SPT	4	6			30		
0									
		2.5" ID	5	19		Medium dense, wet, dark yellowish brown (10YR 4/4), poorly-graded fine to medium SAND (SP-SM) with silt, micaceous, slight hydrocarbon odor			
	20					Bottom of boring at 20 feet below ground surface			
-5									
	25								
-10									
	30								

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Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring FM-14** Sheet 1 of 1

Date(s) Drilled	**05/09/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**15 feet**
Water Level Depth	**10 fbgs (during drilling)**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.78684, W117.20617**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
15	0	Bulk	1			4" of AC over 9" of AB over **Fill** Moist, yellowish brown, sandy SILT, mixed soils (chaotic structure)			CORR
						Moist, brown, silty fine SAND			
10	5		2	10		**Alluvium (Qal)** Medium dense, moist, poorly-graded fine to medium SAND (SP), trace fines, trace fine gravel, trace iron oxide staining, micaceous	6		
						Bay Point Formation (Qbp) Stiff, moist, brown (10YR 4/3), sandy lean CLAY (CL), few calcium carbonate and manganese oxide spots (Btk)	16		
						Medium dense, moist, light olive brown (2.5YR 5/3), poorly-graded fine to medium SAND (SP-SM) with silt, little iron oxide staining, micaceous, few thin interbeds of silty SAND (SM)			
5	10		3	34		becomes wet			Non-Plastic
0	15		4	14		Medium dense / stiff, wet, brown (7.5YR 4/4), moderate to thick interbedded poorly-graded SAND (SP-SM) with silt, sandy lean CLAY (CL) and lean CLAY (CL), little iron oxide staining, few manganese oxide spots	15 17		
						Very stiff, wet, brown (7.5YR 4/3), sandy lean CLAY (CL), little iron oxide staining, few manganese oxide spots			
			5	19					
-5	20					Bottom of boring at 20.0 feet below ground surface			
-10	25								
-15	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-14

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Figure A-17

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-16

Date(s) Drilled	**05/09/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**31 feet**
Water Level Depth	**19.5 fbgs (during drilling)**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.78952, W117.20543**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					3" of AC over 7" of AB over **Fill** Moist, yellowish brown, sandy SILT, few fine gravel, mixed soils (chaotic structure)			
30									
						Bay Point Formation (Qbp) Moist, reddish brown (10YR 5/4), lean CLAY (CL) with fine sand, few manganese oxide spots			
	5					Very stiff, moist, dark yellowish brown (10YR 4/6), SILT (ML) with fine sand, few iron oxide staining, few manganese oxide spots			
25			1	19					
	10								
20			2	25			12	119	
	15					becomes stiff			
15			3	14			12		
						Stiff, moist, dark yellowish brown (10YR 4/4), sandy lean CLAY (CL)			
			4	13		becomes wet ▽	20	108	SA(63)
	20					Bottom of boring at 20 feet below ground surface			
10									
	25								
5									
	30								

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-17** Sheet 1 of 1

Date(s) Drilled	**05/10/17**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch / 4" drag bit and tri-cone bit**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Diedrich D-50 Turbo**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**50 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.78933, W117.20388**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
50	0					3" AC over 3" AB over **Fill** Moist, brown, clayey fine SAND, tree root in top 1'			
45	5		1	40		becomes dark brown (7.5YR 3/3)	13	115	
						Bay Point Formation (Qbp) Dense, moist, yellowish brown (10YR 5/5), poorly-graded fine SAND (SP), trace fines			
40	10		2	67		Very dense, moist, gray brown (10YR 5/2), poorly graded fine SAND (SP), iron oxide staining, trace black spots	18		
						Very dense, moist, olive yellow, silty SAND (SM), little iron oxide staining			
35	15		3	83		increase iron oxide staining	16	113	SA(41)
						Very dense, moist, light brown gray, well-graded SAND (SW), some gravel, trace fines			
			4	45		Dense, moist, gray brown (10YR 5/2), poorly-graded fine SAND (SP), iron oxide staining			
30	20					Bottom of boring at 20.0 feet below ground surface			
25	25								
20	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-17

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Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-18** Sheet 1 of 1

Date(s) Drilled	**05/17/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**19.5 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**58 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.78992, W117.20335**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					9" of AC over **Fill** Moist, yellowish brown, silty fine SAND, few fine to coarse gravel			CORR
55		Bulk	1						
						coarse gravel/cobble			
	5	SPT	2	31		**Scripps/Ardath Formations (Tsc/Ta)** Highly weathered, extremely weak, very soft to soft sedimentary rock Fragments to: Hard, moist, mottled yellowish brown (10YR 5/6), and light brownish gray (2.5Y 6/2), lean CLAY (CL), few fine sand, some iron oxide staining, trace manganese oxide staining, localized weak to moderate cementation	15		
50									
	10	2.5" ID	3	53			19	107	WA(93)
45									
	15	SPT	4	43		slight decrease in weathering, little iron oxide staining, predominantly gray (2.5Y 5/1)	18		
40		2.5" ID	5	50 6"			21	107	
	20					Bottom of boring at 19.5 feet below ground surface			
35									
	25								
30									
	30								

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-19** Sheet 1 of 1

Date(s) Drilled	**06/26/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**105 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.790166, W117.201486**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
105	0					5" AC over 6" AB over **Fill** Moist, dark yellowish brown, SILT, little to some sand, trace gravel, some chunks of Scripps Fm. material, trace chunks of clay			
100	5		1	33			18		SA(71)
95	10		2	40			14	115	
						Scripps Formation (Tsc) Hard, moist, dark yellowish brown (10YR 4/4), SILT (ML) with gravel			
90	15		3	70					
			4	77					
85	20					Bottom of boring at 20.0 feet below ground surface			
80	25								
75	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-19

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	# Log of Boring FM-20 Sheet 1 of 1

Date(s) Drilled	**06/26/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.8 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**151 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.79029, W117.200206**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
150	0		1			5" AC over 4" AB over **Fill** Moist, dark yellowish brown, SILT, trace sand, some harder fragments of silty SAND			CORR
145	5		2	95 12"		**Lindavista Formation (Qln)** Very dense, moist, dark yellowish brown (10YR 4/6), clayey SAND (SC), trace gravel, little laminations of darker-grained minerals, some iron oxide staining, interbeds of silty sand, little manganese oxide nodules	18		SA(48)
140	10		3	97 12"		Hard, moist, brown (10YR 4/3), sandy lean CLAY (CL), little iron oxide staining	19	101	LL(47), PI(24)
135	15		4	87		**Scripps Formation (Tsc)** Hard, moist, pale brown (10YR 6/5), lean CLAY (CL) with sand, trace gravel, laminations of iron-oxide rich materials and darker-grained minerals	18		SA(82)
			5	84 9"			19	97	
130	20					Bottom of boring at 19.8 feet below ground surface			
125	25								
	30								

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-21

Date(s) Drilled	**06/26/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**212 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.791472, W117.197492**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0	Bulk	1			2" AC over 7" concrete over 1" AB over **Fill** Moist, dark yellowish brown, SAND with silt			CORR
210						**Lindavista Formation (Qln)** Moist, dark yellowish brown (10YR 3/6), lean CLAY (CL) with gravel, little small cobbles			
	5	SPT	2	59		Hard, moist, dark yellowish brown (10YR 3/4), clayey SAND (SC), few fine to medium gravel, some laminations of sandy lean CLAY (CL), trace roots	6		SA(31)
205									
	10	2.5" ID	3	42		Dense, moist, very pale brown (10YR 7/4), clayey SAND (SC), some iron oxide staining	5	105	
200									
	15	SPT	4	47					
195									
		2.5" ID	5	65		Hard, moist, light brownish gray (10YR 6/2), lean CLAY (CL) with fine sand, some iron oxide staining	21	90	
	20					Bottom of boring at 20.0 feet below ground surface			
190									
	25								
185									
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-21

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-22

Date(s) Drilled	**06/27/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**296 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.79472, W117.19372**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					8" AC over **Fill** Moist, dark yellowish brown, silty SAND with clay, little AC chunks			
295									
	5		1	50 6"		becomes very moist			
290						**Lindavista Formation (Qln)** Very dense, moist, strong brown (7.5YR 5/8), clayey SAND (SC), trace manganese oxide nodules			
	10		2	50 6"			11	100	
285						Dense, moist, strong brown (7.5 YR 4/6), silty SAND (SM) with clay			
	15		3	50 6"					
280						medium to coarse gravel layer			
			4	72		becomes micaceous	11	105	
	20					Bottom of boring at 20.0 feet below ground surface			
275									
	25								
270									
	30								

Log of Boring FM-23

Sheet 1 of 1

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Date(s) Drilled	06/27/2017	Logged By	E. Marquez	Checked By	S. Fitzwilliam
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	8-inch	Total Depth of Borehole	20.0 feet
Drill Rig Type	CME 85	Drilling Contractor	Cascade Drilling	Approximate Surface Elevation	323 feet
Water Level Depth	not encountered	Sampling Method(s)	SPT / 2.5" ID / Bulk	Hammer Data	140 lbs / 30-inch
Borehole Completion	Bentonite and cuttings with concrete cap	Location	N32.796941, W117.193087		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					5" AC over **Fill** Moist, dark reddish brown, clayey SAND, trace construction debris			LL(22), PI(11)
		Bulk	1						
320									
	5		2	70		**Lindavista Formation (Qln)** Hard, moist, strong brown (7.5YR 4/6), CLAY (CL)			
315									
	10	SPT	3	50/6"		Very dense, moist, strong brown (7.5YR 4/6), clayey SAND (SC)	12	103	
310									
	15		4	70					
305						Very dense, moist, strong brown (7.5YR 4/6), silty SAND (SM)			
		SPT	5	64			11	114	
	20					Bottom of boring at 20.0 feet below ground surface			
300									
	25								
295									
	30								

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Figure A-25

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-24

Date(s) Drilled	**06/27/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.5 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**311 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.79902, W117.19457**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					8" AC over **Fill** Moist, yellowish red, SILT with sand			
310						**Lindavista Formation (Qln)** Very dense, moist, strong brown (7.5YR 5/8), clayey SAND (SC), trace medium gravel, interbeds of well-cemented, brown (10YR 4/5), poorly-graded SAND (SP-SM) with silt			
305	5		1	50 3"			6		WA(21)
300	10		2	50 4"		Very dense, moist, strong brown (7.5 YR 4/6), silty SAND (SM) with clay, little fine to coarse gravel	9		
295	15		3	50 6"		Hard, moist, strong brown (7.5YR 5/8), clayey SAND (SC), little fine to coarse gravel, some manganese oxide staining			
			4	50 6"		Hard, moist, strong brown (7.5YR 4/6), silty SAND (SM) with clay	9		
290	20					Bottom of boring at 19.5 feet below ground surface			
285	25								
	30								

AECOM

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	Log of Boring FM-25 Sheet 1 of 1

Date(s) Drilled	07/27/2017	Logged By	R. Bourdette	Checked By	S. Fitzwilliam
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	8-inch	Total Depth of Borehole	19.3 feet
Drill Rig Type	CME 85	Drilling Contractor	Cascade Drilling	Approximate Surface Elevation	303 feet
Water Level Depth	not encountered	Sampling Method(s)	SPT / 2.5" ID / Bulk	Hammer Data	140 lbs / 30-inch
Borehole Completion	Bentonite and cuttings with concrete cap	Location	N32.80125, W117.196628		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					5" AC over 3" AB over **Fill** Moist, brown, poorly-graded fine SAND			
300		Bulk	1			**Lindavista Formation (Qln)** Moist, olive-gray,clayey SAND (SC)	10		WA(30), CORR, LL(22), PI(11)
	5	SPT	2	83 12"		Very dense, moist, olive-gray, clayey fine SAND (SC), strongly cemented interbed at 5 ft bgs			
295									
	10		3	85 12"		Hard, moist, olive-gray, lean CLAY (CL), some mottled brown fine sand Very dense, moist, olive-brown, poorly-graded fine SAND with clay (SP-SC), trace coarse sand and gravel	11	107	
290									
	15	SPT	4	50 6"		Very dense, moist, olive-brown, poorly-graded fine SAND (SP), few gravel, ~0.5 ft gravel layer at 15 ft bgs			
285			5	78 9"		Very dense, moist, olive-brown, clayey fine to coarse SAND (SC), few gravel, trace mottle oxidation	10		SA(20)
	20					Bottom of boring at 19.25 feet below ground surface			
280									
	25								
275									
	30								

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Figure A-27

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-26

Date(s) Drilled	**07/27/2017**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.5 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**113 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.803355, W117.198636**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" AC over 4" AB over **Fill** Moist, brown, poorly-graded fine SAND			
						Lindavista Formation (Qln) Moist, dark gray, lean CLAY (CL)			
110						Moist, gray-brown, poorly-graded fine SAND (SP), trace coarse sand and gravel, gravel and cobble layer at 3 - 8 ft bgs			
	5		1	50 6"		Very dense, moist, olive-gray, well-graded SAND (SW), little gravel and trace clay gravel and cobble layer	8		SA(19)
105									
	10		2	88 12"		no gravel			
						Very dense, moist, olive-gray, poorly-graded SAND (SP)			
100									
	15		3	90 12"		Very dense, moist, olive-gray, poorly-graded SAND (SP), trace fine gravel, mottle oxidation, interbeds of weak cementation, thin clay interbeds	19		
95			4	91 12"					
	20					Bottom of boring at 19.5 feet below ground surface			
90									
	25								
85									
	30								

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-27

Sheet 1 of 1

Date(s) Drilled	**07/28/2017**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**291 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.80525, W117.200454**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
290	0	Bulk	1			8" AC over 4" AB over **Fill** Moist, red, poorly-graded SAND with clay, trace gravel			
						Lindavista Formation (Qln) Moist, olive-brown, poorly-graded fine SAND (SP), few gravel, trace clay, trace cobbles, trace strongly cemented formation chunks			
285	5	SPT	2	65		Very dense, moist, pale gray, poorly-graded fine SAND with clay (SP-SC), mottle oxidation, weak cementation	20		WA(78), LL(43), PI(25)
280	10	2.5" ID	3	82 12"		becomes olive, decrease in clay			
275	15	SPT	4	95 12"		thin weakly cemented interbeds	19		
						Very dense, moist, olive, clayey fine SAND (SC), mottled oxidation, thin weakly cemented interbeds			
		2.5" ID	5	95 10"		Very dense, moist, olive-gray, poorly-graded fine SAND with clay (SP-SC), trace oxidation, weak to moderate cementation			
270	20					Bottom of boring at 20.0 feet below ground surface			
265	25								
	30								

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Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring FM-28** Sheet 1 of 1

Date(s) Drilled	**07/26/2017**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.5 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**303 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.808603, W117.201152**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					AC over AB over **Fill** Moist, red-brown, poorly-graded fine to medium SAND, trace fines			
300						**Lindavista Formation (Qln)** Very dense, moist, red-yellow, poorly-graded fine to coarse SAND (SP), trace gravel, trace weakly cemented chunks			
	5		1	85 6"			8		
						Very dense, moist, gray, poorly-graded SAND with clay (SP-SC), few mottle oxidation stains			
295									
	10		2	92 12"					
290									
	15		3	80 12"		becomes olive-brown	17		
285			4	78 12"		Very dense, moist, olive-gray, poorly-graded fine SAND (SP), trace gravel			
	20					Bottom of boring at 19.5 feet below ground surface			
280									
	25								
275									
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-28

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Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-29** Sheet 1 of 1

Date(s) Drilled	**07/26/2017**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**311 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.811064, W117.201125**		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" AC over 3" AB over **Fill** Moist, red-yellow, poorly-graded fine SAND with silt, trace weakly cemented chunks			
310			1				7		CORR
	5		2	50 6"		**Lindavista Formation (Qln)** Very dense, moist, orange-brown, poorly-graded fine SAND (SP), trace silt, oxidized			
305									
	10		3	85 12"		2" gravel in shoe becomes orange	8	97	
300									
	15		4	50 6"		Very dense, moist, orange, poorly-graded SAND with clay (SP-SC), trace gravel, oxidized			
295									
			5	50 6"		Very dense, moist, gray, poorly-graded SAND (SP), weak cementation	17		
						Bottom of boring at 19.0 feet below ground surface			
	20								
290									
	25								
285									
	30								

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring FM-30** Sheet 1 of 1

Date(s) Drilled	**07/26/2017**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.5 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**313 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.813809, W117.201113**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					4" AC over 3" AB over **Lindavista Formation (Qln)** Very dense, moist, olive-brown, clayey SAND (SC), trace oxidation			
310									
	5		1	50 3"		becomes very dense, gravel layer, fine to coarse gravel, trace weakly cemented chunks			
305									
	10		2	83 12"		Very dense, moist, dark red-brown, clayey fine SAND (SC)	9	96	
						Very dense, moist, yellow-brown, clayey SAND (SC), weakly cemented, few mottled oxidation stains			
300									
	15		3	85 12"		Very dense, moist, olive-brown, poorly-graded fine SAND (SP), trace fines, few weakly cemented chunks, trace mottled oxidation stains			
295									
			4	79 12"		becomes orange-brown, increased oxidation; interbed of gray-brown, lean CLAY (CL), little sand	15	93	
	20					Bottom of boring at 19.5 feet below ground surface			
290									
	25								
285									
	30								

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	# Log of Boring FM-31 Sheet 1 of 1

Date(s) Drilled	**7/25/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.5 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**324 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.817006, W117.201764**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0		1			4" AC over 3" AB over **Lindavista Formation (Qln)** Very dense, moist, dark yellowish brown (10YR 4/4), clayey SAND (SC) cobble/gravel layer, fine gravel to large cobbles			
320									
	5		2	78 12"		becomes very dense light gray (10YR 7/1) interbed at 5.25 to 6 ft			
315									
	10		3	70		sandier interbed at 10.25 to 10.75 ft Hard, moist, light yellowish brown (10YR 6/4), lean CLAY (CL) with sand, little iron oxide stains			
310									
	15		4	58					
305			5	90 12"					
	20					Bottom of boring at 19.5 feet below ground surface			
300									
	25								
295									
	30								

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Figure A-33

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring FM-32** Sheet 1 of 1

Date(s) Drilled	**7/25/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**327 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.819132, W117.20351**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					5" AC over 3" AB over **Lindavista Formation (Qln)** Very dense, moist, brownish yellow (10YR 6/8), clayey SAND (SC), few fine to coarse gravel, trace roots, trace iron oxide stains			
325									
						Very dense, moist, mottled pale olive (5Y 6/4) and light olive gray (5Y 6/2), silty SAND (SM), trace clay, trace fine-red gravel, trace roots, trace cobbles, clay rich laminations and laminations of iron oxide rich material			
	5		1	85 12"					
320									
	10		2	52		interbed of hard, moist, pale olive (5YR 6/3), sandy lean CLAY (CL), some iron oxide stains becomes dense, increase in clay content			
315									
	15		3	78 12"		becomes very dense			
310									
			4	75 12"		Hard, moist, pale olive (5YR 6/4), sandy lean CLAY (CL), few iron oxide stains			
	20					Bottom of boring at 20.0 feet below ground surface			
305									
	25								
300									
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-32

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Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-33** Sheet 1 of 1

Date(s) Drilled	**7/25/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**18.5 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**335 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk / Grab**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.823902, W117.206029**		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
335	0					5" AC over 4" AB over **Lindavista Formation (Qln)** Very dense, moist, yellowish brown (10YR 5/6), clayey SAND (SC), few chunks of dark brown (10YR 3/3) CLAY (CL) cobble layer			
			1						
330	5		2	50 1"		Hard, moist, brown (10YR 5/3), lean CLAY (CL), few fine to coarse gravel, trace fine sand, laminations of iron rich material			
			3						
325	10		4	50 2"					
			5						
320	15		6	50 0"					
			7						
			8						
						Bottom of boring at 18.5 feet below ground surface, refusal on large cobble			
315	20								
310	25								
305	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-33

Figure A-35

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-34

Date(s) Drilled	**06/28/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.5 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**340 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.827359, W117.206037**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
340	0					6" AC over 8" AB over **Lindavista Formation (Qln)** Very dense, moist, olive yellow (2.5Y 6/6), clayey SAND (SC), <2" chunks of moist, dark olive brown CLAY (CL), few roots, trace fine to medium gravel gravel layer			
335	5		1	50/6"		Very dense, moist, yellow (10YR 7/8), clayey SAND (SC), laminations of iron-oxide rich layers			
330	10		2	50/6"		Very dense, moist, olive yellow (2.5YR 6/6), silty SAND (SM), few to little gravel	10	107	SA(27)
325	15		3	50/6"		Very dense, moist, olive (5YR 4/4), clayey SAND (SC), interbeds of very dark grayish brown (10YR 3/2) CLAY (CL)	14		
			4	50/6"		Very hard, moist, olive (5YR 5/4), lean CLAY (CL), trace fine sand, micaceous, laminations, interbeds of SILT (ML)	12		
320	20					Bottom of boring at 19.5 feet below ground surface			
315	25								
310	30								

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-35

Date(s) Drilled	06/28/2017	Logged By	E. Marquez	Checked By	S. Fitzwilliam
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	8-inch	Total Depth of Borehole	20.0 feet
Drill Rig Type	CME 85	Drilling Contractor	Cascade Drilling	Approximate Surface Elevation	348 feet
Water Level Depth	19.5 fbgs (during drilling)	Sampling Method(s)	SPT / 2.5" ID / Bulk	Hammer Data	140 lbs / 30-inch
Borehole Completion	Bentonite and cuttings with concrete cap	Location	N32.31759, W117.205434		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0	Bulk	1			6" AC over 6" AB over **Fill** Moist, yellowish brown, clayey SAND, trace very coarse gravel, few dark brown chunks of clay, trace AC and brick fragments			CORR
345									
	5	SPT	2	11		**Lindavista Formation (Qln)** Medium dense, moist, yellowish brown (10YR 5/8), clayey SAND (SC), trace very coarse gravel, trace roots, interbeds of dark yellowish brown (10YR 3/4) sandy lean CLAY (CL)	14		
340									
	10	2.5" ID	3	54		Hard, moist, pale brown (10YR 6/3), sandy lean CLAY (CL), micaceous, some iron oxide staining, laminations	24	98	
335									
	15	SPT	4	81 12"		Very dense, moist, light olive brown (10YR 5/6), clayey SAND (SC), some iron oxide staining, laminations			
330									
		2.5" ID	5	18		Very stiff, moist, light olive brown (2.5Y 5/4), lean CLAY (CL) with sand; trace very coarse gravel ▽	23		
	20					Bottom of boring at 20.0 feet below ground surface			
325									
	25								
320									
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-35

AECOM

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring FM-36a** Sheet 1 of 1

Date(s) Drilled	**06/29/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**2.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**356 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**none**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.833234, W117.20105**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
355	0					6" AC over **Lindavista Formation (Qln)** Dense, moist, yellowish brown (10YR 5/8), sandy SILT (ML), trace fine sand, few fine to very coarse gravel, some chunks of well cemented material, trace small cobbles			
						Bottom of boring at 2 feet below ground surface (refusal on hard material)			
350	5								
345	10								
340	15								
335	20								
330	25								
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-36a

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-36b** Sheet 1 of 1

Date(s) Drilled	**06/29/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**18.5 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**356 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.83321, W117.20104**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0		1			7" AC over **Lindavista Formation (Qln)** Very dense, moist, brownish yellow (10YR 6/6), clayey fine SAND (SC), few fine to very coarse gravel, trace small cobbles very hard cemented layer/concretion, few manganese oxide nodules trace iron oxide staining			CORR
355									
	5		2	85 12"			8		LL(21), PI(9)
350									
	10		3	92 12"					
345						Very dense, moist, brownish yellow (10YR 6/8), poorly-graded SAND (SP), trace clay, laminations of alternating bleached and iron-oxide rich layers, few manganese oxide nodules			
	15		4	89 12"		Very dense, moist, yellow brown (10YR 5/6), clayey SAND (SC), trace gravel, laminations of alternating clay-rich, iron-oxide rich layers and layers of darker minerals	8		
340									
			5	50 0"		Bottom of boring at 18.5 feet below ground surface (refusal on hard materials)			
	20								
335									
	25								
330									
	30								

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-37a

Date(s) Drilled	**06/29/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**5.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**373 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**none**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.834441, W117.198367**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					8" AC over **Lindavista Formation (Qln)** Dense, moist, brown (7.5YR 4/4), sandy SILT (ML), few very coarse gravel			
		▩	1			Hard cemented layer/concretion over Moist, brown (7.5YR 4/4), poorly-graded GRAVEL with silt and sand (GP-GM)			
370									
	5					Bottom of boring at 5 feet below ground surface (refusal on hard materials)			
365									
	10								
360									
	15								
355									
	20								
350									
	25								
345									
	30								

AECOM

Figure A-40

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring FM-37b** Sheet 1 of 1

Date(s) Drilled	**06/29/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**4.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**373 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**none**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.834445, W117.198321**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					8" AC over **Lindavista Formation (Qln)** Dense, moist, dark yellowish brown, sandy SILT (ML), some fine gravel to small cobbles. Cobble layer at 1'			
370									
						Bottom of boring at 4 feet below ground surface (refusal on hard materials)			
	5								
365									
	10								
360									
	15								
355									
	20								
350									
	25								
345									
	30								

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring FM-38** Sheet 1 of 1

Date(s) Drilled	**06/30/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.2 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**369 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**Bulk / SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.834805, W117.194949**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					7" AC over 5" AB over **Lindavista Formation (Qln)** Dense, moist, strong brown (7.5YR 5/8), clayey SAND (SC), some fine to very coarse gravel, trace small cobbles			CORR
		Bulk	1			gravel layer			
365									
	5	SPT	2	56		Very dense, moist, yellowish brown (10YR 5/6), clayey SAND (SC)			
360									
	10	2.5" ID	3	76 11"		Very dense, moist, brownish yellow (10YR 6/6), poorly-graded SAND (SP-SM) with silt, trace clay	15	105	
355									
	15	SPT	4	80 12"		increase in iron oxide staining, decrease in clay content			
350		2.5" ID	5	90 8"		increase in manganese oxide staining. Grades to silty SAND (SM)	22		
	20					Bottom of boring at 19.2 feet below ground surface			
345	25								
340	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-38

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Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-40

Date(s) Drilled	**06/30/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**18.9 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**333 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.84014, W117.19674**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					7"AC over **Fill** Very dense, moist, dark yellowish brown (10YR 4/4), silty SAND, some fine to coarse gravel, few small cobbles, fragments of weathered and unweathered formation, trace clay			
330									
	5		1	68		increase in iron oxide staining			
325									
	10		2	75 12"			14	102	
320									
	15		3	76 8"					
315									
			4	50 5"			13		
						Bottom of boring at 18.9 feet below ground surface			
	20								
310									
	25								
305									
	30								

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-41

Date(s) Drilled	06/30/2017	Logged By	E. Marquez	Checked By	S. Fitzwilliam
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	8-inch	Total Depth of Borehole	18.8 feet
Drill Rig Type	CME 85	Drilling Contractor	Cascade Drilling	Approximate Surface Elevation	254 feet
Water Level Depth	not encountered	Sampling Method(s)	Bulk / SPT / 2.5" ID	Hammer Data	140 lbs / 30-inch
Borehole Completion	Bentonite and cuttings with concrete cap	Location	N32.843028, W117.198012		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					8" AC over **Fill** Moist, yellowish brown (10YR 5/6), sandy SILT, little medium to very coarse gravel, little AC pieces, little chunks of unweathered formation, trace clay	18		WA(55), CORR
		Bulk	1			**Scripps Formation (Tsc)** Very dense, moist, yellow (2.5Y 7/6), silty SAND (SM), trace iron oxide staining, laminations of lighter material			
250	5		2	50 2"					
						cobble layer			
245	10		3	50 5"			16	96	
240	15		4	50 5"					
235			5	50 4"		Bottom of boring at 18.8 feet below ground surface	6		
	20								
230	25								
225	30								

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-43** Sheet 1 of 1

Date(s) Drilled	**07/05/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**341 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**Bulk / SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.852015, W117.203768**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
340	0	Bulk	1			6.5" AC over 6" AB over **Fill** Medium dense to very dense, moist, yellowish brown (10YR 5/8), clayey SAND, little chunks of weathered and weakly cemented formation, trace fine to very coarse gravel, micaceous			
335	5	SPT	2	43		**SCRIPPS FORMATION** Dense, moist, yellowish brown, clayey SAND (SC), weakly cemented, few iron oxide staining, micaceous			
330	10	2.5" ID	3	52		few inclusions of clay, increase in iron oxide staining	12	109	
325	15	SPT	4	20		increase in sand grain size			
		2.5" ID	5	44		interbed of hard, moist, dark grey (7.5 YR 4/1), sandy CLAY, little fine to coarse gravel	14	102	
320	20					Bottom of boring at 20.0 feet below ground surface			
315	25								
	30								

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-44

Sheet 1 of 1

Date(s) Drilled	**06/28/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.5 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**373 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.854173, W117.204321**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0				7" AC over **Fill** Moist, yellowish brown (10YR 5/6), SILT, trace fine sand, few AC chunks, trace chunks of dark yellowish brown (10YR 3/4) CLAY, little to some fine to very coarse gravel and small cobbles			
370								
	5		1	89 12"	**Linda Vista Formation (Qln)** Very dense, moist, strong brown (10YR 5/6), poorly-graded SAND with clay (SP-SC), interbeds of clayey SAND (SC), some iron oxide staining, weathered	12		LL(28), PI(11)
365								
	10		2	60				
360					**Scripps Formation (Tsc)** Very dense, moist, light brownish gray (10YR 6/2), silty SAND (SM), laminations of iron oxide rich material, micaceous, interbeds of finer grained material, slightly weathered, trace clay			
	15		3	75 12"	increase in clay content			
355			4	78 12"		21	91	
	20				Bottom of boring at 19.5 feet below ground surface			
350								
	25							
345								
	30							

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-45

Sheet 1 of 1

Date(s) Drilled	**07/28/2017**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**291 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.858257, W117.205637**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
290	0		1			4" AC over 3" AB over **Lindavista Formation (Qln)** Moist, olive-gray, poorly-graded SAND (SP), few gravel, trace clay, trace weakly cemented chunks, trace mottle oxidation			
285	5		2	81 12"		Very dense, moist, olive, clayey fine SAND (SC), mottle oxidation	20		
280	10		3	60			20		WA(97), LL(46), PI(19)
						Hard, moist, olive, lean CLAY (CL), little fine sand			
275	15		4	82 12"		Very dense, moist, mottled gray and olive, clayey fine SAND (SC), weak cementation, mottled oxidation	19		
			5	75 10"		increase clay			
						Very dense, moist, olive, poorly-graded fine SAND (SP-SC) with clay, mottled oxidation			
270	20					Bottom of boring at 20.0 feet below ground surface			
265	25								
	30								

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-46

Date(s) Drilled	**07/06/2017**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**216 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.860329, W117.208244**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					9" AC over **Fill** Moist, olive brown, silty SAND, few gravel, trace cobbles			
215									
	4					Moist, olive brown, silty SAND, few gravel, chunks of cemented Scripps Fm.			
210	5		1	22					
205	10		2	31			18	103	
	11					**Alluvium (Qal)** Hard, moist, dark brown, lean CLAY (CL), some fine sand			
200	15		3	20					
	18.5		4	19			23	100	WA(65), LL(31), PI(16)
195	20					Bottom of boring at 20.0 feet below ground surface			
190	25								
	30								

Figure A-48

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-47

Date(s) Drilled	**07/05/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.5 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**284 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**Bulk / SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.863786, W117.21234**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0	Bulk	1			5" AC over **Fill** Moist, olive yellow (2.5Y 6/6), SILT, few chunks of weakly cemented material, few chunks of formation			
280						**Scripps Formation (Tsc)** Very hard, moist, mottled light yellowish brown (10YR 6/4) and gray (10YR 6/1), fat CLAY (CH), few fine sand, few iron oxide staining, moderately cemented, weathered			
	5	SPT	2	97 12"			16		WA(93), LL(56), PI(32)
275									
	10	2.5" ID	3	78 12"					
270									
	15	SPT	4	50 6"		increase in sand content, increase in iron oxide staining, laminations of iron-oxide rich layers			
265		2.5" ID	5	65 12"			19	96	
	20					Bottom of boring at 19.5 feet below ground surface			
260									
	25								
255									
	30								

AECOM

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring FM-48** Sheet 1 of 1

Date(s) Drilled	**07/05/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.1 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**330 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.866619, W117.213338**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
330	0					4" AC over **Fill** Moist, yellowish brown (10YR 5/6), poorly-graded SAND with silt, few fine to coarse gravel, little chunks of weakly cemented material **Scripps Formation (Tsc)** Hard, moist, mottled strong brown (7.5YR 5/8) and gray (7.5YR 5/1), lean CLAY (CL) with sand, weakly cemented, laminations of alternating gray and brown materials, interbeds of sandier material			
325	5		1	77 9"					
320	10		2	70			9	97	
315	15		3	78 12"					
			4	75 7"			17		
						Bottom of boring at 19.1 feet below ground surface			
310	20								
305	25								
300	30								

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-49

Sheet 1 of 1

Date(s) Drilled	**07/06/2017**	Logged By	**R. Bourdette**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.8 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**301 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**Bulk / SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.865829, W117.208979**		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					5.5" AC over **Fill** Moist, yellow brown, silty fine to medium SAND, trace gravel	13		WA(34), CORR
300		Bulk	1			**Scripps Formation (Tsc)** Very dense, moist, yellow brown, silty fine SAND (SM), trace gravel, some slightly cemented chunks of formation, interbeds of olive-brown silty SAND and oxidized yellow-red poorly-graded SAND			
295	5	SPT	2	78 12"		Very dense, moist, pale gray brown, poorly-graded SAND (SP-SM) with silt, trace oxidation, interbeds of very oxidized, yellow-red layers	18		
290	10	2.5" ID	3	75 12"			14	98	
						Very dense, moist, light gray, poorly graded SAND (SP)			
285	15	SPT	4	84 12"		increase in oxidation	7		
		2.5" ID	5	90 9"		increase in SILT content (SP-SM)			
						becomes yellow brown			
280	20					Bottom of boring at 19.8 feet below ground surface			
275	25								
	30								

AECOM

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	# Log of Boring FM-50 Sheet 1 of 1

Date(s) Drilled	**7/24/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.5 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**289 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.86825, W117.207153**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					5" AC over 3" AB over **Fill** Moist, dark yellowish brown (10YR 4/4), clayey SAND, some fine to very coarse gravel, trace small cobbles			
		Bulk	1			**Scripps Formation (Tsc)** Medium dense, moist, mottled brownish yellow (10YR 6/8) and gray (10YR 6/1), clayey SAND (SC)			CORR
285						~0.5 ft layer of very coarse gravel			
	5		2	20		interbed of very dark gray (10YR 3/1), sandy CLAY (CL)			
						Dense, moist, dark yellowish brown (10YR 4/6), poorly-graded SAND with silt (SP-SM), few fine to coarse gravel, trace clay			
280									
	10		3	32					
275									
	15		4	35		Hard, moist, mottled grayish brown (10YR 6/2) and yellowish brown, SILT (ML), trace sand, trace medium to coarse gravel			
270			5	74		increase in sand content			
	20					Bottom of boring at 19.5 feet below ground surface			
265									
	25								
260									
	30								

AECOM

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring FM-51a** Sheet 1 of 1

Date(s) Drilled	**7/24/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**4.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**379 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**none**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.872422, W117.20358**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" AC over 2" AB over **Fill** Moist, yellowish brown, clayey SAND, little coarse gravel and large cobbles, few chunks of strongly cemented formation			
						Moist, dark yellowish brown, CLAY			
375						Bottom of boring at 4 feet below ground surface, refusal on possible slurry			
	5								
370	10								
365	15								
360	20								
355	25								
350	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-51a

Project: Pure Water, City of San Diego	Log of Boring FM-51b
Project Location: San Diego, California	Sheet 1 of 1
Project Number: 60530732	

Date(s) Drilled	**7/24/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**3.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**379 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**none**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.872397, W117.207355**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" AC over 2" AB over **Fill** Moist, olive-brown, clayey SAND, few fine to medium gravel cobble/sandier layer becomes sandy CLAY with an odor, possibly contaminated			
						Bottom of boring at 3 feet below ground surface, refusal on possible concrete			
375									
	5								
370									
	10								
365									
	15								
360									
	20								
355									
	25								
350									
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 FM-51b

AECOM

Figure A-54

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring FM-52

Date(s) Drilled	**07/07/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**19.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**382 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**Bulk / SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.876399, W117.207639**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6.5" AC over **Lindavista Formation (Qln)** Very dense, moist, red, poorly-graded SAND (SP-SM) with silt, little fine to coarse gravel			CORR
380			1						
	5		2	50 6"		gravel layer			
375									
	10		3	95 12"		some chunks of formation material, few chunks of CLAY (CL) with sand	19		
370									
	15		4	88 12"		**Scripps Formation (Tsc)** Hard, moist, gray (10YR 6/1), lean CLAY (CL) with sand, little iron oxide staining	19		WA(69)
365									
			5	50 6"					
						Bottom of boring at 19.0 feet below ground surface			
	20								
360									
	25								
355									
	30								

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-53a** Sheet 1 of 1

Date(s) Drilled	**07/07/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**2.0 feet**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**359 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.876687, W117.205001**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" AC over 8" gravelly slurry over 6" loose gravelly sand over 6" gravelly slurry			
						Bottom of boring at 2 feet below ground surface			
355	5								
350	10								
345	15								
340	20								
335	25								
330	30								

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring FM-53b** Sheet 1 of 1

Date(s) Drilled	**07/07/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**1.0 foot**
Drill Rig Type	**CME 85**	Drilling Contractor	**Cascade Drilling**	Approximate Surface Elevation	**359 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.876684, W117.20493**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" AC over gravelly slurry			
						Bottom of boring at 1.0 feet below ground surface			
355	5								
350	10								
345	15								
340	20								
335	25								
330	30								

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring PS-1** Sheet 1 of 2

Date(s) Drilled	**03/27/2017**	Logged By	**A . Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**61.5 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**13.5 feet**
Water Level Depth	**9.0**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cement/Bentonite Grout**	Location	**N32.76323, W117.1995**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" of concrete over **Fill** Moist, very dark grayish brown, silty fine SAND, trace fine to coarse gravel			
10						**Alluvium (Qal)** Loose, moist, dark olive brown (2.5Y 3/3), poorly-graded fine SAND (SP-SM) with silt, micaceous			
	5		1	9			10		
5						becomes wet			
	10		2	10		few manganese oxide staining; micaceous, trace iron oxide staining, mostly fine to medium sand			
0									
	15		3	6		contains very thin to thin bedding with fine to medium SAND (SP) interbeds	22		
-5									
	20		4	3		manganese oxide stained bedding laminations, few fine sandy SILT (ML) bedding laminations			
-10									
	25		5	8			28		
-15									
						Loose, wet, dark grey (2.5Y, 4/1) to very dark grey (2.5Y, 3/1), silty fine SAND (SM), few thin interbeds of fine sandy SILT (ML); manganese oxide stained			
	30								

AECOM

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	30		6	8		bedding laminations in finer grained materials			
						Medium stiff, wet, black (10YR, 2/1), SILT with sand (MH), micaceous			
-20									
	35		7	4			54		LL(56), PI(23), HYD(74)
-25									
	40		8	8		becomes stiff, few small shell fragments, little fine sand			
			9	13		Stiff, wet, black (10YR, 2/1), sandy SILT (ML), few shell fragments			
-30			10	9		trace shell fragments, few thin CLAY (CL) interbeds			
	45		11	10		Medium dense, wet, dark gray (2.5Y, 4/1), poorly-graded fine SAND (SP-SM) with silt, micaceous	29		
			12	10		Stiff, wet, dark grey to black (5Y, 4/1), lean CLAY(CL), few fine sand, micaceous, few thin bedding	36		LL(45), PI(21), HYD(56)
-35									
	50		13a	27			26		WA(25)
						Medium dense, wet, dark grey (5Y, 4/1) to black (5Y, 2.5/1), silty fine SAND (SM), manganese oxide stained bedding laminations, micaceous, few thin SILT (ML) interbeds			
-40									
	55		14a	23			23		HYD(10)
						Medium dense, wet, dark gray (GLEY1 4), poorly-graded fine SAND (SP), trace fines, few manganese oxide stained bedding laminations			
-45									
	60		15	50					Sample S-15, blow counts may be inflated due to overpacked sampler.
						Bottom of boring at 61.5 feet below ground surface			
-50									
	65								

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring PS-2** Sheet 1 of 2

Date(s) Drilled	**03/28/2017**	Logged By	**A . Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**65.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**13.0 feet**
Water Level Depth	**7.8 ft**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Well Construction Per County Well Permit Guidelines**	Location	**N32.76364, W117.20007**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					5" of concrete over **Fill** Moist, very dark grayish brown, silty fine SAND			
10									
	5		1	7		**Alluvium (Qal)** Loose, moist, grayish brown (2.5Y 5/2), poorly-graded fine SAND (SP-SM) with silt, trace iron oxide stain, micaceous			
5									
	10		2a	5		contains interbeds of very dark grey, silty SAND (SM), few iron oxide staining			
0									
	15		3-1	6			25	98	Driller added water to inside of auger
-5									
	20		4	3					Some issues with heaving sands, driller began taping end of shoe prior to sampling. Sample S-4, potentially compromised with effort to mitigate flowing sands
-10									
	25		5	4		Soft, wet, very dark gray (GLEY1 3) to black (GLEY1 2.5), very thin to moderate interbeds of SILT (ML) and CLAY (CL), few fine sand, micaceous, few bedding laminations	46		WA(80)
-15									
	30								

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring PS-2

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	30		6-1-1/2	21		becomes very stiff			
						poorly-graded fine to medium SAND (SP-SM) with silt interbeds, dark greenish gray (GLEY1 4/1), micaceous, contact in Tube = 1			
-20									
	35		7	5		becomes medium stiff, trace shell fragments			Flowing sands
-25									
	40		8	16		becomes very stiff			
-30						Loose, wet, very dark gray to black, silty fine SAND (SM)			
	45		9	10		similar to above, trace small shell fragments	23		HYD(27)
-35									
	50		10 (1)	27		Medium dense, wet, dark gray (GLEY1 4), poorly-graded fine to medium SAND (SP-SM) with silt, darker bedding laminations			Flowing sands
-40									
	55		11	27					Sample S-11, Only drove 12"- sample is probably disturbed/sluff
-45									
	60		12	39		becomes dense			
-50									
	65					Bottom of boring at 65 feet below ground surface			

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring PS-3** Sheet 1 of 3

Date(s) Drilled	**04/03/2017**	Logged By	**D. Rector**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**8-inch**	Total Depth of Borehole	**81.0 feet**
Drill Rig Type	**Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**13.5 feet**
Water Level Depth	**10.0**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cement/Bentonite Grout**	Location	**N32.76344, W117.20058**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					2" of AC over 6" of concrete over **Fill** Moist, dark olive gray, silty fine SAND, micaceous			
10						**Alluvium (Qal)** Loose, moist, dark gray (5Y 4/1), silty fine to medium SAND (SM), micaceous			
	5		1-1/2	7			14	94	
5						Loose, wet, dark gray (2.5Y 4/1), poorly-graded fine to medium SAND with silt (SP-SM), micaceous			
	10		2	5		bedding laminations of dark minerals (biotite)	35		WA(6.5)
0									
	15		3-1/2	24		becomes medium dense	25	95	
-5						Soft, wet, very dark gray (5Y 3/1), sandy SILT (ML), micaceous			
	20		4	3			38		WA(63.9) Heaving sand in auger, driller began taping the end of the samples
-10									
	25		5	5					
-15									
	30								

AECOM

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	30								No sample due to flowing sand: 7 feet of sand surged into auger when pulling out the plug.
-20									
	35		6	7		becomes medium stiff, trace shell fragments			Flowing material
-25									
	40		7-1	14		becomes stiff, few interbedded silty fine SAND (SM) laminations and very thin interbeds, few shell fragments	33	89	
-30									
	45		8	12		silty SAND (SM) interbed			
-35									
	50		9	10		Medium dense, wet, dark gray (GLEY1 4), poorly-graded fine to medium SAND with silt (SP-SM), micaceous, bedding laminations of darker minerals (biotite), trace shell fragments	28		WA(9) Surging material in auger
-40									Drilller says drilling is becoming tougher - material is tighter
	55		10	16					
									Surging material
-45						few very thin SILT (ML) interbeds			
	60		11a	11		Medium dense, wet, greenish black (GLEY1 2.5/5GY), silty fine SAND (SM), micaceous	21		2 samples collected due to change in lithology: S-12a is CLAY (CL) and S-12b is SILT (ML)
-50									
	65								

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring PS-3

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	65		12	8		Stiff, wet, very dark gray (GLEY N3), fat CLAY (CH) interbed, trace organics	38		LL(58), PI(40)
						Stiff, wet, very dark gray (GLEY1 N3), SILT (ML), little fine sand, micaceous			
-55									
	70		13	6		trace fine gravel, trace iron oxide spots	26		
-60									
	75		14	53					Moderate rig chatter
						Dense to very dense, fine to coarse GRAVEL (GP)			
-65						clasts becoming larger and increase in amount of clasts			Heavy rig chatter
	80		15	50 6"		auger refusal at 80.5 fbgs on gravel/cobble			
						Bottom of boring at 81 feet below ground surface			
-70									
	85								
-75									
	90								
-80									
	95								
-85									
	100								

AECOM

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring TC-1** Sheet 1 of 3

Date(s) Drilled	**04/06/17, 04/07/17**	Logged By	**A . Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**HSA / Mud Rotary**	Drill Bit Size/Type	**8-inch / 4" drag bit and tri-cone bit**	Total Depth of Borehole	**96.5 feet**
Drill Rig Type	**Diedrich D-50 Turbo**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**17 feet**
Water Level Depth	**15.0 ft**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cement/Bentonite Grout**	Location	**N32.77068, W117.20457**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					7" of AC over 8" of AB over **Fill** Moist, very dark grayish brown, sandy CLAY			
15						Moist, brown, clayey fine to medium sand SAND (SC)			
						Moist, very dark grayish brown, sandy CLAY (CL)			
	5		1	22		Moist, very stiff, very dark gray, sandy CLAY (CL), trace fine to coarse gravels, few olive gray sandy pockets, material appears mixed and heterogeneous			
10									
	10		2	13		small AC fragments, trace organics			
5									
	15		3	7		**Alluvium (Qal)** Medium stiff, moist, very dark grayish brown (2.5Y 3/2), lean CLAY with sand (CL), micaceous, trace very fine shells, homogeneous, massive becomes wet			
0			4	Push		becomes very soft			LL(47), PI(26), HYD(84)
						Loose, wet, brown (10YR 5/3), poorly-graded fine to medium SAND (SP-SM) with silt, slight mottled coloration, massive			
	20		5	9		Stiff, wet, dark grayish brown (10YR 4/2), fat CLAY (CH), trace iron oxide staining, trace mica			
-5						Becomes black (GLEY1 N2.5), trace shells, few organics, slight organic odor			
	25		6	9		contains thin to laminated interbeds of wet, dark greenish gray (GLEY1 5G 4/1) to very dark gray (GLEY1 N3), poorly-graded SAND (SP-SM) with silt, silty SAND (SM), and SILT (ML)			LL(84), PI(55), HYD(92)
-10									
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 TC-1

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Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	30		7	11			40		DS, LL(100), PI(63), HYD(97)
-15									
	35		8	5					
-20									
						Wet, medium dense, dark grey, silty fine SAND (SM)			
	40		9	18					
-25									
						Very stiff, wet, very dark greenish gray (GLEY1 5Y 3/1), clayey fine SAND (SC), few mica, massive			
	45		10	17					LL(34), PI(18), HYD(42)
-30									
	50		11	30		similar to above			
-35									
						Dense, wet, very dark grayish brown (2.5Y 3/2), silty fine to medium SAND with gravel (SM)			
	55		12	44					
-40						gravel layer			Moderate rig chatter (1-2 minutes to get through)
	60		13	38		few to little fine to coarse gravel, trace coarse sand	10		SA(20)
-45									Light rig chatter
						Old Alluvium (Qoa) / Bay Point Formation (Qbp) Hard, dark greenish gray (GLEY1 10GY 4/1), lean CLAY (CL), micaceous, few iron oxide staining			
	65								

Elevation, feet	Depth, feet	Samples Type	Samples Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	65		14	48		becomes brown (10YR 5/3) 1" thick poorly-graded SAND (SP) interbed (not included in sample) 2" thick paleosol (S-14c)			
-50						Dense, wet, olive brown (2.5Y 4/4), silty fine SAND (SM), micaceous, material is oxidized			
						gravel layer			slight rig chatter
	70								
-55						Very dense, wet, grayish brown (2.5Y 5/2), well-graded SAND (SW-SM) with silt, micaceous			
	75		15	86		little iron oxide staining (material looks more oxidized), slight increase in fine content	16		SA(10)
-60									Driller comment: 1' thick hard layer
	80								
-65									
						gravel layer			Light rig chatter
	85		16	51		trace to few fines, slight increase in general grain size, little iron oxide staining			
-70									
	90								
-75						Very dense, wet, very dark gray (GLEY1 N3), silty fine SAND (SM), few thin interbeds of increased/decreased fines content, micaceous			
	95		17	80			19		SA(36)
-80						Bottom of boring at 96.5 feet bgs			
	100								

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring TC-2** Sheet 1 of 3

Date(s) Drilled	**04/10/17 - 04/11/17**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**HSA / Mud Rotary**	Drill Bit Size/Type	**8-inch / 4" drag bit and tri-cone bit**	Total Depth of Borehole	**96.5 feet**
Drill Rig Type	**Diedrich D-50 Turbo**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**17 feet**
Water Level Depth	**not measured**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cement/Bentonite Grout**	Location	**N32.77146, W117.20521**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" of asphalt over **Fill** Moist, brownish yellow, clayey SAND, few fine to medium gravel			
15									
	5		1	17		becomes dark gray			
10						few brick pieces			
	10		2	7		**Alluvium (Qal)** Loose, moist, grayish brown (10YR 5/2), silty SAND (SM) with clay, trace mica			
5						Medium stiff, moist, grayish brown (10YR 5/2), sandy lean CLAY(CL), some fine sand, few mica flakes			
	15		3	5					LL(39), PI(20), HYD(62)
0									
	20		4	14					
-5						Stiff, moist, dark gray (10YR 4/1), sandy fat CLAY (CH)			
	25		5	6					LL(65), PI(41), HYD(71)
-10									
	30					Stiff, moist, dark gray (2.5Y 4/1), fine sandy SILT (ML), trace mica, few thin beds of silty sand			

Elevation, feet	Depth, feet	SAMPLES Type	Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	30		6	9					
-15									
	35		7	4					
-20									
	40		8	18		Medium dense, moist, light brownish gray (10YR 6/2), silty fine to medium SAND (SM), trace mica			
-25									
	45		9	16			19		SA(37)
-30									
						Very dense, wet, grayish brown (10YR 5/2), poorly-graded fine to medium SAND (SP-SM) with silt			
	50		10	60					
-35									
	55		11	70			15		SA(10)
-40									
	60								
-45						Very dense, wet, dark gray (GLEY1 N4), clayey fine to medium SAND (SC) with fine to coarse gravel, contains interbeds of gravel layers			
						concretion			
	65								

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	65		12	50 6"					
-50						interbedded gravel layers, from 68.5' to 69.0'			
	70		13	50 2"			15		SA(16)
-55									
	75		14	24		Medium dense, wet, dark gray (10YR 4/1), silty fine to medium SAND (SM)	23		SA(14)
						Medium dense, wet, dark gray (2.5Y 4/2), clayey fine to medium SAND (SC), some iron oxide staining			
-60						gravel			
	80								
-65									
						Very dense, wet, grayish brown, poorly-graded fine to medium SAND (SP-SM) with silt, trace fine gravel			
	85		15	50 5"			18		SA(12)
-70									
	90					interbedded gravel			
-75									
						Very stiff, wet, very dark gray (GLEY1 N3), sandy SILT (ML), some fine sand, micaceous			
	95		16	27					
-80						Bottom of boring at 96.5 feet below ground surface			
	100								

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring WM-01

Date(s) Drilled	**06/08/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**23 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.76391, W117.1953**		

Elevation, feet	Depth, feet	SAMPLES Number	Blows per foot	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0			7" AC over 6" AB over **Fill** Moist, brown (7.5YR 4/4), gravelly lean CLAY with fine to medium sand, little fine gravel			LL(34), PI(20)
20		1					
	5	2	13	**Alluvium (Qal)** Medium dense, moist, grayish brown (2.5YR 5/2), silty fine SAND (SM), micaceous	8		
15							
	10	3	5	becomes loose, very dark gray (5Y 3/1)	11	91	
10							
	15	4	11	Medium dense, moist, grayish brown (10YR 5/2), poorly-graded fine SAND (SP-SM) with silt, micaceous, trace roots	16		
5		5	13	few thin to moderately thick interbeds of poorly-graded SAND (SP) and silty SAND (SM) increased moisture content	27		Note: S-1-1/2 contains multiple soil types/interbeds
	20			Bottom of boring at 20 feet below ground surface			
0							
	25						
-5							
	30						

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring WM-02

Date(s) Drilled	06/08/2017	Logged By	A. Avakian / E. Marquez	Checked By	S. Fitzwilliam
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	6-inch	Total Depth of Borehole	20.0 feet
Drill Rig Type	Unimog Marl M5	Drilling Contractor	Pacific Drilling	Approximate Surface Elevation	17 feet
Water Level Depth	14.5 ft	Sampling Method(s)	SPT / 2.5" ID	Hammer Data	140 lbs / 30-inch
Borehole Completion	Cuttings with concrete cap	Location	N32.76464, W117.19582		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
17	0				5" AC over 4" AB over **Fill** Moist, dark brown (10YR 3/3), silty fine SAND, few glass, few brick fragments, trace fine to medium gravel, micaceous			
10	7	SPT	1	9	**Alluvium (Qal)** Stiff, moist, very dark grayish brown (10YR 3/2), silty fine SAND (SM), micaceous	18	103	
	10	SPT	2	5	becomes dark grayish brown (10YR 3/2) moisture content increases	23		WA(40)
	14				Loose, wet, brown (10YR 4/3), poorly-graded fine SAND (SP-SM) with silt, trace fine gravel, micaceous			
	15	SPT	3	5		22		Water level measured through auger after drilling
	18.5	SPT	4	18	becomes medium dense bedding laminations of dark minerals becomes dark grayish brown (2.5Y 4/2), no gravel			Flowing sand in auger. S-4 overpacked with soil.
-3	20				Bottom of boring at 20 feet below ground surface			

Figure A-64

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Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring WM-03

Date(s) Drilled	06/08/2017	Logged By	E. Marquez	Checked By	S. Fitzwilliam
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	6-inch	Total Depth of Borehole	20.0 feet
Drill Rig Type	Unimog Marl M5	Drilling Contractor	Pacific Drilling	Approximate Surface Elevation	18 feet
Water Level Depth	15 ft	Sampling Method(s)	SPT / 2.5" ID / Bulk	Hammer Data	140 lbs / 30-inch
Borehole Completion	Cuttings with concrete cap	Location	N32.765073, W117.196454		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" AC over 7" AB over **Fill** Dark grayish brown (2.5YR 4/2), silty fine SAND, micaceous	7		CORR, SA(14)
15			1						
	5		2	4		**Alluvium (Qal)** Medium stiff, moist, dark brown (10YR 3/3), SILT (ML) with fine sand, micaceous interbeds of brown (10YR 4/3), silty SAND (SM) trace sands	21		S-2a is ML; S-2b is SM
10									
	10		3	11		Medium dense, moist, very dark grayish brown (10YR 3/2), silty fine SAND (SM), micaceous, laminations of darker grained minerals increased fines, material becomes darker in color, slight increase in moisture	26	95	
5									
	15		4	6		▽			Water level measured after hole drilled
0									
			5	17		Medium dense, wet, dark grayish brown (10YR 4/2), poorly-graded fine SAND (SP-SM) with silt, micaceous, laminations of darker grained minerals	20		S-5a is SM; S-5b is SP-SM
	20					Bottom of boring at 20 feet below ground surface			
-5									
	25								
-10									
	30								

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring WM-06

Date(s) Drilled	**05/18/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**28 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.76883, W117.19991**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0	Bulk	1			4" AC over 6" AB over **Fill** Moist, dark reddish brown, sandy CLAY (CL), some fine sand			LL(31), PI(20), CORR
25									
	5	SPT	2	13		**Bay Point Formation (Qbp)** Medium dense, moist, brown (7.5YR 4/2), silty fine SAND (SM), oxidized	9		
20									
	10	2.5" ID	3	88 11"		material becomes moist to wet, grayish brown (10YR 5/2), micaceous, contains some fines Very dense, moist, brown (7.5YR 4/2), poorly-graded fine to medium sand SAND (SP-SC) with clay and gravel, mostly, oxidized	4	127	
15									
	15	SPT	4	81 7"					
						Hard, moist, dark yellowish brown (10YR 4/4), sandy SILT (ML), some fine sand, little iron oxide staining, micaceous			
10									
		2.5" ID	5	60			15	120	
	20					Bottom of boring at 20.2 fbgs			
5									
	25								
0									
	30								

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring WM-07

Date(s) Drilled	**05/17/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**25 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.76951, W117.20103**		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
25	0					5" AC over 4" AB over **Fill** Moist, dark reddish brown, sandy CLAY, trace to few fine to coarse gravel			
						Bay Point Formation (Qbp) Medium dense, moist, brown (7.5YR 4/3), clayey fine SAND (SC), some iron oxide staining			
20	5		1	26		gravel Medium dense, moist, brown (10YR 4/3), clayey fine to medium SAND (SC) with fine to coarse gravel, little iron oxide staining, localized gravel interbeds slight increase in fines content gravel			
15	10		2	23		gravel	9		LL(36), PI(24), SA(19)
						Medium dense, moist, brown (7.5YR 4/4), clayey fine to medium SAND (SC), some iron oxide staining, micaceous			
10	15		3	21		Very stiff, moist, brown (7.5YR 4/2), sandy lean CLAY (CL), some fine sand, little iron oxide staining	19	109	
			4	23					
5	20					Bottom of boring at 20 feet below ground surface			
0	25								
-5	30								

AECOM

Project: Pure Water, City of San Diego	Log of Boring WM-08
Project Location: San Diego, California	Sheet 1 of 1
Project Number: 60530732	

Date(s) Drilled	05/18/2017	Logged By	A. Avakian	Checked By	S. Fitzwilliam
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	6-inch	Total Depth of Borehole	19.0 feet
Drill Rig Type	Unimog Marl M5	Drilling Contractor	Pacific Drilling	Approximate Surface Elevation	24 feet
Water Level Depth	not encountered	Sampling Method(s)	SPT / 2.5" ID	Hammer Data	140 lbs / 30-inch
Borehole Completion	Cuttings with concrete cap	Location	N32.77003, W117.20155		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					3.5" AC over 8" AB over **Fill** Moist, dark brown, clayey fine SAND, trace to few fine to coarse gravel			
20									
	5					gravel			
			1	36		**Bay Point Formation (Qbp)** Dense, moist, brown (7.5YR 4/3), clayey fine to medium SAND (SC), few fine to coarse gravel			
15									
	10		2	50 3"		becomes very dense			
			3	38		Dense, moist, brown (7.5YR 4/4), clayey fine to medium SAND (SC), few fine to coarse gravel, oxidized	11		LL(45), PI(30), SA(19)
10									
	15					gravel			
			4	38		moderate (10-inch) interbed of moist, olive gray (5Y 5/2), SILT (ML)	19		
						Dense, moist, olive brown (2.5Y 4/4), silty fine SAND (SM), little iron oxide staining, micaceous			
			5	50 6"		gravel			
5						Bottom of boring at 19.2 feet below ground surface			
	20								
0									
	25								
-5									
	30								

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring WM-10** Sheet 1 of 1

Date(s) Drilled	**06/09/2017**	Logged By	**A. Avakian / E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.5 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**28 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.77214, W117.20211**		

Elevation, feet	Depth, feet	Samples: Type	Samples: Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					3" AC over 7" concrete over **Fill** Moist, dark yellowish brown, SILT with fine sand, few chunks AC, few gravel			
25									
	5								
			1	2					
20									
	10		2	8			13	111	
						Bay Point Formation (Qbp) Stiff, moist, dark brown (7.5YR 3/4), sandy SILT (ML), some fine sand			
15									
	15					gravel layer			
						gravel			
10						gravel layer			
	20		3	46		Hard, moist, light olive brown (2.5Y 5/3), sandy CLAY (CL), few fine sand			S-3-1 and S-3-2 are CL; S-3-3 is SP-SM
						Dense, moist, light olive brown (2.5Y 5/4), poorly-graded SAND (SP-SM) with silt, few iron oxide staining			
						Bottom of boring at 20.5 feet below ground surface			
5									
	25								
0									
	30								

AECOM

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring WM-11** Sheet 1 of 1

Date(s) Drilled	**06/09/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**24 feet**
Water Level Depth	**16 ft**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.77253, W117.20245**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					5" AC over 5" AB over **Fill** Moist, brown, sandy SILT, some fine sand, little fine gravel			
		Bulk	1			**Bay Point Formation (Qbp)** Very stiff, moist, dark reddish brown (5YR 3/4), sandy SILT (ML), some fine sand, few organics, few iron oxide staining			CORR
20	5								
			2	17			10		
15	10		3	30			14	116	
						Dense, moist, dark reddish brown (5YR 3/3), silty SAND (SM), few organics			
10									
	15		4	55		becomes wet, brown (10YR 4/3), micaceous gravel ▽			35 blowcounts possibly penetating through gravel
5			5	25		Medium dense/very stiff, wet, interbedded olive brown (2.5Y 4/3), sandy CLAY (CL) and yellowish brown (10YR 5/4), well-graded SAND (SW-SM) with silt CL-little fine sand, some iron oxide staining, some calcium carbonate accumulation SW-SM-few fine gravel	24	106	S-5 penetrated channel margin. Channel filled with SW-SM LL(45), PI(27)
	20					Bottom of boring at 20 feet below ground surface			
0	25								
-5	30								

Figure A-70

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring WM-16

Date(s) Drilled	**06/09/2017**	Logged By	**E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**32 feet**
Water Level Depth	**16.5 ft**	Sampling Method(s)	**SPT / 2.5" ID**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Bentonite and cuttings with concrete cap**	Location	**N32.79163, W117.20609**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" AC over 7" AB over **Bay Point Formation (Qbp)** Moist, reddish brown (5YR 4/4), sandy SILT (ML), some fine sand			
30									
	5					Loose, moist, brown (10YR 4/3), poorly-graded SAND (SP-SM) with silt, trace fine gravel			
25			1	4			3		
			2	27		Very stiff, moist, strong brown (7.5YR 5/6), SILT (ML) with fine sand	15		WA(75)
	10		3	30			13	120	
20									
	15		4	9		Loose, moist, dark yellowish brown (10YR 4/6), silty SAND (SM), little iron oxide staining, little shell fragments becomes wet			
15									
			5	37		4" silt interbed fine gravel Dense, wet, grayish brown (10YR 5/2), SAND (SP-SM) with silt, micaceous	17	116	Water level measured after dilling at 17.7 fgbs
	20					Bottom of boring at 20 feet below ground surface			
10									
	25								
5									
	30								

Figure A-71

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring WM-21

Date(s) Drilled	**06/14/2017**	Logged By	**A. Avakian / E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Diedrich D-50 Turbo**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**49 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.799195, W117.20976**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					2" AC over 4" AB over **Fill** Moist, silty fine SAND, few asphalt fragments			
						Bay Point Formation (Qbp) Medium dense, moist, yellowish brown (10YR 5/6), silty fine SAND (SM), some iron oxide staining			
45									
	5		1	27		← sandy SILT (ML) interbed	17		
40									
	10		2	75		**Ardath (Ta)** Hard, moist, light yellowish brown (2.5Y 6/4), SILT (ML), few fine sand, iron oxide staining			
35									
	15		3	51			18		
30			4	50 5"					
	20					Bottom of boring at 20 feet below ground surface			
25									
	25								
20									
	30								

AECOM

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring WM-22

Date(s) Drilled	06/14/2017	Logged By	A. Avakian / E. Marquez	Checked By	S. Fitzwilliam
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	6-inch	Total Depth of Borehole	14.2 feet
Drill Rig Type	Diedrich D-50 Turbo	Drilling Contractor	Pacific Drilling	Approximate Surface Elevation	47 feet
Water Level Depth	not encountered	Sampling Method(s)	SPT / 2.5" ID	Hammer Data	140 lbs / 30-inch
Borehole Completion	Cuttings with concrete cap	Location	N32.80042, W117.21051		

Elevation, feet	Depth, feet	Samples Type	Samples Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					**Fill** Moist, yellowish brown, SILT with sand, AC fragments, few fine to coarse gravel			
45									
	5		1	12					
40			2	14					
	10		3	9		**Bay Point Formation (Qbp)** Stiff, moist, yellowish brown (10YR 5/6), SILT (ML) with sand	19	102	
35						← interbed of coarser grained materials: silty fine SAND (SM), trace fine gravels			Hard drilling ~30 min
						← potential concretion			
			4						
	15					Bottom of boring at 14.2 feet below ground surface			Refusal on concretion (?)
30									
	20								
25									
	25								
20									
	30								

Figure A-73

Project: Pure Water, City of San Diego **Project Location: San Diego, California** **Project Number: 60530732**	**Log of Boring WM-23** Sheet 1 of 1

Date(s) Drilled	**05/18/2017**	Logged By	**A. Avakian**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**20.0 feet**
Drill Rig Type	**Unimog Marl M5**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**52 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**SPT / 2.5" ID / Bulk**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.802118, W117.211547**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					7" AC over 6" of AB over **Fill** Moist, brown, sandy SILT, some fine sand			
50						**Bay Point Formation (Qbp)** Very stiff, moist, brown, (7.5YR 4/3), sandy SILT (ML), some fine sand, little iron oxide staining			
	5		1	17		increase iron oxide staining	9		
45									hard drilling reported by driller
	10		2	56		becomes hard, trace manganese oxide spots	8		SA(67)
40									
	15		3	23		becomes very stiff, brown (7.5YR 5/4)	8		
35						becomes hard			
			4	56		increase fine sand content			
	20					Bottom of boring at 20 feet below ground surface			
30									
	25								
25									
	30								

Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 WM-23

Project: Pure Water, City of San Diego
Project Location: San Diego, California
Project Number: 60530732

Log of Boring WM-24

Date(s) Drilled	06/14/2017	Logged By	A. Avakian / E. Marquez	Checked By	S. Fitzwilliam
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	6-inch	Total Depth of Borehole	20.0 feet
Drill Rig Type	Diedrich D-50 Turbo	Drilling Contractor	Pacific Drilling	Approximate Surface Elevation	60 feet
Water Level Depth	not encountered	Sampling Method(s)	SPT / 2.5" ID / Bulk	Hammer Data	140 lbs / 30-inch
Borehole Completion	Cuttings with concrete cap	Location	N32.803758, W117.212571		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
60	0					6" AC over 7" AB over **Fill** Moist, brown (7.5YR 4/4), SILT wth sand, trace contruction debris, trace cobbles			CORR
		Bulk	1						
55	5		2	9		**Bay Point Formation (Qbp)** Stiff, moist, strong brown (7.5YR 5/6), SILT (ML) with sand, some iron oxide staining	12		
50	10		3	47					
						Hard, moist, brown (10YR 4/2), CLAY (CL), some iron oxide staining			
						interbed of moist, brown (7.5YR 5/4), poorly-graded SAND (SP)			
45	15		4a 4b	34			17		4a = SP; 4b = CL LL(57), PI(38)
			5	84		Hard, moist, brown (10YR 5/3), sandy SILT (ML), some fine sand, some shells, some iron oxide staining	4	133	
40	20					Bottom of boring at 20 feet below ground surface			
35	25								
30	30								

AECOM

Project: Pure Water, City of San Diego Project Location: San Diego, California Project Number: 60530732	**Log of Boring WM-25** Sheet 1 of 1

Date(s) Drilled	**06/14/2017**	Logged By	**A. Avakian / E. Marquez**	Checked By	**S. Fitzwilliam**
Drilling Method	**Hollow Stem Auger**	Drill Bit Size/Type	**6-inch**	Total Depth of Borehole	**6.5 feet**
Drill Rig Type	**Diedrich D-50 Turbo**	Drilling Contractor	**Pacific Drilling**	Approximate Surface Elevation	**69 feet**
Water Level Depth	**not encountered**	Sampling Method(s)	**none**	Hammer Data	**140 lbs / 30-inch**
Borehole Completion	**Cuttings with concrete cap**	Location	**N32.80525, W117.21318**		

Elevation, feet	Depth, feet	SAMPLES Type	SAMPLES Number	Blows per foot	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	REMARKS AND OTHER TESTS
	0					6" AC over 7" AB over **San Diego Formation (Tsd)** Moist, light yellowish brown (10YR 6/4), poorly-graded gravel (GP-GM) with silt and fine sand			Hard drilling ~ 40 min
65									Skipped 5' sample due to dense cobbles and gravels
	5								@6' Driller broke shear pin on drill, 15 minutes to fix
						Bottom of boring at 6.5 feet below ground surface			Refusal on cobbles/gravels
60	10								
55	15								
50	20								
45	25								
40	30								

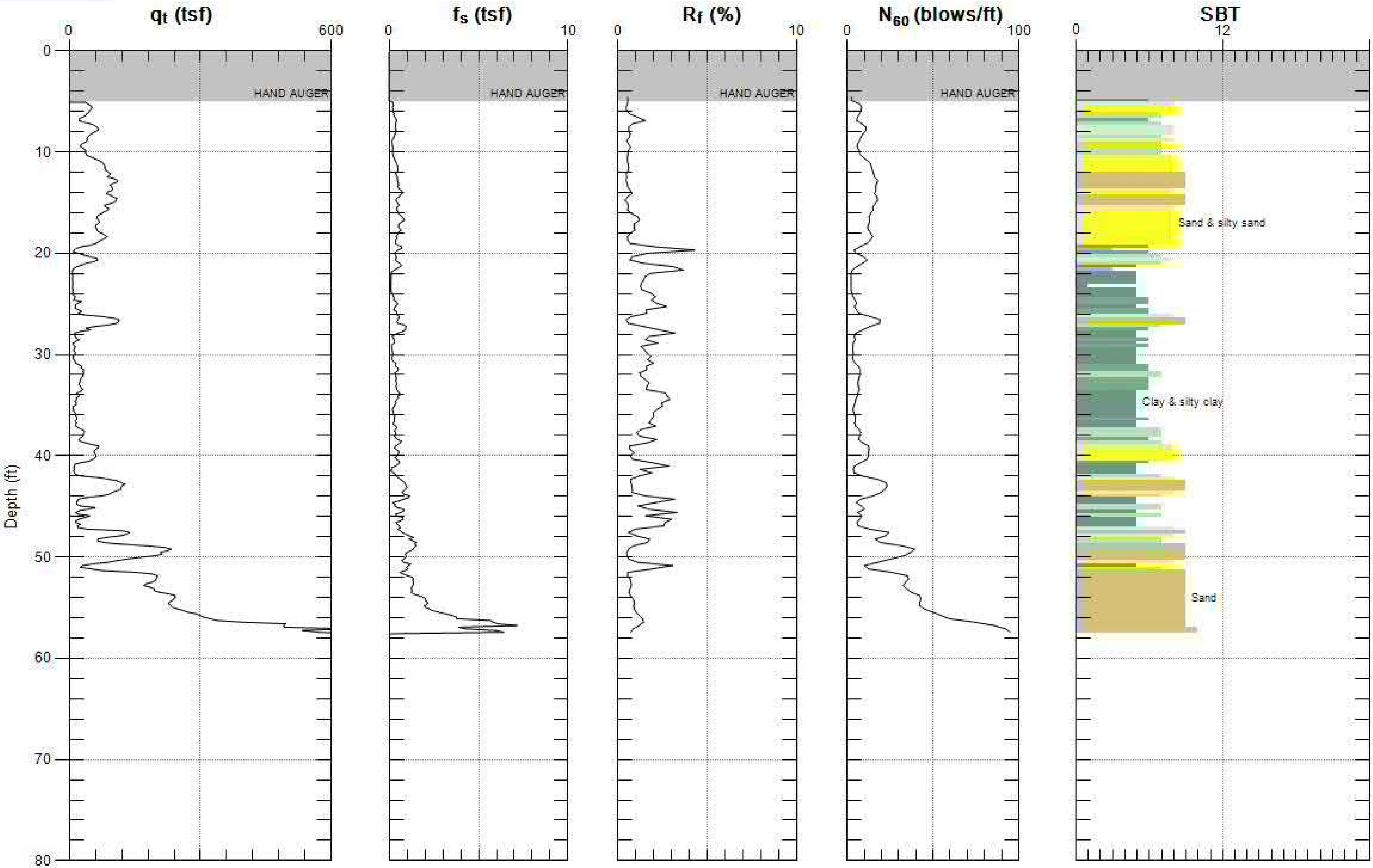
Report: GEO_10_SNA; File: 60530732.GPJ; 9/15/2017 WM-25

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-01 Date: 3/20/17 08:34



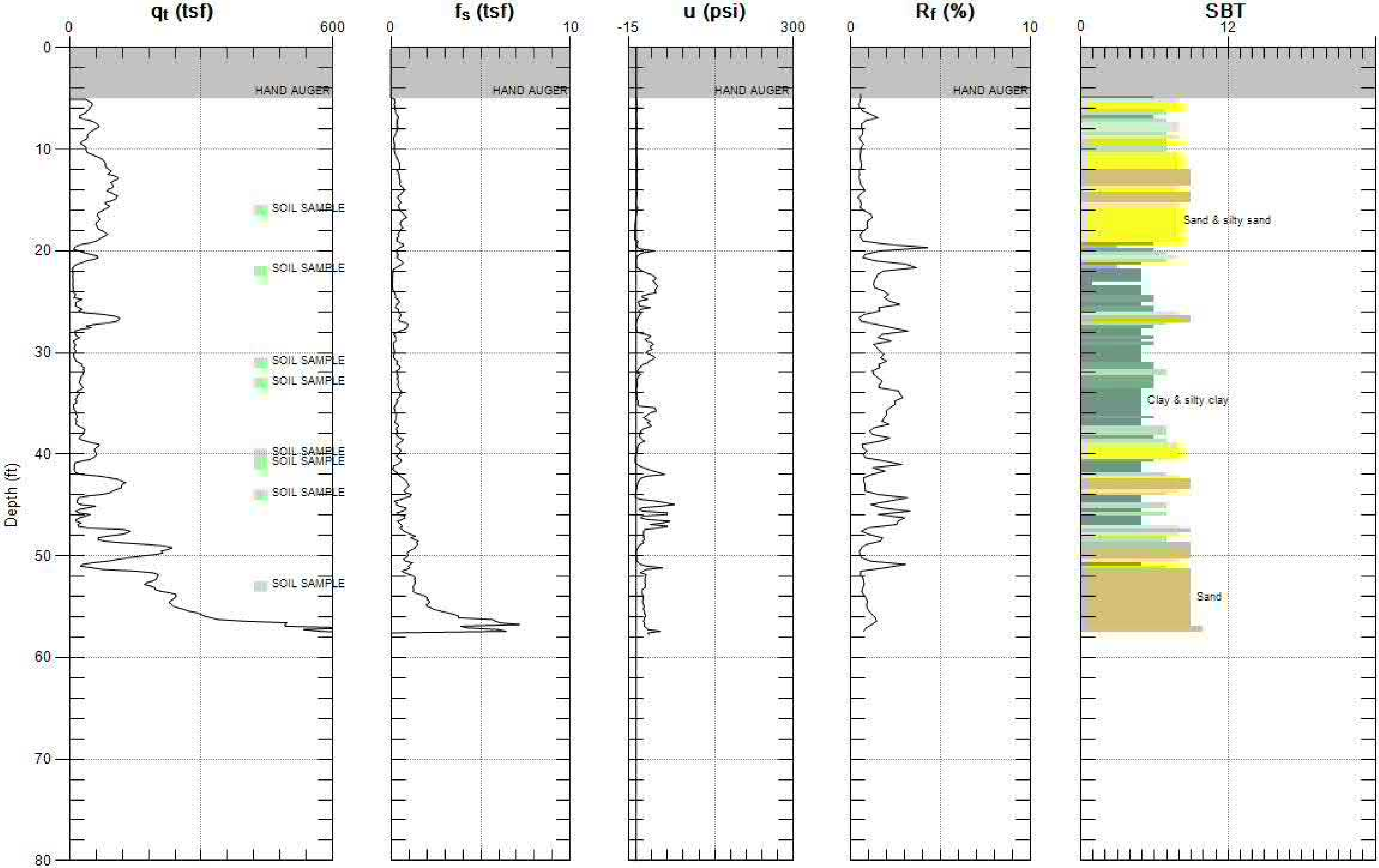
Max. Depth: 57.743 (ft)
Avg. Interval: 0.328 (ft)

Figure A-77 SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-01 Date: 3/20/17 08:34



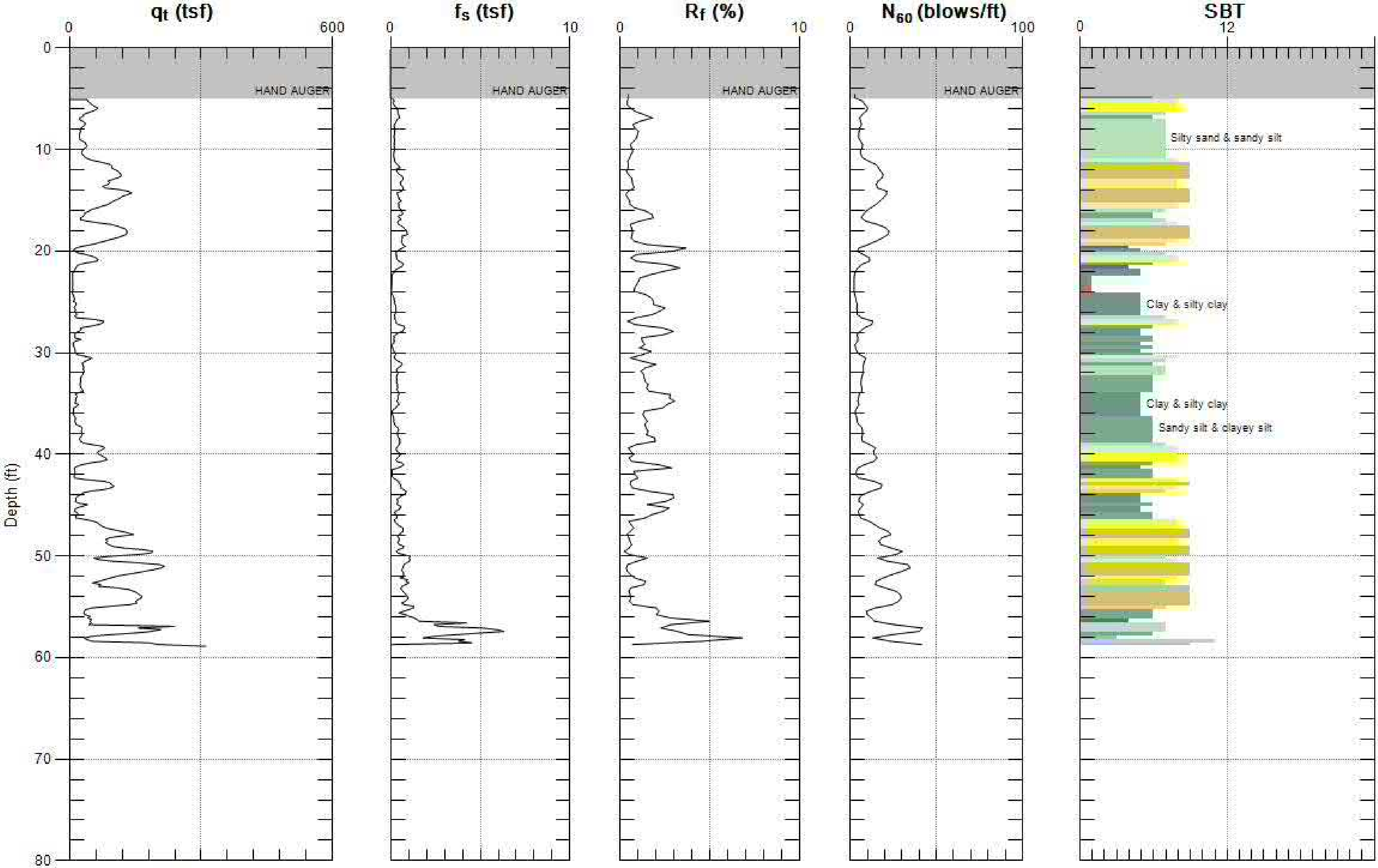
Max. Depth: 57.743 (ft)
Avg. Interval: 0.328 (ft)

Figure A-77 SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-02 Date: 3/20/17 09:38



Max. Depth: 58.891 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

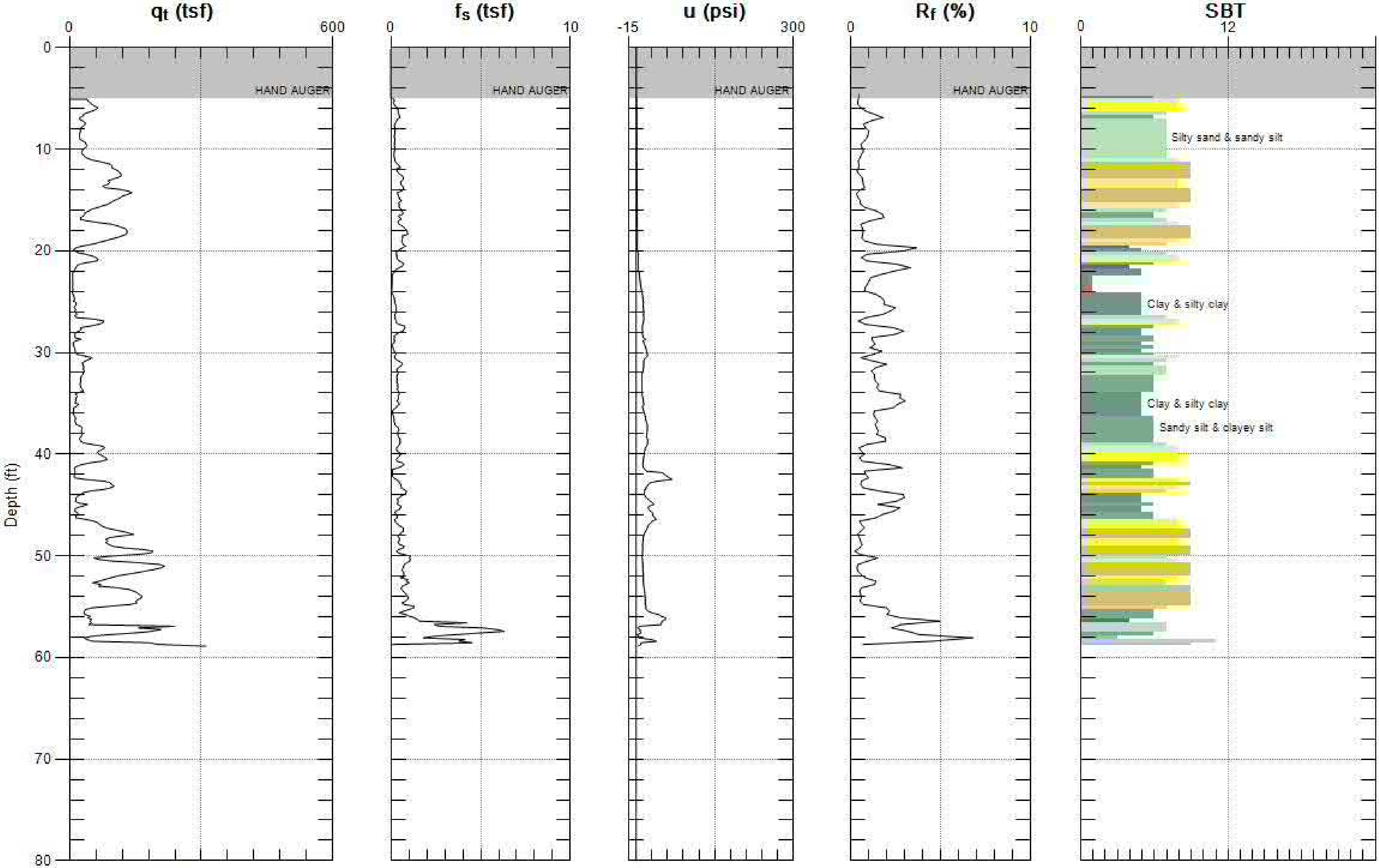
Figure A-78

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-02 Date: 3/20/17 09:38



Max. Depth: 58.891 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

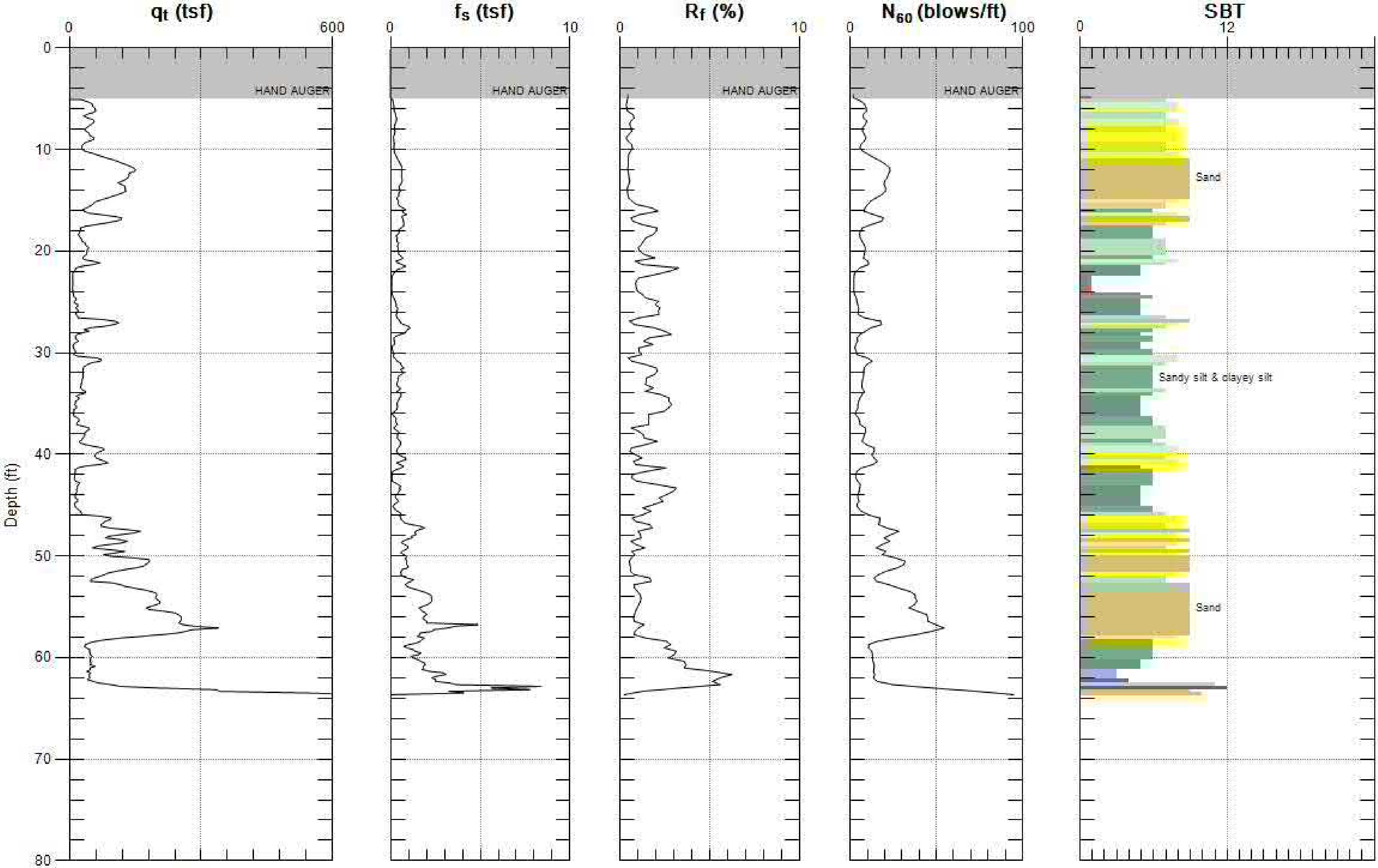
Figure A-78

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-03 Date: 3/20/17 11:02



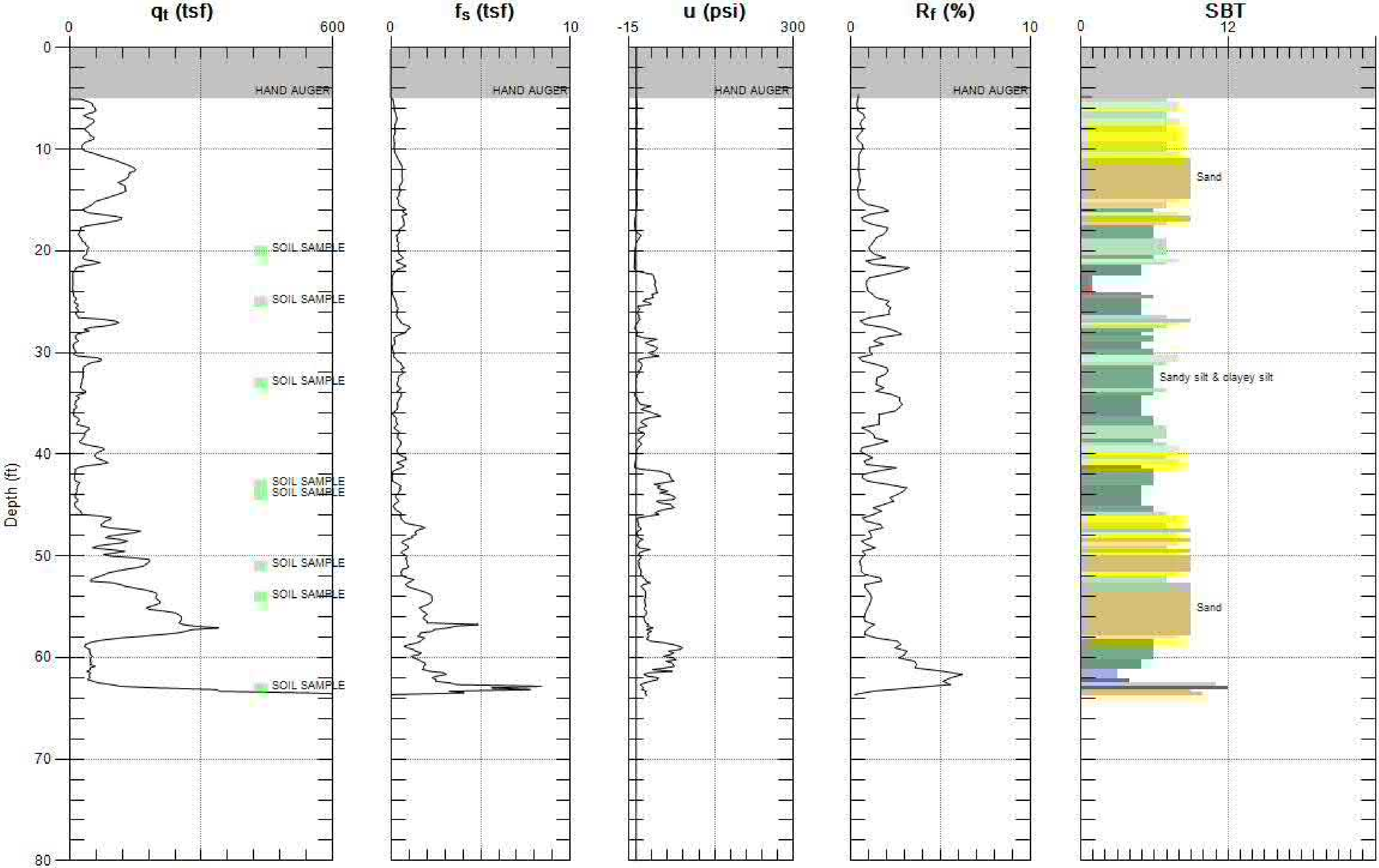
Max. Depth: 63.812 (ft)
Avg. Interval: 0.328 (ft)

Figure A-79 SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-03 Date: 3/20/17 11:02



Max. Depth: 63.812 (ft)
Avg. Interval: 0.328 (ft)

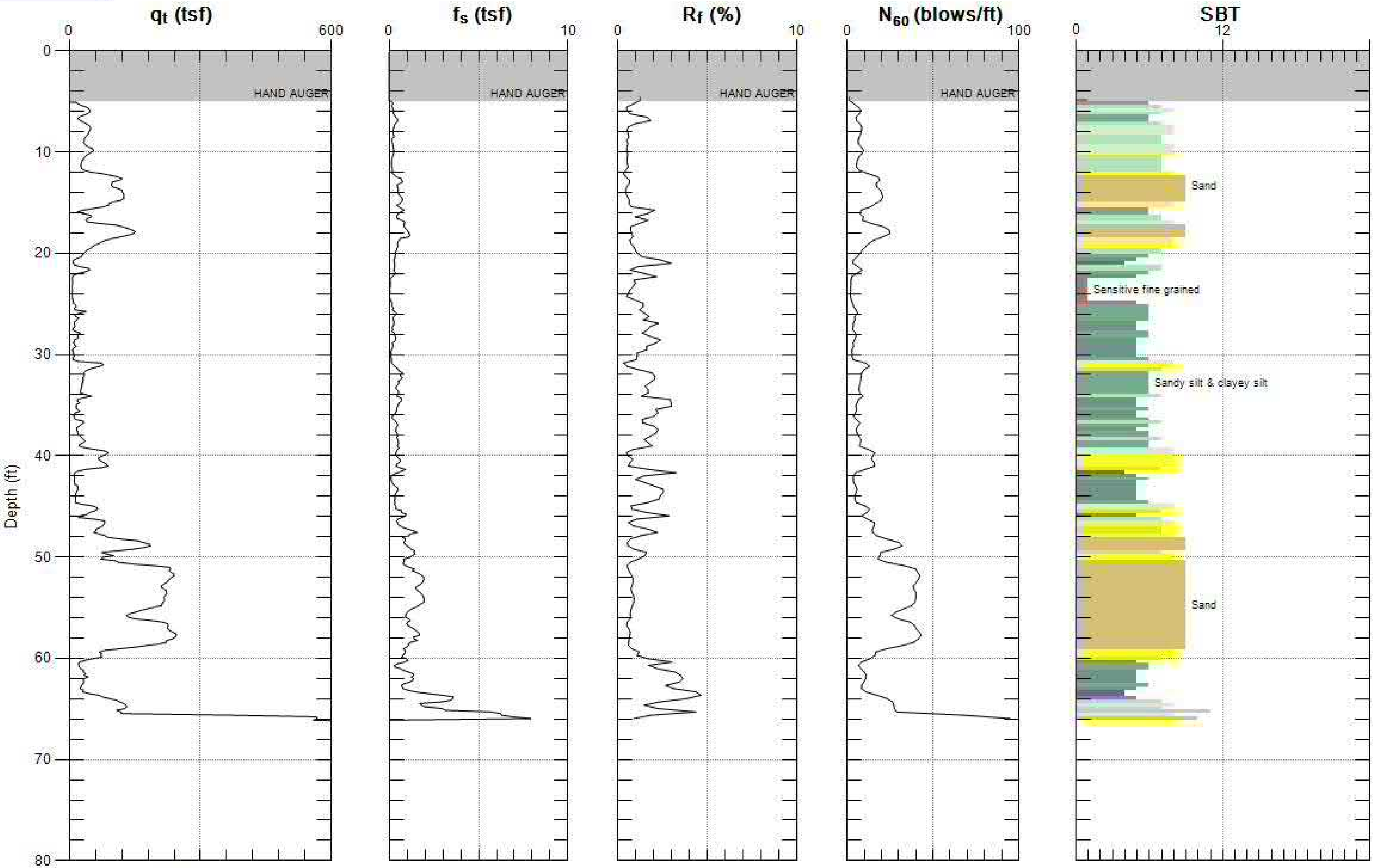
Figure A-79

SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-04 Date: 3/20/17 01:02



Max. Depth: 66.273 (ft)
Avg. Interval: 0.328 (ft)

Figure A-80 SBT: Soil Behavior Type (Robertson 1990)

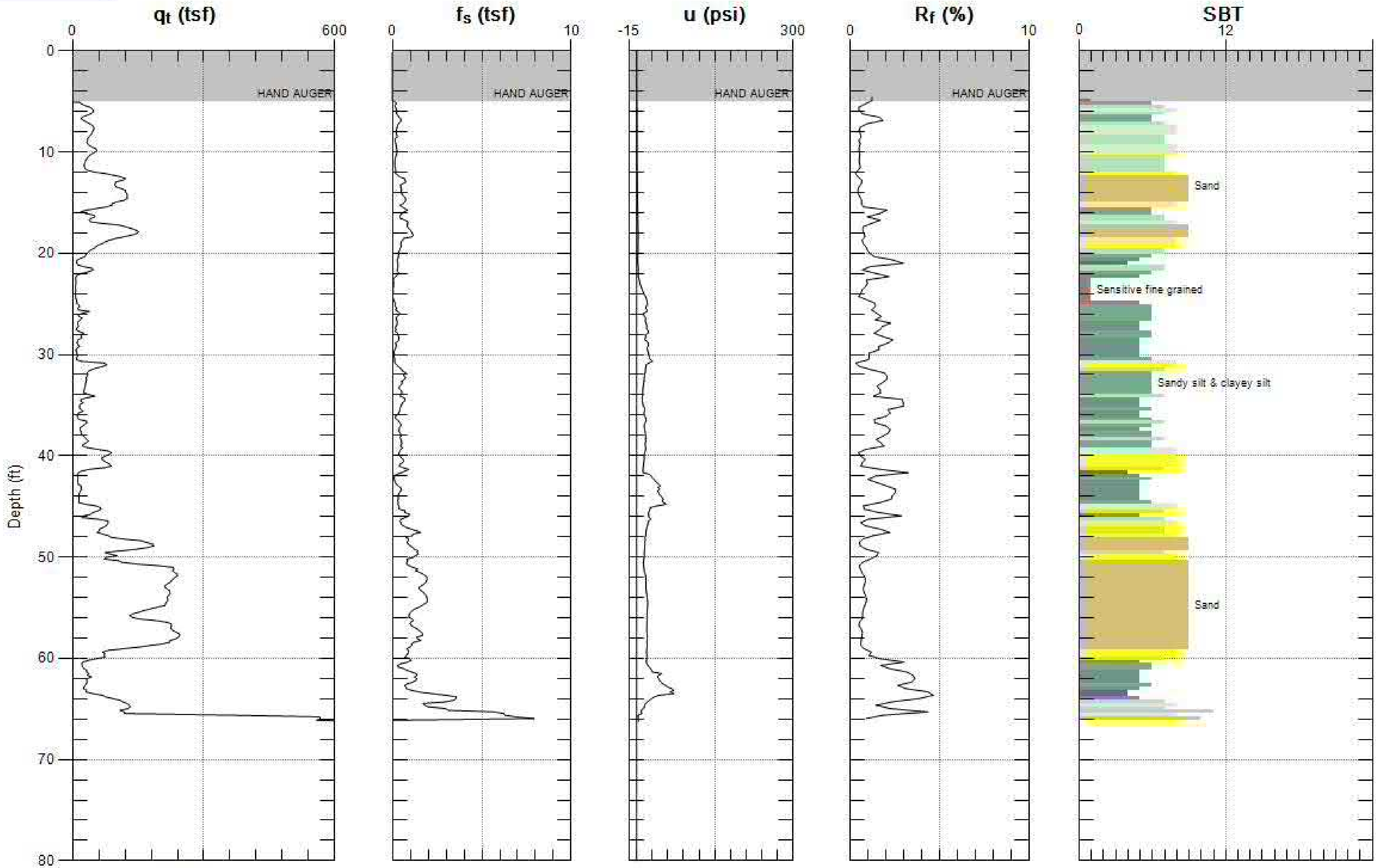
GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-04

Date: 3/20/17 01:02



Max. Depth: 66.273 (ft)
Avg. Interval: 0.328 (ft)

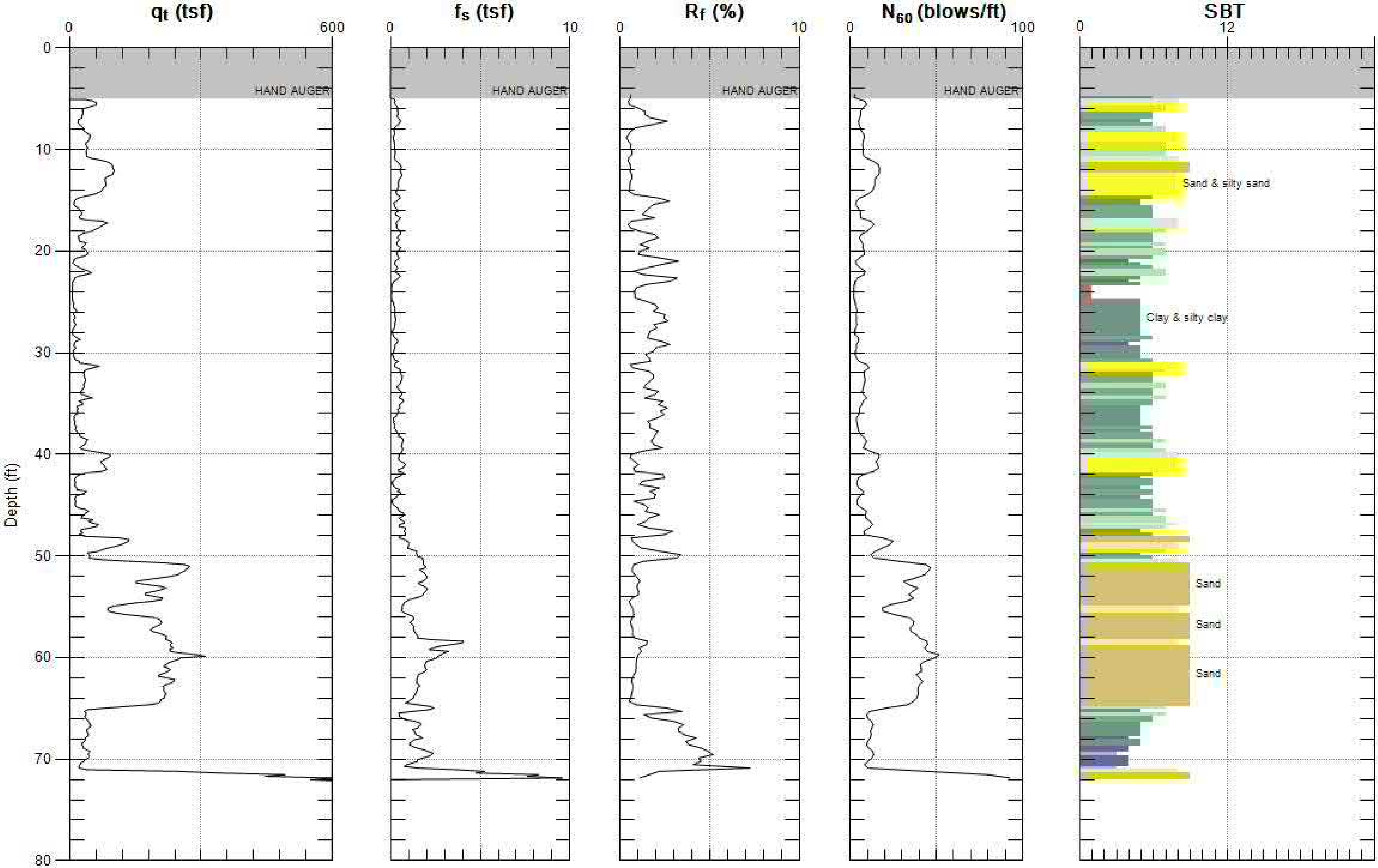
Figure A-80

SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-05 Date: 3/20/17 02:14



Max. Depth: 72.178 (ft)
Avg. Interval: 0.328 (ft)

Figure A-81

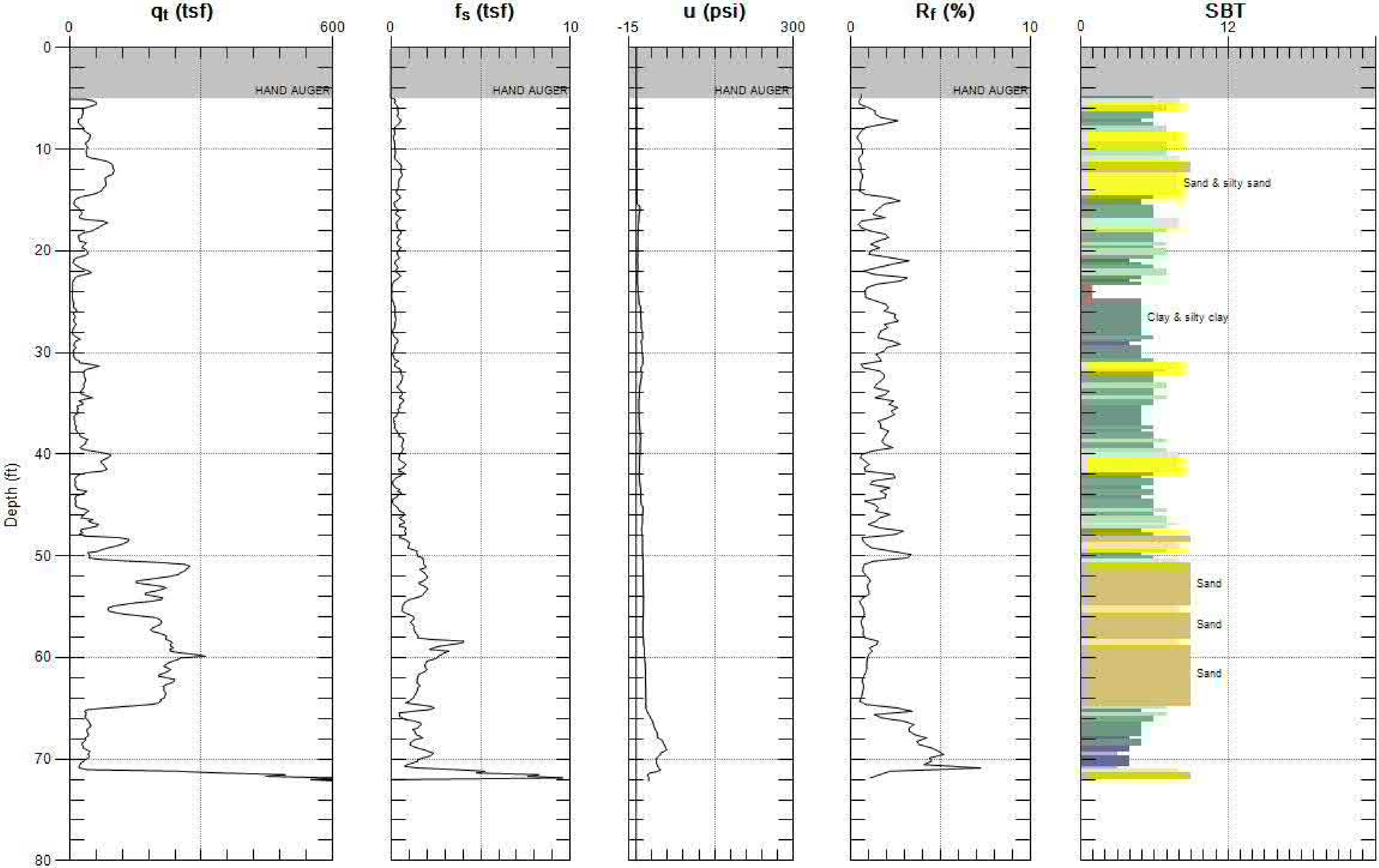
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-05 Date: 3/20/17 02:14



Max. Depth: 72.178 (ft)
Avg. Interval: 0.328 (ft)

Figure A-81

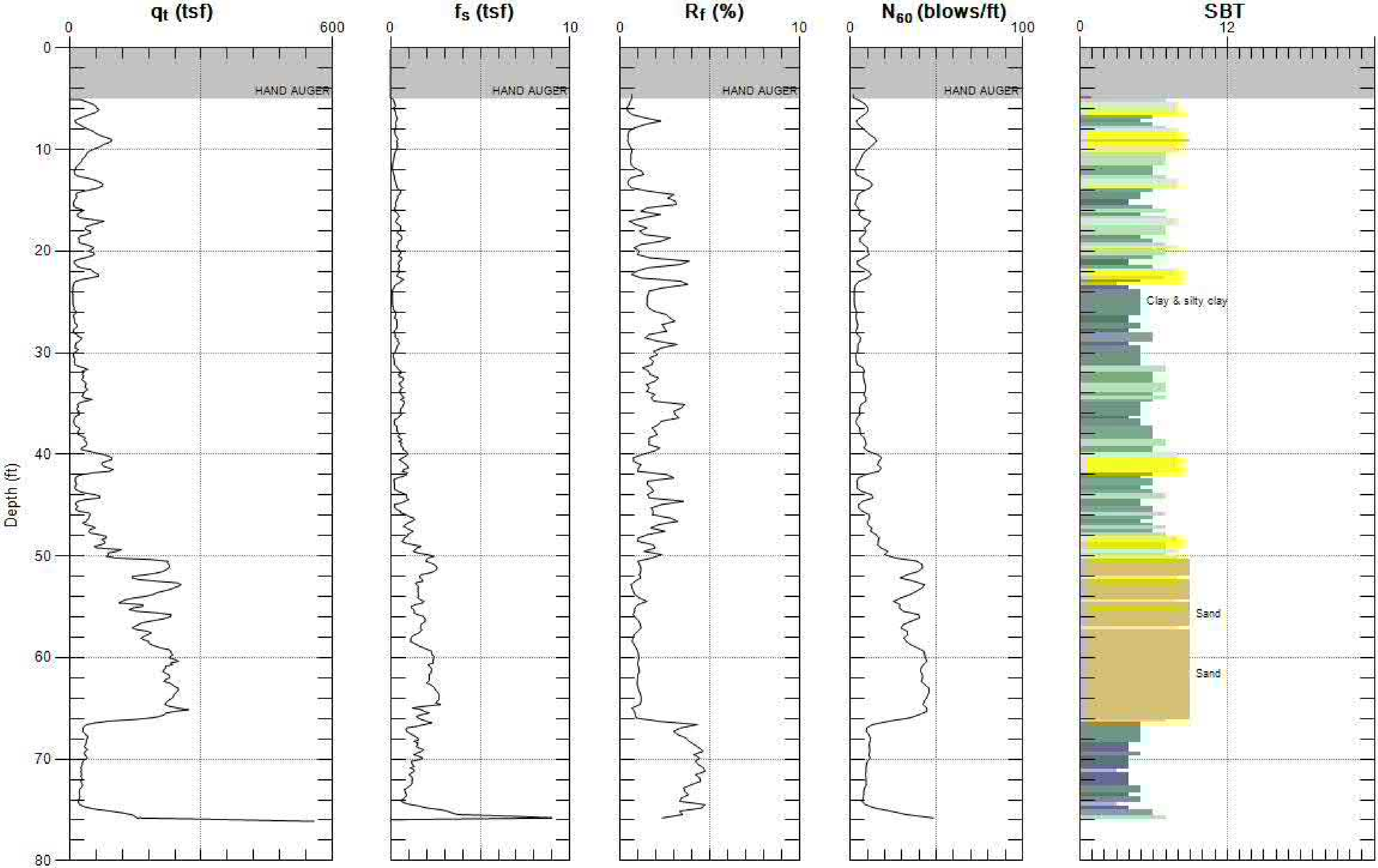
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-06 Date: 3/21/17 07:27



Max. Depth: 76.115 (ft)
Avg. Interval: 0.328 (ft)

Figure A-82

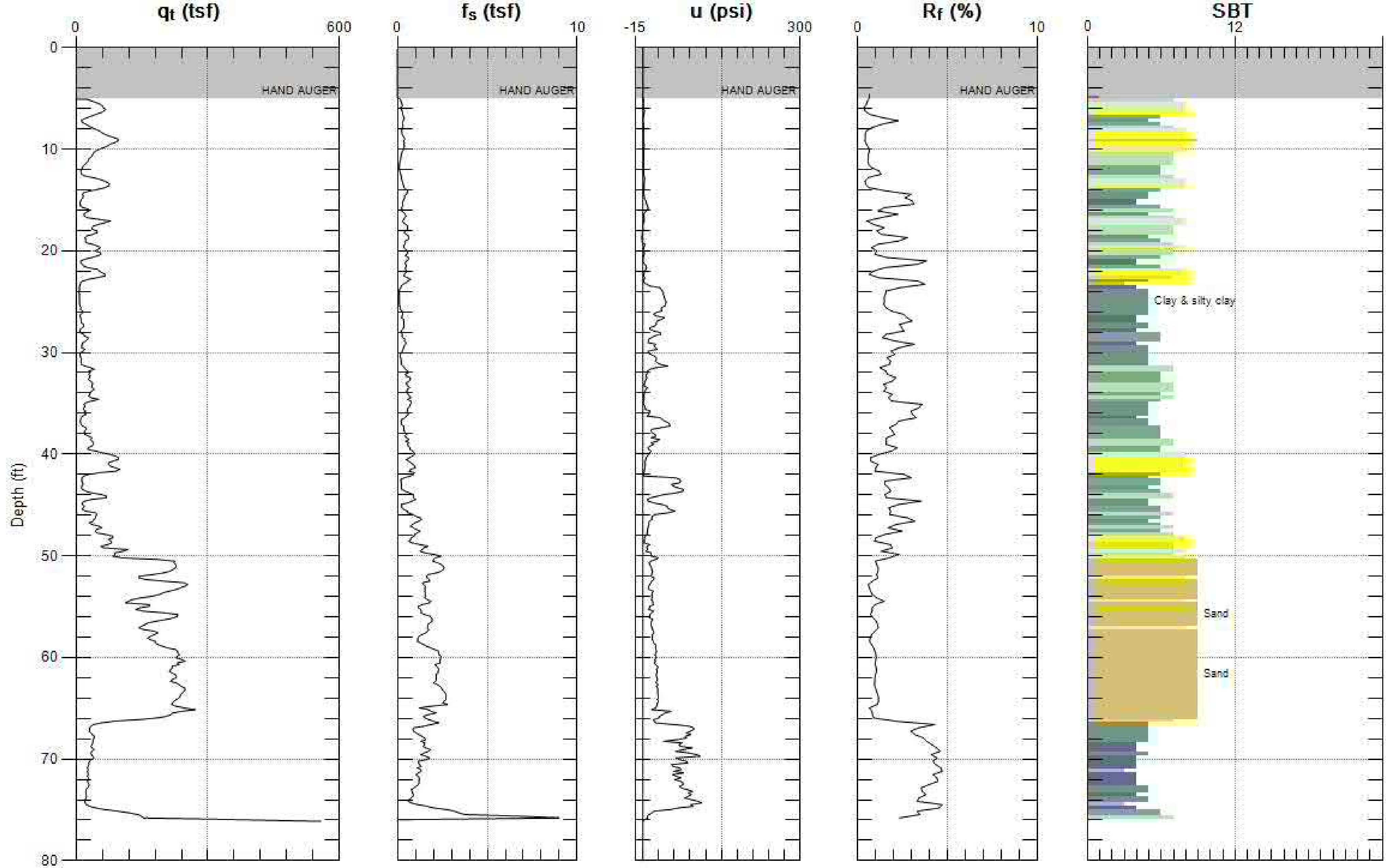
SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-06

Date: 3/21/17 07:27



Max. Depth: 76.115 (ft)
Avg. Interval: 0.328 (ft)

Figure A-82

SBT: Soil Behavior Type (Robertson 1990)

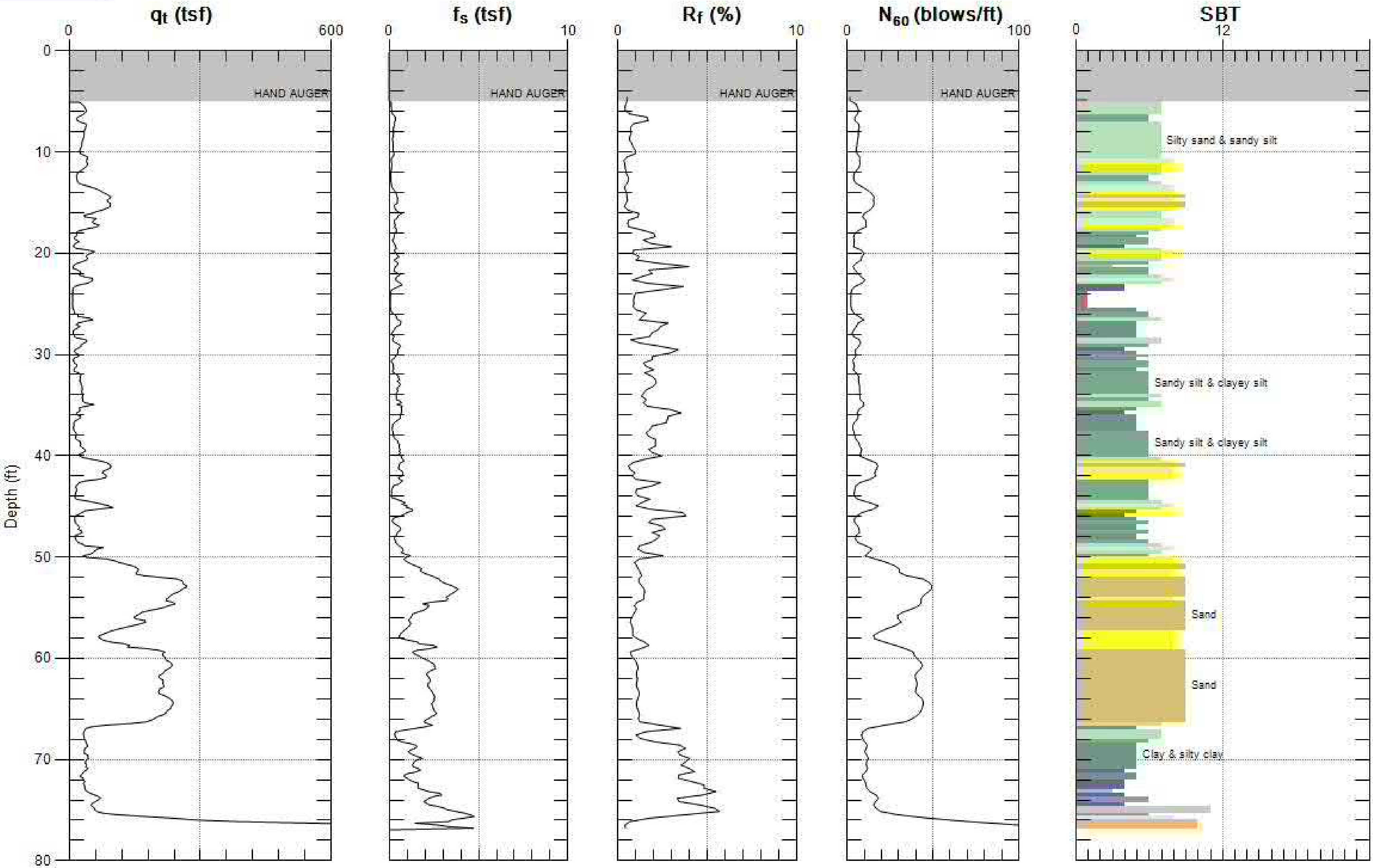
GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-07

Date: 3/21/17 09:18



Max. Depth: 77.100 (ft)
Avg. Interval: 0.328 (ft)

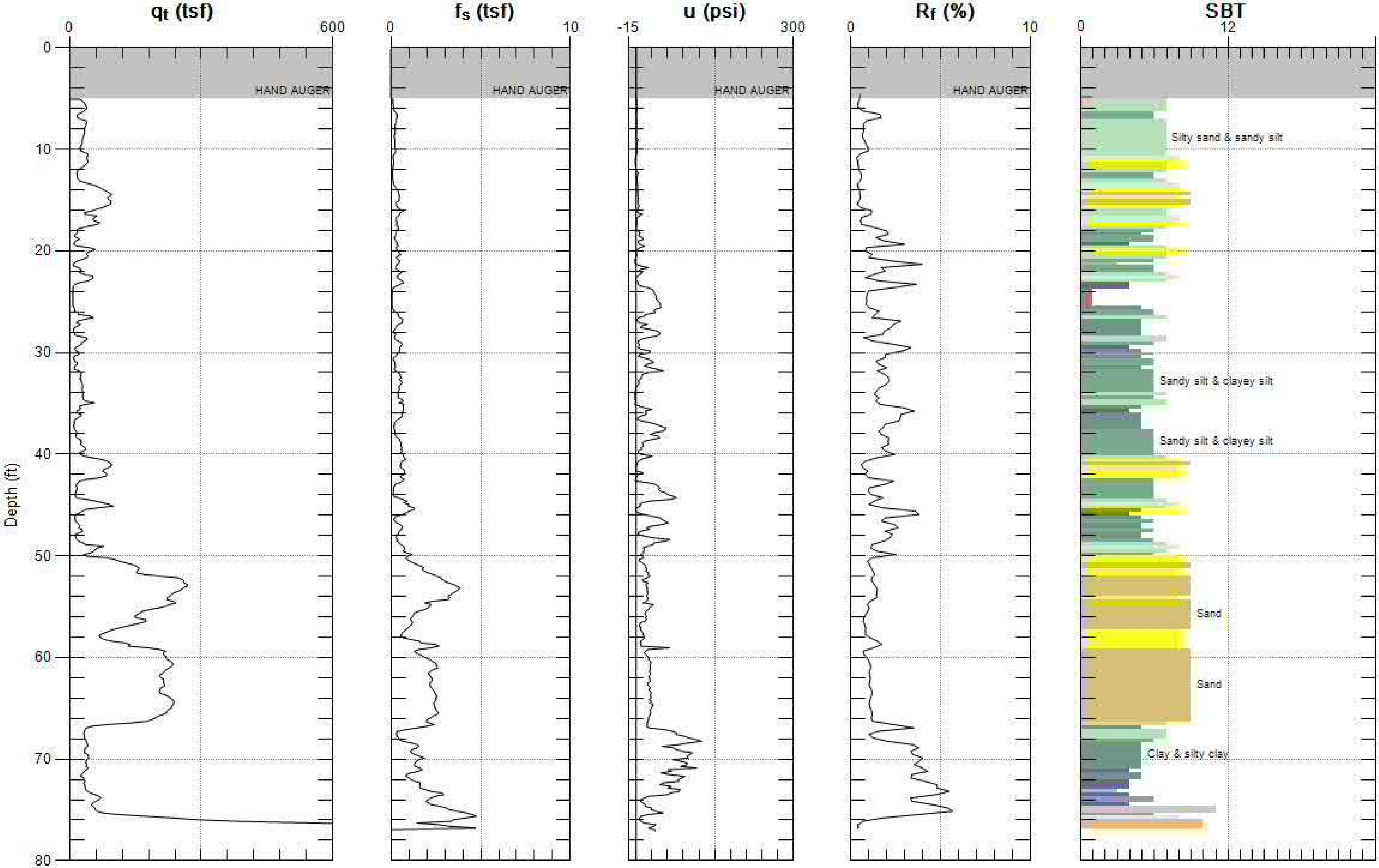
Figure A-83

SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-07 Date: 3/21/17 09:18



Max. Depth: 77.100 (ft)
Avg. Interval: 0.328 (ft)

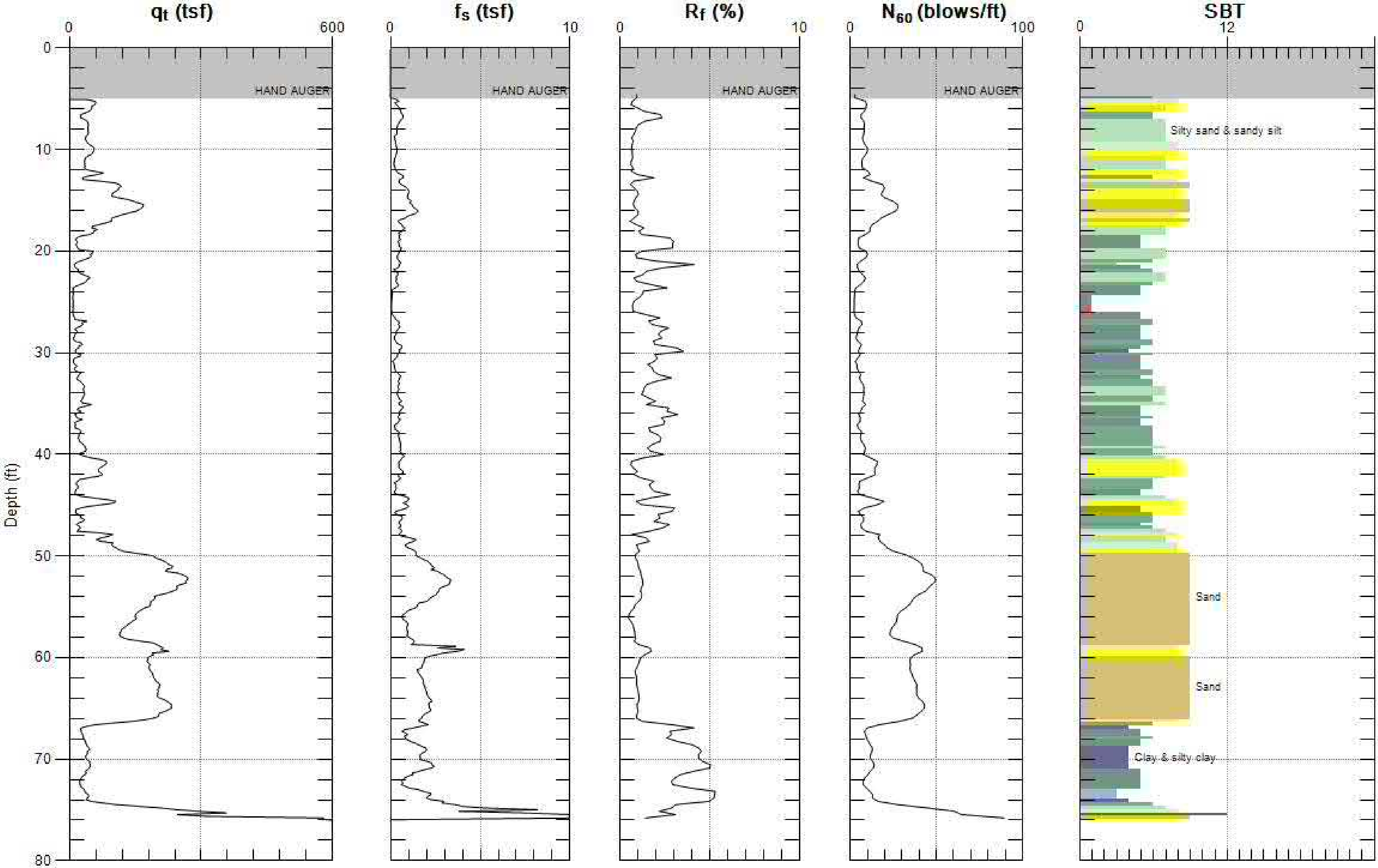
SBT: Soil Behavior Type (Robertson 1990)

Figure A-83

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-08 Date: 3/21/17 10:50



Max. Depth: 76.115 (ft)
Avg. Interval: 0.328 (ft)

Figure A-84

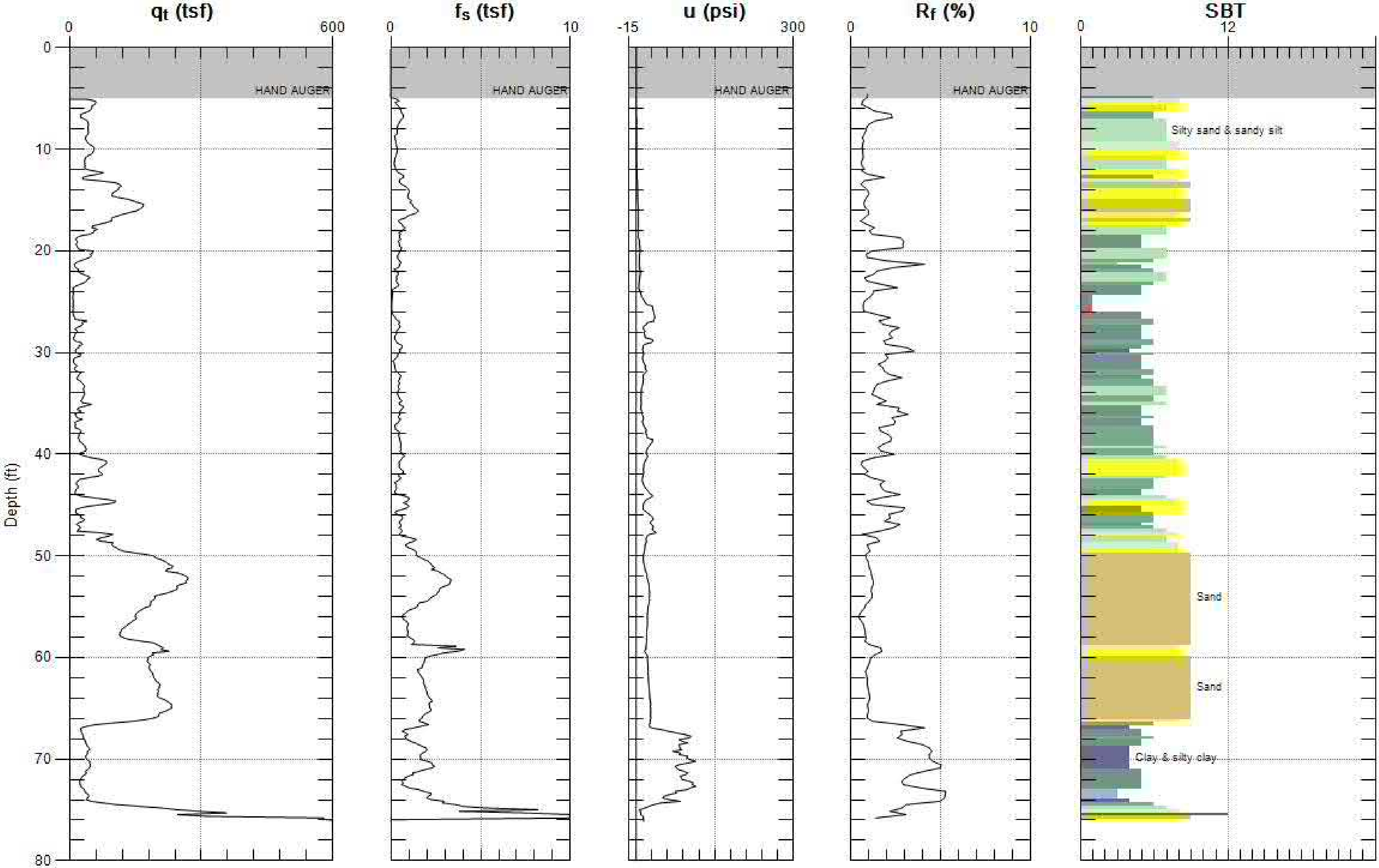
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-08 Date: 3/21/17 10:50



Max. Depth: 76.115 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

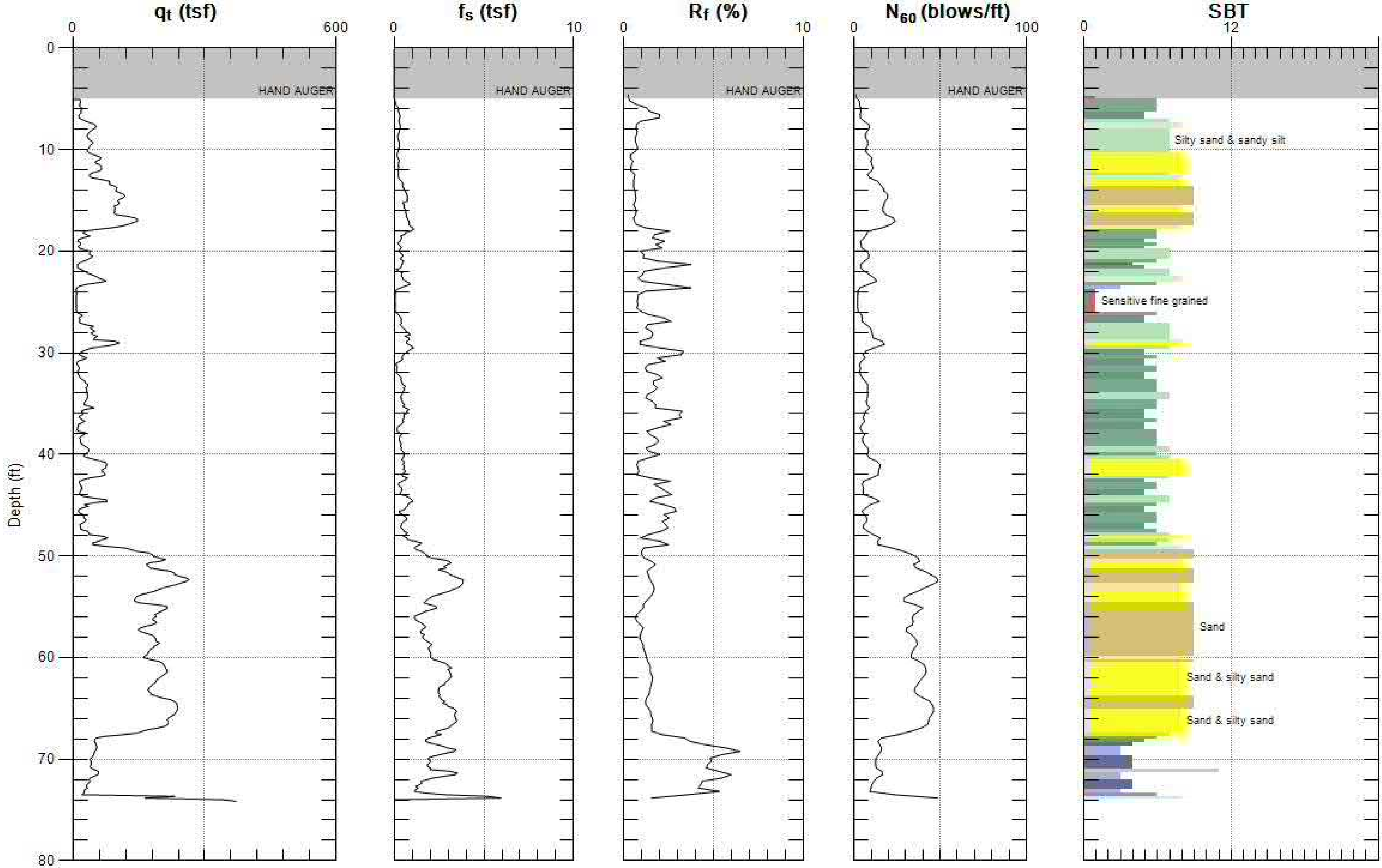
Figure A-84

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-09 Date: 3/21/17 01:01



Max. Depth: 74.147 (ft)
Avg. Interval: 0.328 (ft)

Figure A-85

SBT: Soil Behavior Type (Robertson 1990)

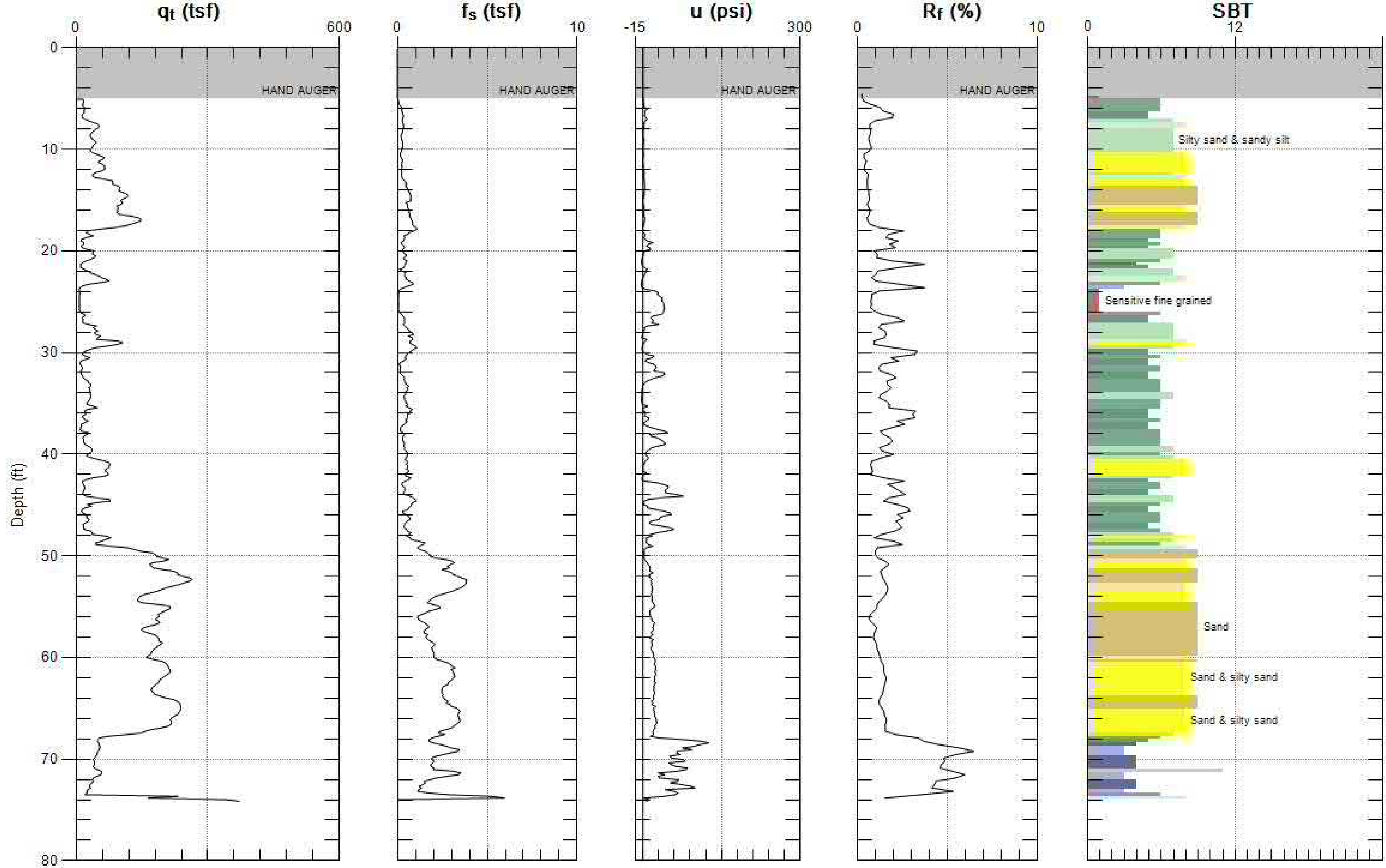
GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-09

Date: 3/21/17 01:01



Max. Depth: 74.147 (ft)
Avg. Interval: 0.328 (ft)

Figure A-85

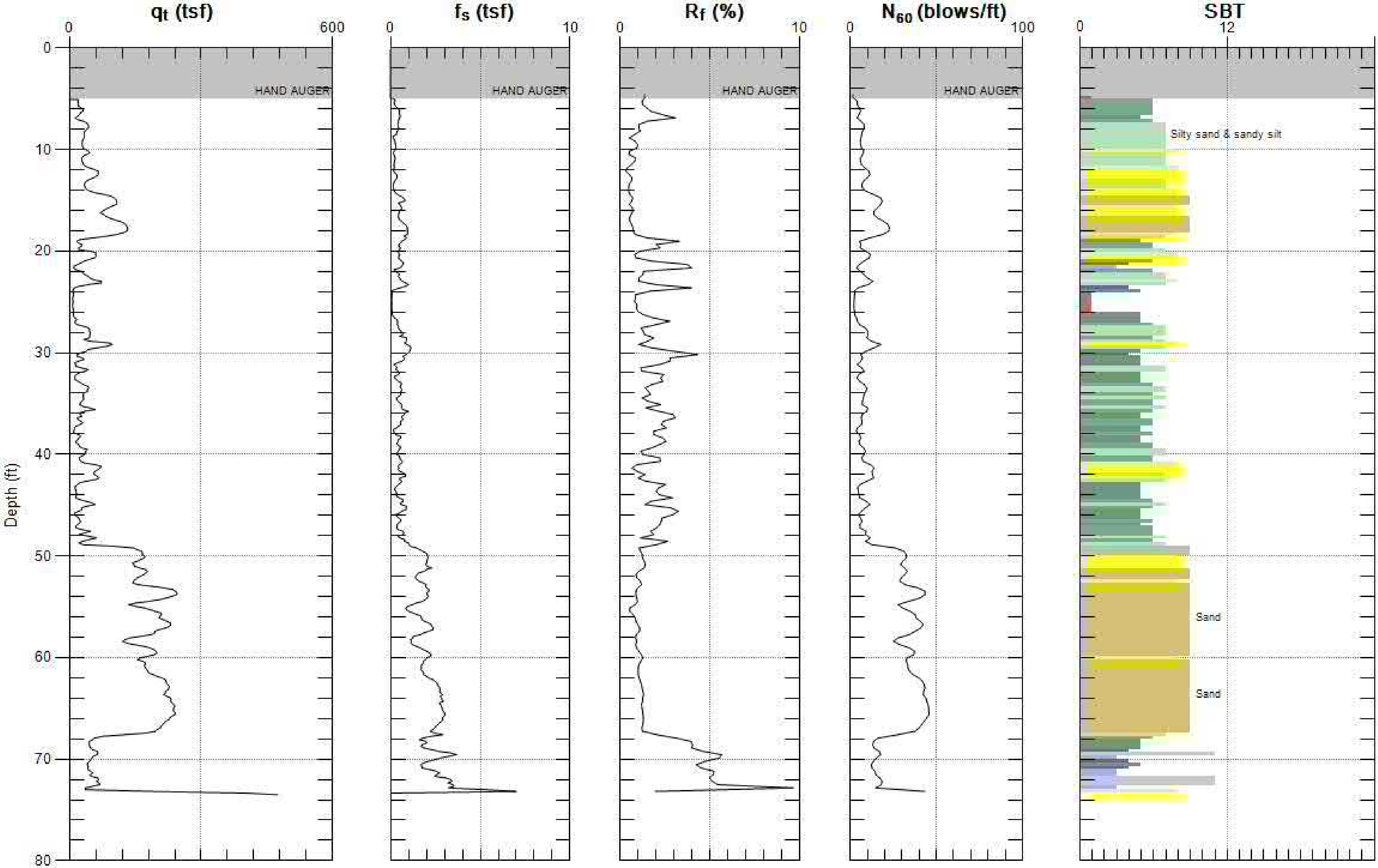
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-10 Date: 3/21/17 02:18



Max. Depth: 73.491 (ft)
Avg. Interval: 0.328 (ft)

Figure A-86

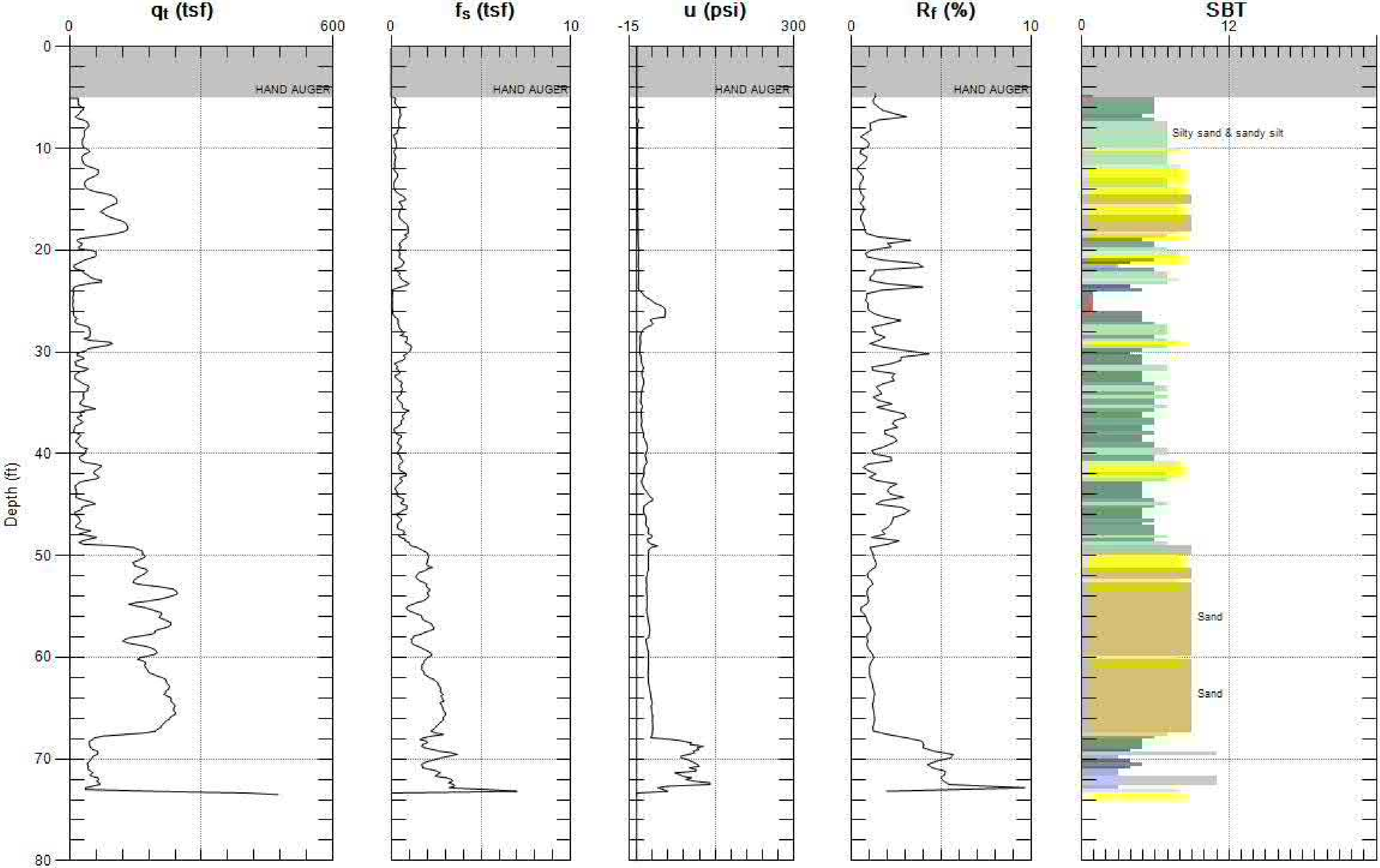
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-10 Date: 3/21/17 02:18



Max. Depth: 73.491 (ft)
Avg. Interval: 0.328 (ft)

Figure A-86

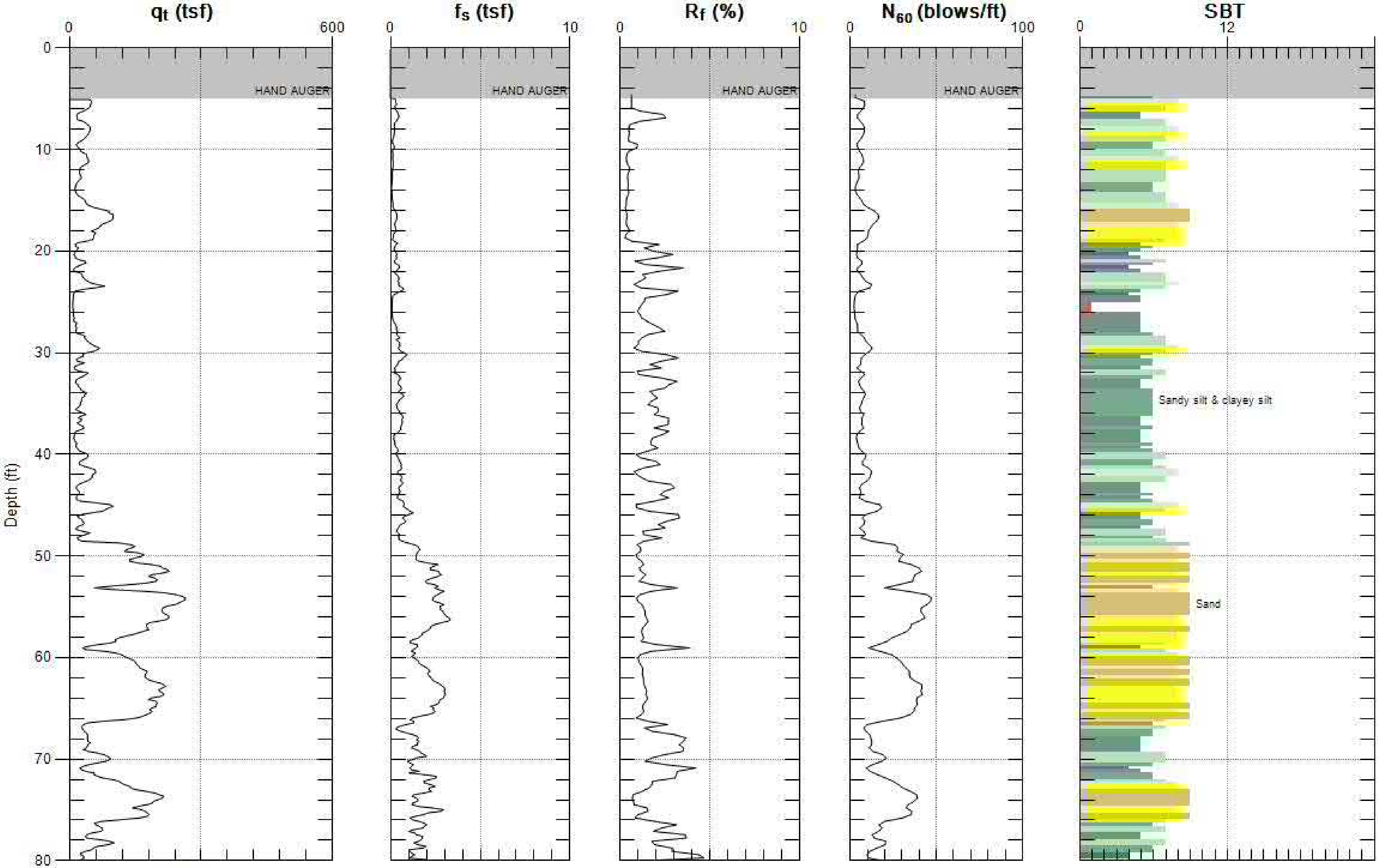
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-11 Date: 3/22/17 07:42



Max. Depth: 80.217 (ft)
Avg. Interval: 0.328 (ft)

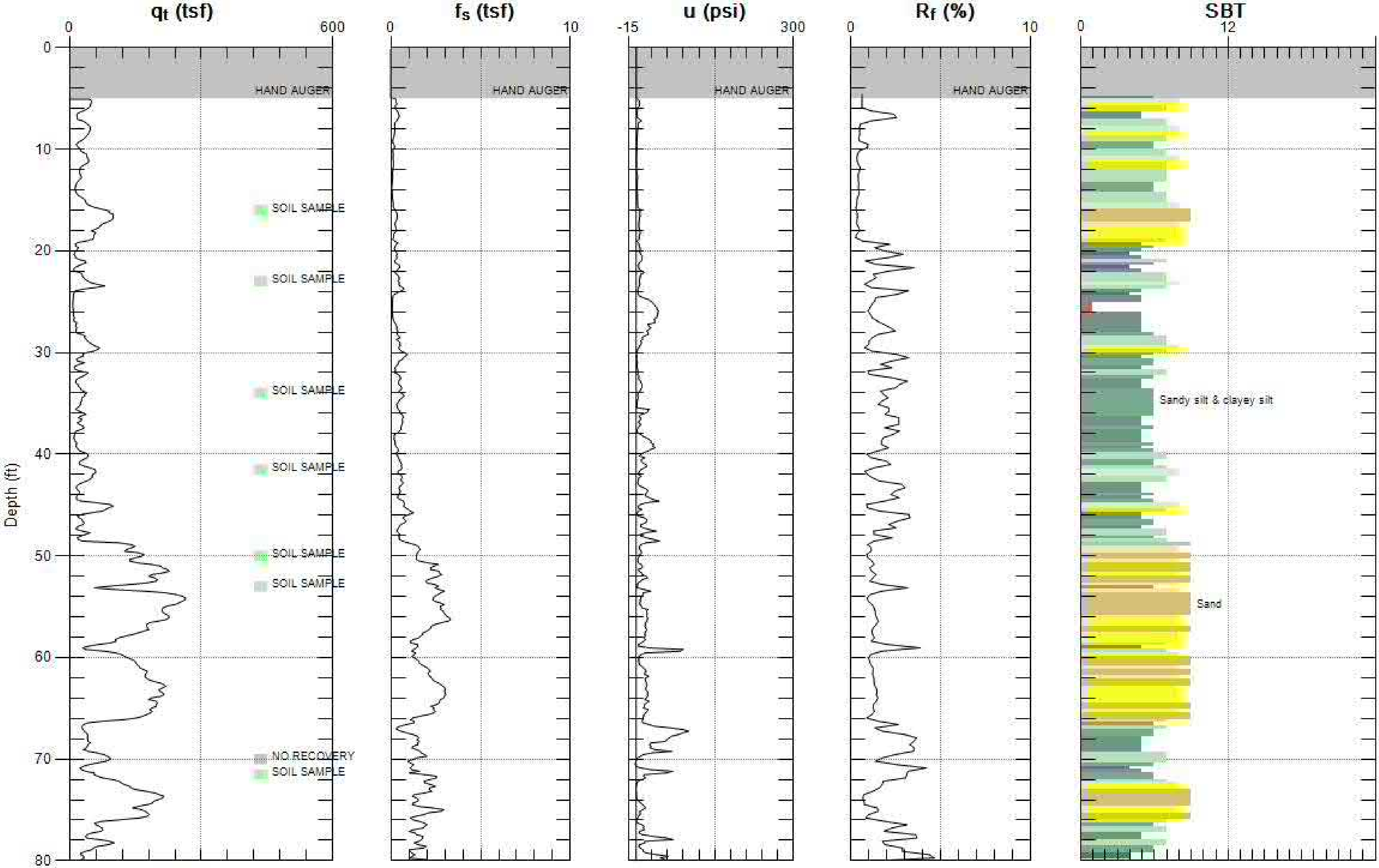
SBT: Soil Behavior Type (Robertson 1990)

Figure A-87

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-11 Date: 3/22/17 07:42



Max. Depth: 80.217 (ft)
Avg. Interval: 0.328 (ft)

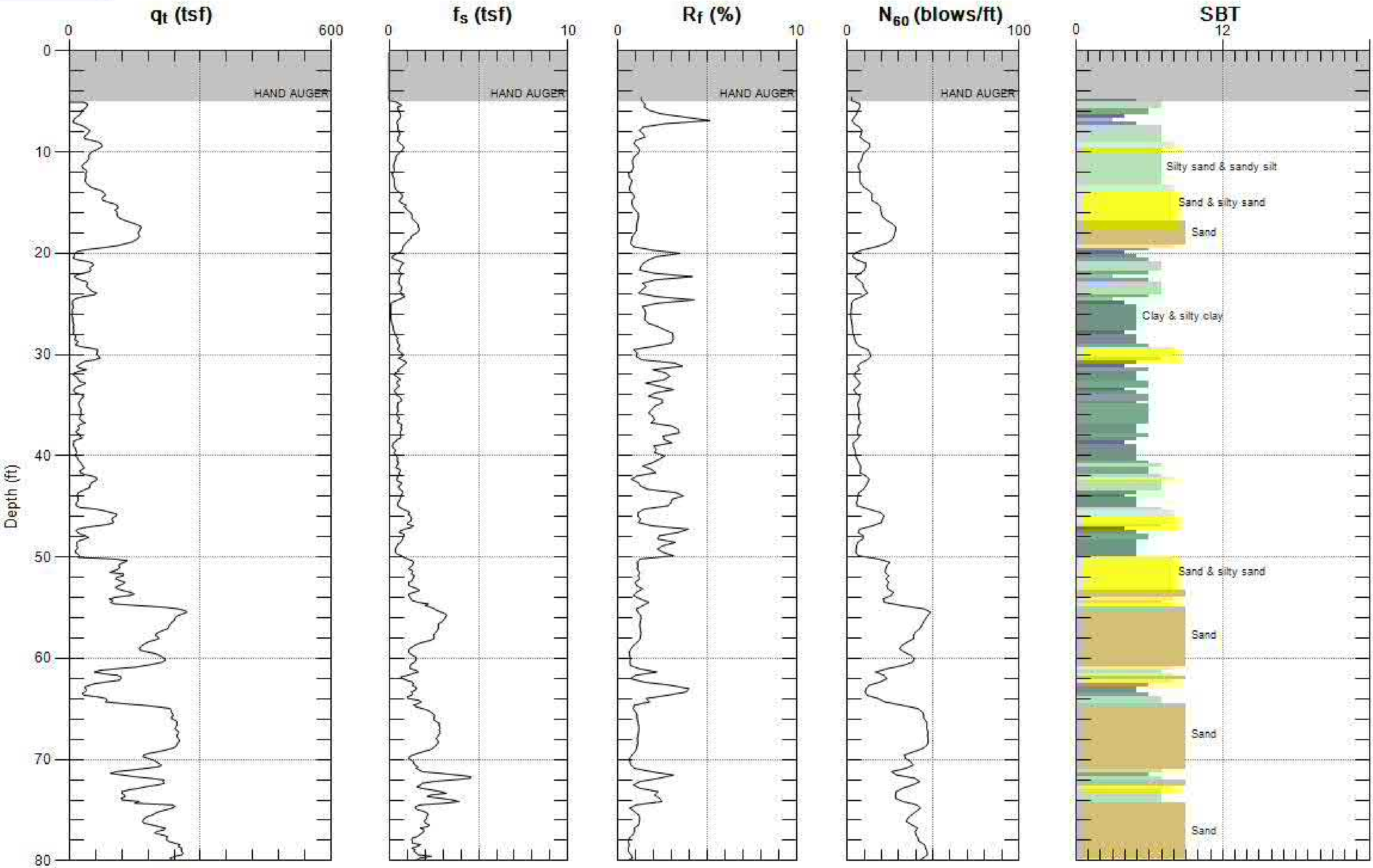
Figure A-87

SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-12 Date: 3/22/17 09:25



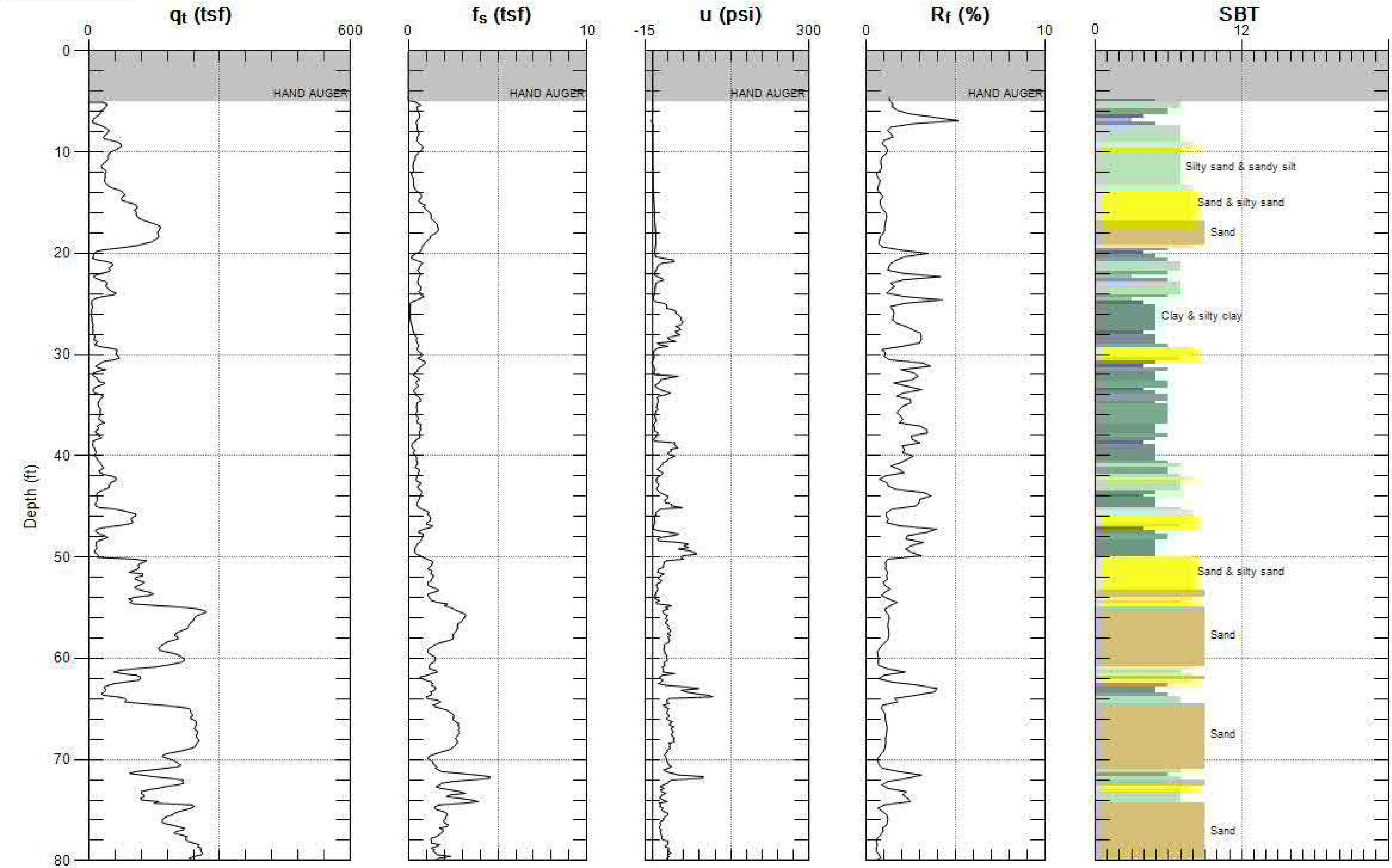
Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

Figure A-88

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-12 Date: 3/22/17 09:25



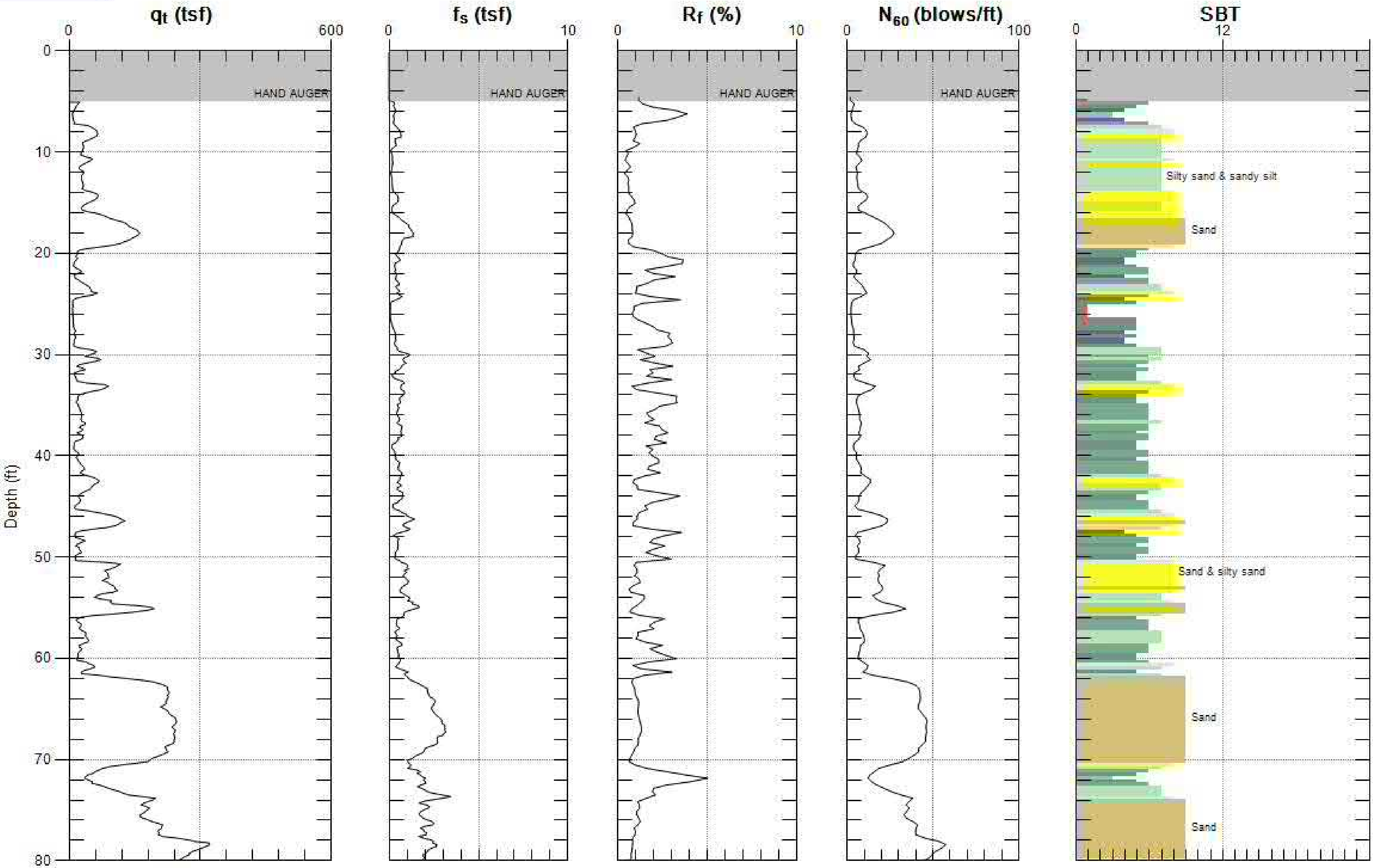
Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-88 SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-13 Date: 3/22/17 10:52



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

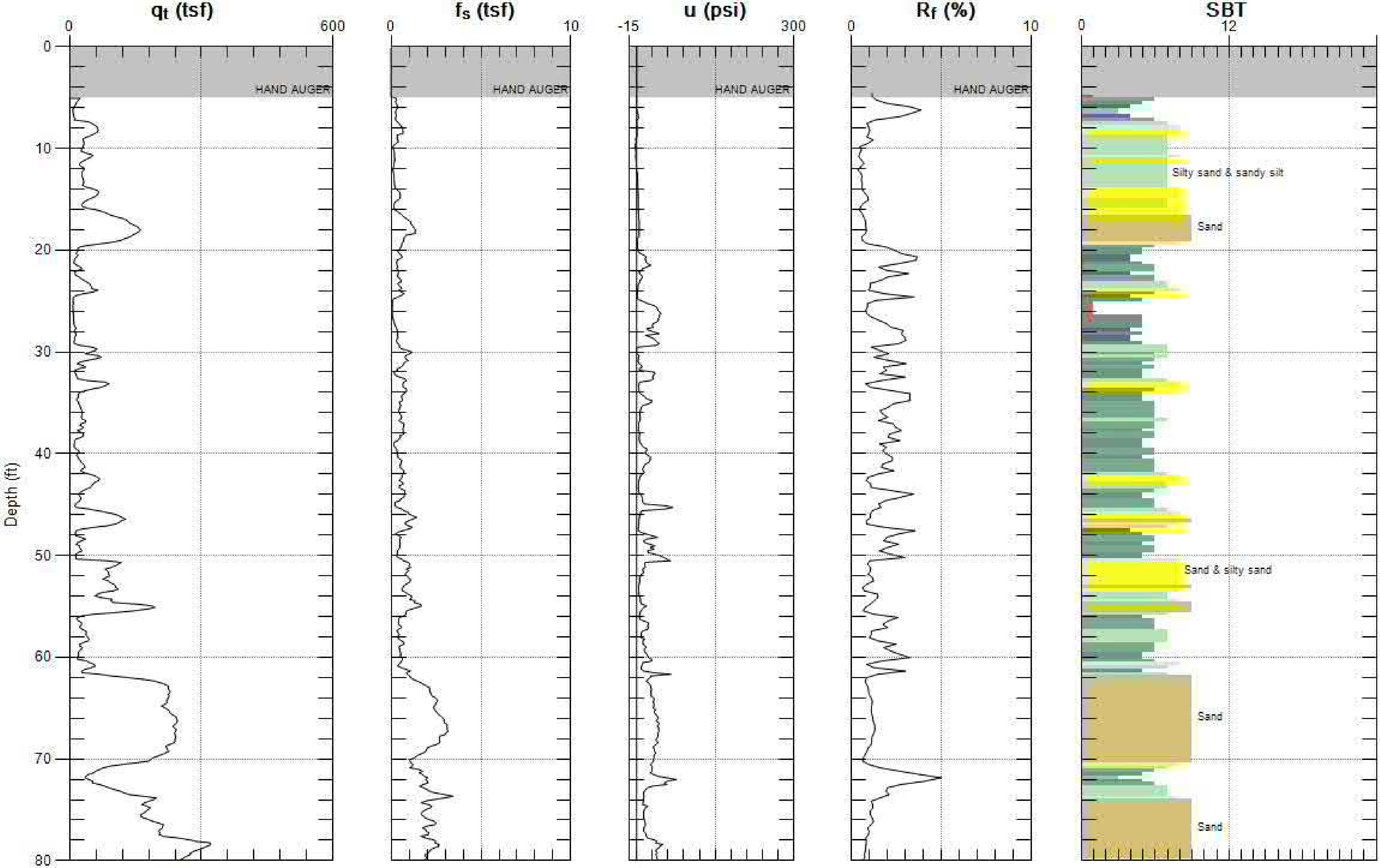
SBT: Soil Behavior Type (Robertson 1990)

Figure A-89

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-13 Date: 3/22/17 10:52



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-89

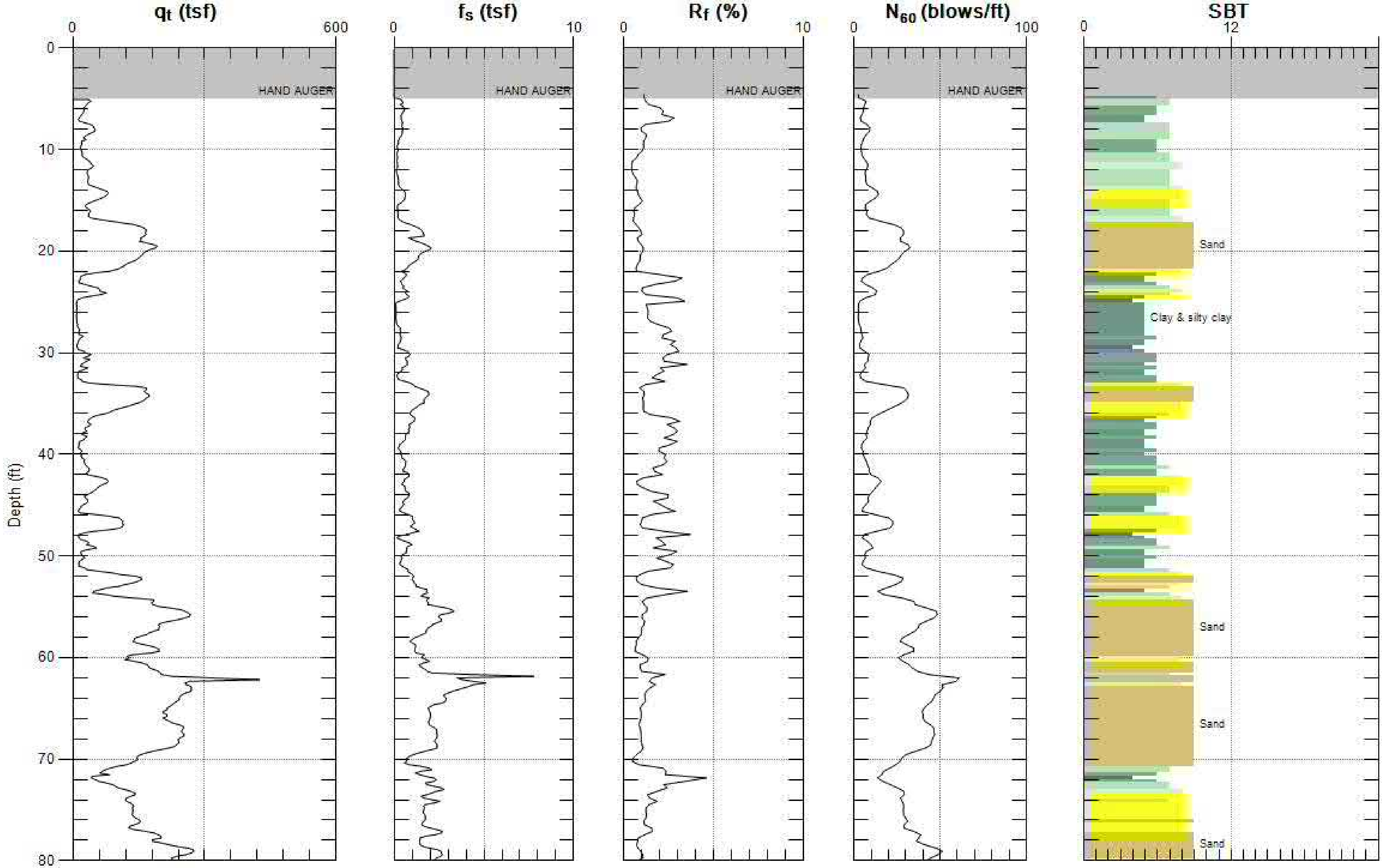
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-14 Date: 3/22/17 01:04



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-90

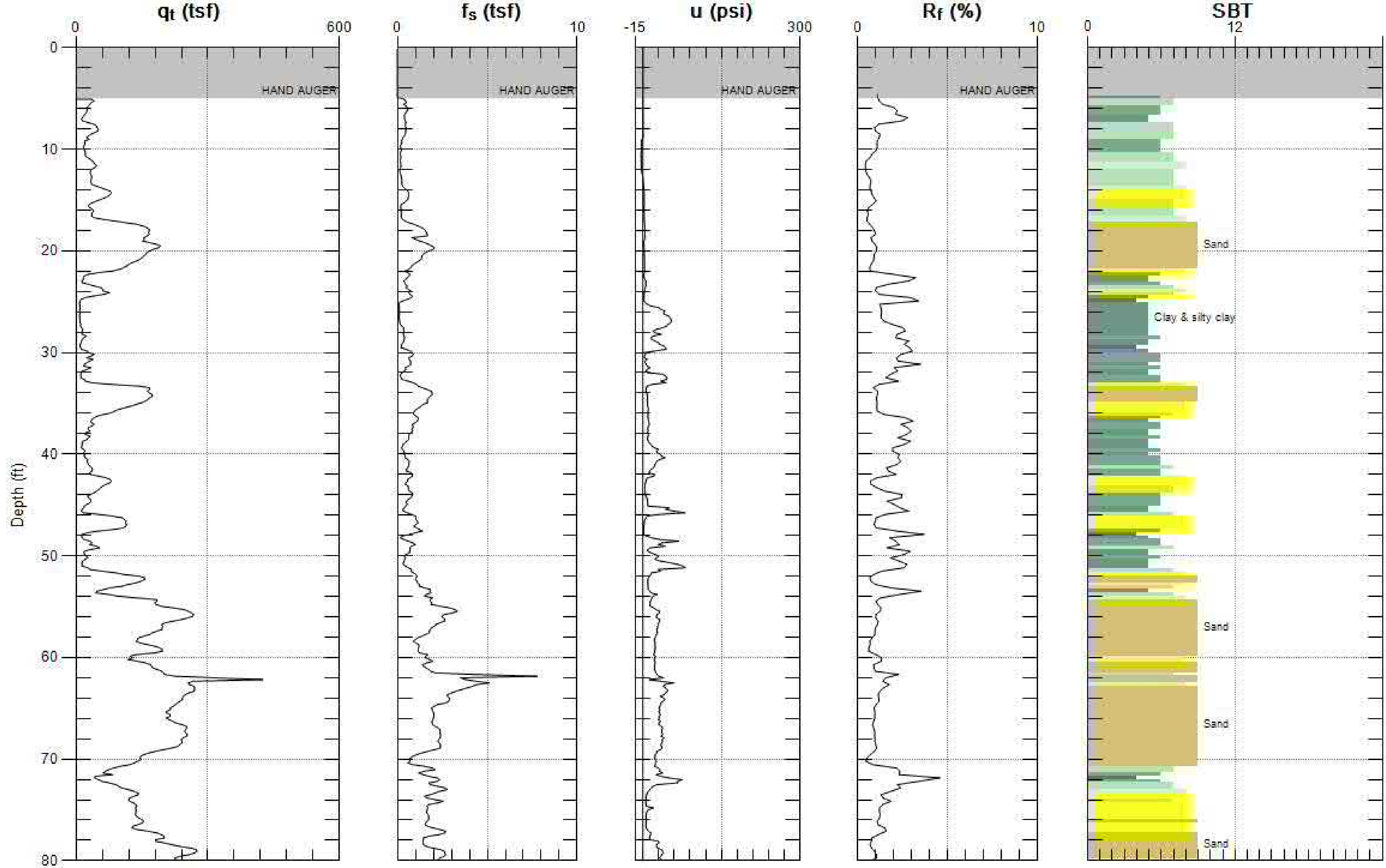
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-14 Date: 3/22/17 01:04



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

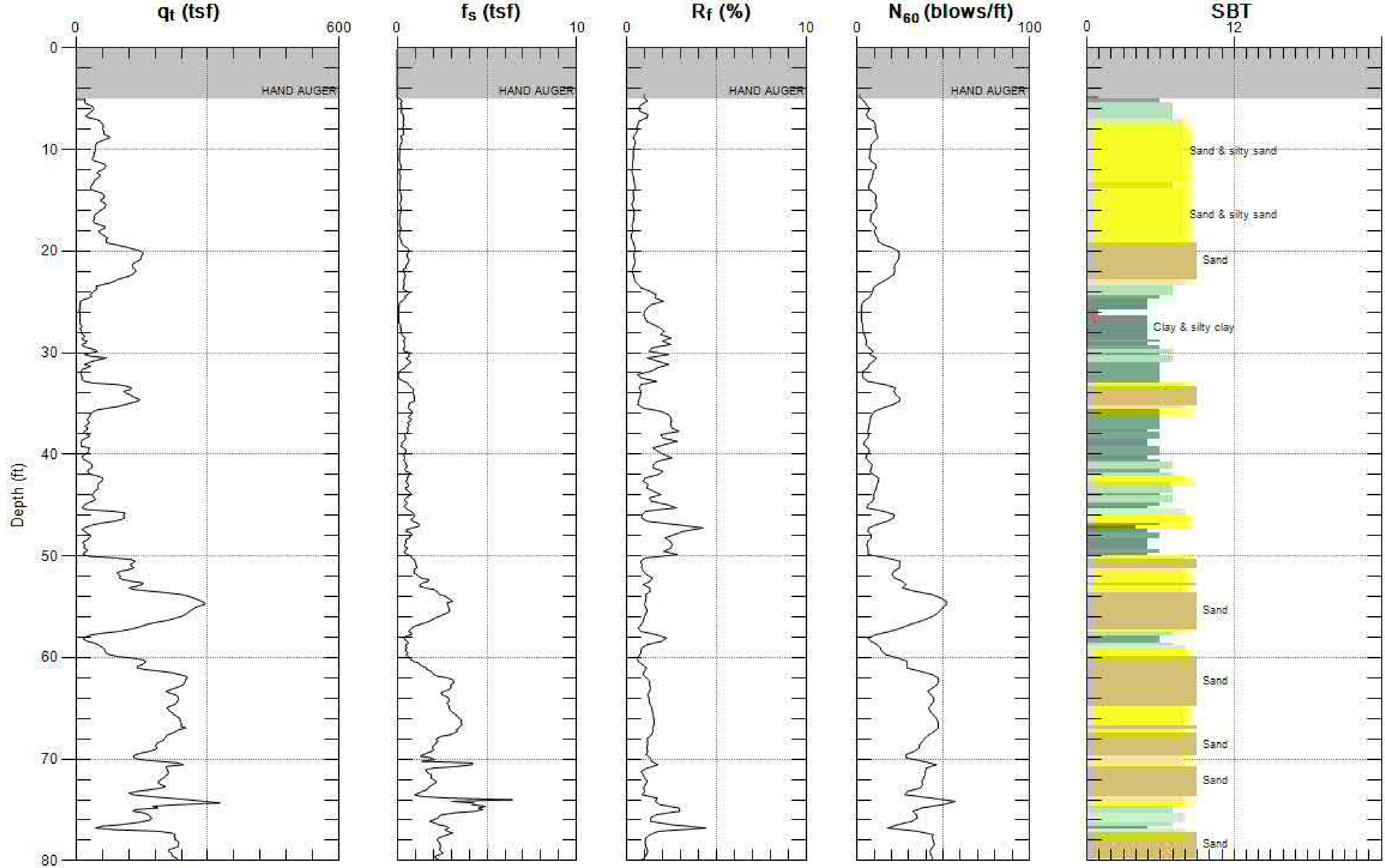
Figure A-90 SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-15 Date: 3/22/17 02:19



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-91 SBT: Soil Behavior Type (Robertson 1990)

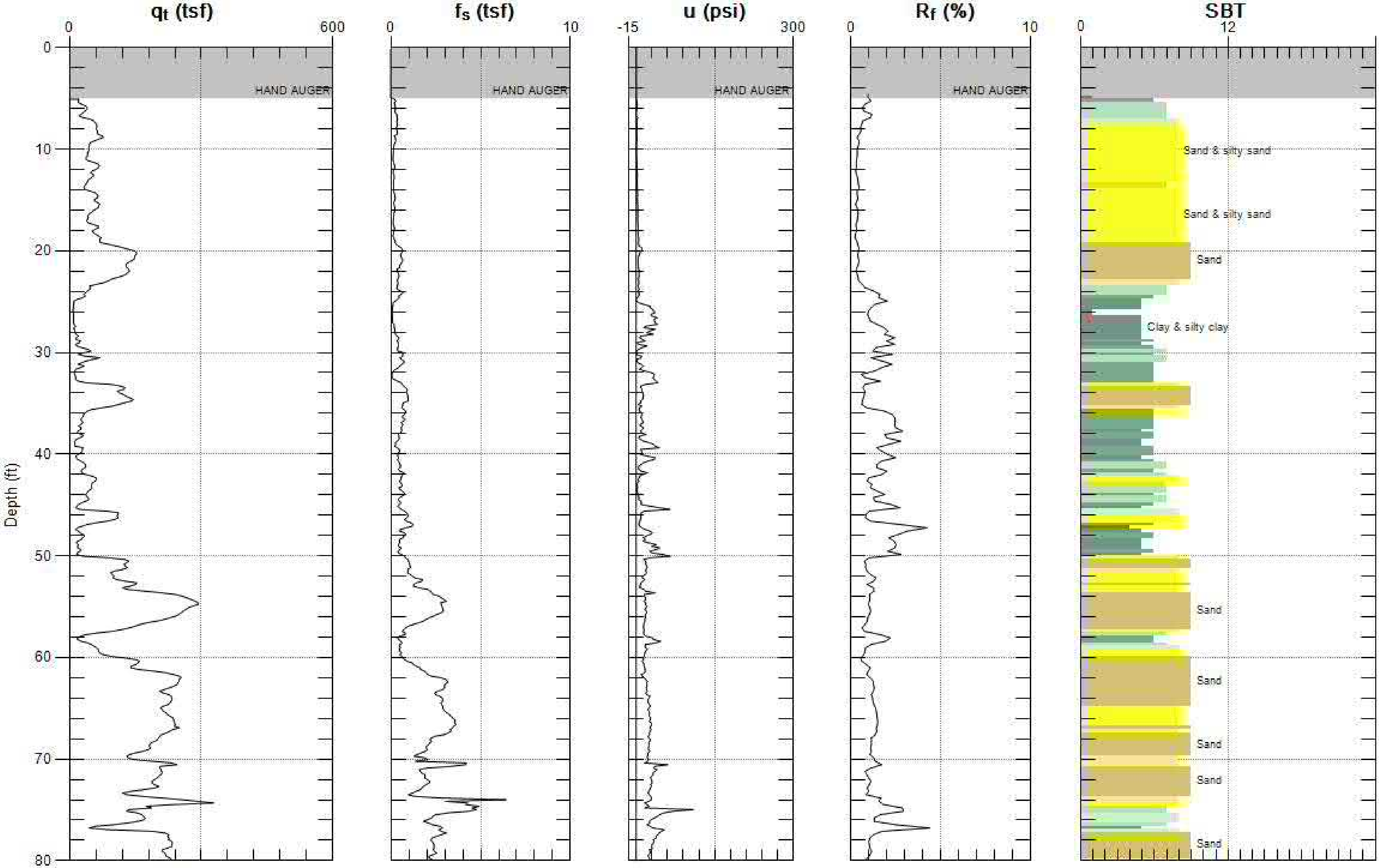
GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-15

Date: 3/22/17 02:19



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-91

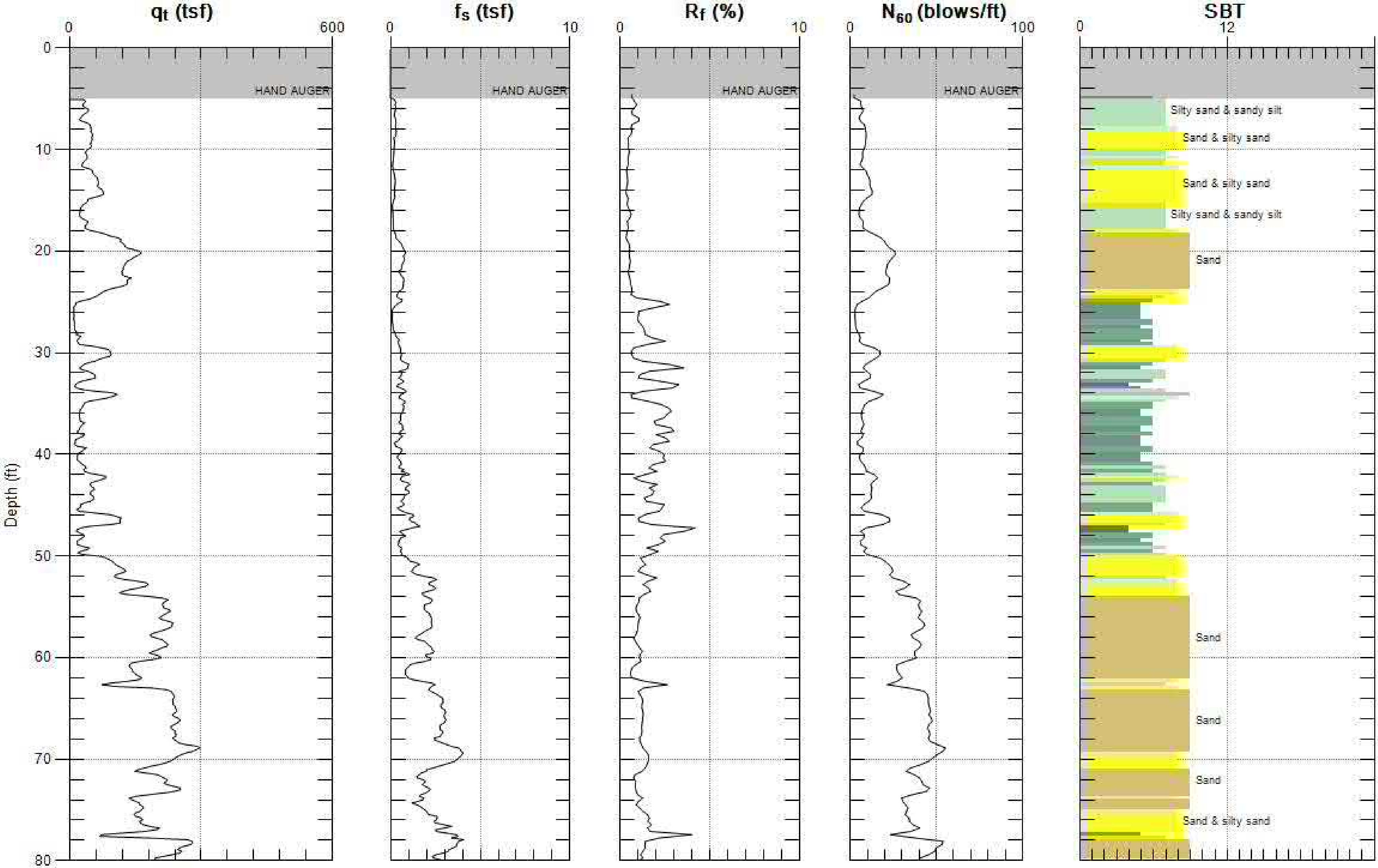
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-16 Date: 3/23/17 07:53



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

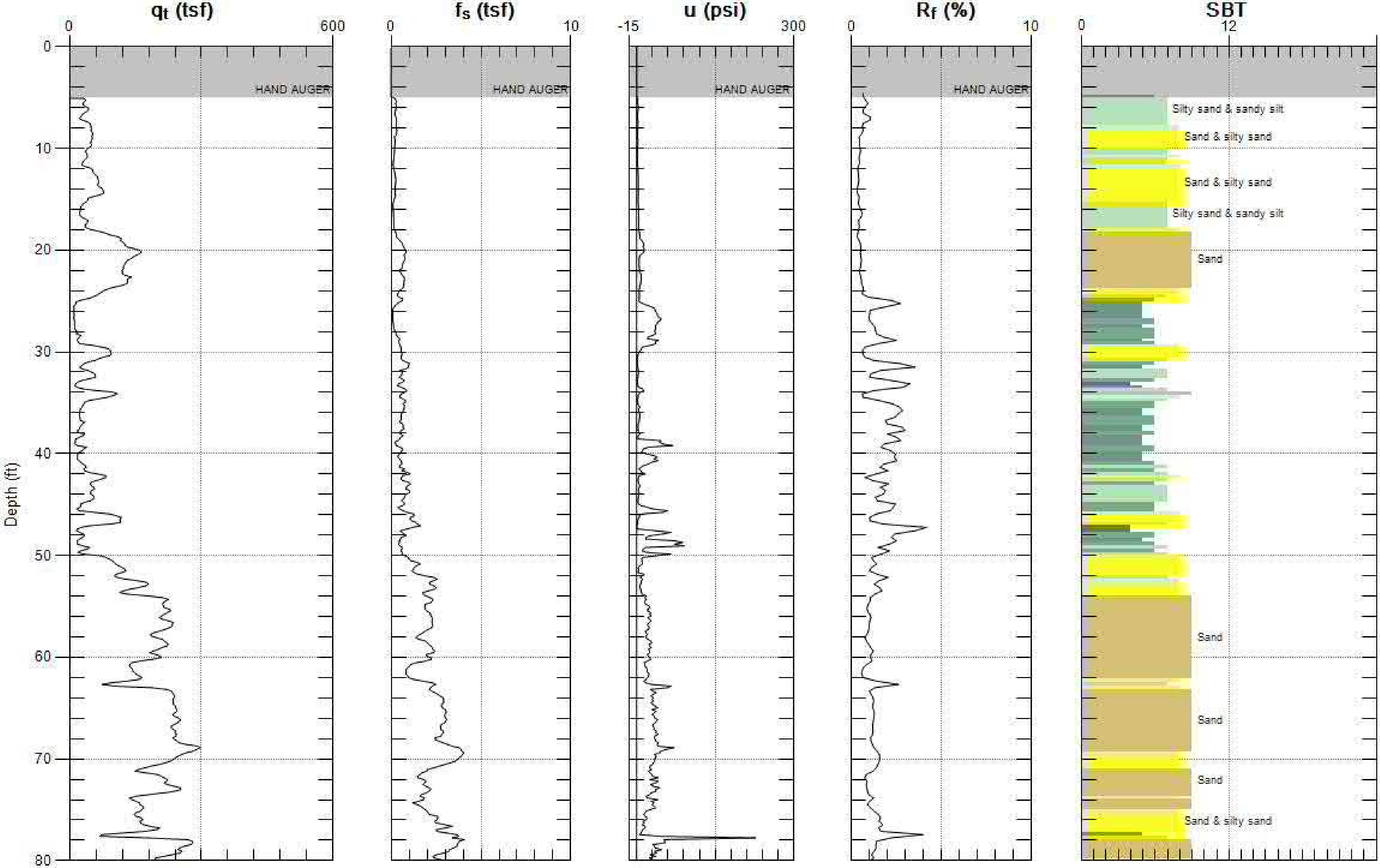
Figure A-92

SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-16 Date: 3/23/17 07:53



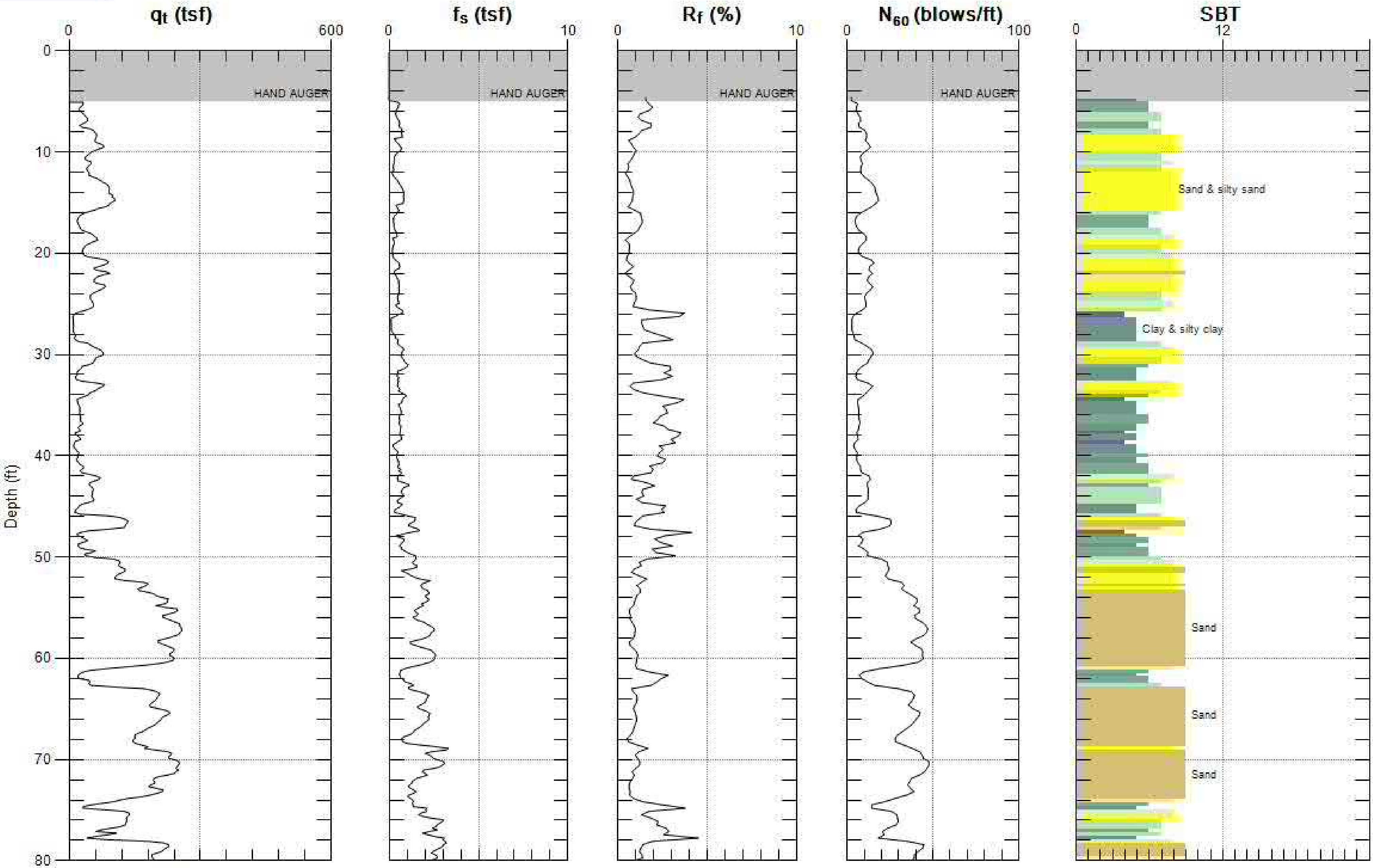
Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-92 SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-17 **Date: 3/23/17 09:15**



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

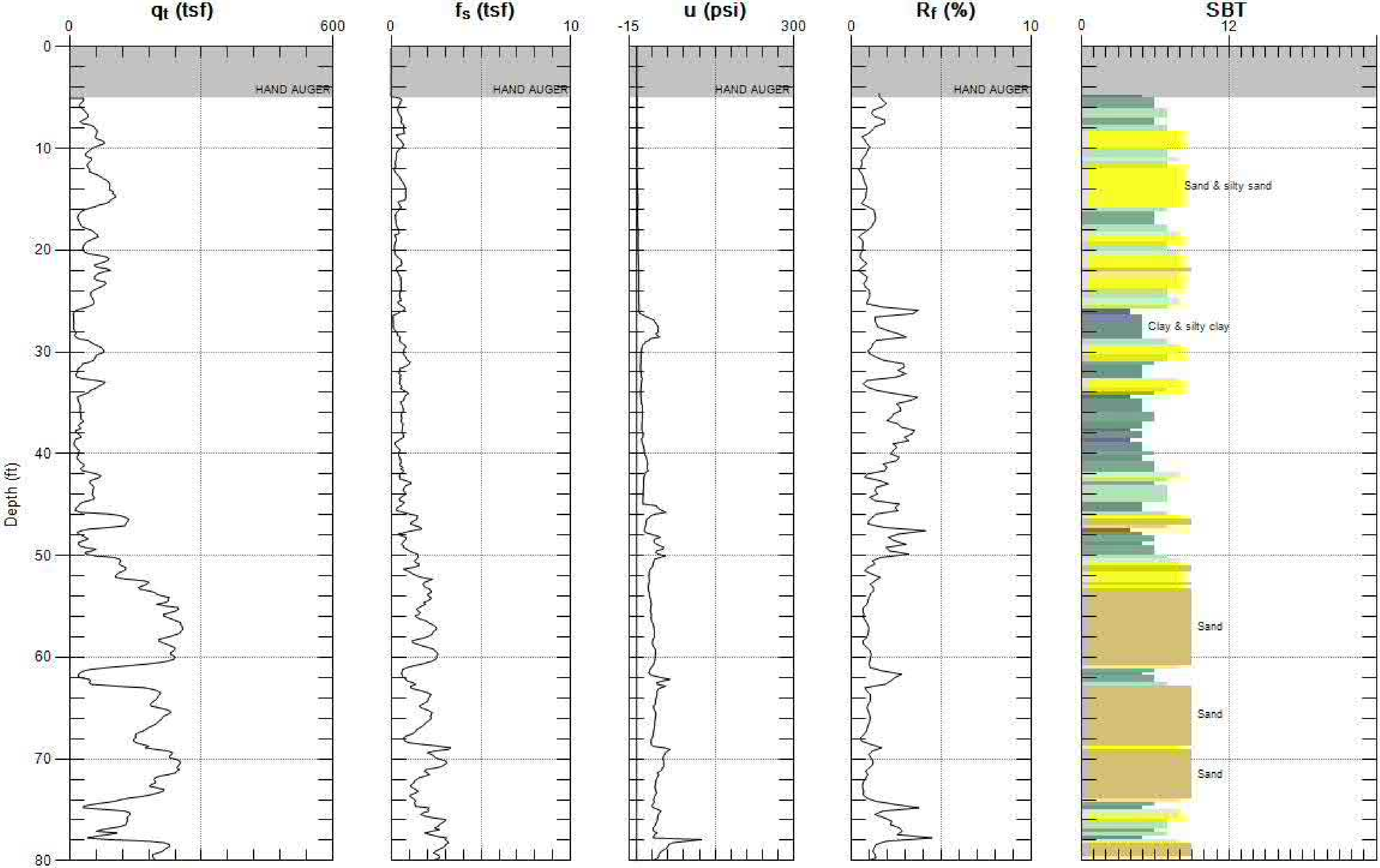
Figure A-93

SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-17 Date: 3/23/17 09:15



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

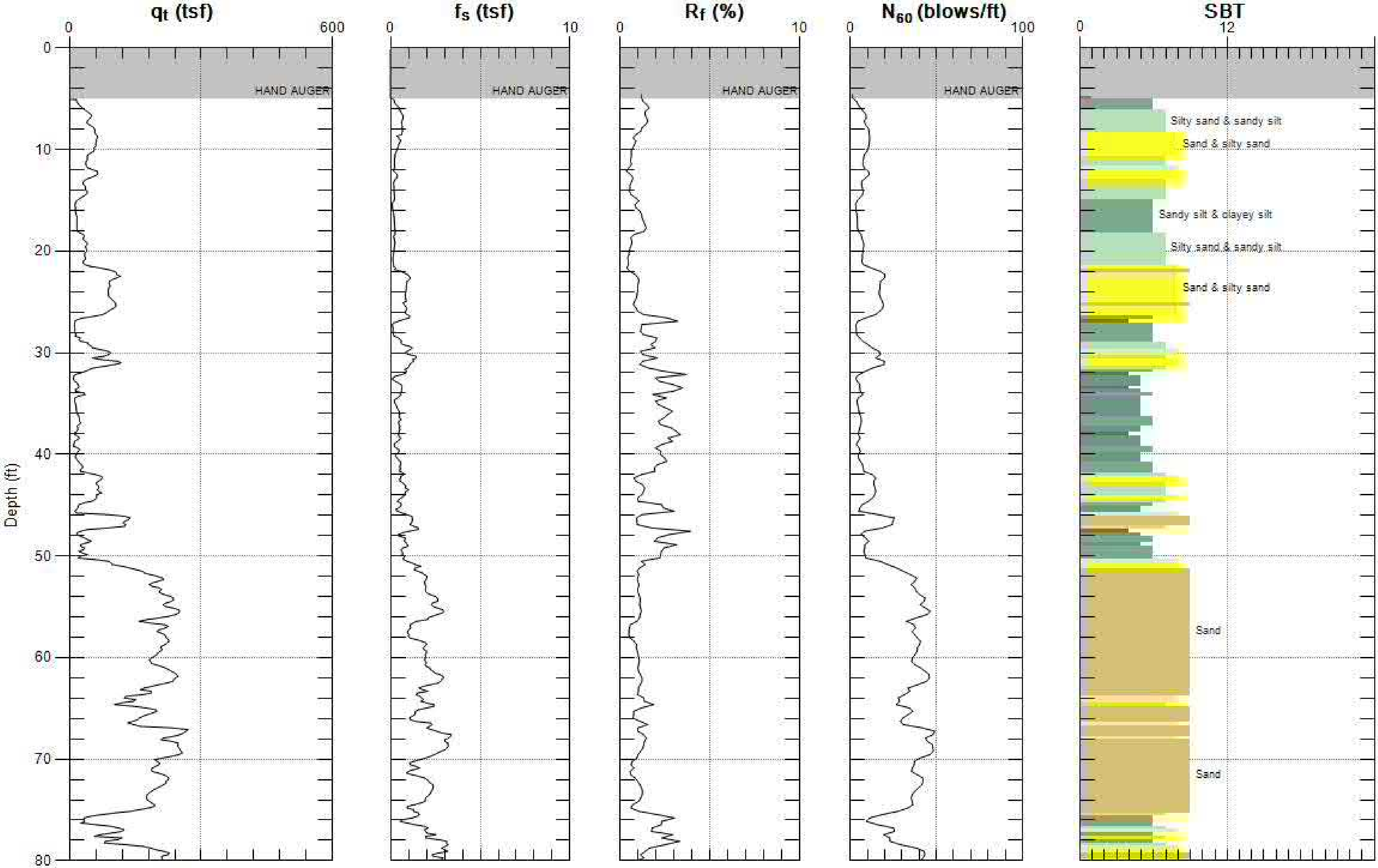
Figure A-93

SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-18 Date: 3/23/17 10:32



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

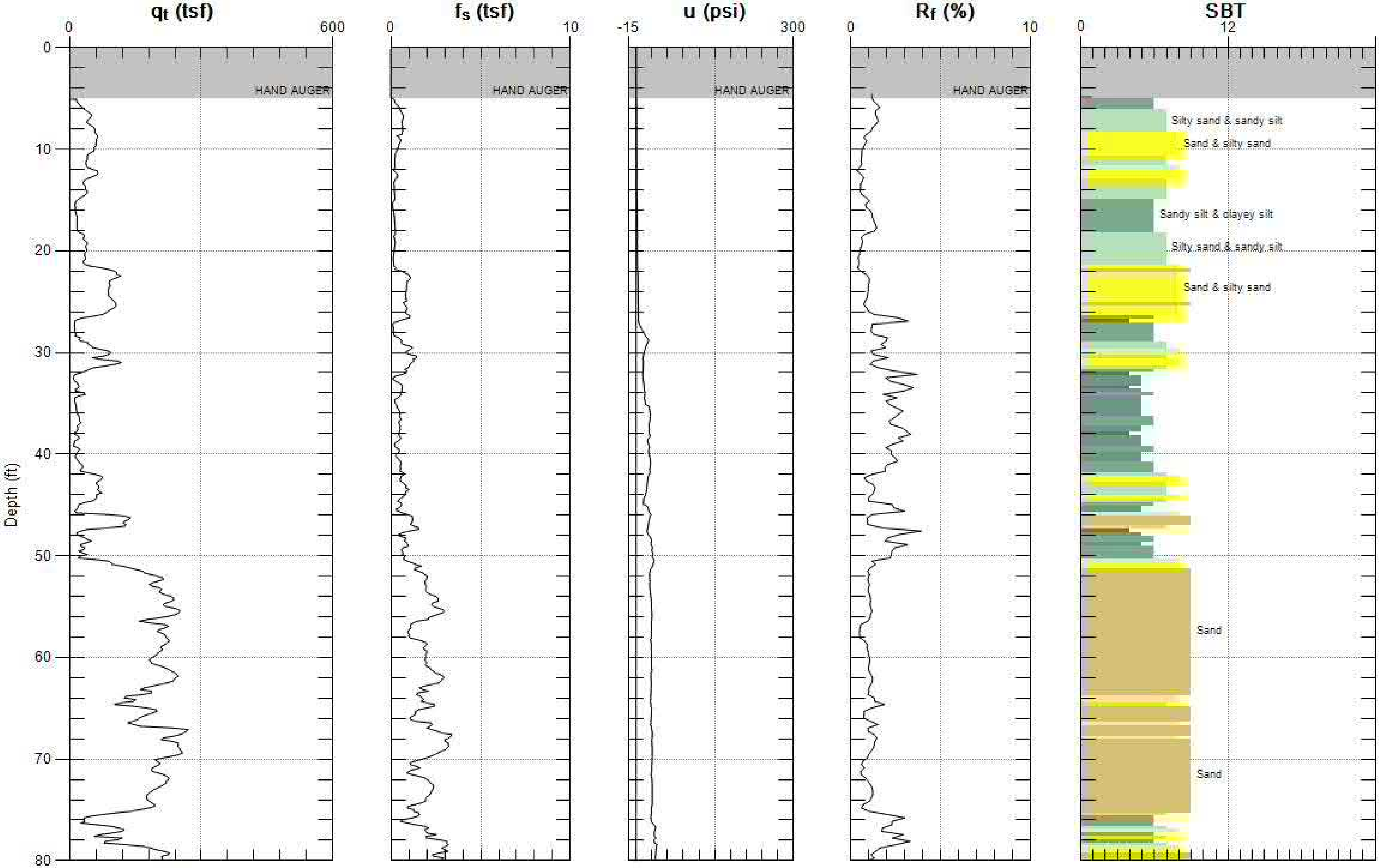
Figure A-94

SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-18 Date: 3/23/17 10:32



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

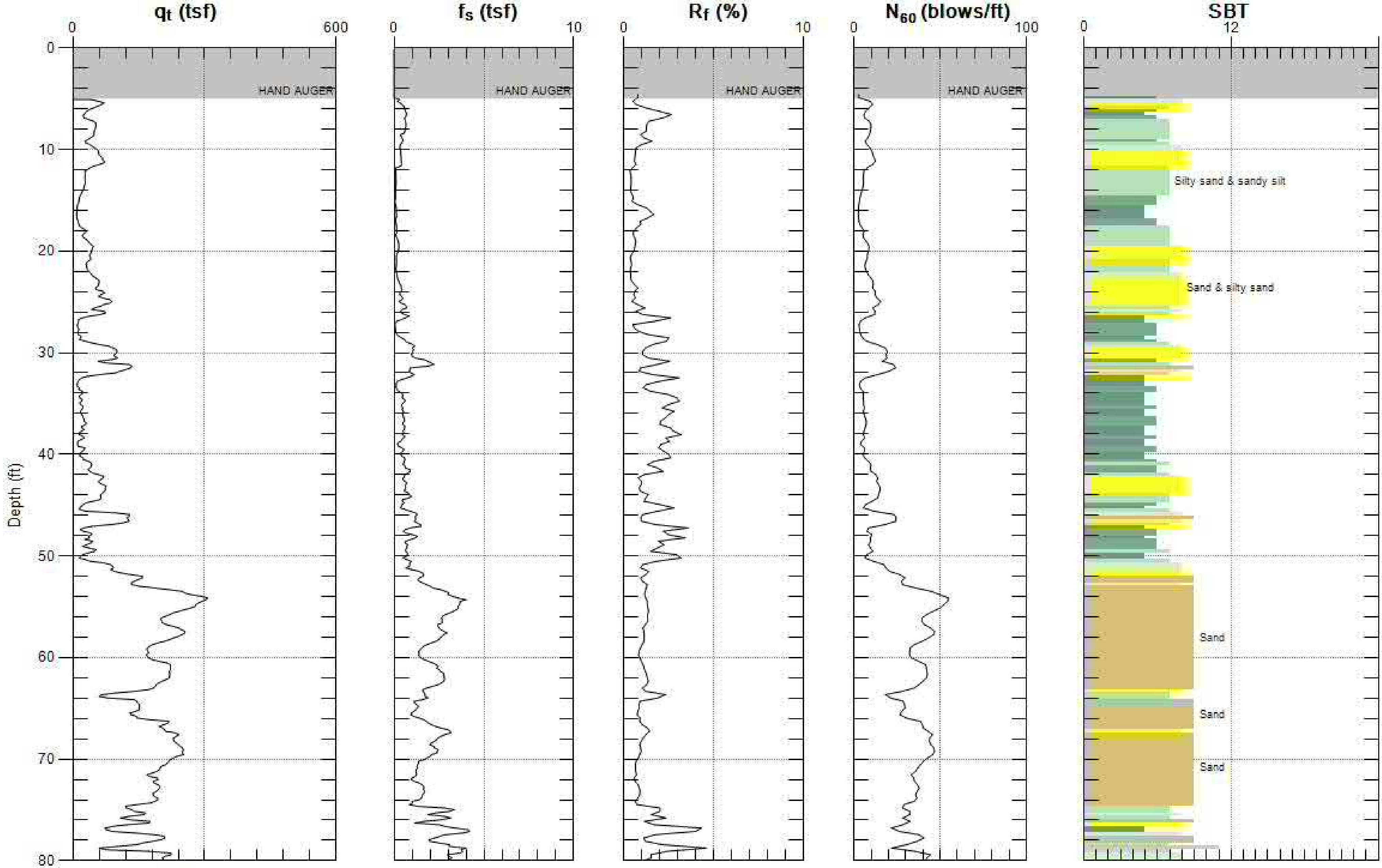
Figure A-94

SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-19 Date: 3/23/17 12:38



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

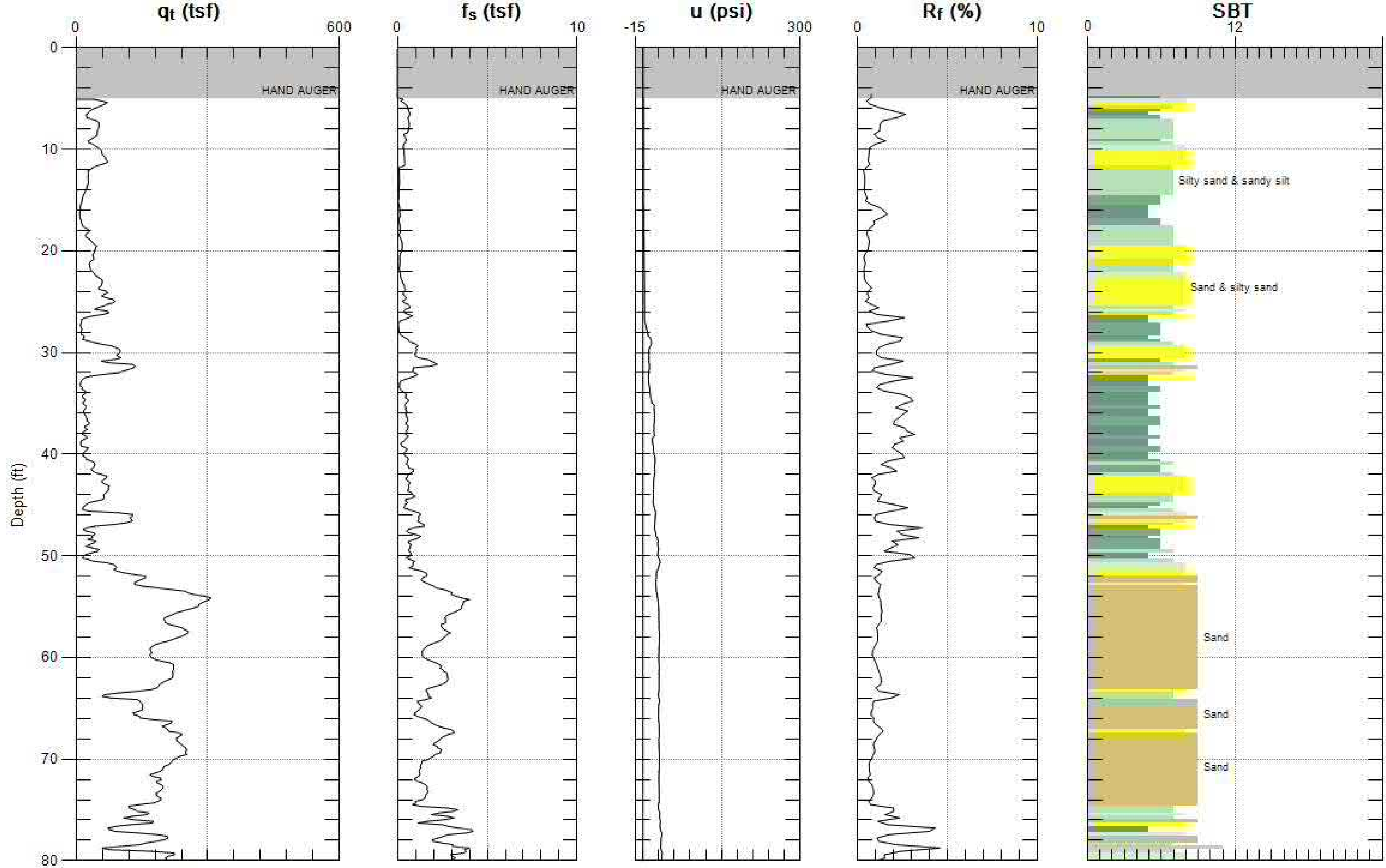
Figure A-95

SBT: Soil Behavior Type (Robertson 1990)

GREGG **AECOM**

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: CU-19 Date: 3/23/17 12:38



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

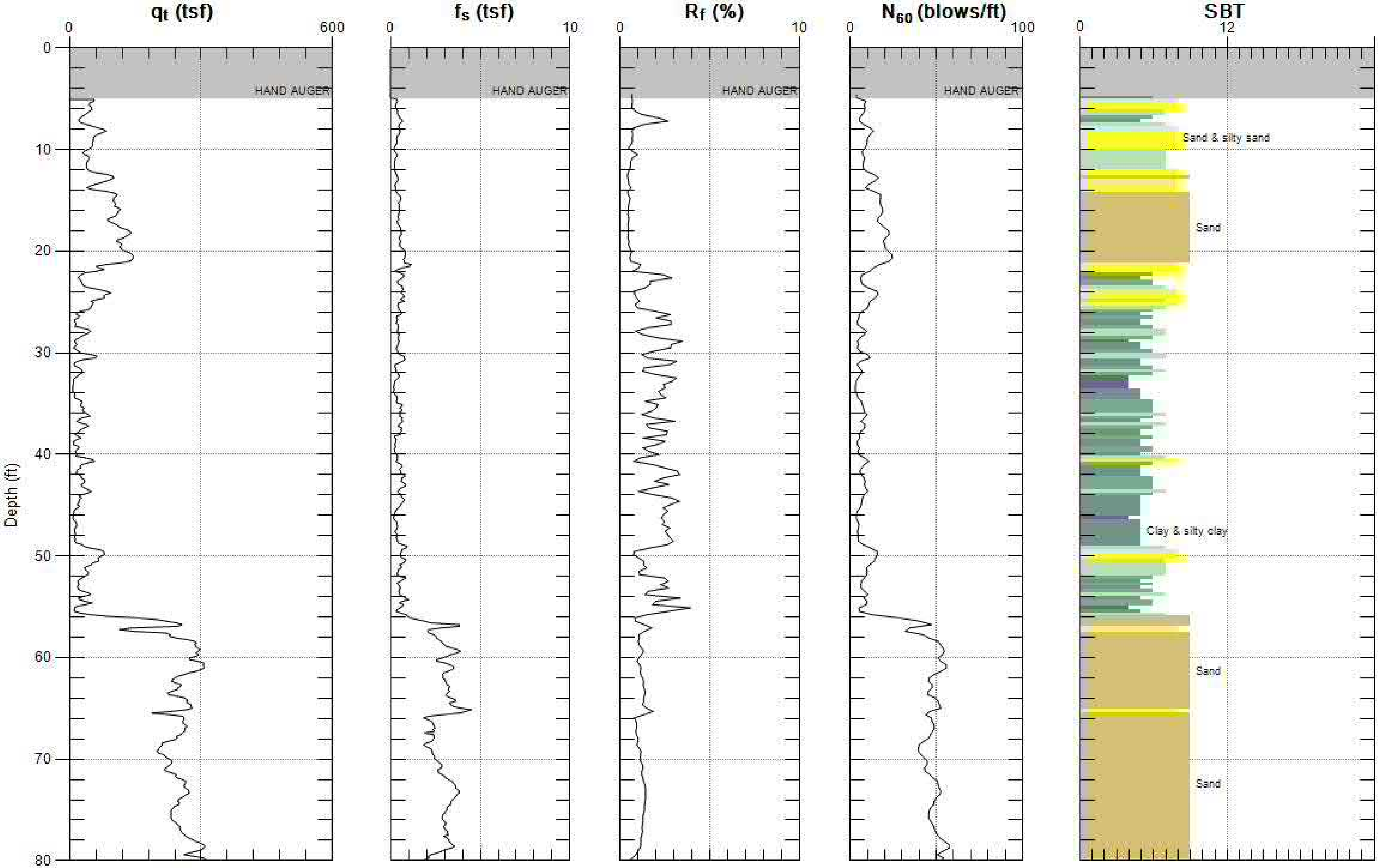
Figure A-95 SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-01 Date: 3/16/17 08:08



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

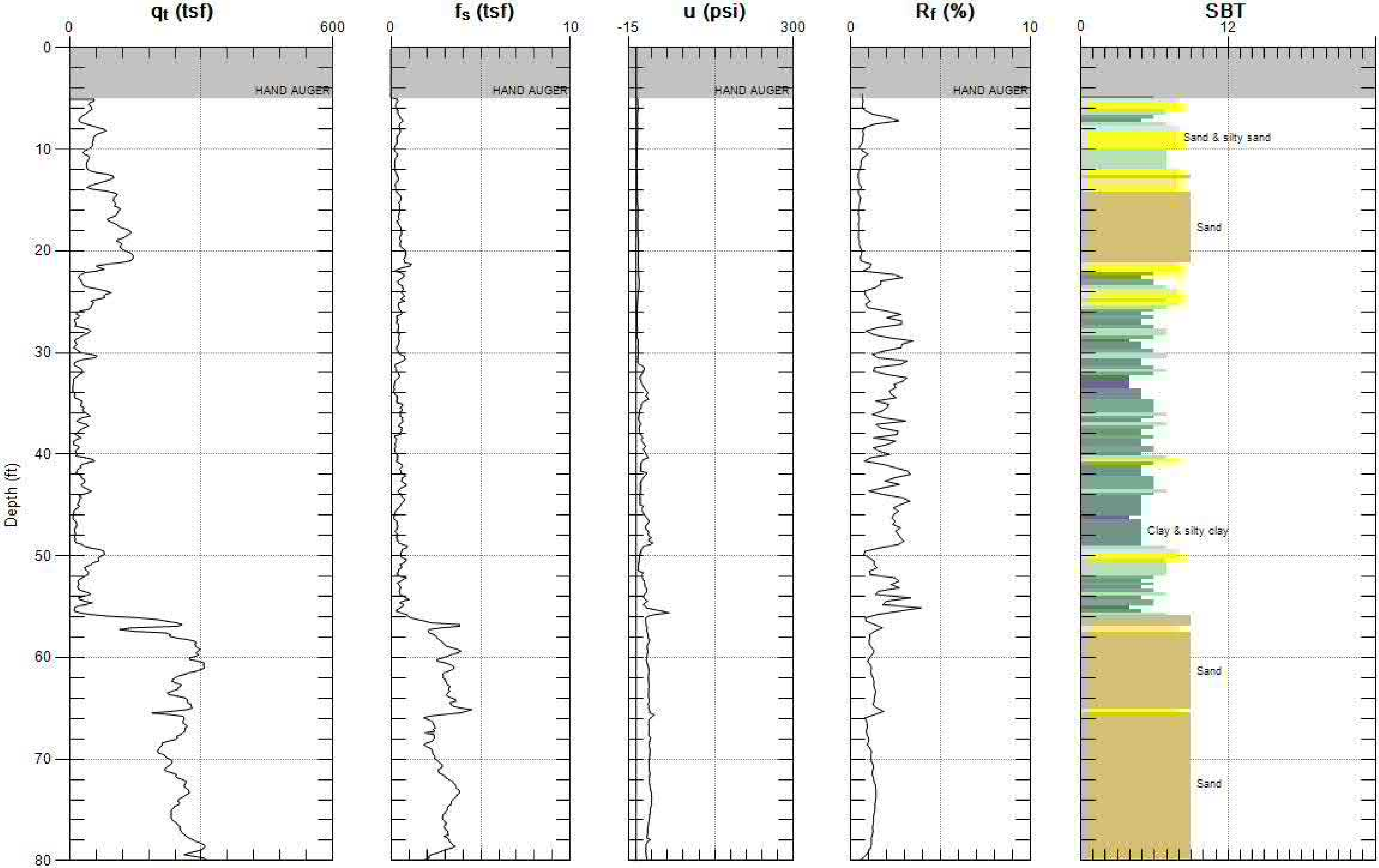
Figure A-96 SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-01 Date: 3/16/17 08:08



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

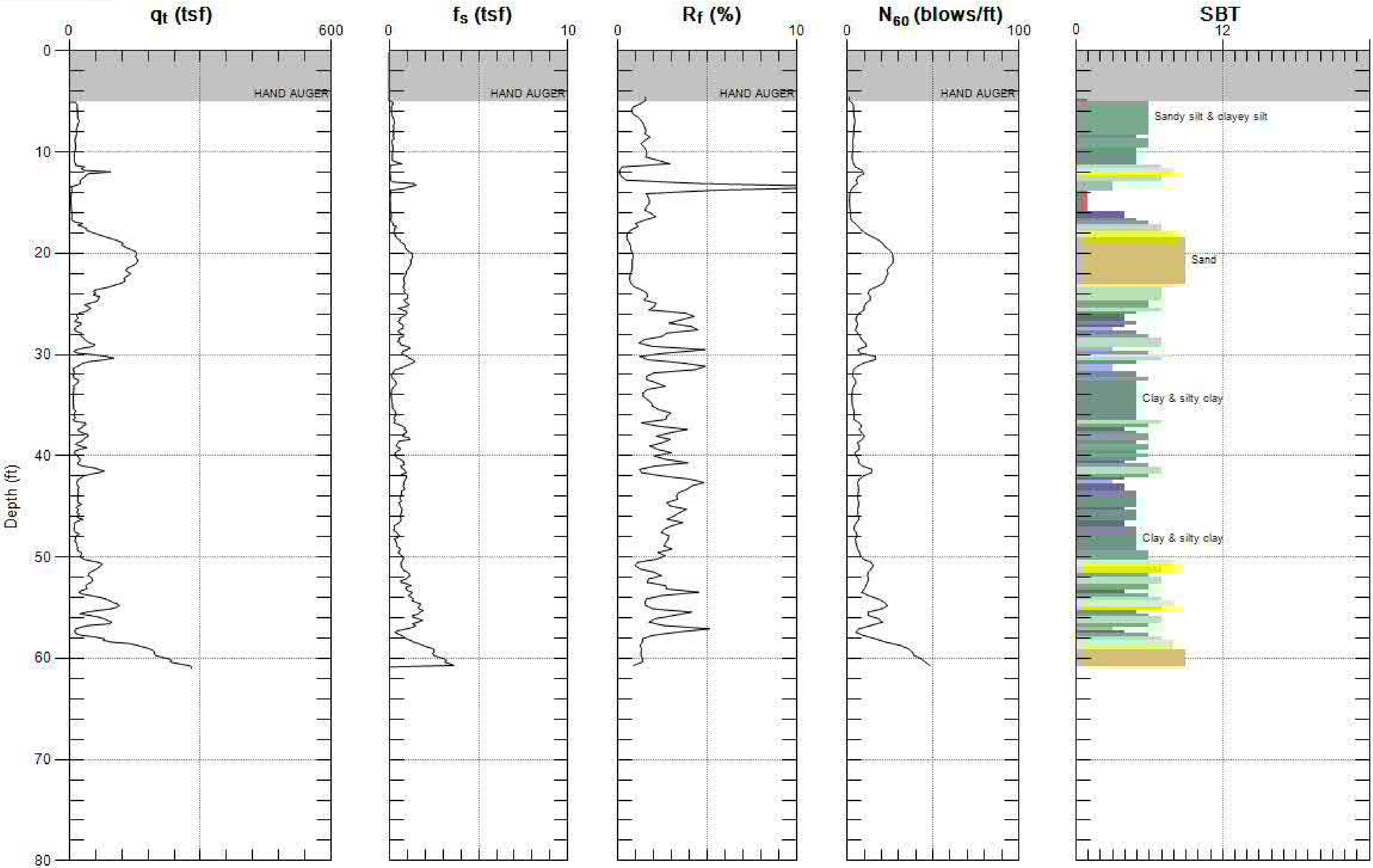
SBT: Soil Behavior Type (Robertson 1990)

Figure A-96

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-02 Date: 3/14/17 09:07



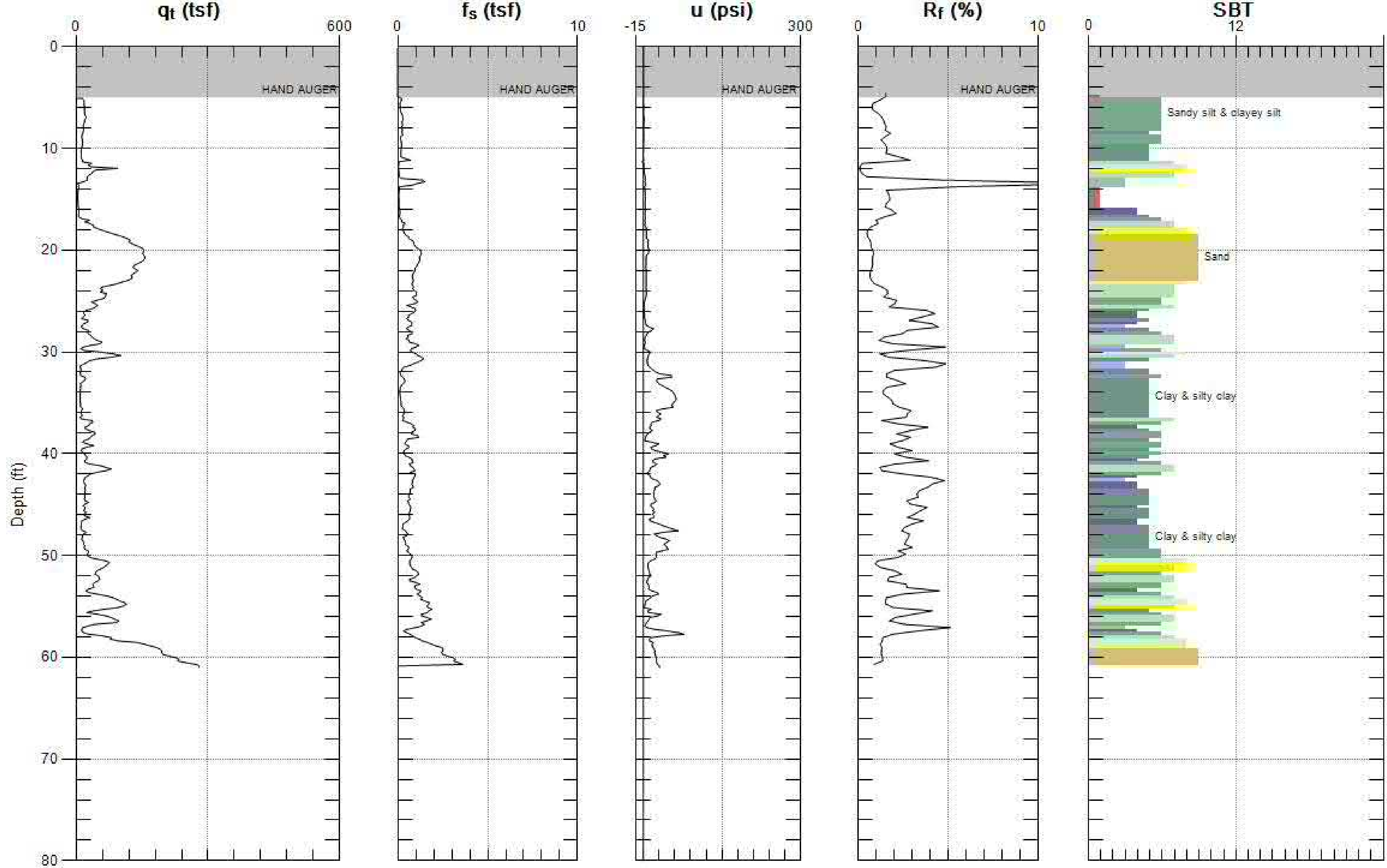
Max. Depth: 61.024 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

Figure A-97

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-02 Date: 3/14/17 09:07



Max. Depth: 61.024 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

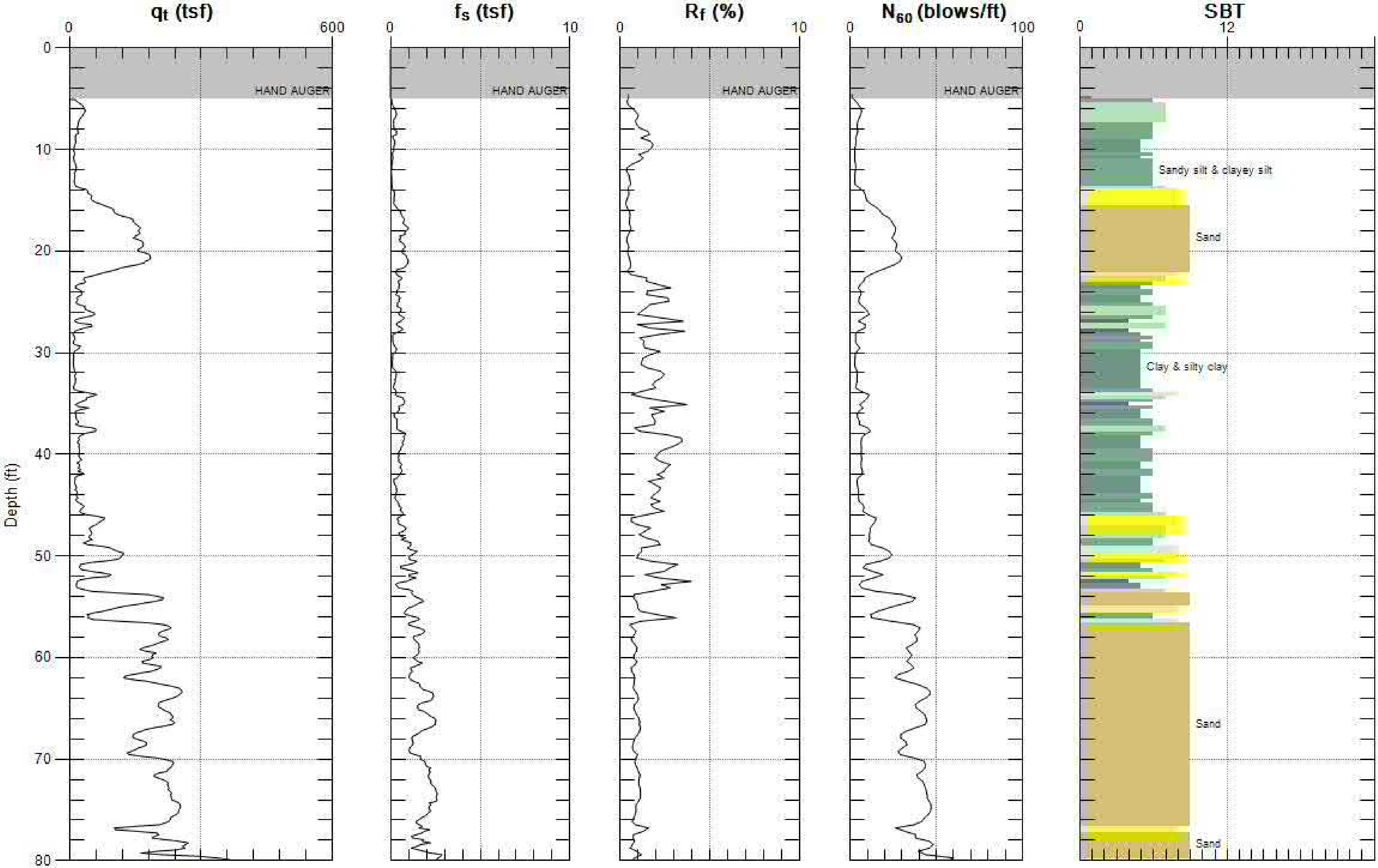
Figure A-97

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-03 Date: 3/14/17 10:35



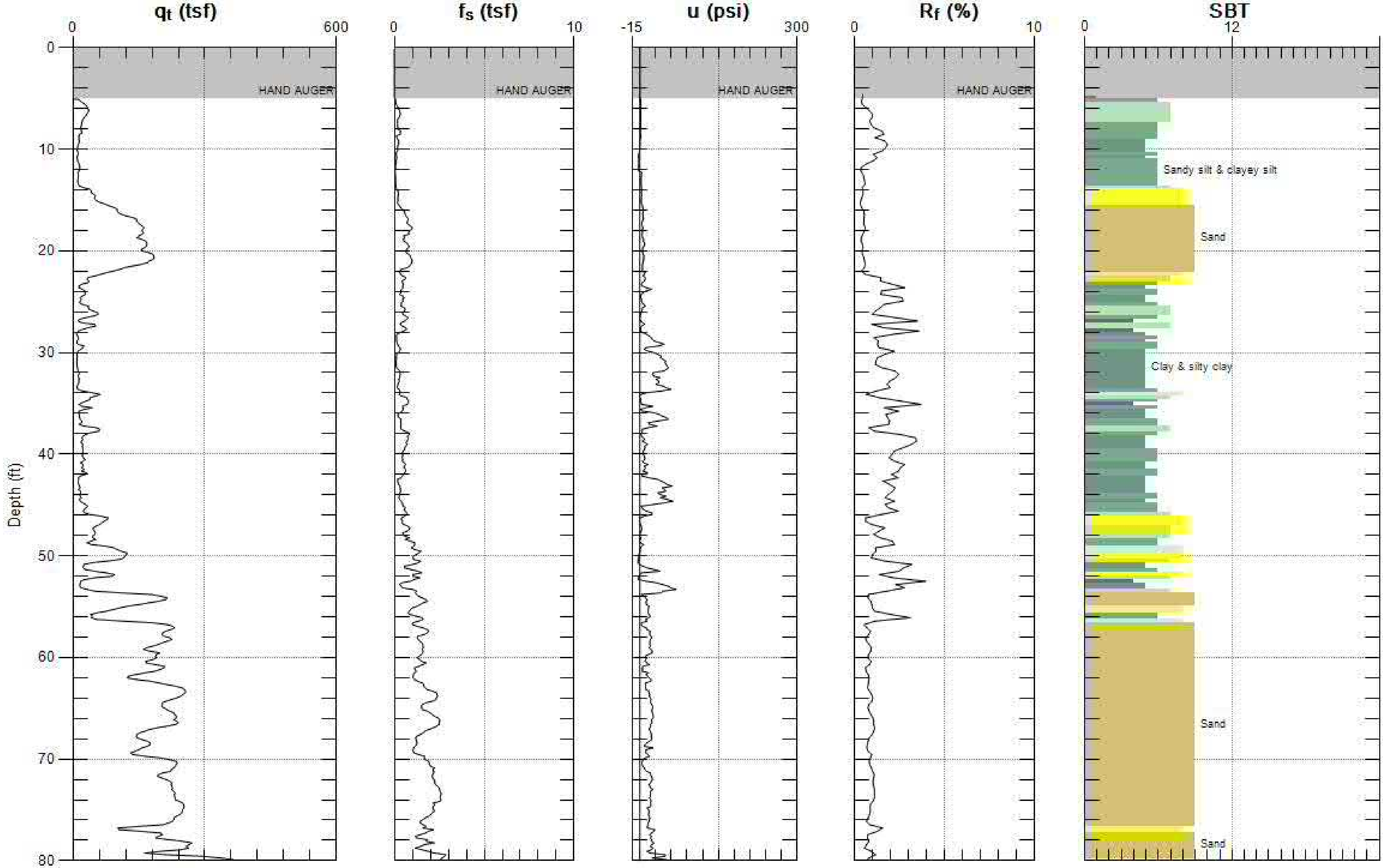
Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-98 SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-03 Date: 3/14/17 10:35



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-98

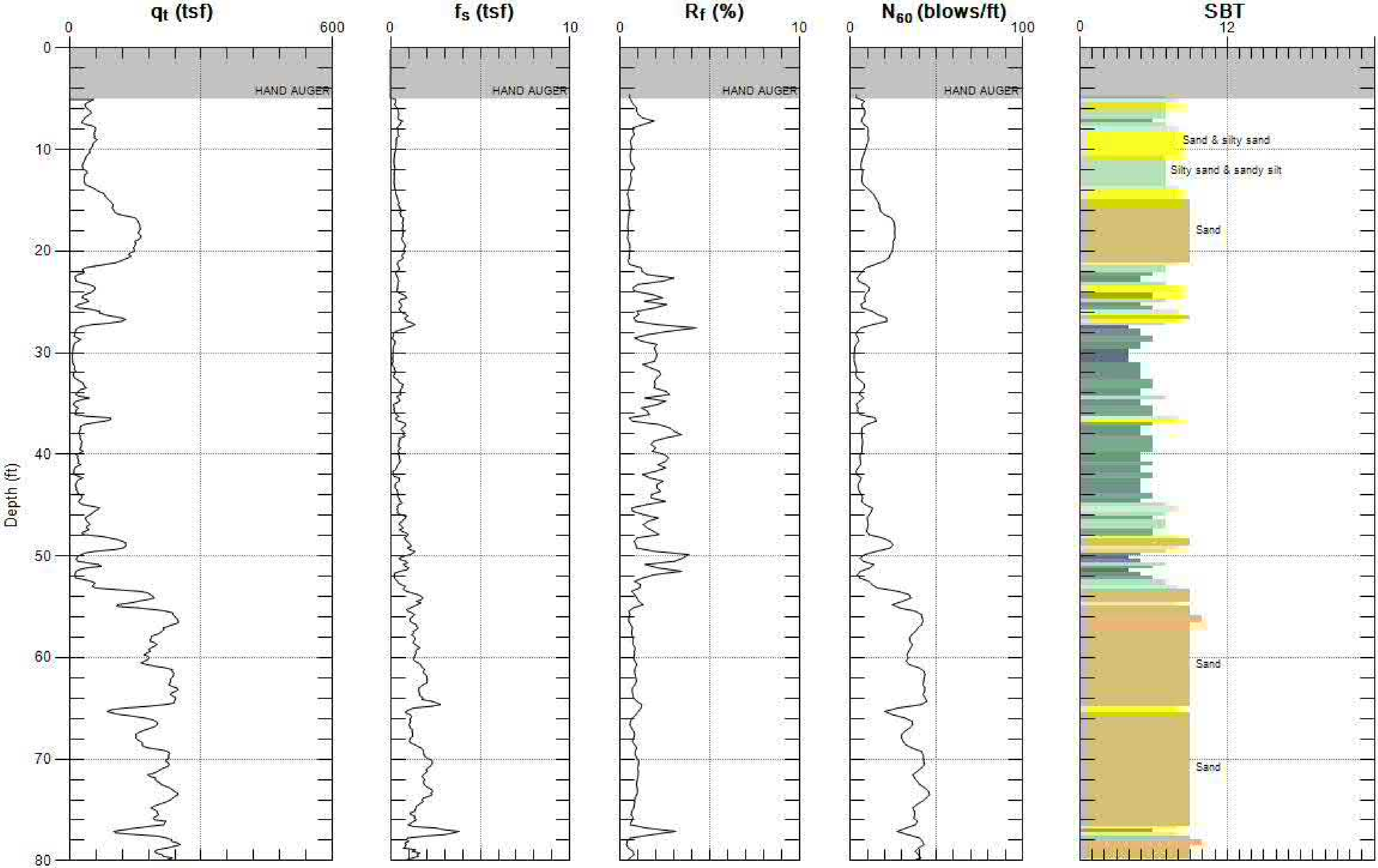
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-04 Date: 3/14/17 02:10



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-99

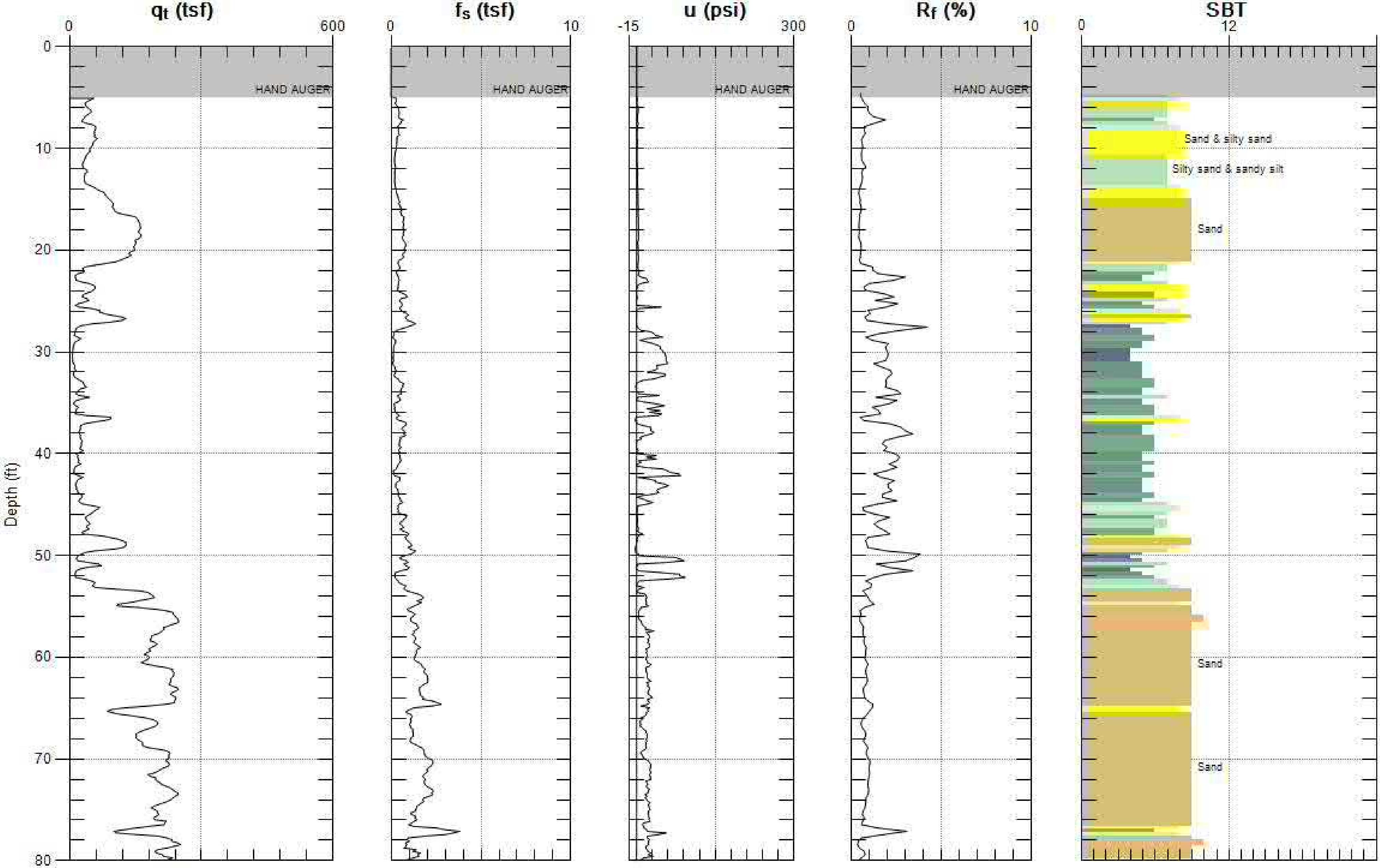
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-04 Date: 3/14/17 02:10



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-99

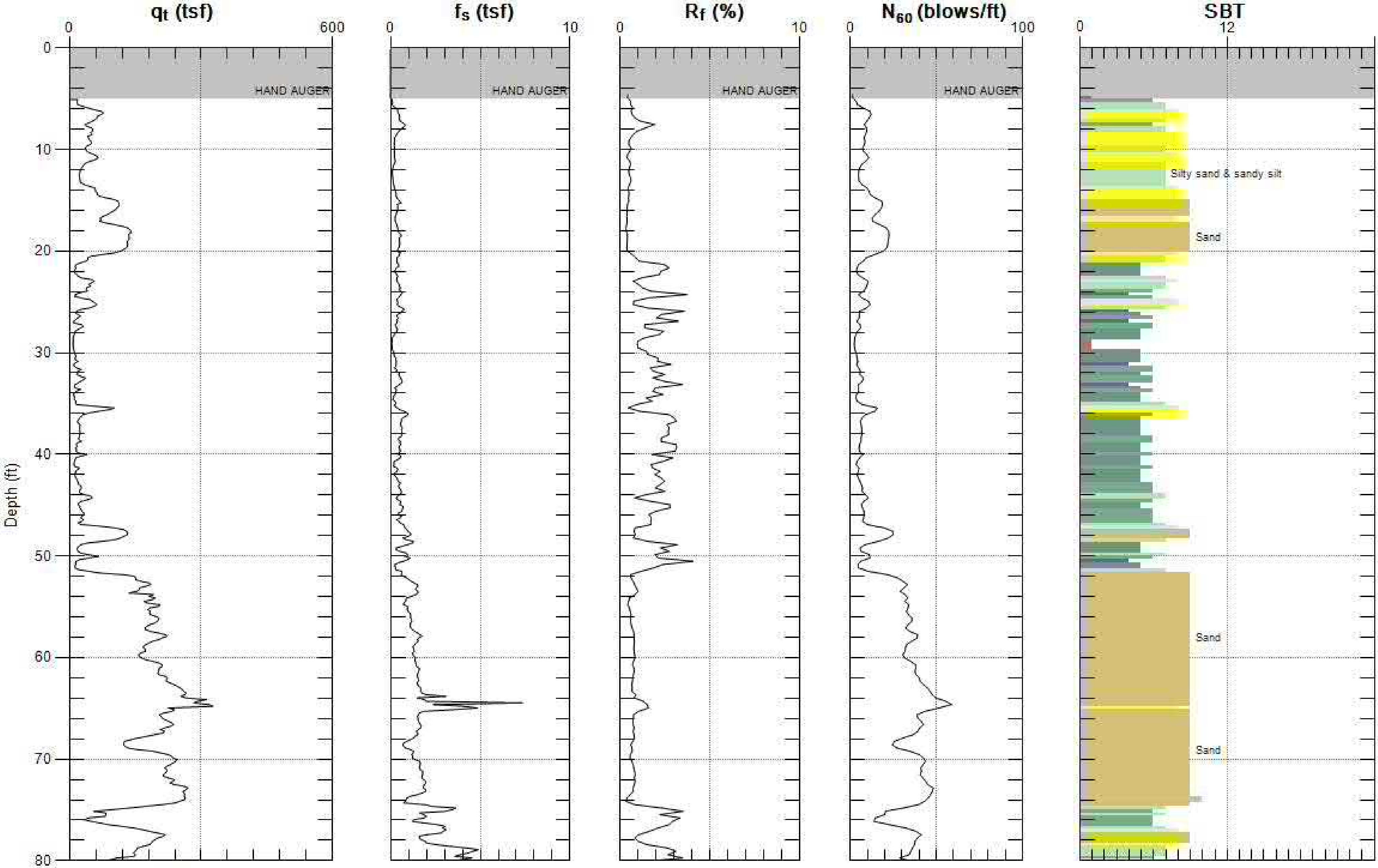
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-05 Date: 3/15/17 07:53



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

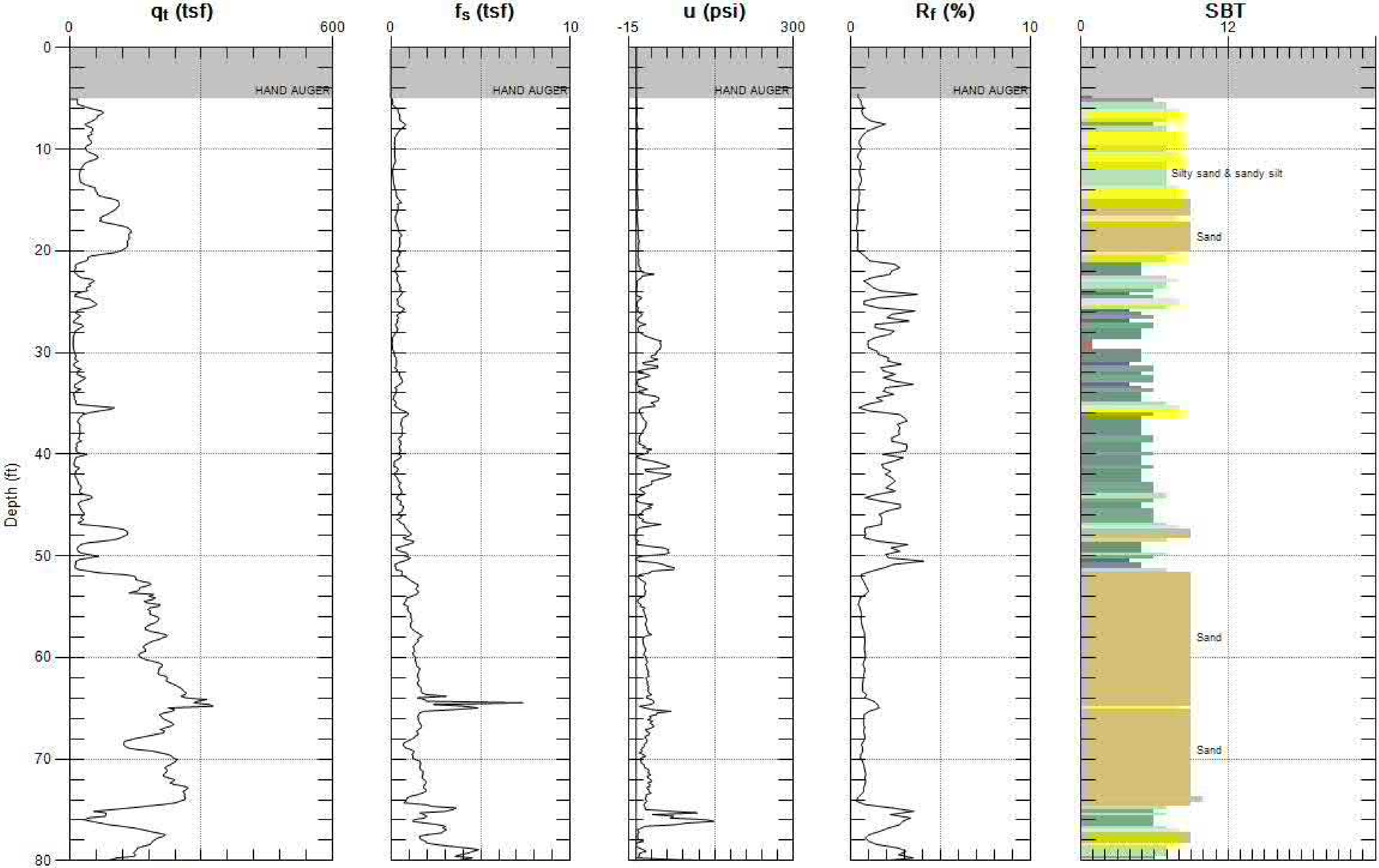
Figure A-100

SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-05 Date: 3/15/17 07:53



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-100

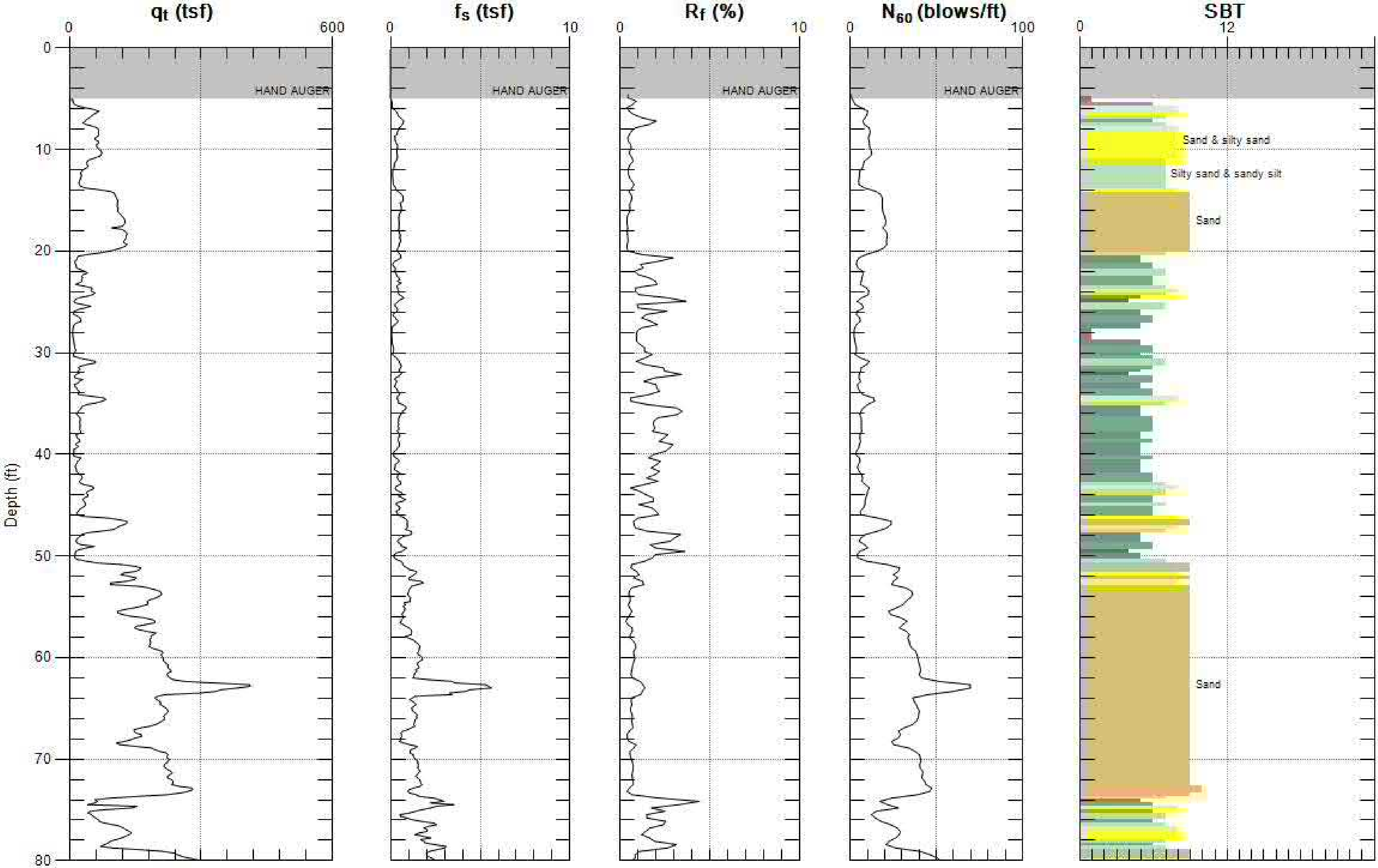
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-06 Date: 3/14/17 12:22



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-101

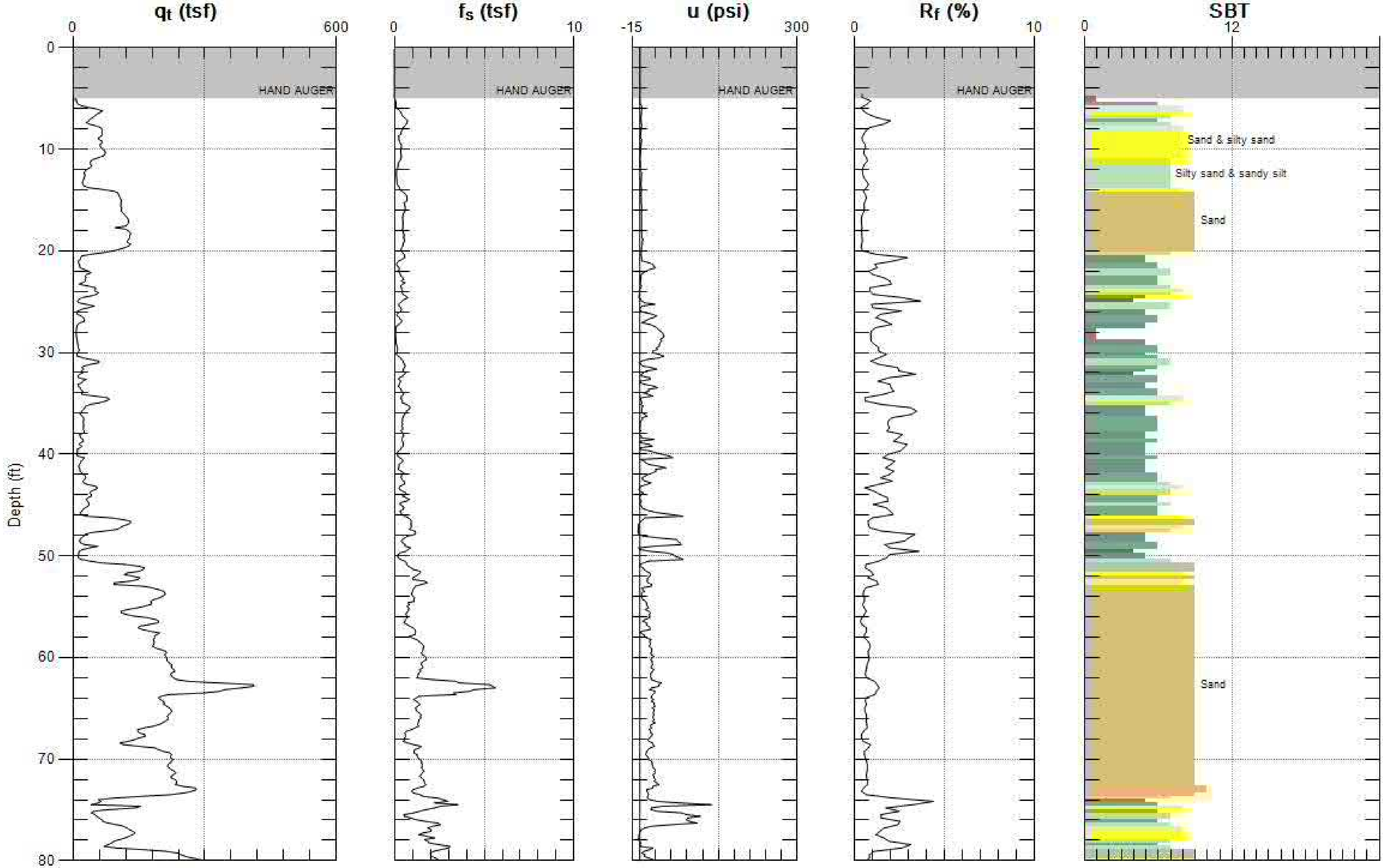
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-06 Date: 3/14/17 12:22



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-101

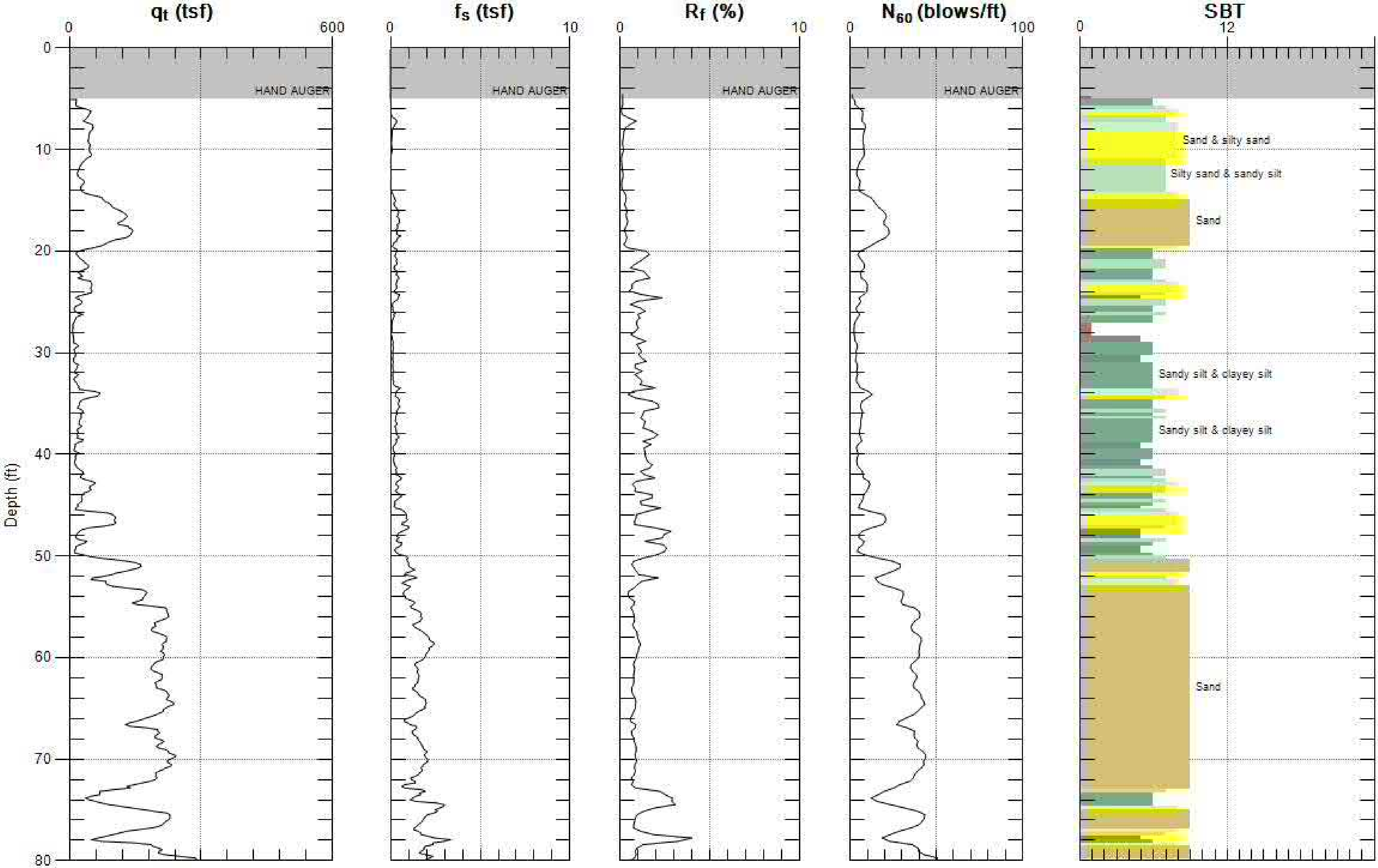
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-07 Date: 3/15/17 12:49



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-102

SBT: Soil Behavior Type (Robertson 1990)

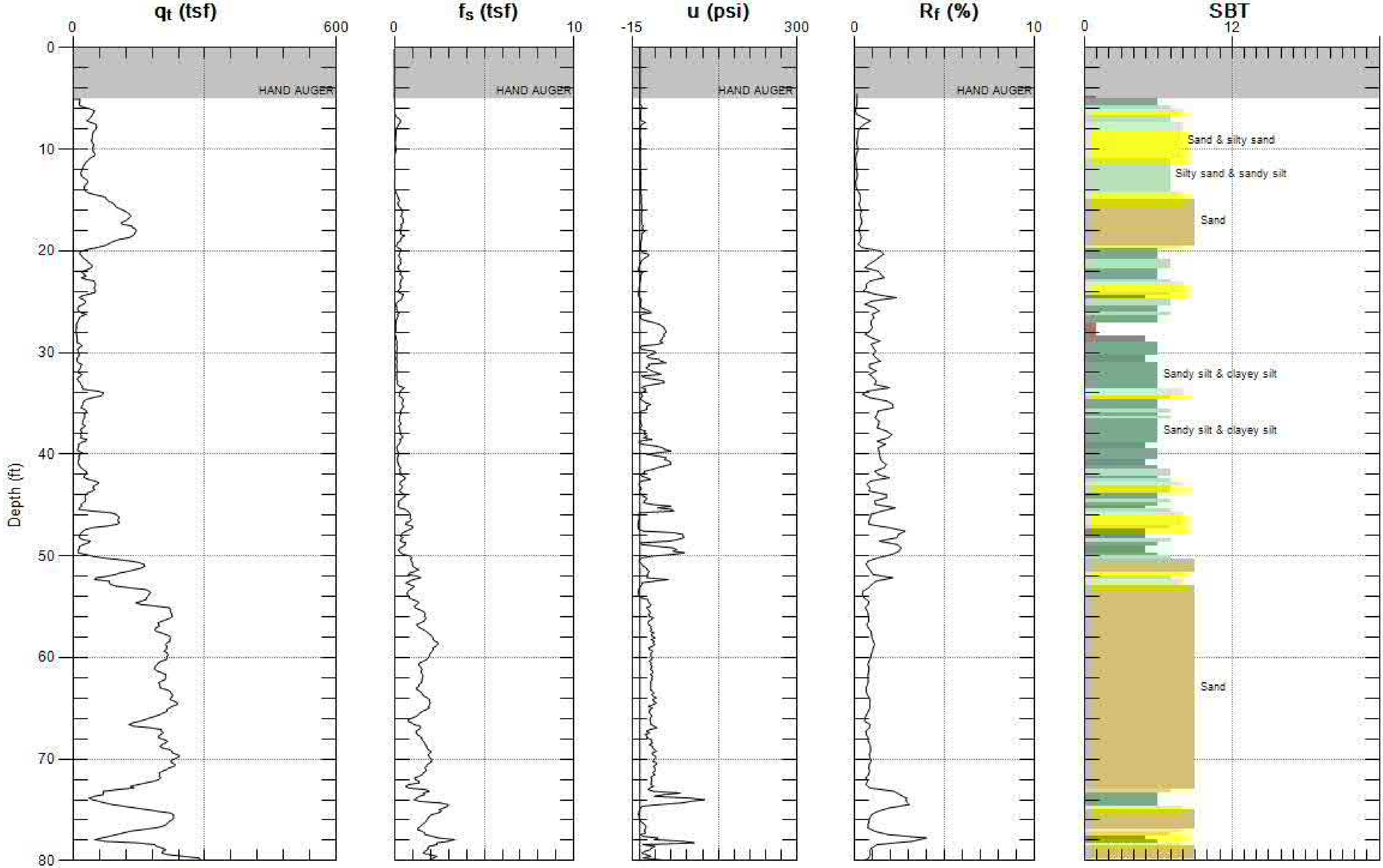
GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-07

Date: 3/15/17 12:49



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

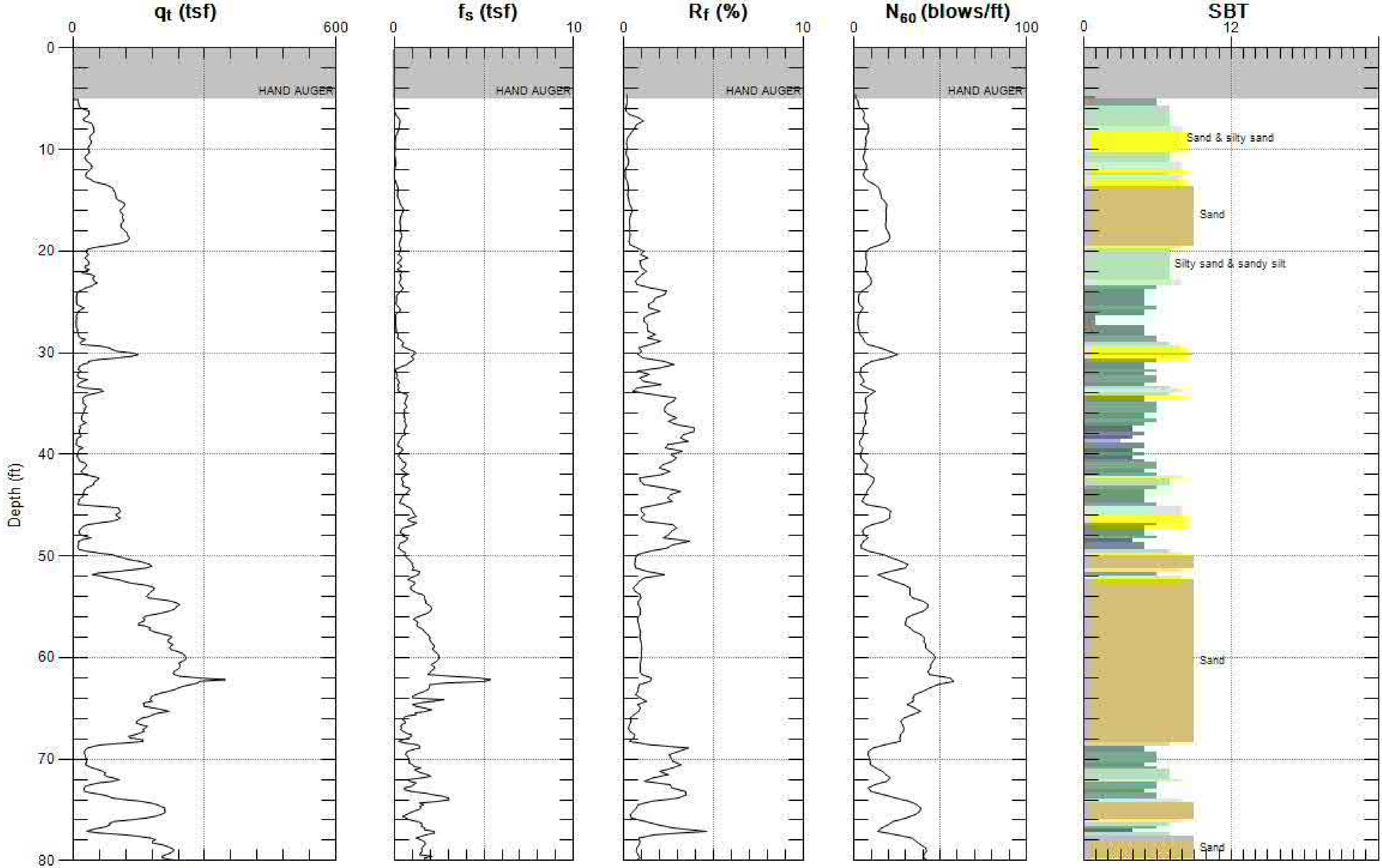
Figure A-102

SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-08 Date: 3/15/17 02:18



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

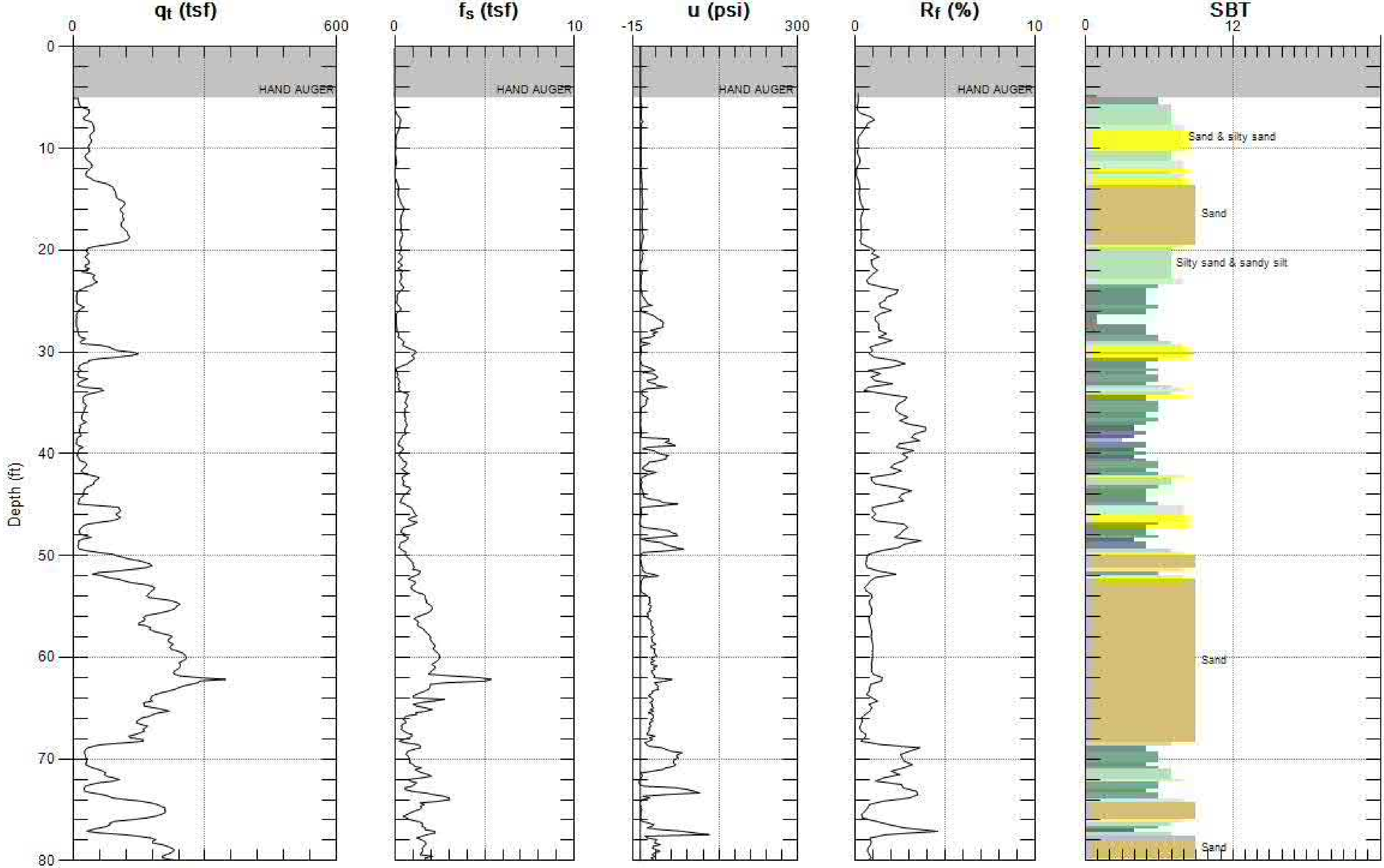
Figure A-103

SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-08 Date: 3/15/17 02:18



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

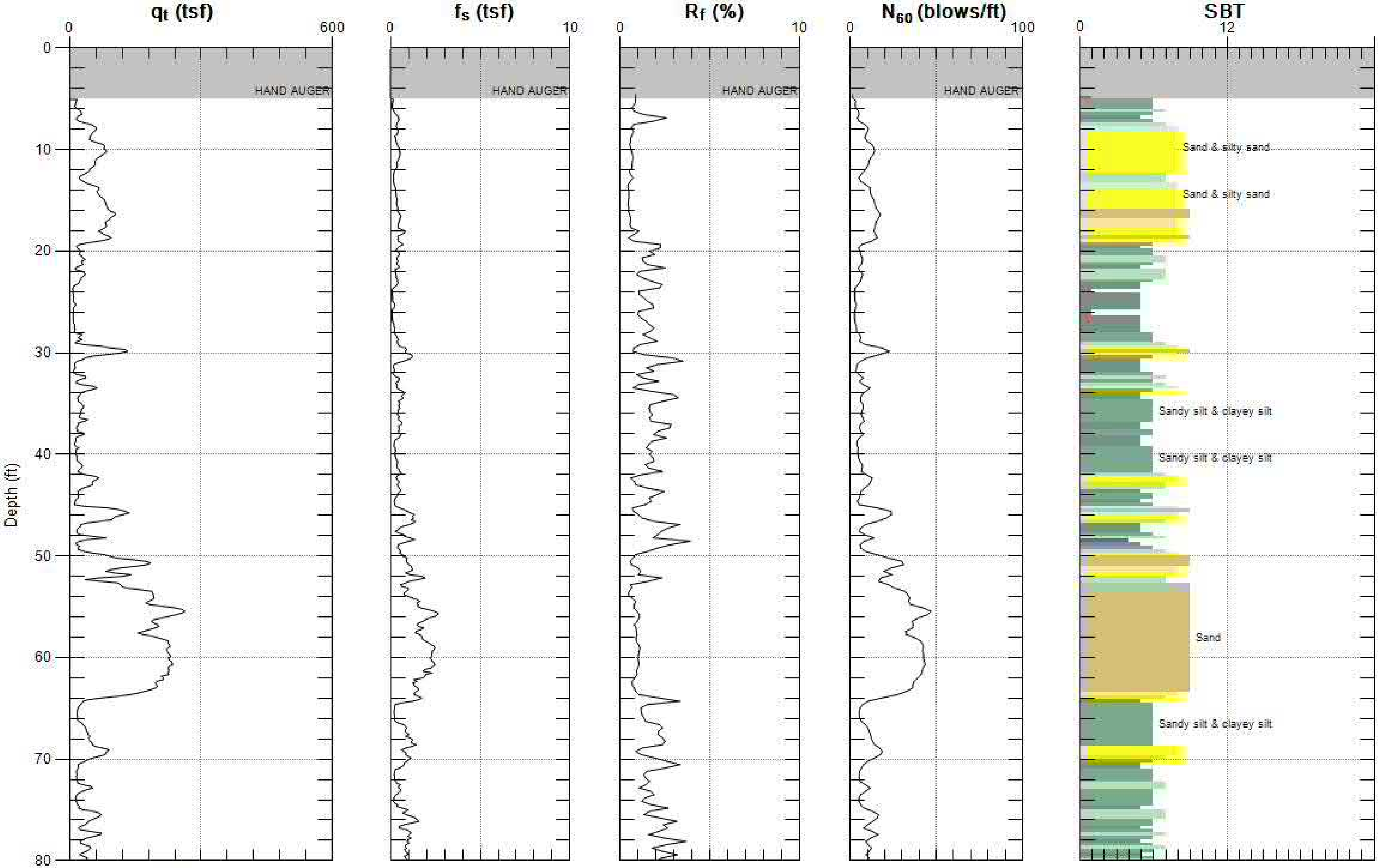
Figure A-103 SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-09 Date: 3/16/17 10:15



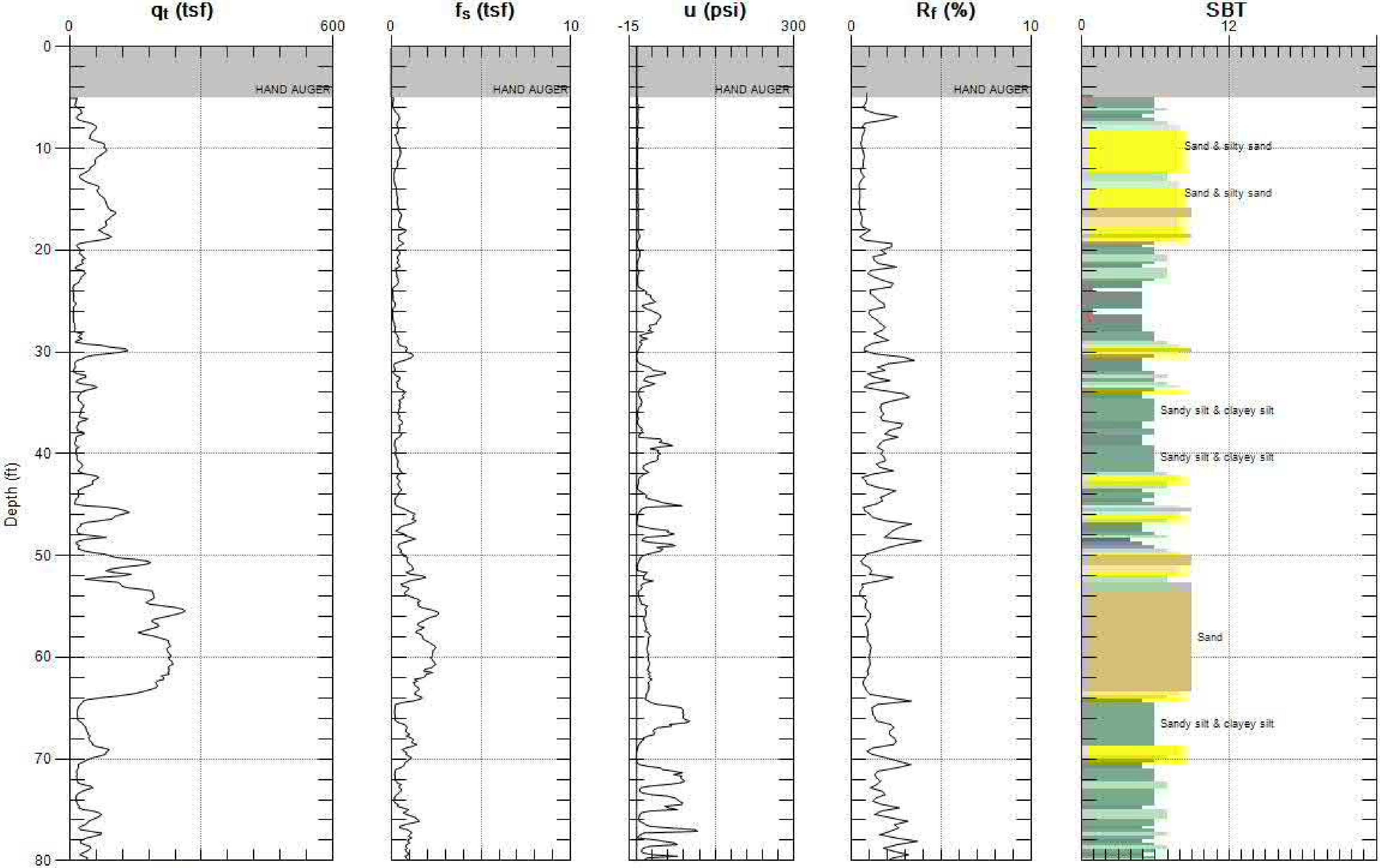
Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-104 SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-09 Date: 3/16/17 10:15



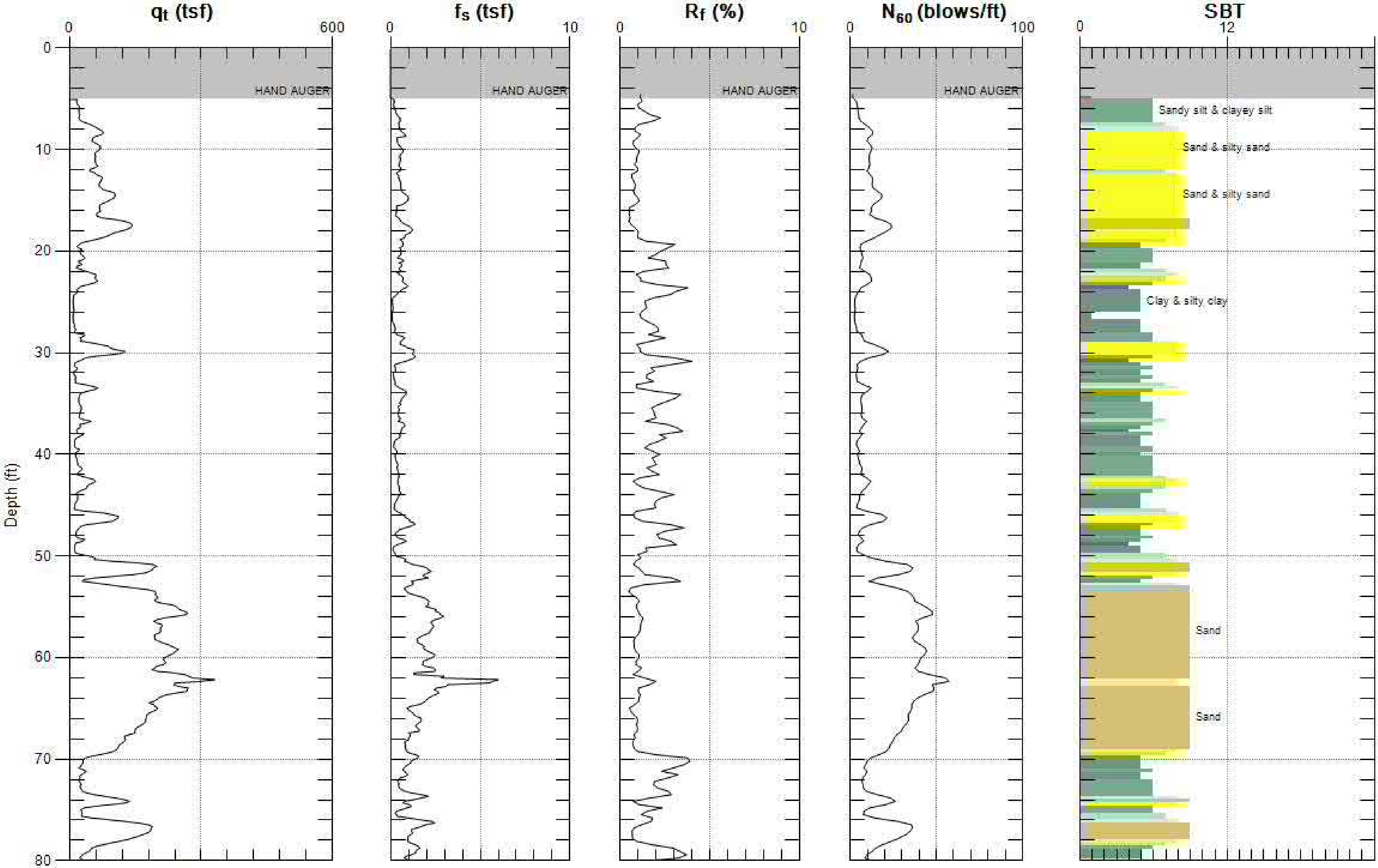
Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-104 SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-10 Date: 3/16/17 12:22



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

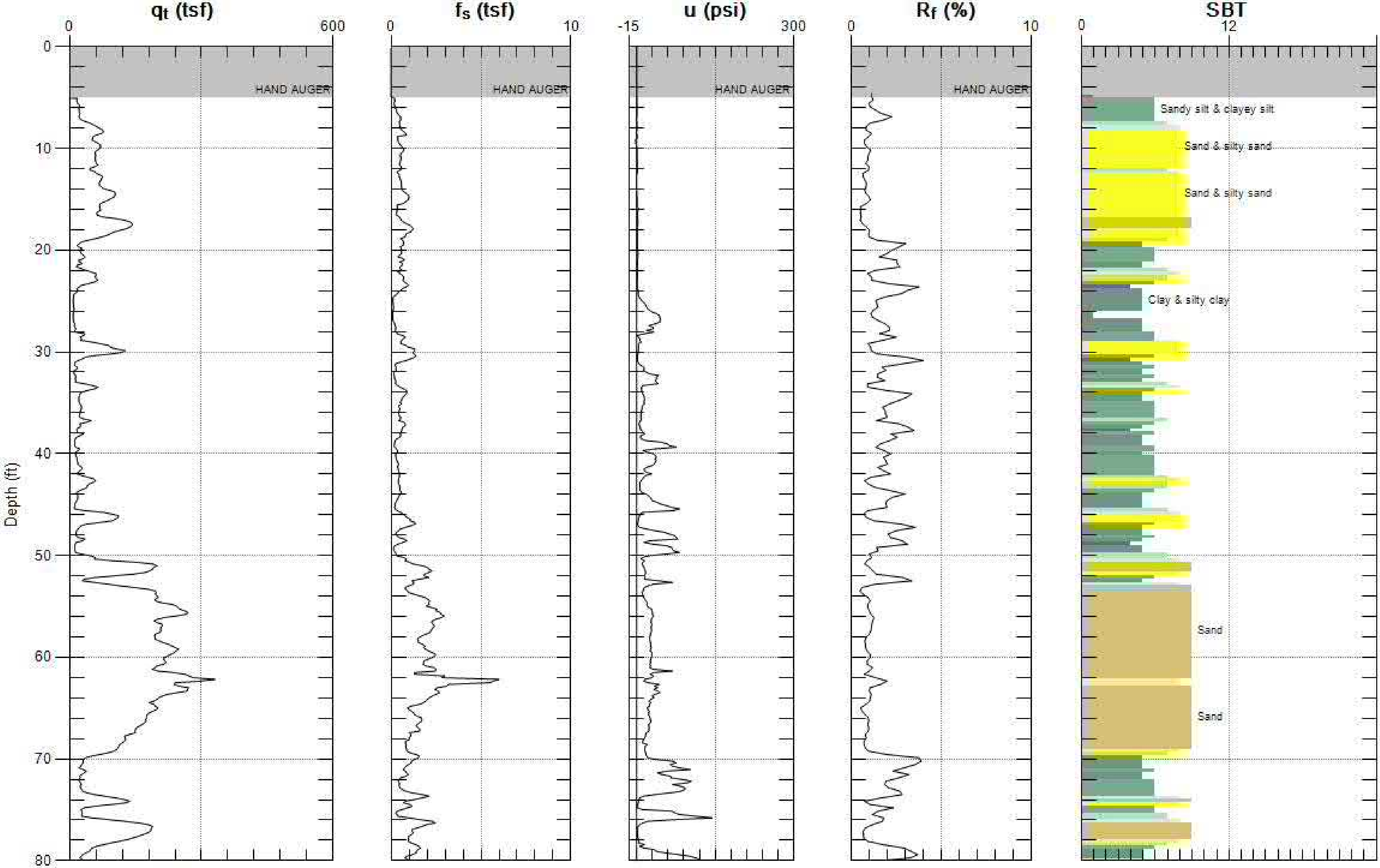
Figure A-105 SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-10

Date: 3/16/17 12:22



Max. Depth: 80.381 (ft)
Avg. Interval: 0.328 (ft)

Figure A-105

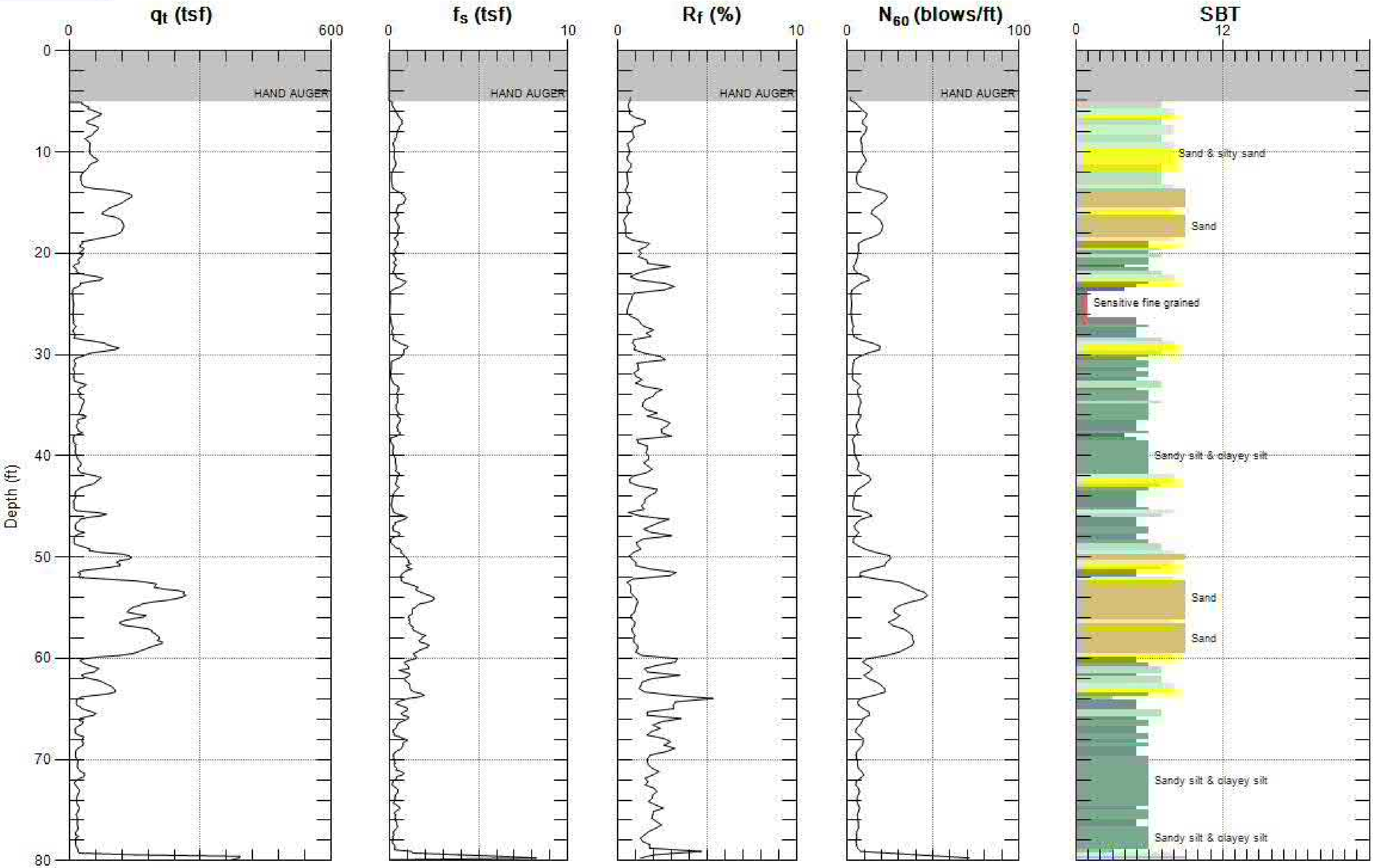
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-11 Date: 3/16/17 01:43



Max. Depth: 80.052 (ft)
Avg. Interval: 0.328 (ft)

Figure A-106

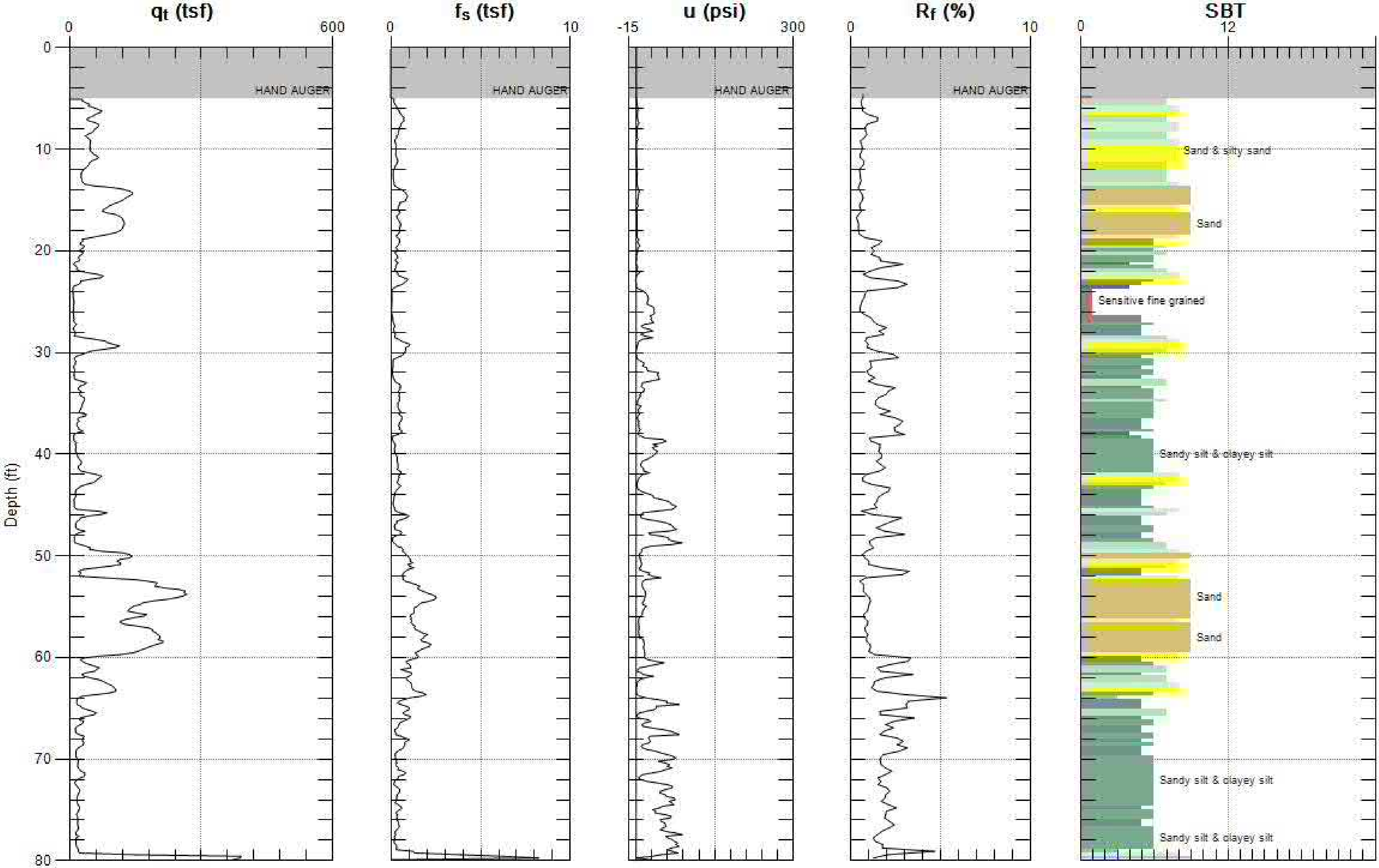
SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-11

Date: 3/16/17 01:43



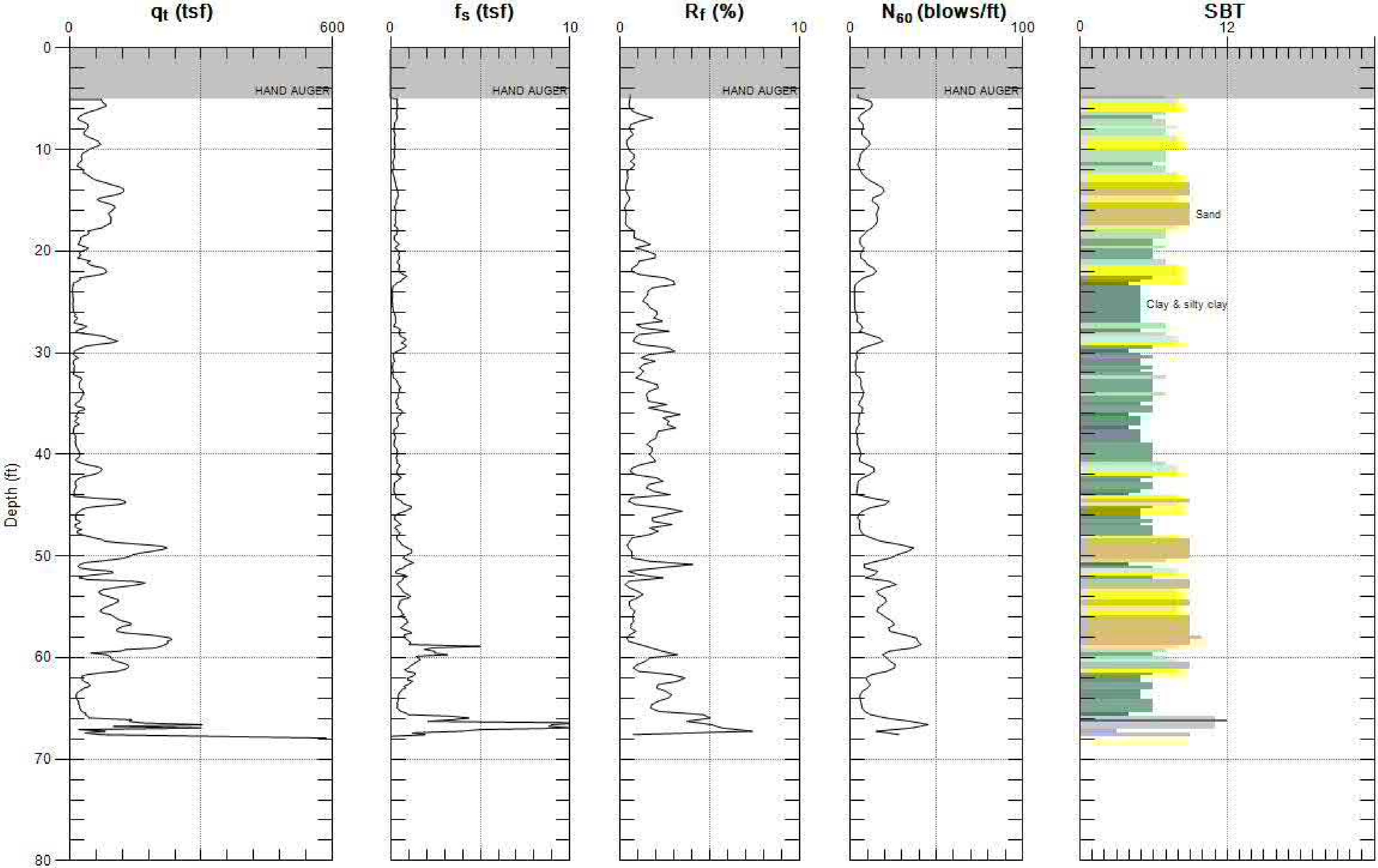
Max. Depth: 80.052 (ft)
Avg. Interval: 0.328 (ft)

Figure A-106 SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-12 Date: 3/17/17 08:02



Max. Depth: 67.913 (ft)
Avg. Interval: 0.328 (ft)

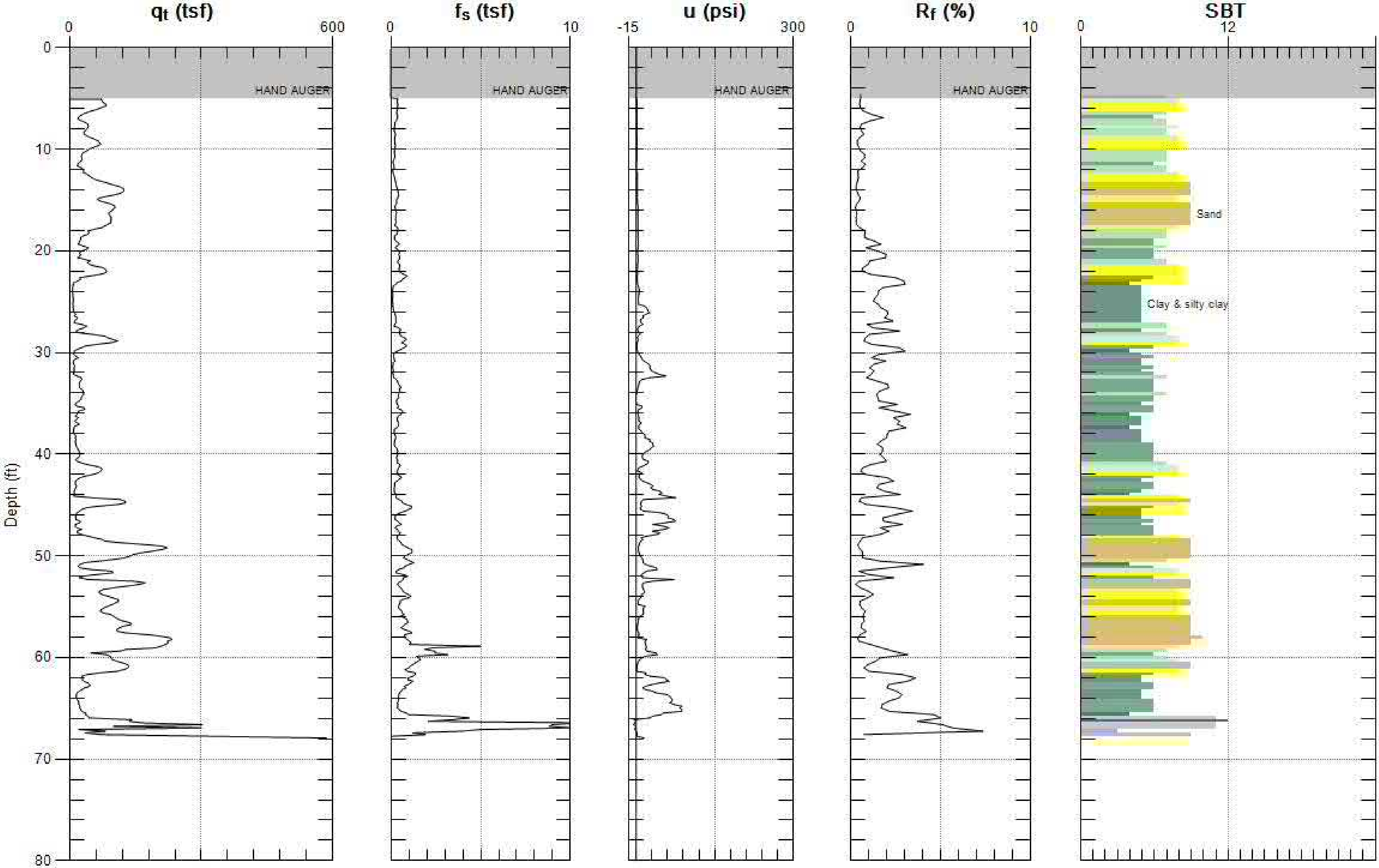
Figure A-107

SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-12 Date: 3/17/17 08:02



Max. Depth: 67.913 (ft)
Avg. Interval: 0.328 (ft)

Figure A-107

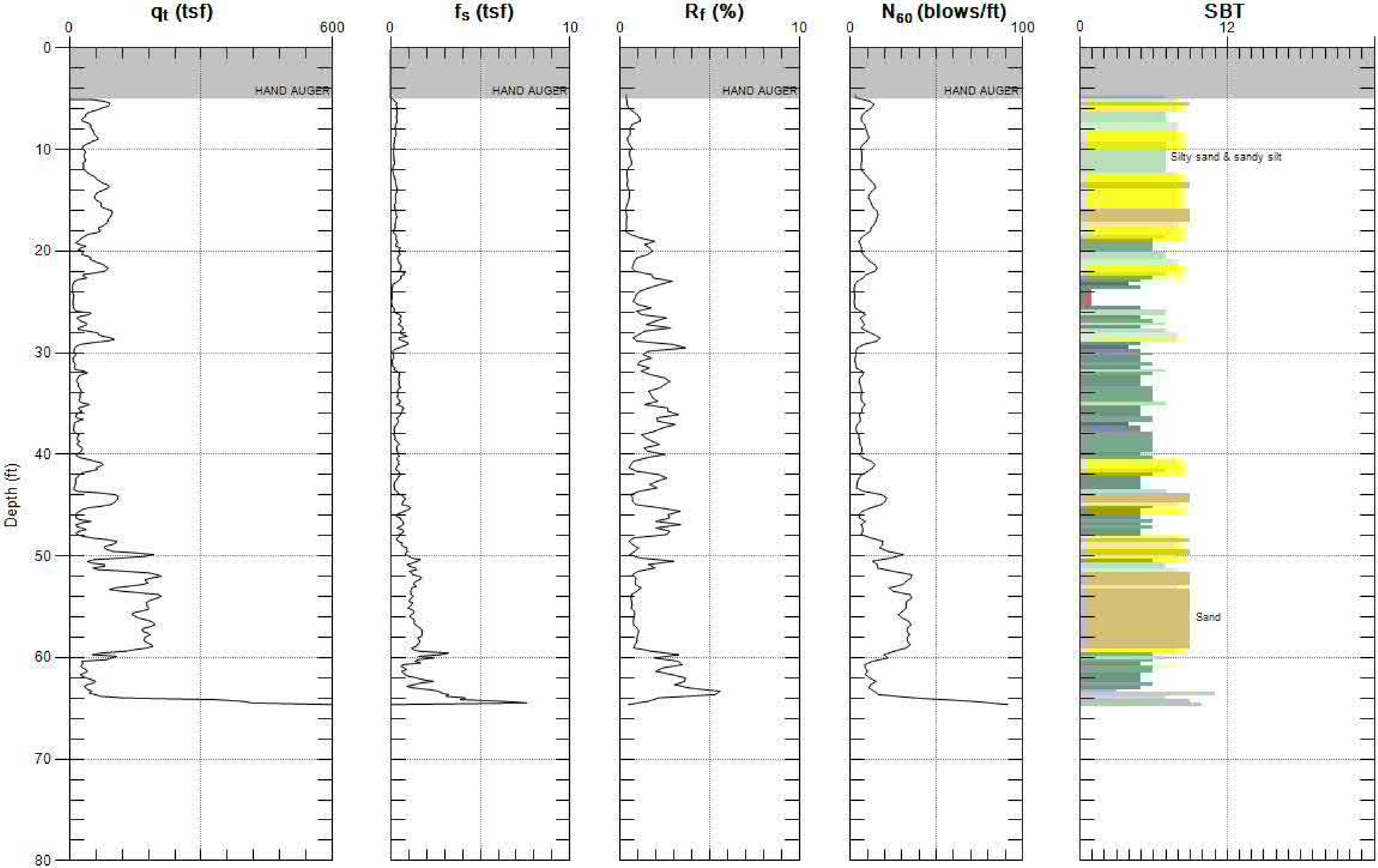
SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-13 Date: 3/15/17 09:27



Max. Depth: 64.797 (ft)
Avg. Interval: 0.328 (ft)

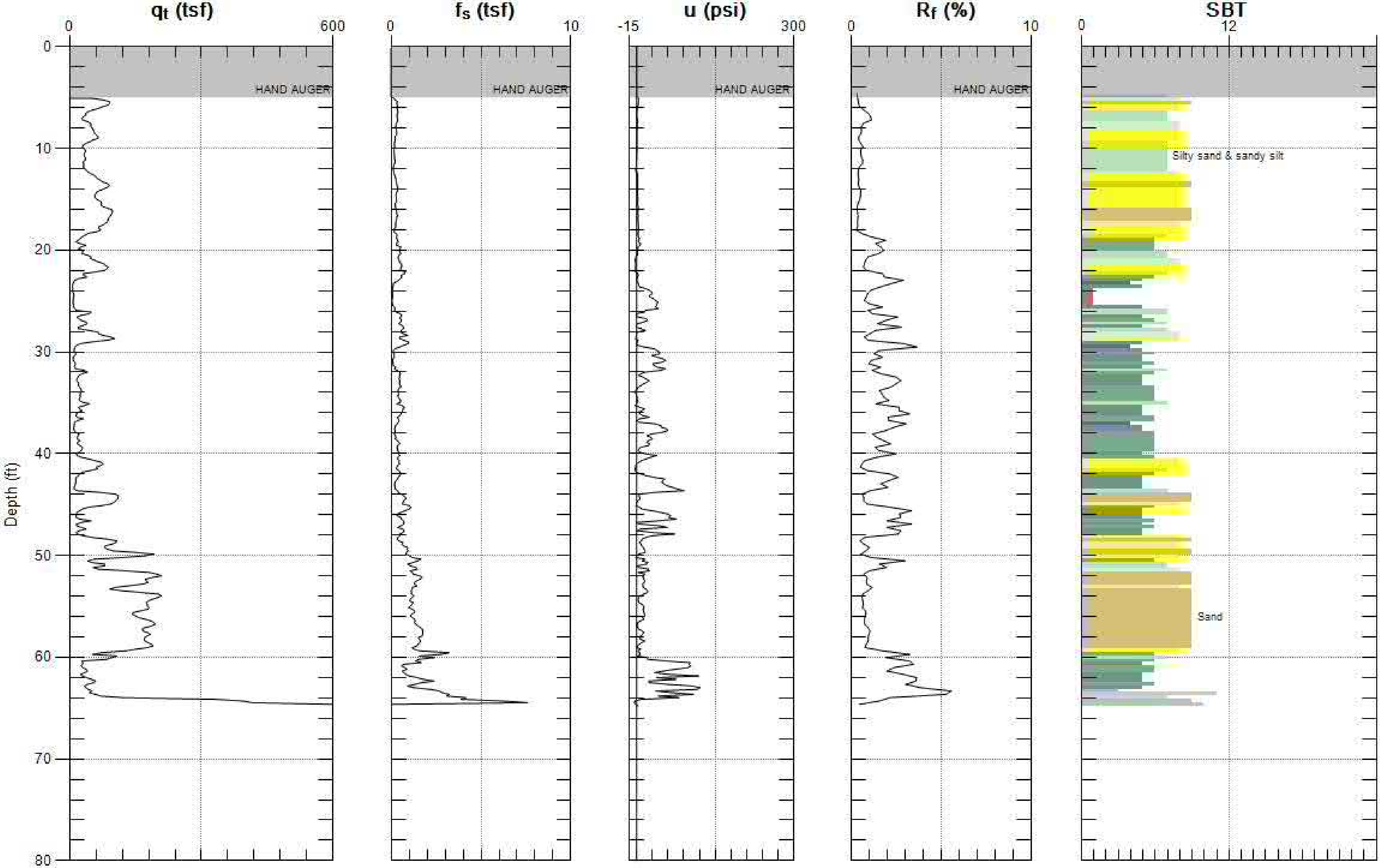
Figure A-108

SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-13 Date: 3/15/17 09:27



Max. Depth: 64.797 (ft)
Avg. Interval: 0.328 (ft)

Figure A-108

SBT: Soil Behavior Type (Robertson 1990)

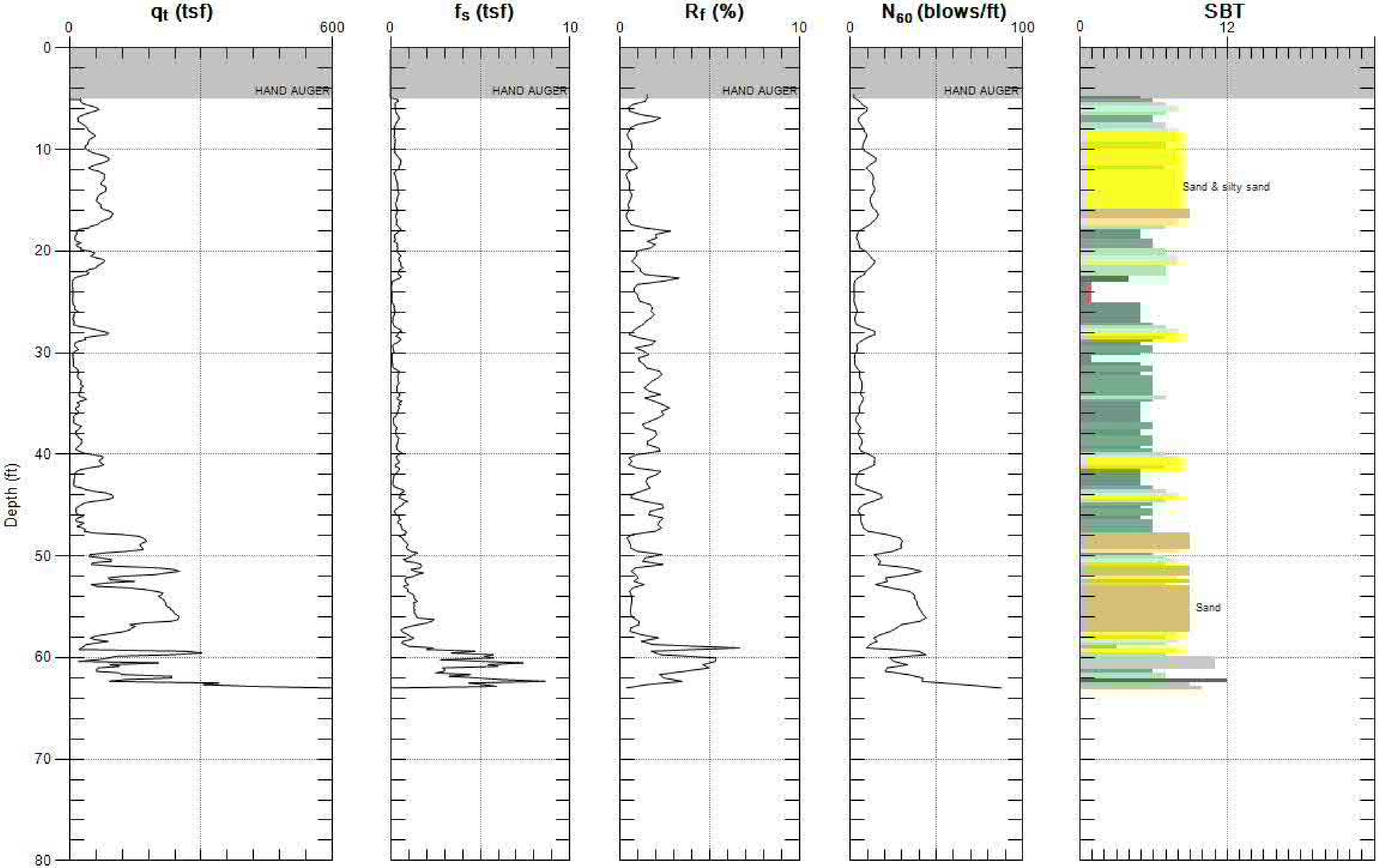
GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-14

Date: 3/17/17 09:29



Max. Depth: 63.156 (ft)
Avg. Interval: 0.328 (ft)

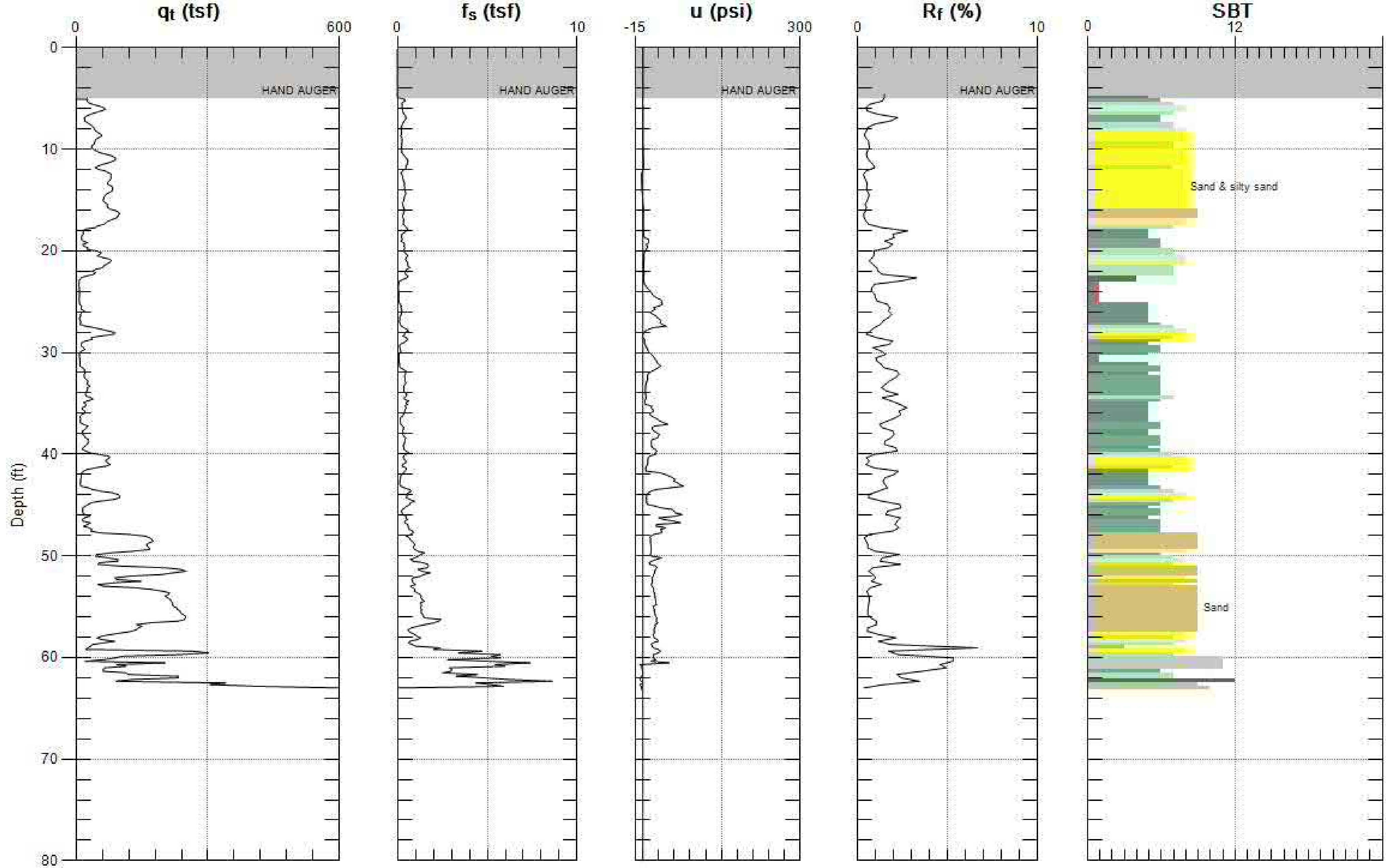
Figure A-109

SBT: Soil Behavior Type (Robertson 1990)

GREGG AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-14 Date: 3/17/17 09:29



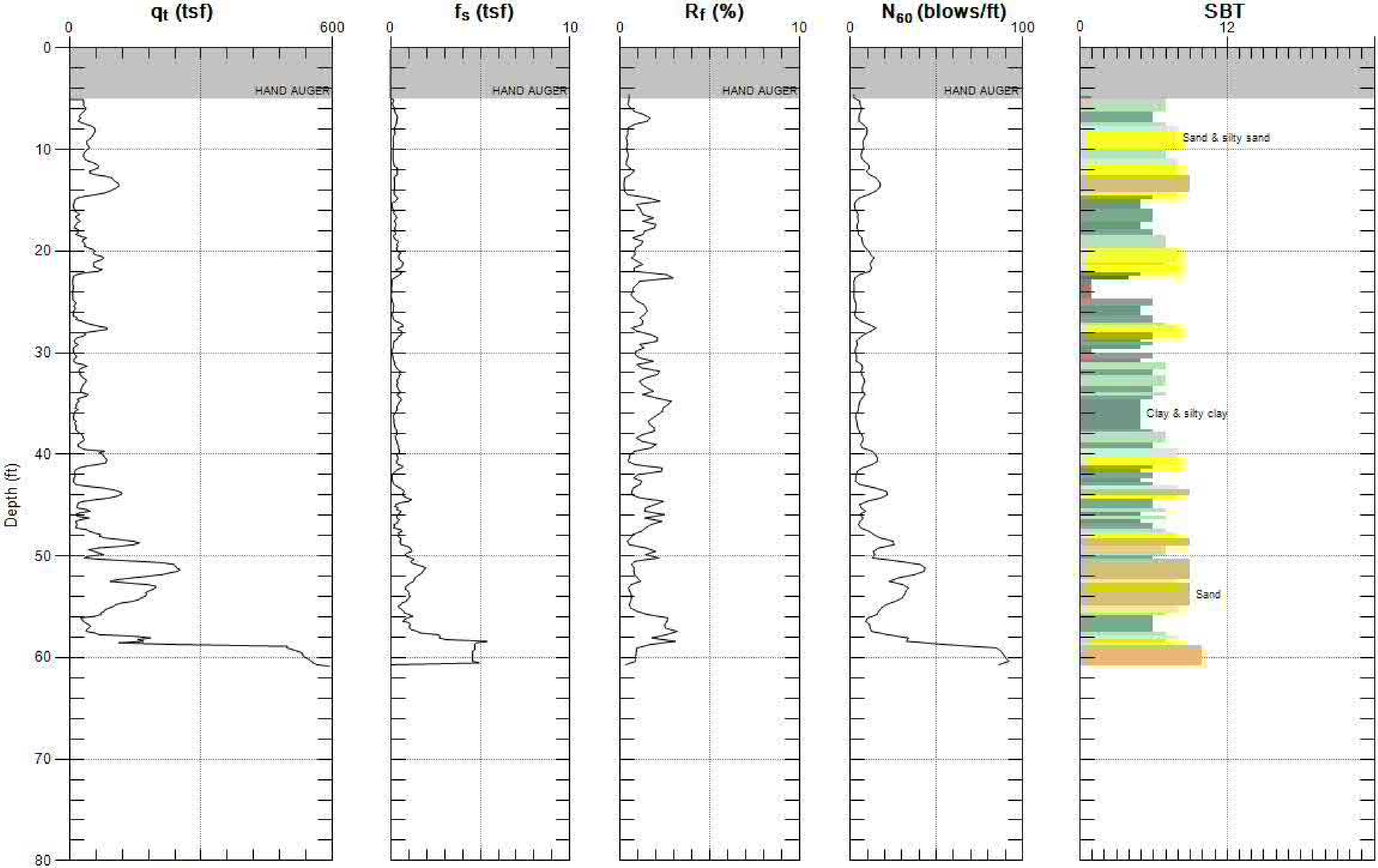
Max. Depth: 63.156 (ft)
Avg. Interval: 0.328 (ft)

Figure A-109 SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-15 **Date: 3/15/17 10:51**



Max. Depth: 60.860 (ft)
Avg. Interval: 0.328 (ft)

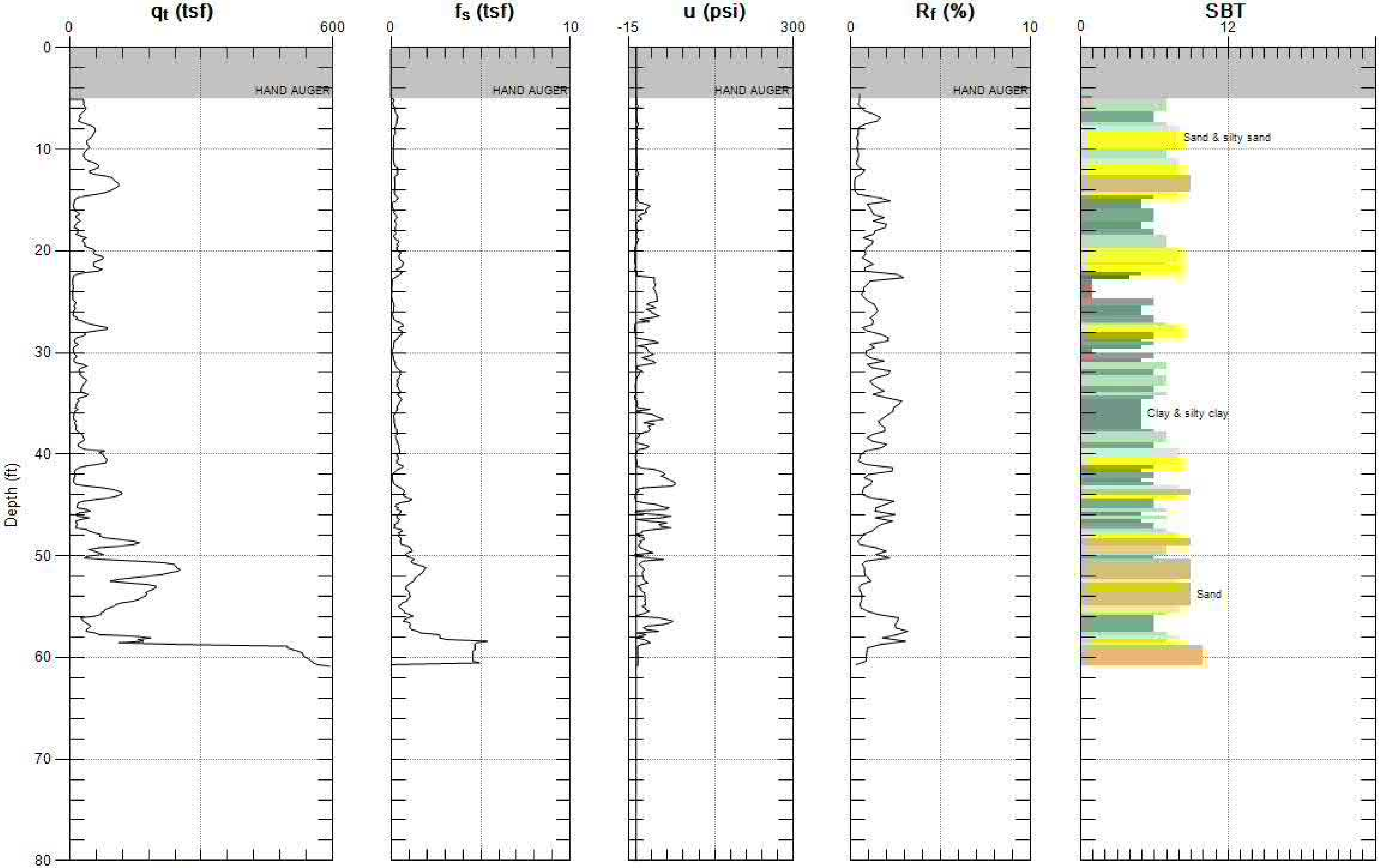
Figure A-110

SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-15 Date: 3/15/17 10:51



Max. Depth: 60.860 (ft)
Avg. Interval: 0.328 (ft)

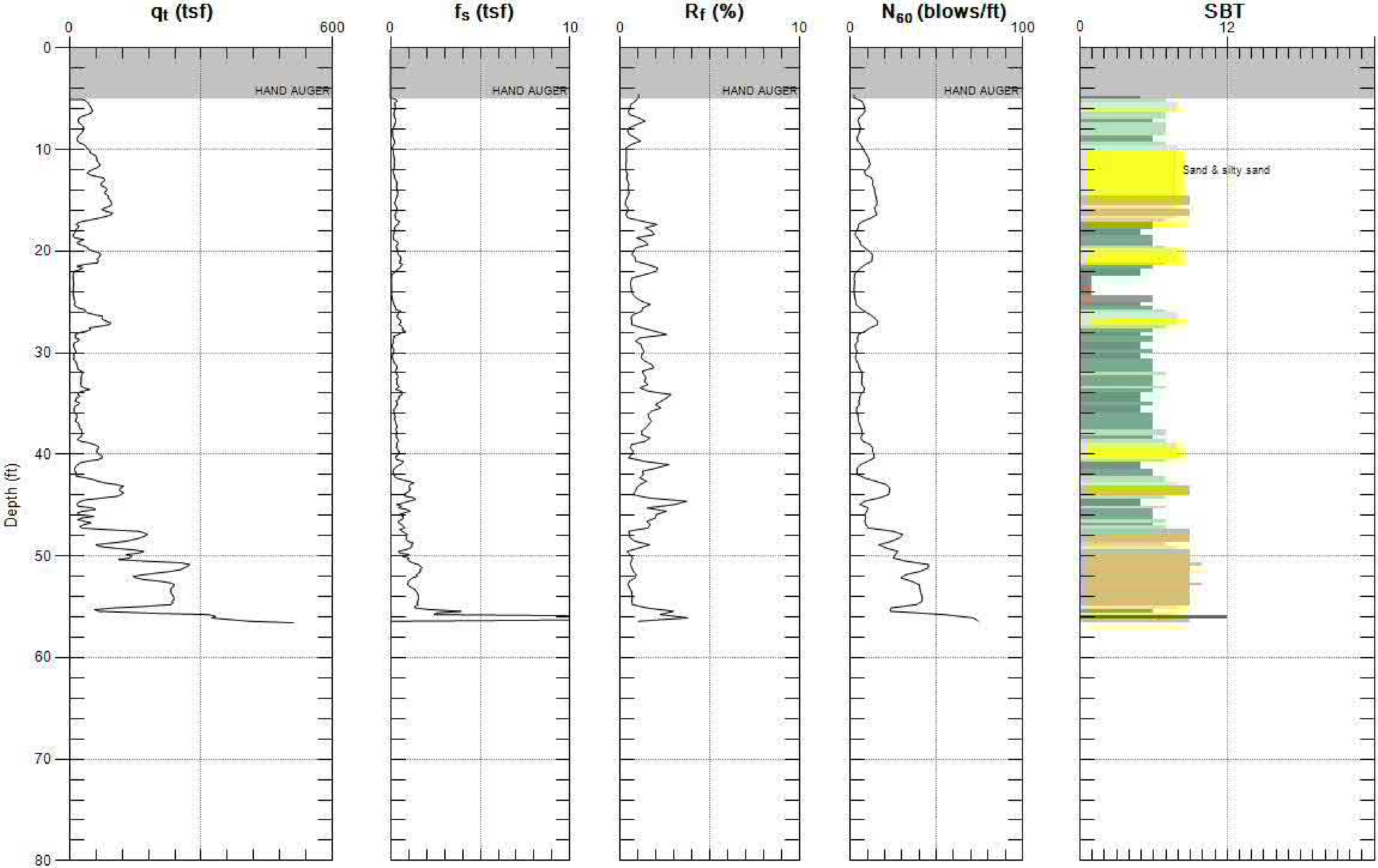
Figure A-110

SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-16 Date: 3/17/17 10:45



Max. Depth: 56.594 (ft)
Avg. Interval: 0.328 (ft)

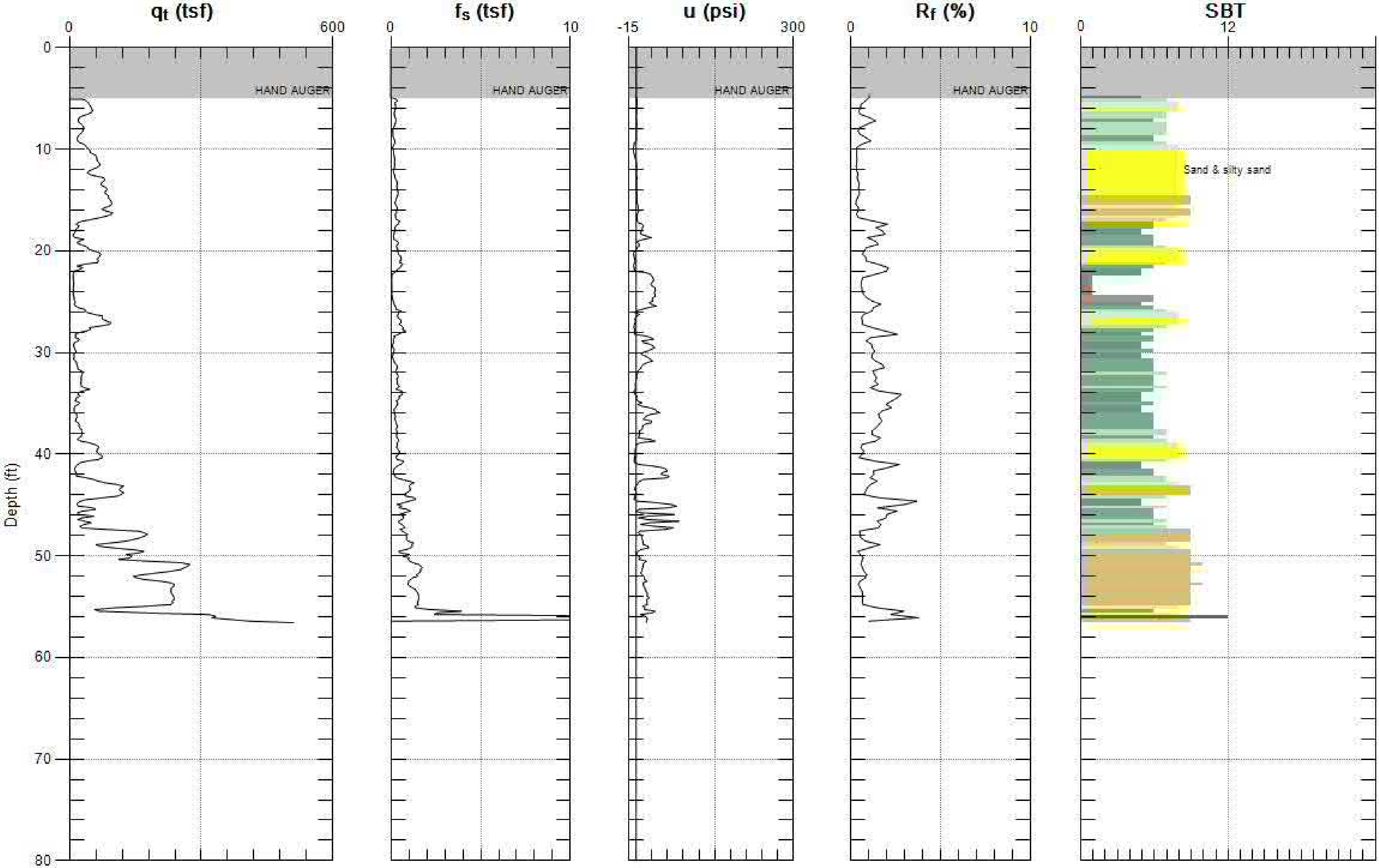
Figure A-111 SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-16 **Date: 3/17/17 10:45**



Max. Depth: 56.594 (ft)
Avg. Interval: 0.328 (ft)

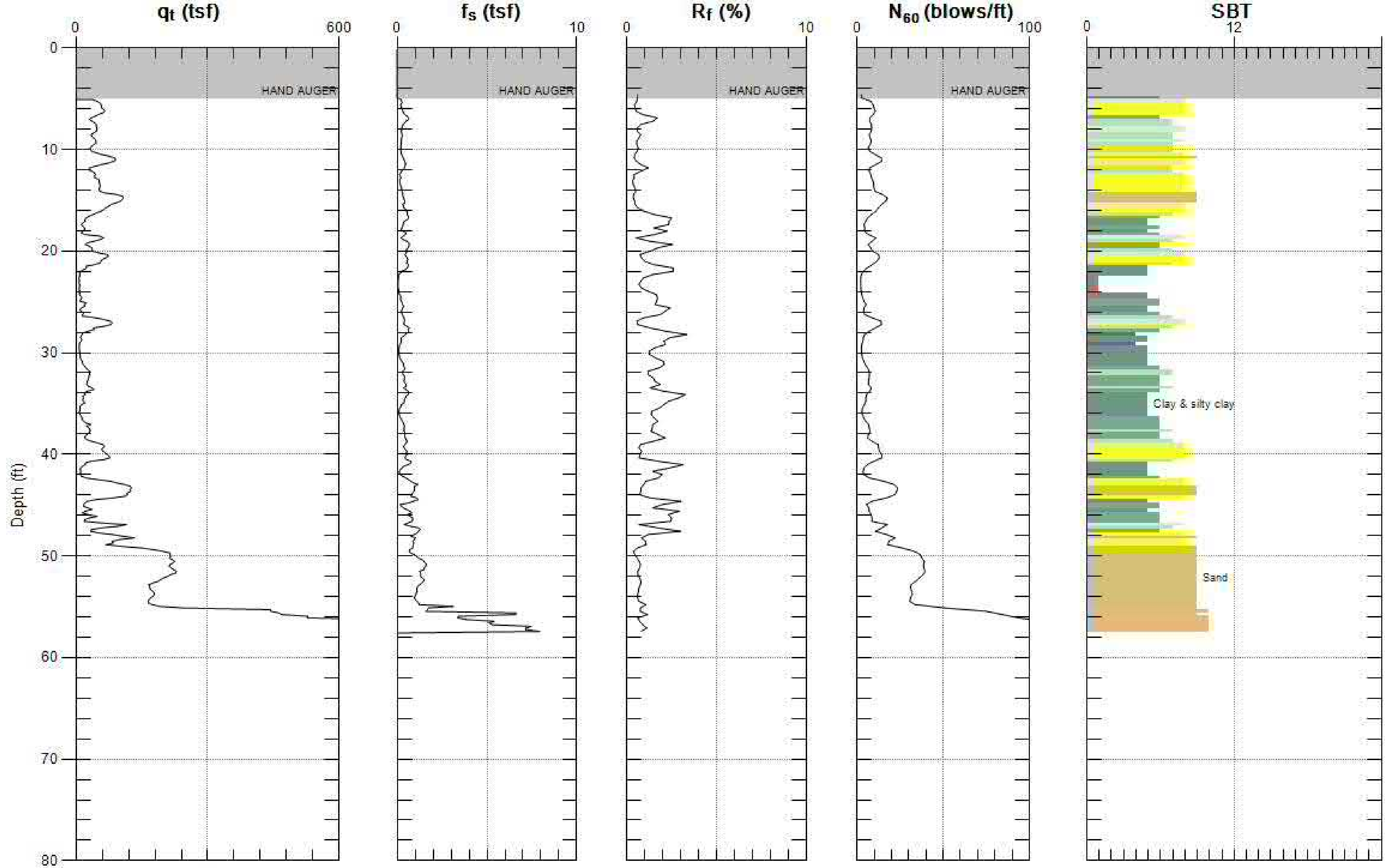
Figure A-111

SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-17 Date: 3/17/17 12:35



Max. Depth: 57.743 (ft)
Avg. Interval: 0.328 (ft)

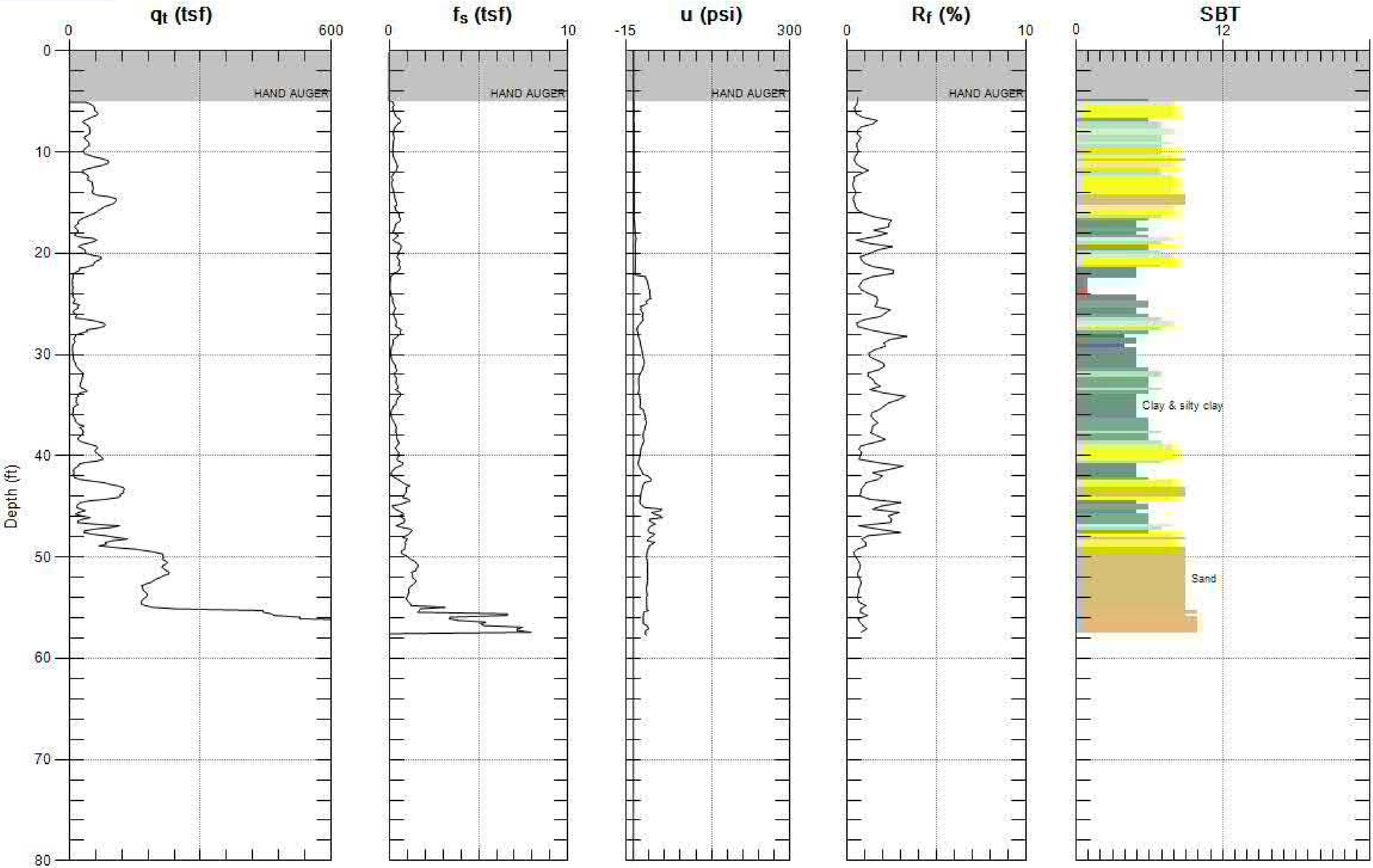
Figure A-112

SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-17 Date: 3/17/17 12:35



Max. Depth: 57.743 (ft)
Avg. Interval: 0.328 (ft)

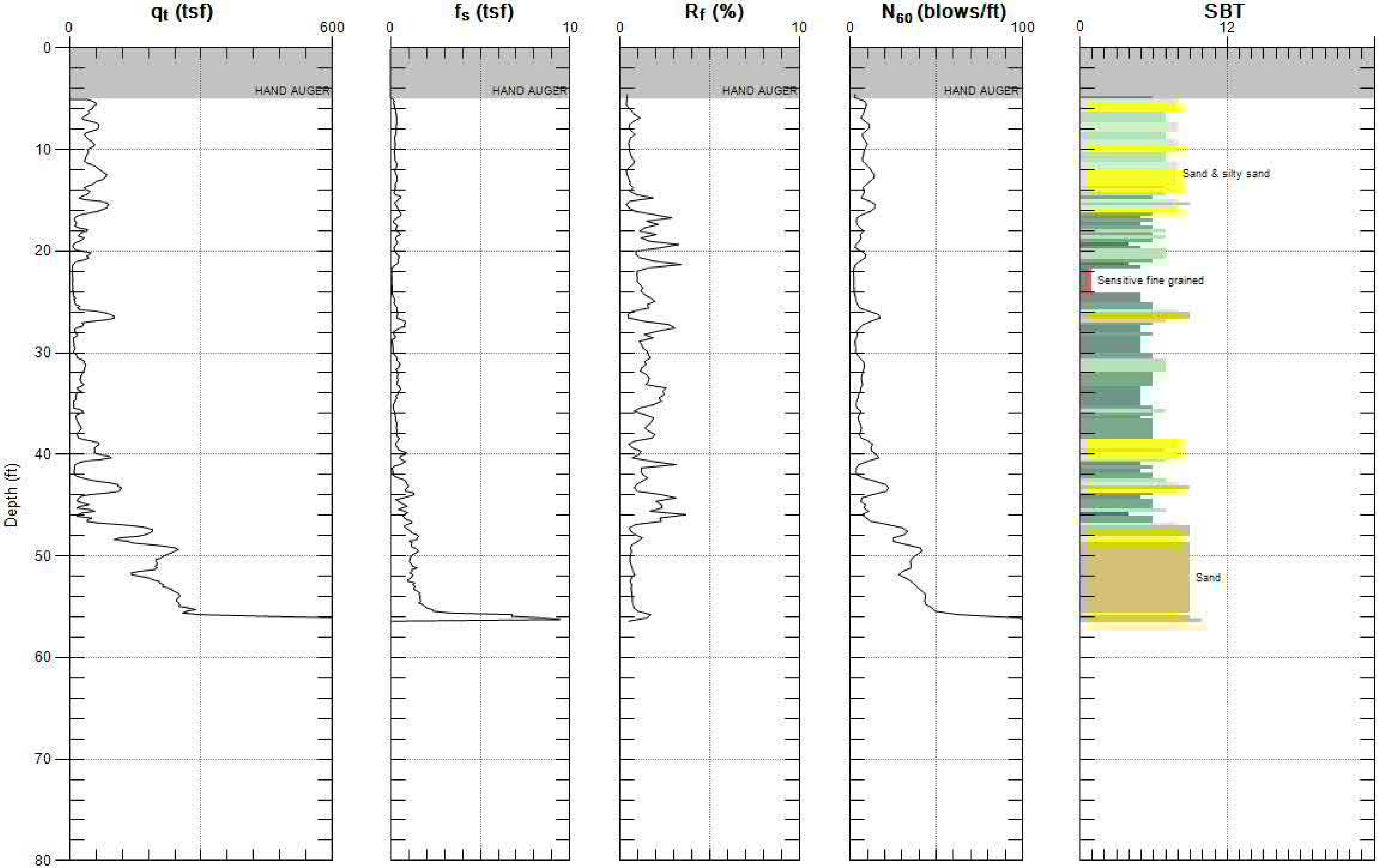
Figure A-112

SBT: Soil Behavior Type (Robertson 1990)

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-18 Date: 3/17/17 02:13



Max. Depth: 56.594 (ft)
Avg. Interval: 0.328 (ft)

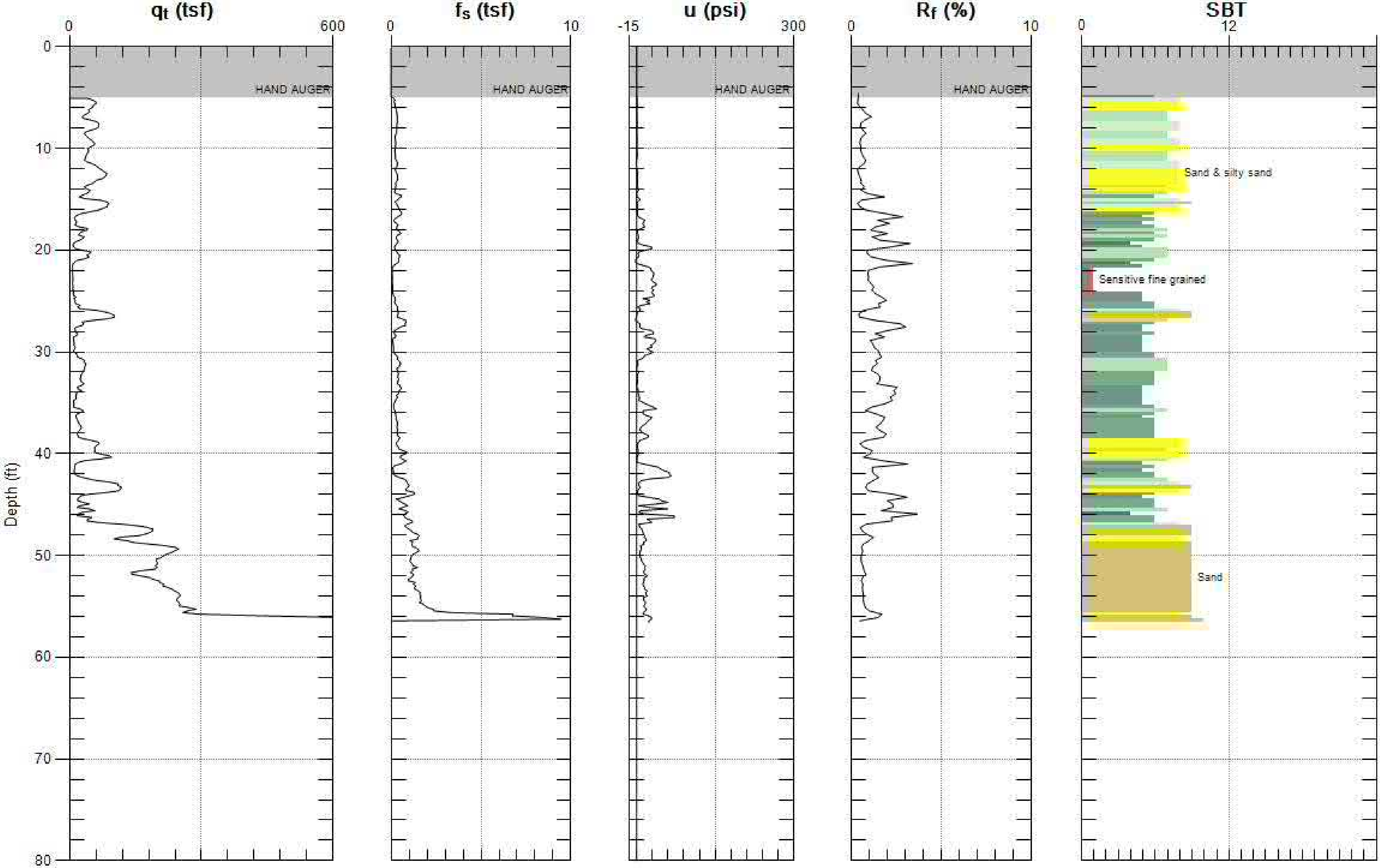
Figure A-113 SBT: Soil Behavior Type (Robertson 1990)

GREGG

AECOM

Site: MORENA PUMP STATION Engineer: K.MARTIN

Sounding: SH-18 Date: 3/17/17 02:13



Max. Depth: 56.594 (ft)
Avg. Interval: 0.328 (ft)

Figure A-113 SBT: Soil Behavior Type (Robertson 1990)

APPENDIX A – Boring Logs

The field investigation for the project included various types of explorations for the different project elements. Three (3) borings (PS-1 through PS-3) were advanced within Sherman Street and Custer Street for the pump station and sixty-seven (67) borings (WM-1 through WM-25 and FM-1 through FM-53) were advanced for the pipeline alignments. Thirty-seven (37) Cone Penetrometer Test (CPT) soundings were also advanced around the pump station site. Four (4) borings were advanced for the diversion structure connections in Friars Road (DS-1 through DS-6). In addition, borings were advanced for the four originally planned tunnel crossings: ONE borings (ex-1) for the I-805 crossing at Executive Drive, four borings (RC-1 through RC-4) at the railroad crossing near Rose Canyon, five (SC-1 through SC-5) near San Clemente Creek, and two (TC-1, 2) on West Morena Blvd. near Tecolote Creek. The Tecolote Creek crossing has been modified to be open trench and these borings are now considered part of the pipeline alignment borings. Some of the planned boring locations were eliminated based on nearby available information or due to utility conflicts, and therefore the numbering of the borings is not sequential.

The logs for the pump station borings, the pipeline alignment borings, and the diversion structure borings are presented in this appendix. The logs of borings for the tunnel crossings are presented in the Tunnel Report. Data for the CPT soundings are presented in the Faulting Report.

Field activities for the pump station borings were performed between April and August 2017 under the supervision of engineering geologists and engineers from our firm. Times and durations of field explorations varied based on traffic control permit constraints (typically 8:30 to 3:30 weekdays). Locations of the field explorations near the pump station, including CPT soundings and Borings PS-1 through PS-3, are presented in Figure 2. The remaining boring locations are presented on Figures 3a through 3e.

Procedures performed prior to any field activities included:

- Notifying Underground Service Alert (USA) 48 hours prior to drilling to mark out for subsurface utilities.
- Obtaining required County of San Diego Department of Environmental Health boring permits.
- Obtaining any necessary City of San Diego Right-of-Way permits.
- Generating plans and acquiring approved permits for traffic control.

Drilling for the borings was performed by Pacific Drilling or Cascade Drilling using hollow stem auger drilling methods. Either a truck-mounted Unimog Marl M5 drill rig with either 6-inch or 8-inch diameter hollow stem augers or a CME 85 with 6-inch diameter hollow stem augers were used to advance the borings. Each boring was advanced from the surface down to depths ranging from 2 feet to 81 feet. Borings shallower than 15 feet that met with refusal were moved and advanced to attempt to bypass the obstruction creating the refusal.

Relatively undisturbed samples of the subsurface materials were obtained within the exploratory borings using either a modified California sampler (2.5-inch outside diameter and 2-inch inside diameter) with thin stainless steel liners or a Standard Penetration Test (SPT) sampler (2.0-inch outside diameter and 1.5-inch inside diameter, without space for liners). The sampler was generally driven 18-inches into the material at the bottom of the boring by a 140-pound hammer falling 30-inches, and the blows required to advance the sampler was recorded in 6-inch increments for density correlations. The blow counts shown on the boring logs are for the final 12 inches of drive and have not been corrected for sample size or other corrections. The soil samples obtained were removed from the sampler, classified in the field, sealed to preserve the natural moisture content of the sample, and returned to the laboratory for further examination and testing.

Borings were backfilled according to San Diego County Site Assessment and Mitigation (SAM) Manual guidelines. The borings were finished with concrete or asphalt to approximately match the original surface. Soil cuttings collected from the borings were collected in 55 gallon steel drums affixed with non-hazardous labels. The drums were transported to a local City designated temporary storage location.

A monitoring well was completed in Boring PS-2. Perforated/slotted polyvinyl chloride (PVC) piping was installed from 6 feet below ground surface to the bottom of the boring at 61.5 feet. Solid pipe was installed at the top 6 feet. Filter sand was backfilled around the slotted pipe to one foot above the top of the slotted pipe. Bentonite was backfilled around the pipe over the filter sand to a depth of 2.5 feet. A traffic-rated vault was installed in concrete at the top of the boring, flush with the existing pavement surface. The monitoring well was developed and sampled. The groundwater samples recovered were sent to Eurofins Calscience analytical laboratory for further testing. Analtyical laboratory test results are presented in Appendix C. A slug test was performed within the monitoring well for Boring PS-2.

A key to boring logs and the boring logs are presented in this Appendix.

APPENDIX B

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APPENDIX B – Geotechnical Laboratory Data

Geotechnical laboratory tests were performed on selected samples to aid in estimating soil properties and verify visual classifications of the materials. The tests include grain size, plasticity characteristics, corrosion potential, and R-value for pavement design. Test results are shown on the corresponding sample location on the logs of the borings in Appendix A. Detailed laboratory results are presented in this appendix.

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WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: DS-01

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT	X	1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	X
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S21			
Mass of Container & Wet Specimen, M1 (g)	528.89			
Mass of Container & Dry Specimen, M2 (g)	479.60			
Mass of Container, M3 (g)	104.85			
WATER CONTENT, wn (%)	**13.15**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	763.56
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	763.56
Specimen Diameter, D (in) or ( )	2.400
Specimen Length, L (in) or ( )	5.150
Specimen Area, A (in^2) or ( )	4.523
Specimen Volume, V (cm^3) or ( )	381.68
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	124.9
DRY UNIT WEIGHT, DUW (pcf) or ( )	110.4
VOID RATIO	0.527
DEGREE OF SATURATION, S (%)	67.36

MEASURED DIMENSIONS

	Length	Diameter
1	5.159	2.394
2	5.182	2.404
3	5.117	2.401
4	5.150	2.394
5	5.142	2.398
6	**XXXXX**	2.407
Average	5.150	2.400

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark grayish brown Silty SAND (SM)

TESTED BY: GD DATE: 8/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: DS-02

Project Name: Pure Water Sample No.: 1

Project Engineer: SF Depth (ft): 5.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE	X	2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY		X					4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	X
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S219			
Mass of Container & Wet Specimen, M1 (g)	536.84			
Mass of Container & Dry Specimen, M2 (g)	458.34			
Mass of Container, M3 (g)	140.68			
WATER CONTENT, wn (%)	**24.71**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1074.94
Mass of Container, M5 (g)	438.36
Mass of Wet Specimen, M6 (g)	636.58
Specimen Diameter, D (in) or ( )	2.399
Specimen Length, L (in) or ( )	4.659
Specimen Area, A (in^2) or ( )	4.521
Specimen Volume, V (cm^3) or ( )	345.13
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	115.1
DRY UNIT WEIGHT, DUW (pcf) or ( )	92.3
VOID RATIO	0.826
DEGREE OF SATURATION, S (%)	80.82

MEASURED DIMENSIONS

	Length	Diameter
1	4.658	2.406
2	4.669	2.399
3	4.640	2.406
4	4.642	2.396
5	4.685	2.390
6	**XXXXX**	2.398
Average	4.659	2.399

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark olive gray Clayey SAND (SC)

TESTED BY: GD DATE: 8/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: DS-03

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 5.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT	X	1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	X
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S215			
Mass of Container & Wet Specimen, M1 (g)	511.13			
Mass of Container & Dry Specimen, M2 (g)	430.58			
Mass of Container, M3 (g)	137.45			
WATER CONTENT, wn (%)	**27.48**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	817.76
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	817.76
Specimen Diameter, D (in) or ( )	2.405
Specimen Length, L (in) or ( )	5.651
Specimen Area, A (in^2) or ( )	4.542
Specimen Volume, V (cm^3) or ( )	420.59
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	121.4
DRY UNIT WEIGHT, DUW (pcf) or ( )	95.2
VOID RATIO	0.770
DEGREE OF SATURATION, S (%)	96.32

MEASURED DIMENSIONS

	Length	Diameter
1	5.661	2.416
2	5.647	2.405
3	5.645	2.394
4	5.664	2.401
5	5.640	2.407
6	**XXXXX**	2.405
Average	5.651	2.405

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive gray Silty SAND (SM)

TESTED BY: GD DATE: 8/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: DS-06

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 5.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT	X	1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	X
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S222			
Mass of Container & Wet Specimen, M1 (g)	503.86			
Mass of Container & Dry Specimen, M2 (g)	437.04			
Mass of Container, M3 (g)	140.49			
WATER CONTENT, wn (%)	**22.53**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	626.72
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	626.72
Specimen Diameter, D (in) or ( )	2.405
Specimen Length, L (in) or ( )	4.217
Specimen Area, A (in^2) or ( )	4.542
Specimen Volume, V (cm^3) or ( )	313.81
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	124.7
DRY UNIT WEIGHT, DUW (pcf) or ( )	101.7
VOID RATIO	0.657
DEGREE OF SATURATION, S (%)	92.66

MEASURED DIMENSIONS

	Length	Diameter
1	4.219	2.414
2	4.212	2.414
3	4.230	2.406
4	4.203	2.391
5	4.219	2.390
6	**XXXXX**	2.413
Average	4.217	2.405

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark grayish brown Silty SAND (SM)

TESTED BY: GD DATE: 8/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-01
Project Name: Pure Water Sample No.: 3
Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST		2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET	X	3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT	X	2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	X
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S29			
Mass of Container & Wet Specimen, M1 (g)	531.86			
Mass of Container & Dry Specimen, M2 (g)	452.44			
Mass of Container, M3 (g)	125.99			
WATER CONTENT, wn (%)	**24.33**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1065.97
Mass of Container, M5 (g)	210.56
Mass of Wet Specimen, M6 (g)	855.41
Specimen Diameter, D (in) or ( )	2.410
Specimen Length, L (in) or ( )	5.845
Specimen Area, A (in^2) or ( )	4.562
Specimen Volume, V (cm^3) or ( )	436.94
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	122.2
DRY UNIT WEIGHT, DUW (pcf) or ( )	98.3
VOID RATIO	0.715
DEGREE OF SATURATION, S (%)	91.91

MEASURED DIMENSIONS

	Length	Diameter
1	5.849	2.392
2	5.862	2.413
3	5.839	2.421
4	5.840	2.395
5	5.836	2.419
6	**XXXXX**	2.420
Average	5.845	2.410

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive brown Poorly Graded SAND (SP)

TESTED BY: GD DATE: 5/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-02

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 5.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT	X	2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	X
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S217			
Mass of Container & Wet Specimen, M1 (g)	442.43			
Mass of Container & Dry Specimen, M2 (g)	427.01			
Mass of Container, M3 (g)	137.94			
WATER CONTENT, wn (%)	**5.33**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	716.37
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	716.37
Specimen Diameter, D (in) or ( )	2.397
Specimen Length, L (in) or ( )	5.954
Specimen Area, A (in^2) or ( )	4.514
Specimen Volume, V (cm^3) or ( )	440.44
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	101.5
DRY UNIT WEIGHT, DUW (pcf) or ( )	96.4
VOID RATIO	0.749
DEGREE OF SATURATION, S (%)	19.24

MEASURED DIMENSIONS

	Length	Diameter
1	5.959	2.391
2	5.947	2.397
3	5.966	2.400
4	5.954	2.393
5	5.946	2.401
6	**XXXXX**	2.402
Average	5.954	2.397

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Very dark grayish brown Poorly Graded SAND with Silt (SP-SM)

TESTED BY: GD DATE: 5/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-04

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 15.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD	X			6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S224			
Mass of Container & Wet Specimen, M1 (g)	531.64			
Mass of Container & Dry Specimen, M2 (g)	472.74			
Mass of Container, M3 (g)	140.75			
WATER CONTENT, wn (%)	**17.74**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	758.01
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	758.01
Specimen Diameter, D (in) or ( )	2.396
Specimen Length, L (in) or ( )	4.980
Specimen Area, A (in^2) or ( )	4.509
Specimen Volume, V (cm^3) or ( )	367.92
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	128.6
DRY UNIT WEIGHT, DUW (pcf) or ( )	109.2
VOID RATIO	0.543
DEGREE OF SATURATION, S (%)	88.21

MEASURED DIMENSIONS

	Length	Diameter
1	4.972	2.394
2	4.976	2.395
3	4.981	2.396
4	4.974	2.401
5	4.995	2.397
6	**XXXXX**	2.393
Average	4.980	2.396

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Brown Sandstone

TESTED BY: GD DATE: 5/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: FM-06

Project Name: Pure Water | Sample No.: 4

Project Engineer: SF | Depth (ft): 15.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	X
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S205			
Mass of Container & Wet Specimen, M1 (g)	566.94			
Mass of Container & Dry Specimen, M2 (g)	490.69			
Mass of Container, M3 (g)	139.34			
WATER CONTENT, wn (%)	**21.70**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	933.59
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	933.59
Specimen Diameter, D (in) or ( )	2.396
Specimen Length, L (in) or ( )	5.997
Specimen Area, A (in^2) or ( )	4.508
Specimen Volume, V (cm^3) or ( )	442.94
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	131.6
DRY UNIT WEIGHT, DUW (pcf) or ( )	108.1
VOID RATIO	0.559
DEGREE OF SATURATION, S (%)	104.81

MEASURED DIMENSIONS

	Length	Diameter
1	5.995	2.389
2	5.998	2.393
3	5.997	2.401
4	5.997	2.393
5	5.996	2.396
6	**XXXXX**	2.402
Average	5.997	2.396

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark yellowish brown Silty SAND (SM)

TESTED BY: GD DATE: 5/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-07

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 5.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S221			
Mass of Container & Wet Specimen, M1 (g)	454.73			
Mass of Container & Dry Specimen, M2 (g)	432.55			
Mass of Container, M3 (g)	140.33			
WATER CONTENT, wn (%)	**7.59**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	776.77
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	776.77
Specimen Diameter, D (in) or ( )	2.394
Specimen Length, L (in) or ( )	5.906
Specimen Area, A (in^2) or ( )	4.500
Specimen Volume, V (cm^3) or ( )	435.52
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	111.3
DRY UNIT WEIGHT, DUW (pcf) or ( )	103.5
VOID RATIO	0.629
DEGREE OF SATURATION, S (%)	32.59

MEASURED DIMENSIONS

	Length	Diameter
1	5.901	2.398
2	5.905	2.404
3	5.910	2.400
4	5.899	2.381
5	5.915	2.389
6	**XXXXX**	2.390
Average	5.906	2.394

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive brown Poorly Graded SAND (SP)

TESTED BY: GD DATE: 5/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-07

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT	X	1). COBBLES (>3")			2). MOIST		2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET	X	3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S208			
Mass of Container & Wet Specimen, M1 (g)	574.44			
Mass of Container & Dry Specimen, M2 (g)	502.67			
Mass of Container, M3 (g)	146.59			
WATER CONTENT, wn (%)	**20.16**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	834.00
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	834.00
Specimen Diameter, D (in) or ( )	2.404
Specimen Length, L (in) or ( )	5.564
Specimen Area, A (in^2) or ( )	4.537
Specimen Volume, V (cm^3) or ( )	413.67
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	125.9
DRY UNIT WEIGHT, DUW (pcf) or ( )	104.7
VOID RATIO	0.609
DEGREE OF SATURATION, S (%)	89.34

MEASURED DIMENSIONS

	Length	Diameter
1	5.558	2.398
2	5.551	2.405
3	5.585	2.412
4	5.564	2.393
5	5.561	2.402
6	**XXXXX**	2.411
Average	5.564	2.404

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Grayish brown Poorly Graded SAND (SP)

TESTED BY: GD DATE: 5/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: FM-08

Project Name: Pure Water | Sample No.: 3

Project Engineer: SF | Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY	X	1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST		2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	B63			
Mass of Container & Wet Specimen, M1 (g)	761.01			
Mass of Container & Dry Specimen, M2 (g)	716.37			
Mass of Container, M3 (g)	200.70			
WATER CONTENT, wn (%)	**8.66**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	923.47
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	923.47
Specimen Diameter, D (in) or ( )	2.378
Specimen Length, L (in) or ( )	5.916
Specimen Area, A (in^2) or ( )	4.441
Specimen Volume, V (cm^3) or ( )	430.60
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	133.9
DRY UNIT WEIGHT, DUW (pcf) or ( )	123.2
VOID RATIO	0.368
DEGREE OF SATURATION, S (%)	63.52

MEASURED DIMENSIONS

	Length	Diameter
1	5.922	2.374
2	5.857	2.364
3	5.810	2.378
4	5.926	2.394
5	6.067	2.379
6	**XXXXX**	2.379
Average	5.916	2.378

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark yellowish brown Sandy, Lean CLAY (CL)

TESTED BY: ADC DATE: 6/12/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-11

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	FJ10			
Mass of Container & Wet Specimen, M1 (g)	621.60			
Mass of Container & Dry Specimen, M2 (g)	538.84			
Mass of Container, M3 (g)	111.28			
WATER CONTENT, wn (%)	**19.36**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	901.99
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	901.99
Specimen Diameter, D (in) or ( )	2.388
Specimen Length, L (in) or ( )	5.697
Specimen Area, A (in^2) or ( )	4.479
Specimen Volume, V (cm^3) or ( )	418.15
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	134.7
DRY UNIT WEIGHT, DUW (pcf) or ( )	112.8
VOID RATIO	0.494
DEGREE OF SATURATION, S (%)	105.80

MEASURED DIMENSIONS

	Length	Diameter
1	5.861	2.386
2	5.807	2.386
3	5.905	2.386
4	5.848	2.384
5	5.062	2.393
6	**XXXXX**	2.394
Average	5.697	2.388

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive brown Sandy, Lean CLAY (CL)

TESTED BY: ADC DATE: 6/12/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-16

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY		X					4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S88			
Mass of Container & Wet Specimen, M1 (g)	607.07			
Mass of Container & Dry Specimen, M2 (g)	555.22			
Mass of Container, M3 (g)	113.09			
WATER CONTENT, wn (%)	**11.73**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	929.87
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	929.87
Specimen Diameter, D (in) or ( )	2.389
Specimen Length, L (in) or ( )	5.950
Specimen Area, A (in^2) or ( )	4.482
Specimen Volume, V (cm^3) or ( )	437.01
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	132.8
DRY UNIT WEIGHT, DUW (pcf) or ( )	118.9
VOID RATIO	0.418
DEGREE OF SATURATION, S (%)	75.80

MEASURED DIMENSIONS

	Length	Diameter
1	5.973	2.381
2	5.967	2.382
3	5.966	2.382
4	5.879	2.394
5	5.966	2.395
6	**XXXXX**	2.399
Average	5.950	2.389

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark yellowish brown Clayey SAND (SC)

TESTED BY: ADC DATE: 6/12/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-16

Project Name: Pure Water Sample No.: 4

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY		X					4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	B22			
Mass of Container & Wet Specimen, M1 (g)	950.01			
Mass of Container & Dry Specimen, M2 (g)	825.70			
Mass of Container, M3 (g)	200.64			
WATER CONTENT, wn (%)	**19.89**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	869.02
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	869.02
Specimen Diameter, D (in) or ( )	2.398
Specimen Length, L (in) or ( )	5.678
Specimen Area, A (in^2) or ( )	4.517
Specimen Volume, V (cm^3) or ( )	420.26
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	129.1
DRY UNIT WEIGHT, DUW (pcf) or ( )	107.7
VOID RATIO	0.565
DEGREE OF SATURATION, S (%)	94.97

MEASURED DIMENSIONS

	Length	Diameter
1	5.665	2.398
2	5.692	2.398
3	5.659	2.413
4	5.687	2.388
5	5.685	2.396
6	**XXXXX**	2.396
Average	5.678	2.398

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Sandy, Lean CLAY (CL)

TESTED BY: ADC DATE: 6/12/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732   Task Number: 2.01.05.20.00   Boring No.: FM-17

Project Name: Pure Water   Sample No.: 1

Project Engineer: SF   Depth (ft): 5.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY		X					4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S3			
Mass of Container & Wet Specimen, M1 (g)	809.07			
Mass of Container & Dry Specimen, M2 (g)	723.53			
Mass of Container, M3 (g)	83.13			
WATER CONTENT, wn (%)	**13.36**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	914.07
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	914.07
Specimen Diameter, D (in) or ( )	2.382
Specimen Length, L (in) or ( )	5.974
Specimen Area, A (in^2) or ( )	4.456
Specimen Volume, V (cm^3) or ( )	436.18
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	130.8
DRY UNIT WEIGHT, DUW (pcf) or ( )	115.4
VOID RATIO	0.461
DEGREE OF SATURATION, S (%)	78.32

MEASURED DIMENSIONS

	Length	Diameter
1	5.970	2.383
2	5.975	2.382
3	5.977	2.382
4	5.971	2.379
5	5.976	2.381
6	**XXXXX**	2.384
Average	5.974	2.382

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown Clayey SAND (SC)

TESTED BY: ADC DATE: 6/12/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-17
Project Name: Pure Water Sample No.: 3
Project Engineer: SF Depth (ft): 15.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	B36			
Mass of Container & Wet Specimen, M1 (g)	1013.05			
Mass of Container & Dry Specimen, M2 (g)	903.60			
Mass of Container, M3 (g)	197.98			
WATER CONTENT, wn (%)	**15.51**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1187.25
Mass of Container, M5 (g)	254.16
Mass of Wet Specimen, M6 (g)	933.09
Specimen Diameter, D (in) or ( )	2.412
Specimen Length, L (in) or ( )	5.966
Specimen Area, A (in^2) or ( )	4.569
Specimen Volume, V (cm^3) or ( )	446.70
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	130.4
DRY UNIT WEIGHT, DUW (pcf) or ( )	112.9
VOID RATIO	0.493
DEGREE OF SATURATION, S (%)	84.94

MEASURED DIMENSIONS

	Length	Diameter
1	5.968	2.412
2	5.960	2.413
3	5.967	2.412
4	5.964	2.411
5	5.970	2.414
6	**XXXXX**	2.410
Average	5.966	2.412

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive yellow Silty SAND (SM)

TESTED BY: ADC DATE: 6/12/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: FM-18

Project Name: Pure Water | Sample No.: 3

Project Engineer: SF | Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY	X	1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST		2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	B27			
Mass of Container & Wet Specimen, M1 (g)	779.48			
Mass of Container & Dry Specimen, M2 (g)	686.58			
Mass of Container, M3 (g)	200.49			
WATER CONTENT, wn (%)	**19.11**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	916.37
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	916.37
Specimen Diameter, D (in) or ( )	2.411
Specimen Length, L (in) or ( )	5.982
Specimen Area, A (in^2) or ( )	4.564
Specimen Volume, V (cm^3) or ( )	447.35
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	127.9
DRY UNIT WEIGHT, DUW (pcf) or ( )	107.4
VOID RATIO	0.570
DEGREE OF SATURATION, S (%)	90.53

MEASURED DIMENSIONS

	Length	Diameter
1	5.981	2.407
2	5.981	2.401
3	5.989	2.399
4	5.984	2.417
5	5.975	2.420
6	**XXXXX**	2.419
Average	5.982	2.411

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown Lean CLAY (CL)

TESTED BY: ADC DATE: 6/13/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-18

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY	X	1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST		2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S31			
Mass of Container & Wet Specimen, M1 (g)	627.15			
Mass of Container & Dry Specimen, M2 (g)	535.54			
Mass of Container, M3 (g)	98.21			
WATER CONTENT, wn (%)	**20.95**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	912.46
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	912.46
Specimen Diameter, D (in) or ( )	2.397
Specimen Length, L (in) or ( )	5.962
Specimen Area, A (in^2) or ( )	4.511
Specimen Volume, V (cm^3) or ( )	440.72
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	129.2
DRY UNIT WEIGHT, DUW (pcf) or ( )	106.9
VOID RATIO	0.577
DEGREE OF SATURATION, S (%)	97.97

MEASURED DIMENSIONS

	Length	Diameter
1	5.961	2.391
2	5.961	2.390
3	5.966	2.394
4	5.959	2.404
5	5.965	2.401
6	**XXXXX**	2.399
Average	5.962	2.397

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Gray Lean CLAY with Sand (CL)

TESTED BY: ADC DATE: 6/13/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-19

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M62			
Mass of Container & Wet Specimen, M1 (g)	488.16			
Mass of Container & Dry Specimen, M2 (g)	441.00			
Mass of Container, M3 (g)	91.69			
WATER CONTENT, wn (%)	**13.50**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	834.22
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	834.22
Specimen Diameter, D (in) or ( )	2.390
Specimen Length, L (in) or ( )	5.446
Specimen Area, A (in^2) or ( )	4.487
Specimen Volume, V (cm^3) or ( )	400.46
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	130.0
DRY UNIT WEIGHT, DUW (pcf) or ( )	114.6
VOID RATIO	0.471
DEGREE OF SATURATION, S (%)	77.38

MEASURED DIMENSIONS

	Length	Diameter
1	5.421	2.385
2	5.458	2.389
3	5.453	2.393
4	5.442	2.394
5	5.458	2.388
6	**XXXXX**	2.392
Average	5.446	2.390

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark yellowish brown Sandy SILT with Gravel (ML)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-20
Project Name: Pure Water Sample No.: 3
Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD	X			6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M5			
Mass of Container & Wet Specimen, M1 (g)	465.89			
Mass of Container & Dry Specimen, M2 (g)	407.05			
Mass of Container, M3 (g)	91.23			
WATER CONTENT, wn (%)	**18.63**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	830.75
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	830.75
Specimen Diameter, D (in) or ( )	2.395
Specimen Length, L (in) or ( )	5.850
Specimen Area, A (in^2) or ( )	4.506
Specimen Volume, V (cm^3) or ( )	432.00
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	120.1
DRY UNIT WEIGHT, DUW (pcf) or ( )	101.2
VOID RATIO	0.666
DEGREE OF SATURATION, S (%)	75.57

MEASURED DIMENSIONS

	Length	Diameter
1	5.841	2.405
2	5.850	2.394
3	5.847	2.383
4	5.875	2.401
5	5.837	2.394
6	**XXXXX**	2.395
Average	5.850	2.395

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Lean CLAY (CL)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-20

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND					OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD	X			6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M6			
Mass of Container & Wet Specimen, M1 (g)	476.83			
Mass of Container & Dry Specimen, M2 (g)	415.88			
Mass of Container, M3 (g)	90.32			
WATER CONTENT, wn (%)	**18.72**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	750.24
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	750.24
Specimen Diameter, D (in) or ( )	2.384
Specimen Length, L (in) or ( )	5.546
Specimen Area, A (in^2) or ( )	4.462
Specimen Volume, V (cm^3) or ( )	405.48
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	115.5
DRY UNIT WEIGHT, DUW (pcf) or ( )	97.3
VOID RATIO	0.732
DEGREE OF SATURATION, S (%)	69.01

MEASURED DIMENSIONS

	Length	Diameter
1	5.541	2.376
2	5.538	2.375
3	5.570	2.381
4	5.554	2.401
5	5.525	2.389
6	**XXXXX**	2.379
Average	5.546	2.384

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Elastic SILT (MH)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-21

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M91			
Mass of Container & Wet Specimen, M1 (g)	474.98			
Mass of Container & Dry Specimen, M2 (g)	457.33			
Mass of Container, M3 (g)	89.78			
WATER CONTENT, wn (%)	**4.80**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	986.28
Mass of Container, M5 (g)	250.18
Mass of Wet Specimen, M6 (g)	736.10
Specimen Diameter, D (in) or ( )	2.395
Specimen Length, L (in) or ( )	5.659
Specimen Area, A (in^2) or ( )	4.506
Specimen Volume, V (cm^3) or ( )	417.89
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	110.0
DRY UNIT WEIGHT, DUW (pcf) or ( )	104.9
VOID RATIO	0.606
DEGREE OF SATURATION, S (%)	21.38

MEASURED DIMENSIONS

	Length	Diameter
1	5.645	2.380
2	5.651	2.389
3	5.682	2.407
4	5.673	2.391
5	5.644	2.400
6	**XXXXX**	2.405
Average	5.659	2.395

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Silty SAND (SM)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-21
Project Name: Pure Water Sample No.: 5
Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM		GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED	X	1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY	X					OTHER:		OTHER:	
6). HARD	X			6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M8			
Mass of Container & Wet Specimen, M1 (g)	441.38			
Mass of Container & Dry Specimen, M2 (g)	380.21			
Mass of Container, M3 (g)	89.37			
WATER CONTENT, wn (%)	**21.03**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1001.01
Mass of Container, M5 (g)	263.02
Mass of Wet Specimen, M6 (g)	737.99
Specimen Diameter, D (in) or ( )	2.394
Specimen Length, L (in) or ( )	5.748
Specimen Area, A (in^2) or ( )	4.501
Specimen Volume, V (cm^3) or ( )	423.92
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	108.7
DRY UNIT WEIGHT, DUW (pcf) or ( )	89.8
VOID RATIO	0.877
DEGREE OF SATURATION, S (%)	64.74

MEASURED DIMENSIONS

	Length	Diameter
1	5.753	2.400
2	5.768	2.395
3	5.725	2.397
4	5.762	2.388
5	5.731	2.394
6	**XXXXX**	2.389
Average	5.748	2.394

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Grayish brown SILT with Sand (ML)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732　　Task Number: 2.01.05.20.00　　Boring No.: FM-22

Project Name: Pure Water　　Sample No.: 2

Project Engineer: SF　　Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20))		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40))		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40))		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M1			
Mass of Container & Wet Specimen, M1 (g)	416.79			
Mass of Container & Dry Specimen, M2 (g)	386.00			
Mass of Container, M3 (g)	91.67			
WATER CONTENT, wn (%)	**10.46**			

Circle Approximate Max. Grain Size in "Sample"　3"　1-1/2"　3/4"　3/8"　#4　#10　<#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	967.29
Mass of Container, M5 (g)	205.15
Mass of Wet Specimen, M6 (g)	762.14
Specimen Diameter, D (in) or ( )	2.395
Specimen Length, L (in) or ( )	5.839
Specimen Area, A (in^2) or ( )	4.503
Specimen Volume, V (cm^3) or ( )	430.87
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	110.4
DRY UNIT WEIGHT, DUW (pcf) or ( )	100.0
VOID RATIO	0.686
DEGREE OF SATURATION, S (%)	41.17

MEASURED DIMENSIONS

	Length	Diameter
1	5.828	2.382
2	5.808	2.383
3	5.873	2.412
4	5.840	2.387
5	5.845	2.394
6	**XXXXX**	2.409
Average	5.839	2.395

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Strong brown Silty SAND (SM)

TESTED BY: GD　DATE: 7/24/17　　CALCULATED BY: ADC　　CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-22

Project Name: Pure Water Sample No.: 4

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	X
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M9			
Mass of Container & Wet Specimen, M1 (g)	510.29			
Mass of Container & Dry Specimen, M2 (g)	469.63			
Mass of Container, M3 (g)	89.70			
WATER CONTENT, wn (%)	**10.70**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	808.81
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	808.81
Specimen Diameter, D (in) or ( )	2.405
Specimen Length, L (in) or ( )	5.813
Specimen Area, A (in^2) or ( )	4.543
Specimen Volume, V (cm^3) or ( )	432.76
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	116.7
DRY UNIT WEIGHT, DUW (pcf) or ( )	105.4
VOID RATIO	0.599
DEGREE OF SATURATION, S (%)	48.22

MEASURED DIMENSIONS

	Length	Diameter
1	5.793	2.403
2	5.857	2.405
3	5.785	2.407
4	5.831	2.403
5	5.801	2.404
6	**XXXXX**	2.408
Average	5.813	2.405

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Strong brown Silty SAND (SM)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-23

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT	X	1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY		X					4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M7			
Mass of Container & Wet Specimen, M1 (g)	434.86			
Mass of Container & Dry Specimen, M2 (g)	397.70			
Mass of Container, M3 (g)	91.00			
WATER CONTENT, wn (%)	**12.12**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1027.87
Mass of Container, M5 (g)	272.50
Mass of Wet Specimen, M6 (g)	755.37
Specimen Diameter, D (in) or ( )	2.366
Specimen Length, L (in) or ( )	5.691
Specimen Area, A (in^2) or ( )	4.396
Specimen Volume, V (cm^3) or ( )	409.95
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	115.0
DRY UNIT WEIGHT, DUW (pcf) or ( )	102.6
VOID RATIO	0.643
DEGREE OF SATURATION, S (%)	50.88

MEASURED DIMENSIONS

	Length	Diameter
1	5.694	2.351
2	5.686	2.358
3	5.693	2.383
4	5.711	2.376
5	5.670	2.354
6	**XXXXX**	2.373
Average	5.691	2.366

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Strong brown Clayey SAND (SC)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-23

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M60			
Mass of Container & Wet Specimen, M1 (g)	500.34			
Mass of Container & Dry Specimen, M2 (g)	459.59			
Mass of Container, M3 (g)	91.37			
WATER CONTENT, wn (%)	**11.07**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	872.25
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	872.25
Specimen Diameter, D (in) or ( )	2.371
Specimen Length, L (in) or ( )	5.952
Specimen Area, A (in^2) or ( )	4.415
Specimen Volume, V (cm^3) or ( )	430.63
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	126.4
DRY UNIT WEIGHT, DUW (pcf) or ( )	113.8
VOID RATIO	0.481
DEGREE OF SATURATION, S (%)	62.18

MEASURED DIMENSIONS

	Length	Diameter
1	5.956	2.364
2	5.938	2.359
3	5.951	2.379
4	5.957	2.376
5	5.957	2.373
6	**XXXXX**	2.375
Average	5.952	2.371

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Strong brown Silty SAND (SM)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-24

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M3			
Mass of Container & Wet Specimen, M1 (g)	459.80			
Mass of Container & Dry Specimen, M2 (g)	430.81			
Mass of Container, M3 (g)	89.90			
WATER CONTENT, wn (%)	**8.50**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

Moisture content only. Bag sample.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	
VOID RATIO	
DEGREE OF SATURATION, S (%)	

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Strong brown Poorly Graded SAND with Silt (SP-SM)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-24

Project Name: Pure Water Sample No.: 4

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M73			
Mass of Container & Wet Specimen, M1 (g)	399.80			
Mass of Container & Dry Specimen, M2 (g)	375.18			
Mass of Container, M3 (g)	108.66			
WATER CONTENT, wn (%)	**9.24**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

Moisture content only. Bag sample.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	
VOID RATIO	
DEGREE OF SATURATION, S (%)	

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Strong brown Silty SAND (SM)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-25

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S216			
Mass of Container & Wet Specimen, M1 (g)	546.03			
Mass of Container & Dry Specimen, M2 (g)	505.32			
Mass of Container, M3 (g)	148.62			
WATER CONTENT, wn (%)	**11.41**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	793.00
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	793.00
Specimen Diameter, D (in) or ( )	2.401
Specimen Length, L (in) or ( )	5.604
Specimen Area, A (in^2) or ( )	4.527
Specimen Volume, V (cm^3) or ( )	415.72
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	119.1
DRY UNIT WEIGHT, DUW (pcf) or ( )	106.9
VOID RATIO	0.577
DEGREE OF SATURATION, S (%)	53.41

MEASURED DIMENSIONS

	Length	Diameter
1	5.597	2.398
2	5.574	2.394
3	5.613	2.412
4	5.643	2.404
5	5.592	2.394
6	**XXXXX**	2.403
Average	5.604	2.401

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Silty SAND (SM)

TESTED BY: GD DATE: 8/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-25
Project Name: Pure Water Sample No.: 5
Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	X
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	B72			
Mass of Container & Wet Specimen, M1 (g)	549.19			
Mass of Container & Dry Specimen, M2 (g)	517.60			
Mass of Container, M3 (g)	200.28			
WATER CONTENT, wn (%)	**9.96**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

No liner. Bag sample. Moisture content only.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	
VOID RATIO	
DEGREE OF SATURATION, S (%)	

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark yellowish brown Silty SAND (SM)

TESTED BY: GD DATE: 8/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-29
Project Name: Pure Water Sample No.: 3
Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	X
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	C4			
Mass of Container & Wet Specimen, M1 (g)	429.26			
Mass of Container & Dry Specimen, M2 (g)	402.84			
Mass of Container, M3 (g)	71.88			
WATER CONTENT, wn (%)	**7.98**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	746.67
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	746.67
Specimen Diameter, D (in) or ( )	2.413
Specimen Length, L (in) or ( )	5.949
Specimen Area, A (in^2) or ( )	4.574
Specimen Volume, V (cm^3) or ( )	445.90
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	104.5
DRY UNIT WEIGHT, DUW (pcf) or ( )	96.8
VOID RATIO	0.741
DEGREE OF SATURATION, S (%)	29.08

MEASURED DIMENSIONS

	Length	Diameter
1	5.933	2.399
2	5.949	2.416
3	5.959	2.426
4	5.962	2.412
5	5.944	2.411
6	**XXXXX**	2.415
Average	5.949	2.413

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Strong brown Silty SAND (SM)

TESTED BY: GD DATE: 8/18/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-29

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M7			
Mass of Container & Wet Specimen, M1 (g)	425.14			
Mass of Container & Dry Specimen, M2 (g)	376.02			
Mass of Container, M3 (g)	91.00			
WATER CONTENT, wn (%)	**17.23**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

No unit weight conducted as only bag sample. Moisture content only.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	
VOID RATIO	
DEGREE OF SATURATION, S (%)	

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown SILT with Sand (ML)

TESTED BY: GD DATE: 8/18/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-30

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM		GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED	X	1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE	X	2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M60			
Mass of Container & Wet Specimen, M1 (g)	442.68			
Mass of Container & Dry Specimen, M2 (g)	412.43			
Mass of Container, M3 (g)	91.37			
WATER CONTENT, wn (%)	**9.42**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	548.23
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	548.23
Specimen Diameter, D (in) or ( )	2.385
Specimen Length, L (in) or ( )	4.468
Specimen Area, A (in^2) or ( )	4.467
Specimen Volume, V (cm^3) or ( )	327.08
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	104.6
DRY UNIT WEIGHT, DUW (pcf) or ( )	95.6
VOID RATIO	0.763
DEGREE OF SATURATION, S (%)	33.36

MEASURED DIMENSIONS

	Length	Diameter
1	4.479	2.391
2	4.435	2.378
3	4.499	2.372
4	4.440	2.395
5	4.486	2.389
6	**XXXXX**	2.385
Average	4.468	2.385

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Silty SAND with Gravel (SM)

TESTED BY: GD DATE: 8/18/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-30

Project Name: Pure Water Sample No.: 4

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT	X	1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD	X			6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M3			
Mass of Container & Wet Specimen, M1 (g)	530.89			
Mass of Container & Dry Specimen, M2 (g)	474.80			
Mass of Container, M3 (g)	89.90			
WATER CONTENT, wn (%)	**14.57**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

horizontally stratified broken sandstone

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	663.75
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	663.75
Specimen Diameter, D (in) or ( )	2.386
Specimen Length, L (in) or ( )	5.339
Specimen Area, A (in^2) or ( )	4.471
Specimen Volume, V (cm^3) or ( )	391.18
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	105.9
DRY UNIT WEIGHT, DUW (pcf) or ( )	92.5
VOID RATIO	0.823
DEGREE OF SATURATION, S (%)	47.80

MEASURED DIMENSIONS

	Length	Diameter
1	5.340	2.378
2	5.351	2.395
3	5.303	2.372
4	5.371	2.390
5	5.329	2.390
6	**XXXXX**	2.391
Average	5.339	2.386

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Silty SAND (SM)

TESTED BY: GD DATE: 8/18/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-34

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	B9			
Mass of Container & Wet Specimen, M1 (g)	1004.77			
Mass of Container & Dry Specimen, M2 (g)	929.10			
Mass of Container, M3 (g)	199.74			
WATER CONTENT, wn (%)	**10.37**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	802.01
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	802.01
Specimen Diameter, D (in) or ( )	2.375
Specimen Length, L (in) or ( )	5.842
Specimen Area, A (in^2) or ( )	4.430
Specimen Volume, V (cm^3) or ( )	424.04
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	118.1
DRY UNIT WEIGHT, DUW (pcf) or ( )	107.0
VOID RATIO	0.576
DEGREE OF SATURATION, S (%)	48.66

MEASURED DIMENSIONS

	Length	Diameter
1	5.834	2.380
2	5.847	2.378
3	5.861	2.377
4	5.821	2.368
5	5.846	2.372
6	**XXXXX**	2.374
Average	5.842	2.375

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive brown Silty SAND (SM)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: FM-35

Project Name: Pure Water | Sample No.: 3

Project Engineer: SF | Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M66			
Mass of Container & Wet Specimen, M1 (g)	555.74			
Mass of Container & Dry Specimen, M2 (g)	469.07			
Mass of Container, M3 (g)	101.66			
WATER CONTENT, wn (%)	**23.59**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	842.00
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	842.00
Specimen Diameter, D (in) or ( )	2.395
Specimen Length, L (in) or ( )	5.891
Specimen Area, A (in^2) or ( )	4.503
Specimen Volume, V (cm^3) or ( )	434.75
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	120.9
DRY UNIT WEIGHT, DUW (pcf) or ( )	97.8
VOID RATIO	0.723
DEGREE OF SATURATION, S (%)	88.10

MEASURED DIMENSIONS

	Length	Diameter
1	5.897	2.403
2	5.895	2.394
3	5.888	2.392
4	5.906	2.396
5	5.871	2.388
6	**XXXXX**	2.394
Average	5.891	2.395

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Grayish brown Elastic SILT (MH)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-35

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)	X	4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M67			
Mass of Container & Wet Specimen, M1 (g)	448.90			
Mass of Container & Dry Specimen, M2 (g)	386.09			
Mass of Container, M3 (g)	110.42			
WATER CONTENT, wn (%)	**22.78**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

Moisture content only. Bag sample.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	
VOID RATIO	
DEGREE OF SATURATION, S (%)	

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Lean CLAY with Sand (CL)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-38
Project Name: Pure Water Sample No.: 3
Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S221			
Mass of Container & Wet Specimen, M1 (g)	595.10			
Mass of Container & Dry Specimen, M2 (g)	537.33			
Mass of Container, M3 (g)	140.33			
WATER CONTENT, wn (%)	**14.55**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	813.35
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	813.35
Specimen Diameter, D (in) or ( )	2.389
Specimen Length, L (in) or ( )	5.764
Specimen Area, A (in^2) or ( )	4.481
Specimen Volume, V (cm^3) or ( )	423.25
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	120.0
DRY UNIT WEIGHT, DUW (pcf) or ( )	104.7
VOID RATIO	0.609
DEGREE OF SATURATION, S (%)	64.46

MEASURED DIMENSIONS

	Length	Diameter
1	5.774	2.407
2	5.767	2.405
3	5.736	2.383
4	5.771	2.370
5	5.770	2.383
6	**XXXXX**	2.384
Average	5.764	2.389

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Silty SAND (SM)

TESTED BY: GD DATE: 7/21/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-38

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE	X	3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S218			
Mass of Container & Wet Specimen, M1 (g)	487.76			
Mass of Container & Dry Specimen, M2 (g)	424.72			
Mass of Container, M3 (g)	140.43			
WATER CONTENT, wn (%)	**22.17**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	
VOID RATIO	
DEGREE OF SATURATION, S (%)	

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown Sandy SILT (ML)

TESTED BY: GD DATE: 7/21/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-40

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S212			
Mass of Container & Wet Specimen, M1 (g)	549.81			
Mass of Container & Dry Specimen, M2 (g)	499.64			
Mass of Container, M3 (g)	137.50			
WATER CONTENT, wn (%)	**13.85**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	811.39
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	811.39
Specimen Diameter, D (in) or ( )	2.384
Specimen Length, L (in) or ( )	5.988
Specimen Area, A (in^2) or ( )	4.464
Specimen Volume, V (cm^3) or ( )	438.04
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	115.6
DRY UNIT WEIGHT, DUW (pcf) or ( )	101.6
VOID RATIO	0.660
DEGREE OF SATURATION, S (%)	56.71

MEASURED DIMENSIONS

	Length	Diameter
1	5.986	2.383
2	5.991	2.388
3	5.984	2.381
4	5.989	2.390
5	5.992	2.375
6	**XXXXX**	2.387
Average	5.988	2.384

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown Sandy SILT (ML)

TESTED BY: GD DATE: 7/21/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION
ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-40
Project Name: Pure Water Sample No.: 4
Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE	X	3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S224			
Mass of Container & Wet Specimen, M1 (g)	279.08			
Mass of Container & Dry Specimen, M2 (g)	262.94			
Mass of Container, M3 (g)	140.74			
WATER CONTENT, wn (%)	**13.21**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

Moisture content only. Bag sample.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	#VALUE!
VOID RATIO	#VALUE!
DEGREE OF SATURATION, S (%)	#VALUE!

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown Sandy SILT (ML)

TESTED BY: GD DATE: 7/21/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732   Task Number: 2.01.05.20.00   Boring No.: FM-41

Project Name: Pure Water   Sample No.: 3

Project Engineer: SF   Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM		GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND					OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S303			
Mass of Container & Wet Specimen, M1 (g)	441.53			
Mass of Container & Dry Specimen, M2 (g)	401.58			
Mass of Container, M3 (g)	143.28			
WATER CONTENT, wn (%)	**15.47**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

Horizontal layers of yellowish brown silt and grayish brown clay.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1103.58
Mass of Container, M5 (g)	386.60
Mass of Wet Specimen, M6 (g)	716.98
Specimen Diameter, D (in) or ( )	2.388
Specimen Length, L (in) or ( )	5.530
Specimen Area, A (in^2) or ( )	4.478
Specimen Volume, V (cm^3) or ( )	405.78
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	110.3
DRY UNIT WEIGHT, DUW (pcf) or ( )	95.5
VOID RATIO	0.764
DEGREE OF SATURATION, S (%)	54.63

MEASURED DIMENSIONS

	Length	Diameter
1	5.521	2.370
2	5.530	2.387
3	5.542	2.375
4	5.531	2.394
5	5.528	2.402
6	**XXXXX**	2.398
Average	5.530	2.388

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown to grayish brown SILT and CLAY layers (CL/ML)

TESTED BY: GD DATE: 7/21/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-41
Project Name: Pure Water Sample No.: 5
Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE	X	3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S213			
Mass of Container & Wet Specimen, M1 (g)	362.37			
Mass of Container & Dry Specimen, M2 (g)	349.21			
Mass of Container, M3 (g)	137.51			
WATER CONTENT, wn (%)	**6.22**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

Moisture content only. Bag sample.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	
VOID RATIO	
DEGREE OF SATURATION, S (%)	

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Silty SAND (SM)

TESTED BY: GD DATE: 7/21/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-43

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM		GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY		X					4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10)		2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)	X	4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S301			
Mass of Container & Wet Specimen, M1 (g)	510.25			
Mass of Container & Dry Specimen, M2 (g)	471.72			
Mass of Container, M3 (g)	143.60			
WATER CONTENT, wn (%)	**11.74**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1069.23
Mass of Container, M5 (g)	272.55
Mass of Wet Specimen, M6 (g)	796.68
Specimen Diameter, D (in) or ( )	2.369
Specimen Length, L (in) or ( )	5.664
Specimen Area, A (in^2) or ( )	4.408
Specimen Volume, V (cm^3) or ( )	409.19
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	121.5
DRY UNIT WEIGHT, DUW (pcf) or ( )	108.8
VOID RATIO	0.550
DEGREE OF SATURATION, S (%)	57.69

MEASURED DIMENSIONS

	Length	Diameter
1	5.672	2.367
2	5.666	2.371
3	5.659	2.359
4	5.653	2.377
5	5.671	2.374
6	**XXXXX**	2.367
Average	5.664	2.369

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Grayish brown to yellowish brown Clayey, Silty SAND (SC-SM)

TESTED BY: GD DATE: 7/21/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-43

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT	X	1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S202			
Mass of Container & Wet Specimen, M1 (g)	522.96			
Mass of Container & Dry Specimen, M2 (g)	477.23			
Mass of Container, M3 (g)	138.66			
WATER CONTENT, wn (%)	**13.51**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

Pockets of clay material.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1139.58
Mass of Container, M5 (g)	385.08
Mass of Wet Specimen, M6 (g)	754.50
Specimen Diameter, D (in) or ( )	2.384
Specimen Length, L (in) or ( )	5.557
Specimen Area, A (in^2) or ( )	4.465
Specimen Volume, V (cm^3) or ( )	406.61
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	115.8
DRY UNIT WEIGHT, DUW (pcf) or ( )	102.1
VOID RATIO	0.652
DEGREE OF SATURATION, S (%)	55.97

MEASURED DIMENSIONS

	Length	Diameter
1	5.553	2.387
2	5.564	2.379
3	5.544	2.386
4	5.559	2.390
5	5.566	2.382
6	**XXXXX**	2.382
Average	5.557	2.384

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light yellowish brown Sandy SILT (ML)

TESTED BY: GD DATE: 7/21/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-44
Project Name: Pure Water Sample No.: 4
Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S216			
Mass of Container & Wet Specimen, M1 (g)	371.96			
Mass of Container & Dry Specimen, M2 (g)	333.47			
Mass of Container, M3 (g)	148.62			
WATER CONTENT, wn (%)	**20.82**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	743.74
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	743.74
Specimen Diameter, D (in) or ( )	2.386
Specimen Length, L (in) or ( )	5.766
Specimen Area, A (in^2) or ( )	4.472
Specimen Volume, V (cm^3) or ( )	422.52
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	109.9
DRY UNIT WEIGHT, DUW (pcf) or ( )	90.9
VOID RATIO	0.853
DEGREE OF SATURATION, S (%)	65.89

MEASURED DIMENSIONS

	Length	Diameter
1	5.780	2.385
2	5.749	2.395
3	5.766	2.389
4	5.761	2.385
5	5.773	2.375
6	**XXXXX**	2.388
Average	5.766	2.386

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown Clayey SILT (ML)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-46
Project Name: Pure Water Sample No.: 2
Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM		GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT	X	1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED	X	2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S205			
Mass of Container & Wet Specimen, M1 (g)	464.98			
Mass of Container & Dry Specimen, M2 (g)	416.56			
Mass of Container, M3 (g)	139.35			
WATER CONTENT, wn (%)	**17.47**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	833.71
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	833.71
Specimen Diameter, D (in) or ( )	2.376
Specimen Length, L (in) or ( )	5.898
Specimen Area, A (in^2) or ( )	4.432
Specimen Volume, V (cm^3) or ( )	428.33
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	121.5
DRY UNIT WEIGHT, DUW (pcf) or ( )	103.4
VOID RATIO	0.629
DEGREE OF SATURATION, S (%)	74.92

MEASURED DIMENSIONS

	Length	Diameter
1	5.906	2.385
2	5.908	2.386
3	5.887	2.385
4	5.905	2.375
5	5.882	2.368
6	**XXXXX**	2.354
Average	5.898	2.376

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark olive brown to light olive brown Sandy SILT (ML)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-46

Project Name: Pure Water Sample No.: 4

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT	X	2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	B40			
Mass of Container & Wet Specimen, M1 (g)	672.92			
Mass of Container & Dry Specimen, M2 (g)	584.30			
Mass of Container, M3 (g)	198.40			
WATER CONTENT, wn (%)	**22.96**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1075.15
Mass of Container, M5 (g)	273.16
Mass of Wet Specimen, M6 (g)	801.99
Specimen Diameter, D (in) or ( )	2.390
Specimen Length, L (in) or ( )	5.555
Specimen Area, A (in^2) or ( )	4.487
Specimen Volume, V (cm^3) or ( )	408.43
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	122.6
DRY UNIT WEIGHT, DUW (pcf) or ( )	99.7
VOID RATIO	0.691
DEGREE OF SATURATION, S (%)	89.76

MEASURED DIMENSIONS

	Length	Diameter
1	5.543	2.378
2	5.547	2.395
3	5.558	2.381
4	5.560	2.399
5	5.566	2.383
6	**XXXXX**	2.405
Average	5.555	2.390

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark yellowish brown Sandy, Lean CLAY (CL)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-47

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD	X			6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S203			
Mass of Container & Wet Specimen, M1 (g)	466.89			
Mass of Container & Dry Specimen, M2 (g)	416.57			
Mass of Container, M3 (g)	147.94			
WATER CONTENT, wn (%)	**18.73**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1024.18
Mass of Container, M5 (g)	272.90
Mass of Wet Specimen, M6 (g)	751.28
Specimen Diameter, D (in) or ( )	2.385
Specimen Length, L (in) or ( )	5.606
Specimen Area, A (in^2) or ( )	4.468
Specimen Volume, V (cm^3) or ( )	410.43
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	114.3
DRY UNIT WEIGHT, DUW (pcf) or ( )	96.2
VOID RATIO	0.751
DEGREE OF SATURATION, S (%)	67.32

MEASURED DIMENSIONS

	Length	Diameter
1	5.599	2.391
2	5.630	2.377
3	5.593	2.386
4	5.607	2.386
5	5.602	2.379
6	**XXXXX**	2.391
Average	5.606	2.385

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown SILT (ML)

TESTED BY: GD DATE: 7/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-48
Project Name: Pure Water Sample No.: 2
Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT	X	2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S306			
Mass of Container & Wet Specimen, M1 (g)	516.02			
Mass of Container & Dry Specimen, M2 (g)	486.33			
Mass of Container, M3 (g)	145.10			
WATER CONTENT, wn (%)	**8.70**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	736.76
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	736.76
Specimen Diameter, D (in) or ( )	2.376
Specimen Length, L (in) or ( )	5.988
Specimen Area, A (in^2) or ( )	4.433
Specimen Volume, V (cm^3) or ( )	435.02
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	105.7
DRY UNIT WEIGHT, DUW (pcf) or ( )	97.3
VOID RATIO	0.733
DEGREE OF SATURATION, S (%)	32.05

MEASURED DIMENSIONS

	Length	Diameter
1	5.989	2.374
2	5.989	2.378
3	5.991	2.365
4	5.988	2.375
5	5.983	2.388
6	**XXXXX**	2.375
Average	5.988	2.376

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown Poorly Graded SAND (SP)

TESTED BY: GD DATE: 7/25/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-48

Project Name: Pure Water Sample No.: 4

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S215			
Mass of Container & Wet Specimen, M1 (g)	512.65			
Mass of Container & Dry Specimen, M2 (g)	457.10			
Mass of Container, M3 (g)	137.49			
WATER CONTENT, wn (%)	**17.38**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

Moisture content only. Bag sample.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	
VOID RATIO	
DEGREE OF SATURATION, S (%)	

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown Sandy SILT (ML)

TESTED BY: GD DATE: 7/25/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-49

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM		GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED	X	1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X			strong brown mottled		3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY					with grayish brown		4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S219			
Mass of Container & Wet Specimen, M1 (g)	479.55			
Mass of Container & Dry Specimen, M2 (g)	437.94			
Mass of Container, M3 (g)	140.70			
WATER CONTENT, wn (%)	**14.00**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	739.94
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	739.94
Specimen Diameter, D (in) or ( )	2.378
Specimen Length, L (in) or ( )	5.709
Specimen Area, A (in^2) or ( )	4.440
Specimen Volume, V (cm^3) or ( )	415.42
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	111.2
DRY UNIT WEIGHT, DUW (pcf) or ( )	97.5
VOID RATIO	0.728
DEGREE OF SATURATION, S (%)	51.92

MEASURED DIMENSIONS

	Length	Diameter
1	5.713	2.386
2	5.715	2.377
3	5.707	2.370
4	5.711	2.365
5	5.701	2.383
6	**XXXXX**	2.385
Average	5.709	2.378

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Strong brown Silty SAND (SM)

TESTED BY: GD DATE: 7/25/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-50

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M66			
Mass of Container & Wet Specimen, M1 (g)	654.27			
Mass of Container & Dry Specimen, M2 (g)	548.87			
Mass of Container, M3 (g)	101.64			
WATER CONTENT, wn (%)	**23.57**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	905.33
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	905.33
Specimen Diameter, D (in) or ( )	2.391
Specimen Length, L (in) or ( )	5.976
Specimen Area, A (in^2) or ( )	4.488
Specimen Volume, V (cm^3) or ( )	439.54
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	128.6
DRY UNIT WEIGHT, DUW (pcf) or ( )	104.1
VOID RATIO	0.620
DEGREE OF SATURATION, S (%)	102.67

MEASURED DIMENSIONS

	Length	Diameter
1	5.978	2.389
2	5.964	2.383
3	5.984	2.397
4	5.975	2.390
5	5.980	2.390
6	**XXXXX**	2.394
Average	5.976	2.391

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive brown Lean CLAY with Sand and Gravel (SL)

TESTED BY: GD DATE: 8/18/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-50

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE	X	2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S101			
Mass of Container & Wet Specimen, M1 (g)	455.75			
Mass of Container & Dry Specimen, M2 (g)	396.54			
Mass of Container, M3 (g)	95.31			
WATER CONTENT, wn (%)	**19.66**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

horzontally fractured layered siltstone

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	653.96
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	653.96
Specimen Diameter, D (in) or ( )	2.402
Specimen Length, L (in) or ( )	5.103
Specimen Area, A (in^2) or ( )	4.531
Specimen Volume, V (cm^3) or ( )	378.88
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	107.8
DRY UNIT WEIGHT, DUW (pcf) or ( )	90.1
VOID RATIO	0.872
DEGREE OF SATURATION, S (%)	60.88

MEASURED DIMENSIONS

	Length	Diameter
1	5.112	2.395
2	5.085	2.410
3	5.118	2.418
4	5.094	2.389
5	5.106	2.397
6	**XXXXX**	2.402
Average	5.103	2.402

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light brownih gray SILT (ML)

TESTED BY: GD DATE: 8/18/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-52

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S217			
Mass of Container & Wet Specimen, M1 (g)	549.78			
Mass of Container & Dry Specimen, M2 (g)	485.04			
Mass of Container, M3 (g)	137.96			
WATER CONTENT, wn (%)	**18.65**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

Moisture content only. Bag sample.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	
VOID RATIO	
DEGREE OF SATURATION, S (%)	

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Sandy SILT (ML)

TESTED BY: GD DATE: 7/25/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-52

Project Name: Pure Water Sample No.: 4

Project Engineer: SF Depth (ft): 15.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	B64			
Mass of Container & Wet Specimen, M1 (g)	685.21			
Mass of Container & Dry Specimen, M2 (g)	606.69			
Mass of Container, M3 (g)	200.61			
WATER CONTENT, wn (%)	**19.34**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

Moisture content only. Bag sample.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	
VOID RATIO	
DEGREE OF SATURATION, S (%)	

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown Sandy SILT (ML)

TESTED BY: GD DATE: 7/25/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION
ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 0 Boring No.: PS-3
Project Name: Pure Water Sample No.: 1
Project Engineer: SF Depth (ft): 5.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	X
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S38			
Mass of Container & Wet Specimen, M1 (g)	483.98			
Mass of Container & Dry Specimen, M2 (g)	438.92			
Mass of Container, M3 (g)	123.86			
WATER CONTENT, wn (%)	**14.30**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	771.32
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	771.32
Specimen Diameter, D (in) or ( )	2.409
Specimen Length, L (in) or ( )	5.984
Specimen Area, A (in^2) or ( )	4.557
Specimen Volume, V (cm^3) or ( )	446.86
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	107.8
DRY UNIT WEIGHT, DUW (pcf) or ( )	94.3
VOID RATIO	0.788
DEGREE OF SATURATION, S (%)	49.01

MEASURED DIMENSIONS

	Length	Diameter
1	5.991	2.411
2	5.984	2.412
3	5.996	2.414
4	5.990	2.401
5	5.957	2.405
6	**XXXXX**	2.410
Average	5.984	2.409

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive brown Silty SAND (SM)

TESTED BY: ADC DATE: 6/9/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 0 Boring No.: PS-3
Project Name: Pure Water Sample No.: 3
Project Engineer: SF Depth (ft): 15.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	X
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S8			
Mass of Container & Wet Specimen, M1 (g)	561.41			
Mass of Container & Dry Specimen, M2 (g)	473.42			
Mass of Container, M3 (g)	115.21			
WATER CONTENT, wn (%)	**24.56**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	840.42
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	840.42
Specimen Diameter, D (in) or ( )	2.421
Specimen Length, L (in) or ( )	5.876
Specimen Area, A (in^2) or ( )	4.602
Specimen Volume, V (cm^3) or ( )	443.08
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	118.4
DRY UNIT WEIGHT, DUW (pcf) or ( )	95.1
VOID RATIO	0.773
DEGREE OF SATURATION, S (%)	85.78

MEASURED DIMENSIONS

	Length	Diameter
1	5.863	2.405
2	5.901	2.432
3	5.851	2.427
4	5.890	2.400
5	5.875	2.433
6	**XXXXX**	2.426
Average	5.876	2.421

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown Poorly Graded SAND (SP)

TESTED BY: ADC DATE: 6/9/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 0 Boring No.: PS-3
Project Name: Pure Water Sample No.: 7
Project Engineer: SF Depth (ft): 40.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	X
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S9			
Mass of Container & Wet Specimen, M1 (g)	530.45			
Mass of Container & Dry Specimen, M2 (g)	419.69			
Mass of Container, M3 (g)	87.90			
WATER CONTENT, wn (%)	**33.38**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	857.65
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	857.65
Specimen Diameter, D (in) or ( )	2.422
Specimen Length, L (in) or ( )	5.948
Specimen Area, A (in^2) or ( )	4.608
Specimen Volume, V (cm^3) or ( )	449.16
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	119.2
DRY UNIT WEIGHT, DUW (pcf) or ( )	89.4
VOID RATIO	0.886
DEGREE OF SATURATION, S (%)	101.72

MEASURED DIMENSIONS

	Length	Diameter
1	5.858	2.421
2	5.956	2.421
3	5.946	2.427
4	5.994	2.422
5	5.984	2.423
6	**XXXXX**	2.420
Average	5.948	2.422

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Greenish black Sandy SILT (ML)

TESTED BY: ADC DATE: 6/9/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: WM-01

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY	X	1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST		2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	X
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S203			
Mass of Container & Wet Specimen, M1 (g)	555.94			
Mass of Container & Dry Specimen, M2 (g)	514.83			
Mass of Container, M3 (g)	147.95			
WATER CONTENT, wn (%)	**11.21**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	713.59
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	713.59
Specimen Diameter, D (in) or ( )	2.379
Specimen Length, L (in) or ( )	6.033
Specimen Area, A (in^2) or ( )	4.445
Specimen Volume, V (cm^3) or ( )	439.45
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	101.4
DRY UNIT WEIGHT, DUW (pcf) or ( )	91.2
VOID RATIO	0.849
DEGREE OF SATURATION, S (%)	35.63

MEASURED DIMENSIONS

	Length	Diameter
1	6.032	2.378
2	6.031	2.370
3	6.032	2.383
4	6.034	2.380
5	6.036	2.384
6	**XXXXX**	2.379
Average	6.033	2.379

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Very dark brown Silty SAND (SM)

TESTED BY: ADC DATE: 6/19/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: WM-02

Project Name: Pure Water Sample No.: 1

Project Engineer: SF Depth (ft): 7.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	X
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S220			
Mass of Container & Wet Specimen, M1 (g)	768.78			
Mass of Container & Dry Specimen, M2 (g)	671.95			
Mass of Container, M3 (g)	140.53			
WATER CONTENT, wn (%)	**18.22**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	846.11
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	846.11
Specimen Diameter, D (in) or ( )	2.382
Specimen Length, L (in) or ( )	5.917
Specimen Area, A (in^2) or ( )	4.457
Specimen Volume, V (cm^3) or ( )	432.14
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	122.2
DRY UNIT WEIGHT, DUW (pcf) or ( )	103.4
VOID RATIO	0.630
DEGREE OF SATURATION, S (%)	78.06

MEASURED DIMENSIONS

	Length	Diameter
1	5.986	2.381
2	5.858	2.381
3	5.913	2.387
4	5.948	2.377
5	5.879	2.384
6	**XXXXX**	2.383
Average	5.917	2.382

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Very dark brown Sandy SILT (ML)

TESTED BY: ADC DATE: 6/19/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: WM-02

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 15.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE	X	3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S210			
Mass of Container & Wet Specimen, M1 (g)	682.76			
Mass of Container & Dry Specimen, M2 (g)	584.65			
Mass of Container, M3 (g)	147.23			
WATER CONTENT, wn (%)	**22.43**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

No unit weight due to excessive disturbance.

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	
Mass of Container, M5 (g)	
Mass of Wet Specimen, M6 (g)	
Specimen Diameter, D (in) or ( )	
Specimen Length, L (in) or ( )	
Specimen Area, A (in^2) or ( )	
Specimen Volume, V (cm^3) or ( )	
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	
DRY UNIT WEIGHT, DUW (pcf) or ( )	
VOID RATIO	
DEGREE OF SATURATION, S (%)	

MEASURED DIMENSIONS

	Length	Diameter
1		
2		
3		
4		
5		
6	**XXXXX**	
Average		

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive Poorly Graded SAND with Silt (SP-SM)

TESTED BY: ADC DATE: 6/19/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: WM-03

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	X
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M3			
Mass of Container & Wet Specimen, M1 (g)	886.87			
Mass of Container & Dry Specimen, M2 (g)	724.07			
Mass of Container, M3 (g)	89.90			
WATER CONTENT, wn (%)	**25.67**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	849.61
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	849.61
Specimen Diameter, D (in) or ( )	2.404
Specimen Length, L (in) or ( )	5.981
Specimen Area, A (in^2) or ( )	4.537
Specimen Volume, V (cm^3) or ( )	444.66
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	119.3
DRY UNIT WEIGHT, DUW (pcf) or ( )	94.9
VOID RATIO	0.776
DEGREE OF SATURATION, S (%)	89.34

MEASURED DIMENSIONS

	Length	Diameter
1	5.971	2.402
2	5.978	2.393
3	5.978	2.393
4	5.984	2.407
5	5.992	2.413
6	**XXXXX**	2.413
Average	5.981	2.404

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark olive brown Silty SAND (SM)

TESTED BY: ADC DATE: 6/19/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: WM-06

Project Name: Pure Water Sample No.: 3b

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE		0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT	X	1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY		X					4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S21			
Mass of Container & Wet Specimen, M1 (g)	878.87			
Mass of Container & Dry Specimen, M2 (g)	846.00			
Mass of Container, M3 (g)	104.82			
WATER CONTENT, wn (%)	**4.43**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

Rock approximately > 2.5" diameter x 2" high

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1209.18
Mass of Container, M5 (g)	278.77
Mass of Wet Specimen, M6 (g)	930.41
Specimen Diameter, D (in) or ( )	2.398
Specimen Length, L (in) or ( )	5.906
Specimen Area, A (in^2) or ( )	4.516
Specimen Volume, V (cm^3) or ( )	437.13
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	132.9
DRY UNIT WEIGHT, DUW (pcf) or ( )	127.2
VOID RATIO	0.325
DEGREE OF SATURATION, S (%)	36.87

MEASURED DIMENSIONS

	Length	Diameter
1	5.741	2.392
2	5.992	2.400
3	6.015	2.395
4	5.944	2.404
5	5.840	2.410
6	**XXXXX**	2.387
Average	5.906	2.398

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive gray Clayey SAND (SC)

TESTED BY: ADC DATE: 6/13/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: WM-06

Project Name: Pure Water | Sample No.: 5

Project Engineer: SF | Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD	X			6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	S41			
Mass of Container & Wet Specimen, M1 (g)	680.29			
Mass of Container & Dry Specimen, M2 (g)	600.39			
Mass of Container, M3 (g)	82.88			
WATER CONTENT, wn (%)	**15.44**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	972.46
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	972.46
Specimen Diameter, D (in) or ( )	2.394
Specimen Length, L (in) or ( )	5.963
Specimen Area, A (in^2) or ( )	4.500
Specimen Volume, V (cm^3) or ( )	439.73
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	138.1
DRY UNIT WEIGHT, DUW (pcf) or ( )	119.6
VOID RATIO	0.409
DEGREE OF SATURATION, S (%)	101.82

MEASURED DIMENSIONS

	Length	Diameter
1	5.969	2.395
2	5.945	2.392
3	5.964	2.392
4	5.971	2.397
5	5.966	2.394
6	**XXXXX**	2.392
Average	5.963	2.394

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive brown to dark yellowish brown Sandy, Lean CLAY (CL)

TESTED BY: ADC DATE: 6/13/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 | Task Number: 0 | Boring No.: WM-07

Project Name: Pure Water | Sample No.: 3

Project Engineer: SF | Depth (ft): 15.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM		GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS		1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED	X	2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	C8			
Mass of Container & Wet Specimen, M1 (g)	680.03			
Mass of Container & Dry Specimen, M2 (g)	581.89			
Mass of Container, M3 (g)	71.56			
WATER CONTENT, wn (%)	**19.23**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

some oxidized seams

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	907.93
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	907.93
Specimen Diameter, D (in) or ( )	2.387
Specimen Length, L (in) or ( )	5.959
Specimen Area, A (in^2) or ( )	4.473
Specimen Volume, V (cm^3) or ( )	436.83
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	129.8
DRY UNIT WEIGHT, DUW (pcf) or ( )	108.8
VOID RATIO	0.549
DEGREE OF SATURATION, S (%)	94.60

MEASURED DIMENSIONS

	Length	Diameter
1	5.966	2.377
2	5.948	2.389
3	5.962	2.381
4	5.962	2.386
5	5.959	2.396
6	**XXXXX**	2.390
Average	5.959	2.387

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Gray to dark grayish brown Lean CLAY with Sand (CL)

TESTED BY: ADC DATE: 6/13/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: WM-10

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY		X					4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M62			
Mass of Container & Wet Specimen, M1 (g)	780.17			
Mass of Container & Dry Specimen, M2 (g)	700.90			
Mass of Container, M3 (g)	91.69			
WATER CONTENT, wn (%)	**13.01**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	873.70
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	873.70
Specimen Diameter, D (in) or ( )	2.384
Specimen Length, L (in) or ( )	5.959
Specimen Area, A (in^2) or ( )	4.464
Specimen Volume, V (cm^3) or ( )	435.90
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	125.1
DRY UNIT WEIGHT, DUW (pcf) or ( )	110.7
VOID RATIO	0.522
DEGREE OF SATURATION, S (%)	67.25

MEASURED DIMENSIONS

	Length	Diameter
1	5.950	2.381
2	5.951	2.382
3	5.982	2.386
4	5.924	2.381
5	5.989	2.390
6	**XXXXX**	2.384
Average	5.959	2.384

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark brown to reddish brown Clayey SAND (SC)

TESTED BY: ADC DATE: 6/19/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: WM-11
Project Name: Pure Water Sample No.: 3
Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY		X					4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	M9			
Mass of Container & Wet Specimen, M1 (g)	755.40			
Mass of Container & Dry Specimen, M2 (g)	675.48			
Mass of Container, M3 (g)	89.74			
WATER CONTENT, wn (%)	**13.64**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	923.49
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	923.49
Specimen Diameter, D (in) or ( )	2.386
Specimen Length, L (in) or ( )	5.974
Specimen Area, A (in^2) or ( )	4.471
Specimen Volume, V (cm^3) or ( )	437.64
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	131.7
DRY UNIT WEIGHT, DUW (pcf) or ( )	115.9
VOID RATIO	0.454
DEGREE OF SATURATION, S (%)	81.12

MEASURED DIMENSIONS

	Length	Diameter
1	5.982	2.388
2	5.940	2.382
3	5.980	2.390
4	5.982	2.383
5	5.985	2.383
6	**XXXXX**	2.389
Average	5.974	2.386

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Dark yellowish brown Clayey SAND (SC)

TESTED BY: ADC DATE: 6/19/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: WM-11

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)	X	3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF	X	4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	N5			
Mass of Container & Wet Specimen, M1 (g)	606.00			
Mass of Container & Dry Specimen, M2 (g)	510.49			
Mass of Container, M3 (g)	104.63			
WATER CONTENT, wn (%)	**23.53**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	909.02
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	909.02
Specimen Diameter, D (in) or ( )	2.387
Specimen Length, L (in) or ( )	5.936
Specimen Area, A (in^2) or ( )	4.473
Specimen Volume, V (cm^3) or ( )	435.09
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	130.4
DRY UNIT WEIGHT, DUW (pcf) or ( )	105.6
VOID RATIO	0.596
DEGREE OF SATURATION, S (%)	106.53

MEASURED DIMENSIONS

	Length	Diameter
1	5.986	2.380
2	5.894	2.383
3	5.917	2.382
4	5.973	2.394
5	5.908	2.388
6	**XXXXX**	2.392
Average	5.936	2.387

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive Lean CLAY with Sand (CL)

TESTED BY: ADC DATE: 6/19/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: WM-16

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND		X			OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT							3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY	X						4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF		3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF	X	5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	X2			
Mass of Container & Wet Specimen, M1 (g)	894.84			
Mass of Container & Dry Specimen, M2 (g)	807.50			
Mass of Container, M3 (g)	147.90			
WATER CONTENT, wn (%)	**13.24**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	964.09
Mass of Container, M5 (g)	0.00
Mass of Wet Specimen, M6 (g)	964.09
Specimen Diameter, D (in) or ( )	2.392
Specimen Length, L (in) or ( )	5.998
Specimen Area, A (in^2) or ( )	4.495
Specimen Volume, V (cm^3) or ( )	441.84
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	136.2
DRY UNIT WEIGHT, DUW (pcf) or ( )	120.3
VOID RATIO	0.401
DEGREE OF SATURATION, S (%)	89.09

MEASURED DIMENSIONS

	Length	Diameter
1	5.989	2.380
2	6.004	2.379
3	5.999	2.382
4	6.002	2.404
5	5.998	2.407
6	**XXXXX**	2.402
Average	5.998	2.392

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Yellowish brown Sandy, Lean CLAY (CL)

TESTED BY: ADC DATE: 6/19/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 — Task Number: 2.01.05.20.00 — Boring No.: WM-16
Project Name: Pure Water — Sample No.: 5
Project Engineer: SF — Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM	X	6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE		7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)	X	1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	
2). SOFT		2). LOW (PI = 1 to 10))		2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	X
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	X9			
Mass of Container & Wet Specimen, M1 (g)	1057.04			
Mass of Container & Dry Specimen, M2 (g)	926.20			
Mass of Container, M3 (g)	134.45			
WATER CONTENT, wn (%)	**16.53**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1210.38
Mass of Container, M5 (g)	280.49
Mass of Wet Specimen, M6 (g)	929.89
Specimen Diameter, D (in) or ( )	2.388
Specimen Length, L (in) or ( )	5.854
Specimen Area, A (in^2) or ( )	4.479
Specimen Volume, V (cm^3) or ( )	429.68
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	135.1
DRY UNIT WEIGHT, DUW (pcf) or ( )	115.9
VOID RATIO	0.454
DEGREE OF SATURATION, S (%)	98.33

MEASURED DIMENSIONS

	Length	Diameter
1	5.942	2.381
2	5.746	2.382
3	5.955	2.387
4	5.831	2.388
5	5.798	2.392
6	**XXXXX**	2.398
Average	5.854	2.388

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3 DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Olive Poorly Graded SAND with Silt (SP-SM)

TESTED BY: ADC DATE: 6/19/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: WM-22

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY		1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST	X	2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND					OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT	X						3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY		X					4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	X3			
Mass of Container & Wet Specimen, M1 (g)	997.00			
Mass of Container & Dry Specimen, M2 (g)	858.00			
Mass of Container, M3 (g)	138.05			
WATER CONTENT, wn (%)	**19.31**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1075.57
Mass of Container, M5 (g)	209.88
Mass of Wet Specimen, M6 (g)	865.69
Specimen Diameter, D (in) or ( )	2.411
Specimen Length, L (in) or ( )	5.921
Specimen Area, A (in^2) or ( )	4.565
Specimen Volume, V (cm^3) or ( )	442.95
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	122.0
DRY UNIT WEIGHT, DUW (pcf) or ( )	102.3
VOID RATIO	0.648
DEGREE OF SATURATION, S (%)	80.42

MEASURED DIMENSIONS

	Length	Diameter
1	5.967	2.412
2	5.910	2.410
3	5.954	2.407
4	5.828	2.414
5	5.948	2.412
6	**XXXXX**	2.410
Average	5.921	2.411

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Brownish yellow Sandy, Clayey SILT (CL-ML)

TESTED BY: ADC DATE: 6/19/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

WATER CONTENT, UNIT WEIGHT, AND VISUAL DESCRIPTION

ASTM D2216, D7263, D2488

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: WM-24

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

TYPE OF SAMPLE		VISUAL SIGNS OF DISTURBANCE (1)		SOIL COMPONENT	Major	Minor	WATER CONTENT ADJECTIVES		COLOR		GRADATION		SHAPE OF GRAINS	
1). BULK		1). NONE	X	0). BOULDERS (>12")			1). DRY	X	1). UNIFORM	X	GRAVEL		1). ANGULAR	
2). SPT		2). SLIGHT		1). COBBLES (>3")			2). MOIST		2). SPOTTED		1). COARSE		2). SUBANGULAR	X
3). CALIFORNIA SLEEVE	X	3). MODERATE		2). GRAVEL			3). WET		3). STREAKED		2). FINE		3). ROUNDED	
4). CORE		4). EXCESSIVE		3). SAND	X				OTHER:		SAND		4). SUBROUNDED	
5). RINGS				4). SILT		X					3). COARSE		5). FLAT	
6). THIN WALL TUBE				5). CLAY							4). MEDIUM		6). ELONGATED	
7). RECONSTITUTED				6). ORGANIC							5). FINE	X	7). FLAT & ELONG.	
				7). PEAT										
				OTHER:										

CONSISTENCY (MANUAL)		PLASTICITY ADJECTIVES		STRUCTURE		ORGANIC APPEARANCE		ORGANIC ODOR		HCl REACTION		MICA CONTENT	
1). VERY SOFT		1). NON-PLASTIC (PI = 0)		1). HOMOGENEOUS	X	1). NONE	X	1). NONE	X	1). NOT TESTED	X	1). NONE	X
2). SOFT		2). LOW (PI = 1 to 10))	X	2). STRATIFIED		2). FIBROUS		2).ORGANIC		2). NONE		2). LOW	
3). MED. STIFF	X	3). MEDIUM (PI >10 to 20)		3). FISSURED		3).DECOMPOSED		3). FUEL		3). WEAK		3). MEDIUM	
4). STIFF		4). HIGH (PI >20 to 40)		4). SLICKENSIDED		OTHER:				4).STRONG		4). HIGH	
5). VERY STIFF		5). VERY PLASTIC (PI >40)		5). BLOCKY						OTHER:		OTHER:	
6). HARD				6). POROUS									
				7). CEMENTED									
				8). FRIABLE									

AS-RECEIVED WATER CONTENT (OVEN DRIED)

	Average	Sub-Specimen / Sub-Layer		
Container No.	SNA1			
Mass of Container & Wet Specimen, M1 (g)	923.94			
Mass of Container & Dry Specimen, M2 (g)	894.10			
Mass of Container, M3 (g)	145.67			
WATER CONTENT, wn (%)	**3.99**			

Circle Approximate Max. Grain Size in "Sample" 3" 1-1/2" 3/4" 3/8" #4 #10 <#10

Remarks

UNIT WEIGHT

Container No.	
Mass of Container and Wet Specimen, M4 (g)	1065.06
Mass of Container, M5 (g)	131.44
Mass of Wet Specimen, M6 (g)	933.62
Specimen Diameter, D (in) or ( )	2.412
Specimen Length, L (in) or ( )	5.626
Specimen Area, A (in^2) or ( )	4.568
Specimen Volume, V (cm^3) or ( )	421.12
assumed Specific Gravity, Gs	2.70
WET UNIT WEIGHT, WUW (pcf) or ( )	138.4
DRY UNIT WEIGHT, DUW (pcf) or ( )	133.1
VOID RATIO	0.266
DEGREE OF SATURATION, S (%)	40.40

MEASURED DIMENSIONS

	Length	Diameter
1	5.515	2.410
2	5.620	2.408
3	5.532	2.409
4	5.795	2.414
5	5.667	2.412
6	**XXXXX**	2.417
Average	5.626	2.412

This Excel spreadsheet is used to verify calculations.

w or wn = ((M1 - M2) / (M2 - M3)) * 100

WUW = (M6,g) / (V,cm^3) * (62.43, lb/ft^3) DUW = WUW / (1 + (w / 100))

S = (DUW * w * Gs) / ((Gs * Unit Weight or Density of Water) - DUW)

Unit Weight or Density of Water (20° C) = 62.32 pcf or 0.9982 g/cm^3

Specimen Color and Description: Light olive brown Silty SAND (SM)

TESTED BY: ADC DATE: 6/19/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: DS-01

Project Name: Pure Water Sample No.: 4a

Project Engineer: SF Depth (ft): 15.0

Visual Description: Dark yellowish brown Clayey SAND (SC)

SPECIMEN: Tested From:

Bulk Sample			Other ____
SPT Sample	x		Thin-Walled Tube
Calif. Sample			Engr. Test Specimen's WC

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used
x Sieves (1) - partial sample used & selected by Method(s)
c Method
(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:
As-Received: x
Air Dried:
Oven-Dried:

Test Method (D1140)
Method A: x not dispersed
Method B: is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:
No: x
Yes:
By: Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other [ ]

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	LF3
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	325.09
Container Number		LF3	LF3	Dry, M2 (g)	305.44
Mass of Container and Dry Soil, (g)		305.44	268.89	Cont.,M3 (g)	205.15
Mass of Container, (g)		205.15	205.15	**Water Content (%)**	**19.59**
Dry Soil, Ws (g)		100.29	63.74		

SIEVING RESULTS

% error: 0.06

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	26.07		74.0
#60 / 60			
#100 / 40	49		51.1
#140 / 30			
#200 / 20	62.85		37.3
Pan	63.78	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	37.3	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: x No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made
(2) Proposed allowable amount of soil retained on 8" dia. Sieve.
(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 08/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: DS-01

Project Name: Pure Water Sample No.: 7

Project Engineer: SF Depth (ft): 30.0

Visual Description: Dark olive gray Silty SAND (SM)

SPECIMEN: Tested From:

Bulk Sample [ ] | [ ] Other ____
SPT Sample [x] | [ ] Thin-Walled Tube
Calif. Sample [ ] | [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used
x Sieves (1) - partial sample used & selected by Method(s)
c Method

(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen: As-Received [x] Air Dried [ ] Oven-Dried [ ]

Test Method (D1140) Method A [x] not dispersed; Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample: No [x] Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content: As Recieved	
				Container No.	L19
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	747.61
Container Number		L19	L19	Dry, M2 (g)	614.13
Mass of Container and Dry Soil, (g)		614.13	552.32	Cont.,M3 (g)	134.87
Mass of Container, (g)		134.87	134.9	**Water Content (%)**	**27.85**
Dry Soil, Ws (g)		479.26	417.42		

% error: 0.04

SIEVING RESULTS

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	58.34		87.8
#60 / 60			
#100 / 40	329.17		31.3
#140 / 30			
#200 / 20	412.6		13.9
Pan	417.27	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	13.9	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

SET-UP BY: GD DATE 08/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: DS-02

Project Name: Pure Water | Sample No.: 2

Project Engineer: SF | Depth (ft): 10.0

Visual Description: Very dark gray Poorly Graded SAND with Silt (SP-SM)

SPECIMEN: Tested From:

- Bulk Sample [ ]
- SPT Sample [x]
- Calif. Sample [ ]
- Other ____ [ ]
- Thin-Walled Tube [ ]
- Engr. Test Specimen's WC [ ]
- [ ] **Whole sample used**
- [ ] **See Bulk Sample Processing Form**

Selection Method:

- ____ Sieves (1) - whole sample used
- x Sieves (1) - partial sample used & selected by Method(s)
- c Method
- (a): Splitter; (use for dry soils or that which will segregate)
- (b): Quartering; (use for dry soils or that which will segregate)
- (c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen: As-Received [x] Air Dried [ ] Oven-Dried [ ]

Test Method (D1140) Method A [x] not dispersed; Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample: No [x] Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content: As Recieved	
				Container No.	B59
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	721.76
Container Number		B59	B59	Dry, M2 (g)	549.9
Mass of Container and Dry Soil, (g)		549.9	513.44	Cont.,M3 (g)	200.13
Mass of Container, (g)		200.13	200.18	**Water Content (%)**	**49.14**
Dry Soil, Ws (g)		349.77	313.26		

SIEVING RESULTS % error: 0.03

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	25.62		92.7
#60 / 60			
#100 / 40	240.01		31.4
#140 / 30			
#200 / 20	308.21		11.9
Pan	313.34	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	11.9	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [ ] No [x] Yes Amount Adjective: medium

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 08/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: DS-03

Project Name: Pure Water Sample No.: 7

Project Engineer: SF Depth (ft): 30.0

Visual Description: Dark gray Clayey SAND (SC)

SPECIMEN: Tested From:

Bulk Sample			Other ____
SPT Sample	x		Thin-Walled Tube
Calif. Sample			Engr. Test Specimen's WC

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:

- ____ Sieves (1) - whole sample used
- x Sieves (1) - partial sample used & selected by Method(s)
- c Method

(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received	x
Air Dried	
Oven-Dried	

Test Method (D1140)

Method A	x	not dispersed
Method B		is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No: x Yes:

By: [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B96
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	713.97
Container Number		B96	B96	Dry, M2 (g)	584.22
Mass of Container and Dry Soil, (g)		584.22	427.6	Cont.,M3 (g)	204.67
Mass of Container, (g)		204.67	204.72	**Water Content (%)**	**34.19**
Dry Soil, Ws (g)		379.55	222.88		

SIEVING RESULTS

% error: 0.04

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	15.89		95.8
#60 / 60			
#100 / 40	163.67		56.9
#140 / 30			
#200 / 20	219.14		42.3
Pan	222.8	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	42.3	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [ ] No [x] Yes Amount Adjective: medium

(1) X in box denotes sieve on which split was made
(2) Proposed allowable amount of soil retained on 8" dia. Sieve.
(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 08/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: DS-06

Project Name: Pure Water | Sample No.: 1

Project Engineer: SF | Depth (ft): 0~5

Visual Description: Dark grayish brown Silty SAND (SM)

SPECIMEN: Tested From:

Bulk Sample [x] | Other ____
SPT Sample [ ] | Thin-Walled Tube
Calif. Sample [ ] | Engr. Test Specimen's WC

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used
x Sieves (1) - partial sample used & selected by Method(s)
c Method

(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]
Air Dried [ ]
Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed
Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]
Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand; [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content As Recieved	
				Container No.	B55
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	806.97
Container Number		B55	B55	Dry, M2 (g)	742
Mass of Container and Dry Soil, (g)		742	533.41	Cont.,M3 (g)	197.9
Mass of Container, (g)		197.9	197.96	**Water Content (%)**	**11.94**
Dry Soil, Ws (g)		544.1	335.45		

SIEVING RESULTS

% error: 0.03

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	113.13		79.2
#60 / 60			
#100 / 40	258.38		52.5
#140 / 30			
#200 / 20	331.91		39.0
Pan	335.34	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	39.0	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10   Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made
(2) Proposed allowable amount of soil retained on 8" dia. Sieve.
(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 08/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: DS-06

Project Name: Pure Water Sample No.: 4

Project Engineer: SF Depth (ft): 15.0

Visual Description: Dark grayish brown Poorly Graded SAND with Silt (SP-SM)

SPECIMEN: Tested From:

Bulk Sample			Other ____	
SPT Sample	x		Thin-Walled Tube	
Calif. Sample			Engr. Test Specimen's WC	

	Whole sample used
	See Bulk Sample Processing Form

Selection Method:

____ Sieves (1) - whole sample used

x Sieves (1) - partial sample used & selected by Method(s)

c Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received	x
Air Dried	
Oven-Dried	

Test Method (D1140)

Method A	x	not dispersed
Method B		is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No: x

Yes:

By: [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B10
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	789.84
Container Number		B10	B10	Dry, M2 (g)	650.79
Mass of Container and Dry Soil, (g)		650.79	618.75	Cont.,M3 (g)	197.98
Mass of Container, (g)		197.98	198.01	**Water Content (%)**	**30.71**
Dry Soil, Ws (g)		452.81	420.74		

SIEVING RESULTS % error: 0.02

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	19.34		95.7
#60 / 60			
#100 / 40	346.71		23.4
#140 / 30			
#200 / 20	416.9		7.9
Pan	420.64	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	7.9	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

SET-UP BY: GD DATE 08/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-01

Project Name: Pure Water Sample No.: 1

Project Engineer: SF Depth (ft): 0-5

Visual Description: Olive brown Silty SAND (SM)

SPECIMEN: Tested From:

Bulk Sample [x] | [ ] Other ____
SPT Sample [ ] | [ ] Thin-Walled Tube
Calif. Sample [ ] | [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used
x Sieves (1) - partial sample used & selected by Method(s)
c Method

(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]
Air Dried [ ]
Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed
Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]
Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand; [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content: As Recieved	
				Container No.	B38
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	794.35
Container Number		B38	B38	Dry, M2 (g)	735.41
Mass of Container and Dry Soil, (g)		735.41	575.58	Cont.,M3 (g)	200.34
Mass of Container, (g)		200.34	200.34	**Water Content (%)**	**11.02**
Dry Soil, Ws (g)		535.07	375.24		

SIEVING RESULTS

% error: 0.08

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	49.36		90.8
#60 / 60			
#100 / 40	252.7		52.8
#140 / 30			
#200 / 20	368.57		31.1
Pan	374.94	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	31.1	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 05/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: FM-01

Project Name: Pure Water | Sample No.: 5

Project Engineer: SF | Depth (ft): 18.5

Visual Description: Dark gray Poorly Graded SAND with Silt (SP-SM)

SPECIMEN: Tested From:

Bulk Sample [ ] | [ ] Other ____
SPT Sample [x] | [ ] Thin-Walled Tube
Calif. Sample [ ] | [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used
x Sieves (1) - partial sample used & selected by Method(s)
c Method

(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]
Air Dried [ ]
Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed
Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]
Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand; [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content As Recieved	
				Container No.	B62
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	427.75
Container Number		B62	B62	Dry, M2 (g)	386.41
Mass of Container and Dry Soil, (g)		386.41	376.45	Cont.,M3 (g)	200.38
Mass of Container, (g)		200.38	200.38	**Water Content (%)**	**22.22**
Dry Soil, Ws (g)		186.03	176.07		

SIEVING RESULTS

% error: 0.02

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	66.53		64.2
#60 / 60			
#100 / 40	162.94		12.4
#140 / 30			
#200 / 20	175.59		5.6
Pan	176.03	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	5.6	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10   Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes   Amount Adjective: ____

(1) X in box denotes sieve on which split was made
(2) Proposed allowable amount of soil retained on 8" dia. Sieve.
(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 05/23/17   CALCULATED BY: ADC   CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-02

Project Name: Pure Water Sample No.: 4

Project Engineer: SF Depth (ft): 15.0

Visual Description: Dark gray Silty SAND (SM)

SPECIMEN: Tested From: **Selection Method:**

Bulk Sample [ ] [ ] Other ____ ____ Sieves (1) - whole sample used

SPT Sample [x] [ ] Thin-Walled Tube x Sieves (1) - partial sample used & selected by Method(s)

Calif. Sample [ ] [ ] Engr. Test Specimen's WC c Method

[ ] **Whole sample used** (a): Splitter; (use for dry soils or that which will segregate)

[ ] **See Bulk Sample Processing Form** (b): Quartering; (use for dry soils or that which will segregate)

Preparation: Sample/Specimen: **Test Method (D1140)** (c) : Representative scoop after mixing, or slice of intact sample.

As-Received [x] Method A [x] not dispersed (use for moist soils or that which will not segregate)

Air Dried [ ] Method B [ ] is dispersed

Oven-Dried [ ] **Oven-Dried Soil Broken Up Before Selecting Partial sample:**

Washing: No Yes No [x]

Whole Specimen Washed on No. 200 sieve ? [ ] [x] Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand

Retained Fraction: 1st Split Washed ? [ ] [ ] [ ] Pulverizer [ ] Other

Fine Fraction Washed on No. 200 sieve ? [ ] [ ] and Soil Soaked for: 5 hrs. **Water Content**

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	As Recieved	
				Container No.	B68
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	597.16
Container Number		B68	B68	Dry, M2 (g)	506.7
Mass of Container and Dry Soil, (g)		506.7	472.41	Cont.,M3 (g)	200.19
Mass of Container, (g)		200.19	200.19	**Water Content (%)**	**29.51**
Dry Soil, Ws (g)		306.51	272.22		

SIEVING RESULTS % error: 0.10

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	30.16		90.2
#60 / 60			
#100 / 40	219.54		28.4
#140 / 30			
#200 / 20	269.53		12.1
Pan	271.96	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	12.1	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

Mica Noted: [ ] No [x] Yes Amount Adjective: high

SET-UP BY: GD DATE 05/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-03

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 5.0

Visual Description: Olive brown Poorly Graded SAND with Silt (SP-SM)

SPECIMEN: Tested From:

Bulk Sample [ ] [ ] Other ____

SPT Sample [x] [ ] Thin-Walled Tube

Calif. Sample [ ] [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**

[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used

x Sieves (1) - partial sample used & selected by Method(s)

c Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]

Air Dried [ ]

Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed

Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]

Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200
Container Number		B35	B35
Mass of Container and Dry Soil, (g)		448.51	422.15
Mass of Container, (g)		198.11	198.11
Dry Soil, Ws (g)		250.4	224.04

Water Content

As Recieved	
Container No.	B35
Wet, M1 (g)	456.66
Dry, M2 (g)	448.51
Cont.,M3 (g)	198.11
Water Content (%)	**3.25**

% error: 0.08

SIEVING RESULTS

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	26.42		89.4
#60 / 60			
#100 / 40	190.68		23.8
#140 / 30			
#200 / 20	223.01		10.9
Pan	223.86	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	10.9	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

Mica Noted: [ ] No [ ] Yes Amount Adjective: ____

SET-UP BY: GD DATE 05/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-04

Project Name: Pure Water Sample No.: 1

Project Engineer: SF Depth (ft): 10.0

Visual Description: Strong brown Silty SAND (SM)

SPECIMEN: Tested From:

Bulk Sample [ ] [ ] Other ____

SPT Sample [x] [ ] Thin-Walled Tube

Calif. Sample [ ] [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**

[ ] **See Bulk Sample Processing Form**

Selection Method:

x Sieves (1) - whole sample used

Sieves (1) - partial sample used & selected by Method(s)

Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]

Air Dried [ ]

Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed

Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]

Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand; [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B57
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	393.24
Container Number		B57	B57	Dry, M2 (g)	378.2
Mass of Container and Dry Soil, (g)		378.2	311.51	Cont.,M3 (g)	200.54
Mass of Container, (g)		200.54	200.54	**Water Content (%)**	**8.47**
Dry Soil, Ws (g)		177.66	110.97		

SIEVING RESULTS

% error: 0.01

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	58.78		66.9
#60 / 60			
#100 / 40	85.1		52.1
#140 / 30			
#200 / 20	109.45		38.4
Pan	110.96	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	38.4	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [ ] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 05/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-06

Project Name: Pure Water Sample No.: 5

Project Engineer: SF Depth (ft): 18.5

Visual Description: Yellowish brown Well Graded SAND with Gravel (SW)

SPECIMEN: Tested From:

Bulk Sample [ ] [ ] Other ____

SPT Sample [x] [ ] Thin-Walled Tube

Calif. Sample [ ] [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**

[ ] **See Bulk Sample Processing Form**

Selection Method:

x Sieves (1) - whole sample used

___ Sieves (1) - partial sample used & selected by Method(s)

___ Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]

Air Dried [ ]

Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed

Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x] Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B83
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	798.98
Container Number		B83	B83	Dry, M2 (g)	704.15
Mass of Container and Dry Soil, (g)		704.15	701.04	Cont.,M3 (g)	205.44
Mass of Container, (g)		205.44	205.44	**Water Content (%)**	**19.02**
Dry Soil, Ws (g)		498.71	495.6		

SIEVING RESULTS % error: 0.03

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	453.85		9.0
#60 / 60			
#100 / 40	492.36		1.3
#140 / 30			
#200 / 20	495.38		0.7
Pan	495.46	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	0.7	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [ ] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 05/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: FM-07

Project Name: Pure Water | Sample No.: 1

Project Engineer: SF | Depth (ft): 0-5

Visual Description: Dark yellowish brown Silty SAND (SM)

SPECIMEN: Tested From:

Bulk Sample [x] | Other ____

SPT Sample [ ] | Thin-Walled Tube

Calif. Sample [ ] | Engr. Test Specimen's WC

[ ] **Whole sample used**

[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used

x Sieves (1) - partial sample used & selected by Method(s)

c Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]

Air Dried [ ]

Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed

Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x] Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content As Recieved	
				Container No.	B56
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	655.56
Container Number		B56	B56	Dry, M2 (g)	595.33
Mass of Container and Dry Soil, (g)		595.33	421.66	Cont.,M3 (g)	197.66
Mass of Container, (g)		197.66	197.66	**Water Content (%)**	**15.15**
Dry Soil, Ws (g)		397.67	224		

SIEVING RESULTS

% error: 0.00

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	47.08		88.2
#60 / 60			
#100 / 40	135.28		66.0
#140 / 30			
#200 / 20	219.16		44.9
Pan	223.99	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	44.9	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [ ] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 05/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: FM-07

Project Name: Pure Water | Sample No.: 3

Project Engineer: SF | Depth (ft): 10.0

Visual Description: Light olive brown Poorly Graded SAND (SP)

SPECIMEN: Tested From:

- Bulk Sample [ ]
- SPT Sample [x]
- Calif. Sample [ ]
- Other ____ [ ]
- Thin-Walled Tube [ ]
- Engr. Test Specimen's WC [ ]
- [ ] **Whole sample used**
- [ ] **See Bulk Sample Processing Form**

Selection Method:

- x Sieves (1) - whole sample used
- ____ Sieves (1) - partial sample used & selected by Method(s)
- ____ Method
- (a): Splitter; (use for dry soils or that which will segregate)
- (b): Quartering; (use for dry soils or that which will segregate)
- (c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

- As-Received [x]
- Air Dried [ ]
- Oven-Dried [ ]

Test Method (D1140)

- Method A [x] not dispersed
- Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

- No [x]
- Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content As Recieved	
				Container No.	B73
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	819.65
Container Number		B73	B73	Dry, M2 (g)	712.83
Mass of Container and Dry Soil, (g)		712.83	689.48	Cont.,M3 (g)	200.86
Mass of Container, (g)		200.86	200.86	**Water Content (%)**	**20.86**
Dry Soil, Ws (g)		511.97	488.62		

SIEVING RESULTS

% error: 0.02

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	170.9		66.6
#60 / 60			
#100 / 40	458.78		10.4
#140 / 30			
#200 / 20	487.61		4.8
Pan	488.54	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	4.8	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [ ] No [ ] Yes Amount Adjective: ______

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 05/23/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-18

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

Visual Description: Light olive brown Lean CLAY (CL)

SPECIMEN: Tested From:

Bulk Sample [ ] [ ] Other ____

SPT Sample [ ] [ ] Thin-Walled Tube

Calif. Sample [x] [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**

[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used

x Sieves (1) - partial sample used & selected by Method(s)

c Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]

Air Dried [ ]

Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed

Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]

Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand; [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B27
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	779.48
Container Number		B27	B27	Dry, M2 (g)	686.58
Mass of Container and Dry Soil, (g)		686.58	234.88	Cont.,M3 (g)	200.49
Mass of Container, (g)		200.49	200.49	**Water Content (%)**	**19.11**
Dry Soil, Ws (g)		486.09	34.39		

SIEVING RESULTS

% error: 0.23

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	0.96		99.8
#60 / 60			
#100 / 40	4.83		99.0
#140 / 30			
#200 / 20	33.04		93.2
Pan	34.31	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	93.2	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: ADC DATE 06/13/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-24

Project Name: Pure Water Sample No.: 1

Project Engineer: SF Depth (ft): 5.0

Visual Description: Strong brown Silty SAND (SM)

SPECIMEN: Tested From:

Bulk Sample			Other ____
SPT Sample	x		Thin-Walled Tube
Calif. Sample			Engr. Test Specimen's WC

[ ] **Whole sample used**

[ ] **See Bulk Sample Processing Form**

Selection Method:

x Sieves (1) - whole sample used

___ Sieves (1) - partial sample used & selected by Method(s)

___ Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]

Air Dried [ ]

Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed

Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]

Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B50
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	412.11
Container Number		B50	B50	Dry, M2 (g)	399.88
Mass of Container and Dry Soil, (g)		399.88	359.62	Cont.,M3 (g)	200.37
Mass of Container, (g)		200.37	200.37	**Water Content (%)**	**6.13**
Dry Soil, Ws (g)		199.51	159.25		

SIEVING RESULTS

% error: 0.15

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	61.49		69.2
#60 / 60			
#100 / 40	146.37		26.6
#140 / 30			
#200 / 20	158.59		20.5
Pan	159.01	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	20.5	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes Amount Adjective: ______

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 07/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-25

Project Name: Pure Water Sample No.: 1

Project Engineer: SF Depth (ft): 0~5

Visual Description: Strong brown Clayey SAND (SC)

SPECIMEN: Tested From:

Bulk Sample	x		Other ____		Sieves (1) - whole sample used
SPT Sample			Thin-Walled Tube	x	Sieves (1) - partial sample used & selected by Method(s)
Calif. Sample			Engr. Test Specimen's WC	c	Method

Selection Method:

- (a): Splitter; (use for dry soils or that which will segregate)
- (b): Quartering; (use for dry soils or that which will segregate)
- (c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Preparation: Sample/Specimen: As-Received [x] Air Dried [ ] Oven-Dried [ ]

Test Method (D1140) Method A [x] not dispersed; Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample: No [x] Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content: As Recieved	
				Container No.	B7
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	654.63
Container Number		B7	B7	Dry, M2 (g)	612.13
Mass of Container and Dry Soil, (g)		612.13	488.21	Cont.,M3 (g)	198.1
Mass of Container, (g)		198.1	198.19	**Water Content (%)**	**10.26**
Dry Soil, Ws (g)		414.03	290.02		

SIEVING RESULTS % error: 0.01

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	164.63		60.2
#60 / 60			
#100 / 40	265		36.0
#140 / 30			
#200 / 20	289.1		30.2
Pan	289.98	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	30.2	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes Amount Adjective: ______

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 08/17/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: FM-27

Project Name: Pure Water | Sample No.: 2

Project Engineer: SF | Depth (ft): 5.0

Visual Description: Light yellowish brown CLAY with Sand (CL)

SPECIMEN: Tested From:

- Bulk Sample [ ]
- SPT Sample [x]
- Calif. Sample [ ]
- Other ____ [ ]
- Thin-Walled Tube [ ]
- Engr. Test Specimen's WC [ ]
- [ ] **Whole sample used**
- [ ] **See Bulk Sample Processing Form**

Selection Method:

- ____ Sieves (1) - whole sample used
- x Sieves (1) - partial sample used & selected by Method(s)
- c Method
- (a): Splitter; (use for dry soils or that which will segregate)
- (b): Quartering; (use for dry soils or that which will segregate)
- (c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen: As-Received [x] Air Dried [ ] Oven-Dried [ ]

Test Method (D1140) Method A [x] not dispersed; Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample: No [x] Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content As Recieved	
				Container No.	B98
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	715.27
Container Number		B98	B98	Dry, M2 (g)	628.73
Mass of Container and Dry Soil, (g)		628.73	301.83	Cont.,M3 (g)	203.42
Mass of Container, (g)		203.42	203.5	**Water Content (%)**	**20.35**
Dry Soil, Ws (g)		425.31	98.33		

SIEVING RESULTS % error: 0.17

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	40.47		90.5
#60 / 60			
#100 / 40	55.22		87.0
#140 / 30			
#200 / 20	94.03		77.9
Pan	98.5	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	77.9	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 08/18/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-32

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 10.0

Visual Description: Light olive brown Silty SAND (SM)

SPECIMEN: Tested From:

Bulk Sample [ ] Other ____
SPT Sample [ ] Thin-Walled Tube
Calif. Sample [x] Engr. Test Specimen's WC

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used
x Sieves (1) - partial sample used & selected by Method(s)
c Method

(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]
Air Dried [ ]
Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed
Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]
Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand; [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content: As Recieved	
				Container No.	B36
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	665.95
Container Number		B36	B36	Dry, M2 (g)	600.81
Mass of Container and Dry Soil, (g)		600.81	492.75	Cont.,M3 (g)	197.98
Mass of Container, (g)		197.98	198.06	**Water Content (%)**	**16.17**
Dry Soil, Ws (g)		402.83	294.69		

SIEVING RESULTS

% error: 0.08

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	17.97		95.5
#60 / 60			
#100 / 40	219.71		45.5
#140 / 30			
#200 / 20	291.39		27.7
Pan	294.93	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	27.7	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made
(2) Proposed allowable amount of soil retained on 8" dia. Sieve.
(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 08/18/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732   Task Number: 2.01.05.20.00   Boring No.: FM-41

Project Name: Pure Water   Sample No.: 1

Project Engineer: SF   Depth (ft): 0~5

Visual Description: Light olive brown Sandy SILT (ML)

SPECIMEN: Tested From:

Bulk Sample [x] Other ____
SPT Sample [ ] Thin-Walled Tube
Calif. Sample [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:

___ Sieves (1) - whole sample used
x Sieves (1) - partial sample used & selected by Method(s)
c Method

(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]
Air Dried [ ]
Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed
Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]
Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing: No / Yes

Whole Specimen Washed on No. 200 sieve ? No [ ] Yes [x]
Retained Fraction: 1st Split Washed ? No [ ] Yes [ ]
Fine Fraction Washed on No. 200 sieve ? No [ ] Yes [ ]

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B1
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	640.99
Container Number		B1	B1	Dry, M2 (g)	574.06
Mass of Container and Dry Soil, (g)		574.06	370.06	Cont.,M3 (g)	200.05
Mass of Container, (g)		200.05	200.05	**Water Content (%)**	**17.90**
Dry Soil, Ws (g)		374.01	170.01		

SIEVING RESULTS   % error: 0.02

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	20.41		94.5
#60 / 60			
#100 / 40	58.66		84.3
#140 / 30			
#200 / 20	167.59		55.2
Pan	169.98	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	55.2	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10   Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes   Amount Adjective: ____

(1) X in box denotes sieve on which split was made
(2) Proposed allowable amount of soil retained on 8" dia. Sieve.
(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: ADC   DATE 07/20/17   CALCULATED BY: ADC   CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-45

Project Name: Pure Water Sample No.: 3

Project Engineer: SF Depth (ft): 10.0

Visual Description: Light olive brown Silty CLAY (CL)

SPECIMEN: Tested From:

Bulk Sample			Other ____
SPT Sample			Thin-Walled Tube
Calif. Sample	x		Engr. Test Specimen's WC

Whole sample used

See Bulk Sample Processing Form

Selection Method:

____ Sieves (1) - whole sample used

x Sieves (1) - partial sample used & selected by Method(s)

c Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received	x
Air Dried	
Oven-Dried	

Test Method (D1140)

Method A	x	not dispersed
Method B		is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No: x Yes: ____ **By:** ____ Mortar & Pestle ____ Hand ____ Pulverizer ____ Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content: As Recieved	
				Container No.	B68
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	648.35
Container Number		B68	B68	Dry, M2 (g)	572.66
Mass of Container and Dry Soil, (g)		572.66	213.21	Cont.,M3 (g)	200.17
Mass of Container, (g)		200.17	200.2	**Water Content (%)**	**20.32**
Dry Soil, Ws (g)		372.49	13.01		

SIEVING RESULTS % error: 0.54

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	1.13		99.7
#60 / 60			
#100 / 40	2.04		99.5
#140 / 30			
#200 / 20	12.43		96.7
Pan	12.94	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	96.7	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: x No ____ Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 08/18/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-46

Project Name: Pure Water Sample No.: 4

Project Engineer: SF Depth (ft): 18.5

Visual Description: Dark yellowish brown Sandy, Lean CLAY (CL)

SPECIMEN: Tested From:

Bulk Sample [ ] [ ] Other ____

SPT Sample [ ] [ ] Thin-Walled Tube

Calif. Sample [x] [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**

[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used

x Sieves (1) - partial sample used & selected by Method(s)

c Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]

Air Dried [ ]

Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed

Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]

Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand

[ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B40
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	672.92
Container Number		B40	B40	Dry, M2 (g)	584.3
Mass of Container and Dry Soil, (g)		584.3	337.85	Cont.,M3 (g)	198.4
Mass of Container, (g)		198.4	198.4	**Water Content (%)**	**22.96**
Dry Soil, Ws (g)		385.9	139.45		

SIEVING RESULTS

% error: 0.07

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	8.13		97.9
#60 / 60			
#100 / 40	68.83		82.2
#140 / 30			
#200 / 20	136.36		64.7
Pan	139.35	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	64.7	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

SET-UP BY: GD DATE 07/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: FM-47

Project Name: Pure Water | Sample No.: 2

Project Engineer: SF | Depth (ft): 5.0

Visual Description: Light olive brown Fat CLAY (CH)

SPECIMEN: Tested From:

Bulk Sample [ ] | Other ____ [ ]
SPT Sample [x] | Thin-Walled Tube [ ]
Calif. Sample [ ] | Engr. Test Specimen's WC [ ]

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used
x Sieves (1) - partial sample used & selected by Method(s)
c Method

(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen: As-Received [x] Air Dried [ ] Oven-Dried [ ]

Test Method (D1140) Method A [x] not dispersed; Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample: No [x] Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B56
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	434.78
Container Number		B56	B56	Dry, M2 (g)	401.58
Mass of Container and Dry Soil, (g)		401.58	213.19	Cont.,M3 (g)	197.61
Mass of Container, (g)		197.61	197.61	**Water Content (%)**	**16.28**
Dry Soil, Ws (g)		203.97	15.58		

SIEVING RESULTS | % error: 0.13

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	3.49		98.3
#60 / 60			
#100 / 40	4.19		97.9
#140 / 30			
#200 / 20	15.07		92.6
Pan	15.6	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	92.6	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 07/24/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-49

Project Name: Pure Water Sample No.: 1

Project Engineer: SF Depth (ft): 0~5

Visual Description: Brownish yellow Silty SAND (SM)

SPECIMEN: Tested From:

Bulk Sample [x] [ ] Other ____

SPT Sample [ ] [ ] Thin-Walled Tube

Calif. Sample [ ] [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**

[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used

x Sieves (1) - partial sample used & selected by Method(s)

c Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]

Air Dried [ ]

Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed

Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]

Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

Water Content

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	As Recieved	
				Container No.	B14
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	634.65
Container Number		B14	B14	Dry, M2 (g)	585.5
Mass of Container and Dry Soil, (g)		585.5	456.61	Cont.,M3 (g)	200.71
Mass of Container, (g)		200.71	200.71	**Water Content (%)**	**12.77**
Dry Soil, Ws (g)		384.79	255.9		

SIEVING RESULTS

% error: 0.05

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	11.47		97.0
#60 / 60			
#100 / 40	201.48		47.6
#140 / 30			
#200 / 20	255.07		33.7
Pan	255.76	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	33.7	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: ADC DATE 07/20/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 2.01.05.20.00 Boring No.: FM-52

Project Name: Pure Water Sample No.: 4

Project Engineer: SF Depth (ft): 15.0

Visual Description: Light olive brown Sandy SILT (ML)

SPECIMEN: Tested From:

Bulk Sample [ ] ; SPT Sample [x] ; Calif. Sample [ ]

Other ____ [ ] ; Thin-Walled Tube [ ] ; Engr. Test Specimen's WC [ ]

[ ] **Whole sample used**

[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used

x Sieves (1) - partial sample used & selected by Method(s)

c Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen: As-Received [x] ; Air Dried [ ] ; Oven-Dried [ ]

Test Method (D1140) Method A [x] not dispersed ; Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample: No [x] ; Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B64
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	685.21
Container Number		B64	B64	Dry, M2 (g)	606.69
Mass of Container and Dry Soil, (g)		606.69	330.42	Cont.,M3 (g)	200.61
Mass of Container, (g)		200.61	200.61	**Water Content (%)**	**19.34**
Dry Soil, Ws (g)		406.08	129.81		

SIEVING RESULTS % error: 0.24

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	13.26		96.7
#60 / 60			
#100 / 40	23.66		94.2
#140 / 30			
#200 / 20	125.46		69.1
Pan	129.5	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	69.1	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: GD DATE 07/25/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 1.01.05.20.00 Boring No.: PS-3

Project Name: Pure Water Sample No.: 2

Project Engineer: SF Depth (ft): 10.0

Visual Description: Light olive brown Poorly Graded SAND with Silt (SP-SM)

SPECIMEN: Tested From:

Bulk Sample [ ] [ ] Other ____

SPT Sample [x] [ ] Thin-Walled Tube

Calif. Sample [ ] [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**

[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used

x Sieves (1) - partial sample used & selected by Method(s)

c Method

(a): Splitter; (use for dry soils or that which will segregate)

(b): Quartering; (use for dry soils or that which will segregate)

(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]

Air Dried [ ]

Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed

Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x] Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B40
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	517.29
Container Number		B40	B40	Dry, M2 (g)	434.8
Mass of Container and Dry Soil, (g)		434.8	420.14	Cont.,M3 (g)	198.41
Mass of Container, (g)		198.41	198.43	**Water Content (%)**	**34.90**
Dry Soil, Ws (g)		236.39	221.71		

SIEVING RESULTS

% error: 0.01

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	11.73		95.0
#60 / 60			
#100 / 40	190.74		19.3
#140 / 30			
#200 / 20	221.07		6.5
Pan	221.69	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	6.5	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [ ] No [x] Yes Amount Adjective: high

(1) X in box denotes sieve on which split was made

(2) Proposed allowable amount of soil retained on 8" dia. Sieve.

(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: ADC DATE 06/09/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 | Task Number: 1.01.05.20.00 | Boring No.: PS-3

Project Name: Pure Water | Sample No.: 4

Project Engineer: SF | Depth (ft): 20.0

Visual Description: Olive gray Sandy SILT (ML)

SPECIMEN: Tested From:

Bulk Sample [ ] | [ ] Other ____
SPT Sample [x] | [ ] Thin-Walled Tube
Calif. Sample [ ] | [ ] Engr. Test Specimen's WC

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used
x Sieves (1) - partial sample used & selected by Method(s)
c Method

(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]
Air Dried [ ]
Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed
Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]
Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing: No / Yes

Whole Specimen Washed on No. 200 sieve ? [ ] [x]
Retained Fraction: 1st Split Washed ? [ ] [ ]
Fine Fraction Washed on No. 200 sieve ? [ ] [ ]

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	**Water Content** As Recieved	
				Container No.	B26
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	470.42
Container Number		B26	B26	Dry, M2 (g)	396.16
Mass of Container and Dry Soil, (g)		396.16	273.7	Cont.,M3 (g)	199.73
Mass of Container, (g)		199.73	199.75	**Water Content (%)**	**37.80**
Dry Soil, Ws (g)		196.43	73.95		

SIEVING RESULTS

% error: 0.18

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	0.47		99.8
#60 / 60			
#100 / 40	16.6		91.5
#140 / 30			
#200 / 20	70.9		63.9
Pan	73.82	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES ____ D60 XXXXX D85 XXXXX
% GRAVEL ____ D30 XXXXX D15 XXXXX
% SAND ____ D10 XXXXX D50 XXXXX
% FINES 63.9 Cu = XXXXX Cc = XXXXX

Cu = D60 / D10   Cc = D30^2 / (D60 * D10)

Mica Noted: [ ] No [x] Yes   Amount Adjective: medium

(1) X in box denotes sieve on which split was made
(2) Proposed allowable amount of soil retained on 8" dia. Sieve.
(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: ADC DATE 06/09/17   CALCULATED BY: ADC   CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 Task Number: 1.01.05.20.00 Boring No.: PS-3

Project Name: Pure Water Sample No.: 9

Project Engineer: SF Depth (ft): 50.0

Visual Description: Gray Poorly Graded SAND with Silt (SP-SM)

SPECIMEN: Tested From:

Bulk Sample [ ] | Other ____ [ ]
SPT Sample [x] | Thin-Walled Tube [ ]
Calif. Sample [ ] | Engr. Test Specimen's WC [ ]

[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:

____ Sieves (1) - whole sample used
x Sieves (1) - partial sample used & selected by Method(s)
c Method

(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

As-Received [x]
Air Dried [ ]
Oven-Dried [ ]

Test Method (D1140)

Method A [x] not dispersed
Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x]
Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand; [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content: As Recieved	
				Container No.	B15
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	551.72
Container Number		B15	B15	Dry, M2 (g)	475.97
Mass of Container and Dry Soil, (g)		475.97	450.56	Cont.,M3 (g)	200.68
Mass of Container, (g)		200.68	200.69	**Water Content (%)**	**27.52**
Dry Soil, Ws (g)		275.29	249.87		

SIEVING RESULTS % error: 0.03

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	44.6		83.8
#60 / 60			
#100 / 40	231.82		15.8
#140 / 30			
#200 / 20	249.55		9.4
Pan	249.8	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	9.4	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [ ] No [x] Yes Amount Adjective: medium

(1) X in box denotes sieve on which split was made
(2) Proposed allowable amount of soil retained on 8" dia. Sieve.
(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: ADC DATE 06/09/17 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content

ASTM D1140 and D2216

Project Number: 60530732 | Task Number: 2.01.05.20.00 | Boring No.: WM-02

Project Name: Pure Water | Sample No.: 2

Project Engineer: SF | Depth (ft): 10.0

Visual Description: Olive Silty SAND (SM)

SPECIMEN: Tested From:

- Bulk Sample [ ]
- SPT Sample [x]
- Calif. Sample [ ]
- Other ____ [ ]
- Thin-Walled Tube [ ]
- Engr. Test Specimen's WC [ ]
- [ ] **Whole sample used**
- [ ] **See Bulk Sample Processing Form**

Selection Method:

- ____ Sieves (1) - whole sample used
- x Sieves (1) - partial sample used & selected by Method(s)
- c Method

(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample.
(use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:

- As-Received [x]
- Air Dried [ ]
- Oven-Dried [ ]

Test Method (D1140)

- Method A [x] not dispersed
- Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:

No [x] Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200
Container Number		B3	B3
Mass of Container and Dry Soil, (g)		391.59	316.81
Mass of Container, (g)		198.05	198.08
Dry Soil, Ws (g)		193.54	118.73

Water Content

As Recieved	
Container No.	B3
Wet, M1 (g)	436.27
Dry, M2 (g)	391.59
Cont.,M3 (g)	198.05
Water Content (%)	**23.09**

SIEVING RESULTS

% error: 0.06

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	2.99		98.5
#60 / 60			
#100 / 40	98.74		49.0
#140 / 30			
#200 / 20	116.29		39.9
Pan	118.66	XXXXXXXX	XXXXXXXXXX

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	39.9	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 Cc = D30^2 / (D60 * D10)

Mica Noted: [x] No [ ] Yes Amount Adjective: ____

(1) X in box denotes sieve on which split was made
(2) Proposed allowable amount of soil retained on 8" dia. Sieve.
(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: ADC DATE 06/19/15 CALCULATED BY: ADC CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

GRADATION OF SOILS by Sieving using Soil Sieve Sizes & with Water Content
ASTM D1140 and D2216

Project Number: 60530732 — Task Number: 2.01.05.20.00 — Boring No.: WM-16
Project Name: Pure Water — Sample No.: 2
Project Engineer: SF — Depth (ft): 8.0
Visual Description: Yellowish brown Lean CLAY with Sand (CL)

SPECIMEN: Tested From:
Bulk Sample [ ] — Other ____ [ ]
SPT Sample [x] — Thin-Walled Tube [ ]
Calif. Sample [ ] — Engr. Test Specimen's WC [ ]
[ ] **Whole sample used**
[ ] **See Bulk Sample Processing Form**

Selection Method:
____ Sieves (1) - whole sample used
x Sieves (1) - partial sample used & selected by Method(s)
c Method
(a): Splitter; (use for dry soils or that which will segregate)
(b): Quartering; (use for dry soils or that which will segregate)
(c) : Representative scoop after mixing, or slice of intact sample. (use for moist soils or that which will not segregate)

Preparation: Sample/Specimen:
As-Received [x]
Air Dried [ ]
Oven-Dried [ ]

Test Method (D1140)
Method A [x] not dispersed
Method B [ ] is dispersed

Oven-Dried Soil Broken Up Before Selecting Partial sample:
No [x]
Yes [ ] **By:** [ ] Mortar & Pestle [ ] Hand [ ] Pulverizer [ ] Other

Washing:

	No	Yes
Whole Specimen Washed on No. 200 sieve ?		x
Retained Fraction: 1st Split Washed ?		
Fine Fraction Washed on No. 200 sieve ?		

and Soil Soaked for: 5 hrs.

MASS OF TEST SPECIMEN (g)	Total Test Specimen with Coarse Fraction	Partial or Whole Test Specimen	Soil Retained (after washing)	Water Content As Recieved	
				Container No.	B56
Min. sieve size in sieving sequence (3)	#N/A	# 200	+200	Wet, M1 (g)	665.37
Container Number		B56	B56	Dry, M2 (g)	604.45
Mass of Container and Dry Soil, (g)		604.45	302.49	Cont.,M3 (g)	197.62
Mass of Container, (g)		197.62	197.64	**Water Content (%)**	**14.97**
Dry Soil, Ws (g)		406.83	104.85		

SIEVING RESULTS — % error: 0.05

See (1)	Sieve No.	Cum. Mass Retained (g)	Total Specimen % Finer N'
	3 "		
	2 "		
	1 1/2"		
	1 "		
	3/4 "		
	1/2 "		
	3/8 "		
	4		
	Pan		XXXXXXXX

Req. Mass of Test Spec. for 1% (kg)
3"= 70
1 1/2"=10
3/4"= 1.1
3/8"= 0.25
#4 = 0.1
#10 = 0.1

Sieve No. / (2)	Cum. Mass Retained (g)	Partial Test Specimen	Total Specimen % Finer N'
3 "			
2 "			
1 1/2"			
1 "			
3/4 "			
1/2 "			
3/8 "			
#4 / 325			
#10 / 180			
#20 / 115			
#40 / 75	10.04		97.5
#60 / 60			
#100 / 40	53.98		86.7
#140 / 30			
#200 / 20	103.94		74.5
Pan	104.8	XXXXXXXX	XXXXXXXXXX

Mica Noted: [ ] No [x] Yes — Amount Adjective: low

SUMMARY: Shape & Filter Parameters

% COBBLES		D60	XXXXX	D85	XXXXX
% GRAVEL		D30	XXXXX	D15	XXXXX
% SAND		D10	XXXXX	D50	XXXXX
% FINES	74.5	Cu =	XXXXX	Cc =	XXXXX

Cu = D60 / D10 — Cc = D30^2 / (D60 * D10)

(1) X in box denotes sieve on which split was made
(2) Proposed allowable amount of soil retained on 8" dia. Sieve.
(3) Sieve size given, denotes min. sieve size used in the appropriate sieving sequence.

SET-UP BY: ADC DATE 06/19/15 — CALCULATED BY: ADC — CHECKED BY: ADC

SUBMITTED BY: A. D. Camacho

LABORATORY WATER CONTENT: AS - RECEIVED CONDITION
ASTM D 2216

Project Number: 60530732 Task Number: 2.01.05.20.00

Project Name: Pure Water

Project Engineer: SF Test Method: B (0.1%)

Boring No.	DS-01	DS-01	DS-01	DS-01	DS-01		DS-02	
Sample No.	2	5	8b	10	11		3a	
Depth (ft.)	5	20	35	45	50		15	
Container No.	S10	S203	S217	S204	S205		S302	
Mass of Container and Wet Specimen, M1 (g)	335.04	467.70	275.27	458.24	430.36		502.09	
Mass Container and Dry Specimen, M2 (g)	313.74	402.86	237.61	367.89	355.53		392.14	
Mass Container, M3 (g)	84.01	147.88	137.94	149.08	139.32		144.91	
Water Content, w (%)	9.3	25.4	37.8	41.3	34.6		44.5	
Unified Soil Classification Group Symbol (Visual)	SM	SM	CL	ML	ML		ML	
Boring No.	DS-03	DS-03	DS-03					
Sample No.	6a	9b	11a					
Depth (ft.)	25	40	50					
Container No.	S304	S308	S206					
Mass of Container and Wet Specimen, M1 (g)	560.94	455.03	676.79					
Mass Container and Dry Specimen, M2 (g)	477.04	360.30	527.01					
Mass Container, M3 (g)	144.68	145.06	139.91					
Water Content, w (%)	25.2	44	38.7					
Unified Soil Classification Group Symbol (Visual)	SM	CL-ML	ML					

w = ((M1 - M2)/ (M2 - M3)) * 100

Recommended Minimum Mass of Moist Test Specimen in Accordance with ASTM D 2216		
Approximate Maximum Grain Size in Standard Sieve Size	Water Content Reported to ±0.1 %	Water Content Reported to ±1 %
No. 10	20 g	To be representative not less than 20 g shall be used.
No. 4	100 g	To be representative not less than 20 g shall be used.
3/8-in.	500 g	50 g
3/4-in.	2.5 kg	250 g
1 1/2-in.	10 kg	1 kg
3-in.	50 kg	5 kg

TESTED BY: GD Date 8/17/2017

CALCULATED BY: ADC

CHECKED BY: ADC

LABORATORY WATER CONTENT: AS - RECEIVED CONDITION
ASTM D 2216

Project Number: 60530732 Task Number: 2.01.05.20.00

Project Name: Pure Water

Project Engineer: SF Test Method: B (0.1%)

Boring No.	FM-08	FM-08	FM-10-1	FM-11	FM-14	FM-14	FM-14	FM-14
Sample No.	2	4	2	4	2a	2b	4a	4b/c
Depth (ft.)	5	15	5	15	5	5	15	15
Container No.	S7	S11	M1	M8	M6	M5	M7	M70
Mass of Container and Wet Specimen, M1 (g)	538.08	481.80	425.52	529.78	402.47	419.08	467.34	603.94
Mass Container and Dry Specimen, M2 (g)	488.09	420.44	376.48	427.68	384.97	372.79	418.55	532.39
Mass Container, M3 (g)	80.32	95.71	91.72	89.38	90.32	91.24	91.02	105.47
Water Content, w (%)	12.3	18.9	17.2	30.2	5.9	16.4	14.9	16.8
Unified Soil Classification Group Symbol (Visual)	SC	CL	CL	ML	SP	SC	SM	CL
Boring No.	FM-16	FM-17						
Sample No.	3	2						
Depth (ft.)	15	10						
Container No.	M89	M72						
Mass of Container and Wet Specimen, M1 (g)	713.17	708.82						
Mass Container and Dry Specimen, M2 (g)	647.42	618.18						
Mass Container, M3 (g)	109.50	108.58						
Water Content, w (%)	12.2	17.8						
Unified Soil Classification Group Symbol (Visual)	SM-ML	SM-ML						

w = ((M1 - M2)/ (M2 - M3)) * 100

Recommended Minimum Mass of Moist Test Specimen in Accordance with ASTM D 2216		
Approximate Maximum Grain Size in Standard Sieve Size	Water Content Reported to ±0.1 %	Water Content Reported to ±1 %
No. 10	20 g	To be representative not less than 20 g shall be used.
No. 4	100 g	To be representative not less than 20 g shall be used.
3/8-in.	500 g	50 g
3/4-in.	2.5 kg	250 g
1 1/2-in.	10 kg	1 kg
3-in.	50 kg	5 kg

TESTED BY: ADC Date 6/12/2017

CALCULATED BY: ADC

CHECKED BY: ADC

LABORATORY WATER CONTENT: AS - RECEIVED CONDITION
ASTM D 2216

Project Number: 60530732 | Task Number: 2.01.05.20.00

Project Name: Pure Water

Project Engineer: SF | Test Method: B (0.1%)

Boring No.	FM-09	FM-09	FM-18	FM-18				
Sample No.	1	3	2	4				
Depth (ft.)	5	15	5	15				
Container No.	S12	S39	S19	S33				
Mass of Container and Wet Specimen, M1 (g)	549.43	383.19	641.91	586.22				
Mass Container and Dry Specimen, M2 (g)	513.35	375.62	571.02	512.63				
Mass Container, M3 (g)	83.55	113.44	102.54	110.13				
Water Content, w (%)	8.4	2.9	15.1	18.3				
Unified Soil Classification Group Symbol (Visual)	SM	SW	ML	ML				

Boring No.								
Sample No.								
Depth (ft.)								
Container No.								
Mass of Container and Wet Specimen, M1 (g)								
Mass Container and Dry Specimen, M2 (g)								
Mass Container, M3 (g)								
Water Content, w (%)								
Unified Soil Classification Group Symbol (Visual)								

w = ((M1 - M2)/ (M2 - M3)) * 100

Recommended Minimum Mass of Moist Test Specimen in Accordance with ASTM D 2216		
Approximate Maximum Grain Size in Standard Sieve Size	Water Content Reported to ±0.1 %	Water Content Reported to ±1 %
No. 10	20 g	To be representative not less than 20 g shall be used.
No. 4	100 g	To be representative not less than 20 g shall be used.
3/8-in.	500 g	50 g
3/4-in.	2.5 kg	250 g
1 1/2-in.	10 kg	1 kg
3-in.	50 kg	5 kg

TESTED BY: ADC   Date 6/13/2017

CALCULATED BY: ADC

CHECKED BY: ADC

LABORATORY WATER CONTENT: AS - RECEIVED CONDITION
ASTM D 2216

Project Number: 60530732 Task Number: 2.01.05.20.00
Project Name: Pure Water
Project Engineer: SF Test Method: B (0.1%)

Boring No.	FM-26	FM-27	FM-28	FM-28	FM-29	FM-45	FM-45	
Sample No.	3	4	1	3	1	2	4	
Depth (ft.)	15	15	5	15	0~5	5	15	
Container No.	S306	S309	S33	S34	S39	M9	M8	
Mass of Container and Wet Specimen, M1 (g)	522.52	484.00	348.02	427.14	521.13	445.50	504.52	
Mass Container and Dry Specimen, M2 (g)	463.55	430.22	330.46	382.49	493.40	386.97	437.09	
Mass Container, M3 (g)	145.08	143.28	110.10	117.99	113.42	89.73	89.38	
Water Content, w (%)	18.5	18.7	8	16.9	7.3	19.7	19.4	
Unified Soil Classification Group Symbol (Visual)	ML	ML	SM	ML	SM	ML	ML	

Boring No.								
Sample No.								
Depth (ft.)								
Container No.								
Mass of Container and Wet Specimen, M1 (g)								
Mass Container and Dry Specimen, M2 (g)								
Mass Container, M3 (g)								
Water Content, w (%)								
Unified Soil Classification Group Symbol (Visual)								

w = ((M1 - M2)/ (M2 - M3)) * 100

Recommended Minimum Mass of Moist Test Specimen in Accordance with ASTM D 2216		
Approximate Maximum Grain Size in Standard Sieve Size	Water Content Reported to ±0.1 %	Water Content Reported to ±1 %
No. 10	20 g	To be representative not less than 20 g shall be used.
No. 4	100 g	To be representative not less than 20 g shall be used.
3/8-in.	500 g	50 g
3/4-in.	2.5 kg	250 g
1 1/2-in.	10 kg	1 kg
3-in.	50 kg	5 kg

TESTED BY: GD Date 8/18/2017

CALCULATED BY: ADC

CHECKED BY: ADC

LABORATORY WATER CONTENT: AS - RECEIVED CONDITION
ASTM D 2216

Project Number: 60530732 Task Number: 2.01.05.20.00
Project Name: Pure Water
Project Engineer: SF Test Method: B (0.1%)

Boring No.	FM-31	FM-31	FM-32	FM-32	FM-33	FM-33	FM-50	
Sample No.	2	4	1	3	3	7	1	
Depth (ft.)	5	15	5	15	7	15	0~5	
Container No.	M1	M91	M6	M67	M89	M72	M73	
Mass of Container and Wet Specimen, M1 (g)	582.45	473.05	438.15	480.39	417.72	475.72	639.34	
Mass Container and Dry Specimen, M2 (g)	508.57	412.52	384.75	424.27	371.64	426.68	588.57	
Mass Container, M3 (g)	91.70	89.78	90.32	110.41	109.49	108.61	108.67	
Water Content, w (%)	17.7	18.8	18.1	17.9	17.6	15.4	10.6	
Unified Soil Classification Group Symbol (Visual)	SC	CL	SM	CL	CL	CL	SM	

Boring No.								
Sample No.								
Depth (ft.)								
Container No.								
Mass of Container and Wet Specimen, M1 (g)								
Mass Container and Dry Specimen, M2 (g)								
Mass Container, M3 (g)								
Water Content, w (%)								
Unified Soil Classification Group Symbol (Visual)								

w = ((M1 - M2)/ (M2 - M3)) * 100

Recommended Minimum Mass of Moist Test Specimen in Accordance with ASTM D 2216		
Approximate Maximum Grain Size in Standard Sieve Size	Water Content Reported to ±0.1 %	Water Content Reported to ±1 %
No. 10	20 g	To be representative not less than 20 g shall be used.
No. 4	100 g	To be representative not less than 20 g shall be used.
3/8-in.	500 g	50 g
3/4-in.	2.5 kg	250 g
1 1/2-in.	10 kg	1 kg
3-in.	50 kg	5 kg

TESTED BY: GD Date 8/18/2017

CALCULATED BY: ADC

CHECKED BY: ADC

LABORATORY WATER CONTENT: AS - RECEIVED CONDITION
ASTM D 2216

Project Number: 60530732 Task Number: 2.01.05.20.00
Project Name: Pure Water
Project Engineer: SF Test Method: B (0.1%)

Boring No.	FM-34	FM-34	FM-35					
Sample No.	3	4	2a,b					
Depth (ft.)	15	18.5	5					
Container No.	M70	M72	M89					
Mass of Container and Wet Specimen, M1 (g)	389.04	339.62	457.53					
Mass Container and Dry Specimen, M2 (g)	355.33	314.09	415.54					
Mass Container, M3 (g)	105.51	108.61	109.53					
Water Content, w (%)	13.5	12.4	13.7					
Unified Soil Classification Group Symbol (Visual)	SM	MH	SM					

Boring No.								
Sample No.								
Depth (ft.)								
Container No.								
Mass of Container and Wet Specimen, M1 (g)								
Mass Container and Dry Specimen, M2 (g)								
Mass Container, M3 (g)								
Water Content, w (%)								
Unified Soil Classification Group Symbol (Visual)								

w = ((M1 - M2)/ (M2 - M3)) * 100

Recommended Minimum Mass of Moist Test Specimen in Accordance with ASTM D 2216		
Approximate Maximum Grain Size in Standard Sieve Size	Water Content Reported to ±0.1 %	Water Content Reported to ±1 %
No. 10	20 g	To be representative not less than 20 g shall be used.
No. 4	100 g	To be representative not less than 20 g shall be used.
3/8-in.	500 g	50 g
3/4-in.	2.5 kg	250 g
1 1/2-in.	10 kg	1 kg
3-in.	50 kg	5 kg

TESTED BY: GD Date 7/24/2017

CALCULATED BY: ADC

CHECKED BY: ADC

LABORATORY WATER CONTENT: AS - RECEIVED CONDITION
ASTM D 2216

Project Number: 60530732 Task Number: 2.01.05.20.00

Project Name: Pure Water

Project Engineer: SF Test Method: B (0.1%)

Boring No.	FM-36b	FM-36b	FM-44					
Sample No.	2	4	1a,b					
Depth (ft.)	5	15	5					
Container No.	S31	S209	S206					
Mass of Container and Wet Specimen, M1 (g)	230.25	406.37	339.80					
Mass Container and Dry Specimen, M2 (g)	220.73	386.37	318.10					
Mass Container, M3 (g)	98.24	146.53	139.92					
Water Content, w (%)	7.8	8.3	12.2					
Unified Soil Classification Group Symbol (Visual)	SC	SM	SC					

Boring No.								
Sample No.								
Depth (ft.)								
Container No.								
Mass of Container and Wet Specimen, M1 (g)								
Mass Container and Dry Specimen, M2 (g)								
Mass Container, M3 (g)								
Water Content, w (%)								
Unified Soil Classification Group Symbol (Visual)								

w = ((M1 - M2)/ (M2 - M3)) * 100

Recommended Minimum Mass of Moist Test Specimen in Accordance with ASTM D 2216		
Approximate Maximum Grain Size in Standard Sieve Size	Water Content Reported to ±0.1 %	Water Content Reported to ±1 %
No. 10	20 g	To be representative not less than 20 g shall be used.
No. 4	100 g	To be representative not less than 20 g shall be used.
3/8-in.	500 g	50 g
3/4-in.	2.5 kg	250 g
1 1/2-in.	10 kg	1 kg
3-in.	50 kg	5 kg

TESTED BY: GD Date 7/21/2017

CALCULATED BY: ADC

CHECKED BY: ADC

LABORATORY WATER CONTENT: AS - RECEIVED CONDITION
ASTM D 2216

Project Number: 60530732 Task Number: 2.01.05.20.00
Project Name: Pure Water
Project Engineer: SF Test Method: B (0.1%)

Boring No.	FM-49	FM-49						
Sample No.	2	4						
Depth (ft.)	5	15						
Container No.	S304	S308						
Mass of Container and Wet Specimen, M1 (g)	406.85	381.02						
Mass Container and Dry Specimen, M2 (g)	367.03	365.12						
Mass Container, M3 (g)	144.65	145.10						
Water Content, w (%)	17.9	7.2						
Unified Soil Classification Group Symbol (Visual)	ML	SM						

Boring No.								
Sample No.								
Depth (ft.)								
Container No.								
Mass of Container and Wet Specimen, M1 (g)								
Mass Container and Dry Specimen, M2 (g)								
Mass Container, M3 (g)								
Water Content, w (%)								
Unified Soil Classification Group Symbol (Visual)								

w = ((M1 - M2)/ (M2 - M3)) * 100

Recommended Minimum Mass of Moist Test Specimen in Accordance with ASTM D 2216		
Approximate Maximum Grain Size in Standard Sieve Size	Water Content Reported to ±0.1 %	Water Content Reported to ±1 %
No. 10	20 g	To be representative not less than 20 g shall be used.
No. 4	100 g	To be representative not less than 20 g shall be used.
3/8-in.	500 g	50 g
3/4-in.	2.5 kg	250 g
1 1/2-in.	10 kg	1 kg
3-in.	50 kg	5 kg

TESTED BY: GD Date 7/25/2017

CALCULATED BY: ADC

CHECKED BY: ADC

LABORATORY WATER CONTENT: AS - RECEIVED CONDITION
ASTM D 2216

Project Number: 60530732 Task Number: 1.01.05.20.00
Project Name: Pure Water
Project Engineer: SF Test Method: B (0.1%)

Boring No.	PS-3	PS-3	PS-3					
Sample No.	11a	12a	13					
Depth (ft.)	60	65	70					
Container No.	S30	C6	S6					
Mass of Container and Wet Specimen, M1 (g)	270.39	296.80	315.03					
Mass Container and Dry Specimen, M2 (g)	244.48	235.02	266.14					
Mass Container, M3 (g)	120.41	71.88	79.82					
Water Content, w (%)	20.9	37.9	26.2					
Unified Soil Classification Group Symbol (Visual)	SP	CH	ML					

Boring No.								
Sample No.								
Depth (ft.)								
Container No.								
Mass of Container and Wet Specimen, M1 (g)								
Mass Container and Dry Specimen, M2 (g)								
Mass Container, M3 (g)								
Water Content, w (%)								
Unified Soil Classification Group Symbol (Visual)								

w = ((M1 - M2)/ (M2 - M3)) * 100

Recommended Minimum Mass of Moist Test Specimen in Accordance with ASTM D 2216

Approximate Maximum Grain Size in Standard Sieve Size	Water Content Reported to ±0.1 %	Water Content Reported to ±1 %
No. 10	20 g	To be representative not less than 20 g shall be used.
No. 4	100 g	To be representative not less than 20 g shall be used.
3/8-in.	500 g	50 g
3/4-in.	2.5 kg	250 g
1 1/2-in.	10 kg	1 kg
3-in.	50 kg	5 kg

TESTED BY: ADC Date 6/9/2017

CALCULATED BY: ADC

CHECKED BY: ADC

LABORATORY WATER CONTENT: AS - RECEIVED CONDITION
ASTM D 2216

Project Number: 60530732 Task Number: 2.01.05.20.00
Project Name: Pure Water
Project Engineer: SF Test Method: B (0.1%)

Boring No.	WM-01	WM-01	WM-01	WM-03	WM-03	WM-11	WM-16	WM-21
Sample No.	2	4a	5	2a	5a	2	1	1
Depth (ft.)	5	15	18.5	5	18.5	6	6	5
Container No.	S2	S219	S300	S211	S222	M60	M66	M67
Mass of Container and Wet Specimen, M1 (g)	520.90	471.42	631.91	553.10	571.39	405.03	305.11	560.88
Mass Container and Dry Specimen, M2 (g)	489.39	424.74	527.61	483.36	499.04	376.26	299.96	494.58
Mass Container, M3 (g)	100.09	140.70	143.53	148.48	140.49	91.37	101.65	110.42
Water Content, w (%)	8.1	16.4	27.2	20.8	20.2	10.1	2.6	17.3
Unified Soil Classification Group Symbol (Visual)	SM	ML	SP	ML	SM	SC	SP-SM	SC

Boring No.	WM-21	WM-24						
Sample No.	3	2						
Depth (ft.)	15	5						
Container No.	M73	F110						
Mass of Container and Wet Specimen, M1 (g)	564.84	599.74						
Mass Container and Dry Specimen, M2 (g)	496.36	546.40						
Mass Container, M3 (g)	108.68	109.55						
Water Content, w (%)	17.7	12.2						
Unified Soil Classification Group Symbol (Visual)	SC	SM						

w = ((M1 - M2)/ (M2 - M3)) * 100

Recommended Minimum Mass of Moist Test Specimen in Accordance with ASTM D 2216		
Approximate Maximum Grain Size in Standard Sieve Size	Water Content Reported to ±0.1 %	Water Content Reported to ±1 %
No. 10	20 g	To be representative not less than 20 g shall be used.
No. 4	100 g	To be representative not less than 20 g shall be used.
3/8-in.	500 g	50 g
3/4-in.	2.5 kg	250 g
1 1/2-in.	10 kg	1 kg
3-in.	50 kg	5 kg

TESTED BY: ADC Date 6/19/2017

CALCULATED BY: ADC

CHECKED BY: ADC

LABORATORY WATER CONTENT: AS - RECEIVED CONDITION
ASTM D 2216

Project Number: 60530732 | Task Number: 2.01.05.20.00

Project Name: Pure Water

Project Engineer: SF | Test Method: B (0.1%)

Boring No.	WM-06	WM-08	WM-23	WM-23				
Sample No.	2	4a	1	3				
Depth (ft.)	5	15.5	5	15				
Container No.	S45	S34	S27	S32				
Mass of Container and Wet Specimen, M1 (g)	498.55	455.65	538.70	490.98				
Mass Container and Dry Specimen, M2 (g)	464.86	401.68	501.61	460.40				
Mass Container, M3 (g)	77.64	117.98	79.00	78.29				
Water Content, w (%)	8.7	19	8.8	8				
Unified Soil Classification Group Symbol (Visual)	SM	ML	CL	CL				
Boring No.								
Sample No.								
Depth (ft.)								
Container No.								
Mass of Container and Wet Specimen, M1 (g)								
Mass Container and Dry Specimen, M2 (g)								
Mass Container, M3 (g)								
Water Content, w (%)								
Unified Soil Classification Group Symbol (Visual)								

w = ((M1 - M2)/ (M2 - M3)) * 100

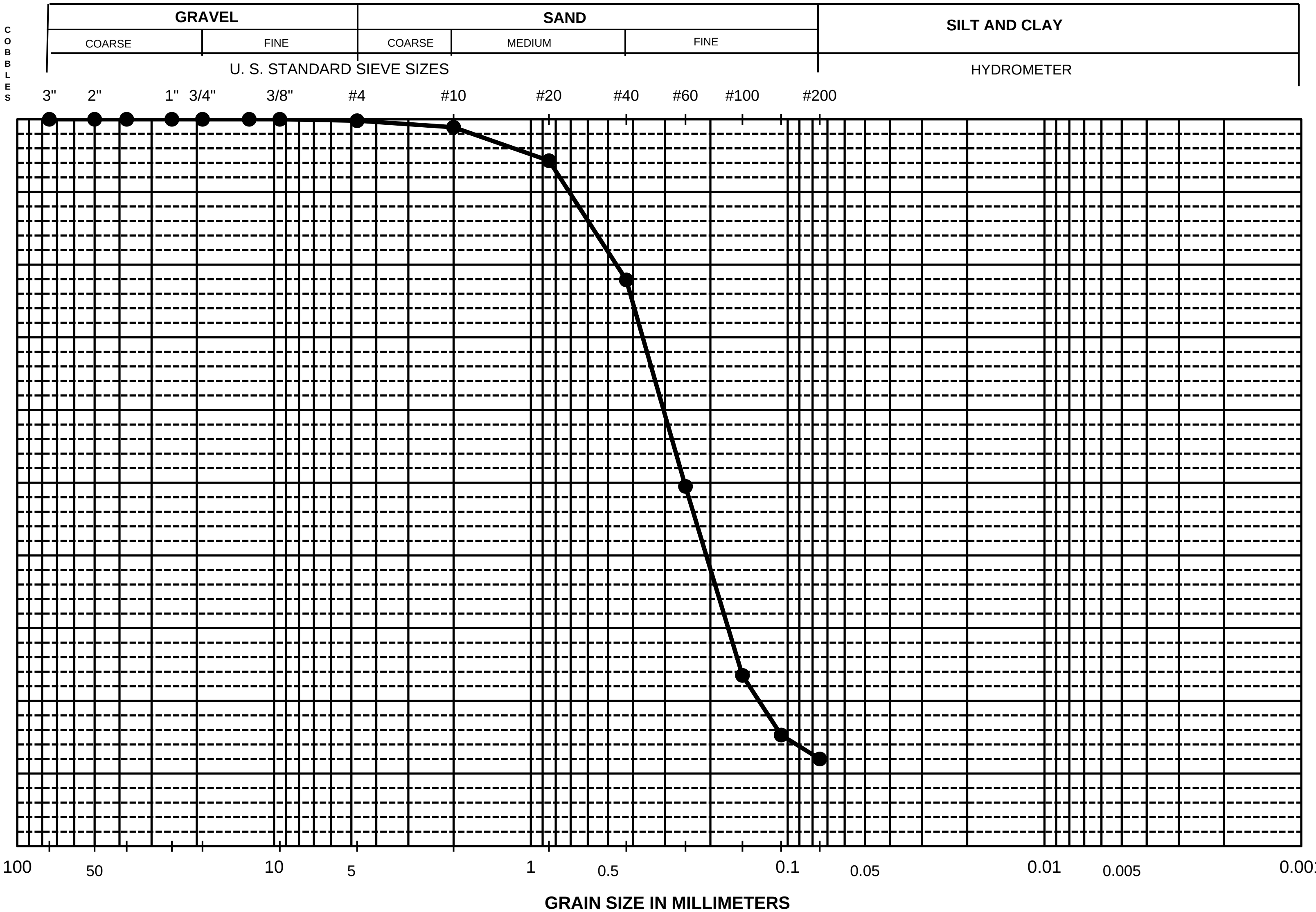
Recommended Minimum Mass of Moist Test Specimen in Accordance with ASTM D 2216		
Approximate Maximum Grain Size in Standard Sieve Size	Water Content Reported to ±0.1 %	Water Content Reported to ±1 %
No. 10	20 g	To be representative not less than 20 g shall be used.
No. 4	100 g	To be representative not less than 20 g shall be used.
3/8-in.	500 g	50 g
3/4-in.	2.5 kg	250 g
1 1/2-in.	10 kg	1 kg
3-in.	50 kg	5 kg

TESTED BY: ADC | Date 6/13/2017

CALCULATED BY: ADC

CHECKED BY: ADC

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	99.8
#10	2.00	98.9
#20	0.850	94.3
#40	0.425	77.9
#60	0.250	49.5
#100	0.150	23.5
#140	0.106	15.3
#200	0.075	12.0
Hydrometer Analysis		

% Cobbles	---
% Gravel	0.2
% Sand	87.8
% Fines	12.0
D_{85}	0.574
D_{60}	0.304
D_{50}	0.252
D_{30}	0.170
D_{15}	0.103
D_{10}	---
C_u	----
C_c	-----

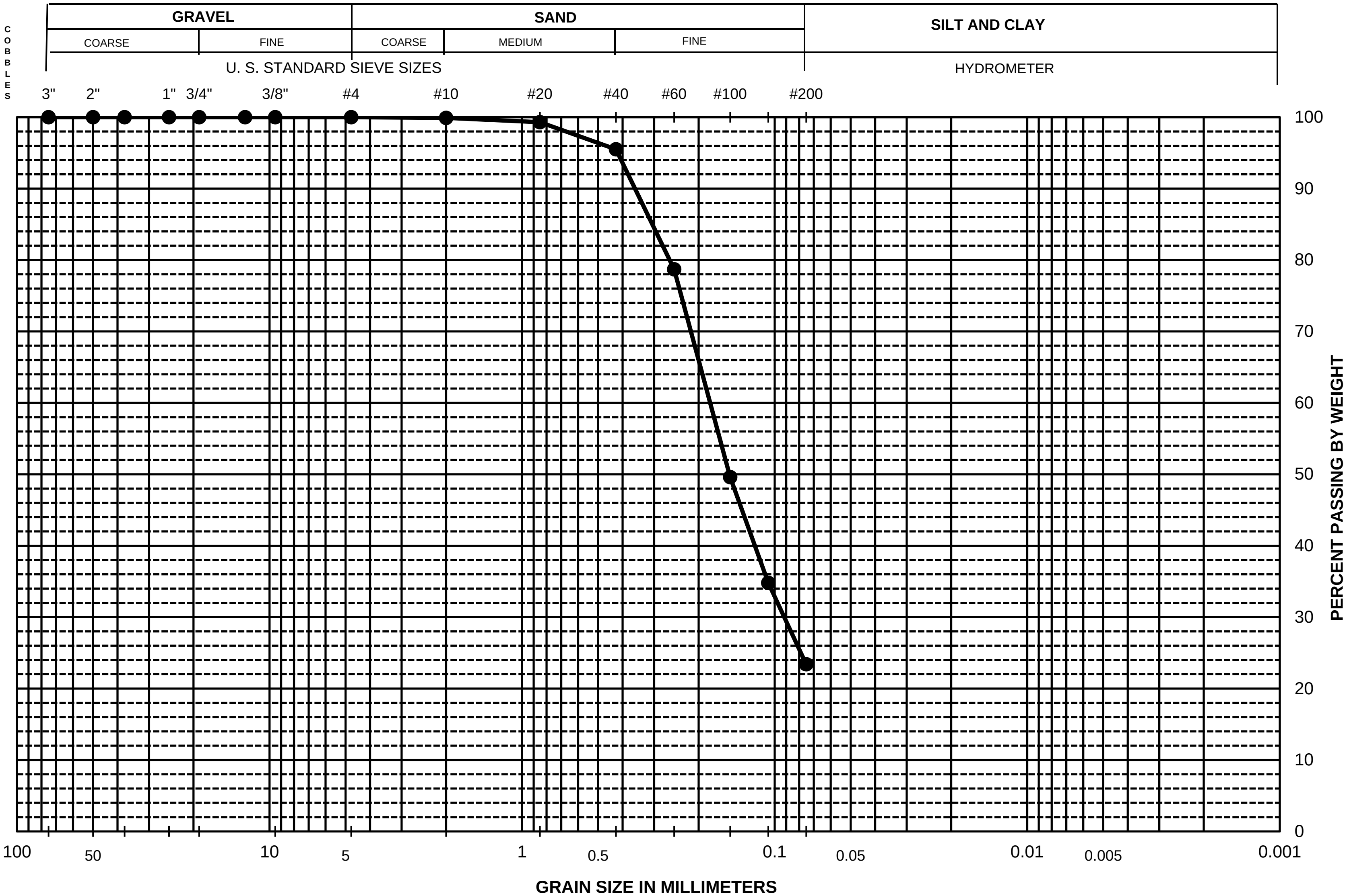
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
DS-03	4	15.0	l	32.6	---	---	---	**Dark olive gray Poorly Graded SAND with Silt (SP-SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	99.9
#20	0.850	99.3
#40	0.425	95.5
#60	0.250	78.7
#100	0.150	49.6
#140	0.106	34.8
#200	0.075	23.4
Hydrometer Analysis		

% Cobbles	---
% Gravel	0.0
% Sand	76.6
% Fines	23.4
D_{85}	0.305
D_{60}	0.180
D_{50}	0.151
D_{30}	0.092
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

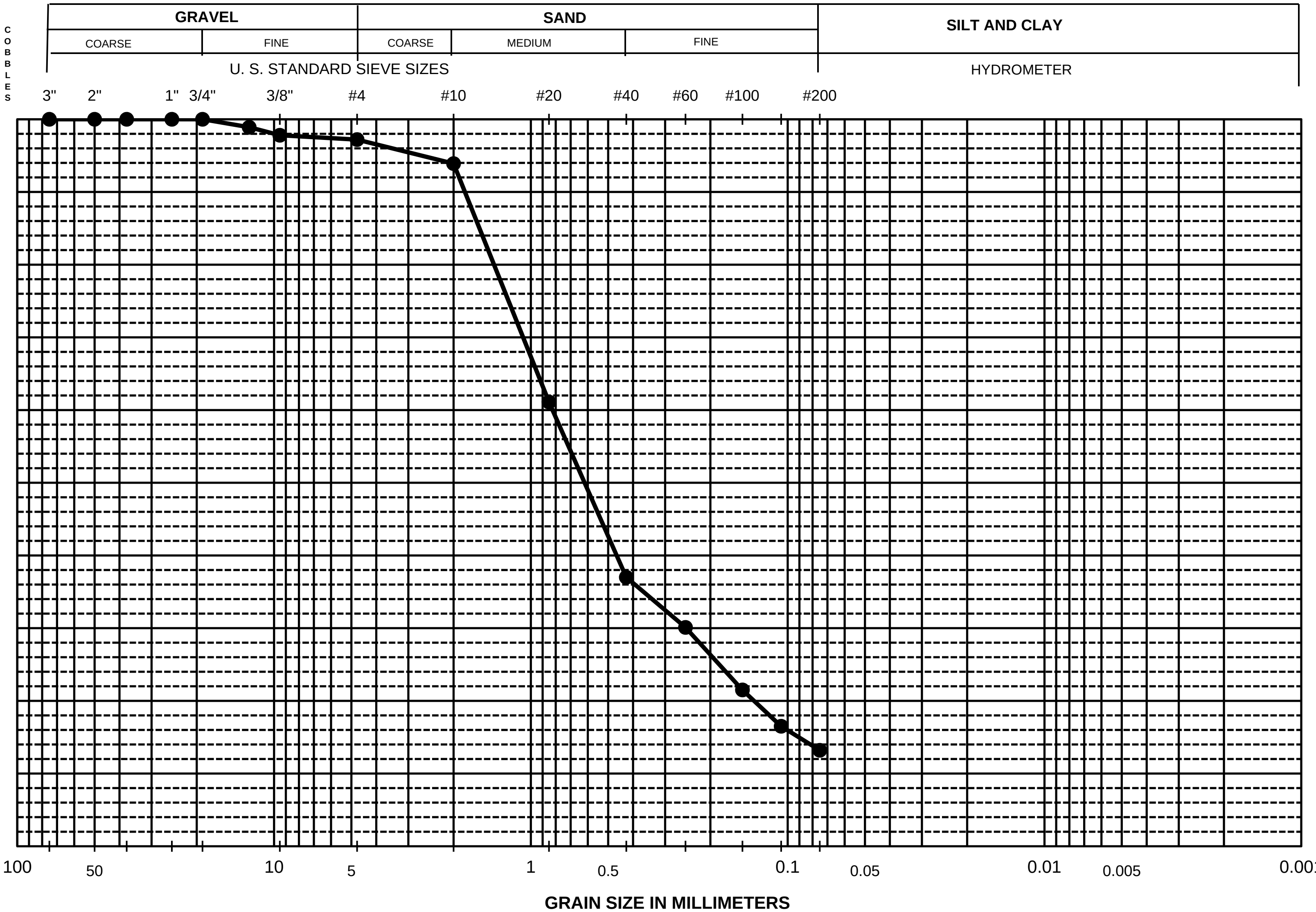
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-02	1	0-5	l	9.1	---	---	---	**Olive brown Silty SAND (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	98.9
3/8"	9.50	97.8
#4	4.75	97.2
#10	2.00	93.9
#20	0.850	61.1
#40	0.425	37.0
#60	0.250	30.1
#100	0.150	21.5
#140	0.106	16.5
#200	0.075	13.2
Hydrometer Analysis		

% Cobbles	---
% Gravel	2.8
% Sand	84.0
% Fines	13.2
D_{85}	1.586
D_{60}	0.824
D_{50}	0.618
D_{30}	0.249
D_{15}	0.091
D_{10}	---
C_u	----
C_c	-----

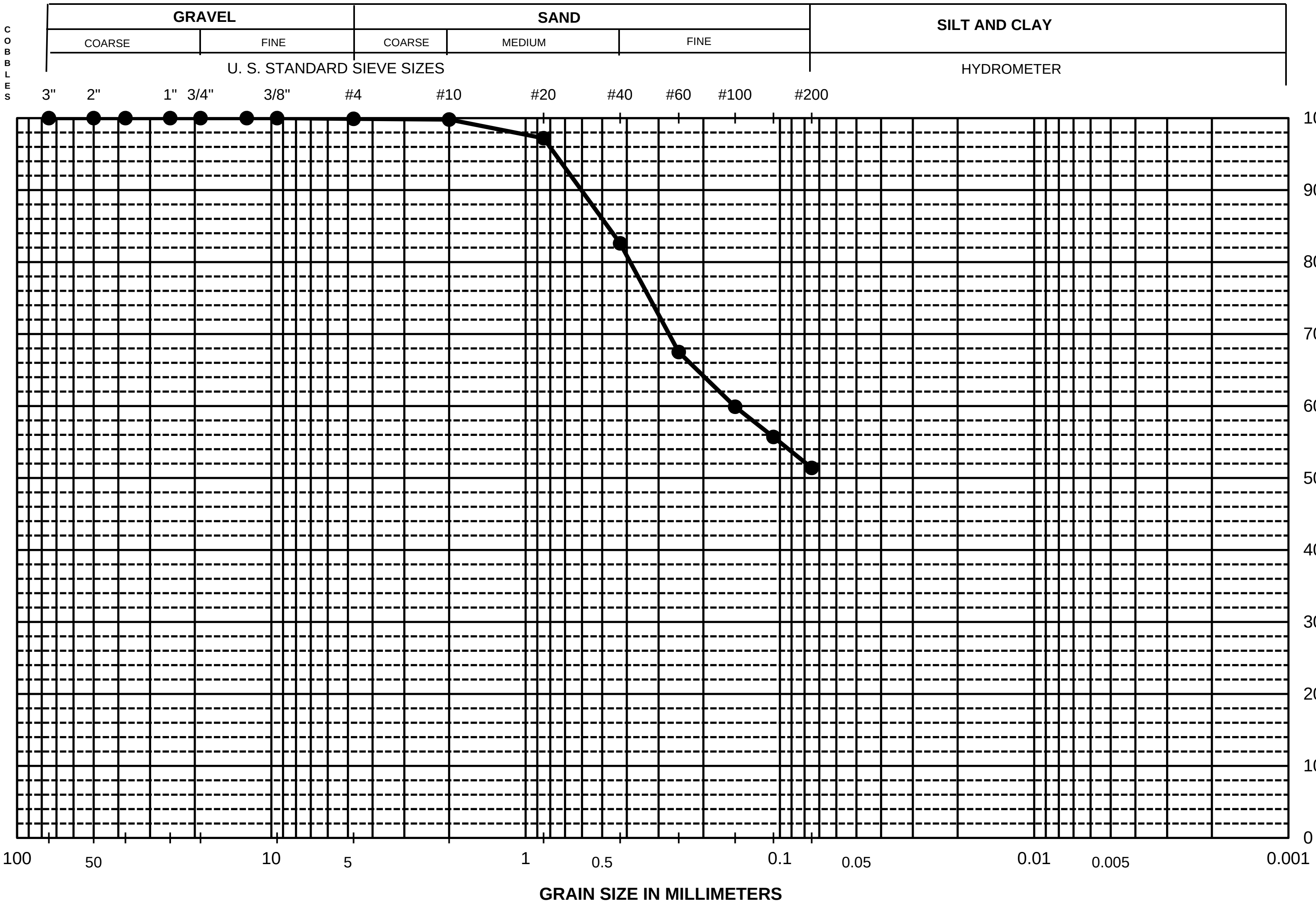
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-06	1	5.0	l	6.5	---	---	---	**Dark yellowish brown Silty SAND (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	99.9
#10	2.00	99.8
#20	0.850	97.2
#40	0.425	82.6
#60	0.250	67.5
#100	0.150	59.9
#140	0.106	55.7
#200	0.075	51.4
Hydrometer Analysis		

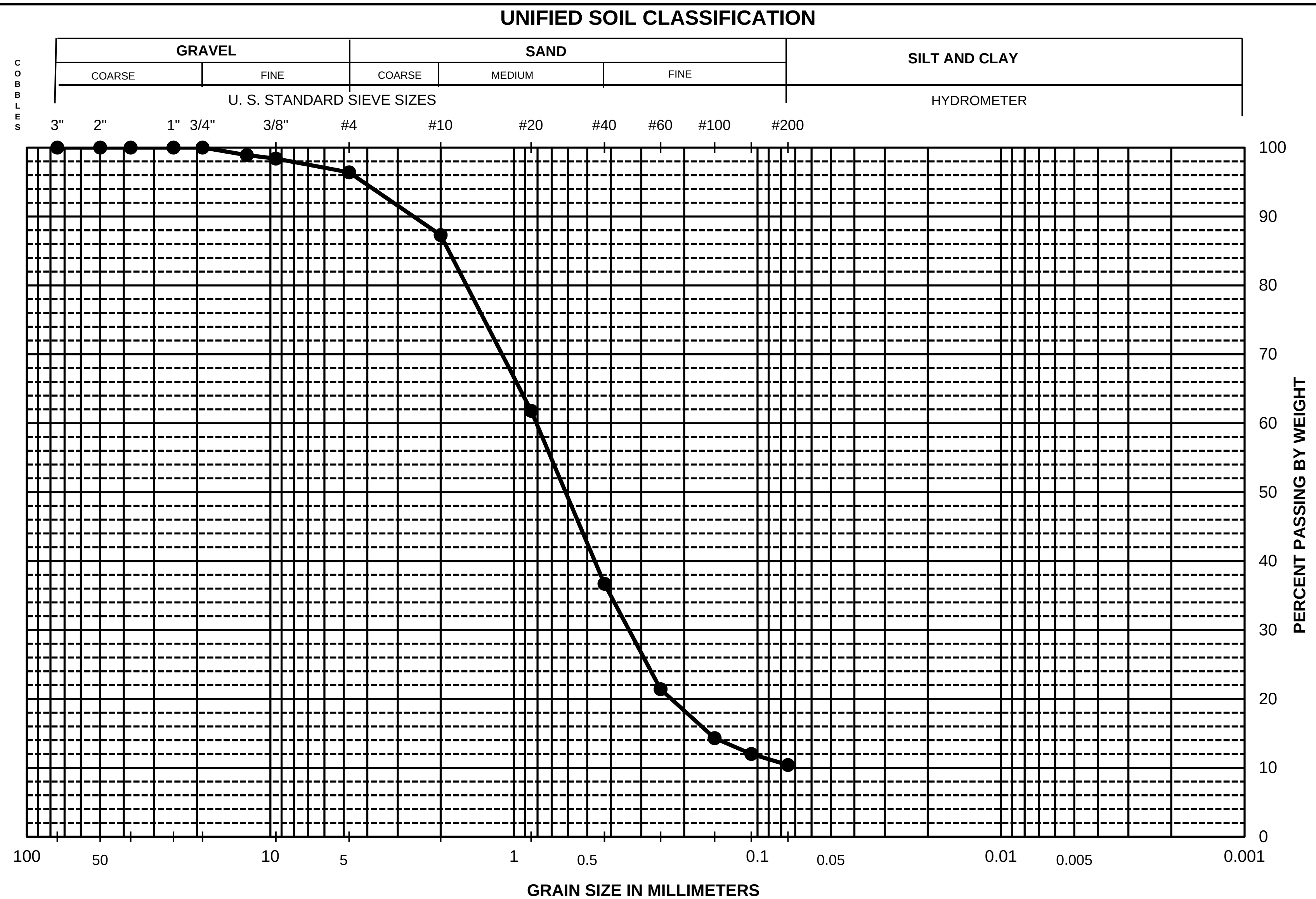
% Cobbles	---
% Gravel	0.1
% Sand	48.5
% Fines	51.4
D_{85}	0.476
D_{60}	0.151
D_{50}	---
D_{30}	---
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-08	3	10.0	I	8.7	---	---	---	**Dark yellowish brown Sandy, Lean CLAY (CL)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	98.9
3/8"	9.50	98.4
#4	4.75	96.4
#10	2.00	87.3
#20	0.850	61.8
#40	0.425	36.7
#60	0.250	21.4
#100	0.150	14.3
#140	0.106	12.0
#200	0.075	10.4
Hydrometer Analysis		

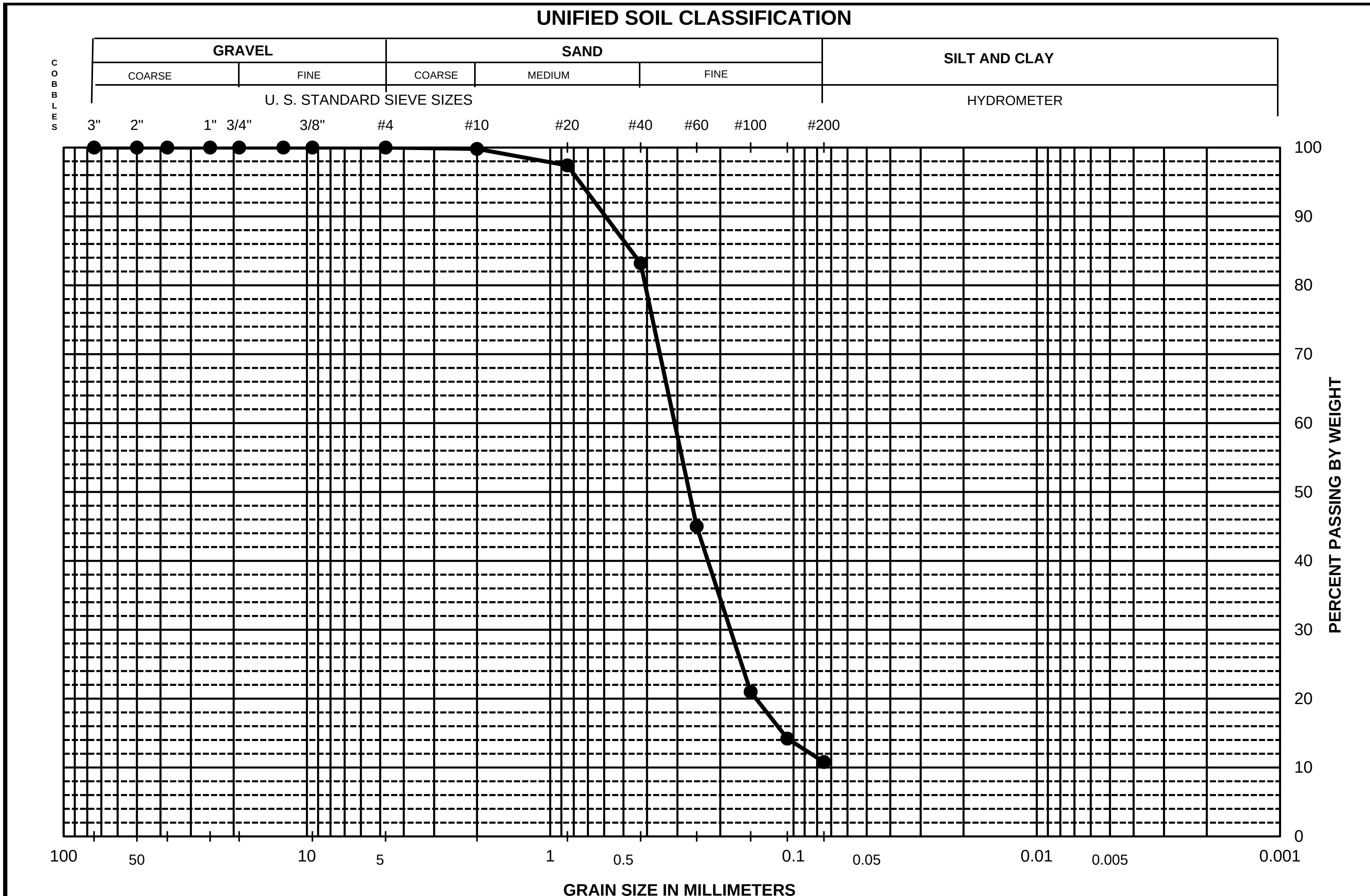
% Cobbles	---
% Gravel	3.6
% Sand	86.0
% Fines	10.4
D_{85}	1.851
D_{60}	0.809
D_{50}	0.614
D_{30}	0.337
D_{15}	0.158
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-09	2	10.0	l	2.9	---	---	---	**Yellowish brown Poorly Graded SAND with Silt (SP-SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	99.8
#20	0.850	97.4
#40	0.425	83.2
#60	0.250	45.0
#100	0.150	21.0
#140	0.106	14.2
#200	0.075	10.8
Hydrometer Analysis		

% Cobbles	---
% Gravel	0.0
% Sand	89.2
% Fines	10.8
D_{85}	0.464
D_{60}	0.308
D_{50}	0.268
D_{30}	0.182
D_{15}	0.110
D_{10}	---
C_u	----
C_c	-----

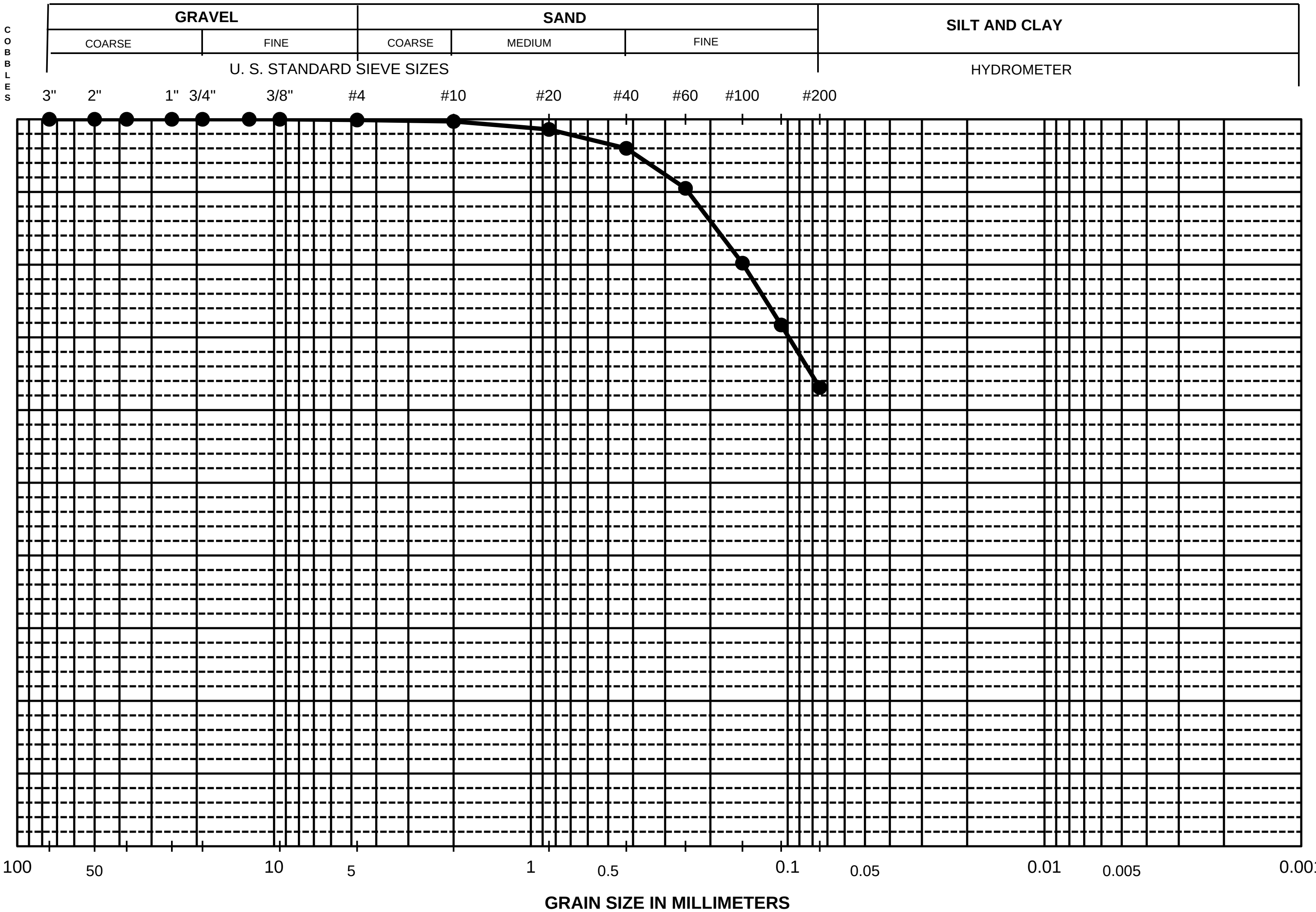
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-11	2	5.0	l	6.7	---	---	---	**Dark yellowish brown Poorly Graded SAND with Silt (SP-SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	99.9
#10	2.00	99.7
#20	0.850	98.6
#40	0.425	96.0
#60	0.250	90.5
#100	0.150	80.2
#140	0.106	71.7
#200	0.075	63.1

Hydrometer Analysis

% Cobbles	---
% Gravel	0.1
% Sand	36.8
% Fines	63.1
D_{85}	0.190
D_{60}	---
D_{50}	---
D_{30}	---
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

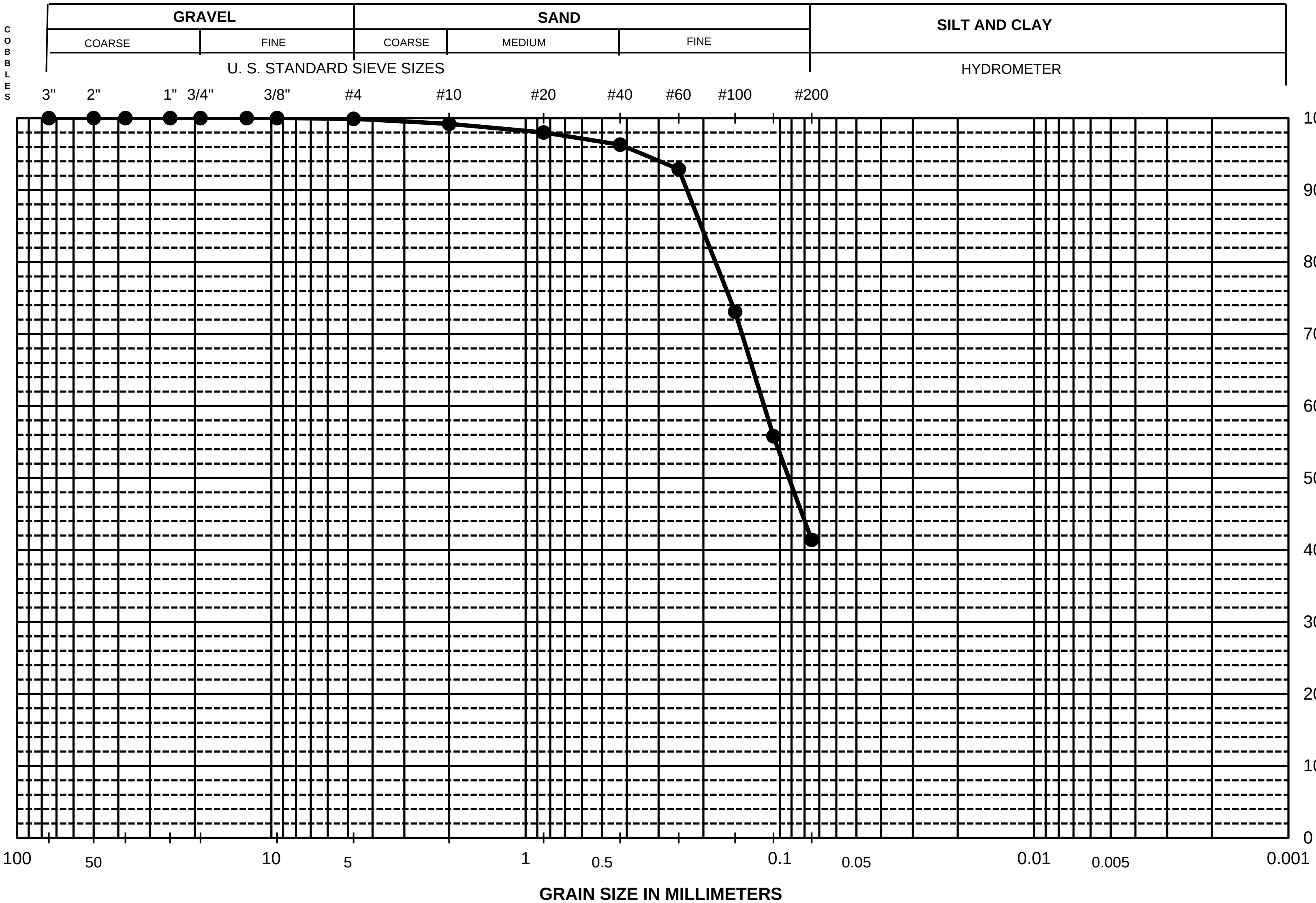
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-16	4	18.5	l	19.9	---	---	---	**Yellowish brown Sandy, Lean CLAY (CL)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	99.9
#10	2.00	99.2
#20	0.850	98.0
#40	0.425	96.3
#60	0.250	92.9
#100	0.150	73.1
#140	0.106	55.8
#200	0.075	41.4

Hydrometer Analysis

% Cobbles	---
% Gravel	0.1
% Sand	58.5
% Fines	41.4
D_{85}	0.204
D_{60}	0.115
D_{50}	0.092
D_{30}	---
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

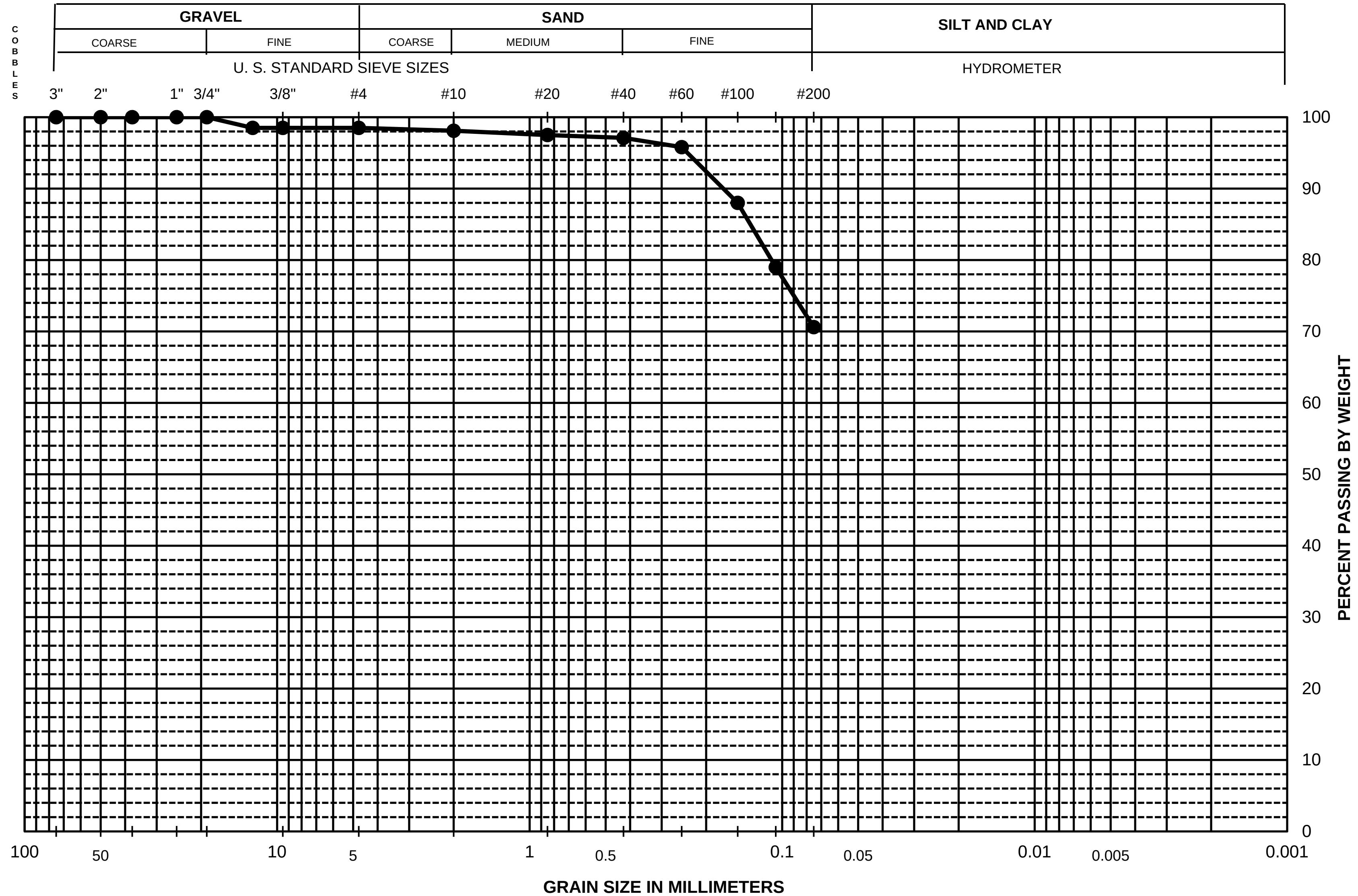
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-17	3	15.0	l	15.5	---	---	---	**Olive yellow Silty SAND (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	98.5
3/8"	9.50	98.5
#4	4.75	98.5
#10	2.00	98.1
#20	0.850	97.5
#40	0.425	97.1
#60	0.250	95.8
#100	0.150	88.0
#140	0.106	79.0
#200	0.075	70.6
Hydrometer Analysis		

% Cobbles	---
% Gravel	1.5
% Sand	27.9
% Fines	70.6
D_{85}	0.134
D_{60}	---
D_{50}	---
D_{30}	---
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

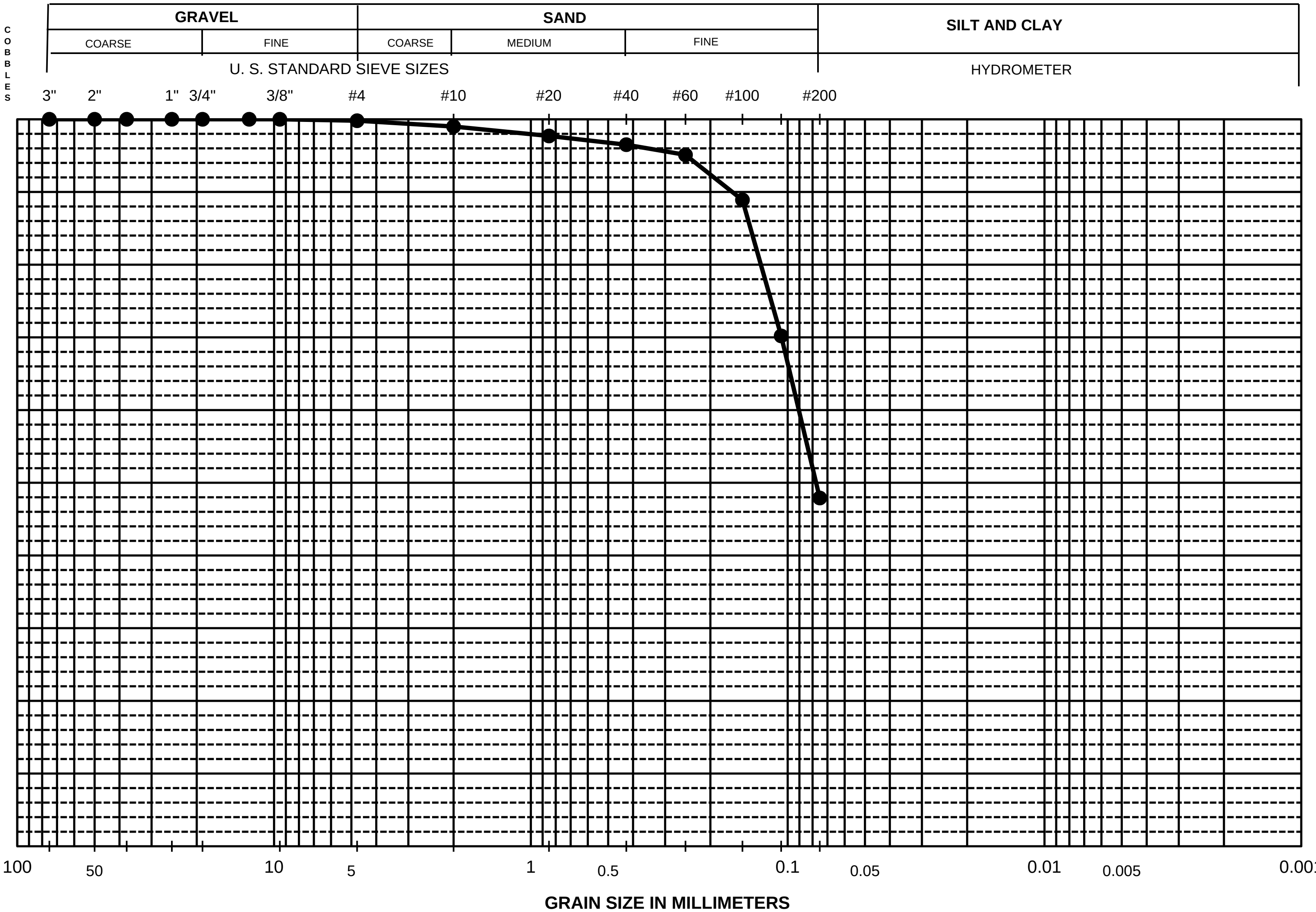
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-19	1	5.0	l	18.4	---	---	---	**Light olive brown SILT with Sand (ML)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	99.8
#10	2.00	99.0
#20	0.850	97.7
#40	0.425	96.5
#60	0.250	95.1
#100	0.150	88.9
#140	0.106	70.2
#200	0.075	47.9
Hydrometer Analysis		

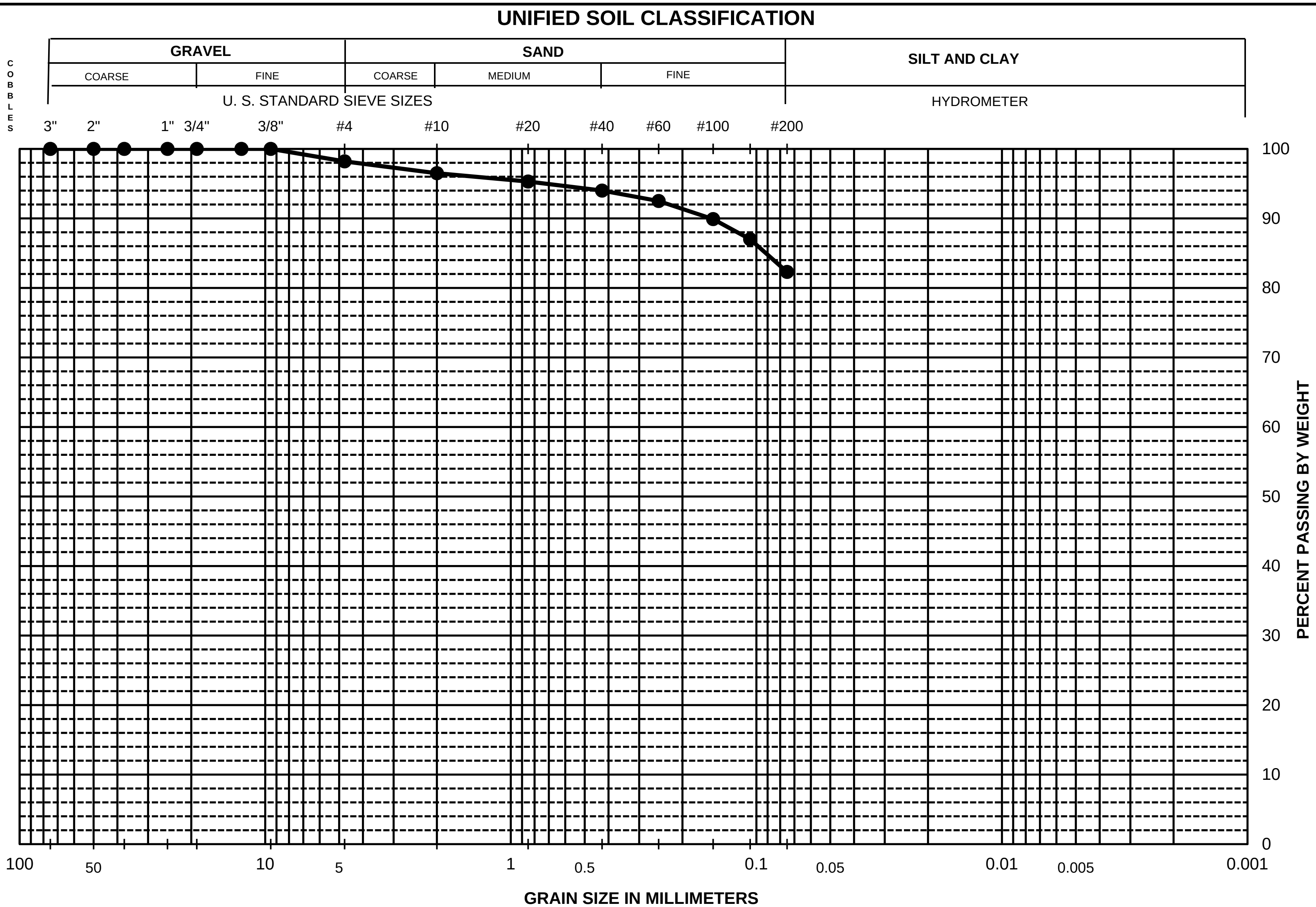
% Cobbles	---
% Gravel	0.2
% Sand	51.9
% Fines	47.9
D_{85}	0.140
D_{60}	0.090
D_{50}	0.077
D_{30}	---
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-20	2	5.0	l	17.7	---	---	---	**Yellowish brown Silty SAND (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	98.2
#10	2.00	96.5
#20	0.850	95.3
#40	0.425	94.0
#60	0.250	92.5
#100	0.150	89.9
#140	0.106	87.0
#200	0.075	82.3
Hydrometer Analysis		

% Cobbles	---
% Gravel	1.8
% Sand	15.9
% Fines	82.3
D_{85}	0.091
D_{60}	---
D_{50}	---
D_{30}	---
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

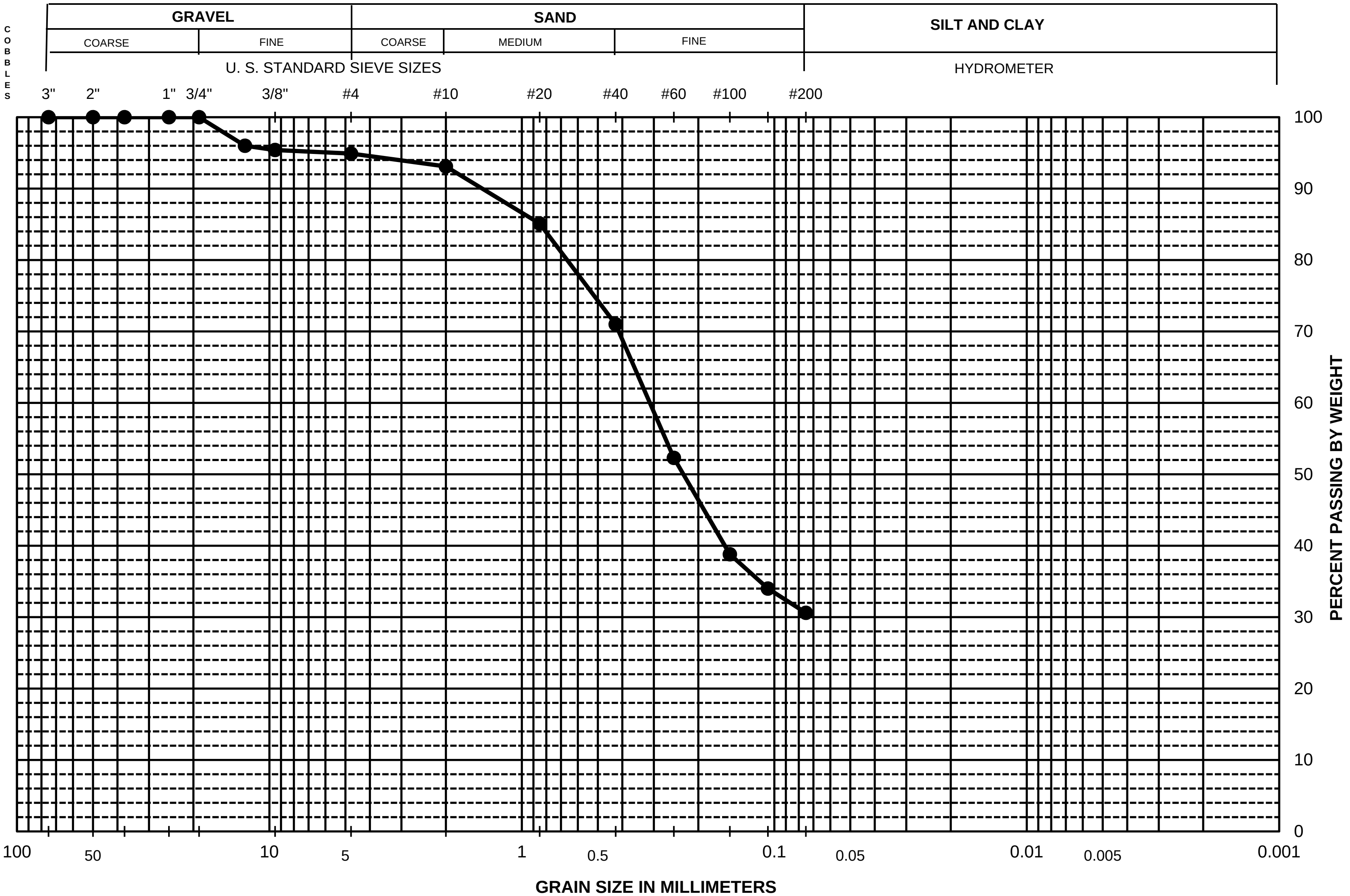
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-20	4	15.0	I	17.9	---	---	---	**Yellowish brown SILT with Sand (ML)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	96.0
3/8"	9.50	95.4
#4	4.75	94.9
#10	2.00	93.1
#20	0.850	85.1
#40	0.425	71.0
#60	0.250	52.3
#100	0.150	38.8
#140	0.106	34.0
#200	0.075	30.6

Hydrometer Analysis

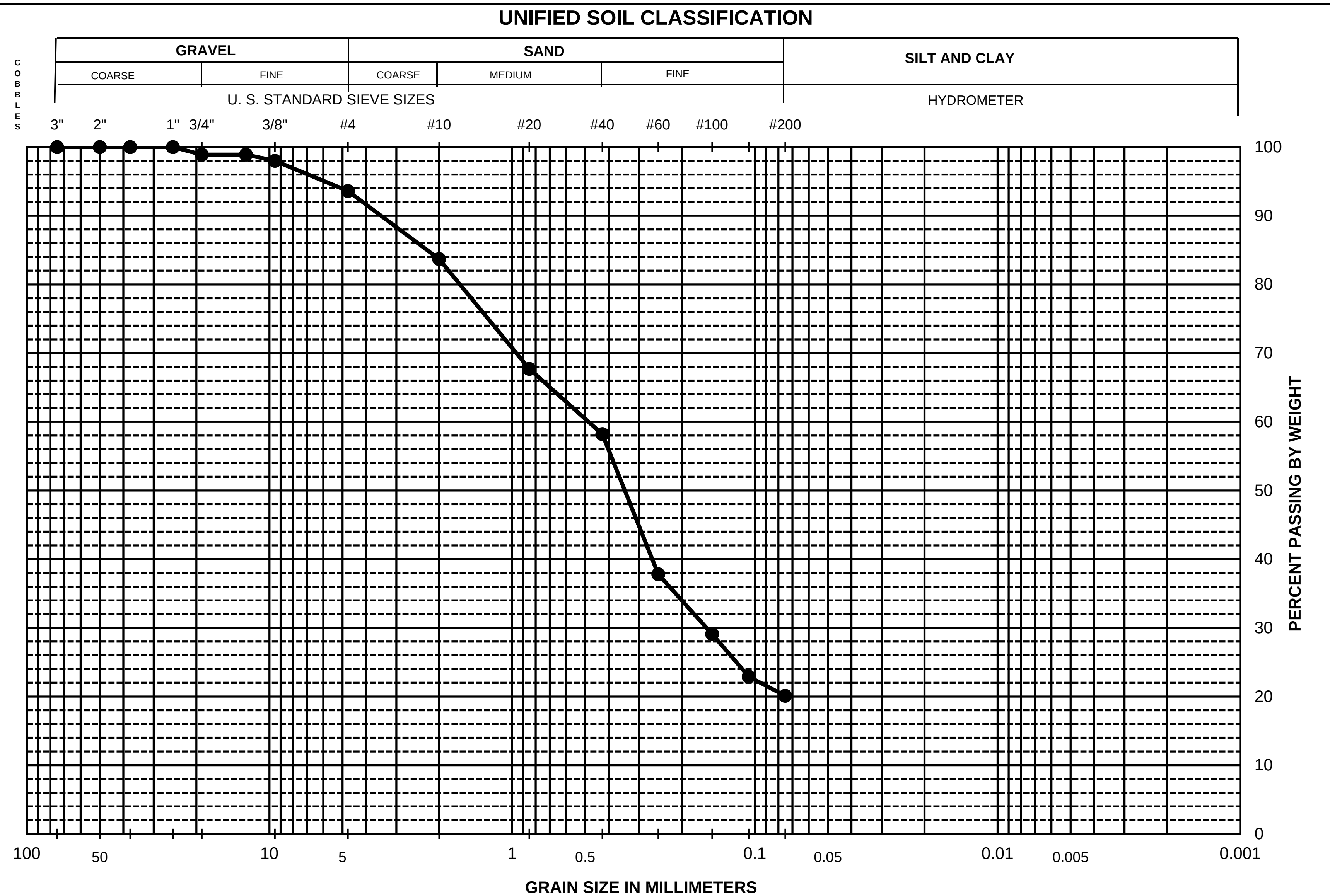
% Cobbles	---
% Gravel	5.1
% Sand	64.3
% Fines	30.6
D_{85}	0.846
D_{60}	0.311
D_{50}	0.229
D_{30}	---
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-21	2	5.0	l	5.9	---	---	---	**Dark yellowish brown Silty SAND (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	98.9
1/2"	12.50	98.9
3/8"	9.50	98.0
#4	4.75	93.6
#10	2.00	83.7
#20	0.850	67.7
#40	0.425	58.2
#60	0.250	37.8
#100	0.150	29.1
#140	0.106	22.9
#200	0.075	20.1
Hydrometer Analysis		

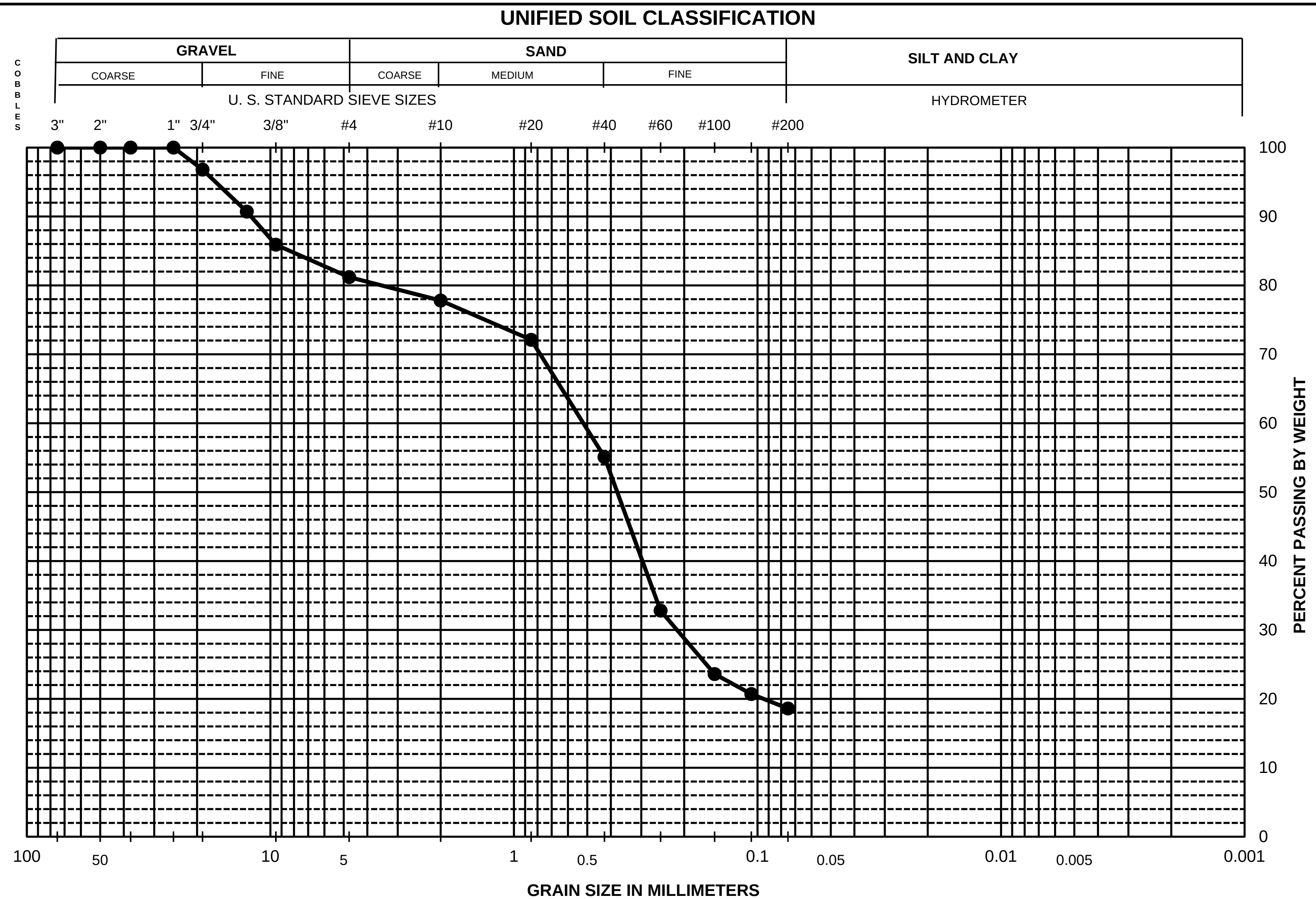
% Cobbles	---
% Gravel	6.4
% Sand	73.5
% Fines	20.1
D_{85}	2.241
D_{60}	0.485
D_{50}	0.343
D_{30}	0.158
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-25	5	18.5	l	10.0	---	---	---	**Dark yellowish brown Silty SAND (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	96.8
1/2"	12.50	90.7
3/8"	9.50	85.9
#4	4.75	81.2
#10	2.00	77.8
#20	0.850	72.1
#40	0.425	55.1
#60	0.250	32.8
#100	0.150	23.6
#140	0.106	20.7
#200	0.075	18.6
Hydrometer Analysis		

% Cobbles	---
% Gravel	18.8
% Sand	62.6
% Fines	18.6
D_{85}	8.319
D_{60}	0.519
D_{50}	0.376
D_{30}	0.214
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

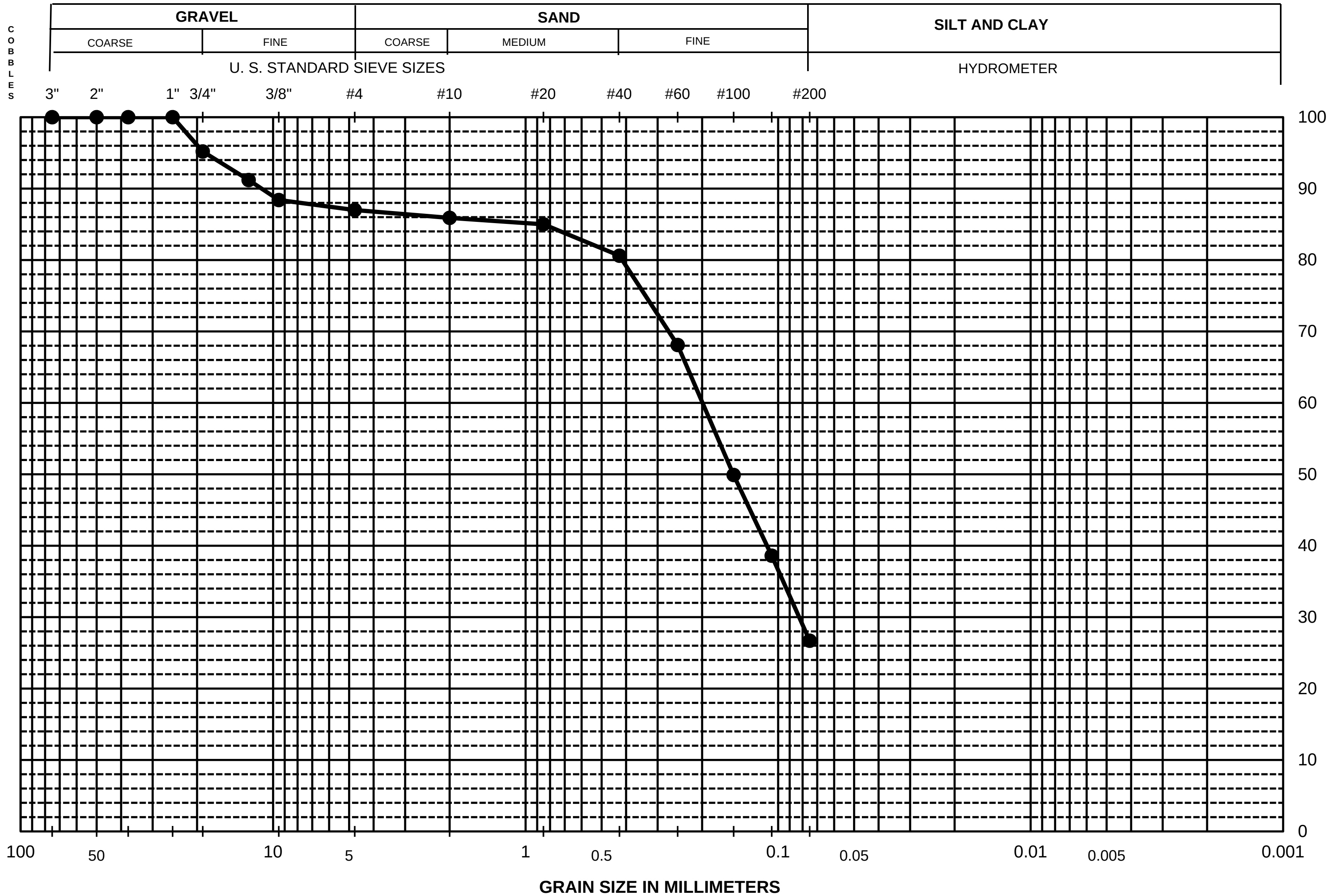
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-26	1	5.0	l	8.2	---	---	---	**Light olive brown Silty SAND with Gravel (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	95.2
1/2"	12.50	91.2
3/8"	9.50	88.4
#4	4.75	87.0
#10	2.00	85.9
#20	0.850	85.0
#40	0.425	80.6
#60	0.250	68.1
#100	0.150	49.9
#140	0.106	38.6
#200	0.075	26.7
Hydrometer Analysis		

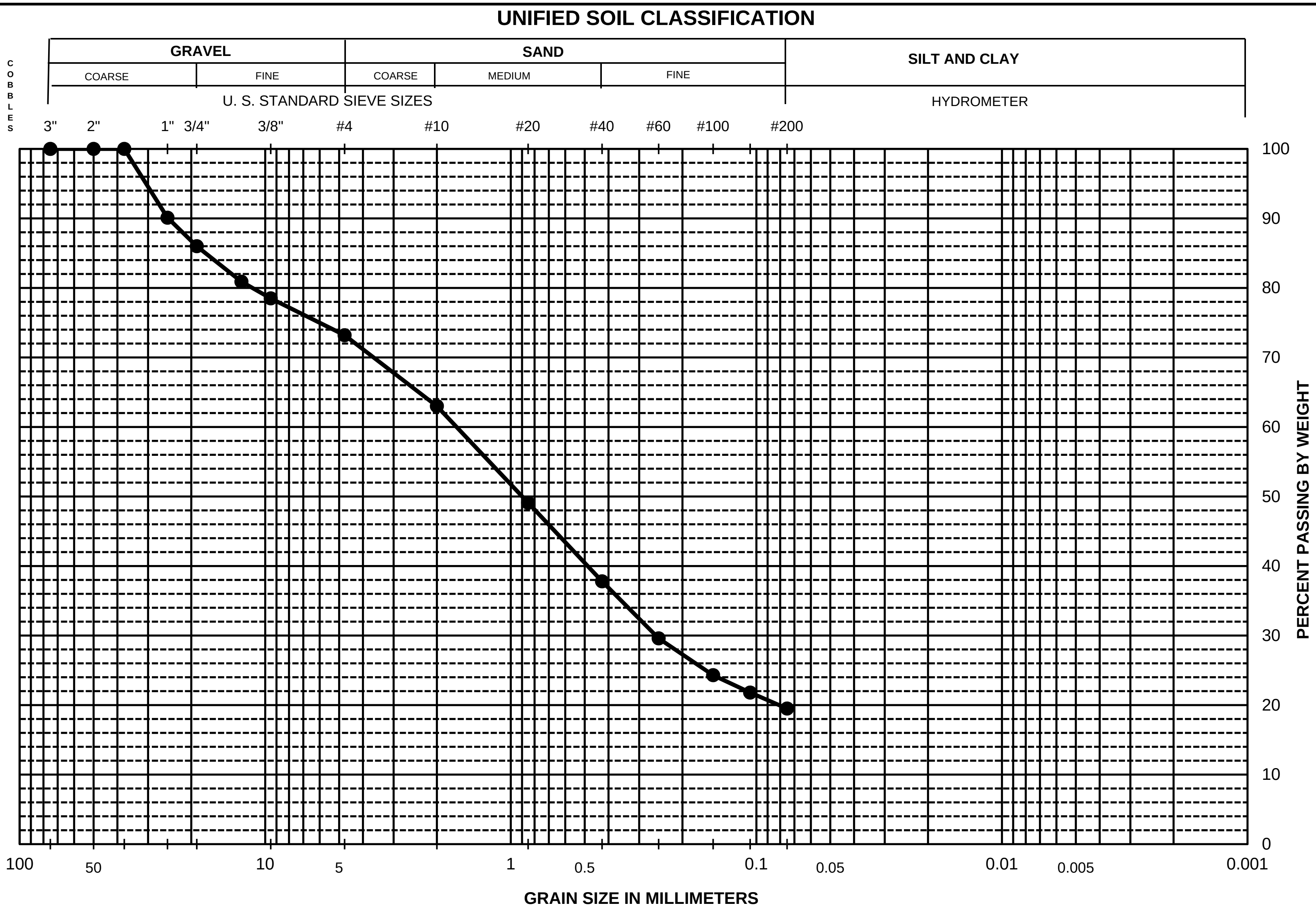
% Cobbles	---
% Gravel	13.0
% Sand	60.3
% Fines	26.7
D_{85}	0.850
D_{60}	0.199
D_{50}	0.150
D_{30}	0.083
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
FM-34	2	10.0	I	10.4	---	---	---	**Olive brown Silty SAND (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	90.1
3/4"	19.00	86.0
1/2"	12.50	80.9
3/8"	9.50	78.5
#4	4.75	73.2
#10	2.00	63.0
#20	0.850	49.1
#40	0.425	37.8
#60	0.250	29.6
#100	0.150	24.3
#140	0.106	21.8
#200	0.075	19.5

Hydrometer Analysis

% Cobbles	---
% Gravel	26.8
% Sand	53.7
% Fines	19.5
D_{85}	17.502
D_{60}	1.663
D_{50}	0.898
D_{30}	0.257
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

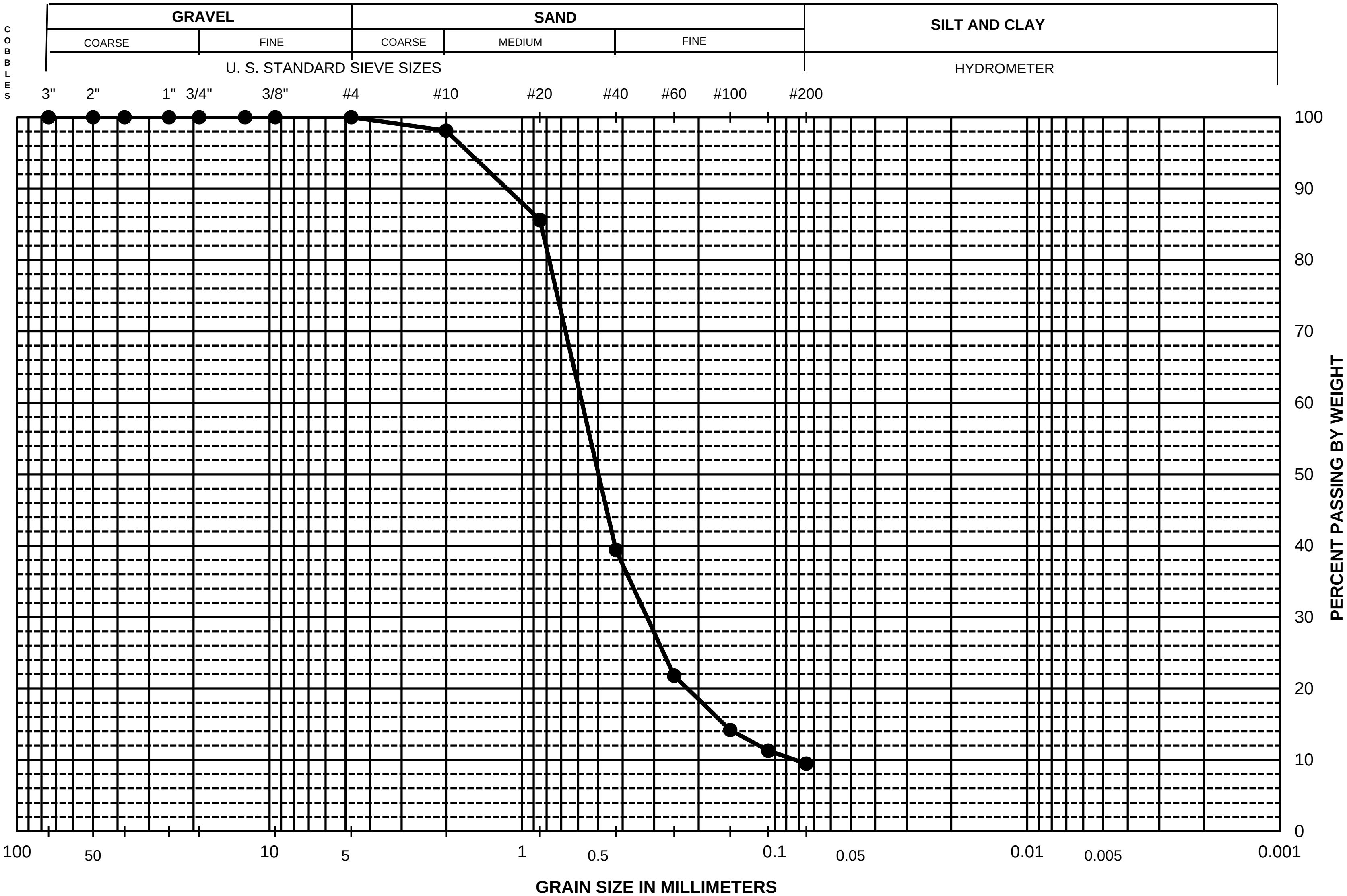
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-01	13	60.0	I	10.1	---	---	---	**Olive brown Silty SAND with Gravel (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	98.1
#20	0.850	85.6
#40	0.425	39.4
#60	0.250	21.8
#100	0.150	14.2
#140	0.106	11.3
#200	0.075	9.5
Hydrometer Analysis		

% Cobbles	---
% Gravel	0.0
% Sand	90.5
% Fines	9.5
D_{85}	0.842
D_{60}	0.579
D_{50}	0.498
D_{30}	0.320
D_{15}	0.158
D_{10}	0.083
C_u	7.0
C_c	2.1

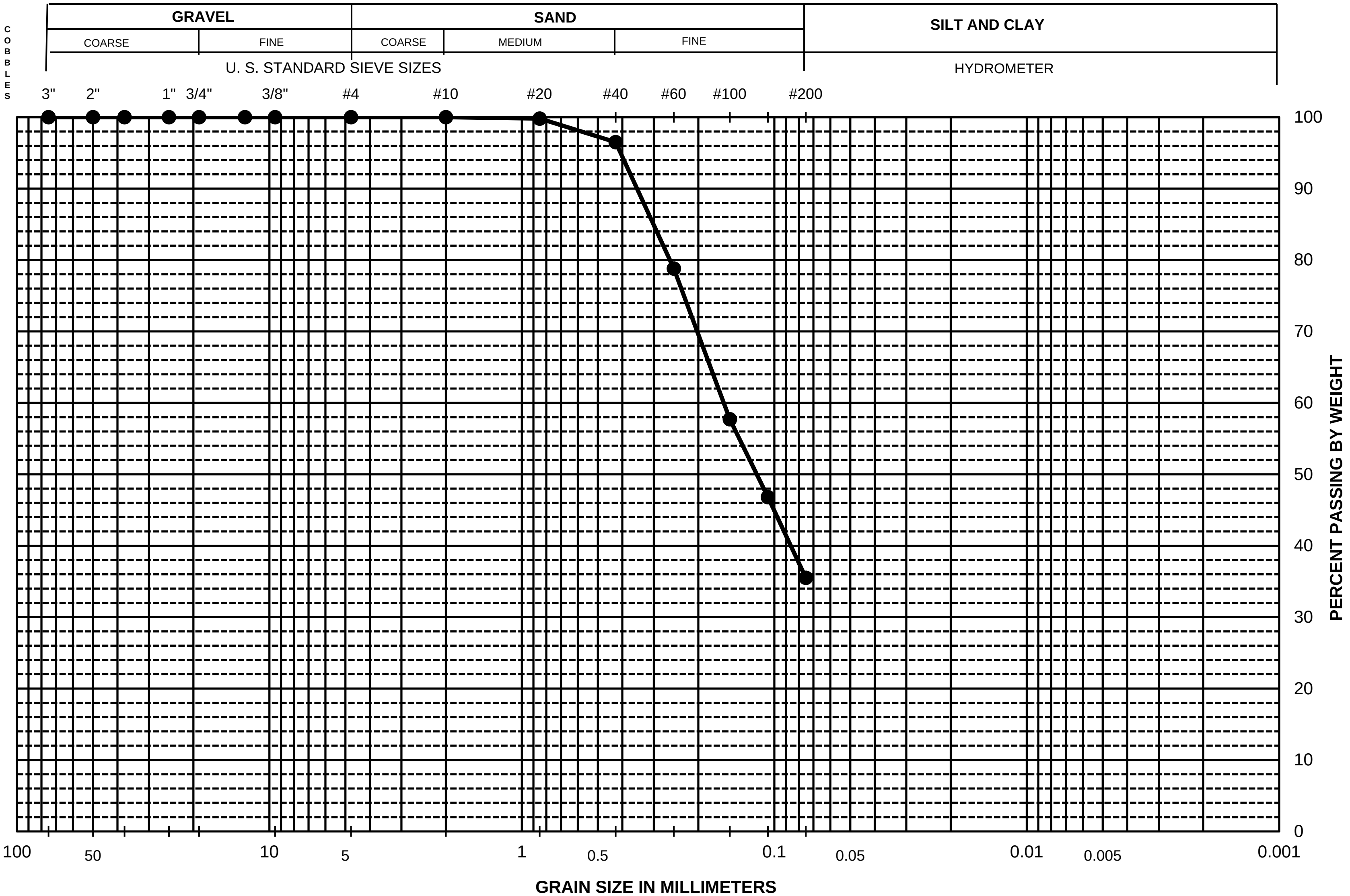
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-01	15	75.0	I	15.8	---	---	---	**Olive brown Well Graded SAND with Silt (SW-SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	99.8
#40	0.425	96.5
#60	0.250	78.8
#100	0.150	57.7
#140	0.106	46.8
#200	0.075	35.5
Hydrometer Analysis		

% Cobbles	---
% Gravel	0.0
% Sand	64.5
% Fines	35.5
D_{85}	0.301
D_{60}	0.159
D_{50}	0.117
D_{30}	---
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

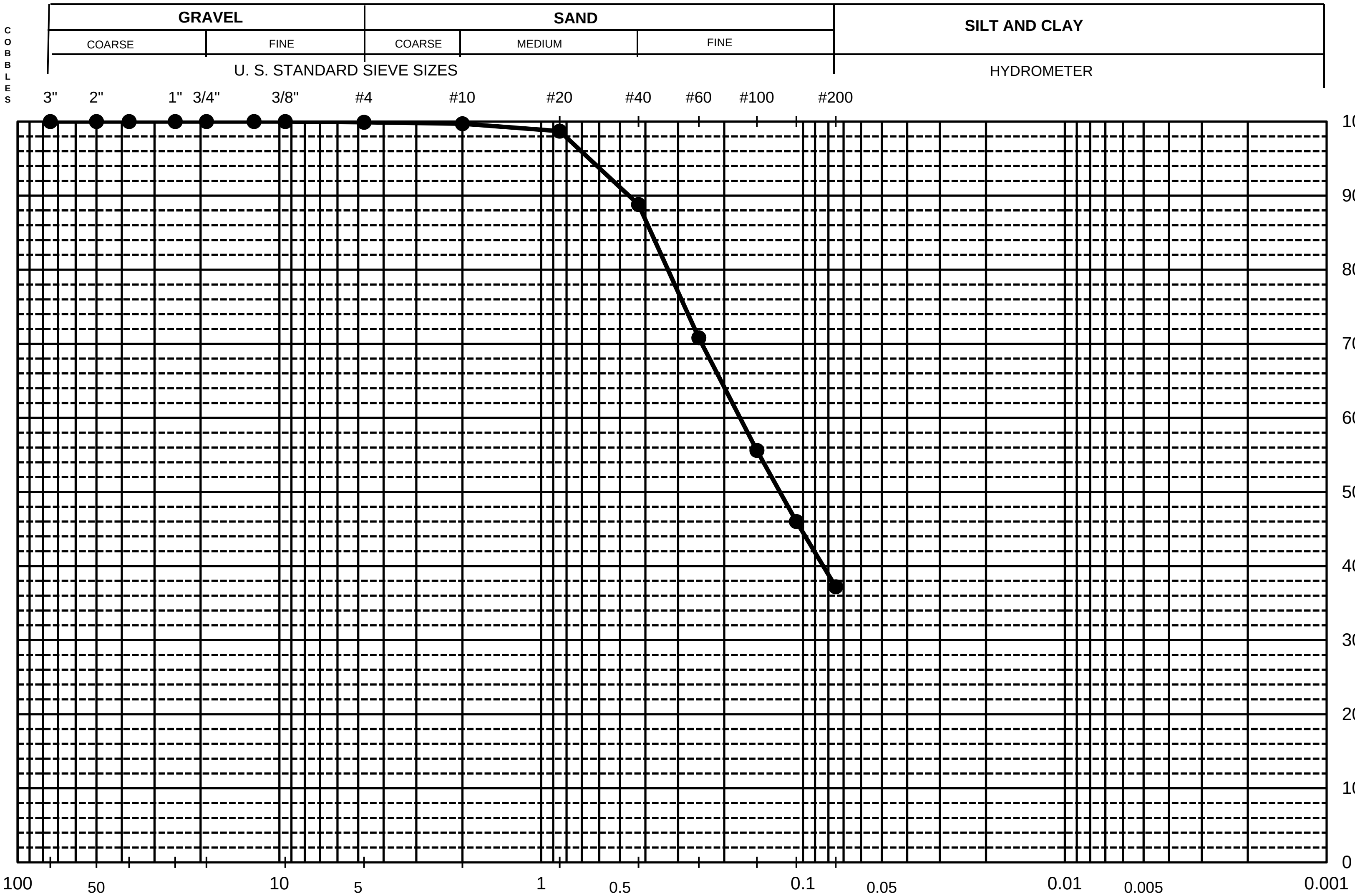
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-01	17	95.0	l	19.3	---	---	---	**Olive brown Silty SAND (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	99.9
#10	2.00	99.7
#20	0.850	98.7
#40	0.425	88.8
#60	0.250	70.8
#100	0.150	55.6
#140	0.106	46.0
#200	0.075	37.2
Hydrometer Analysis		

% Cobbles	---
% Gravel	0.1
% Sand	62.7
% Fines	37.2
D_{85}	0.380
D_{60}	0.174
D_{50}	0.122
D_{30}	---
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

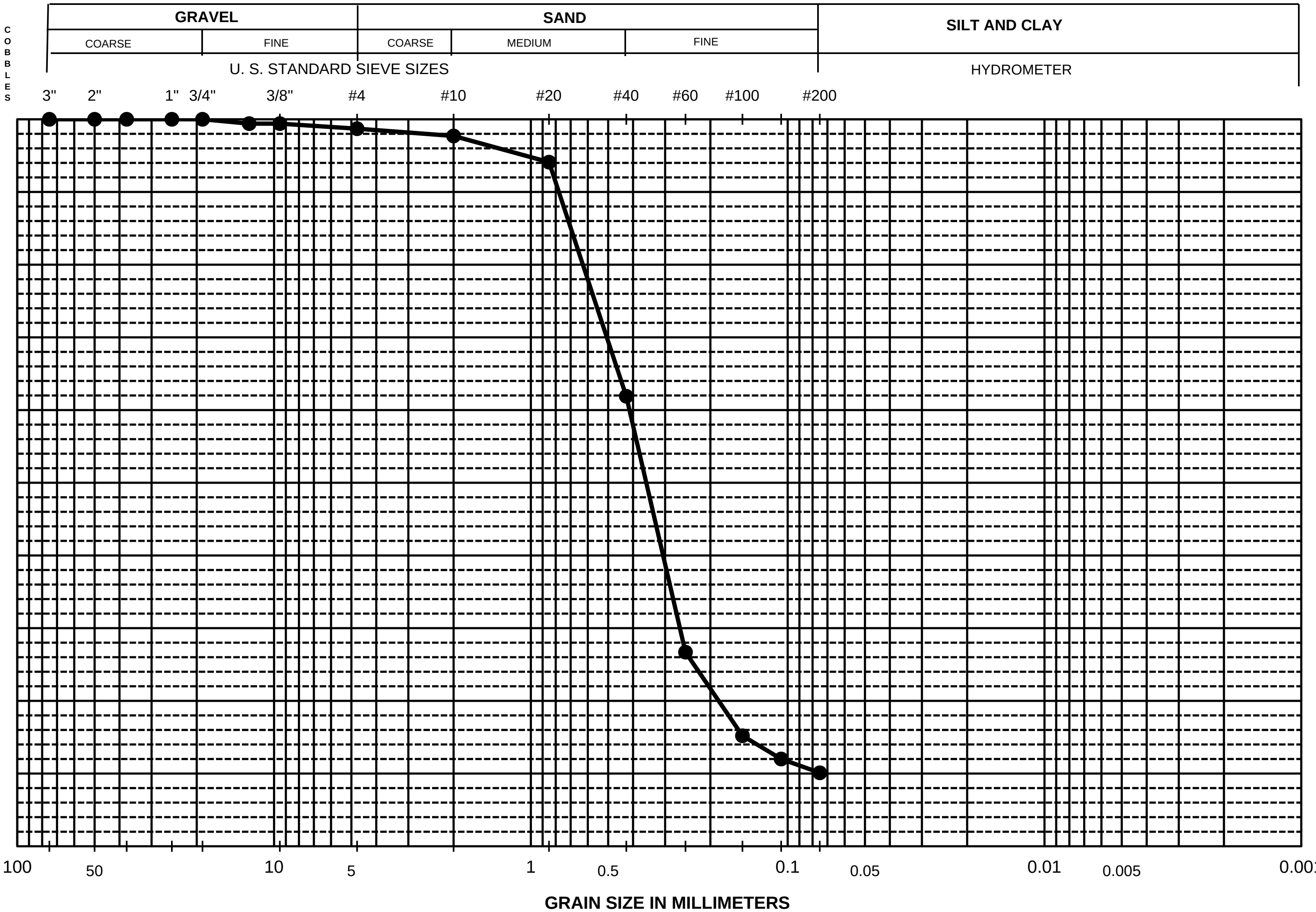
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-02	9	45.0	l	19.0	---	---	---	**Olive brown Silty SAND (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	99.4
3/8"	9.50	99.4
#4	4.75	98.7
#10	2.00	97.7
#20	0.850	94.1
#40	0.425	61.9
#60	0.250	26.7
#100	0.150	15.2
#140	0.106	12.0
#200	0.075	10.1
Hydrometer Analysis		

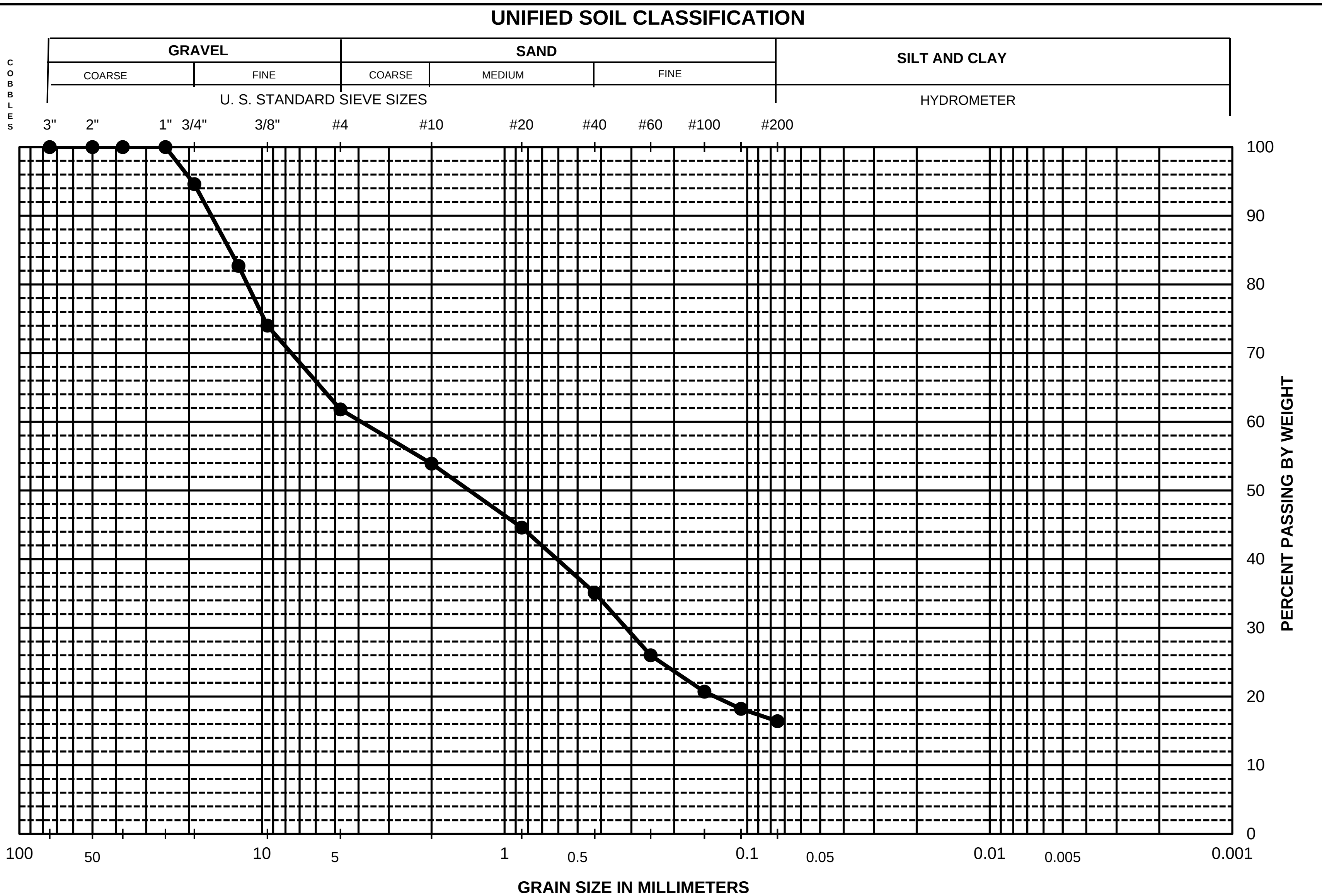
% Cobbles	---
% Gravel	1.3
% Sand	88.6
% Fines	10.1
D_{85}	0.699
D_{60}	0.413
D_{50}	0.355
D_{30}	0.263
D_{15}	0.147
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-02	11	55.0	I	15.1	---	---	---	**Olive brown Poorly Graded SAND with Silt (SP-SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	94.6
1/2"	12.50	82.7
3/8"	9.50	74.0
#4	4.75	61.8
#10	2.00	53.9
#20	0.850	44.6
#40	0.425	35.1
#60	0.250	26.0
#100	0.150	20.7
#140	0.106	18.2
#200	0.075	16.4
Hydrometer Analysis		

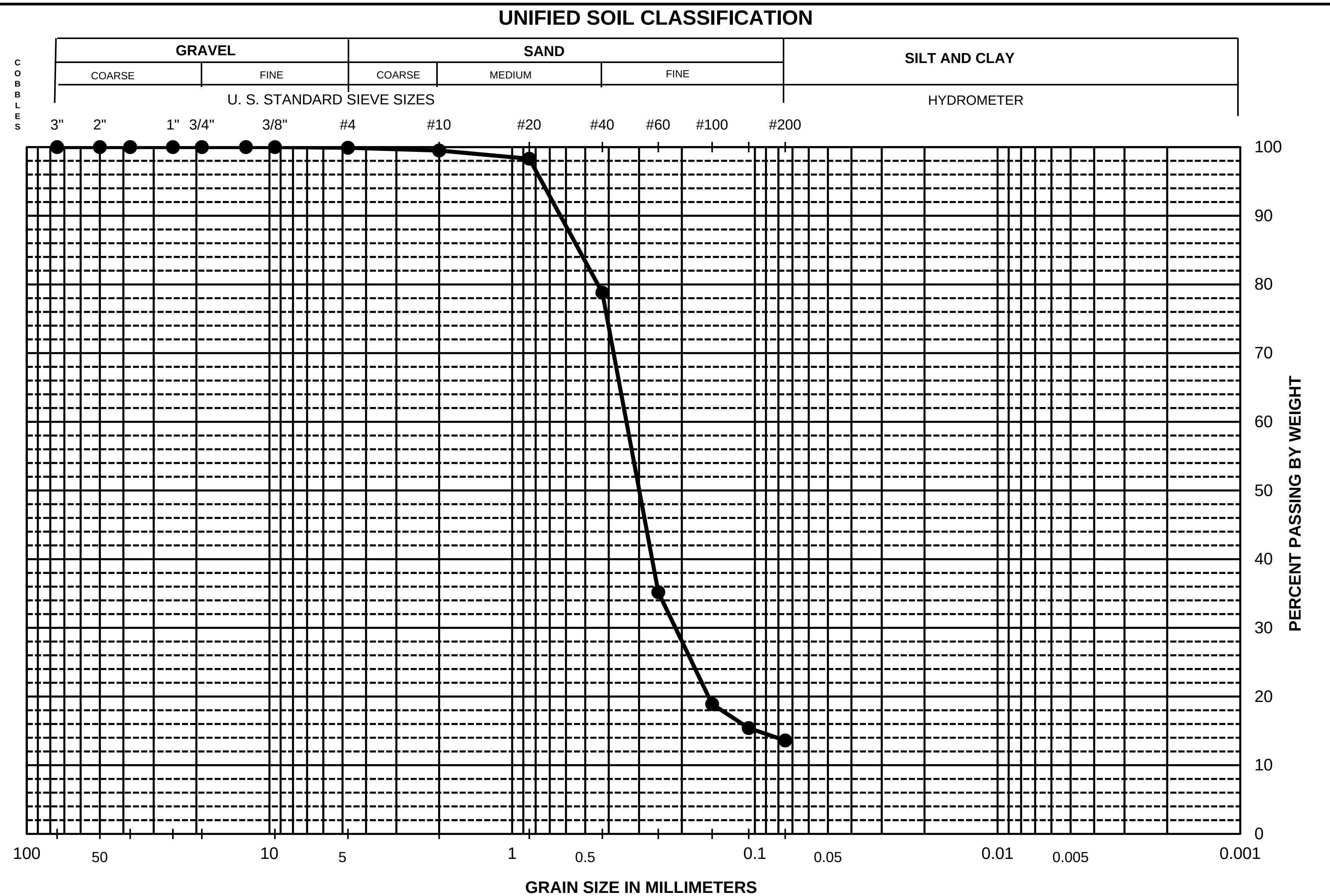
% Cobbles	---
% Gravel	38.2
% Sand	45.4
% Fines	16.4
D_{85}	13.554
D_{60}	3.900
D_{50}	1.397
D_{30}	0.316
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-02	13	70.0	l	15.2	---	---	---	**Olive brown Clayey SAND with Gravel (SC)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	99.9
#10	2.00	99.5
#20	0.850	98.3
#40	0.425	78.8
#60	0.250	35.2
#100	0.150	18.9
#140	0.106	15.4
#200	0.075	13.6

Hydrometer Analysis

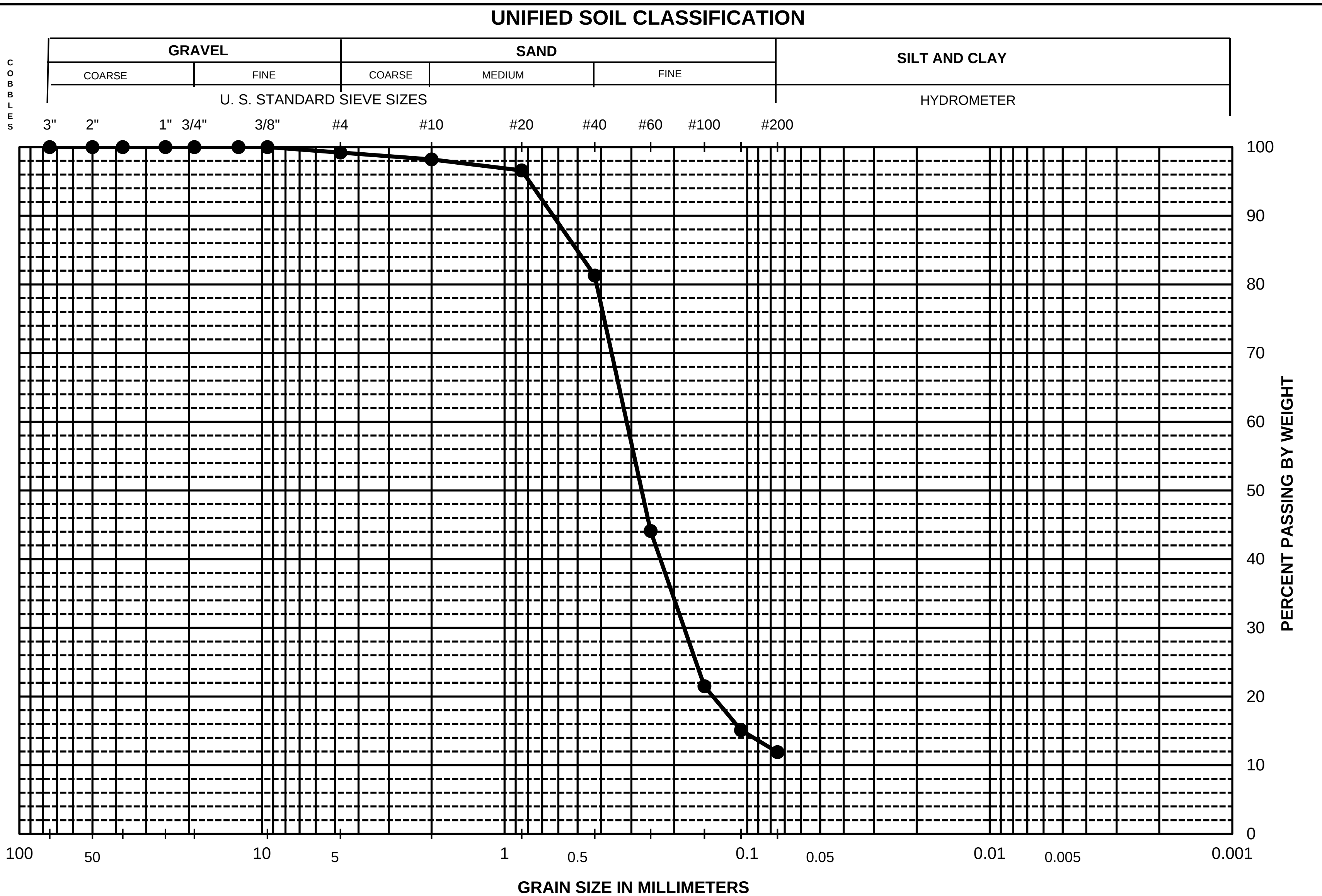
% Cobbles	---
% Gravel	0.1
% Sand	86.3
% Fines	13.6
D_{85}	0.530
D_{60}	0.338
D_{50}	0.299
D_{30}	0.212
D_{15}	0.098
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-02	14	75.0	l	22.7	---	---	---	**Dark yellowish brown Silty SAND (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	99.2
#10	2.00	98.2
#20	0.850	96.6
#40	0.425	81.3
#60	0.250	44.1
#100	0.150	21.5
#140	0.106	15.1
#200	0.075	11.9
Hydrometer Analysis		

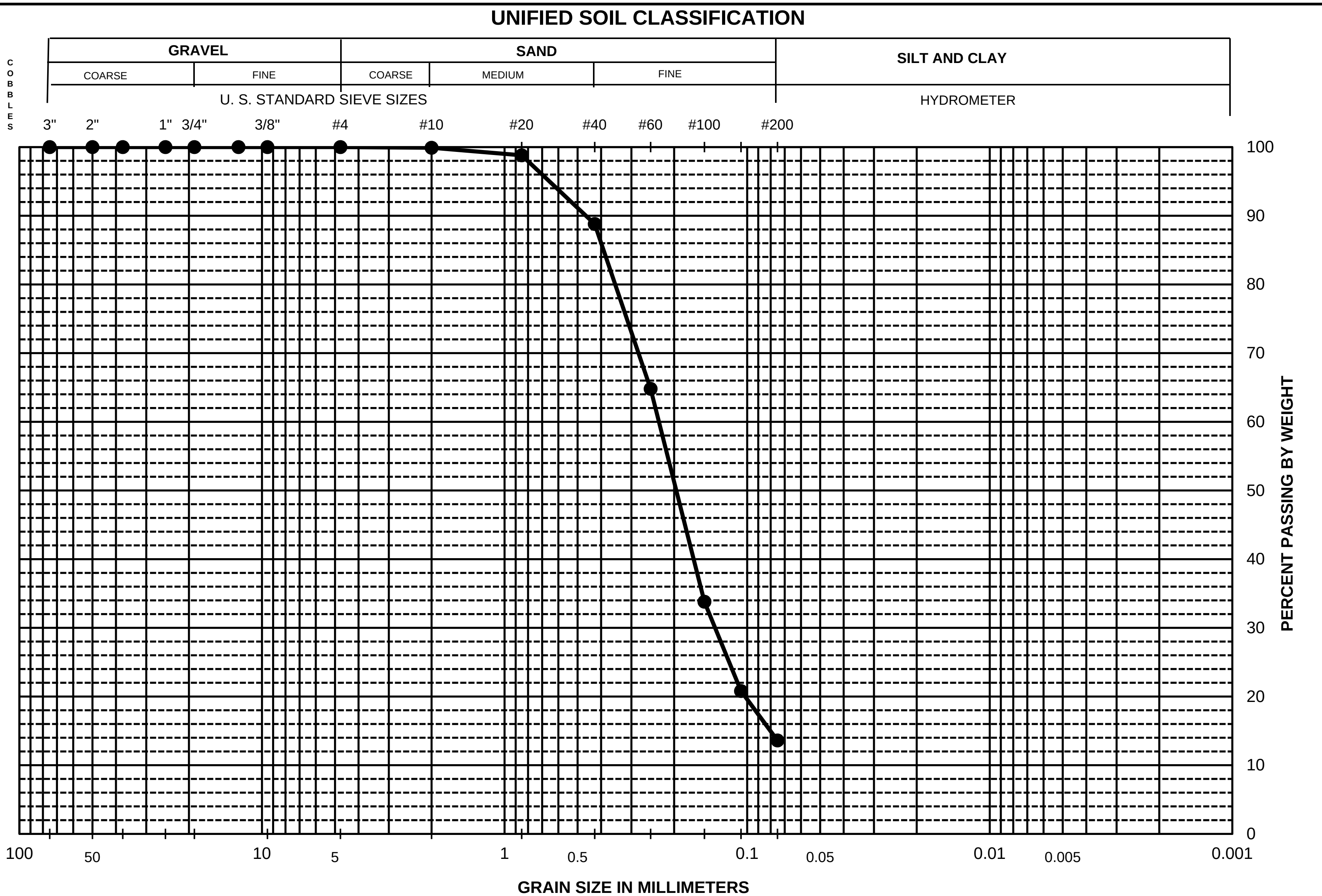
% Cobbles	---
% Gravel	0.8
% Sand	87.3
% Fines	11.9
D_{85}	0.503
D_{60}	0.314
D_{50}	0.272
D_{30}	0.182
D_{15}	0.105
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-02	15	85.0	I	18.3	---	---	---	**Pale brown Poorly Graded SAND with Silt (SP-SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	99.9
#20	0.850	98.8
#40	0.425	88.8
#60	0.250	64.8
#100	0.150	33.8
#140	0.106	20.8
#200	0.075	13.6
Hydrometer Analysis		

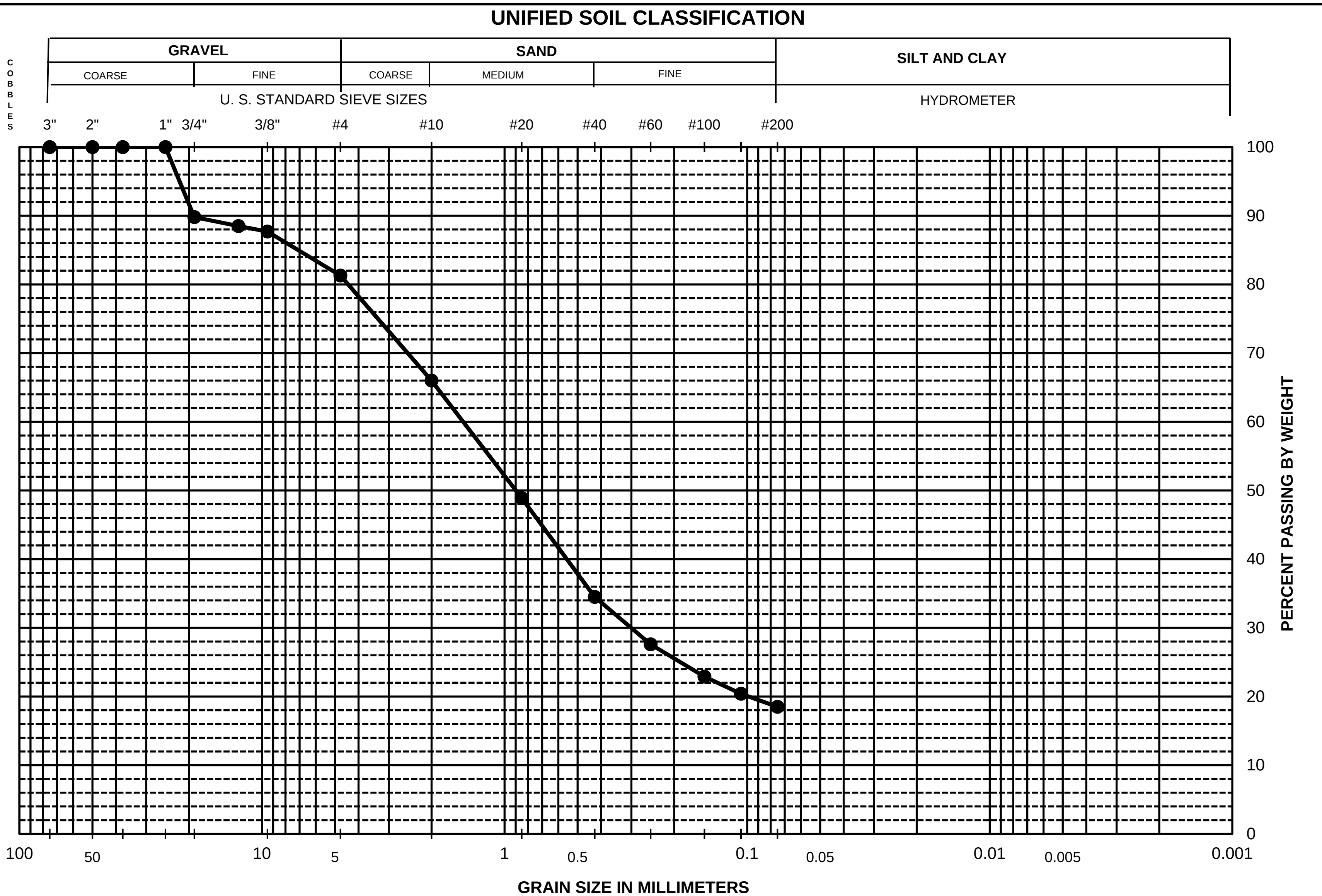
% Cobbles	---
% Gravel	0.0
% Sand	86.4
% Fines	13.6
D_{85}	0.391
D_{60}	0.231
D_{50}	0.196
D_{30}	0.136
D_{15}	0.080
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
WM-03	1	0~5	l	6.8	---	---	---	**Light gray to light olive brown Silty SAND (SM)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	89.8
1/2"	12.50	88.5
3/8"	9.50	87.7
#4	4.75	81.3
#10	2.00	66.0
#20	0.850	48.9
#40	0.425	34.5
#60	0.250	27.6
#100	0.150	22.9
#140	0.106	20.4
#200	0.075	18.5

Hydrometer Analysis

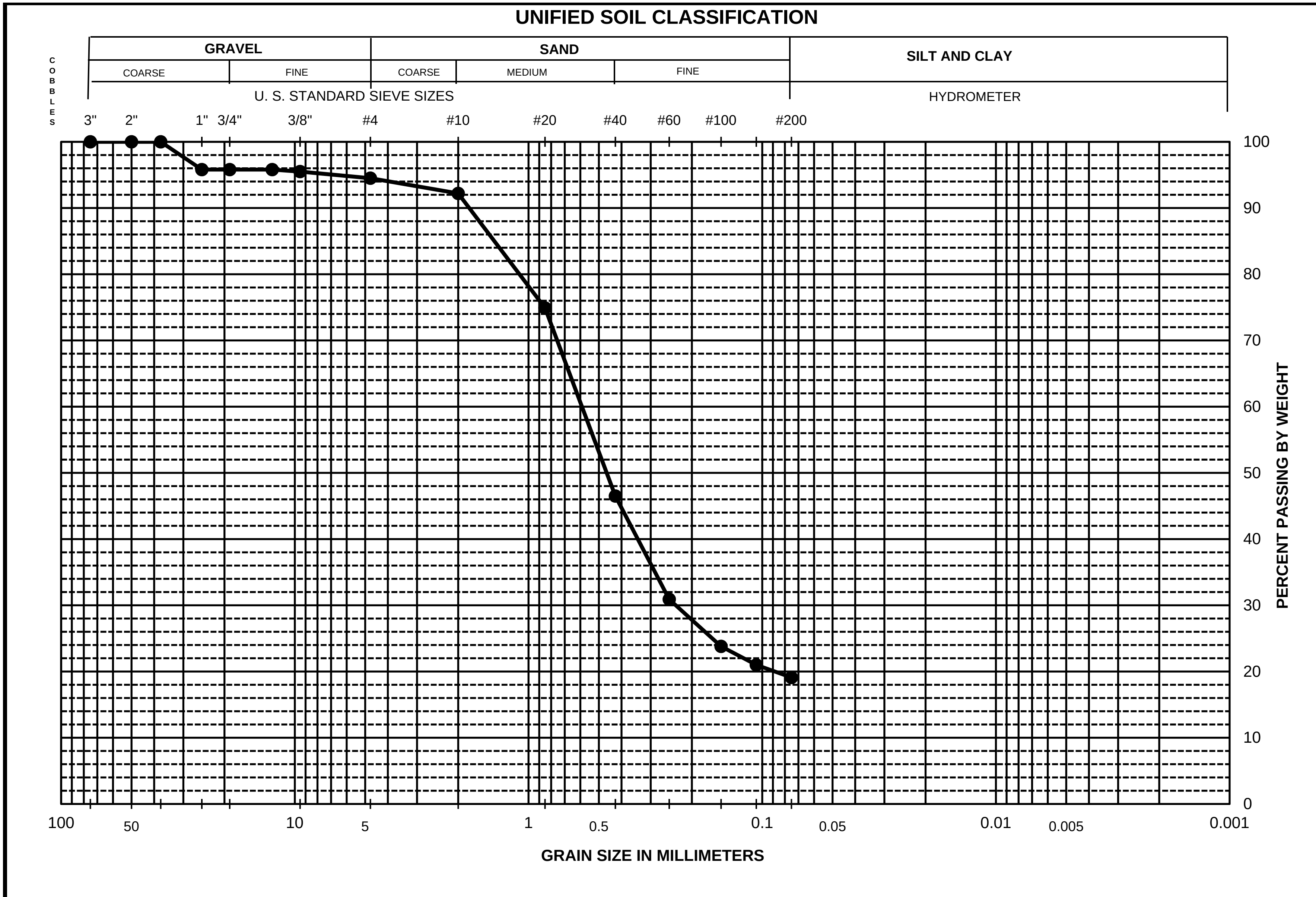
% Cobbles	---
% Gravel	18.7
% Sand	62.8
% Fines	18.5
D_{85}	7.091
D_{60}	1.481
D_{50}	0.898
D_{30}	0.301
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
WM-07	2	10.0	l	8.7	36	24	---	**Olive brown Clayey SAND with Gravel (SC)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	95.8
3/4"	19.00	95.8
1/2"	12.50	95.8
3/8"	9.50	95.5
#4	4.75	94.5
#10	2.00	92.2
#20	0.850	74.9
#40	0.425	46.5
#60	0.250	30.9
#100	0.150	23.8
#140	0.106	21.0
#200	0.075	19.1
Hydrometer Analysis		

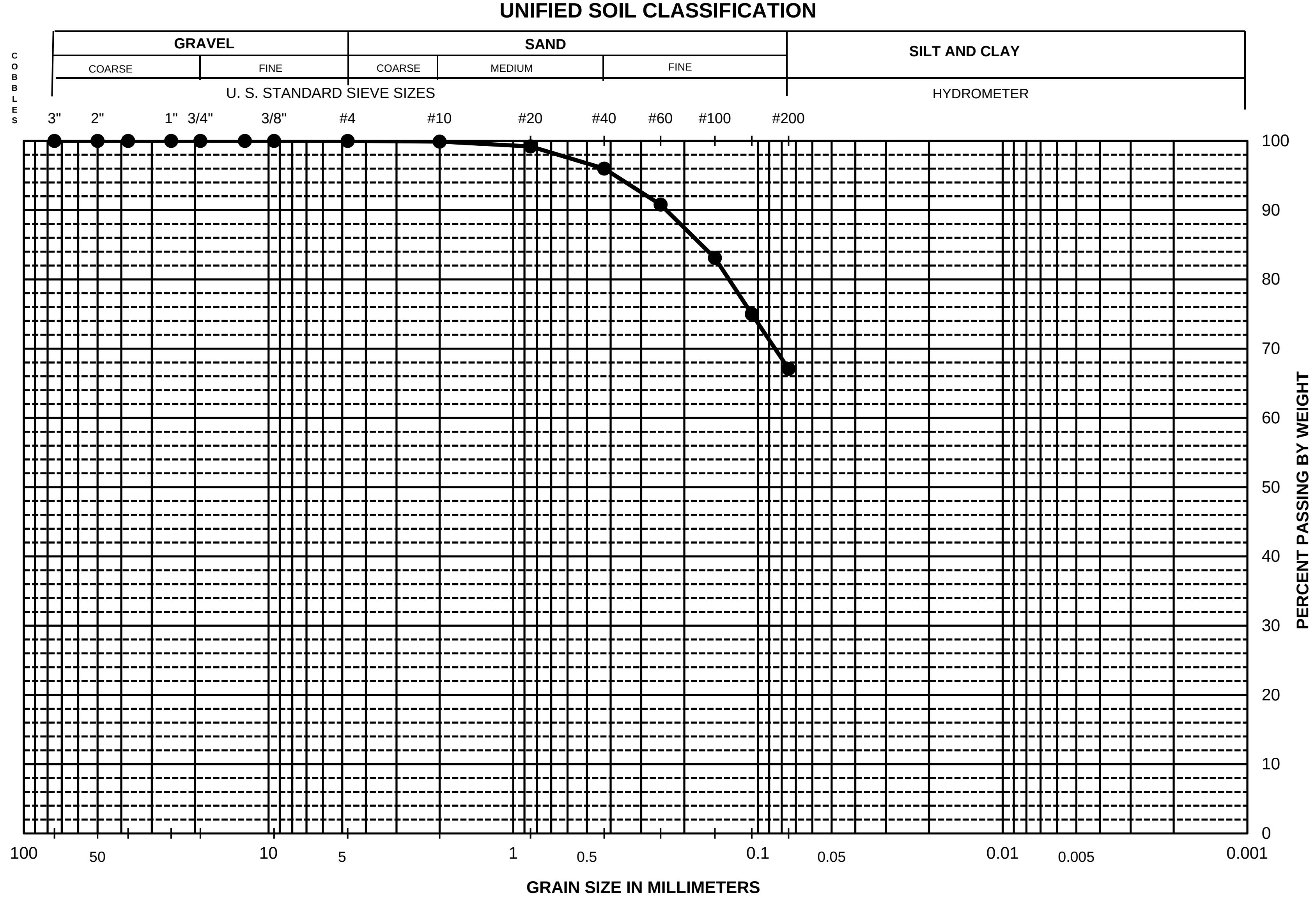
% Cobbles	---
% Gravel	5.5
% Sand	75.4
% Fines	19.1
D_{85}	1.401
D_{60}	0.591
D_{50}	0.463
D_{30}	0.234
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
WM-08	3	12.5	l	10.6	45	30	---	**Strong brown Clayey SAND (SC)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3"	75.0	100.0
2"	50.0	100.0
1.5"	37.5	100.0
1"	25.0	100.0
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	99.9
#20	0.850	99.2
#40	0.425	96.0
#60	0.250	90.8
#100	0.150	83.1
#140	0.106	75.0
#200	0.075	67.1
Hydrometer Analysis		

% Cobbles	---
% Gravel	0.0
% Sand	32.9
% Fines	67.1
D_{85}	0.170
D_{60}	---
D_{50}	---
D_{30}	---
D_{15}	---
D_{10}	---
C_u	----
C_c	-----

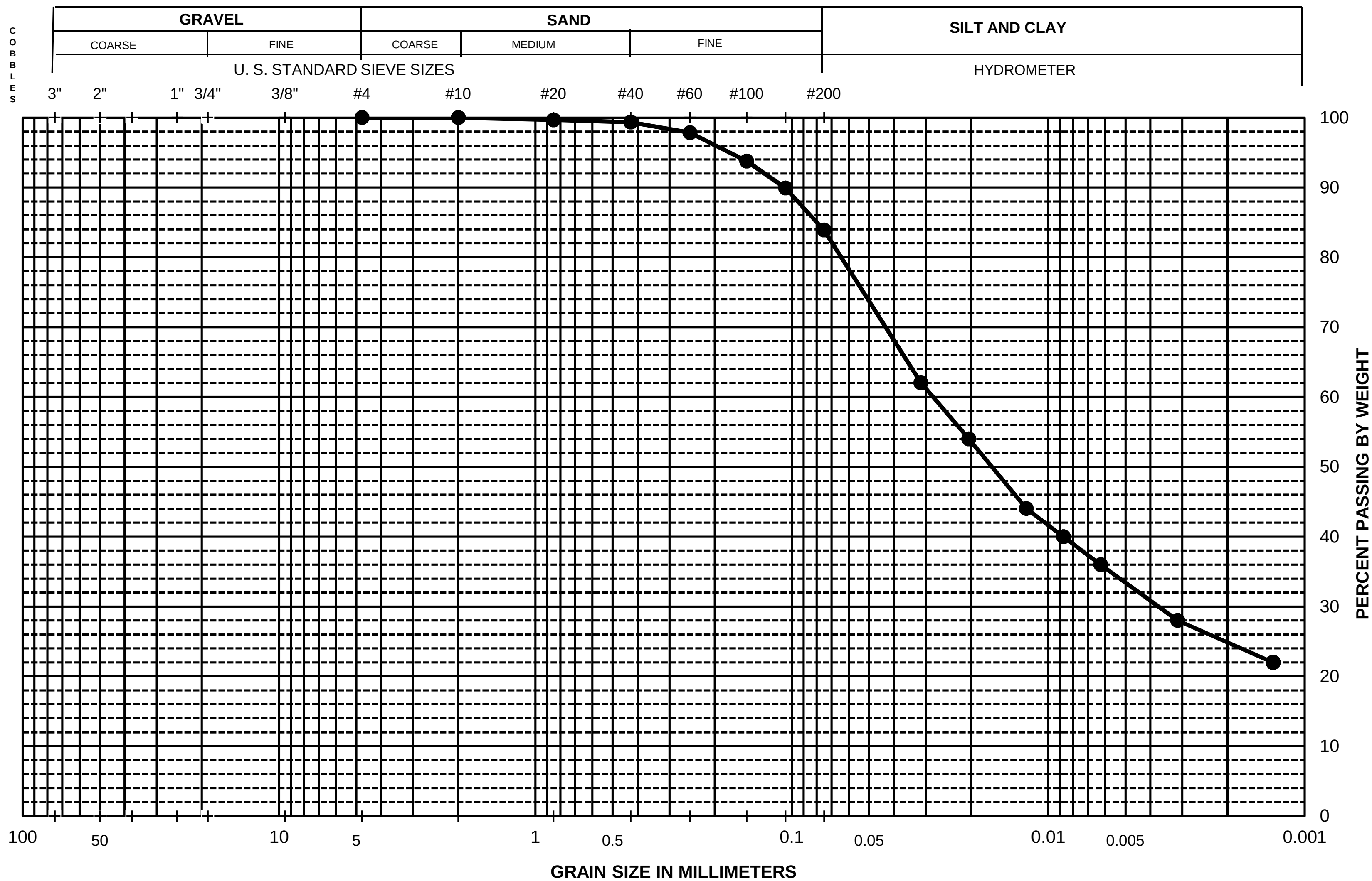
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
WM-23	2	10.0	l	8.2	---	---	---	**Strong brown Sandy, Lean CLAY (CL)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	99.7
#40	0.425	99.3
#60	0.250	97.8
#100	0.150	93.8
#140	0.106	89.9
#200	0.075	83.9
Hydrometer Analysis	0.0314	62.0
	0.0204	54.0
	0.0122	44.0
	0.0087	40.0
	0.0062	36.0
	0.0031	28.0
	0.0013	22.0
	0.0013	22.0
	0.0013	22.0
	0.0013	22.0

% Cobbles	--
% Gravel	0.0
% Sand	16.1
% Fines	83.9
D_{85}	0.6541
D_{60}	0.0281
D_{30}	0.0037
D_{15}	---
D_{10}	---
C_u	---
C_c	---

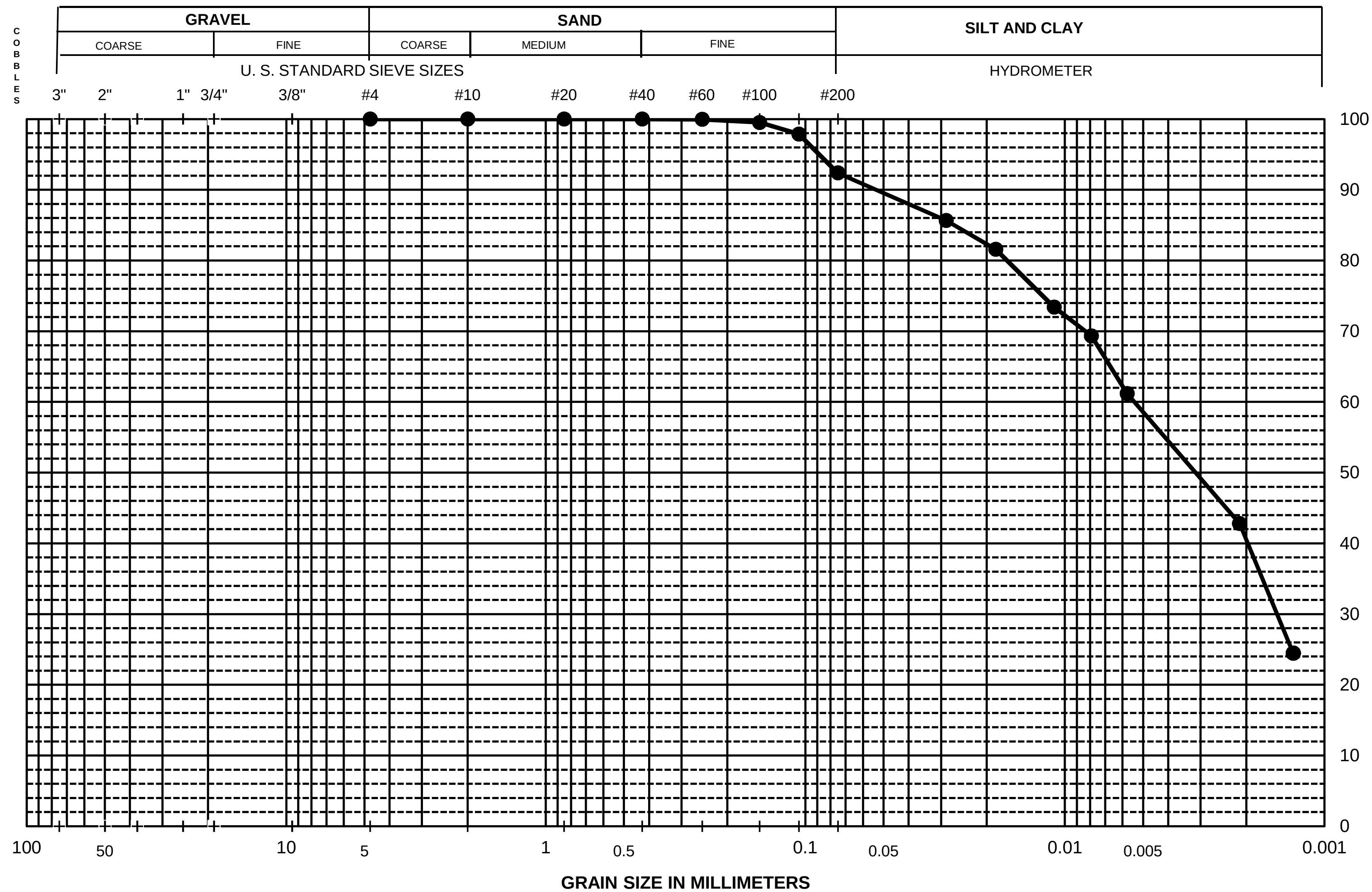
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-01	4	17.0	I	----	47	26	25	**Dark grayish brown CLAY with Sand (CL)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	100.0
#40	0.425	100.0
#60	0.250	100.0
#100	0.150	99.5
#140	0.106	97.9
#200	0.075	92.4
Hydrometer Analysis	0.0287	85.7
	0.0185	81.6
	0.0110	73.4
	0.0079	69.3
	0.0058	61.2
	0.0021	42.8
	0.0013	24.5
	0.0013	24.5
	0.0013	24.5
	0.0013	24.5

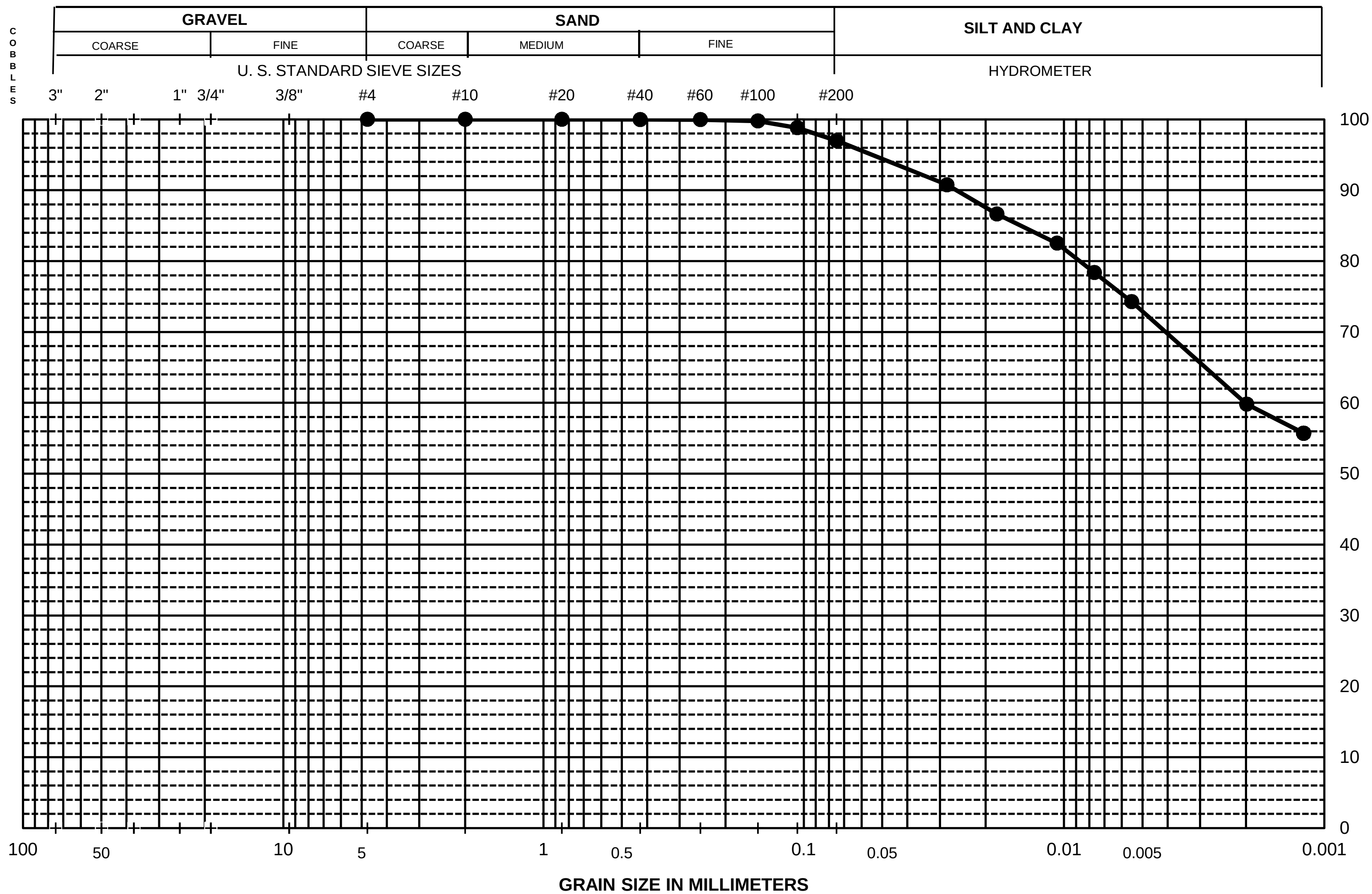
% Cobbles	--
% Gravel	0.0
% Sand	7.6
% Fines	92.4
D_{85}	0.0267
D_{60}	0.0054
D_{30}	0.0015
D_{15}	---
D_{10}	---
C_u	---
C_c	---

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-01	6	25.0	I		84	55	41	**Dark gray Fat CLAY (CH)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	100.0
#40	0.425	100.0
#60	0.250	100.0
#100	0.150	99.8
#140	0.106	98.8
#200	0.075	97.0
Hydrometer Analysis	0.0282	90.8
	0.0181	86.7
	0.0107	82.5
	0.0077	78.4
	0.0055	74.3
	0.0020	59.8
	0.0012	55.7
	0.0012	55.7
	0.0012	55.7
	0.0012	55.7

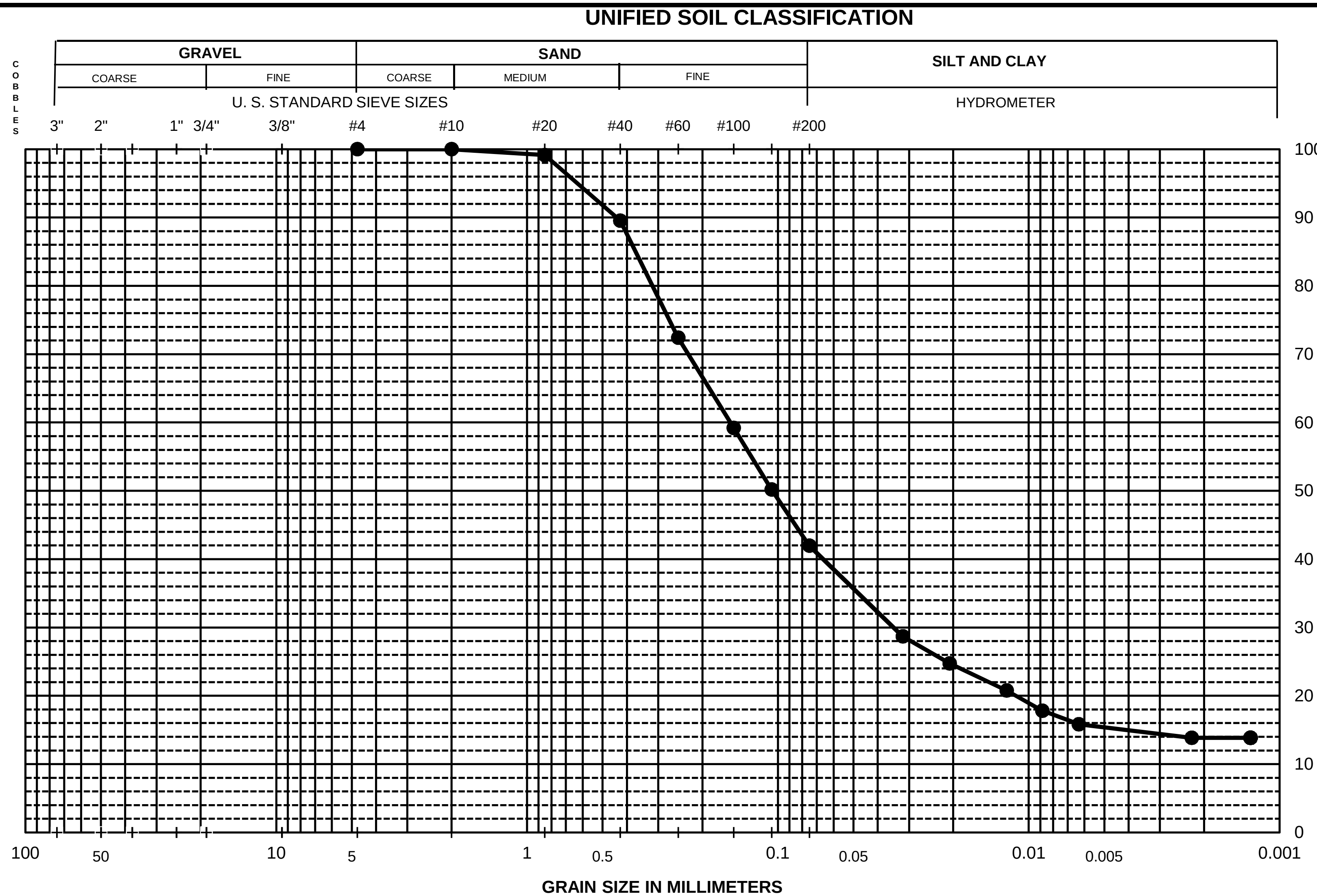
% Cobbles	--
% Gravel	0.0
% Sand	3.0
% Fines	97.0
D_{85}	0.0147
D_{60}	0.0020
D_{30}	---
D_{15}	---
D_{10}	---
C_u	---
C_c	---

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-01	7	30.0	I	40.0	100	63	60	**Dark gray Fat CLAY (CH)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	99.1
#40	0.425	89.6
#60	0.250	72.4
#100	0.150	59.2
#140	0.106	50.2
#200	0.075	42.0
Hydrometer Analysis	0.0318	28.7
	0.0207	24.7
	0.0123	20.8
	0.0088	17.8
	0.0063	15.8
	0.0022	13.9
	0.0013	13.9
	0.0013	13.9
	0.0013	13.9
	0.0013	13.9

% Cobbles	--
% Gravel	0.0
% Sand	58.0
% Fines	42.0
D_{85}	1.6569
D_{60}	0.2864
D_{30}	0.0348
D_{15}	---
D_{10}	---
C_u	---
C_c	---

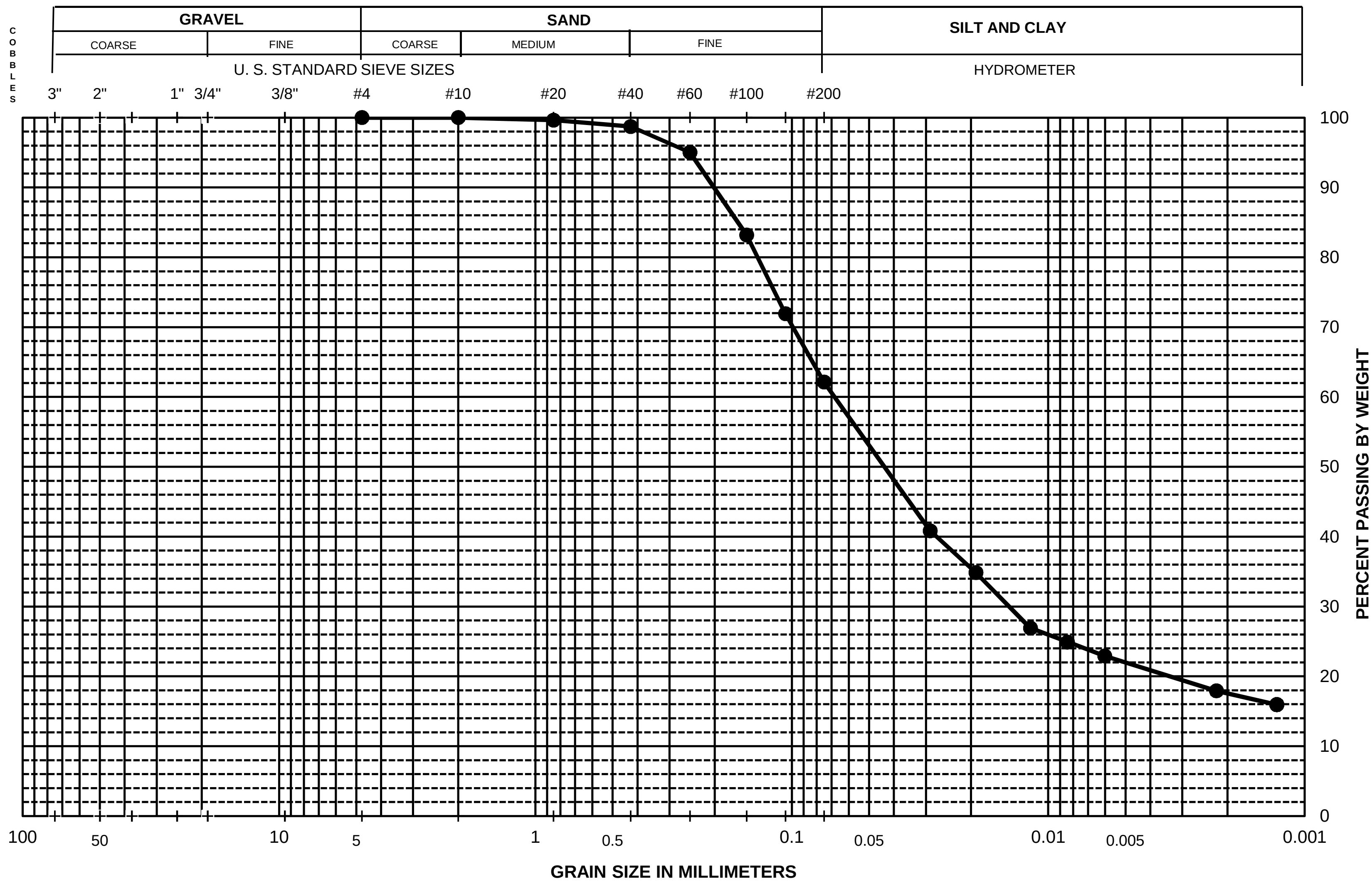
Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-01	10	45.0	I	----	34	18	14	**Dark grayish brown Clayey SAND (SC)**

PROJECT NAME: Pure Water

PROJECT NUMBER: 60530732

PARTICLE-SIZE DISTRIBUTION CURVES

UNIFIED SOIL CLASSIFICATION



Sieve No.	Dia. mm	% Finer
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	99.6
#40	0.425	98.7
#60	0.250	95.0
#100	0.150	83.2
#140	0.106	71.9
#200	0.075	62.1
Hydrometer Analysis	0.0289	40.8
	0.0192	34.9
	0.0117	26.9
	0.0084	24.9
	0.0060	22.9
	0.0022	17.9
	0.0013	15.9
	0.0013	15.9
	0.0013	15.9
	0.0013	15.9

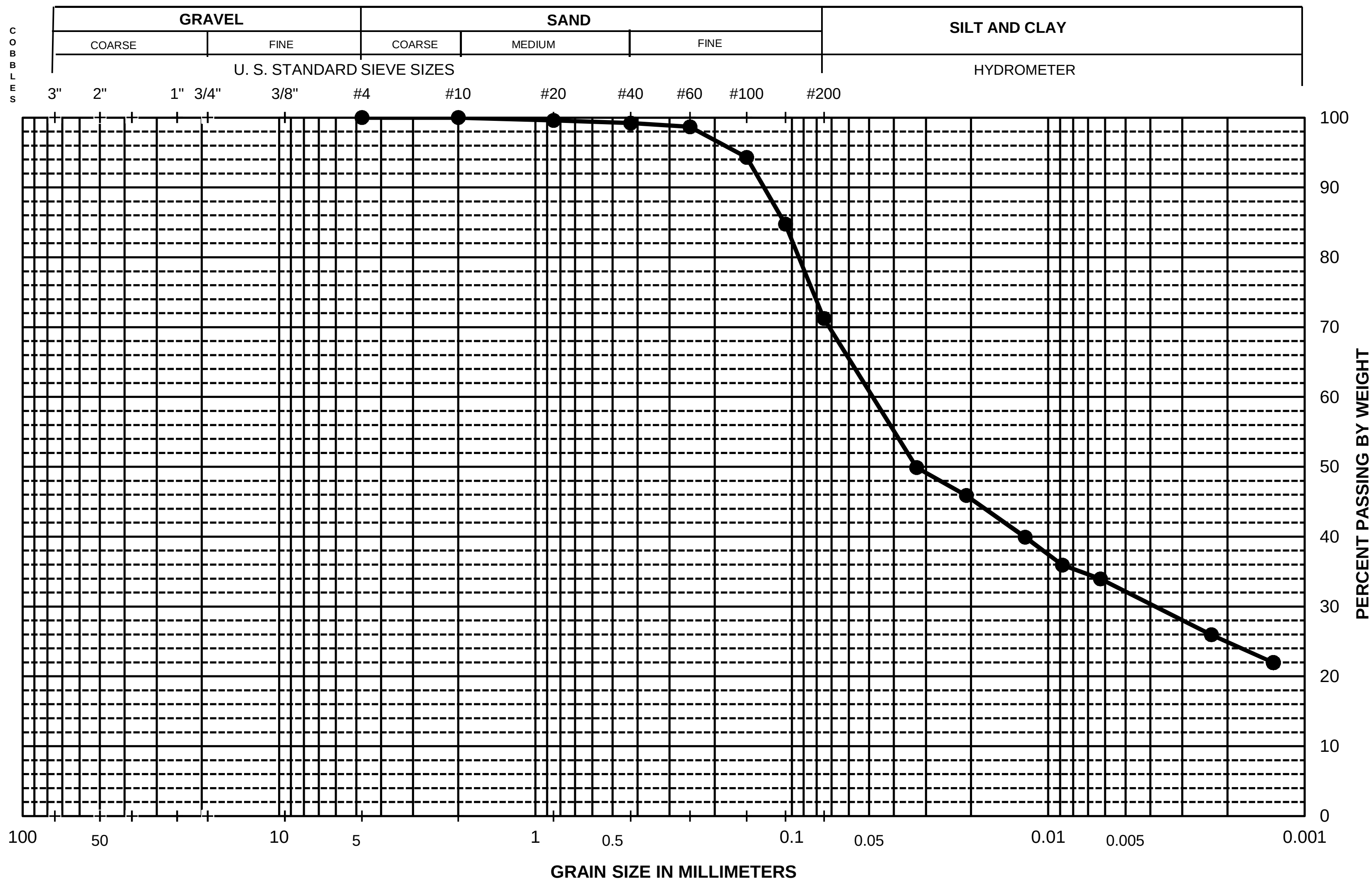
% Cobbles	--
% Gravel	0.0
% Sand	37.9
% Fines	62.1
D_{85}	1.3022
D_{60}	0.1507
D_{30}	0.0142
D_{15}	---
D_{10}	---
C_u	---
C_c	---

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-02	3	15.0	I		39	20	18	**Olive Brown Sandy Lean CLAY (CL)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES



Sieve No.	Dia. mm	% Finer
3/4"	19.00	100.0
1/2"	12.50	100.0
3/8"	9.50	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	99.6
#40	0.425	99.2
#60	0.250	98.7
#100	0.150	94.3
#140	0.106	84.8
#200	0.075	71.3
Hydrometer Analysis	0.0326	49.9
	0.0209	45.9
	0.0123	39.9
	0.0088	35.9
	0.0063	33.9
	0.0023	26.0
	0.0013	22.0
	0.0013	22.0
	0.0013	22.0
	0.0013	22.0

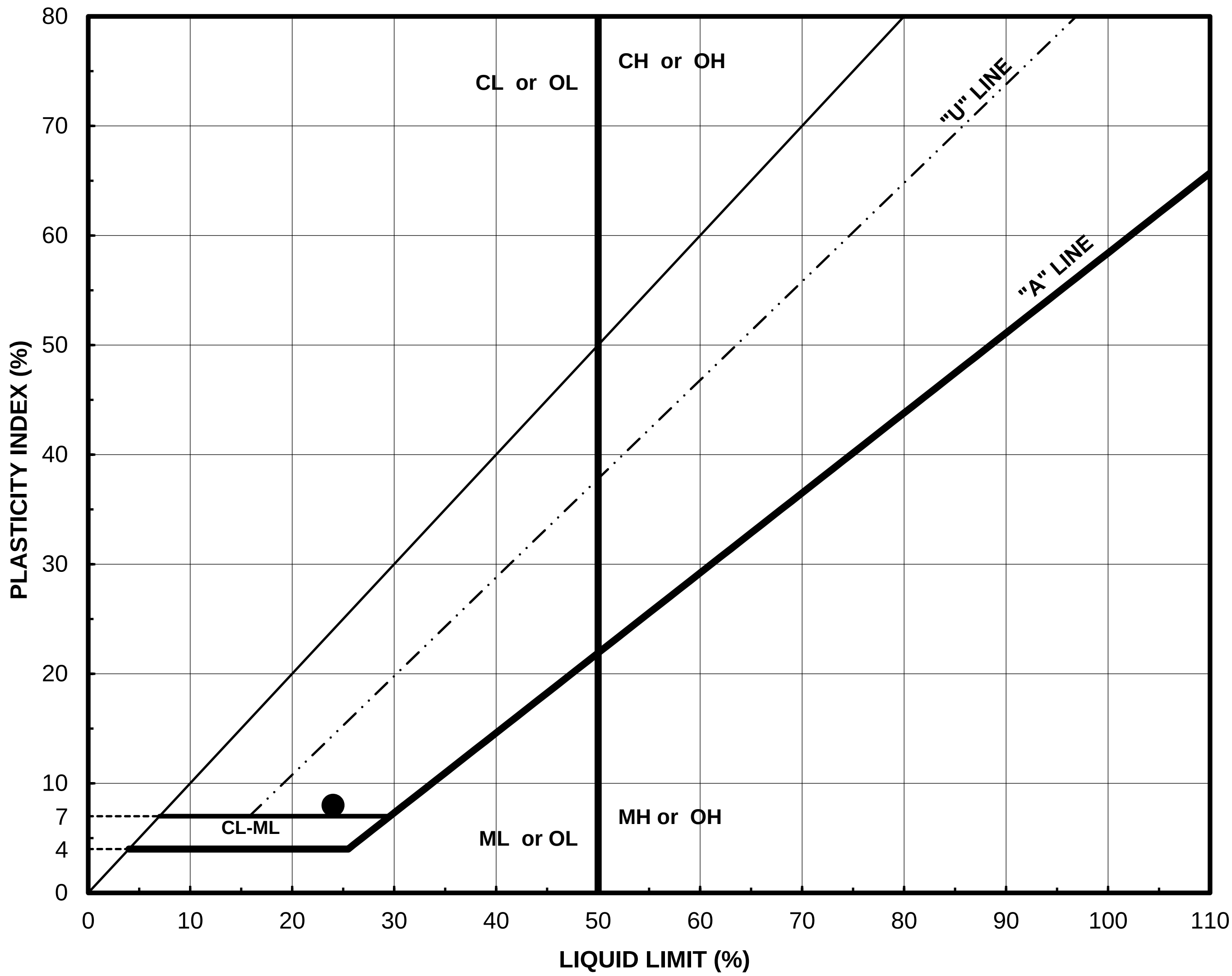
% Cobbles	--
% Gravel	0.0
% Sand	28.7
% Fines	71.3
D_{85}	1.0687
D_{60}	0.0890
D_{30}	0.0038
D_{15}	---
D_{10}	---
C_u	---
C_c	---

Boring No.	Sample No.	Depth (ft)	SYMBOL	Wn (%)	LL	PI	% 2 mm	Description and Classification
TC-02	5	25.0	I		65	41	25	**Dark gray Fat CLAY (CH)**

PROJECT NAME: **Pure Water**

PROJECT NUMBER: **60530732**

PARTICLE-SIZE DISTRIBUTION CURVES

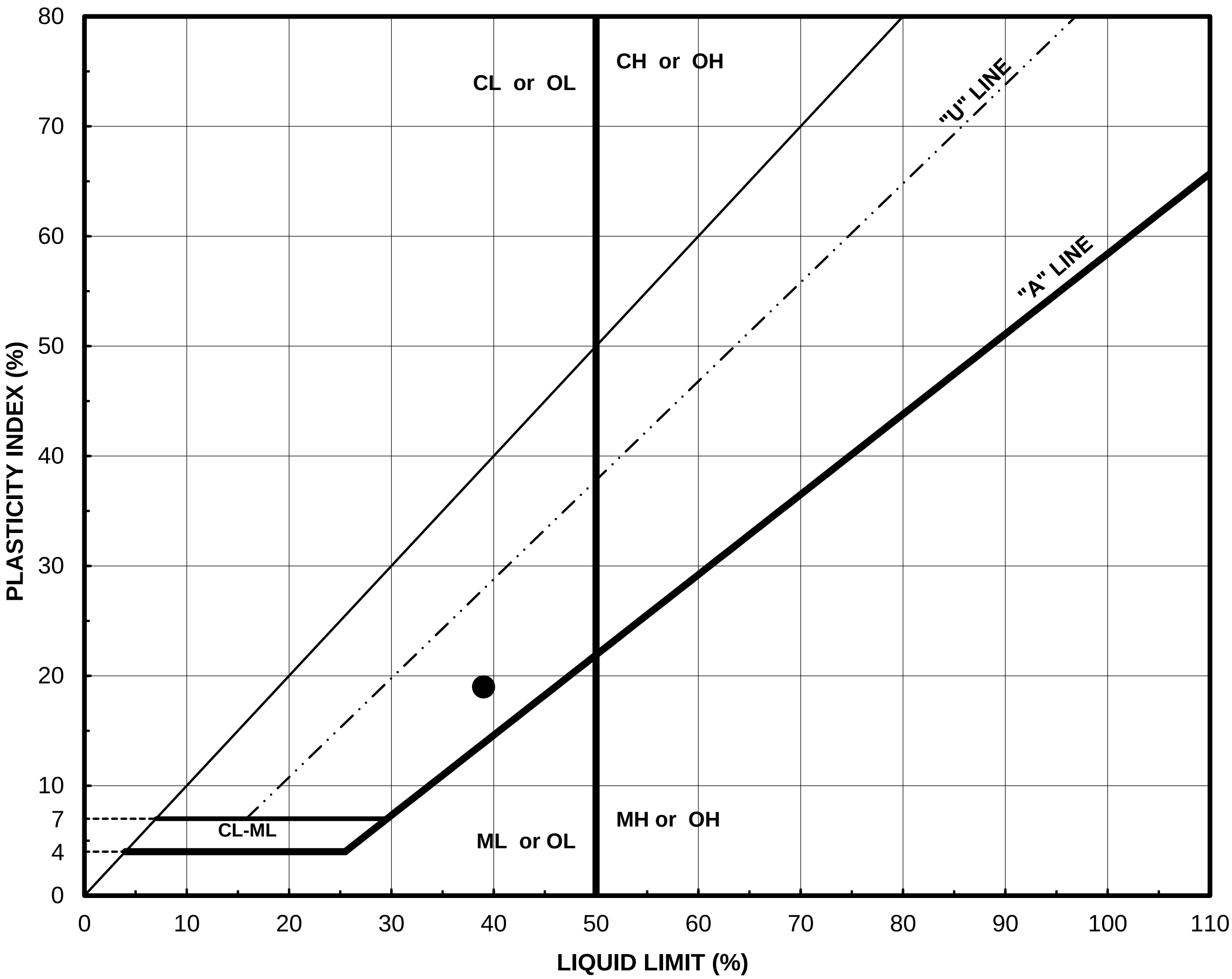


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
DS-01	4a	15.0	19.6	24	8	Dark yellowish brown Clayey SAND (SC)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

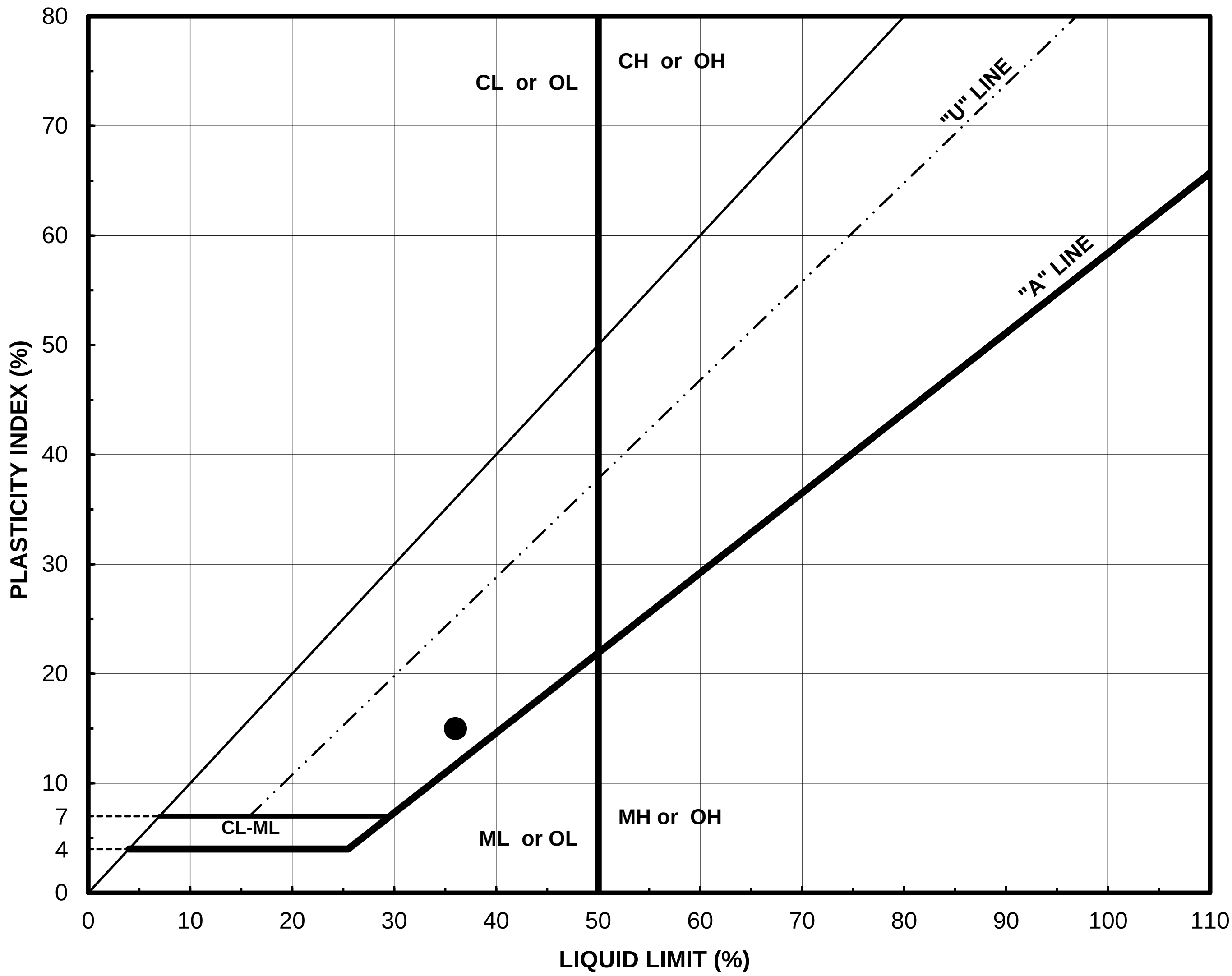


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
DS-01	8b	35.0	37.8	39	19	Gray Lean CLAY with Sand (CL)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

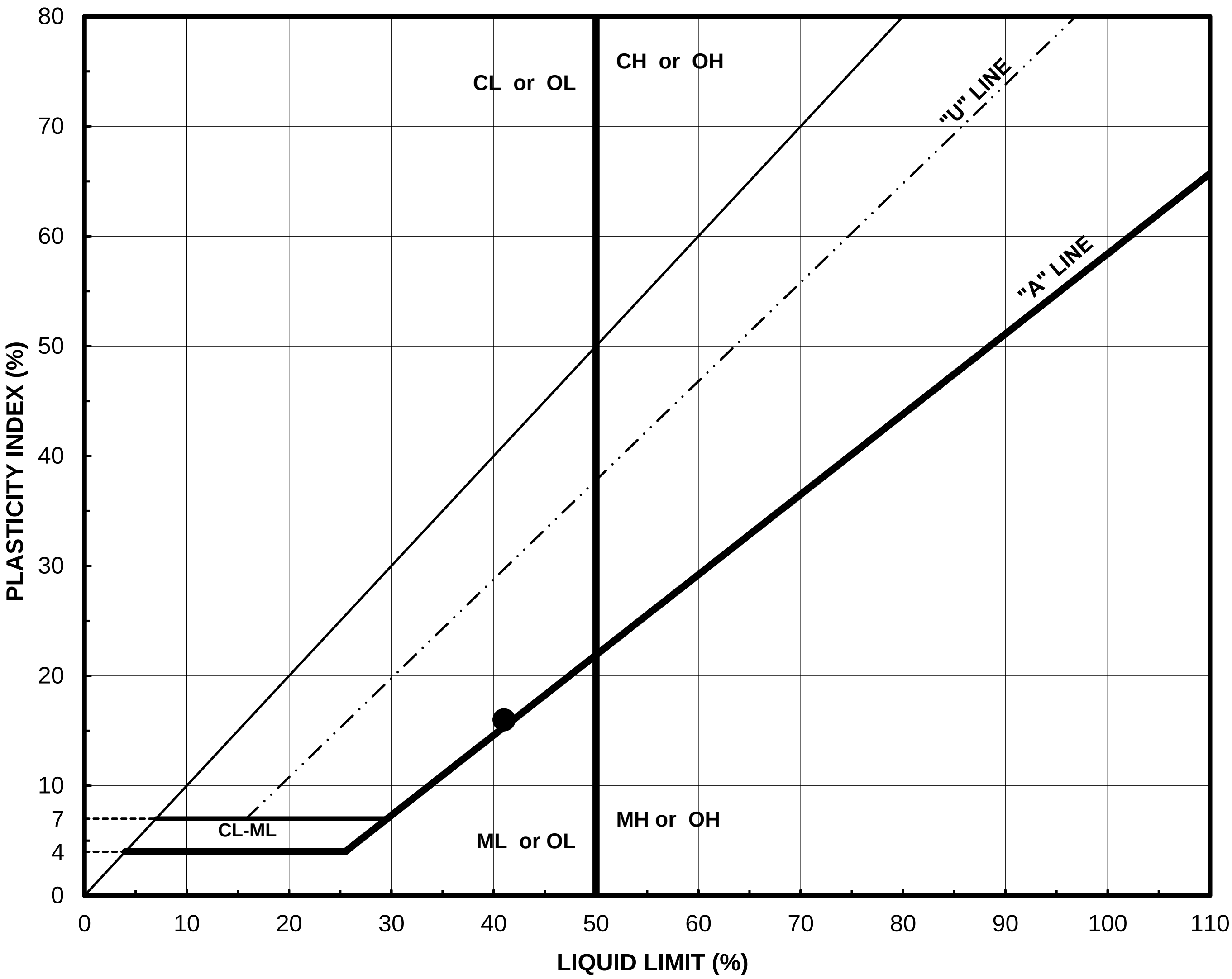


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
DS-03	7	30.0	34.2	36	15	Dark gray Clayey SAND (SC)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

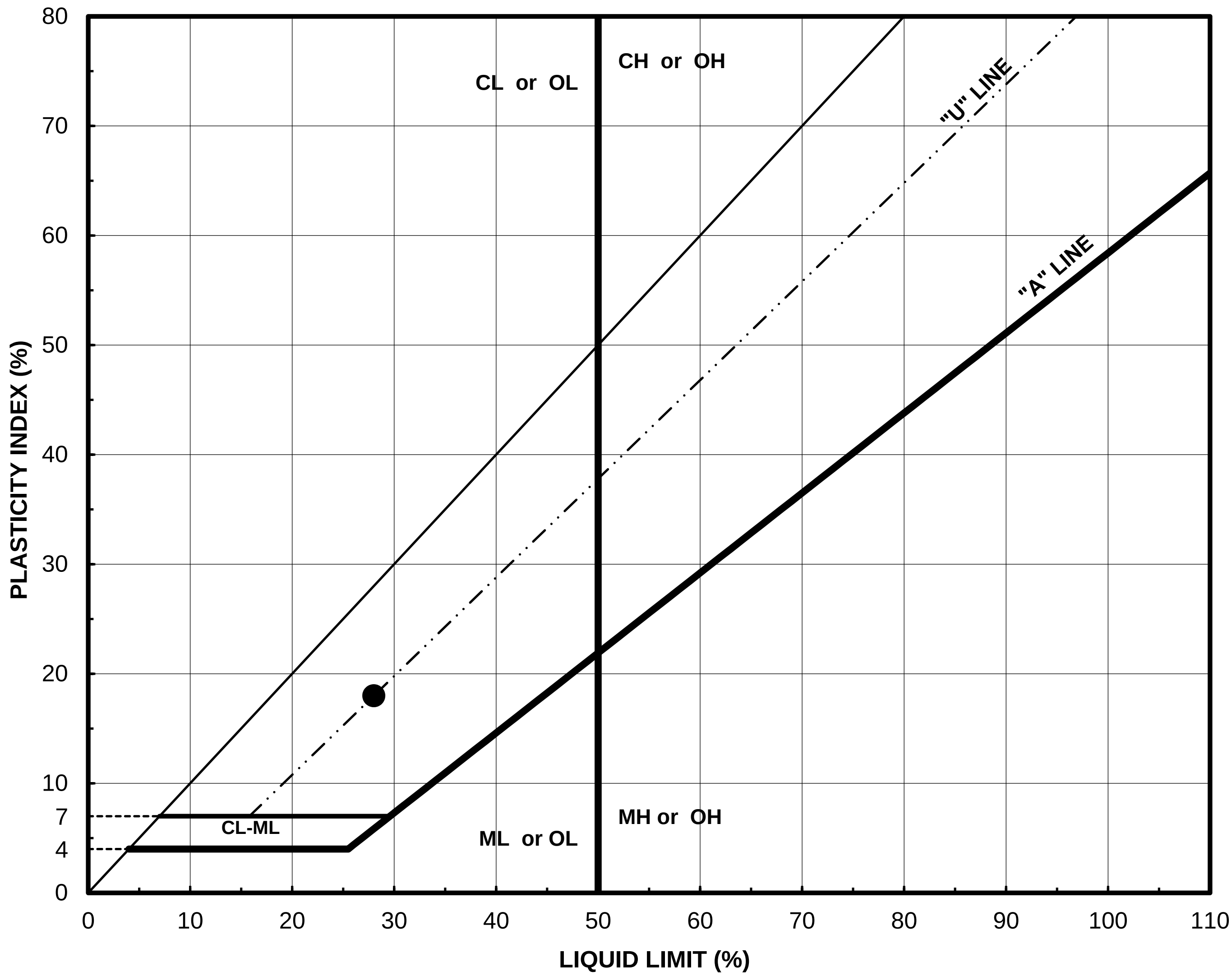


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
DS-06	7	30.0	35.7	41	16	Dark gray Sandy, Lean CLAY (CL)

Project Name: **Pure Water**

Project Number: **60530732**

PLASTICITY CHART

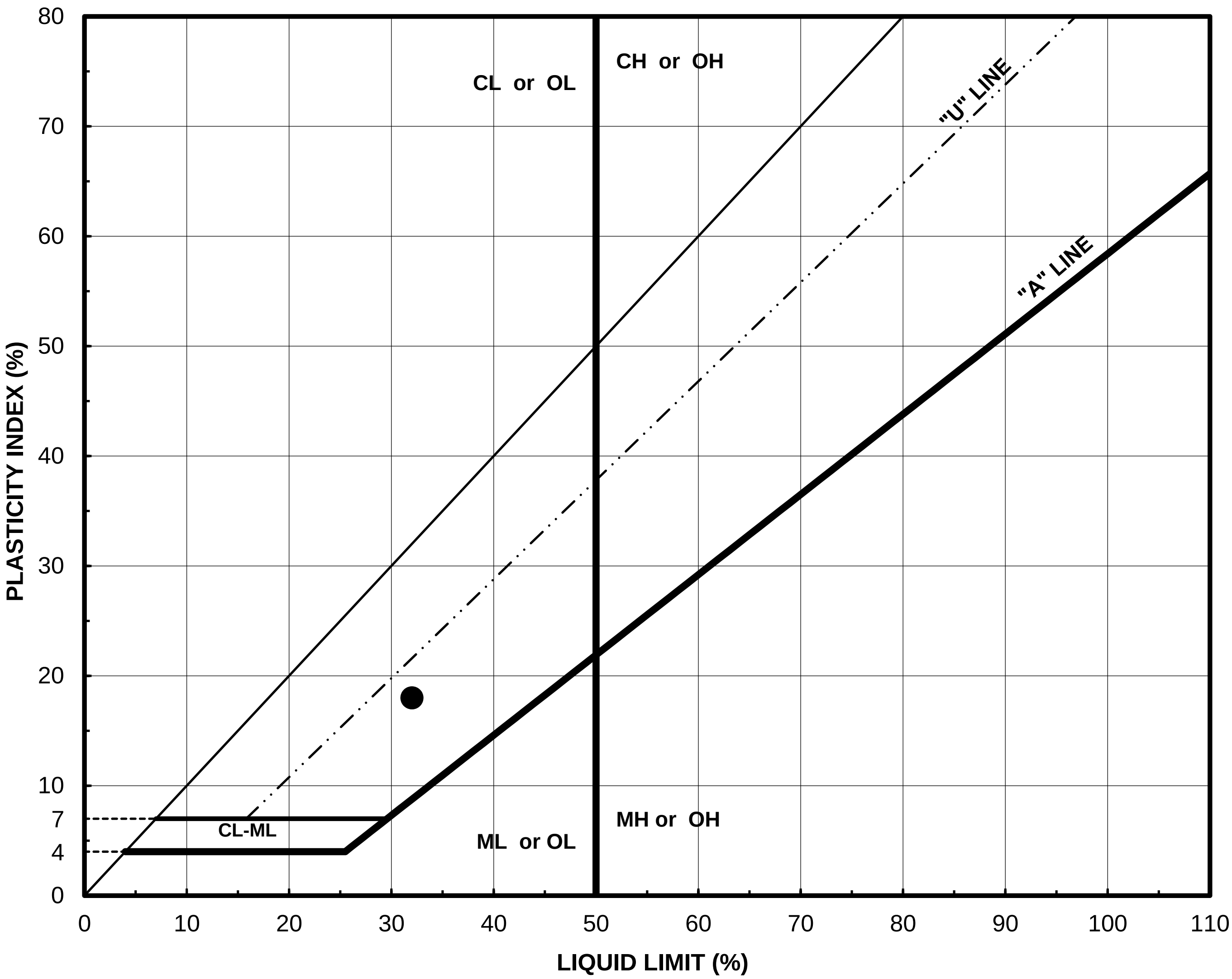


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-08	4	15.0	18.9	28	18	Light brown Lean CLAY (CL)

Project Name: **Pure Water**

Project Number: **60530732**

PLASTICITY CHART

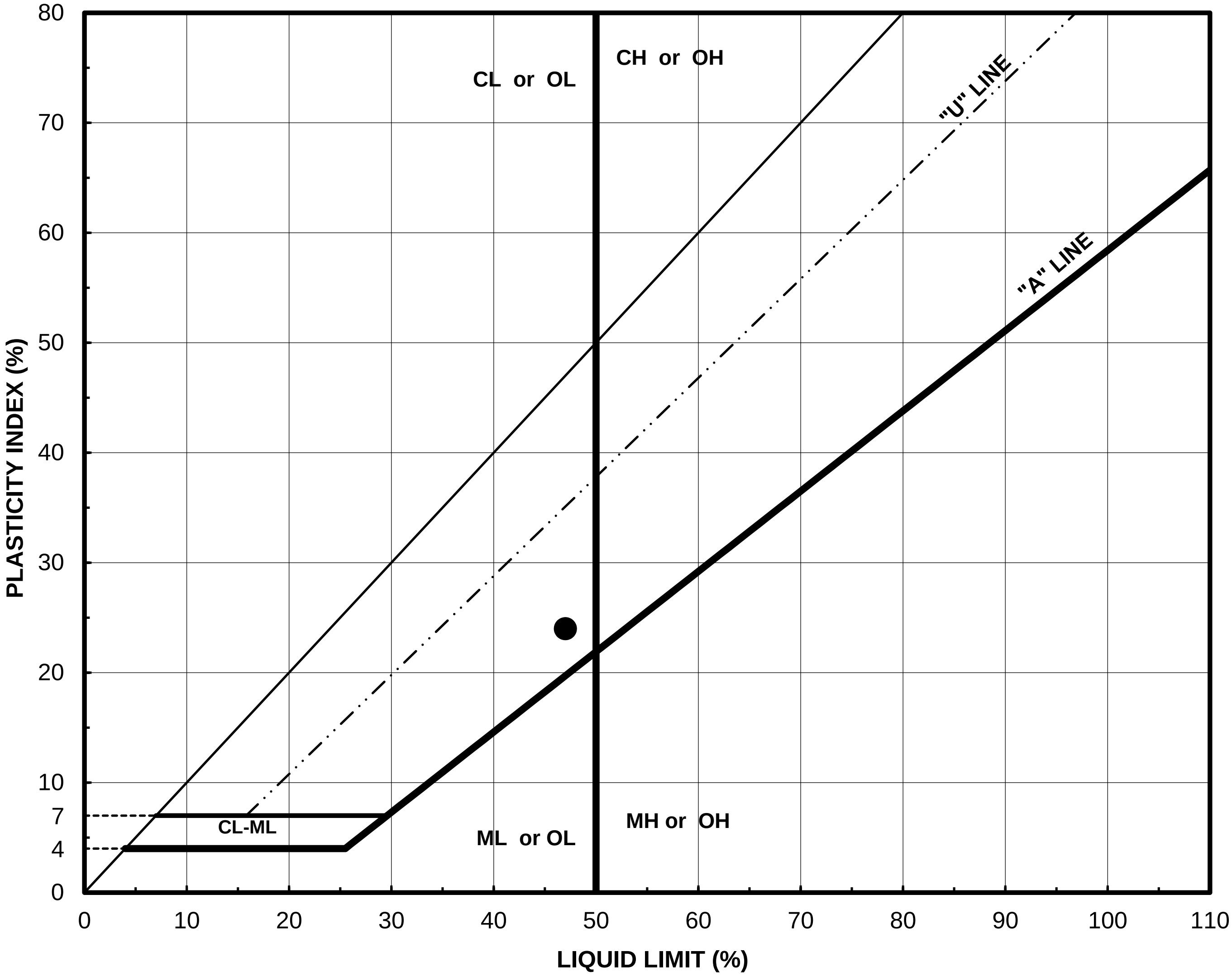


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-11	3	10.0	19.4	32	18	Olive brown Sandy, Lean CLAY (CL)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

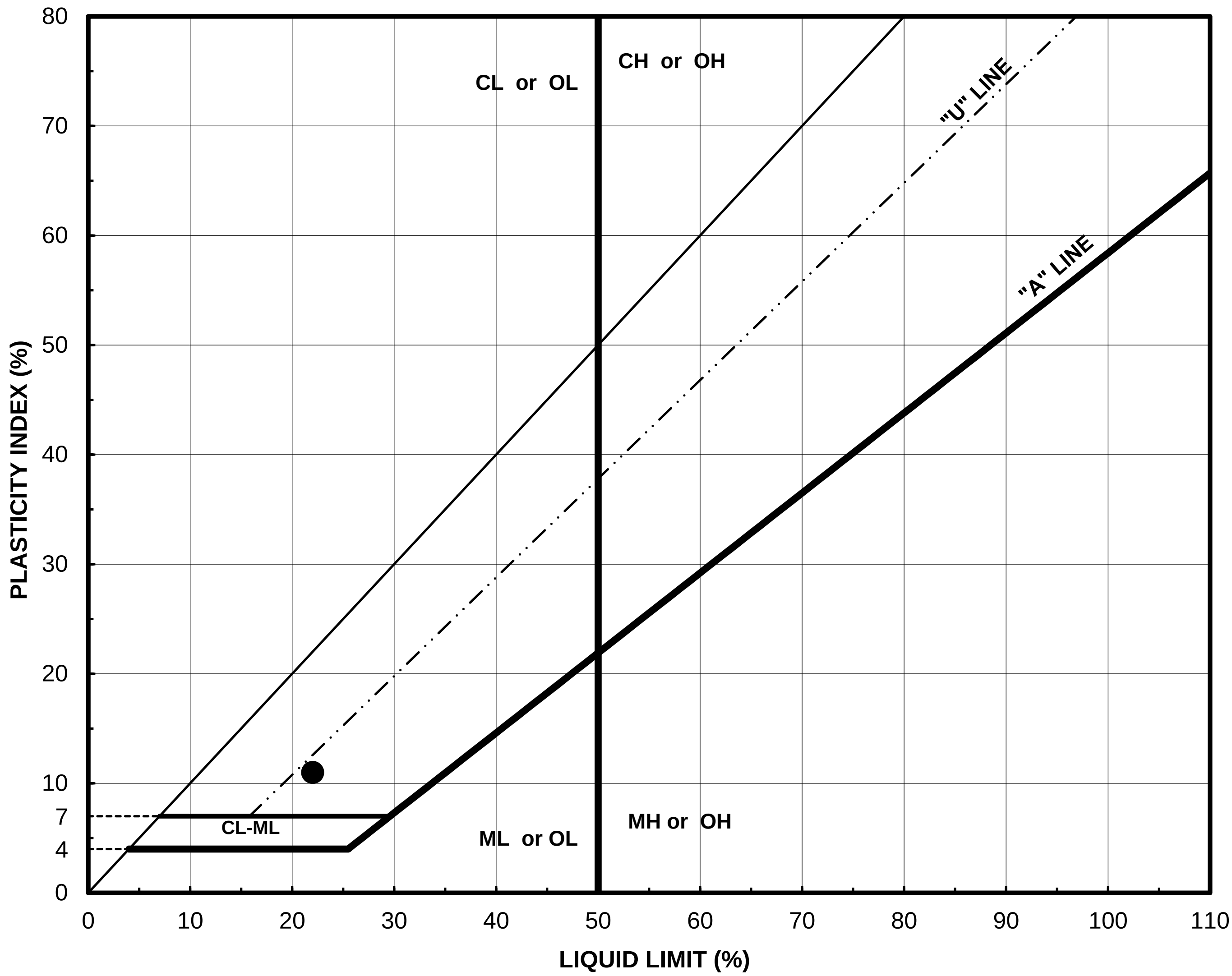


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-20	3	10.0	18.6	47	24	Yellowish brown Lean CLAY (CL)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

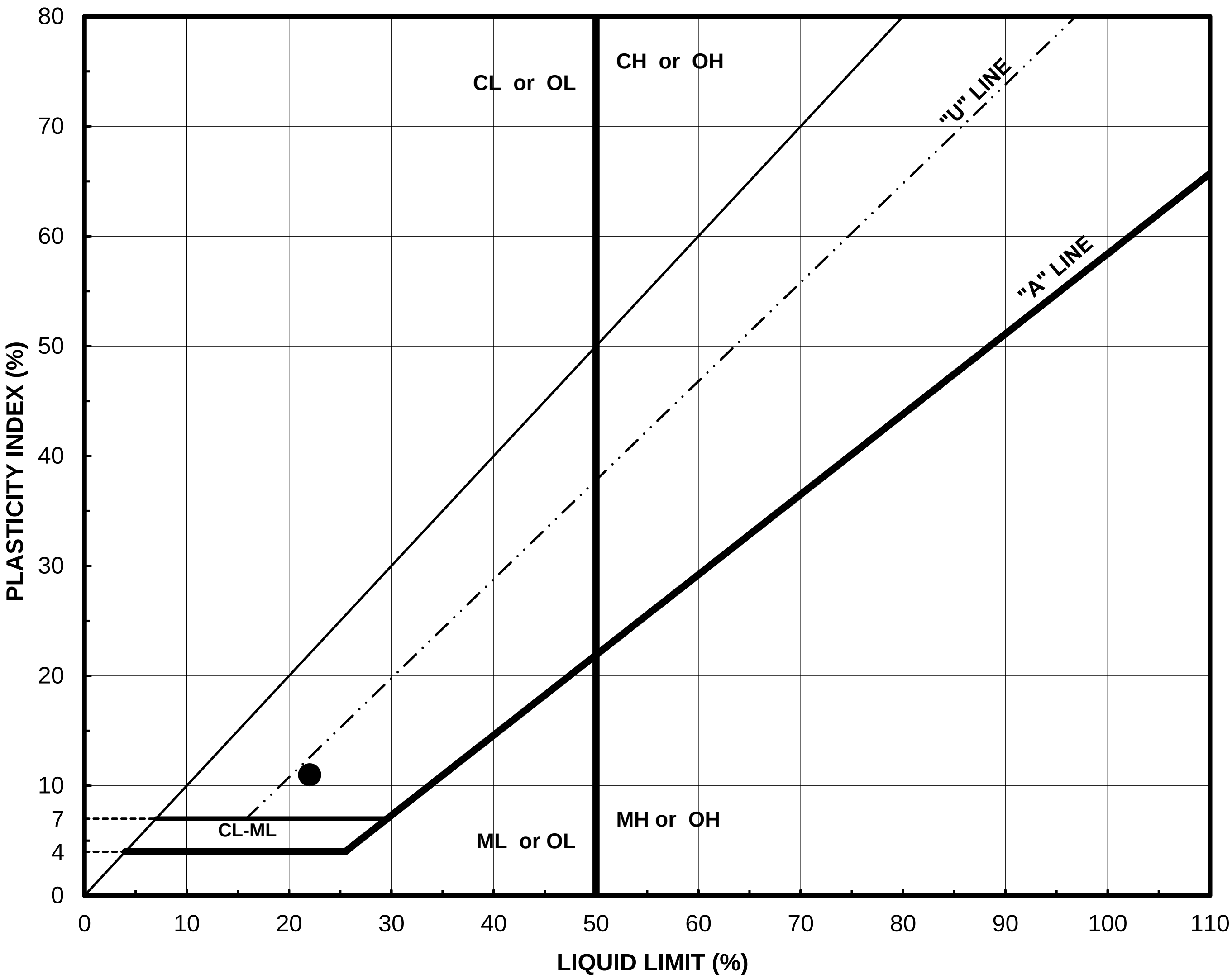


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-23	1	0~5	NA	22	11	Strong brown Lean CLAY (CL)

Project Name: **Pure Water**

Project Number: **60530732**

PLASTICITY CHART

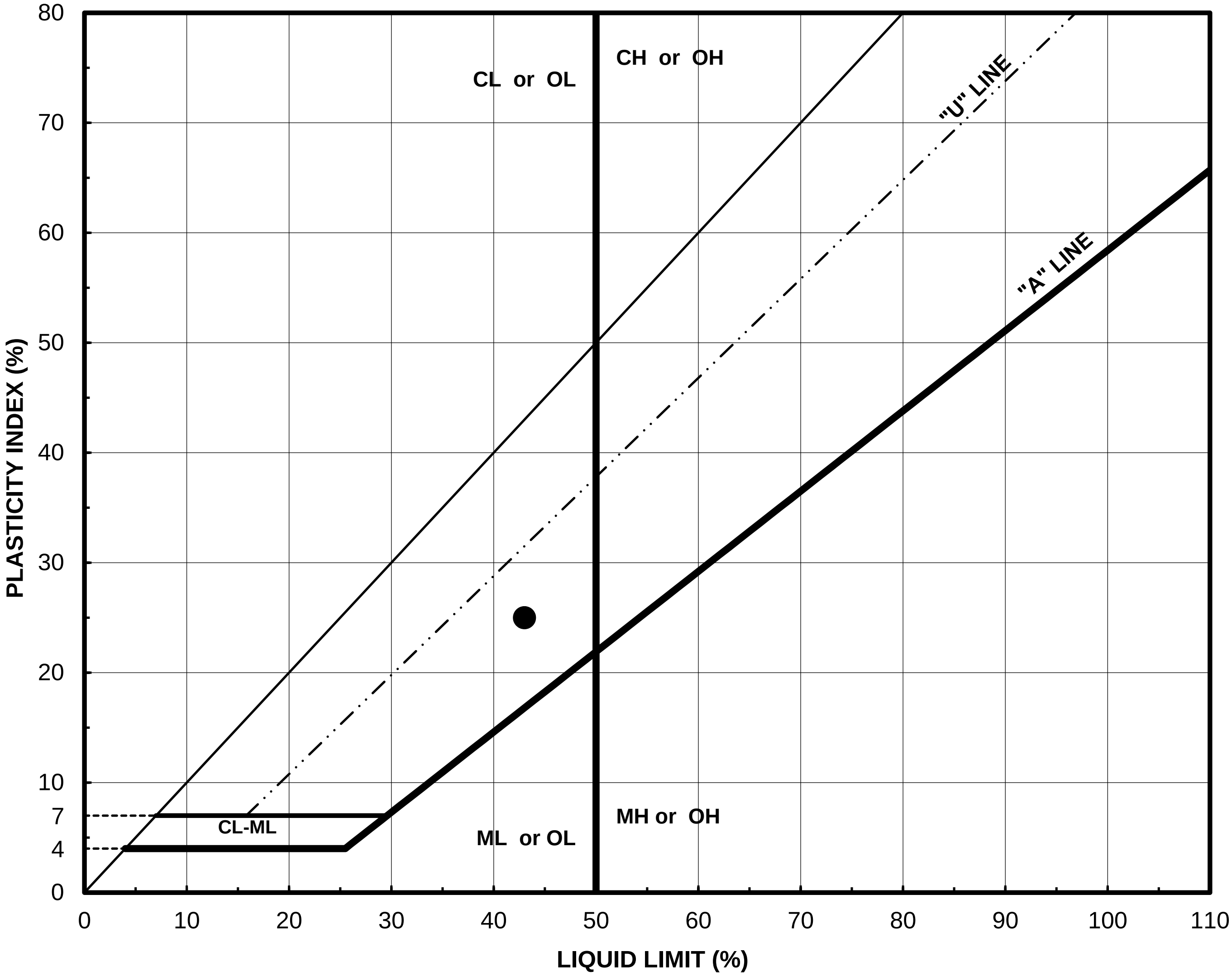


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-25	1	0-5	10.3	22	11	Strong brown Clayey SAND (SC)

Project Name: Pure Water

Project Number: 60530732

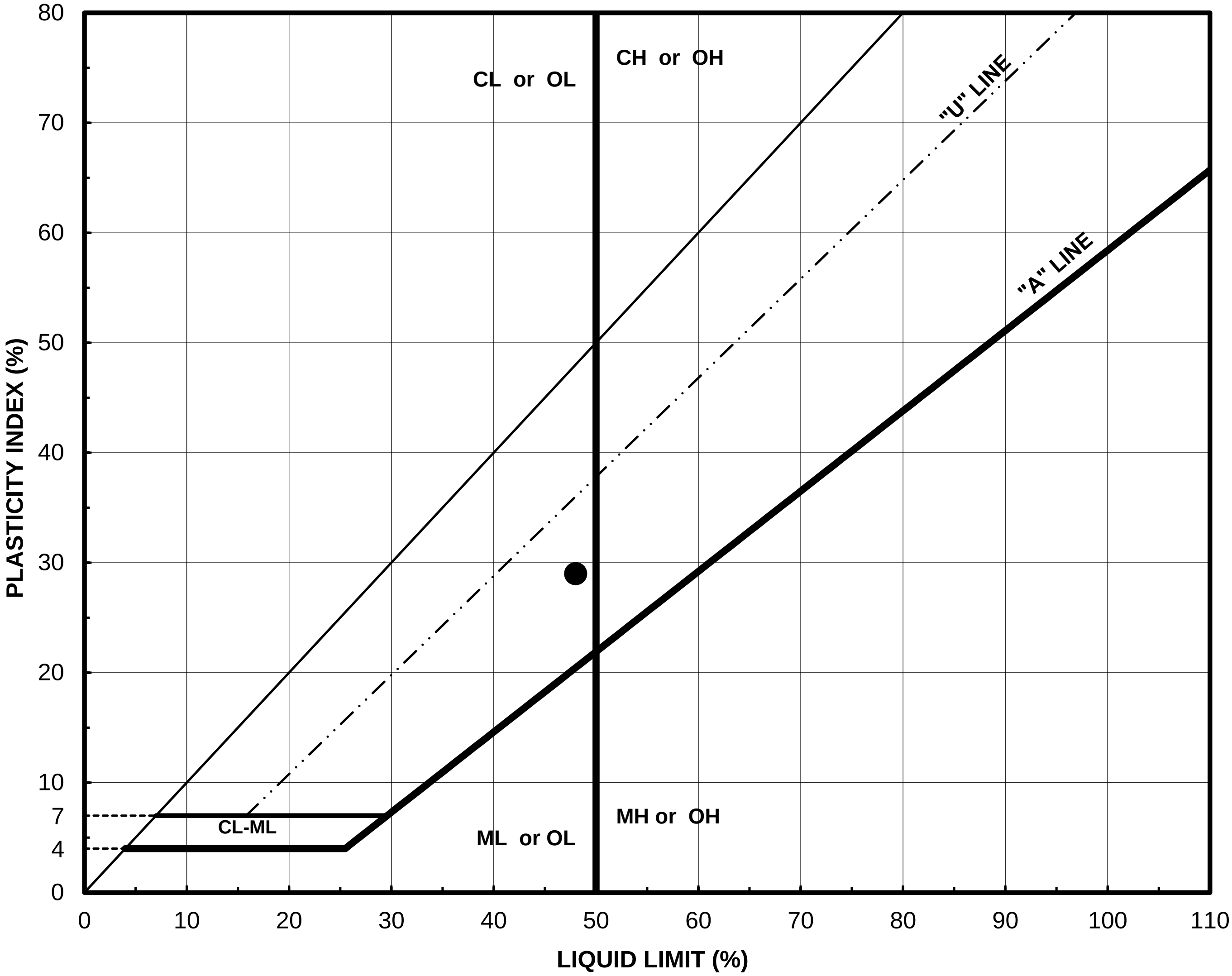
PLASTICITY CHART



Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-27	2	5.0	20.3	43	25	Light yellowish brown CLAY with Sand (CL)

Project Name: **Pure Water**
Project Number: **60530732**

PLASTICITY CHART

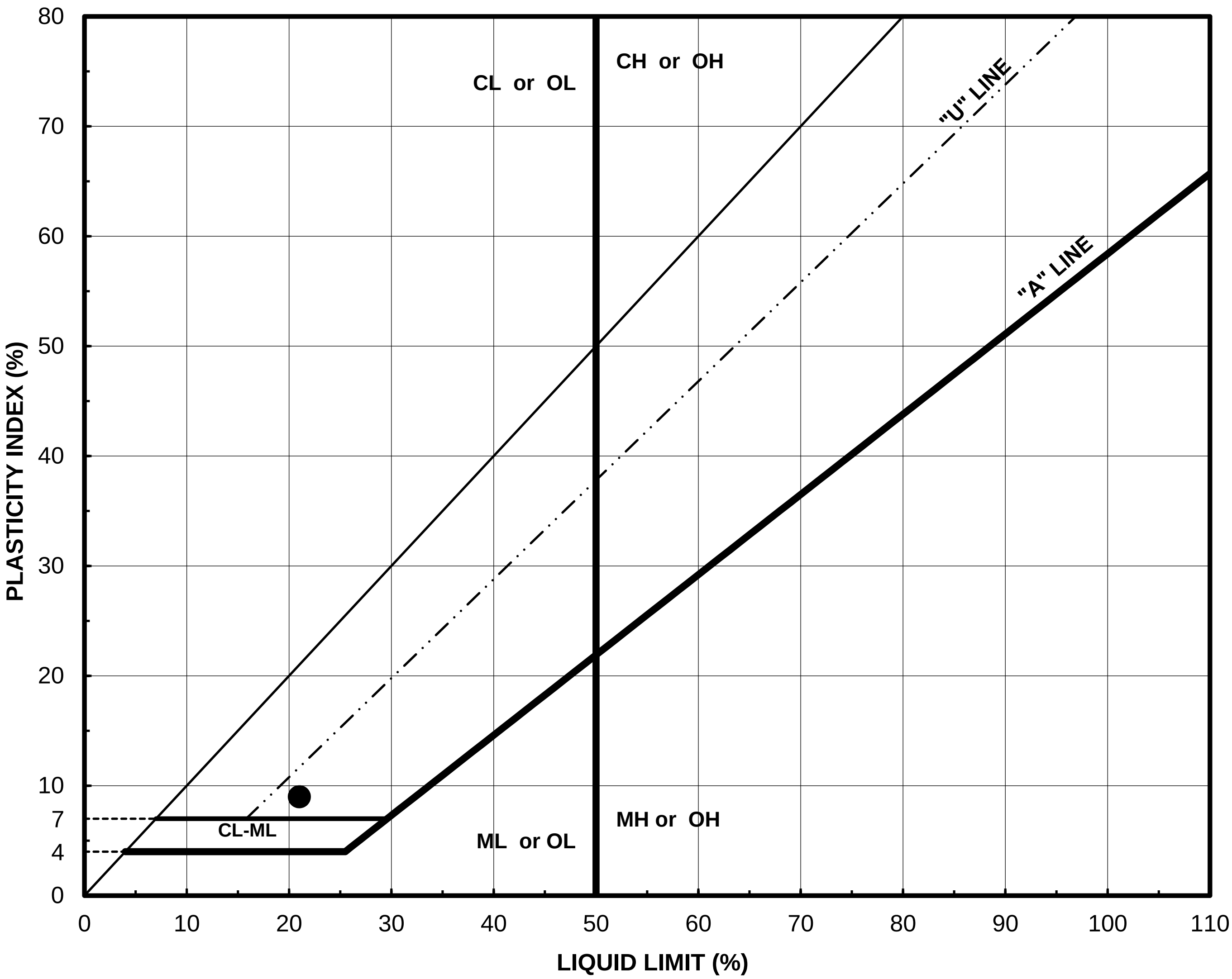


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-31	3	10.0	NA	48	29	Yellowish brown Silty CLAY (CL)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

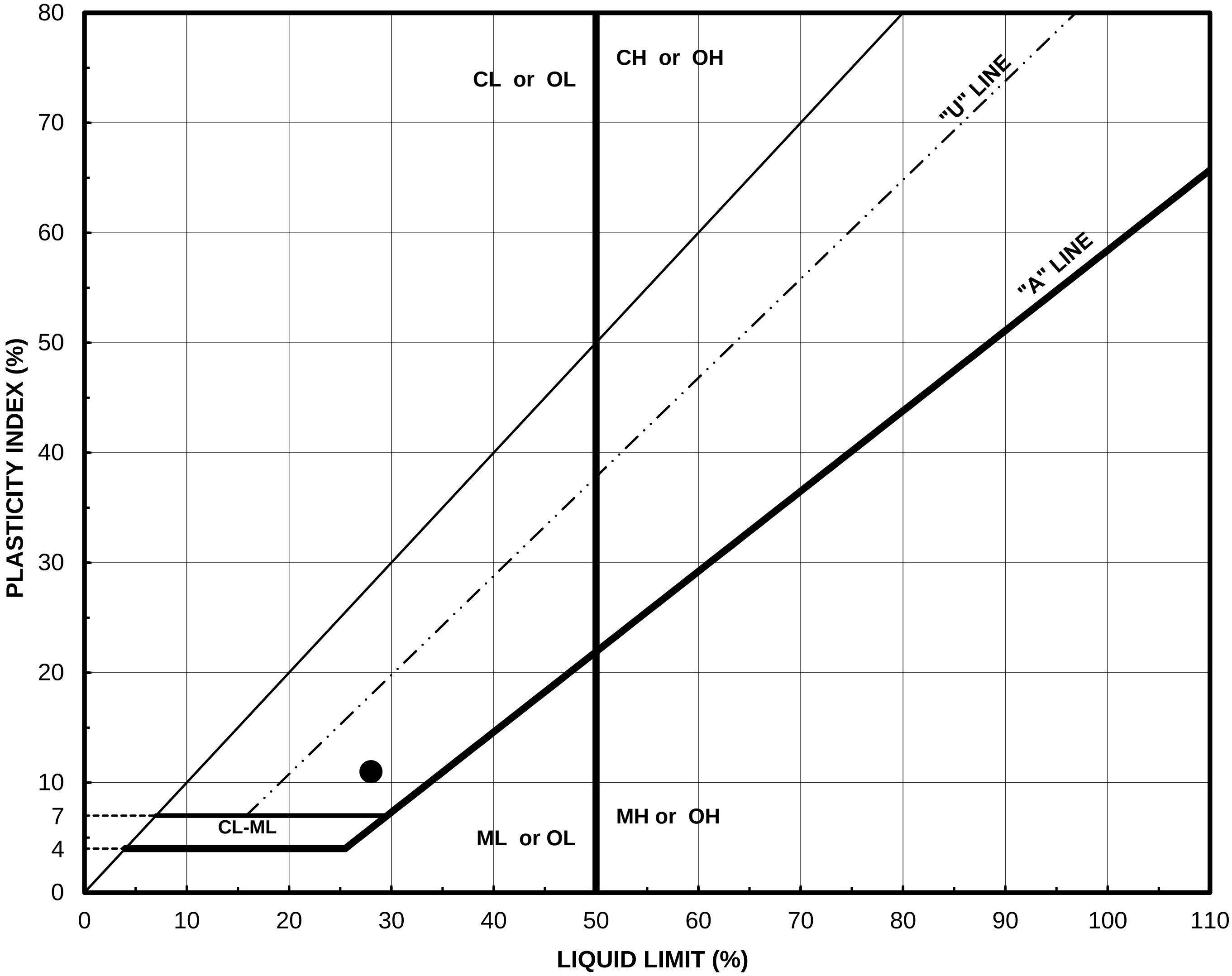


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-36b	2	5.0	7.8	21	9	Strong brown Clayey SAND (SC)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

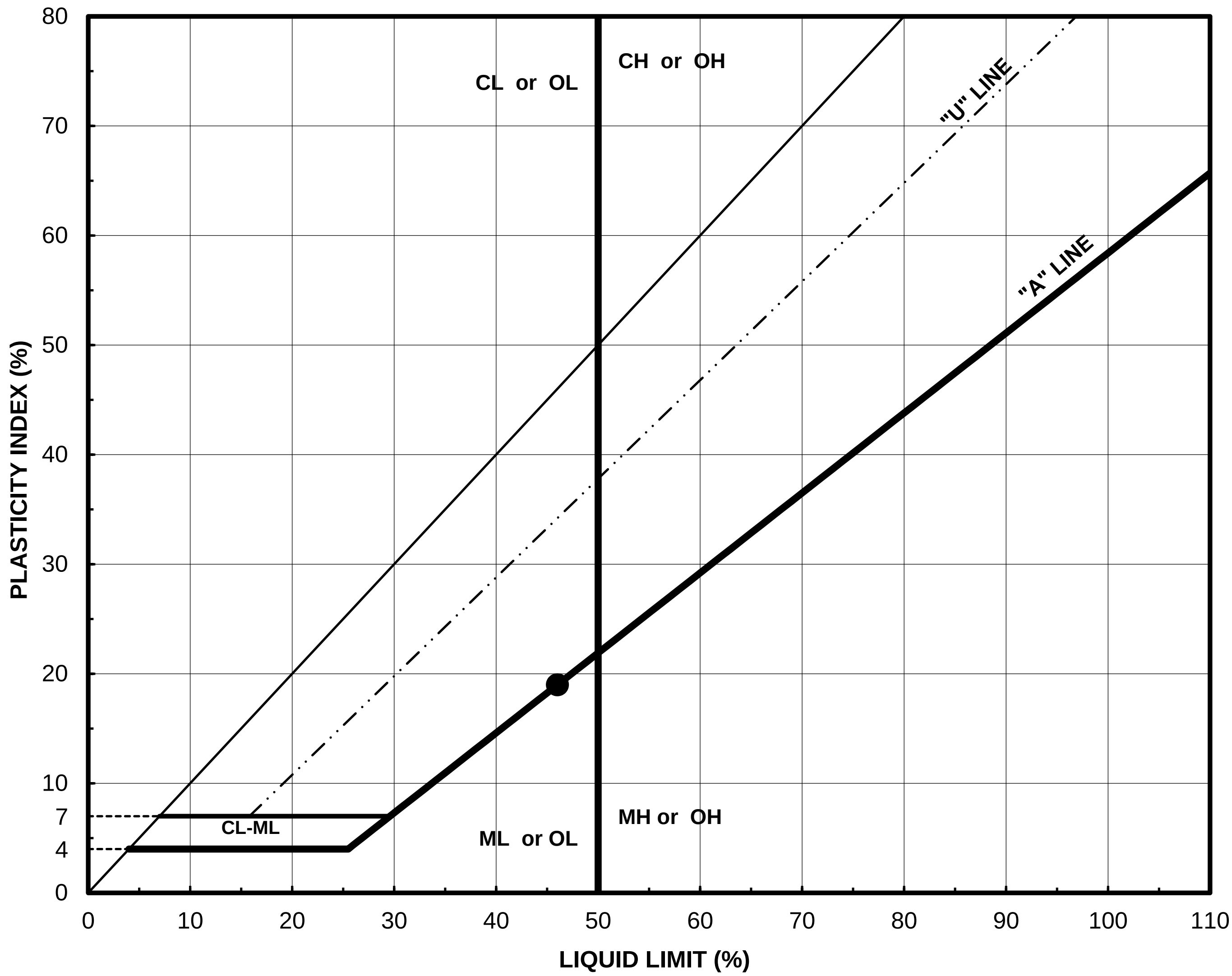


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-44	1	5.0	12.2	28	11	Yellowish brown Clayey SAND (SC)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

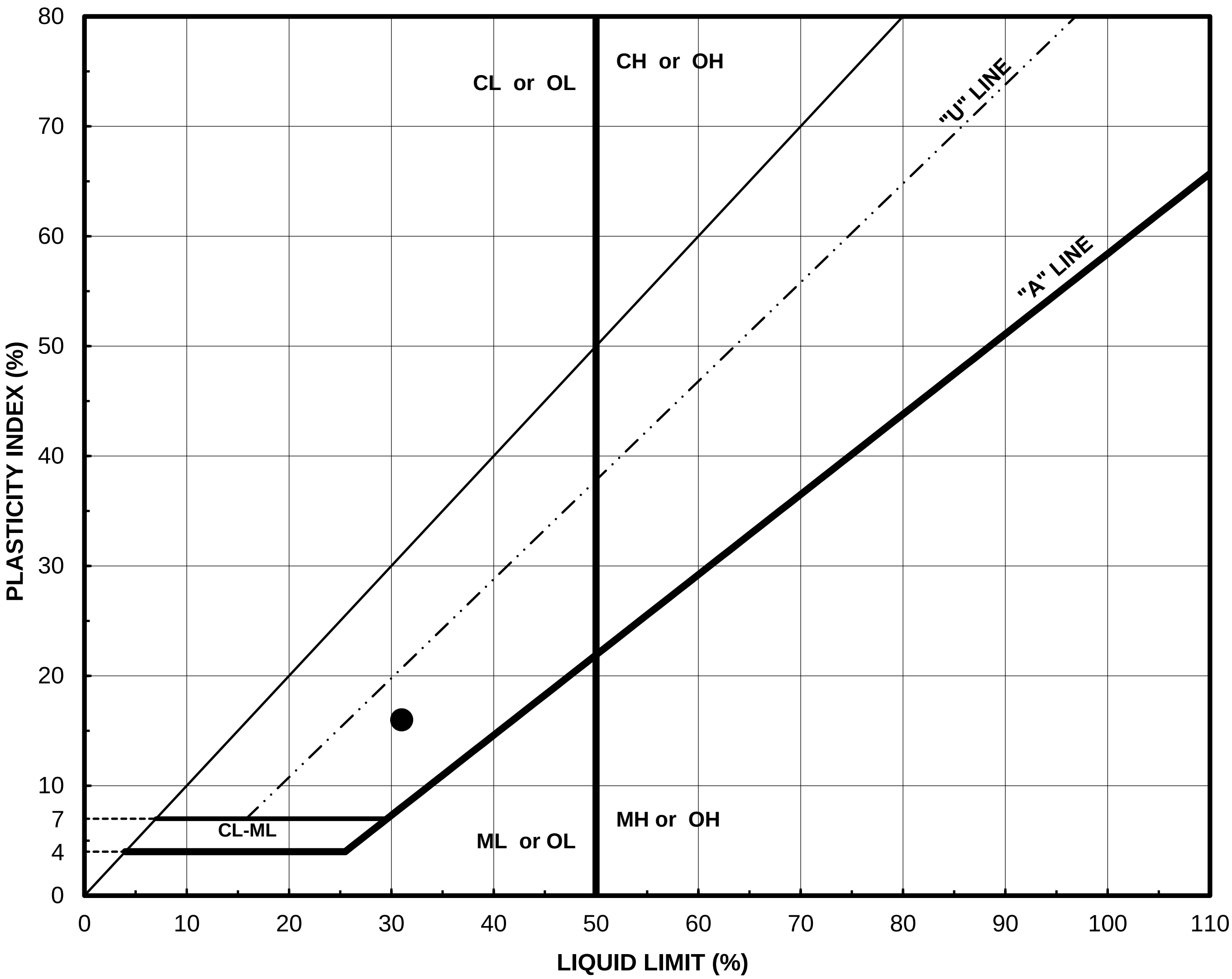


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-45	3	10.0	20.3	46	19	Light olive brown Silty CLAY (CL)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

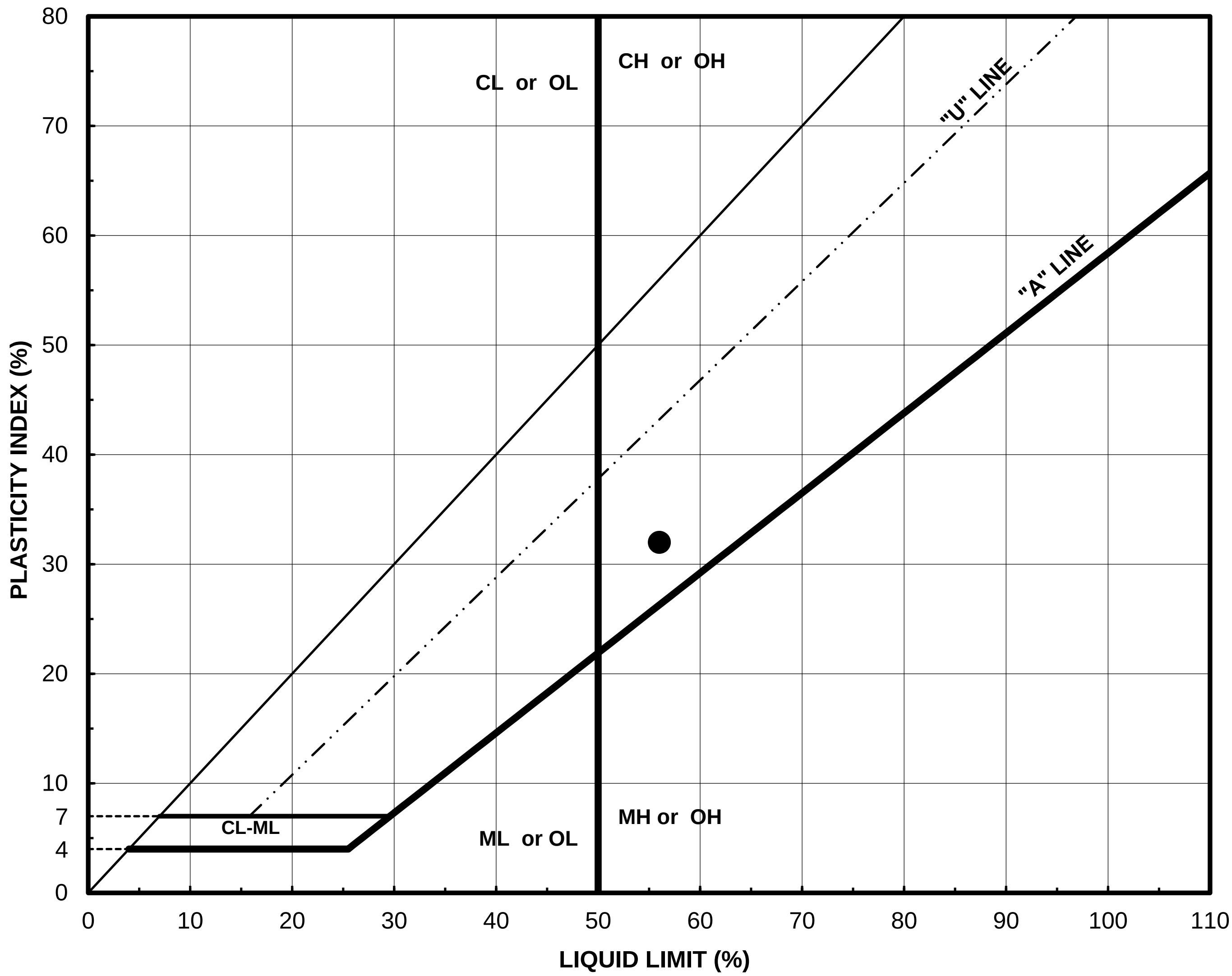


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-46	4	18.5	23.0	31	16	Dark yellowish brown Sandy, Lean CLAY (CL)

Project Name: **Pure Water**

Project Number: **60530732**

PLASTICITY CHART

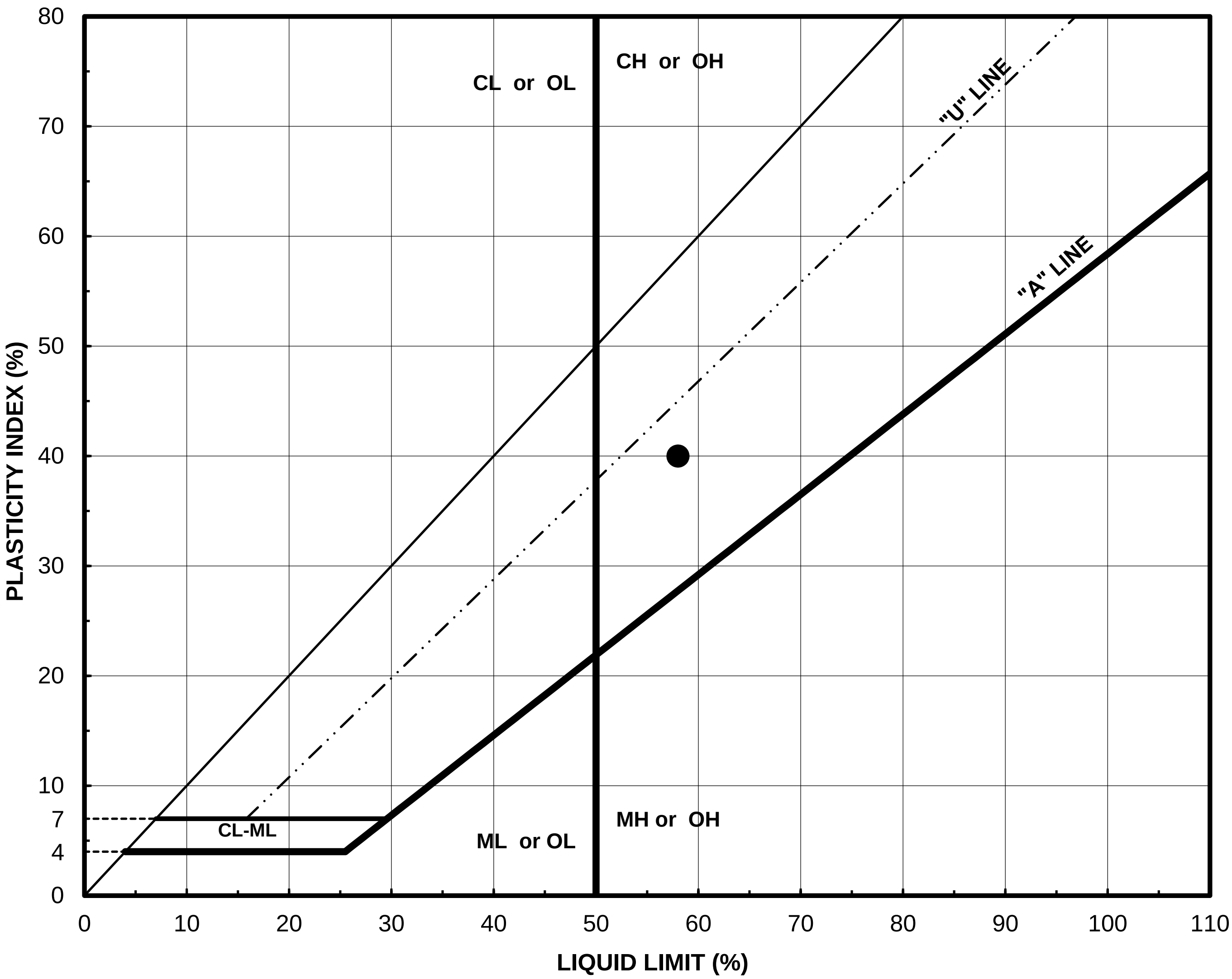


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
FM-47	2	5.0	16.3	56	32	Light olive brown Fat CLAY (CH)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

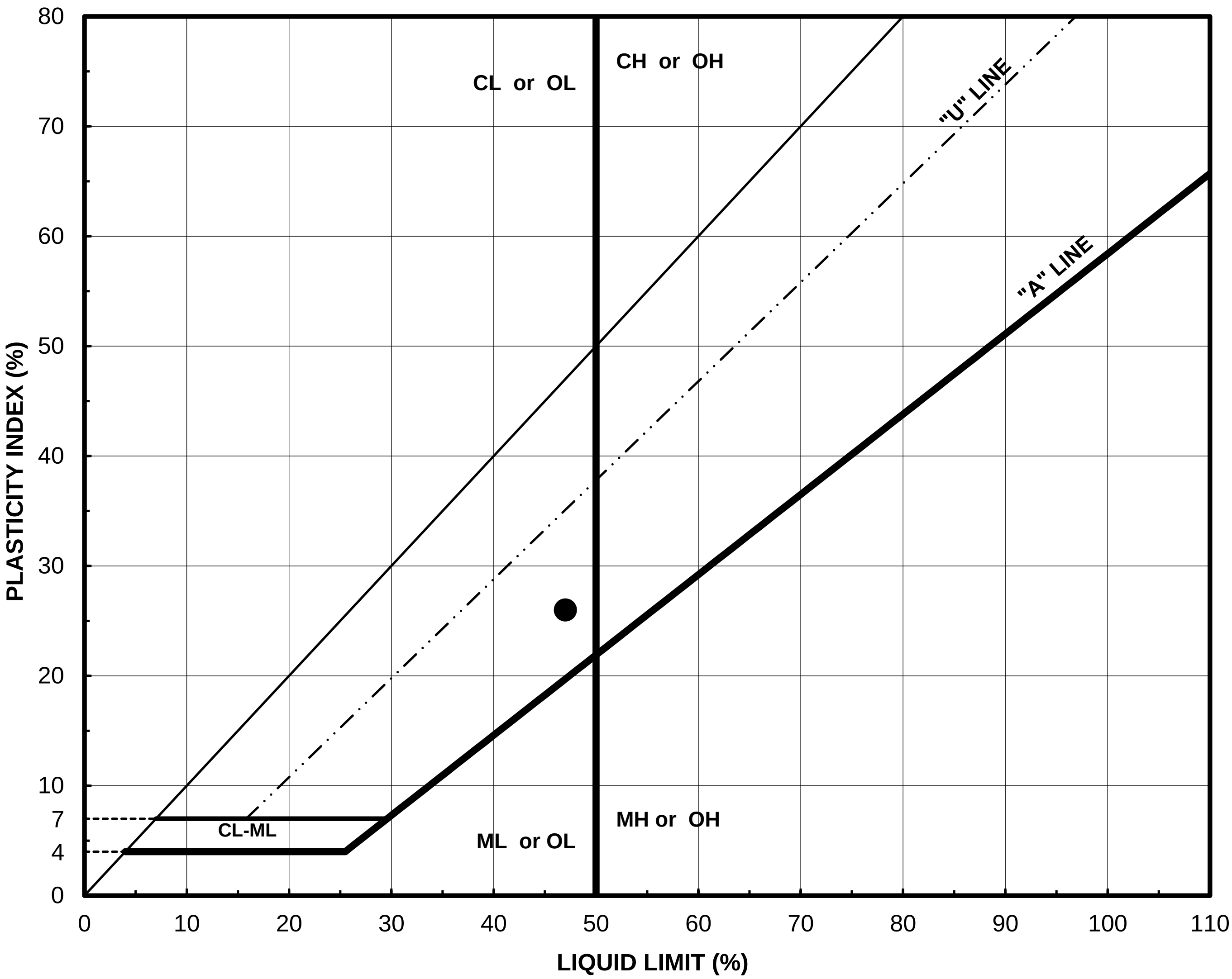


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
PS-3	12a	65.0	37.9	58	40	Dark gray Fat CLAY (CH)

Project Name: **Pure Water**

Project Number: **60530732**

PLASTICITY CHART

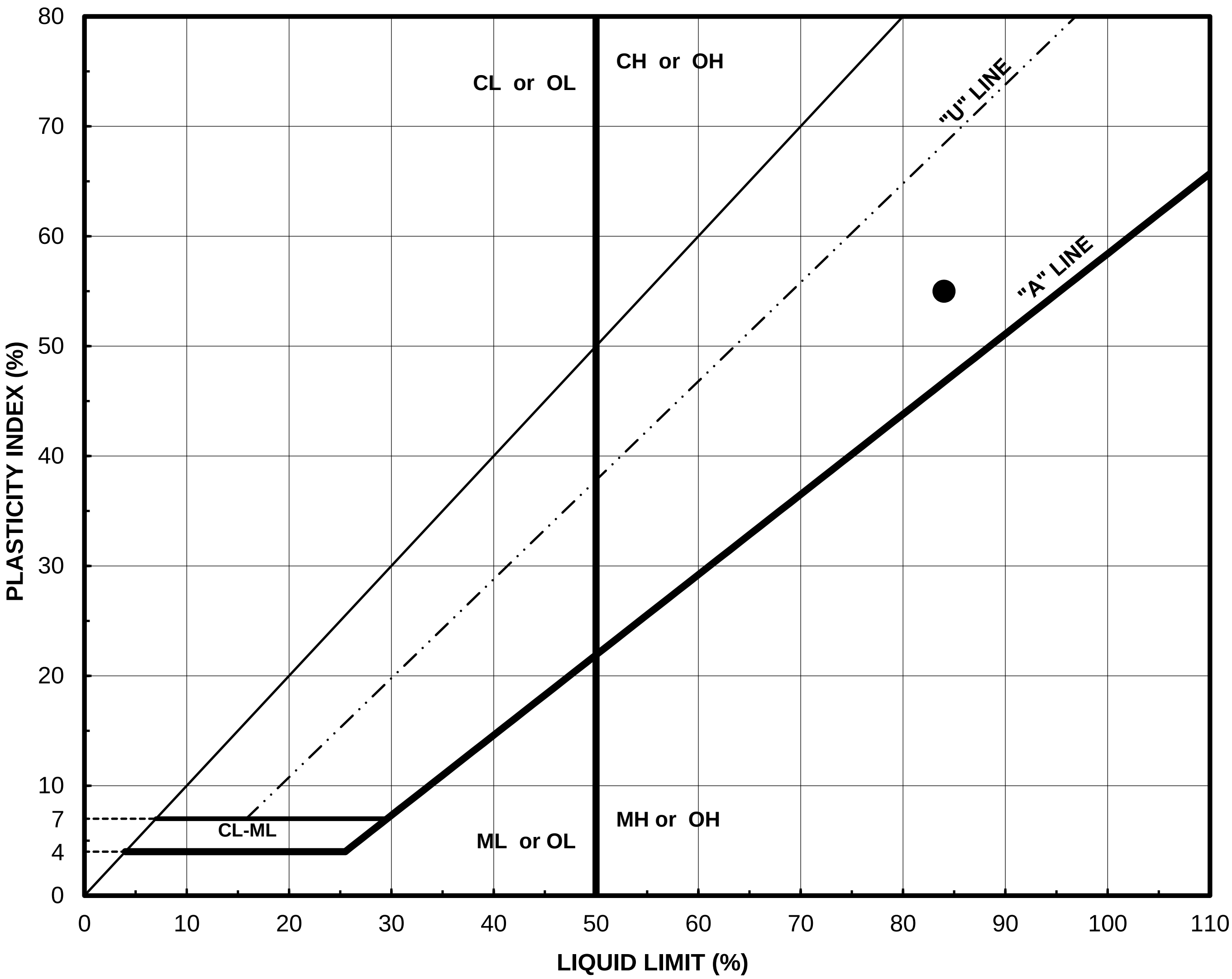


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
TC-01	4	17.0	NA	47	26	Dark grayish brown CLAY with Sand (CL)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

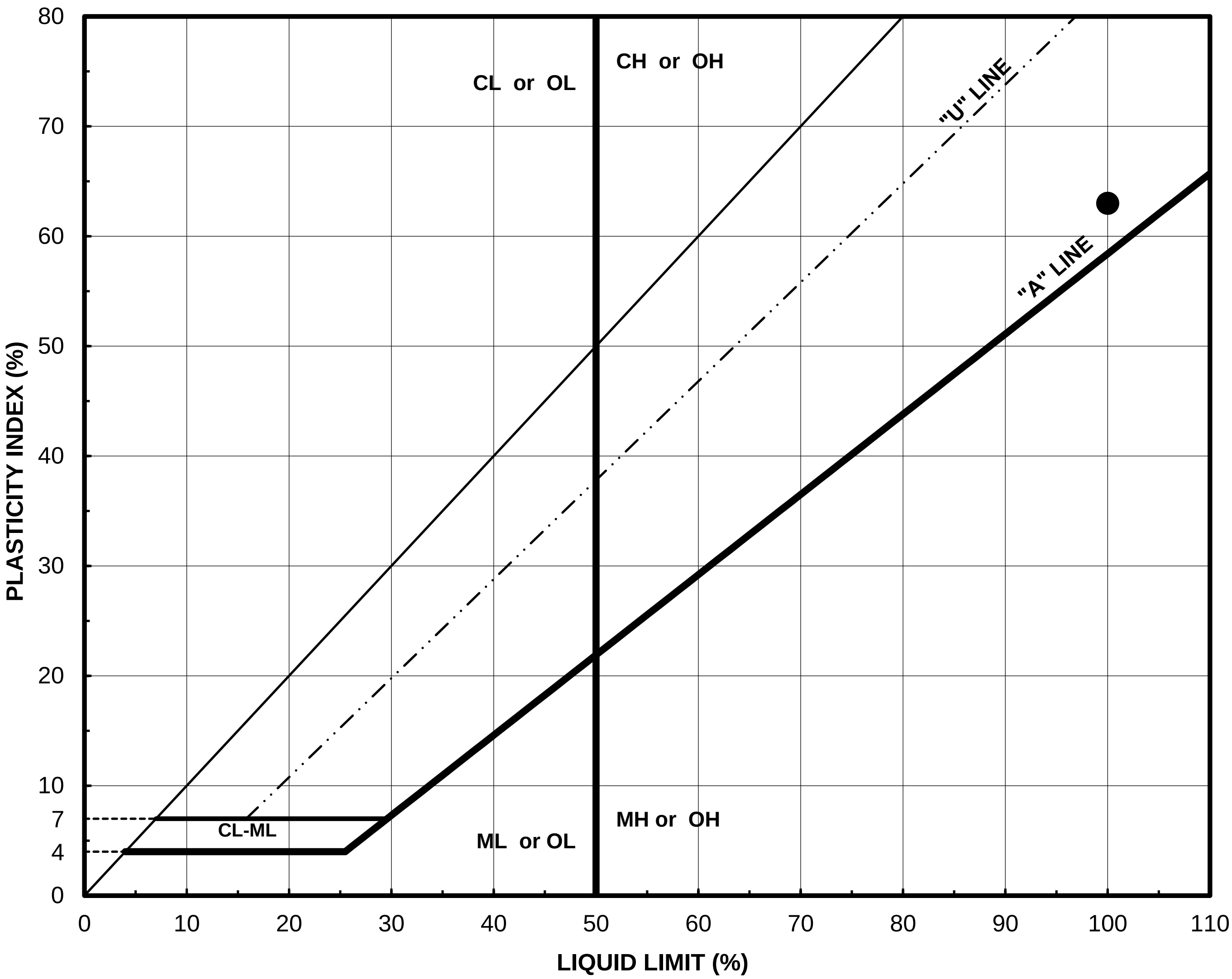


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
TC-01	6	25.0	----	84	55	Dark gray Fat CLAY (CH)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

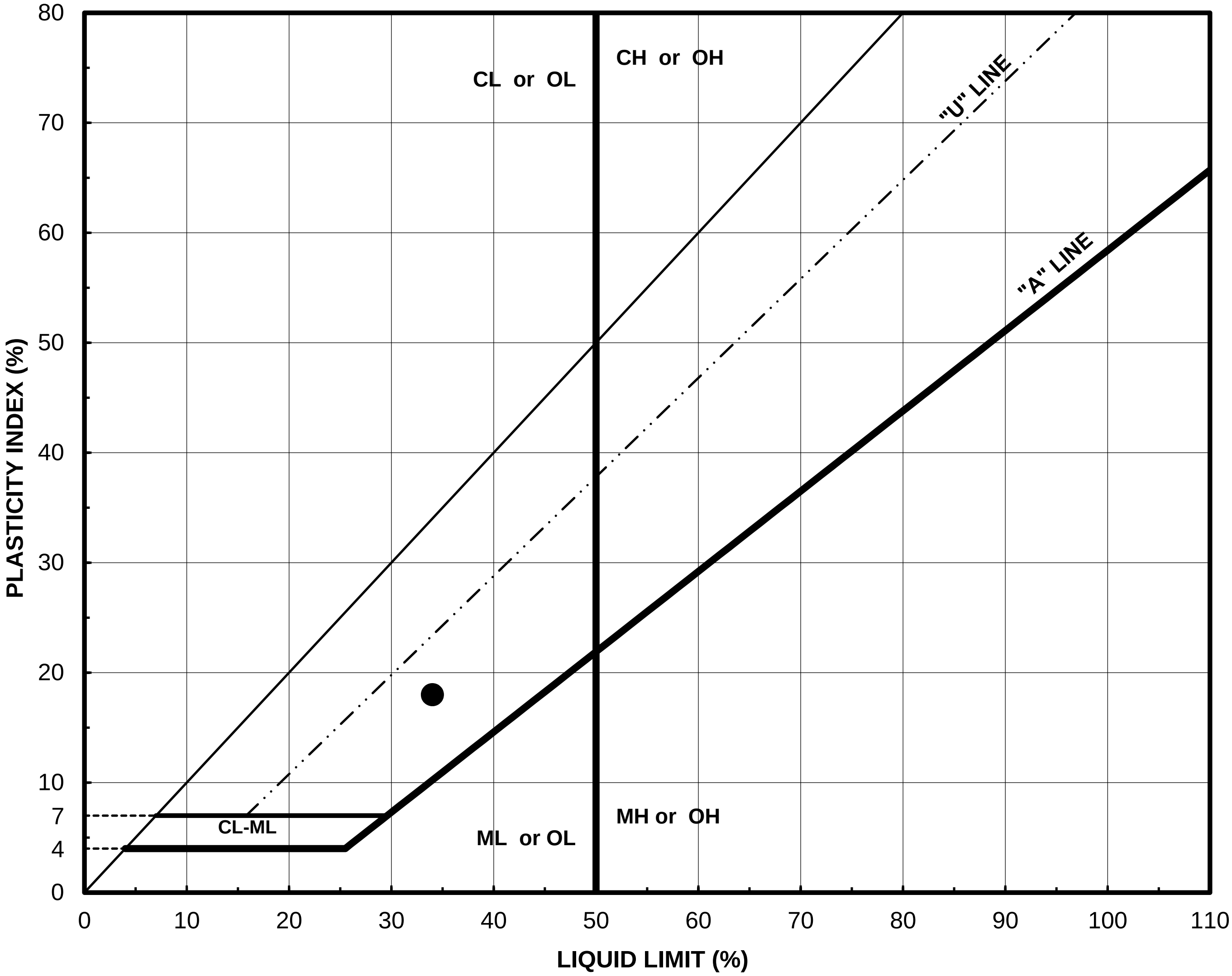


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
TC-01	7	30.0	40.0	100	63	Dark gray Fat CLAY (CH)

Project Name: Pure Water

Project Number: 60530732

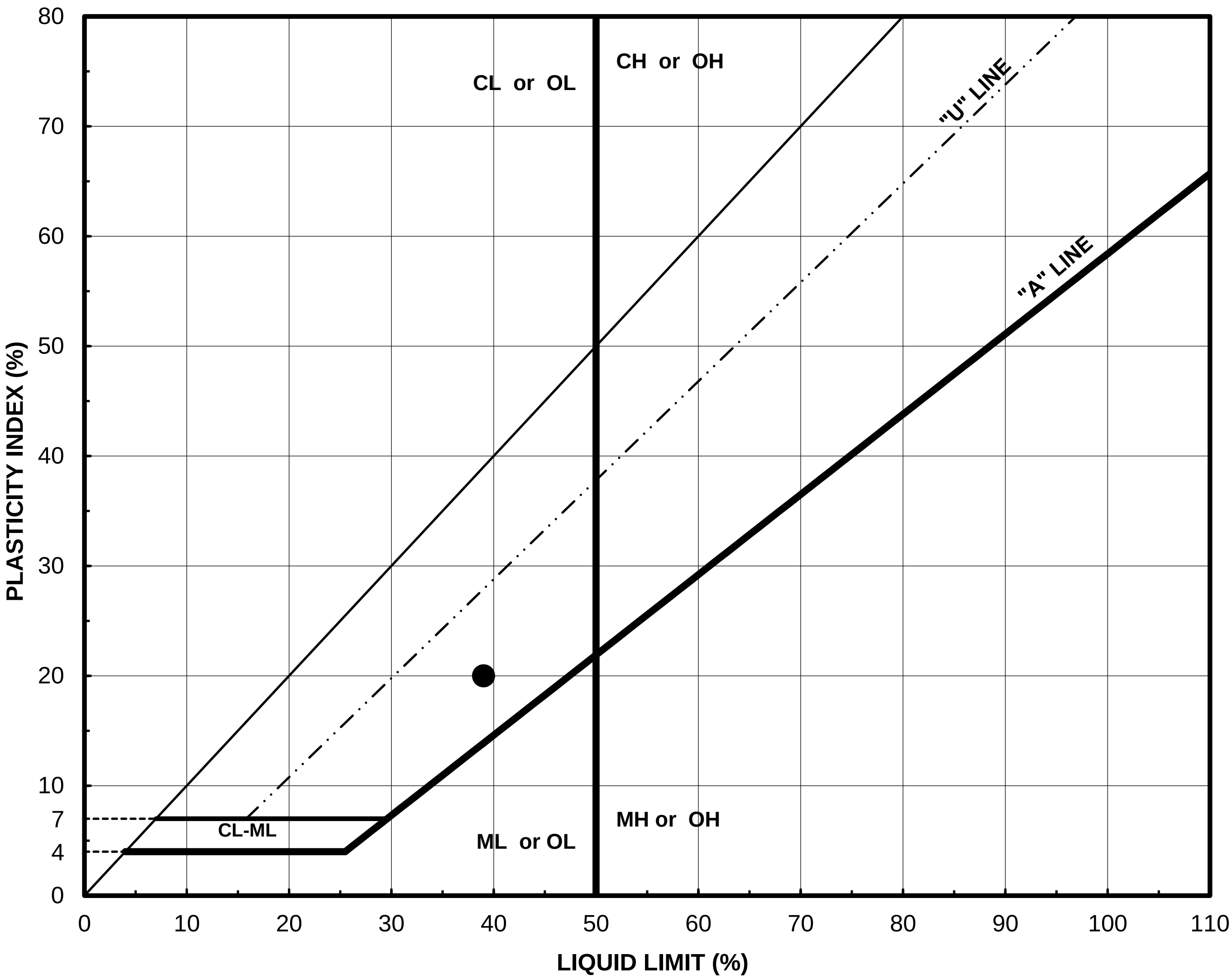
PLASTICITY CHART



Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
TC-01	10	45.0	NA	34	18	Dark grayish brown Clayey SAND (SC)

Project Name: **Pure Water**
Project Number: **60530732**

PLASTICITY CHART

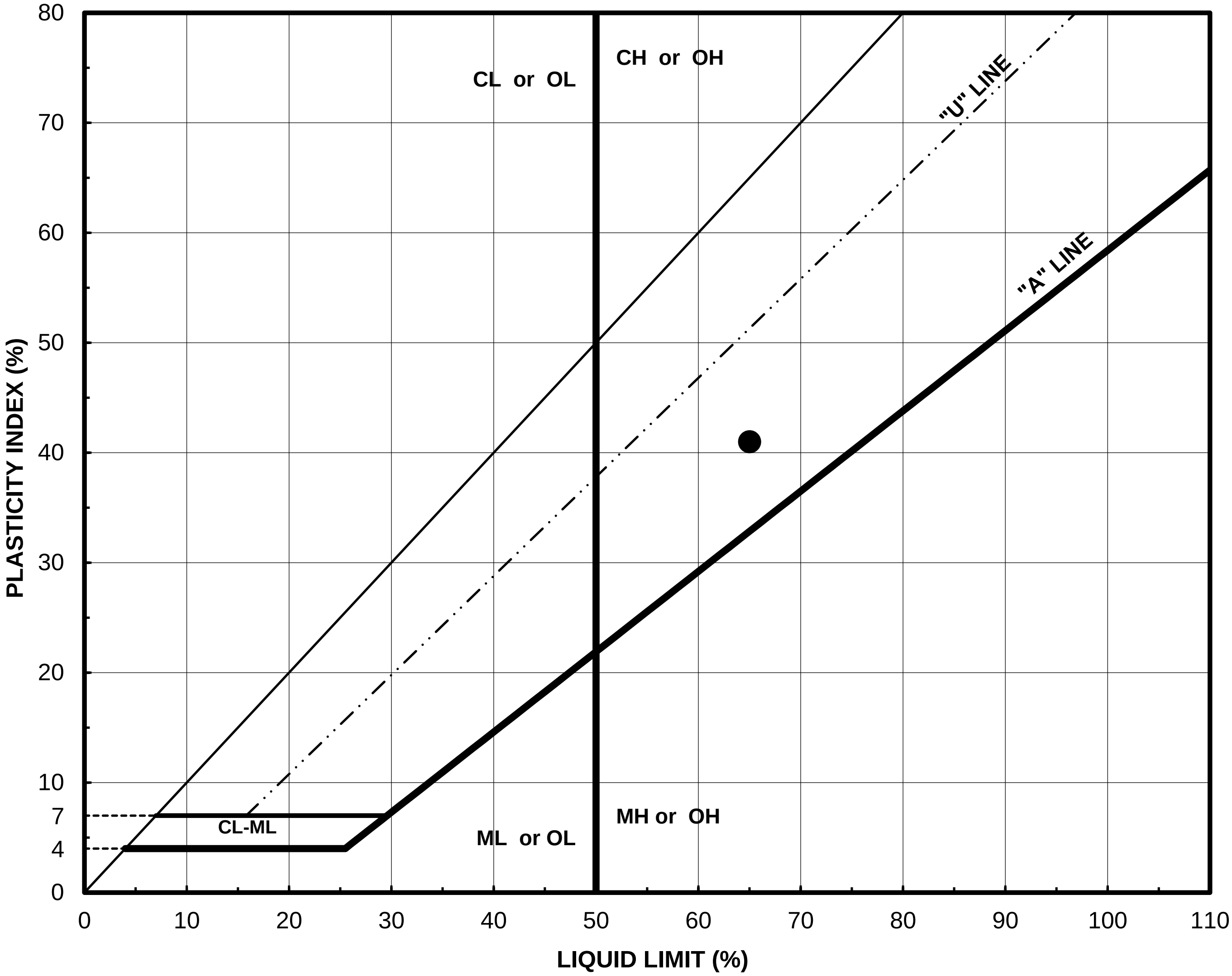


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
TC-02	3	15.0	----	39	20	Olive brown Sandy Lean CLAY (CL)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

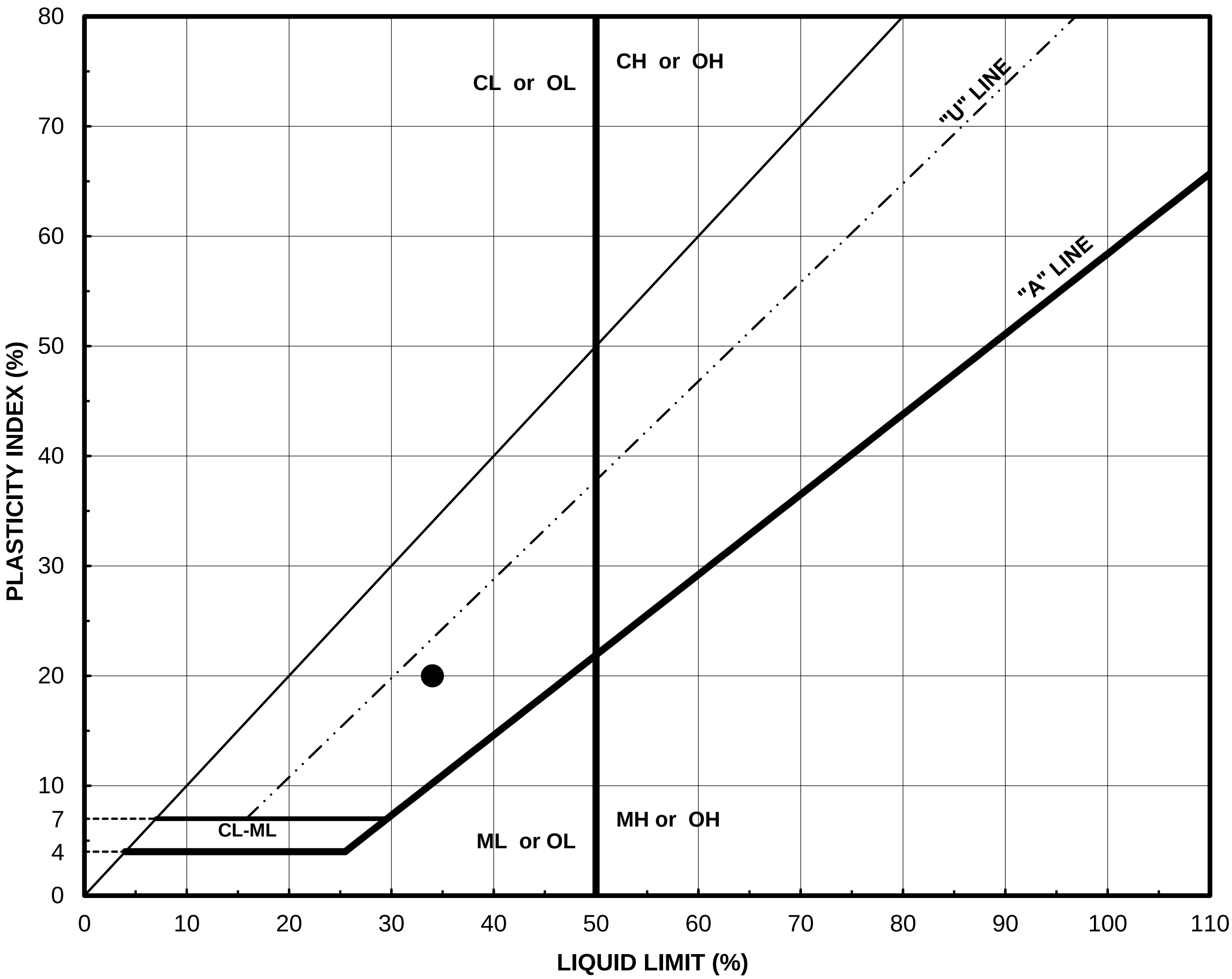


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
TC-02	5	25.0	----	65	41	Dark gray Fat CLAY (CH)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

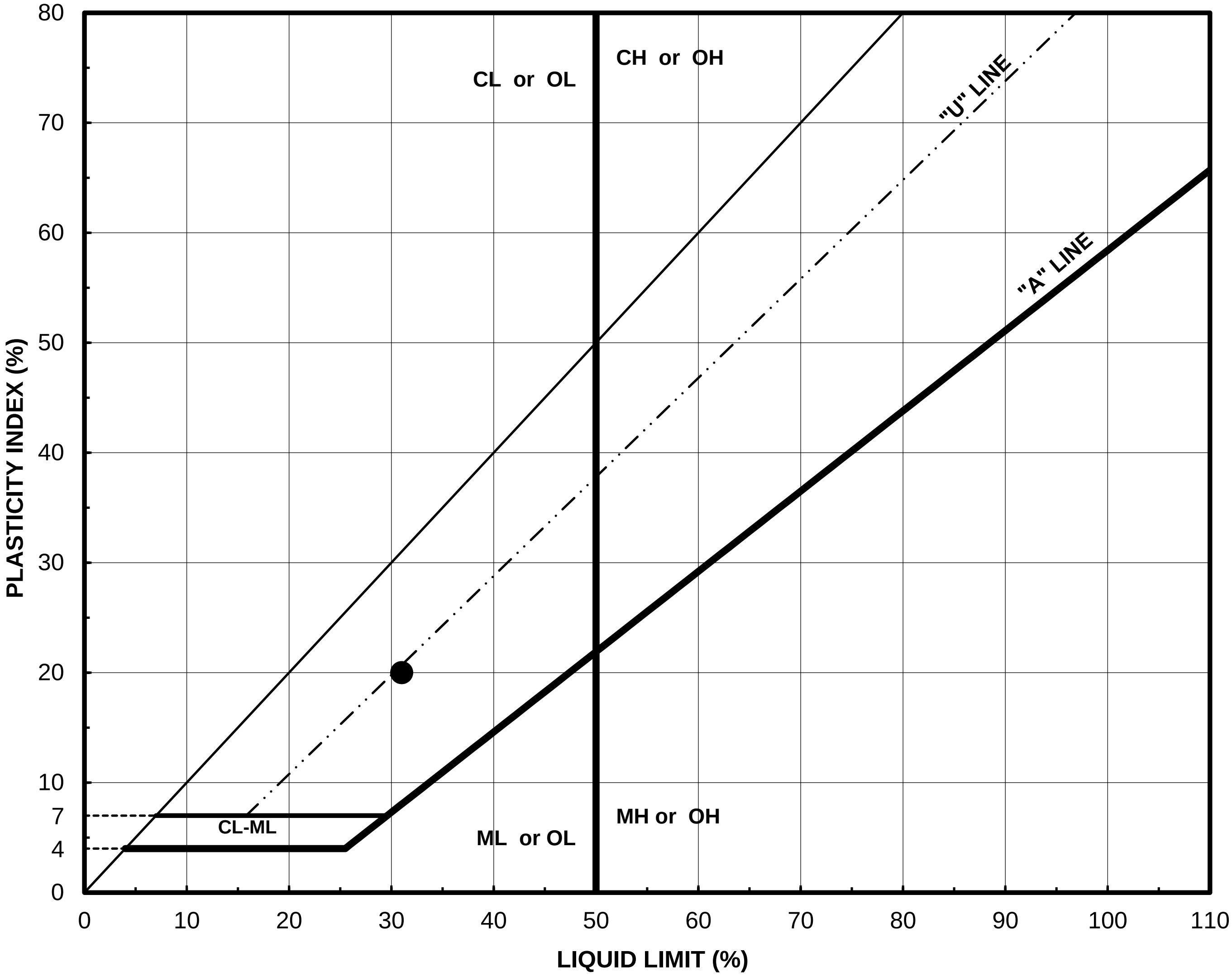


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
WM-01	1	0~5	----	34	20	Yellowish brown Clayey SAND (SC)

Project Name: SR-210

Project Number: 60512688

PLASTICITY CHART

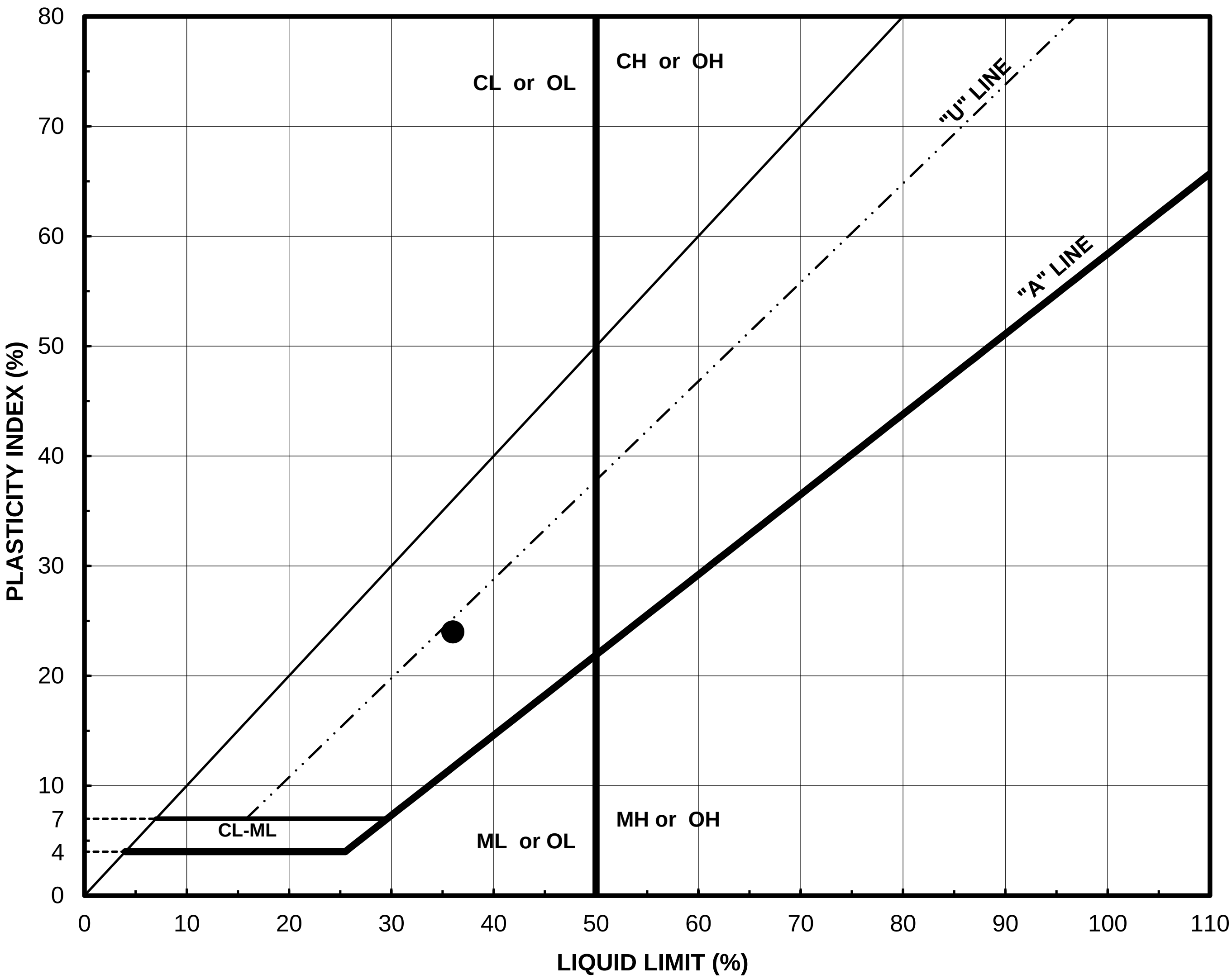


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
WM-06	1	0-5	NA	31	20	Dark yellowish brown Lean CLAY with Sand (CL)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

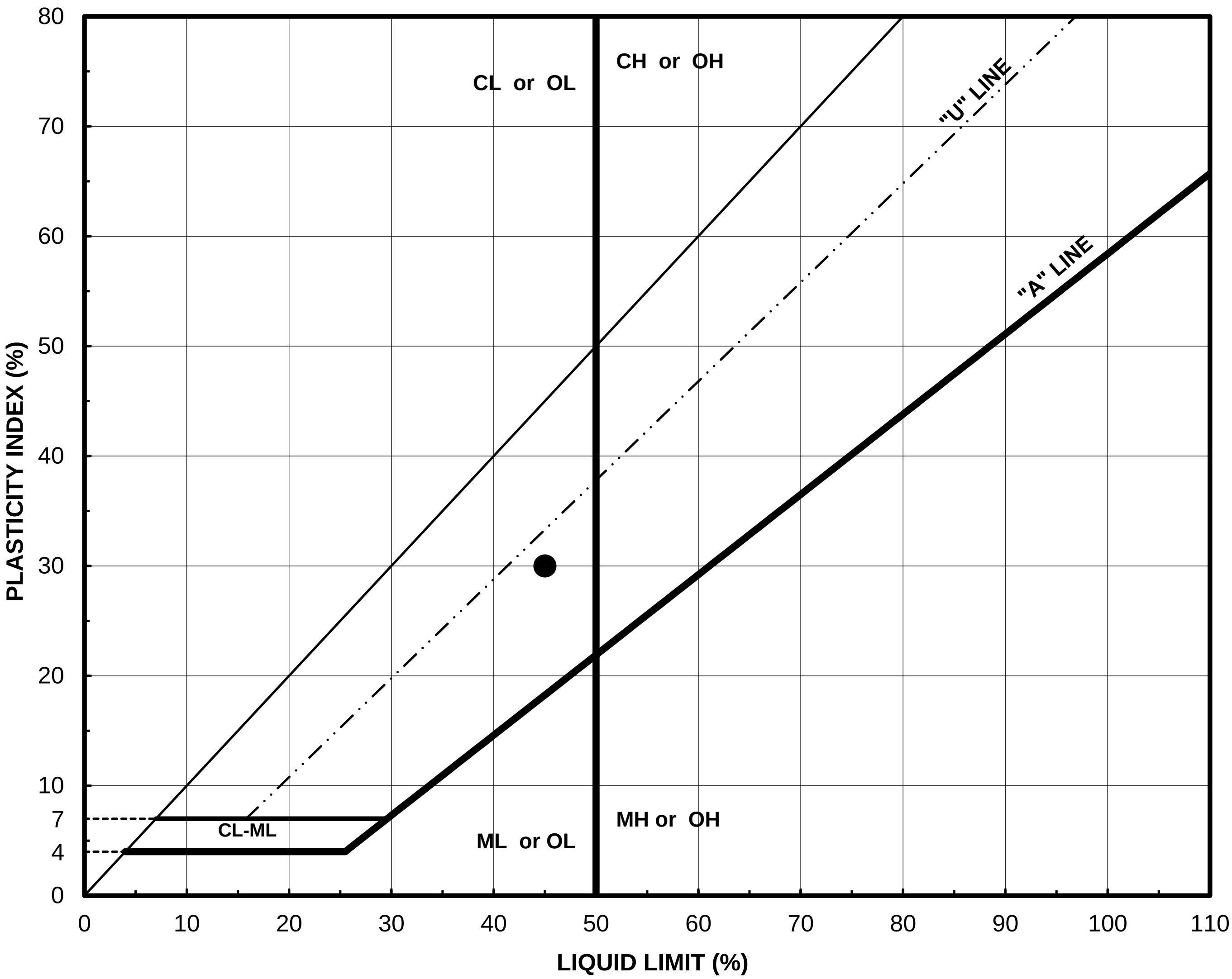


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
WM-07	2	10.0	8.7	36	24	Olive brown Clayey SAND with Gravel (SC)

Project Name: **Pure Water**

Project Number: **60530732**

PLASTICITY CHART

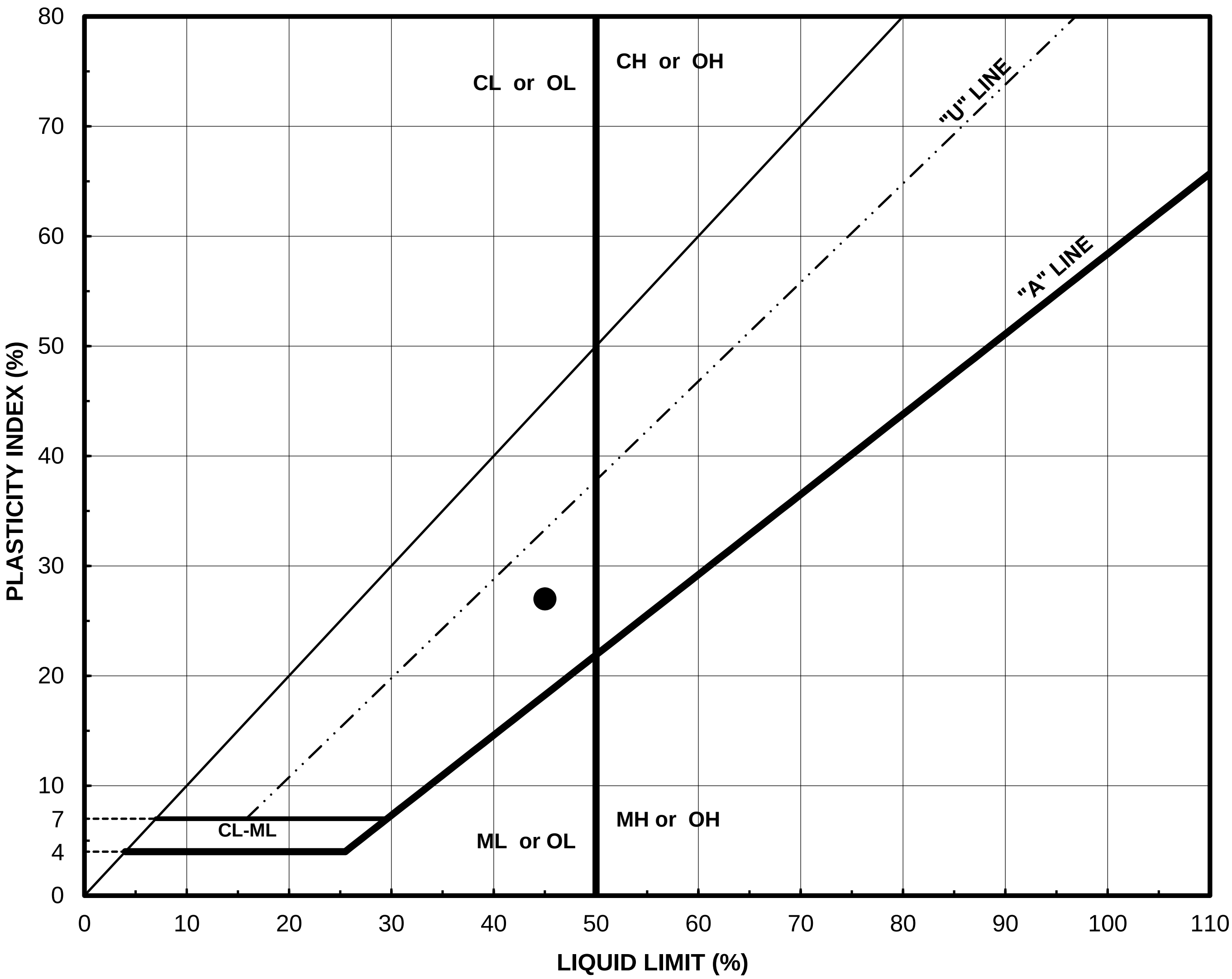


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
WM-08	3	12.5	10.6	45	30	Strong brown Clayey SAND (SC)

Project Name: Pure Water

Project Number: 60530732

PLASTICITY CHART

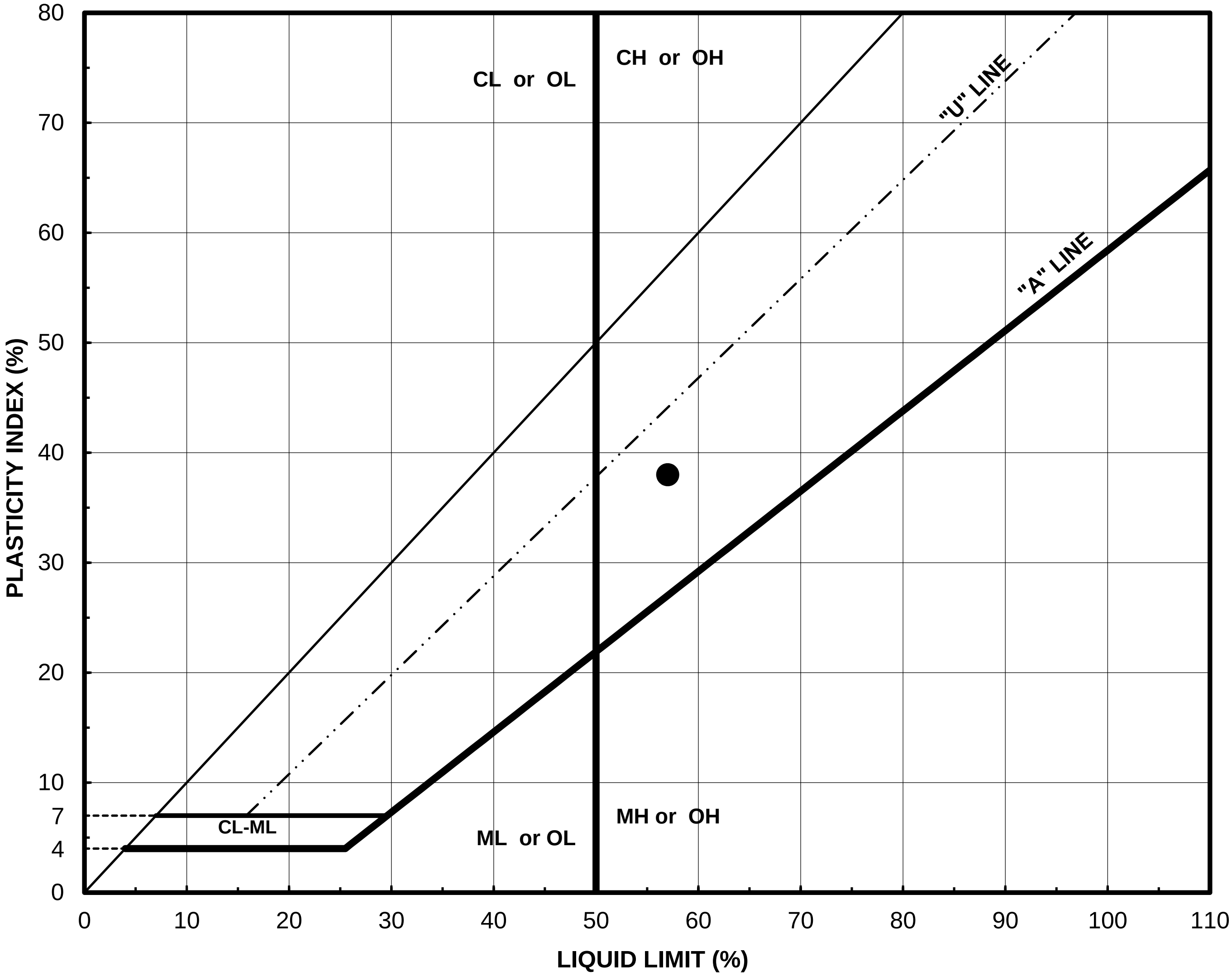


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
WM-11	5	18.5	23.5	45	27	Olive Lean CLAY with Sand (CL)

Project Name: SR-210

Project Number: 60512688

PLASTICITY CHART

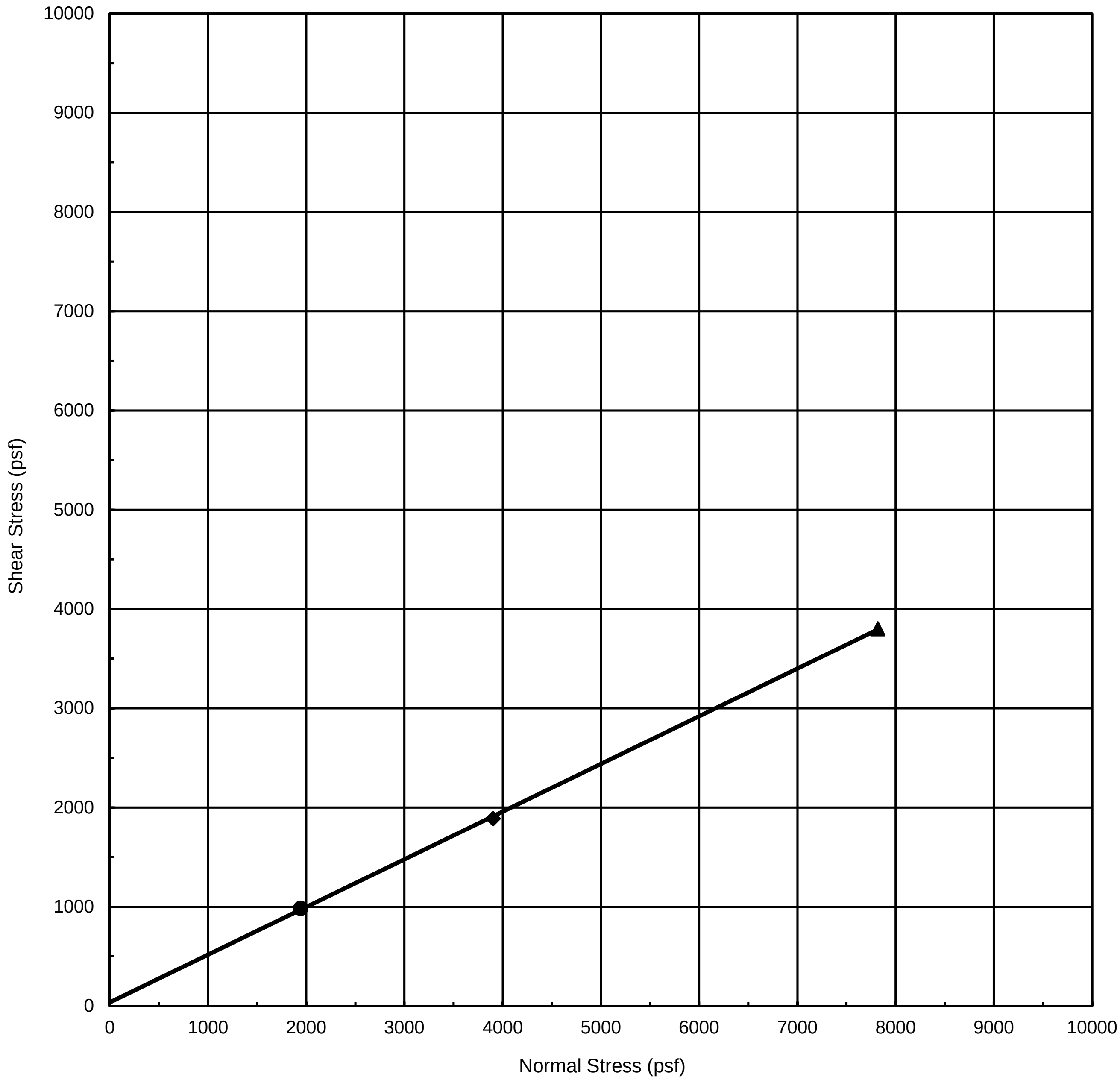


Boring Number	Sample Number	Depth (ft)	Water Content (%)	LL	PI	DESCRIPTION / CLASSIFICATION
WM-24	4b	15.0	17.4	57	38	Light olive brown Fat CLAY (CH)

Project Name: SR-210

Project Number: 60512688

PLASTICITY CHART



Peak Values are :		l	,solid trend line					Ultimate Values are:		m	,dashed trend line
Exploration No.:		TC-01		Strength Intercept (C) :		35.3	psf	Peak	XXXXX	psf	Ultimate
Sample No.:		7				1.7	kPa		XXXXX	kPa	
Depth (ft | m)		30.0	9.1	Friction Angle (f) :		26	degree		XXXXX	degree	
Description:		**Dark gray Fat CLAY (CH)**					Shear rate :	0.0010	(in/min) ,	0.0025	(cm/min)
SYMBOL		% Water	Total Unit Weight		Dry Unit Weight		Normal Stress		Peak Stress		Ultimate Stress	
		Content	(pcf)	(kN/m^3)	(pcf)	(kN/m^3)	(psf)	(kPa)	(psf)	(kPa)	(psf)	(kPa)
Initial / Set up		40.0	111.2	17.5	79.4	12.5	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
pre-shear	l spec. 1	67.0	109.2	17.2	65.4	10.3	1943	93	984	47	XXXXX	XXXXX
	u spec. 2	36.7	126.3	19.8	92.4	14.5	3902	187	1888	90	XXXXX	XXXXX
	p spec. 3	24.5	132.7	20.9	106.6	16.8	7819	374	3800	182	XXXXX	XXXXX

AECOM

Pure Water

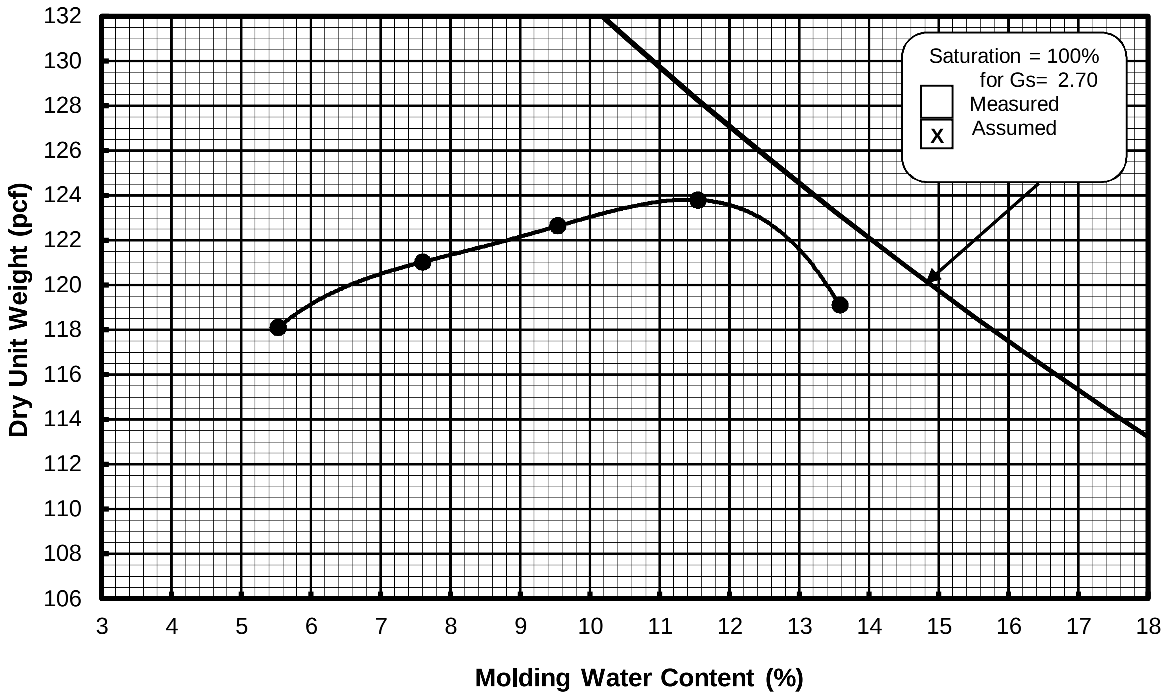
Project Number: 60530732
Test Date: 5/3/2017

DIRECT SHEAR TEST
ASTM D 3080

COMPACTION CURVE

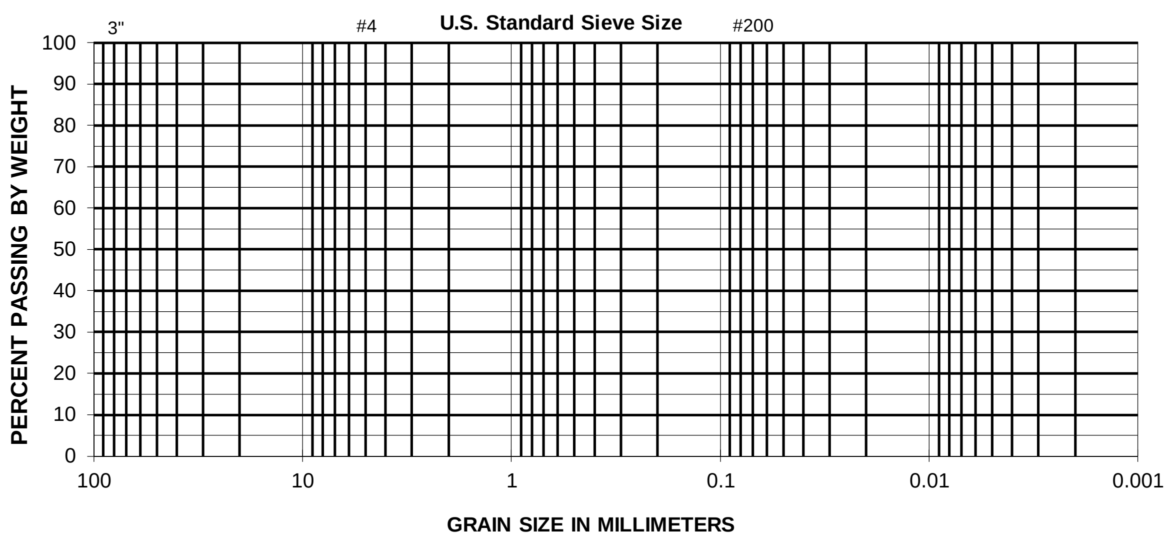
Test Method: l ASTM D 1557 n ASTM D 698 u CA-DWR: S-10 m Other Effort

Compaction Procedure: Specimen Preparation Method: **Moist**



PARTICLE-SIZE DISTRIBUTION CURVE

COBBLES	GRAVEL COARSE	GRAVEL FINE	SAND COARSE	SAND MEDIUM	SAND FINE	SILT OR CLAY



NOTATION: l Representative of entire sample u Representative of compacted specimen n Representative of compacted specimen and entire sample

Boring Number	Sample Number	Depth (ft.)	Optimum WC (%)	Maximum DUW (pcf)	Description and/or Classification
FM-01	1	0~5	11.4	123.9	Olive brown Silty SAND (SM)

PROJECT NAME: Pure Water
PROJECT NUMBER: 60530732

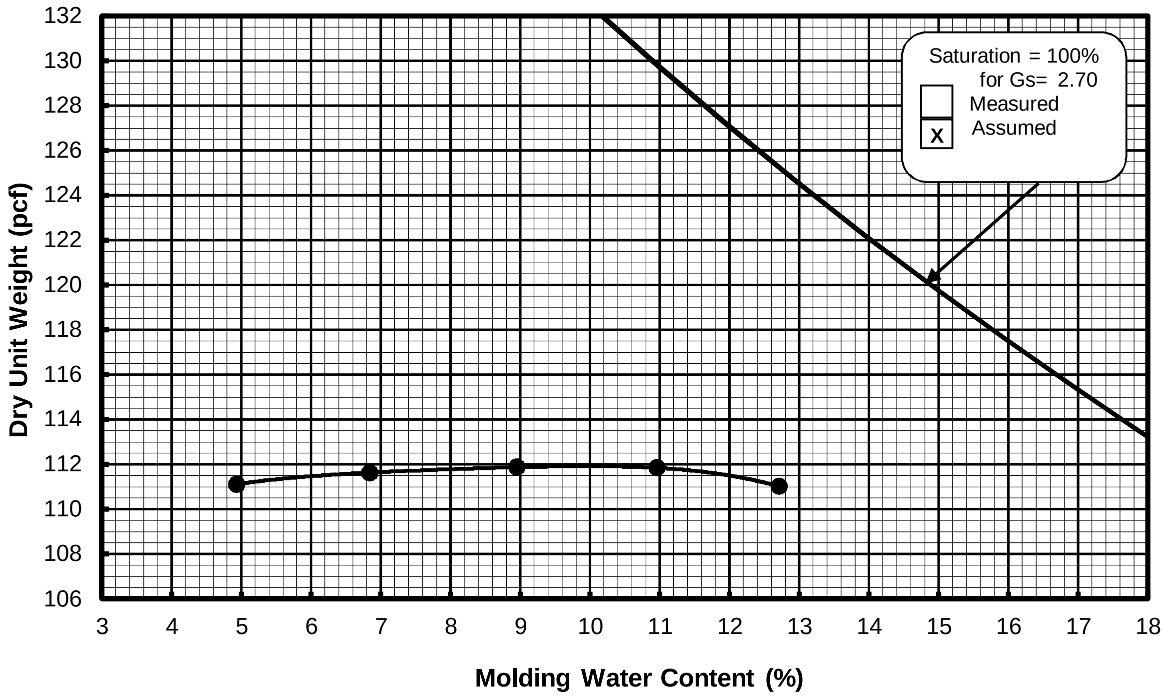
COMPACTION AND INDEX PROPERTY DATA

SUBMITTED BY: A. D. Camacho

COMPACTION CURVE

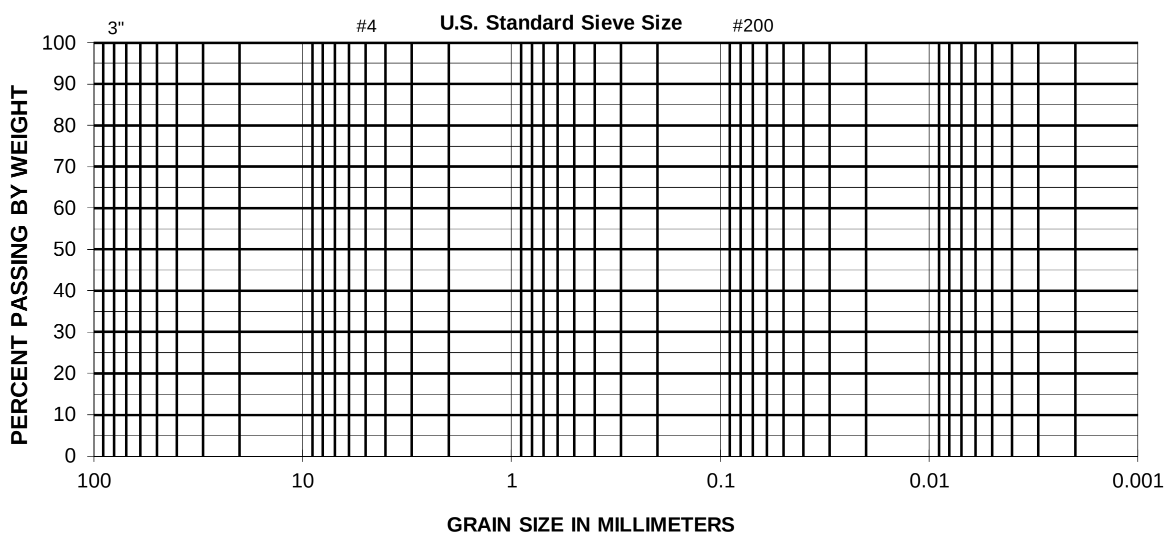
Test Method: l ASTM D 1557 n ASTM D 698 u CA-DWR: S-10 m Other Effort

Compaction Procedure: Specimen Preparation Method: **Moist**



PARTICLE-SIZE DISTRIBUTION CURVE

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	



NOTATION: l Representative of entire sample u Representative of compacted specimen n Representative of compacted specimen and entire sample

Boring Number	Sample Number	Depth (ft.)	Optimum WC (%)	Maximum DUW (pcf)	Description and/or Classification
FM-02	1	0~5	10.2	112.0	Olive brown Silty SAND (SM)

PROJECT NAME: **Pure Water**
PROJECT NUMBER: **60530732**

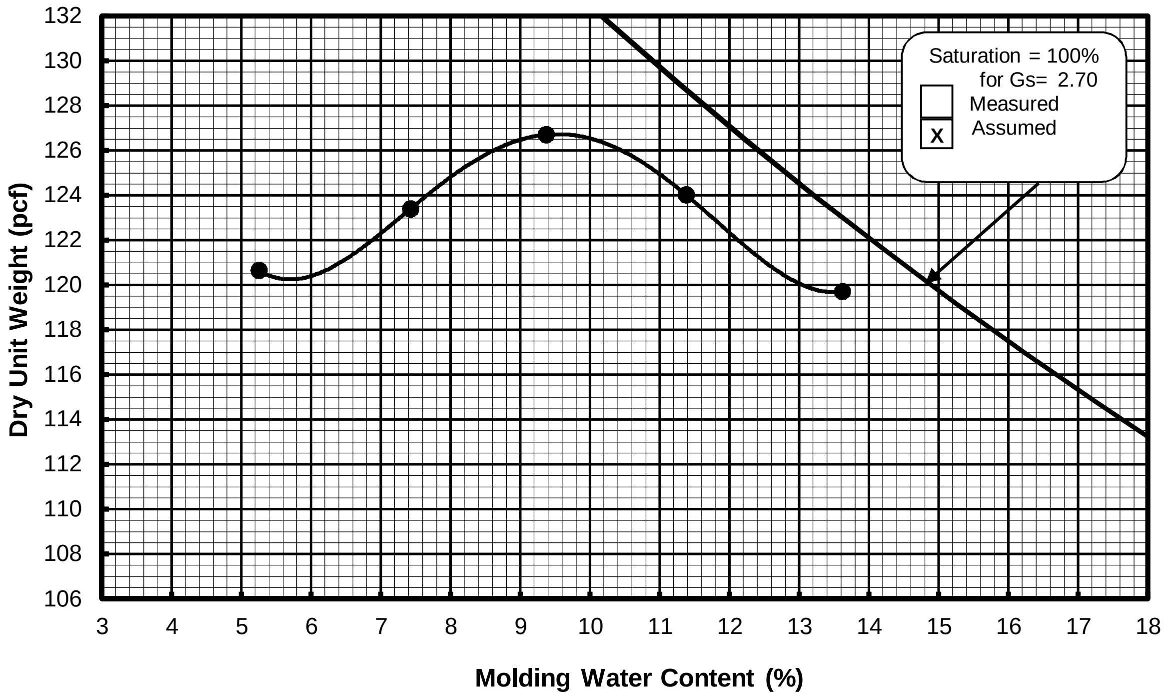
COMPACTION AND INDEX PROPERTY DATA

SUBMITTED BY: A. D. Camacho

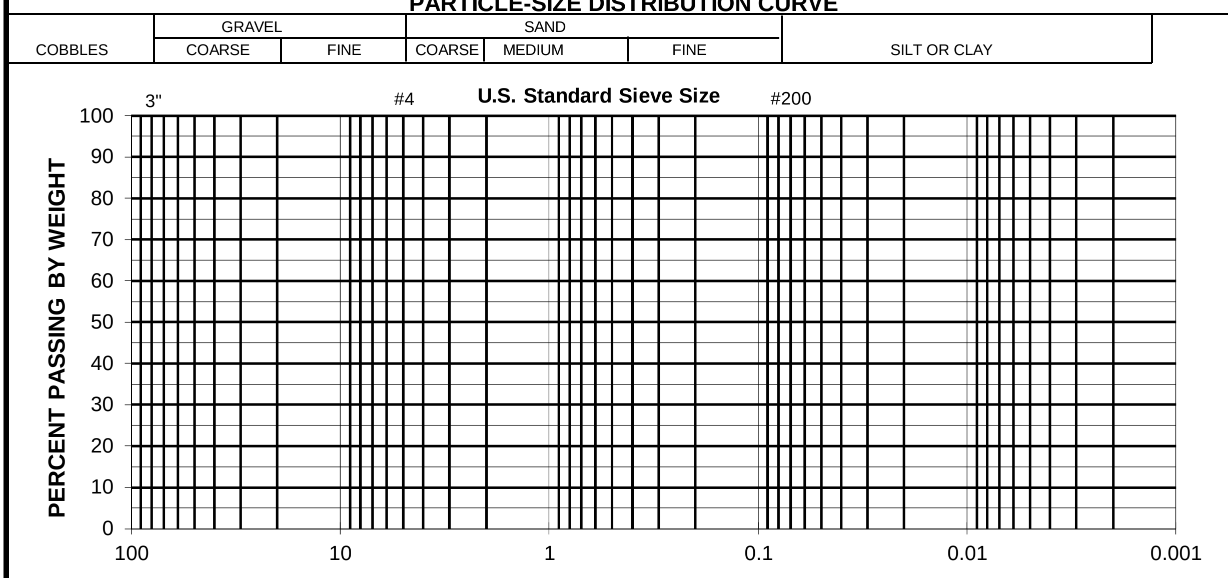
COMPACTION CURVE

Test Method: l ASTM D 1557 n ASTM D 698 u CA-DWR: S-10 m Other Effort

Compaction Procedure: Specimen Preparation Method: **Moist**



PARTICLE-SIZE DISTRIBUTION CURVE



NOTATION: l Representative of entire sample u Representative of compacted specimen n Representative of compacted specimen and entire sample

Boring Number	Sample Number	Depth (ft.)	Optimum WC (%)	Maximum DUW (pcf)	Description and/or Classification
FM-07	1	0~5	9.4	126.7	Dark yellowish brown Silty SAND (SM)

PROJECT NAME: Pure Water
PROJECT NUMBER: 60530732

COMPACTION AND INDEX PROPERTY DATA

SUBMITTED BY: A. D. Camacho

Table 1 - Laboratory Tests on Soil Samples

AECOM
Pure Water - City of San Diego
Your #60413030.29865969.00000, HDR Lab #17-0400LAB
22-Jun-17

Sample ID

			FM-01	FM-02	FM-03	FM-06	FM-08
Resistivity		**Units**					
as-received		ohm-cm	16,000	1,680	1,120	2,680	1,280
minimum		ohm-cm	5,600	1,400	1,080	2,680	600
pH			7.7	8.5	8.7	7.8	8.0
Electrical Conductivity		mS/cm	0.08	0.08	0.26	0.05	0.36
Chemical Analyses							
Cations							
calcium	Ca^{2+}	mg/kg	16	6.2	31	5.0	13
magnesium	Mg^{2+}	mg/kg	2.9	1.9	18	1.6	5.9
sodium	Na^{1+}	mg/kg	58	82	272	57	309
potassium	K^{1+}	mg/kg	21	9.3	102	5.3	38
Anions							
carbonate	CO_3^{2-}	mg/kg	14	ND	128	ND	ND
bicarbonate	HCO_3^{1-}	mg/kg	88	70	162	64	73
fluoride	F^{1-}	mg/kg	8.6	4.5	16	10	7.3
chloride	Cl^{1-}	mg/kg	16	37	27	17	19
sulfate	SO_4^{2-}	mg/kg	24	36	70	30	599
phosphate	PO_4^{3-}	mg/kg	ND	2.3	3.9	ND	ND
Other Tests							
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	32	22	5.2	5.4	6.5
sulfide	S^{2-}	qual	na	na	na	na	na
Redox		mV	na	na	na	na	na

Minimum resistivity per CTM 643, Chlorides per CTM 422, Sulfates per CTM 417
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

431 West Baseline Road · Claremont, CA 91711
Phone: 909.962.5485 · Fax: 909.626.3316

Figure B-182

Table 1 - Laboratory Tests on Soil Samples

AECOM
Pure Water - City of San Diego
Your #60413030.29865969.00000, HDR Lab #17-0400LAB
22-Jun-17

Sample ID

			FM-10-1	FM-14	FM-18	WM-06
Resistivity		**Units**				
as-received		ohm-cm	2,120	6,400	2,760	6,000
minimum		ohm-cm	1,280	1,600	1,280	1,120
pH			8.3	8.4	7.9	7.6
Electrical Conductivity		mS/cm	0.06	0.18	0.09	0.21
Chemical Analyses						
Cations						
calcium	Ca^{2+}	mg/kg	9.3	18	12	16
magnesium	Mg^{2+}	mg/kg	5.1	8.0	7.9	6.5
sodium	Na^{1+}	mg/kg	67	183	105	171
potassium	K^{1+}	mg/kg	7.1	17	12	92
Anions						
carbonate	CO_3^{2-}	mg/kg	ND	44	ND	ND
bicarbonate	HCO_3^{1-}	mg/kg	140	189	119	159
fluoride	F^{1-}	mg/kg	4.7	10	8.9	34
chloride	Cl^{1-}	mg/kg	13	29	29	111
sulfate	SO_4^{2-}	mg/kg	27	62	48	91
phosphate	PO_4^{3-}	mg/kg	2.5	ND	2.7	ND
Other Tests						
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	6.7	45	5.4	84
sulfide	S^{2-}	qual	na	na	na	na
Redox		mV	na	na	na	na

Minimum resistivity per CTM 643, Chlorides per CTM 422, Sulfates per CTM 417

Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.

mg/kg = milligrams per kilogram (parts per million) of dry soil.

Redox = oxidation-reduction potential in millivolts

ND = not detected

na = not analyzed

Table 1 - Laboratory Tests on Soil Samples

AECOM
Pure Water City of San Diego
HDR Lab #17-0414LAB
29-Jun-17

Sample ID			WM-24 S-1 @ 0-5' SM	WM-11 S-1 @ 0-5' SM	WM-03 @-1 @ 0-5' SM
Resistivity		**Units**			
as-received		ohm-cm	3,440	6,400	44,000
saturated		ohm-cm	1,240	1,360	5,600
pH			7.7	8.7	8.5
Electrical Conductivity		mS/cm	0.11	0.22	0.06
Chemical Analyses					
Cations					
calcium	Ca^{2+}	mg/kg	39	16	38
magnesium	Mg^{2+}	mg/kg	12	34	12
sodium	Na^{1+}	mg/kg	94	246	39
potassium	K^{1+}	mg/kg	46	26	28
Anions					
carbonate	CO_3^{2-}	mg/kg	ND	35	ND
bicarbonate	HCO_3^{1-}	mg/kg	122	198	119
fluoride	F^{1-}	mg/kg	3.4	4.9	2.3
chloride	Cl^{1-}	mg/kg	27	84	3.7
sulfate	SO_4^{2-}	mg/kg	85	134	27
phosphate	PO_4^{3-}	mg/kg	6.6	2.4	6.7
Other Tests					
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	26	17	37
sulfide	S^{2-}	qual	na	na	na
Redox		mV	na	na	na

Resistivity per ASTM G187, Cations per ASTM D6919, Anions per ASTM D4327, and Alkalinity per APHA 2320-B.
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

HDR

Table 1 - Laboratory Tests on Soil Samples

AECOM
Pure Water - City of San Diego
HDR Lab #17-0507LAB
28-Jul-17

Sample ID			FM-20 @ 0-5 ft	FM-21 @ 0-5 ft	FM-35 @ 0-5 ft	FM-36b @ 0-5 ft	FM-38 @ 0-5 ft
Resistivity		**Units**					
as-received		ohm-cm	6,800	21,200	4,400	26,400	13,200
minimum		ohm-cm	2,120	1,120	1,400	1,080	1,240
pH			8.1	7.9	7.6	7.9	6.7
Electrical Conductivity		mS/cm	0.07	0.26	0.10	0.23	0.07
Chemical Analyses							
Cations							
calcium	Ca^{2+}	mg/kg	43	29	47	39	35
magnesium	Mg^{2+}	mg/kg	27	15	25	ND	14
sodium	Na^{1+}	mg/kg	92	246	123	231	75
potassium	K^{1+}	mg/kg	8.0	44	19	24	22
Anions							
carbonate	CO_3^{2-}	mg/kg	ND	ND	ND	ND	ND
bicarbonate	HCO_3^{1-}	mg/kg	95	302	82	229	15
fluoride	F^{1-}	mg/kg	20	7.7	10	12	3.3
chloride	Cl^{1-}	mg/kg	17	126	26	94	5.3
sulfate	SO_4^{2-}	mg/kg	33	146	109	148	92
phosphate	PO_4^{3-}	mg/kg	17	6.4	2.4	1.7	1.7
Other Tests							
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	6.0	13	8.0	59	4.3
sulfide	S^{2-}	qual	na	na	na	na	na
Redox		mV	na	na	na	na	na

Minimum resistivity per CTM 643, Chlorides per CTM 422, Sulfates per CTM 417
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

Table 1 - Laboratory Tests on Soil Samples

AECOM
Pure Water - City of San Diego
HDR Lab #17-0507LAB
28-Jul-17

Sample ID			FM-41 @ 0-5 ft	FM-49 @ 0-5 ft	FM-52 @ 0-5 ft
Resistivity		**Units**			
as-received		ohm-cm	3,040	5,200	10,800
minimum		ohm-cm	480	880	1,280
pH			7.2	8.1	8.9
Electrical Conductivity		mS/cm	0.63	0.25	0.25
Chemical Analyses					
Cations					
calcium	Ca^{2+}	mg/kg	75	33	45
magnesium	Mg^{2+}	mg/kg	20	24	ND
sodium	Na^{1+}	mg/kg	456	271	260
potassium	K^{1+}	mg/kg	71	19	45
Anions					
carbonate	CO_3^{2-}	mg/kg	ND	ND	ND
bicarbonate	HCO_3^{1-}	mg/kg	122	98	433
fluoride	F^{1-}	mg/kg	16	36	37
chloride	Cl^{1-}	mg/kg	657	192	28
sulfate	SO_4^{2-}	mg/kg	288	138	227
phosphate	PO_4^{3-}	mg/kg	2.7	14	3.4
Other Tests					
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	10	4.6	6.2
sulfide	S^{2-}	qual	na	na	na
Redox		mV	na	na	na

Minimum resistivity per CTM 643, Chlorides per CTM 422, Sulfates per CTM 417
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

Table 1 - Laboratory Tests on Soil Samples

AECOM
Pure Water - City of San Diego
HDR Lab #17-0562LAB
28-Aug-17

Sample ID			DS-01 @ 0-5 ft	FM-25 @ 0-5 ft	FM-29 @ 0-5 ft	FM-50 @ 0-5 ft
Resistivity		**Units**				
as-received		ohm-cm	13,600	14,800	14,400	7,200
minimum		ohm-cm	2,200	2,680	840	2,600
pH			7.6	7.3	7.1	7.3
Electrical Conductivity		mS/cm	0.09	0.11	0.29	0.12
Chemical Analyses						
Cations						
calcium	Ca^{2+}	mg/kg	ND	25	24	31
magnesium	Mg^{2+}	mg/kg	7.3	6.9	7.6	7.7
sodium	Na^{1+}	mg/kg	80	88	227	133
potassium	K^{1+}	mg/kg	7.8	8.5	10	17
Anions						
carbonate	CO_3^{2-}	mg/kg	ND	ND	ND	35
bicarbonate	HCO_3^{1-}	mg/kg	79	101	214	247
fluoride	F^{1-}	mg/kg	2.0	3.1	6.4	4.6
chloride	Cl^{1-}	mg/kg	25	5.5	121	4.0
sulfate	SO_4^{2-}	mg/kg	41	78	163	35
phosphate	PO_4^{3-}	mg/kg	ND	ND	ND	4.4
Other Tests						
ammonium	NH_4^{1+}	mg/kg	ND	ND	ND	ND
nitrate	NO_3^{1-}	mg/kg	5.2	4.6	4.5	4.8
sulfide	S^{2-}	qual	na	na	na	na
Redox		mV	na	na	na	na

Minimum resistivity per CTM 643, Chlorides per CTM 422, Sulfates per CTM 417
Electrical conductivity in millisiemens/cm and chemical analyses were made on a 1:5 soil-to-water extract.
mg/kg = milligrams per kilogram (parts per million) of dry soil.
Redox = oxidation-reduction potential in millivolts
ND = not detected
na = not analyzed

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APPENDIX C

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APPENDIX C – Groundwater Sampling

On March 31, 2017, AECOM personnel sampled the groundwater monitoring well PS-2. Depth to groundwater was measured using an electronic water level indicator and measured to the closest hundredth-inch from the top of the well casing. The well was purged by manually bailing using a disposal bailer using low flow purge techniques in accordance with the County of San Diego Department of Environmental Health Site Assessment and Mitigation (SAM) Manual guidelines. Field parameters including pH, temperature, and electric conductivity were regularly monitored during purging. Purging continued until measurements stabilized to generally within 10 percentof the previous reading. Field data was recorded on the sampling forms in our project files, and is available for review if requested.

One groundwater sample was collected using a disposal bailer and placed in unused, laboratory-supplied sample containers. The sample was stored in the field in a chilled cooler pending transport to a California Department of Health Services-Certified analytical laboratory, Eurofins Calscience, Inc., under proper chain-of-custody documentation.

The groundwater sample was analyzed for total petroleum hydrocarbons (TPH) extended range by EPA Modified Method 8015B, Title 22 metals including mercury by EPA Methods 6010B and 7470A, organochlorine pesticides (OCPs) by EPA Method 8081A, polychlorinated biphenyls (PCBs) by EPA Method 8082, semi-volatile organic compounds (SVOCs) by EPA Method 8270C, and volatile organic compounds (VOCs) by EPA Method 8260B.

Purged water generated during sampling was contained in one California Department of Transportation 55-gallon drum and transported to the project temporary storage facility on City property pending disposal evaluation.

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WORK ORDER NUMBER: 17-03-2408

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: AECOM

Client Project Name: Pure Water

Attention: Steve Fitzwilliam
401 West A Street
Suite 1200
San Diego, CA 92101-2421

Vikas Patel

Approved for release on 04/11/2017 by:
Vikas Patel
Project Manager

ResultLink ▸

Email your PM ▸

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Contents

Client Project Name: Pure Water
Work Order Number: 17-03-2408

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Work Order Narrative

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 03/31/17. They were assigned to Work Order 17-03-2408.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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QC Association Summary

Work Order: 17-03-2408

Client Sample ID	Method Name	Type	Ext Name	Instrument	MS/MSD/SDP	LCS/LCSD
PS-2	EPA 6010B/7470A CAC Title 22 Metals		EPA 3010A Total	ICP 7300	170403SA5	170403LA5
PS-2	EPA 7470A Mercury		EPA 7470A Total	Mercury 07	170407SA2	170407LA2
PS-2	EPA 8015B (M) C6-C44		EPA 3510C	GC 47	*2	170404B02A
PS-2	EPA 8081A Organochlorine Pesticides		EPA 3510C	GC 44	*2	170404L03
PS-2	EPA 8082 PCB Aroclors		EPA 3510C	GC 66	*2	170404L04
PS-2	EPA 8260B Volatile Organics + Oxygenates		EPA 5030C	GC/MS V V	170404S011	170401L029
PS-2	EPA 8260B Volatile Organics + Oxygenates	R	EPA 5030C	GC/MS V V	170404S015	170404L033
PS-2	EPA 8270C Semi-Volatile Organics		EPA 3510C	GC/MS TT	*2	170403L04A

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2 = Limited sample received, no MS/MSD performed

R = Rerun

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Detections Summary

Client:	AECOM 401 West A Street, Suite 1200 San Diego, CA 92101-2421	Work Order: Project Name: Received:	17-03-2408 Pure Water 03/31/17
Attn:	Steve Fitzwilliam		Page 1 of 1

Client SampleID

Analyte	Result	Qualifiers	RL	Units	Method	Extraction
PS-2 (17-03-2408-1)						
Barium	0.142		0.0100	mg/L	EPA 6010B	EPA 3010A Total
Molybdenum	0.0287		0.0100	mg/L	EPA 6010B	EPA 3010A Total
C6-C44 Total	73		50	ug/L	EPA 8015B (M)	EPA 3510C
c-1,2-Dichloroethene	480		10	ug/L	EPA 8260B	EPA 5030C
t-1,2-Dichloroethene	2.6		1.0	ug/L	EPA 8260B	EPA 5030C

Subcontracted analyses, if any, are not included in this summary.

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* MDL is shown

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Analytical Report

AECOM	Date Received: 03/31/17
401 West A Street, Suite 1200	Work Order: 17-03-2408
San Diego, CA 92101-2421	Preparation: EPA 3510C
	Method: EPA 8015B (M)
	Units: ug/L
Project: Pure Water	Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PS-2	**17-03-2408-1-G**	**03/31/17 09:25**	**Aqueous**	**GC 47**	**04/04/17**	**04/05/17 04:44**	**170404B02A**

Comment(s): - The total concentration includes individual carbon range concentrations (estimated), if any, below the RL reported as ND.

Parameter	Result	RL	DF	Qualifiers
C6	ND	50	1.00	
C7	ND	50	1.00	
C8	ND	50	1.00	
C9-C10	ND	50	1.00	
C11-C12	ND	50	1.00	
C13-C14	ND	50	1.00	
C15-C16	ND	50	1.00	
C17-C18	ND	50	1.00	
C19-C20	ND	50	1.00	
C21-C22	ND	50	1.00	
C23-C24	ND	50	1.00	
C25-C28	ND	50	1.00	
C29-C32	ND	50	1.00	
C33-C36	ND	50	1.00	
C37-C40	ND	50	1.00	
C41-C44	ND	50	1.00	
C6-C44 Total	73	50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	106	68-140	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM		Date Received:	03/31/17
401 West A Street, Suite 1200		Work Order:	17-03-2408
San Diego, CA 92101-2421		Preparation:	EPA 3510C
		Method:	EPA 8015B (M)
		Units:	ug/L
Project: Pure Water			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-472-642**	**N/A**	**Aqueous**	**GC 47**	**04/04/17**	**04/05/17 00:54**	**170404B02A**

Parameter	Result	RL	DF	Qualifiers
C6	ND	50	1.00	
C7	ND	50	1.00	
C8	ND	50	1.00	
C9-C10	ND	50	1.00	
C11-C12	ND	50	1.00	
C13-C14	ND	50	1.00	
C15-C16	ND	50	1.00	
C17-C18	ND	50	1.00	
C19-C20	ND	50	1.00	
C21-C22	ND	50	1.00	
C23-C24	ND	50	1.00	
C25-C28	ND	50	1.00	
C29-C32	ND	50	1.00	
C33-C36	ND	50	1.00	
C37-C40	ND	50	1.00	
C41-C44	ND	50	1.00	
C6-C44 Total	ND	50	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
n-Octacosane	91	68-140	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM	Date Received: 03/31/17
401 West A Street, Suite 1200	Work Order: 17-03-2408
San Diego, CA 92101-2421	Preparation: EPA 3010A Total
	Method: EPA 6010B
	Units: mg/L
Project: Pure Water	Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PS-2	**17-03-2408-1-F**	**03/31/17 09:25**	**Aqueous**	**ICP 7300**	**04/03/17**	**04/04/17 15:06**	**170403LA5**

Parameter	Result	RL	DF	Qualifiers
Antimony	ND	0.0150	1.00	
Arsenic	ND	0.0100	1.00	
Barium	0.142	0.0100	1.00	
Beryllium	ND	0.0100	1.00	
Cadmium	ND	0.0100	1.00	
Chromium	ND	0.0100	1.00	
Cobalt	ND	0.0100	1.00	
Copper	ND	0.0100	1.00	
Lead	ND	0.0100	1.00	
Molybdenum	0.0287	0.0100	1.00	
Nickel	ND	0.0100	1.00	
Selenium	ND	0.0150	1.00	
Silver	ND	0.00500	1.00	
Thallium	ND	0.0150	1.00	
Vanadium	ND	0.0100	1.00	
Zinc	ND	0.0100	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM	Date Received: 03/31/17
401 West A Street, Suite 1200	Work Order: 17-03-2408
San Diego, CA 92101-2421	Preparation: EPA 3010A Total
	Method: EPA 6010B
	Units: mg/L
Project: Pure Water	Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**097-01-003-16394**	**N/A**	**Aqueous**	**ICP 7300**	**04/03/17**	**04/04/17 11:17**	**170403LA5**

Parameter	Result	RL	DF	Qualifiers
Antimony	ND	0.0150	1.00	
Arsenic	ND	0.0100	1.00	
Barium	ND	0.0100	1.00	
Beryllium	ND	0.0100	1.00	
Cadmium	ND	0.0100	1.00	
Chromium	ND	0.0100	1.00	
Cobalt	ND	0.0100	1.00	
Copper	ND	0.0100	1.00	
Lead	ND	0.0100	1.00	
Molybdenum	ND	0.0100	1.00	
Nickel	ND	0.0100	1.00	
Selenium	ND	0.0150	1.00	
Silver	ND	0.00500	1.00	
Thallium	ND	0.0150	1.00	
Vanadium	ND	0.0100	1.00	
Zinc	ND	0.0100	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM	Date Received: 03/31/17
401 West A Street, Suite 1200	Work Order: 17-03-2408
San Diego, CA 92101-2421	Preparation: EPA 7470A Total
	Method: EPA 7470A
	Units: mg/L
Project: Pure Water	Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PS-2	**17-03-2408-1-F**	**03/31/17 09:25**	**Aqueous**	**Mercury 07**	**04/07/17**	**04/07/17 14:53**	**170407LA2**

Parameter	Result	RL	DF	Qualifiers
Mercury	ND	0.000500	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-04-008-8169**	**N/A**	**Aqueous**	**Mercury 07**	**04/07/17**	**04/07/17 14:48**	**170407LA2**

Parameter	Result	RL	DF	Qualifiers
Mercury	ND	0.000500	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM		Date Received:	03/31/17
401 West A Street, Suite 1200		Work Order:	17-03-2408
San Diego, CA 92101-2421		Preparation:	EPA 3510C
		Method:	EPA 8081A
		Units:	ug/L
Project: Pure Water			Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PS-2	**17-03-2408-1-H**	**03/31/17 09:25**	**Aqueous**	**GC 44**	**04/04/17**	**04/07/17 08:02**	**170404L03**

Parameter	Result	RL	DF	Qualifiers
Alpha-BHC	ND	0.096	1.00	
Gamma-BHC	ND	0.096	1.00	
Beta-BHC	ND	0.096	1.00	
Heptachlor	ND	0.096	1.00	
Delta-BHC	ND	0.096	1.00	
Aldrin	ND	0.096	1.00	
Heptachlor Epoxide	ND	0.096	1.00	
Endosulfan I	ND	0.096	1.00	
Dieldrin	ND	0.096	1.00	
4,4'-DDE	ND	0.096	1.00	
Endrin	ND	0.096	1.00	
Endrin Aldehyde	ND	0.096	1.00	
4,4'-DDD	ND	0.096	1.00	
Endosulfan II	ND	0.096	1.00	
4,4'-DDT	ND	0.096	1.00	
Endosulfan Sulfate	ND	0.096	1.00	
Methoxychlor	ND	0.096	1.00	
Chlordane	ND	0.96	1.00	
Toxaphene	ND	1.9	1.00	
Endrin Ketone	ND	0.096	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Decachlorobiphenyl	72	50-135	
2,4,5,6-Tetrachloro-m-Xylene	93	50-135	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM		Date Received:	03/31/17
401 West A Street, Suite 1200		Work Order:	17-03-2408
San Diego, CA 92101-2421		Preparation:	EPA 3510C
		Method:	EPA 8081A
		Units:	ug/L
Project: Pure Water			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-529-949**	**N/A**	**Aqueous**	**GC 44**	**04/04/17**	**04/06/17 16:44**	**170404L03**

Parameter	Result	RL	DF	Qualifiers
Alpha-BHC	ND	0.10	1.00	
Gamma-BHC	ND	0.10	1.00	
Beta-BHC	ND	0.10	1.00	
Heptachlor	ND	0.10	1.00	
Delta-BHC	ND	0.10	1.00	
Aldrin	ND	0.10	1.00	
Heptachlor Epoxide	ND	0.10	1.00	
Endosulfan I	ND	0.10	1.00	
Dieldrin	ND	0.10	1.00	
4,4'-DDE	ND	0.10	1.00	
Endrin	ND	0.10	1.00	
Endrin Aldehyde	ND	0.10	1.00	
4,4'-DDD	ND	0.10	1.00	
Endosulfan II	ND	0.10	1.00	
4,4'-DDT	ND	0.10	1.00	
Endosulfan Sulfate	ND	0.10	1.00	
Methoxychlor	ND	0.10	1.00	
Chlordane	ND	1.0	1.00	
Toxaphene	ND	2.0	1.00	
Endrin Ketone	ND	0.10	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Decachlorobiphenyl	79	50-135	
2,4,5,6-Tetrachloro-m-Xylene	85	50-135	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM		Date Received:	03/31/17
401 West A Street, Suite 1200		Work Order:	17-03-2408
San Diego, CA 92101-2421		Preparation:	EPA 3510C
		Method:	EPA 8082
		Units:	ug/L
Project: Pure Water			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PS-2	**17-03-2408-1-H**	**03/31/17 09:25**	**Aqueous**	**GC 66**	**04/04/17**	**04/06/17 14:33**	**170404L04**

Parameter	Result	RL	DF	Qualifiers
Aroclor-1016	ND	0.96	1.00	
Aroclor-1221	ND	0.96	1.00	
Aroclor-1232	ND	0.96	1.00	
Aroclor-1242	ND	0.96	1.00	
Aroclor-1248	ND	0.96	1.00	
Aroclor-1254	ND	0.96	1.00	
Aroclor-1260	ND	0.96	1.00	
Aroclor-1262	ND	0.96	1.00	
Aroclor-1268	ND	0.96	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Decachlorobiphenyl	77	50-135	
2,4,5,6-Tetrachloro-m-Xylene	81	50-135	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-533-1272**	**N/A**	**Aqueous**	**GC 66**	**04/04/17**	**04/06/17 13:40**	**170404L04**

Parameter	Result	RL	DF	Qualifiers
Aroclor-1016	ND	1.0	1.00	
Aroclor-1221	ND	1.0	1.00	
Aroclor-1232	ND	1.0	1.00	
Aroclor-1242	ND	1.0	1.00	
Aroclor-1248	ND	1.0	1.00	
Aroclor-1254	ND	1.0	1.00	
Aroclor-1260	ND	1.0	1.00	
Aroclor-1262	ND	1.0	1.00	
Aroclor-1268	ND	1.0	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Decachlorobiphenyl	73	50-135	
2,4,5,6-Tetrachloro-m-Xylene	72	50-135	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM	Date Received: 03/31/17
401 West A Street, Suite 1200	Work Order: 17-03-2408
San Diego, CA 92101-2421	Preparation: EPA 3510C
	Method: EPA 8270C
	Units: ug/L
Project: Pure Water	Page 1 of 6

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PS-2	**17-03-2408-1-I**	**03/31/17 09:25**	**Aqueous**	**GC/MS TT**	**04/03/17**	**04/04/17 20:53**	**170403L04A**

Parameter	Result	RL	DF	Qualifiers
Carbazole	ND	10	1.00	
Acenaphthene	ND	10	1.00	
Acenaphthylene	ND	10	1.00	
Aniline	ND	10	1.00	
Anthracene	ND	10	1.00	
Azobenzene	ND	10	1.00	
Benzidine	ND	50	1.00	
Benzo (a) Anthracene	ND	10	1.00	
Benzo (a) Pyrene	ND	10	1.00	
Benzo (b) Fluoranthene	ND	10	1.00	
Benzo (g,h,i) Perylene	ND	10	1.00	
Benzo (k) Fluoranthene	ND	10	1.00	
Benzoic Acid	ND	50	1.00	
Benzyl Alcohol	ND	10	1.00	
Bis(2-Chloroethoxy) Methane	ND	10	1.00	
Bis(2-Chloroethyl) Ether	ND	25	1.00	
Bis(2-Chloroisopropyl) Ether	ND	10	1.00	
Bis(2-Ethylhexyl) Phthalate	ND	10	1.00	
4-Bromophenyl-Phenyl Ether	ND	10	1.00	
Butyl Benzyl Phthalate	ND	10	1.00	
4-Chloro-3-Methylphenol	ND	10	1.00	
4-Chloroaniline	ND	10	1.00	
2-Chloronaphthalene	ND	10	1.00	
2-Chlorophenol	ND	10	1.00	
4-Chlorophenyl-Phenyl Ether	ND	10	1.00	
Chrysene	ND	10	1.00	
Di-n-Butyl Phthalate	ND	10	1.00	
Di-n-Octyl Phthalate	ND	10	1.00	
Dibenz (a,h) Anthracene	ND	10	1.00	
Dibenzofuran	ND	10	1.00	
1,2-Dichlorobenzene	ND	10	1.00	
1,3-Dichlorobenzene	ND	10	1.00	
1,4-Dichlorobenzene	ND	10	1.00	
3,3'-Dichlorobenzidine	ND	25	1.00	
2,4-Dichlorophenol	ND	10	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM		Date Received:	03/31/17
401 West A Street, Suite 1200		Work Order:	17-03-2408
San Diego, CA 92101-2421		Preparation:	EPA 3510C
		Method:	EPA 8270C
		Units:	ug/L
Project: Pure Water			Page 2 of 6

Parameter	Result	RL	DF	Qualifiers
Diethyl Phthalate	ND	10	1.00	
Dimethyl Phthalate	ND	10	1.00	
2,4-Dimethylphenol	ND	10	1.00	
4,6-Dinitro-2-Methylphenol	ND	50	1.00	
2,4-Dinitrophenol	ND	50	1.00	
2,4-Dinitrotoluene	ND	10	1.00	
2,6-Dinitrotoluene	ND	10	1.00	
Fluoranthene	ND	10	1.00	
Fluorene	ND	10	1.00	
Hexachloro-1,3-Butadiene	ND	10	1.00	
Hexachlorobenzene	ND	10	1.00	
Hexachlorocyclopentadiene	ND	25	1.00	
Hexachloroethane	ND	10	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	10	1.00	
Isophorone	ND	10	1.00	
2-Methylnaphthalene	ND	10	1.00	
1-Methylnaphthalene	ND	10	1.00	
2-Methylphenol	ND	10	1.00	
3/4-Methylphenol	ND	10	1.00	
N-Nitroso-di-n-propylamine	ND	10	1.00	
N-Nitrosodimethylamine	ND	10	1.00	
N-Nitrosodiphenylamine	ND	10	1.00	
Naphthalene	ND	10	1.00	
4-Nitroaniline	ND	10	1.00	
3-Nitroaniline	ND	10	1.00	
2-Nitroaniline	ND	10	1.00	
Nitrobenzene	ND	25	1.00	
4-Nitrophenol	ND	10	1.00	
2-Nitrophenol	ND	10	1.00	
Pentachlorophenol	ND	10	1.00	
Phenanthrene	ND	10	1.00	
Phenol	ND	10	1.00	
Pyrene	ND	10	1.00	
Pyridine	ND	10	1.00	
1,2,4-Trichlorobenzene	ND	10	1.00	
2,4,6-Trichlorophenol	ND	10	1.00	
2,4,5-Trichlorophenol	ND	10	1.00	
2,6-Dichlorophenol	ND	10	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM		Date Received:	03/31/17
401 West A Street, Suite 1200		Work Order:	17-03-2408
San Diego, CA 92101-2421		Preparation:	EPA 3510C
		Method:	EPA 8270C
		Units:	ug/L
Project: Pure Water			Page 3 of 6

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	75	33-120	
2-Fluorophenol	55	24-120	
Nitrobenzene-d5	88	38-120	
p-Terphenyl-d14	95	41-137	
Phenol-d6	37	16-120	
2,4,6-Tribromophenol	85	27-159	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM		Date Received:	03/31/17
401 West A Street, Suite 1200		Work Order:	17-03-2408
San Diego, CA 92101-2421		Preparation:	EPA 3510C
		Method:	EPA 8270C
		Units:	ug/L
Project: Pure Water			Page 4 of 6

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**095-01-003-4354**	**N/A**	**Aqueous**	**GC/MS TT**	**04/03/17**	**04/04/17 17:04**	**170403L04A**

Parameter	Result	RL	DF	Qualifiers
Carbazole	ND	10	1.00	
Acenaphthene	ND	10	1.00	
Acenaphthylene	ND	10	1.00	
Aniline	ND	10	1.00	
Anthracene	ND	10	1.00	
Azobenzene	ND	10	1.00	
Benzidine	ND	50	1.00	
Benzo (a) Anthracene	ND	10	1.00	
Benzo (a) Pyrene	ND	10	1.00	
Benzo (b) Fluoranthene	ND	10	1.00	
Benzo (g,h,i) Perylene	ND	10	1.00	
Benzo (k) Fluoranthene	ND	10	1.00	
Benzoic Acid	ND	50	1.00	
Benzyl Alcohol	ND	10	1.00	
Bis(2-Chloroethoxy) Methane	ND	10	1.00	
Bis(2-Chloroethyl) Ether	ND	25	1.00	
Bis(2-Chloroisopropyl) Ether	ND	10	1.00	
Bis(2-Ethylhexyl) Phthalate	ND	10	1.00	
4-Bromophenyl-Phenyl Ether	ND	10	1.00	
Butyl Benzyl Phthalate	ND	10	1.00	
4-Chloro-3-Methylphenol	ND	10	1.00	
4-Chloroaniline	ND	10	1.00	
2-Chloronaphthalene	ND	10	1.00	
2-Chlorophenol	ND	10	1.00	
4-Chlorophenyl-Phenyl Ether	ND	10	1.00	
Chrysene	ND	10	1.00	
Di-n-Butyl Phthalate	ND	10	1.00	
Di-n-Octyl Phthalate	ND	10	1.00	
Dibenz (a,h) Anthracene	ND	10	1.00	
Dibenzofuran	ND	10	1.00	
1,2-Dichlorobenzene	ND	10	1.00	
1,3-Dichlorobenzene	ND	10	1.00	
1,4-Dichlorobenzene	ND	10	1.00	
3,3'-Dichlorobenzidine	ND	25	1.00	
2,4-Dichlorophenol	ND	10	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM		Date Received:	03/31/17
401 West A Street, Suite 1200		Work Order:	17-03-2408
San Diego, CA 92101-2421		Preparation:	EPA 3510C
		Method:	EPA 8270C
		Units:	ug/L
Project: Pure Water			Page 5 of 6

Parameter	Result	RL	DF	Qualifiers
Diethyl Phthalate	ND	10	1.00	
Dimethyl Phthalate	ND	10	1.00	
2,4-Dimethylphenol	ND	10	1.00	
4,6-Dinitro-2-Methylphenol	ND	50	1.00	
2,4-Dinitrophenol	ND	50	1.00	
2,4-Dinitrotoluene	ND	10	1.00	
2,6-Dinitrotoluene	ND	10	1.00	
Fluoranthene	ND	10	1.00	
Fluorene	ND	10	1.00	
Hexachloro-1,3-Butadiene	ND	10	1.00	
Hexachlorobenzene	ND	10	1.00	
Hexachlorocyclopentadiene	ND	25	1.00	
Hexachloroethane	ND	10	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	10	1.00	
Isophorone	ND	10	1.00	
2-Methylnaphthalene	ND	10	1.00	
1-Methylnaphthalene	ND	10	1.00	
2-Methylphenol	ND	10	1.00	
3/4-Methylphenol	ND	10	1.00	
N-Nitroso-di-n-propylamine	ND	10	1.00	
N-Nitrosodimethylamine	ND	10	1.00	
N-Nitrosodiphenylamine	ND	10	1.00	
Naphthalene	ND	10	1.00	
4-Nitroaniline	ND	10	1.00	
3-Nitroaniline	ND	10	1.00	
2-Nitroaniline	ND	10	1.00	
Nitrobenzene	ND	25	1.00	
4-Nitrophenol	ND	10	1.00	
2-Nitrophenol	ND	10	1.00	
Pentachlorophenol	ND	10	1.00	
Phenanthrene	ND	10	1.00	
Phenol	ND	10	1.00	
Pyrene	ND	10	1.00	
Pyridine	ND	10	1.00	
1,2,4-Trichlorobenzene	ND	10	1.00	
2,4,6-Trichlorophenol	ND	10	1.00	
2,4,5-Trichlorophenol	ND	10	1.00	
2,6-Dichlorophenol	ND	10	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM	Date Received: 03/31/17
401 West A Street, Suite 1200	Work Order: 17-03-2408
San Diego, CA 92101-2421	Preparation: EPA 3510C
	Method: EPA 8270C
	Units: ug/L
Project: Pure Water	Page 6 of 6

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	80	33-120	
2-Fluorophenol	58	24-120	
Nitrobenzene-d5	88	38-120	
p-Terphenyl-d14	92	41-137	
Phenol-d6	37	16-120	
2,4,6-Tribromophenol	85	27-159	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM		Date Received:	03/31/17
401 West A Street, Suite 1200		Work Order:	17-03-2408
San Diego, CA 92101-2421		Preparation:	EPA 5030C
		Method:	EPA 8260B
		Units:	ug/L
Project: Pure Water			Page 1 of 6

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PS-2	**17-03-2408-1-A**	**03/31/17 09:25**	**Aqueous**	**GC/MS V V**	**04/01/17**	**04/02/17 02:30**	**170401L029**

Parameter	Result	RL	DF	Qualifiers
Acetone	ND	20	1.00	
Benzene	ND	0.50	1.00	
Bromobenzene	ND	1.0	1.00	
Bromochloromethane	ND	1.0	1.00	
Bromodichloromethane	ND	1.0	1.00	
Bromoform	ND	1.0	1.00	
Bromomethane	ND	10	1.00	
2-Butanone	ND	10	1.00	
n-Butylbenzene	ND	1.0	1.00	
sec-Butylbenzene	ND	1.0	1.00	
tert-Butylbenzene	ND	1.0	1.00	
Carbon Disulfide	ND	10	1.00	
Carbon Tetrachloride	ND	0.50	1.00	
Chlorobenzene	ND	1.0	1.00	
Chloroethane	ND	5.0	1.00	
Chloroform	ND	1.0	1.00	
Chloromethane	ND	10	1.00	
2-Chlorotoluene	ND	1.0	1.00	
4-Chlorotoluene	ND	1.0	1.00	
Dibromochloromethane	ND	1.0	1.00	
1,2-Dibromo-3-Chloropropane	ND	5.0	1.00	
1,2-Dibromoethane	ND	1.0	1.00	
Dibromomethane	ND	1.0	1.00	
1,2-Dichlorobenzene	ND	1.0	1.00	
1,3-Dichlorobenzene	ND	1.0	1.00	
1,4-Dichlorobenzene	ND	1.0	1.00	
Dichlorodifluoromethane	ND	1.0	1.00	
1,1-Dichloroethane	ND	1.0	1.00	
1,2-Dichloroethane	ND	0.50	1.00	
1,1-Dichloroethene	ND	1.0	1.00	
t-1,2-Dichloroethene	2.6	1.0	1.00	
1,2-Dichloropropane	ND	1.0	1.00	
1,3-Dichloropropane	ND	1.0	1.00	
2,2-Dichloropropane	ND	1.0	1.00	
1,1-Dichloropropene	ND	1.0	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM		Date Received:	03/31/17
401 West A Street, Suite 1200		Work Order:	17-03-2408
San Diego, CA 92101-2421		Preparation:	EPA 5030C
		Method:	EPA 8260B
		Units:	ug/L
Project: Pure Water			Page 2 of 6

Parameter	Result	RL	DF	Qualifiers
c-1,3-Dichloropropene	ND	0.50	1.00	
t-1,3-Dichloropropene	ND	0.50	1.00	
Ethylbenzene	ND	1.0	1.00	
2-Hexanone	ND	10	1.00	
Isopropylbenzene	ND	1.0	1.00	
p-Isopropyltoluene	ND	1.0	1.00	
Methylene Chloride	ND	10	1.00	
4-Methyl-2-Pentanone	ND	10	1.00	
Naphthalene	ND	10	1.00	
n-Propylbenzene	ND	1.0	1.00	
Styrene	ND	1.0	1.00	
1,1,1,2-Tetrachloroethane	ND	1.0	1.00	
1,1,2,2-Tetrachloroethane	ND	1.0	1.00	
Tetrachloroethene	ND	1.0	1.00	
Toluene	ND	1.0	1.00	
1,2,3-Trichlorobenzene	ND	1.0	1.00	
1,2,4-Trichlorobenzene	ND	1.0	1.00	
1,1,1-Trichloroethane	ND	1.0	1.00	
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1.00	
1,1,2-Trichloroethane	ND	1.0	1.00	
Trichloroethene	ND	1.0	1.00	
Trichlorofluoromethane	ND	10	1.00	
1,2,3-Trichloropropane	ND	5.0	1.00	
1,2,4-Trimethylbenzene	ND	1.0	1.00	
1,3,5-Trimethylbenzene	ND	1.0	1.00	
Vinyl Acetate	ND	10	1.00	
Vinyl Chloride	ND	0.50	1.00	
p/m-Xylene	ND	1.0	1.00	
o-Xylene	ND	1.0	1.00	
Methyl-t-Butyl Ether (MTBE)	ND	1.0	1.00	
Tert-Butyl Alcohol (TBA)	ND	10	1.00	
Diisopropyl Ether (DIPE)	ND	2.0	1.00	
Ethyl-t-Butyl Ether (ETBE)	ND	2.0	1.00	
Tert-Amyl-Methyl Ether (TAME)	ND	2.0	1.00	
Ethanol	ND	100	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
1,4-Bromofluorobenzene	87	77-120	
Dibromofluoromethane	102	80-128	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

AECOM	Date Received: 03/31/17
401 West A Street, Suite 1200	Work Order: 17-03-2408
San Diego, CA 92101-2421	Preparation: EPA 5030C
	Method: EPA 8260B
	Units: ug/L
Project: Pure Water	Page 3 of 6

Surrogate	Rec. (%)	Control Limits	Qualifiers
1,2-Dichloroethane-d4	95	80-129	
Toluene-d8	98	80-120	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PS-2	**17-03-2408-1-B**	**03/31/17 09:25**	**Aqueous**	**GC/MS V V**	**04/04/17**	**04/04/17 18:55**	**170404L033**

Parameter	Result	RL	DF	Qualifiers
c-1,2-Dichloroethene	480	10	10.0	

Surrogate	Rec. (%)	Control Limits	Qualifiers
1,4-Bromofluorobenzene	91	77-120	
Dibromofluoromethane	96	80-128	
1,2-Dichloroethane-d4	90	80-129	
Toluene-d8	97	80-120	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.