GEOTECHNICAL DATA REPORT

ANIMAL CARE SHELTER
12 AIRPORT BOULEVARD
SAN MATEO, CALIFORNIA

Submitted to
County of San Mateo
555 County Center, 5th Floor
Redwood City, CA 94063

Prepared by
ENGEO Incorporated

March 9, 2015

Project No.
11780.000.000

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Project No.
11780.000.000

March 9, 2015

Ms. Theresa Yee, AIC, CPC
Capital Projects Manager
County of San Mateo
Department of Public Works
555 County Center, 5th Floor
Redwood City, CA 94063

Subject: Animal Care Shelter
12 Airport Boulevard
San Mateo, California

GEOTECHNICAL DATA REPORT

Dear Ms. Yee:

With your authorization, we prepared this geotechnical data report documenting the information obtained during our field exploration for the Animal Care Shelter project in San Mateo, California.

We are pleased to have been of service to you on this project and will be happy to continue assisting you and your design team as the project progresses.

Sincerely,

ENGEO Incorporated

Andrew H. Firmin, GE

Paul C. Guerin, GE

ahf/pcg/bvv

TABLE OF CONTENTS

1.0 INTRODUCTION

We prepared this geotechnical data report (GDR) to present the findings of our geotechnical subsurface exploration and laboratory test data and to summarize existing geotechnical subsurface information for the subject project.

This report was prepared for the exclusive use of the County of San Mateo and its consultants for design of this project.

1.1 PROJECT LOCATION

Figure 1 displays a Vicinity Map. The site is located northeast of Highway 101. Access is provided by a parking lot entrance off Airport Boulevard.

Figure 2 is a Site Plan that shows approximate site boundaries, our exploratory locations, geologic cross section locations, and other pertinent information. The project site is bounded by Airport Boulevard and Highway 101 to the south, Poplar Creek Golf Course to the east, the San Francisco Bay Trail and San Francisco Bay to the north, and vacant land to the west.

At the time of our field exploration, the site was occupied by several one- to two-story buildings, paved parking areas, and open space areas.

1.2 ELEVATION DATUM

For our use, we received a topographic survey of the site prepared by BKF Engineers (BKF), dated March 3, 2015 (Job Number 20145240). According to the survey, the elevation datum applied to the project is the North American Vertical Datum of 1988 (NAVD 88). The figures and data presented in this report reference elevations based on this survey and datum.

Figure 6 presents a recent topographic map of the site.

2.0 SITE GEOLOGY AND SEISMICITY

2.1 SITE GEOLOGY

As shown on the Geologic Map prepared by Brabb and Graymer (1998), artificial fill (af) is mapped on the site (Figure 4). Pampeyan (1994) similarly maps the site as underlain by artificial fill (Figure 5). Historical development of the San Francisco Bay shoreline resulted in placement of artificial fill material over substantial portions of modern estuaries, marshlands, tributaries, and creek beds in an effort to reclaim land (Nichols and Wright, 1971). Historical mapping of the area shows the project site to be located within a former tidal marsh (Figure 11) that was subsequently filled during development of the area.

The California Division of Mines and Geology (CDMG), currently known as the California Geological Survey (CGS), mapped the approximate thickness of younger Bay Mud in the Bay

Area (CDMG, 1966). Review of this mapping shows the site is located between 0- and 20-foot-thickness contours. By interpolation, the map suggests an estimated Bay Mud thickness between 5 and 10 feet at the site. If present within reclaimed land areas, Bay Mud deposits would be encountered below surficial artificial fill deposits.

2.2 SITE SEISMICITY

The Bay Area contains numerous active earthquake faults (Figure 9). The major active faults in the area include the San Andreas and San Gregorio to the west of the bay, and the Hayward and Calaveras to the east of the bay. An active fault is defined by the State Mining and Geology Board as one that has had surface displacement within Holocene time (about the last 11,000 years) (Hart and Bryant, 1997).

Numerous small earthquakes occur every year in the San Francisco Bay Region, and larger earthquakes have been recorded and can be expected to occur in the future. Figure 9 shows the approximate locations of these faults and significant historic earthquakes recorded within the San Francisco Bay Region.

The site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone (Figure 8) and no known surface expression of active faults is believed to exist within the site. The nearest known active faults using the latitude and longitude coordinates of the approximate center of the site (Latitude 37.587353°, Longitude -122.330642°) are summarized in the table below.

TABLE 2.2-1
Nearest Active Faults

Fault	Distance from Site km (miles)	Moment Magnitude
San Andreas	5.8 (3.6)	7.7
San Gregorio North	16.7 (10.4)	7.5
Monte Vista – Shannon	18.1 (11.2)	6.5
Hayward	23.6 (14.7)	7.0
Calaveras	37.0 (23.0)	6.9

Figure 7 shows the site is within an area mapped with very high liquefaction susceptibility, according to mapping prepared by the Association of Bay Area Governments (ABAG). Figure 10 shows the northern perimeter of the site adjacent to San Francisco Bay is on the border of a tsunami inundation zone.

A site-specific geologic hazard assessment was not performed as part of this GDR.

3.0 FIELD EXPLORATION

The field exploration included advancing five cone penetration test (CPT) soundings on January 2, 2015, and drilling two exploratory borings on January 30, 2015. The approximate exploration locations are shown on the Site Plan, Figure 2. The exploration locations are approximate and were estimated by pacing from features shown on the site plan; the approximate coordinates are provided in the table below. These measurements should be considered accurate only to the degree implied by the method used. The elevations are based on the above-referenced topographic survey performed by BKF.

TABLE 3.0-1
Field Exploration Locations

Exploration ID	Location Coordinates		Depth of Exploration (feet)	Surface Elevation at Exploration Location (feet)*
	Latitude	Longitude		
1-B1	37.587651°	-122.329831°	51.5	5.5
1-B2	37.587527°	-122.331592°	51.5	4
1-CPT1	37.587773°	-122.330552°	49.9	5.5
1-CPT2	37.587542°	-122.331595°	49.9	4
1-CPT3	37.587262°	-122.330811°	49.9	5.5
1-CPT4	37.587275°	-122.330057°	49.9	6.5
1-CPT5	37.586923°	-122.329947°	49.9	7

**Elevation Datum NAVD88*

3.1 EXPLORATORY BORINGS

An ENGEO representative supervised the drilling and logged the subsurface conditions of the exploratory borings. The borings were drilled using a track-mounted drill rig using a 5-inch-diameter auger and mud rotary drilling methods to depths of approximately 51½ feet below ground surface (bgs).

The borings were logged in the field and soil samples were collected using either a 2½-inch inside diameter (I.D.) California-type split-spoon sampler fitted with 6-inch-long brass liners, a 2-inch outside diameter (O.D.) Standard Penetration Test (SPT) split-spoon sampler or a 3-inch O.D. Shelby Tube sampler. A bulk sample was collected from the upper 3 feet of site soils adjacent to Boring 1-B1.

The penetration of the California-type and SPT samplers was recorded as the number of blows needed to drive the sampler 18 inches in 6-inch increments. The boring logs show the number of blows required for the last one foot of penetration, and the blow counts have not been converted using any correction factors. The samplers were driven with a 140-pound hammer falling a distance of 30 inches employing an automatic trip system. The 3-inch O.D. Shelby Tube sampler

was pushed hydraulically with the drill rig. We used the field logs to develop the report logs in Appendix A.

The report boring logs graphically depict the subsurface conditions encountered at the time of the exploration, and describe the soil type, color, consistency, and visual classification in general accordance with the Unified Soil Classification System (USCS). Subsurface conditions at other locations may differ from conditions occurring at these boring locations, and the passage of time may result in altered subsurface conditions. In addition, stratification lines represent the approximate boundaries between soil types and the transitions may be gradual.

3.2 CONE PENETRATION TEST SOUNDINGS

An ENGEO representative supervised the CPT soundings and observed the subsurface conditions of exploratory CPTs. The CPT soundings were advanced using a truck-mounted CPT rig to depths of approximately 50 feet.

The CPT equipment has a 20-ton compression-type cone with a 15-square-centimeter (cm^2) tip area, an apex angle of 60 degrees, and a friction sleeve with a surface area of 225 cm^2. The cone, connected with a series of rods, is pushed into the ground at a constant rate. Cone readings are taken at approximately 5-cm intervals with a penetration rate of 2 cm per second in accordance with ASTM D3441. Measurements include the tip resistance to penetration of the cone (Qc), the resistance of the surface sleeve (Fs), and pore pressure (U) (Robertson and Campanella, 1988). The CPT data were provided by Gregg Drilling and Testing and are presented in Appendix B.

Pore pressure dissipation tests were conducted in 1-CPT1 through 1-CPT5 by Gregg Drilling and Testing. The CPT cone was halted at select depths, and the variation of the penetration pore pressure with time was measured until the pore pressure stabilized. Results of the pore-pressure dissipation tests are included in Appendix D.

3.3 LABORATORY TESTING

Laboratory testing on the samples recovered during borehole drilling was performed in accordance with the following table to determine various soil characteristics:

TABLE 3.3-1
Laboratory Testing

Test	Designation	Number of Tests Performed
Determination of Moisture Content by Mass	ASTM D2216	12
Determination of Density	ASTM D7263	3
Amount of Material in Soils Finer than No. 200 Sieve	ASTM D1140	6
Particle-Size Analysis of Soil	ASTM D422	4
Liquid Limit, Plastic Limit and Plasticity Index	ASTM D4318	7

Test	Designation	Number of Tests Performed
Unconsolidated Undrained Triaxial Compression	ASTM D2850	2
Laboratory Miniature Vane Shear	ASTM D4648	2
Consolidation Using Incremental Loading	ASTM D2435	1
Resistance Value	CTM-301	1

Laboratory result reports are included in Appendix C. In addition, some of the laboratory test results are shown on the boring logs in Appendix A.

We also performed corrosivity analysis on two soil samples. The samples were delivered to CERCO Analytical, Inc. and tested according to ASTM Test Methods for redox potential, pH, resistivity, sulfate, sulfide, and chloride ion concentrations. These tests provide an indication of the corrosion potential of the soil environment on buried concrete structures and metal pipes. A detailed description of the laboratory results is contained in the attached report prepared by CERCO Analytical, Inc. in Appendix E.

3.4 GROUNDWATER

As discussed in Section 3.2, we conducted pore-pressure-dissipation tests at the CPT locations. We calculated the groundwater elevation at each location based on the pore pressure dissipation test results. Due to the mud rotary drilling methods, we did not measure groundwater in the two boring locations. The table below provides a summary of the calculated groundwater elevation at the CPT locations.

TABLE 3.4-1
Groundwater Elevation based on Pore Pressure Dissipation Tests

CPT Location	Depth of Cone (feet)	Measured Pore Pressure (psi)	Calculated Groundwater Depth (feet)	Calculated Groundwater Elevation* (feet)
1-CPT1	21.7	7.9	3.3	2.2
1-CPT2	35.8	14.6	2.1	1.9
1-CPT3	12.1	3.7	3.6	1.9
1-CPT4	30.0	11.0	4.6	1.9
1-CPT5	33.6	11.7	6.6	-0.3

**Elevation Datum NAVD88*

Fluctuations in groundwater levels may occur seasonally and over a period of years because of precipitation, changes in drainage patterns, irrigation, and other factors not evident at the time measurements were made.

4.0 SITE CONDITIONS

4.1 SURFACE CONDITIONS

Based on information from historic topographic mapping, the site was once occupied by marshland prior to reclamation. Based on review of historical aerial photographs, by 1961, construction of the existing facility was completed. The site has remained relatively unchanged with the exception of structural additions since then.

4.2 SUBSURFACE CONDITIONS

Based on the exploratory borings and CPTs, the subsurface conditions generally consist of existing "man-made" fills over Bay Mud over alluvial deposits. Cross Sections A-A' and B-B' depict generalized subsurface conditions at the site (Figure 3).

We encountered 3 to 7 feet of fill at exploration locations. The fill is typically classified as sandy clay or clayey sand with variable amounts of gravel. The sandy clay ranges from medium stiff to very stiff in consistency, and the clayey sand ranges from loose to dense in density. Although not encountered, the existing fill unit adjacent to the San Francisco Bay often contains man-made debris such as asphalt, brick, or concrete fragments.

Below the fill, we encountered 3 to 5 feet of Bay Mud deposits. The Bay Mud underlying the fill is typically characterized as a marine deposit comprising soft to medium stiff, high plasticity clay with organics. Typically, the upper zone of Bay Mud deposits (normally up to about 5 feet) have been desiccated and are normally stiffer in consistency as a result.

We encountered geologically older alluvial deposits below the Bay Mud, extending to the bottom of our exploration locations. The alluvial deposits consisted of interbedded layers of lean clay and clayey sand with variable amounts of gravel. The clayey deposits were medium stiff to very stiff in consistency, and the sandy deposits were medium dense to dense in density.

5.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report presents geotechnical data for the Animal Care Shelter project. If changes occur in the nature or design of the project, we should be allowed to review this report and provide additional information. It is the responsibility of the owner to transmit the information and recommendations of this report to the appropriate organizations or people involved in design of the project, including but not limited to developers, owners, buyers, contractors, architects, engineers, and designers. The conclusions and recommendations contained in this report are solely professional opinions and are valid for a period of no more than 2 years from the date of report issuance.

We strived to perform our professional services in accordance with generally accepted geotechnical engineering principles and practices currently employed in the area; no warranty is expressed or implied. There are risks of earth movement and property damages inherent in

building on or with earth materials. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our services.

SELECTED REFERENCES

American Society of Testing and Materials (ASTM), 2015, Annual Book of Standards.

Association of Bay Area Governments (ABAG), 2009, Liquefaction Susceptibility.

BKF Engineers (BKF), 2015, SMCO Animal Shelter Topographic Survey, San Mateo, California, Job Number 20145240, March 3, 2015, electronic file received March 3, 2015.

Brabb, E.E., Graymer, E.W., and Jones, D.L., 1998, Geology of the Onshore Part of San Mateo County, California, Open-File Report 98-137, United States Geological Survey (USGS) .

California Division of Mines and Geology (CDMG), 1966, Thicknesses of Younger Bay Mud, compiled by James E. Kahle and Harold B. Goldman.

CDMG, 1974, State of California Special Studies Zones, San Mateo Quadrangle, scale 1:24000.

Hart, E.W. and Bryant, W.A., 1997, Fault-Rupture Hazard Zones in California, Special Publication 42, CDMG.

Nichols, D.R. and Wright, N.A., 1971, Preliminary Map of Historic Margins of Marshland, San Francisco Bay, California, Open-File Map, USGS.

Pampeyan E.H., 1994, Geologic Map of Montara Mountain and San Mateo, 7½ quadrangles, San Mateo County, California, USGS.

Robertson, P.K.. and Campanella, R.G., 1988, Guidelines for Geotechnical Design Using CPT and CPTu Data, Pennsylvania Department of Transportation.

State of California—Business, Transportation and Housing Agency, 2000, California Test 301, Department of Transportation, Engineering Service Center.

LIST OF FIGURES

FIGURES

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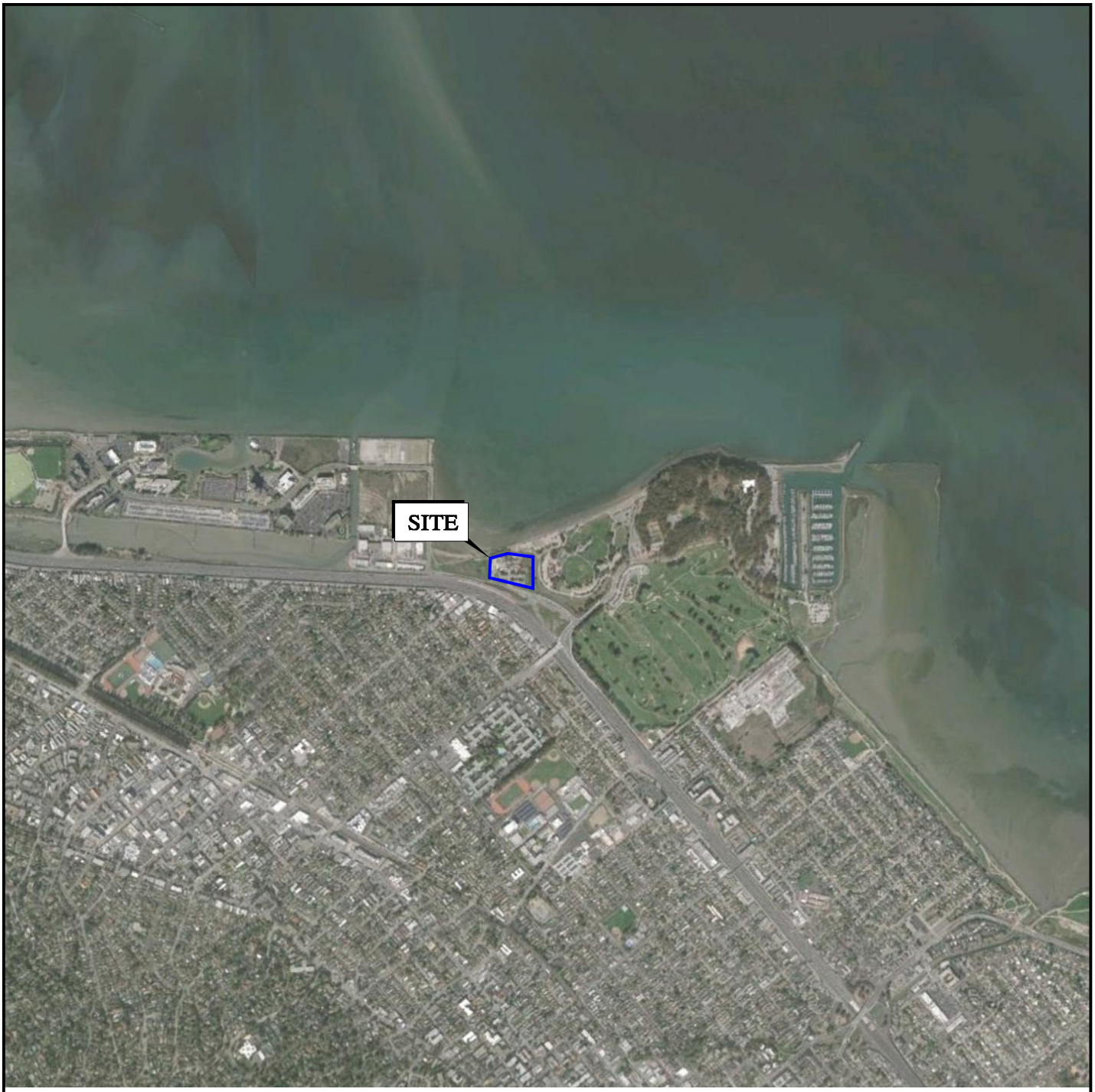

N

0 FEET 2000

0 METERS 1000

BASE MAP SOURCE: GOOGLE EARTH PRO

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VICINITY MAP

ANIMAL CARE SHELTER

REDWOOD CITY, CALIFORNIA

PROJECT NO.: 11780.000.000		FIGURE NO. 1
SCALE: AS SHOWN		
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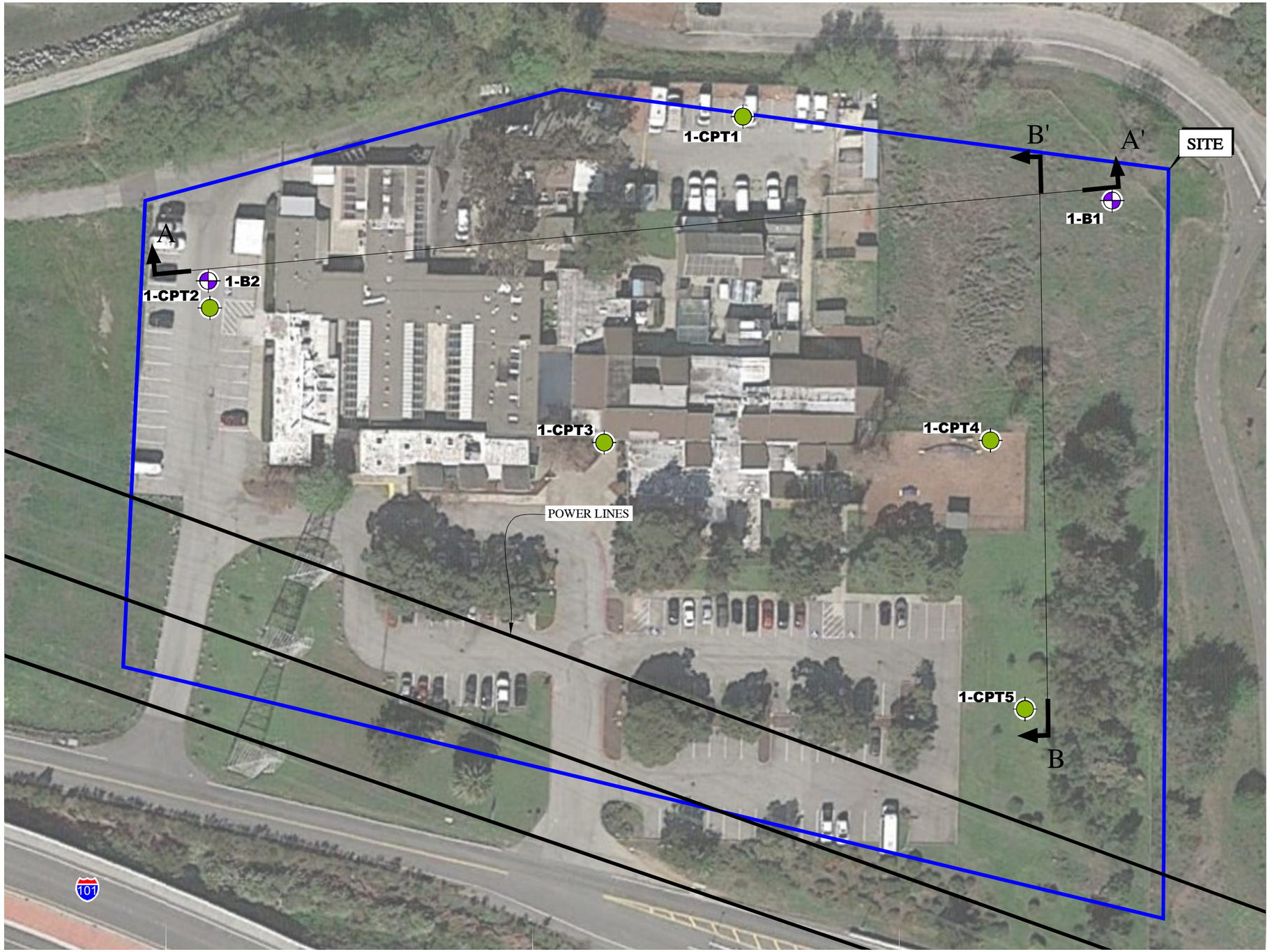

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

1-B2 — BORING

1-CPT5 — CONE PENETRATION TEST

A — A' — CROSS SECTION LOCATION

N

0 FEET 60

0 METERS 30

BASE MAP SOURCE: GOOGLE EARTH PRO

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SITE PLAN

ANIMAL CARE SHELTER

REDWOOD CITY, CALIFORNIA

PROJECT NO.: 11780.000.000	FIGURE NO. 2
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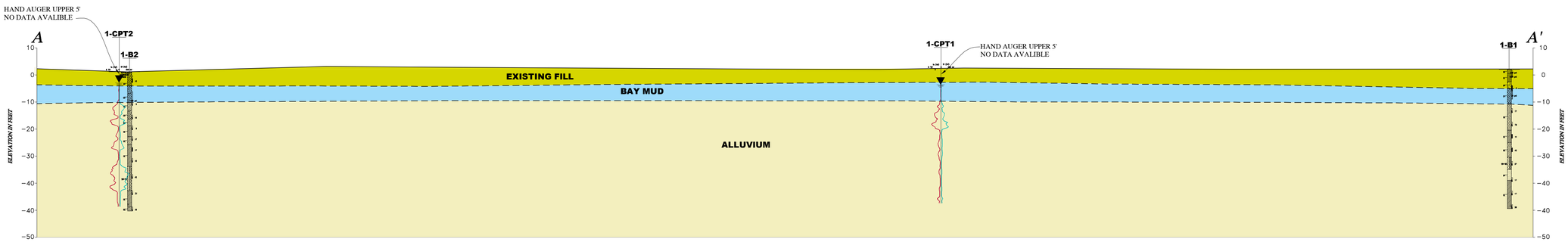

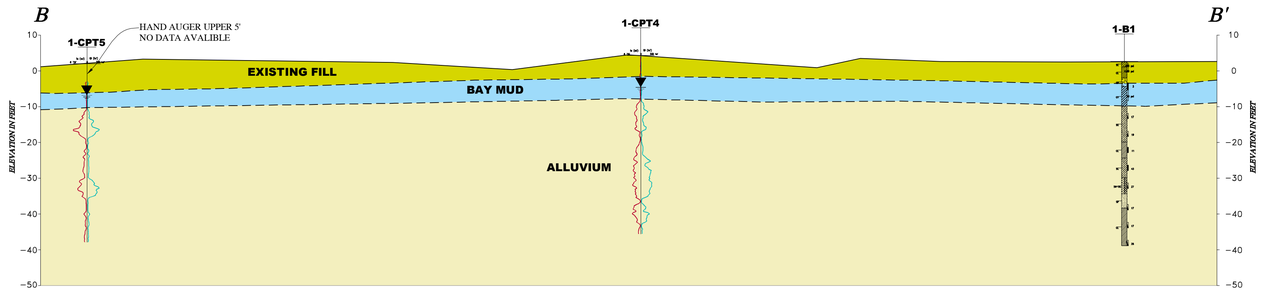

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

EXISTING FILL	SANDY CLAY TO CLAYEY SAND WITH GRAVEL
BAY MUD	SOFT TO STIFF, HIGHLY EXPANSIVE, DESICCATED CLAY
ALLUVIUM	INTERBEDDED MEDIUM STIFF TO VERY STIFF CLAY AND MEDIUM DENSE TO VERY DENSE CLAYEY SAND WITH GRAVEL
1-B2	BORING
1-CPT5	CONE PENETRATION TEST

ASPHALT	USCS POORLY-GRADED GRAVEL
USCS LOW PLASTICITY CLAY	USCS ELASTIC SILT
USCS CLAYEY GRAVEL	USCS POORLY-GRADED SAND
USCS SILTY GRAVEL	USCS SILTY SAND
USCS HIGH PLASTICITY CLAY	SILTY SAND/SANDY SILT
USCS SILT	USCS WELL-GRADED SAND

CROSS SECTION A-A' AND B-B'
ANIMAL CARE SHELTER
REDWOOD CITY, CALIFORNIA

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PROJECT NO.: 11780.000.000 | FIGURE NO: 3
SCALE: AS SHOWN
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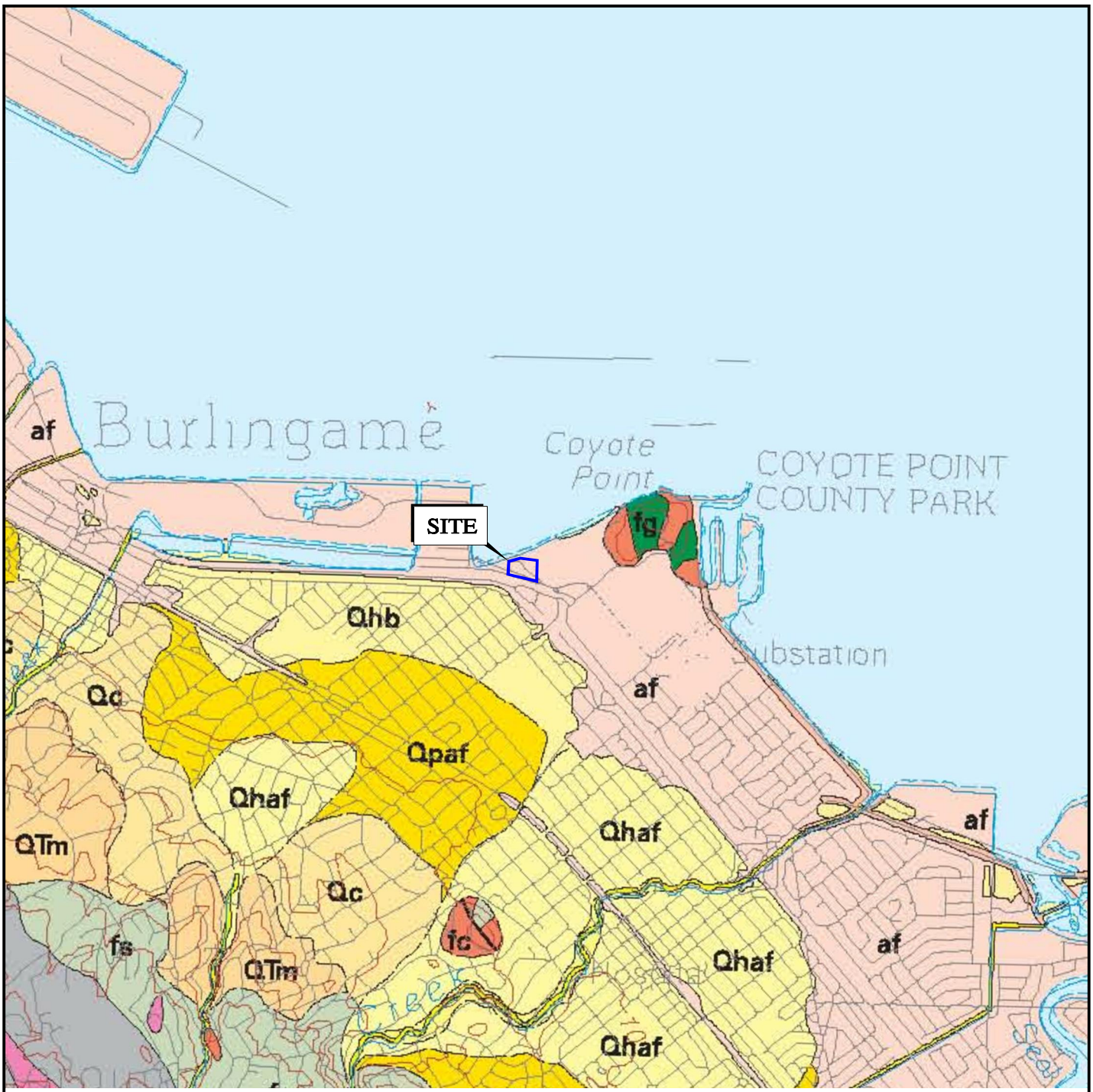

EXPLANATION

af	ARTIFICIAL FILL
Qc	COLMA FORMATION (PLEISTOCENE)
Qhb	BASIN DEPOSITS (HOLOCENE)
Qhaf	ALLUVIAL FAN AND FLUVIAL DEPOSITS (HOLOCENE)
Qpaf	ALLUVIAL FAN AND FLUVIAL FAN DEPOSITS (PLEISTOCENE)
fg	GREENSTONE

N

0 FEET 3000

0 METERS 1500

BASE MAP SOURCE: BRABB, 1998

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GEOLOGIC MAP- BRABB

ANIMAL CARE SHELTER

REDWOOD CITY, CALIFORNIA

PROJECT NO.: 11780.000.000		FIGURE NO. 4
SCALE: AS SHOWN		
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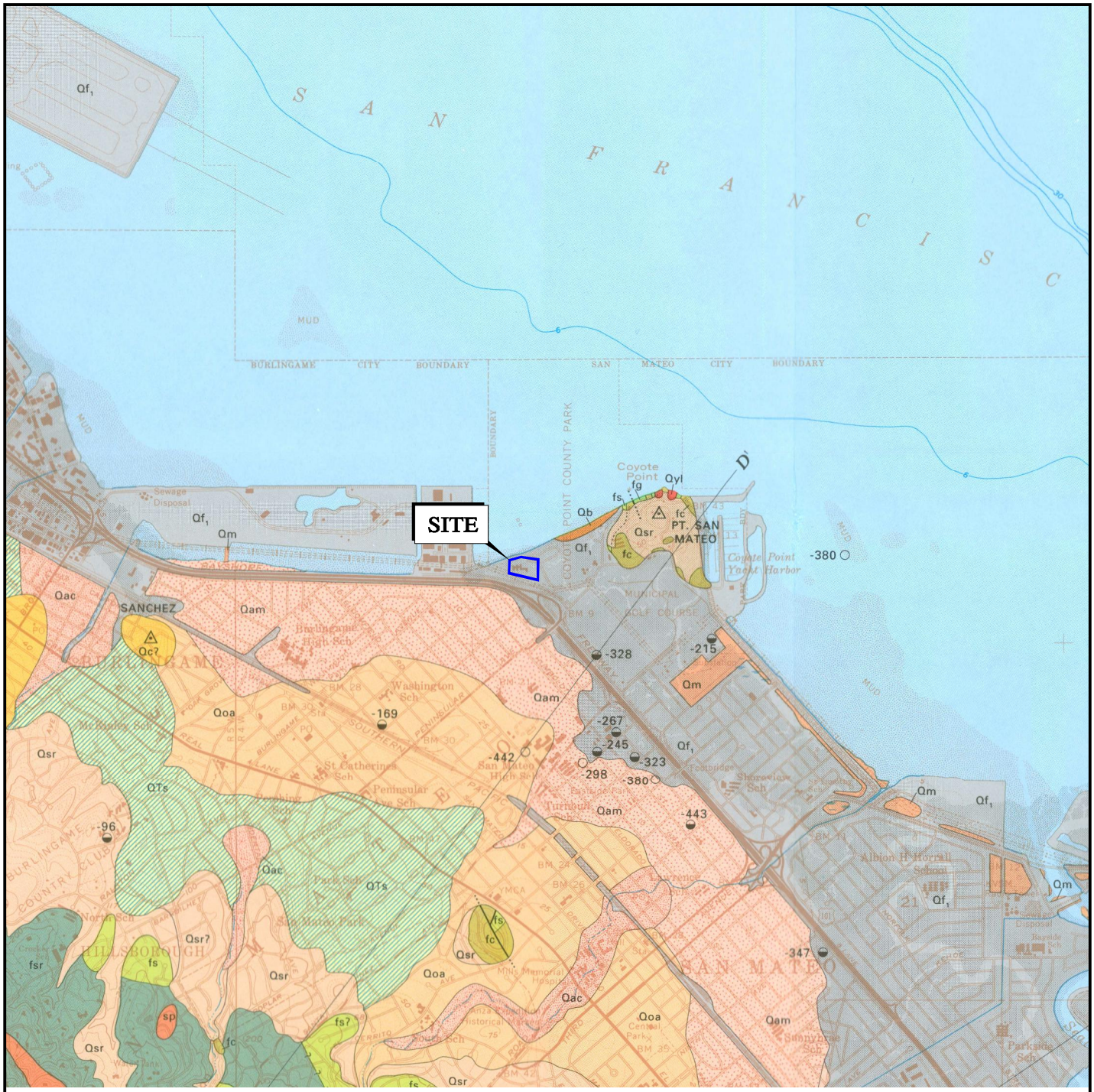

EXPLANATION

Qam	MEDIUM GRAINED ALLUVIUM (PLEISTOCENE)	**Qf_1**	ARTIFICIAL FILL-UNIT 1
Qsr	SLOPE WASH, RAVINE FILL, AND COLLUVIUM (HOLOCENE)	**Qoa**	OLDER ALLUVIUM (PLEISTOCENE)
Qm	BAY MUD (HOLOCENE)	**fc**	CHERT
Qb	BEACH DEPOSITS (HOLOCENE)		

BASE MAP SOURCE: PAMPEYAN

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GEOLOGIC MAP- PAMPEYAN

ANIMAL CARE SHELTER

REDWOOD CITY, CALIFORNIA

PROJECT NO.: 11780.000.000		**FIGURE NO.** 5
SCALE: AS SHOWN		
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BASE MAP SOURCE: USGS

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TOPOGRAPHIC MAP

ANIMAL CARE SHELTER

REDWOOD CITY, CALIFORNIA

PROJECT NO.: 11780.000.000		FIGURE NO. 6
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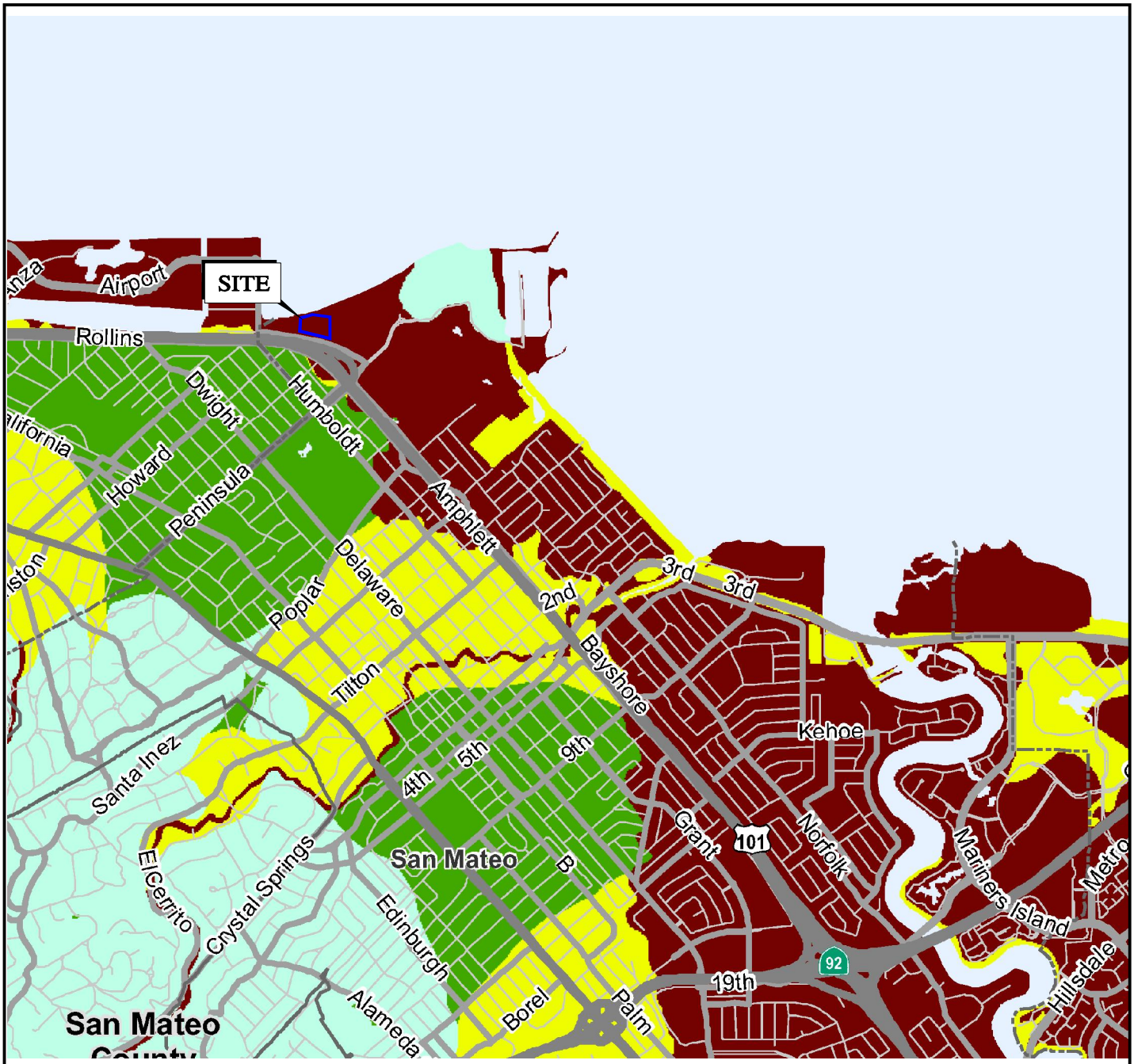

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EXPLANATION

Susceptibility Level

- Very High
- High
- Moderate
- Low
- Very Low

Major Roads

Local Roads

BASE MAP SOURCE: ASSOCIATION OF BAY AREA GOVERNMENTS, 2009

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LIQUEFACTION SUSCEPTIBILITY MAP

ANIMAL CARE SHELTER

REDWOOD CITY, CALIFORNIA

PROJECT NO.: 11780.000.000		FIGURE NO. 7
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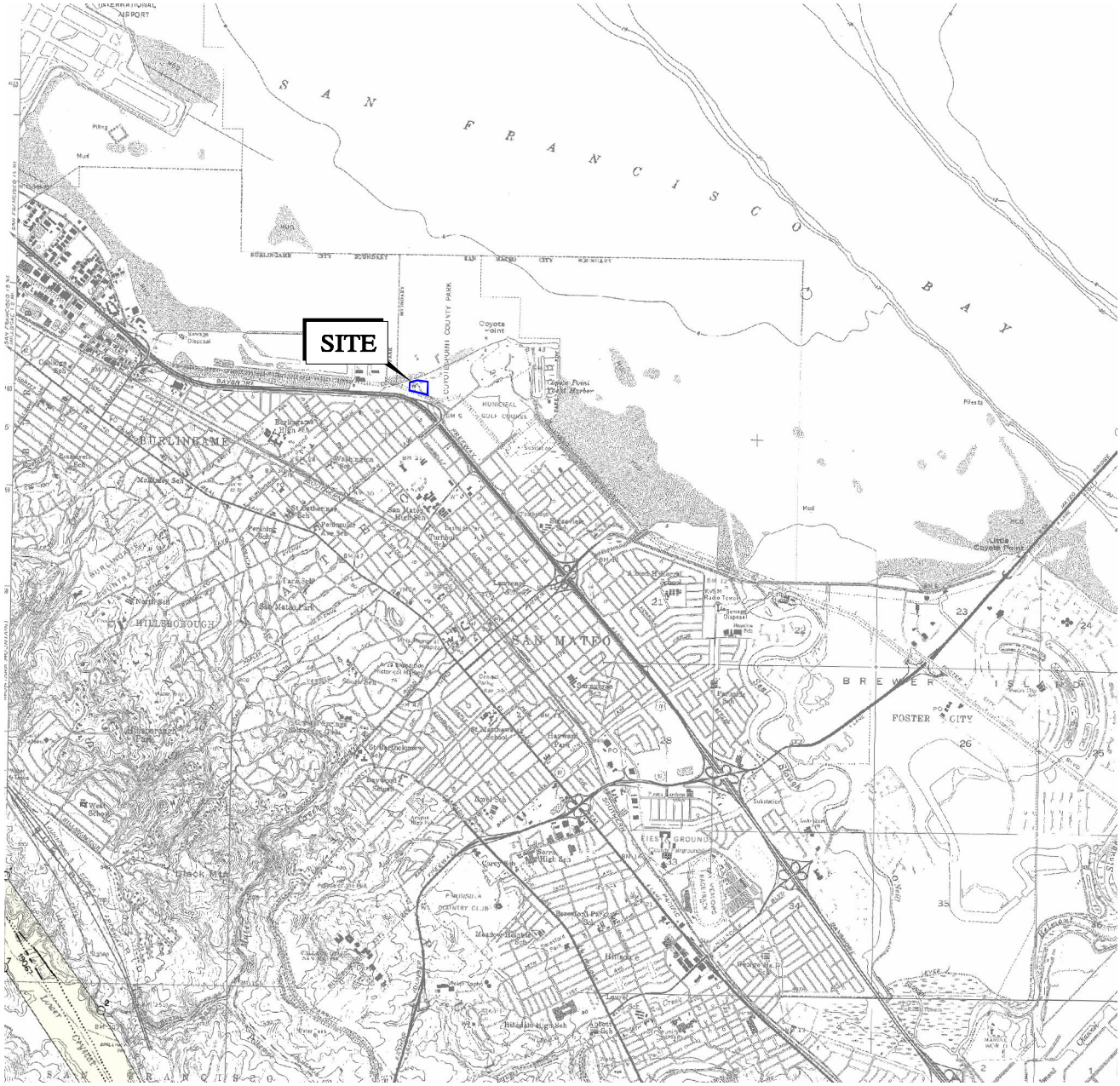

EXPLANATION

1906 C

FAULTS CONSIDERED TO HAVE BEEN ACTIVE DURING HOLOCENE TIME AND TO HAVE A RELATIVELY HIGH POTENTIAL FOR SURFACE RUPTURE; SOLID LINE WHERE ACCURATELY LOCATED, LONG DASH WHERE APPROXIMATELY LOCATED, SHORT DASH WHERE INFERRED, DOTTED WHERE CONCEALED; QUERY (?) INDICATES ADDITIONAL UNCERTAINTY. EVIDENCE OF HISTORIC OFFSET INDICATED BY YEAR OF EARTHQUAKE-ASSOCIATED EVENT OR C FOR DISPLACEMENT CAUSED BY CREEP OR POSSIBLE CREEP

EARTHQUAKE FAULT ZONE BOUNDARIES; DELINEATED AS STRAIGHT-LINE SEGMENTS THAT CONNECT ENCIRCLED TURNING POINTS SO AS TO DEFINE EARTHQUAKE FAULT ZONE SEGMENTS

BASE MAP SOURCE: CDMG, 1993

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EARTHQUAKE FAULT ZONE MAP

ANIMAL CARE SHELTER

REDWOOD CITY, CALIFORNIA

PROJECT NO.: 11780.000.000		FIGURE NO. 8
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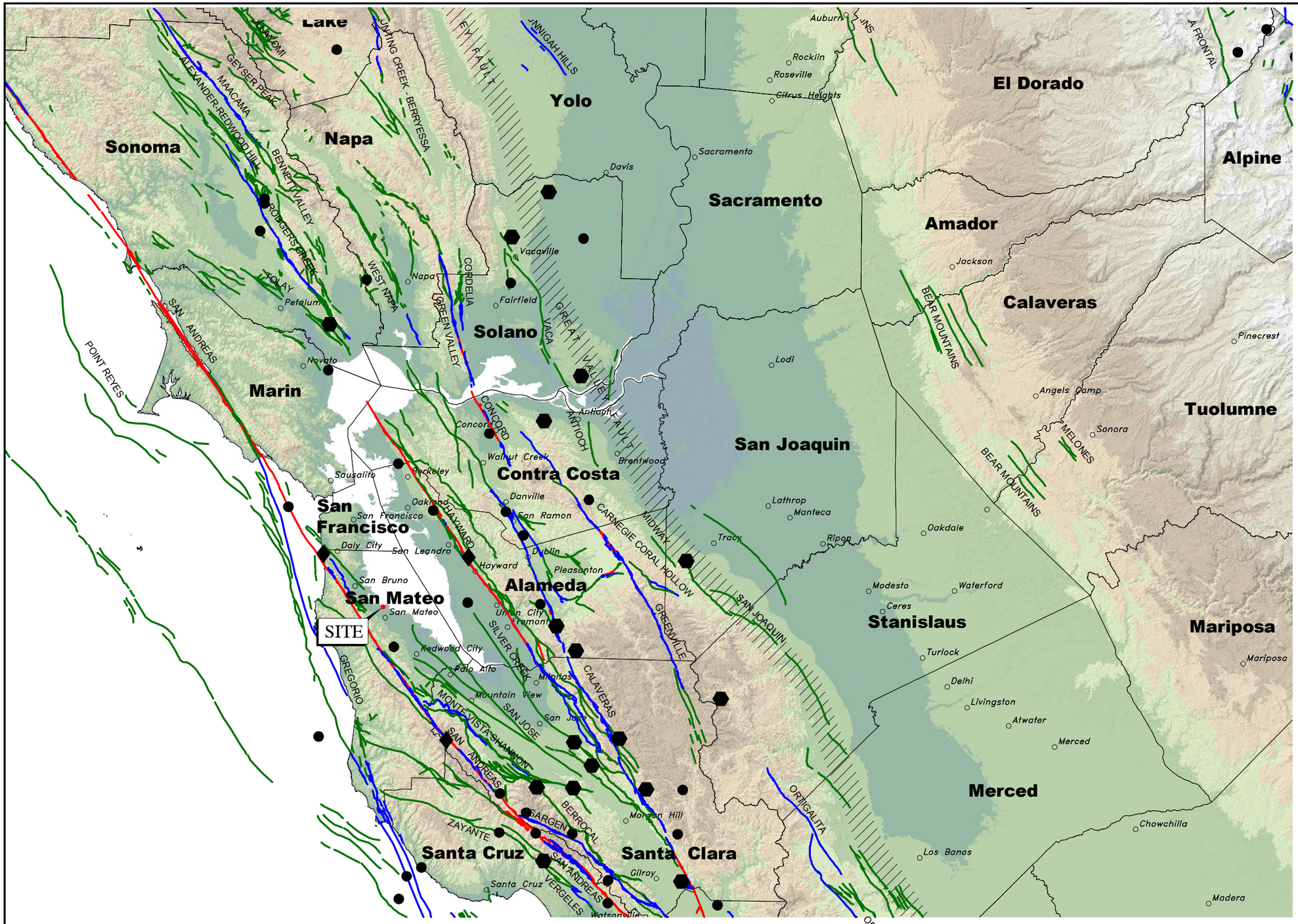

BASE MAP SOURCE:
COLOR HILLSHADE IMAGE BASED ON THE NATIONAL ELEVATION DATASET (NED) AT 30 METER RESOLUTION
U.S.G.S. QUATERNARY FAULT DATABASE, NOVEMBER, 2010
U.S.G.S. HISTORIC EARTHQUAKE DATABASE (1800–2000)

ENGEO Expect Excellence

REGIONAL FAULTING AND SEISMICITY

ANIMAL CARE SHELTER

REDWOOD CITY, CALIFORNIA

PROJECT NO.: 11780.000.000			FIGURE NO 9
SCALE: AS SHOWN			
DRAWN BY: SRP	CHECKED BY: AF		

ORIGINAL FIGURE PRINTED IN COLOR

G:\Drafting\DRAFTING2_Dwg_10000 to 12999\11780\000\11780000000-9-Fault-Map-0215.dwg Plot Date: 2-27-15 SPATTERS

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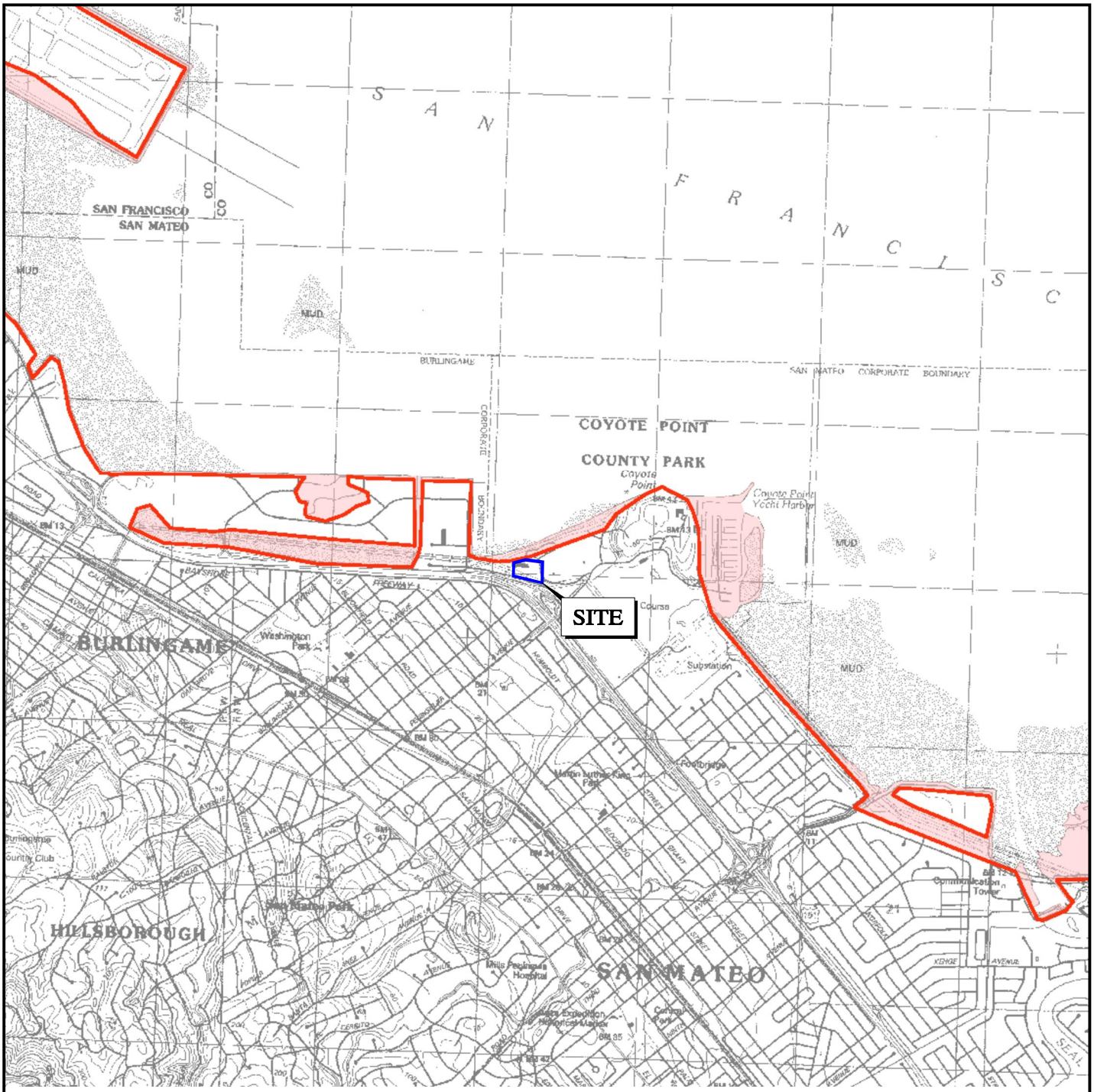

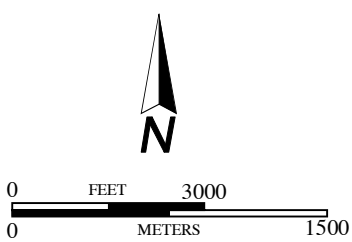

EXPLANATION

Tsunami Inundation Line

Tsunami Inundation Area

BASE MAP SOURCE: STATE OF CALIFORNIA – COUNTY OF SAN MATEO

ENGEO Expect Excellence

TSUNAMI INUNDATION MAP

ANIMAL CARE SHELTER

REDWOOD CITY, CALIFORNIA

PROJECT NO.: 11780.000.000		FIGURE NO. 10
SCALE: AS SHOWN		
DRAWN BY: SRP	CHECKED BY: AF	

G:\Drafting\DRAFTING2_Dwg_10000 to 12999\11780\000\11780000000-10-TsunamiMap-0215.dwg Plot Date: 2-27-15 SPATTERS

ORIGINAL FIGURE PRINTED IN COLOR

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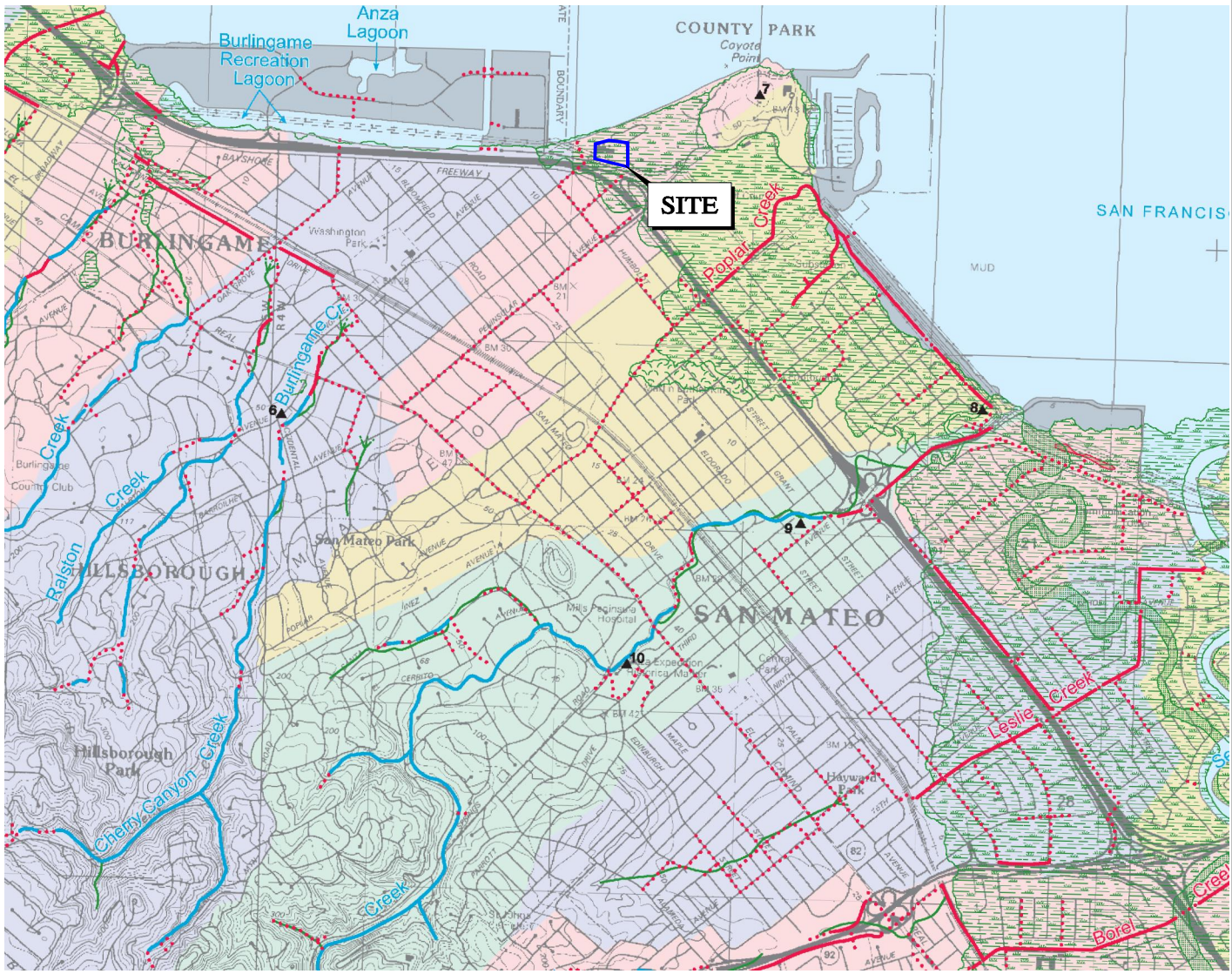

EXPLANATION

- Creeks, watershed area ≥ 0.2 km²
- Underground storm drains ≥ 24"
- Engineered channels
- Bay, ocean or natural lakes
- Artificial bodies of water
- Bay fill
- Present watersheds
- Modern tidal marsh formed after ~1850
- Historical tidal marsh, circa 1850, still present

Historical Features, circa 1850

- Creeks, buried or drained, dashed where location uncertain
- Shoreline or marsh boundary
- Ephemeral creek
- Lakes
- Water spreads over the ground
- Willow grove
- Tidal marsh and sloughs
- Now filled land

N

0 FEET 3000

0 METERS 1500

BASE MAP SOURCE: ANNE C. TILLEY, JANET M. SOWERS, WILLIAM LELLIS & ASSOCIATES, INC, SAN FRANCISCO ESTURAY INSTITUTE

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HISTORIC CREEK AND AND WATERSHED MAP

ANIMAL CARE SHELTER

REDWOOD CITY, CALIFORNIA

PROJECT NO.: 11780.000.000		FIGURE NO. 11
SCALE: AS SHOWN		
DRAWN BY: SRP	CHECKED BY: AF	

G:\Drafting\DRAFTING2_Dwg_10000 to 12999\11780\000\11780000000-11-Watershed-Map-0215.dwg Plot Date: 2-27-15 SPATTERS

ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX A

Key to Boring Logs
Log of Borings

APPENDIX A

KEY TO BORING LOGS

MAJOR TYPES			DESCRIPTION
COARSE-GRAINED SOILS MORE THAN HALF OF MAT'L LARGER THAN #200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW - Well graded gravels or gravel-sand mixtures GP - Poorly graded gravels or gravel-sand mixtures
		GRAVELS WITH OVER 12 % FINES	GM - Silty gravels, gravel-sand and silt mixtures GC - Clayey gravels, gravel-sand and clay mixtures
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 5% FINES	SW - Well graded sands, or gravelly sand mixtures SP - Poorly graded sands or gravelly sand mixtures
		SANDS WITH OVER 12 % FINES	SM - Silty sand, sand-silt mixtures SC - Clayey sand, sand-clay mixtures
FINE-GRAINED SOILS MORE THAN HALF OF MAT'L SMALLER THAN #200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50 % OR LESS		ML - Inorganic silt with low to medium plasticity CL - Inorganic clay with low to medium plasticity OL - Low plasticity organic silts and clays
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50 %		MH - Elastic silt with high plasticity CH - Fat clay with high plasticity OH - Highly plastic organic silts and clays
	HIGHLY ORGANIC SOILS		PT - Peat and other highly organic soils

For fine-grained soils with 15 to 29% retained on the #200 sieve, the words "with sand" or "with gravel" (whichever is predominant) are added to the group name.

For fine-grained soil with >30% retained on the #200 sieve, the words "sandy" or "gravelly" (whichever is predominant) are added to the group name.

GRAIN SIZES

U.S. STANDARD SERIES SIEVE SIZE					CLEAR SQUARE SIEVE OPENINGS			
200	40	10	4	3/4 "	3"	12"		
SILTS AND CLAYS	SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE			

RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT (S.P.T.)
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	STRENGTH*
VERY SOFT	0-1/4
SOFT	1/4-1/2
MEDIUM STIFF	1/2-1
STIFF	1-2
VERY STIFF	2-4
HARD	OVER 4

SAMPLER SYMBOLS

- Modified California (3" O.D.) sampler
- California (2.5" O.D.) sampler
- S.P.T. - Split spoon sampler
- Shelby Tube
- Continuous Core
- Bag Samples
- Grab Samples
- NR No Recovery

MOISTURE CONDITION

DRY	Dusty, dry to touch
MOIST	Damp but no visible water
WET	Visible freewater

LINE TYPES

- ———— Solid - Layer Break
- – – – – – Dashed - Gradational or approximate layer break

GROUND-WATER SYMBOLS

- Groundwater level during drilling
- Stabilized groundwater level

(S.P.T.) Number of blows of 140 lb. hammer falling 30" to drive a 2-inch O.D. (1-3/8 inch I.D.) sampler

* Unconfined compressive strength in tons/sq. ft., asterisk on log means determined by pocket penetrometer

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LOG OF BORING 1-B1

ENGEO INCORPORATED

Geotechnical Exploration
Animal Care Shelter
San Mateo, CA
11780.000.000

DATE DRILLED: 1/30/2015
HOLE DEPTH: Approx. 51½ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (NAVD 88): Approx. 5½ ft.

LOGGED / REVIEWED BY: I. McCreery / PG
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: Automatic Trip Hammer

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
0	5		CLAYEY SAND (SC), dark orange brown, loose, slightly moist, with fine to coarse gravel (FILL)			500 psi	36	16	20	32			
			LEAN CLAY (CL), dark reddish brown and dark gray, stiff, moist, with fine to coarse gravel (FILL)			1500 psi							1.25*
5	0		POORLY GRADED GRAVEL (GP), brown, very loose, wet, with sand (FILL)			3							
			LEAN CLAY (CL), dark grayish brown, soft to medium stiff, wet (BAY MUD?)										
10	-5		Grayish green to green, very stiff			50 psi	33	17	16				0.5*
15	-10		CLAYEY SAND (SC), olive brown to olive green, medium dense, wet, fine to coarse-grained sand (ALLUVIUM)			17				16	16.4		
20	-15		Pale olive brown and gray			19							
25	-20		SANDY LEAN CLAY (CL), olive brown, medium stiff, wet, iron oxide and manganese staining			11					17.4	114.1	
30			CLAYEY SAND (SC), olive brown, dense, wet, fine to coarse-grained sand			43				14	13.6	127.3	

LOG - GEOTECHNICAL W/ELEV. LOGS.GPJ ENGEO INC.GDT 2/27/15

LOG OF BORING 1-B1

ENGEO INCORPORATED

Geotechnical Exploration
Animal Care Shelter
San Mateo, CA
11780.000.000

DATE DRILLED: 1/30/2015
HOLE DEPTH: Approx. 51½ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (NAVD 88): Approx. 5½ ft.

LOGGED / REVIEWED BY: I. McCreery / PG
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: Automatic Trip Hammer

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	-25		CLAYEY SAND (SC), olive brown, dense, wet, fine to coarse-grained sand										
35	-30		POORLY GRADED SAND TO CLAYEY SAND WITH GRAVEL (SP-SC), olive brown to brown, medium dense, wet, fine to coarse-grained sand			27				10			
40	-35		POORLY GRADED SAND (SP), olive brown, medium dense, wet, with fine to coarse gravel, fine to coarse-grained sand			17							
			LEAN CLAY (CL), dark yellowish brown to olive brown, very stiff, wet										
45	-40		Pale greenish olive			17					32.3		2.5*
50	-45					28					21.3	104.5	3.5*
			Bottom of boring at approximately 51.5 feet below existing grade. Groundwater was not encountered due to the method of drilling.										

LOG - GEOTECHNICAL W/ELEV. LOGS.GPJ ENGEO INC.GDT 2/27/15

LOG OF BORING 1-B2

ENGEO INCORPORATED

Geotechnical Exploration
Animal Care Shelter
San Mateo, CA
11780.000.000

DATE DRILLED: 1/30/2015
HOLE DEPTH: Approx. 51½ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (NAVD 88): Approx. 4 ft.

LOGGED / REVIEWED BY: I. McCreery / PG
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: Automatic Trip Hammer

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			2" asphalt concrete over 4" aggregate base										
			CLAYEY GRAVEL (GC), dark brown, moist (FILL)										
			FAT CLAY (CH), very dark brown to very dark greenish gray, stiff, moist (FILL)			10	87	28	59	98			1.25*
	0		Black mottled with greenish gray										1.0*
5			FAT CLAY (CH), dark grayish brown, stiff, moist to wet (BAY MUD)										
			Soft, wet			0 psi							
	-5		SANDY LEAN CLAY (CL), yellowish brown, soft to medium stiff, wet, with gravel								22	107	
10			Medium stiff to stiff			100 psi							1.25*
			CLAYEY SAND (SC), yellowish brown to dark yellowish brown, loose, wet, medium-grained sand			5	27	15	12	35	19.9		
			CLAYEY SAND (SC), yellowish brown, medium dense to dense, wet (ALLUVIUM)										
	-10												
15			SANDY CLAY (CL), yellowish red to dark yellowish brown, stiff, wet, fine-grained sand			14							2.25*
			CLAYEY SAND (SC), yellowish brown, medium dense, wet										
	-15												
20			SANDY LEAN CLAY (CL), pale olive brown, stiff, wet, low plasticity, iron oxide staining			9	44	18	26	65	20.8		1.25*
	-20												
25			CLAYEY SAND (SC), yellowish brown to dark yellowish brown, medium dense, wet, with gravel			17	30	16	14	34	16.7		
	-25		SILTY LEAN CLAY (CL), dark yellowish brown, very stiff, wet, <15% gravel			17					25	102.2	3.25*
30													

LOG OF BORING 1-B2

ENGEO INCORPORATED

Geotechnical Exploration
Animal Care Shelter
San Mateo, CA
11780.000.000

DATE DRILLED: 1/30/2015
HOLE DEPTH: Approx. 51½ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (NAVD 88): Approx. 4 ft.

LOGGED / REVIEWED BY: I. McCreery / PG
DRILLING CONTRACTOR: Pitcher Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: Automatic Trip Hammer

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SILTY LEAN CLAY (CL), dark yellowish brown, stiff, wet, <15% gravel			10					20.2		1.75*
	-30												
35													
			WELL GRADED SAND TO CLAYEY SAND (SW-SC), dark olive brown to dark gray, dense, wet			42				9	14.1		
40													
	-40												
			LEAN SILTY CLAY (CL), pale olive mottled with reddish yellow, very stiff, wet, <15% sand			21					20		3.5*
45													
	-45												
50			CLAYEY SAND (SC), dark yellowish brown, medium stiff, wet, low plasticity			19	30	17	13	44	22.1		
			Bottom of boring at approximately 51.5 feet below existing grade. Groundwater was not encountered due to the method of drilling.										

LOG - GEOTECHNICAL W/ELEV. LOGS.GPJ ENGEO INC.GDT 2/27/15

APPENDIX B

Cone Penetration Test Report

APPENDIX B

Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*. The soundings were conducted using a 20 ton capacity cone with a tip area of 15 cm^2 and a friction sleeve area of 225 cm^2. The cone is designed with an equal end area friction sleeve and a tip end area ratio of 0.80.

The cone takes measurements of cone bearing (q_c), sleeve friction (f_s) and penetration pore water pressure (u_2) at 5-cm intervals during penetration to provide a nearly continuous log. CPT data reduction and interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored on disk for further analysis and reference. All CPT soundings are performed in accordance with revised (2007) ASTM standards (D 5778-07).

The cone also contains a porous filter element located directly behind the cone tip (u_2). It consists of porous plastic and is 5.0mm thick. The filter element is used to obtain penetration pore pressure as the cone is advanced as well as Pore Pressure Dissipation Tests (*PPDT's*) during appropriate pauses in penetration. It should be noted that prior to penetration, the element is fully saturated with oil under vacuum pressure to ensure accurate and fast dissipation.

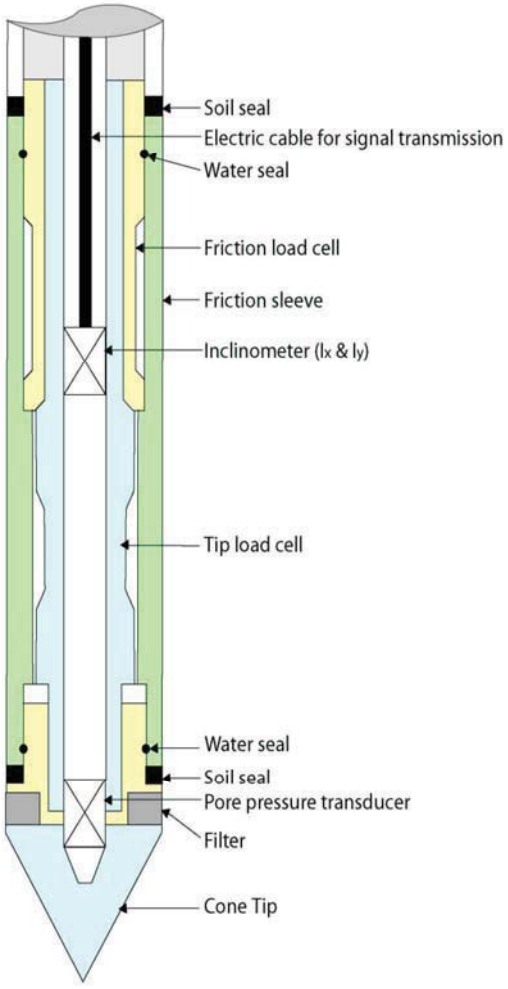


Figure CPT

The cone has the following accuracy:
1 tsf for q_c, 0.02 tsf for f_s and 0.5 psi for u_2. In soft clays, a lower capacity cone should be used for improved accuracy.

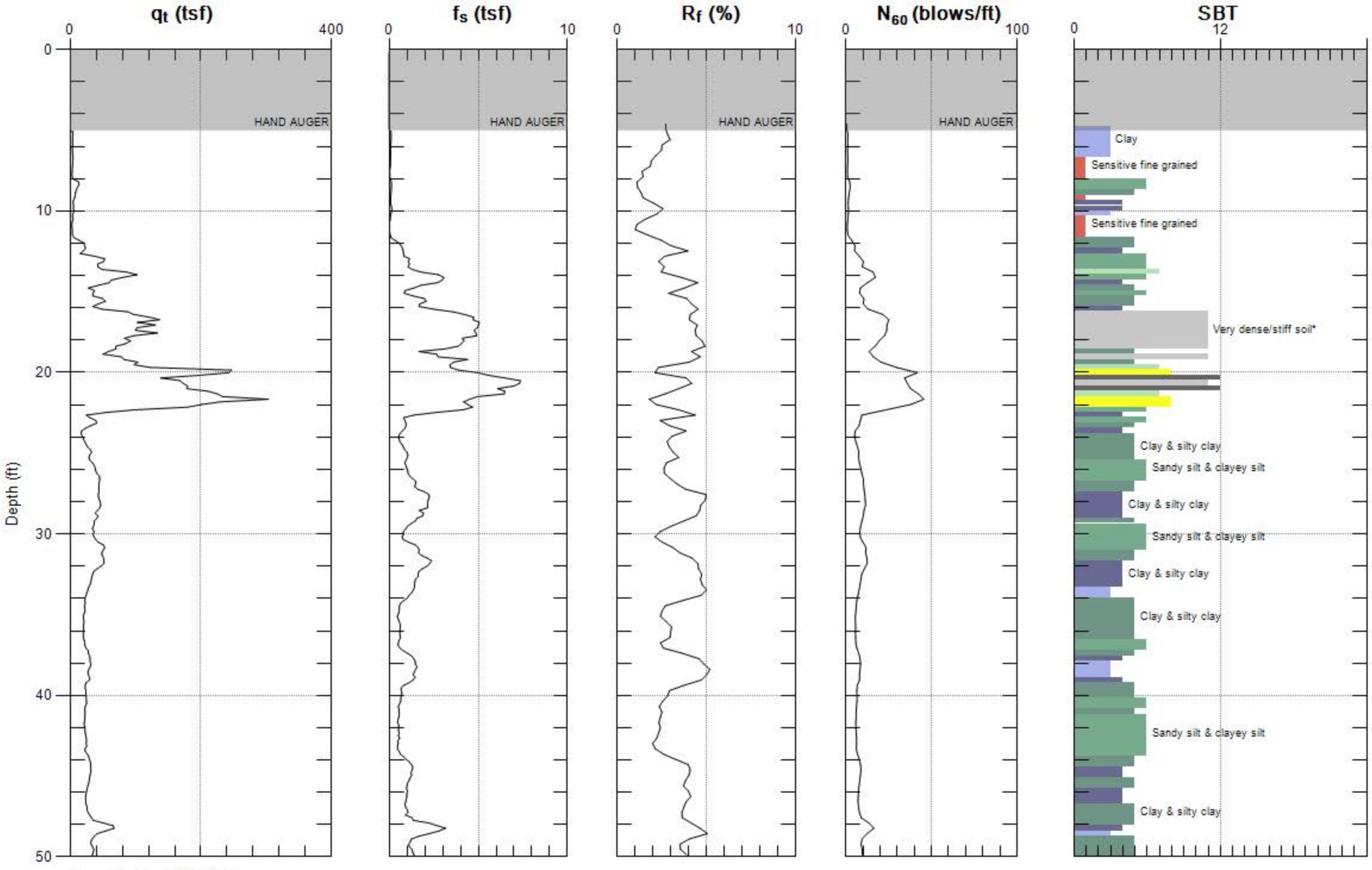
When the soundings are complete, the test holes are grouted. The grouting procedures generally consist of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

GREGG

ENGEO

Site: SAN MATEO ANIMAL
Sounding: 1-CPT01

Engineer: I.MCCREERY
Date: 1/2/2015 02:47



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

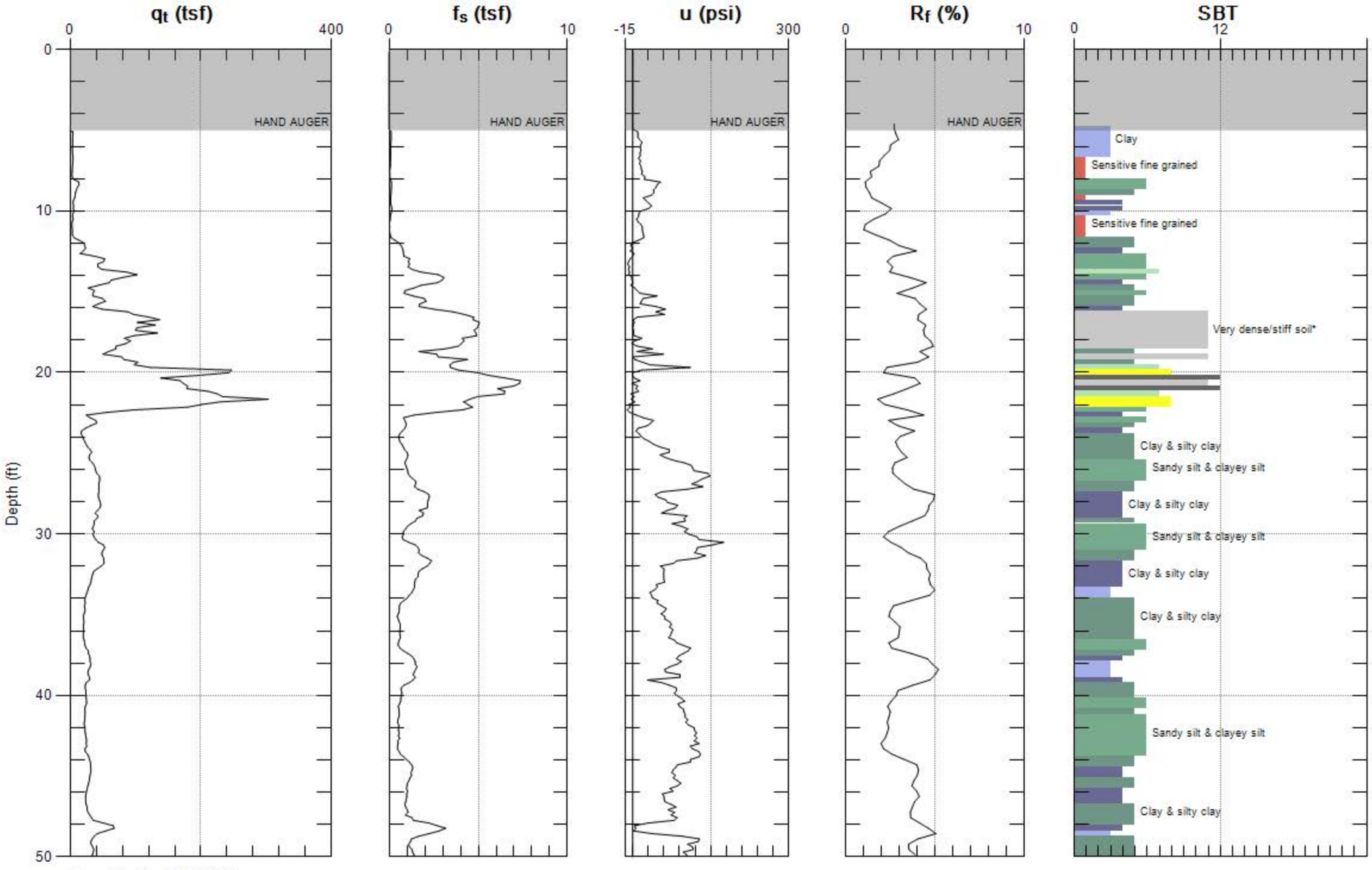
SBT: Soil Behavior Type (Robertson 1990)

GREGG

ENGEO

Site: SAN MATEO ANIMAL
Sounding: 1-CPT01

Engineer: I.MCCREERY
Date: 1/2/2015 02:47



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

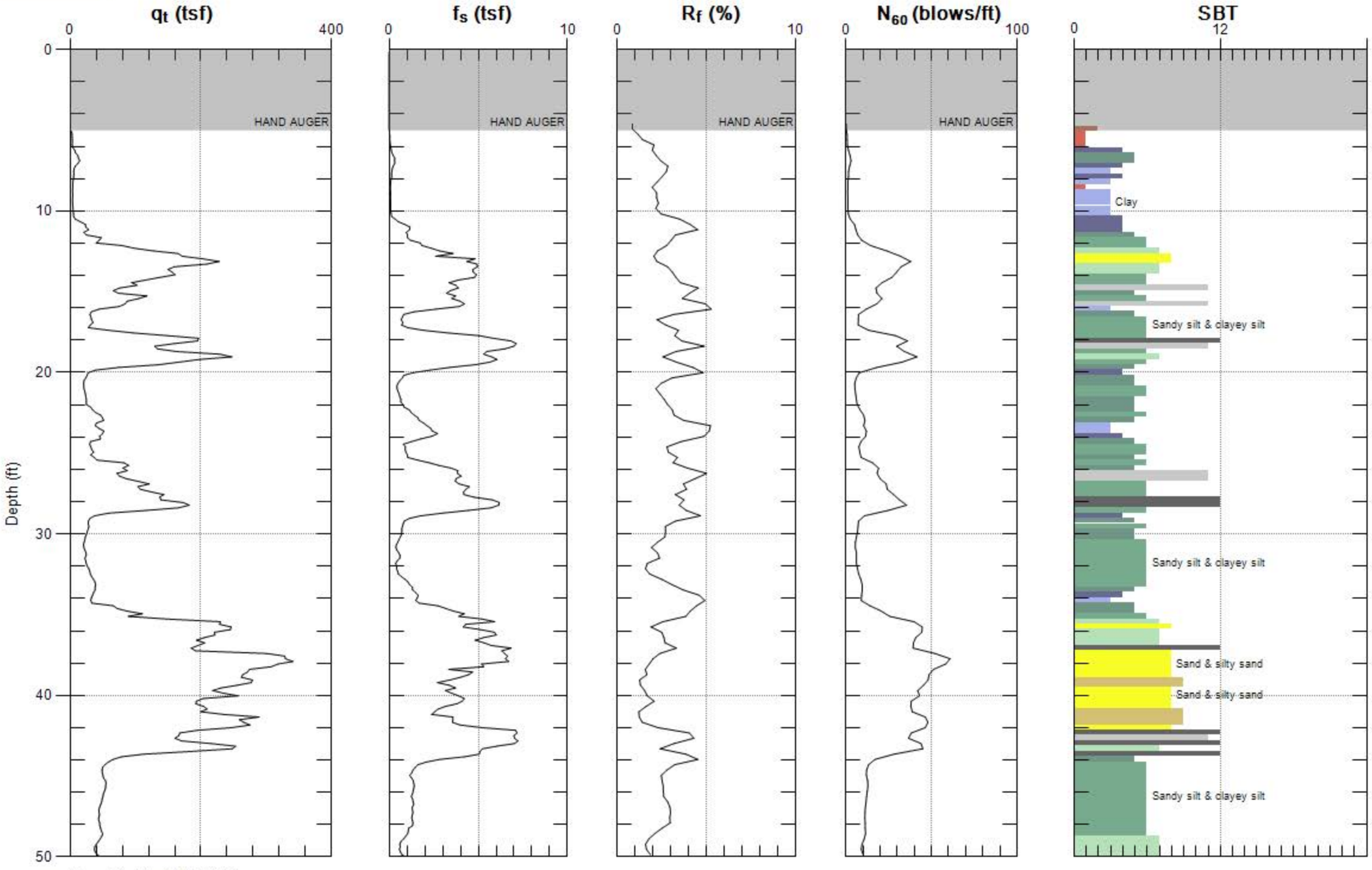
SBT: Soil Behavior Type (Robertson 1990)

GREGG

ENGEO

Site: SAN MATEO ANIMAL
Sounding: 1-CPT02

Engineer: I.MCCREERY
Date: 1/2/2015 10:41



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

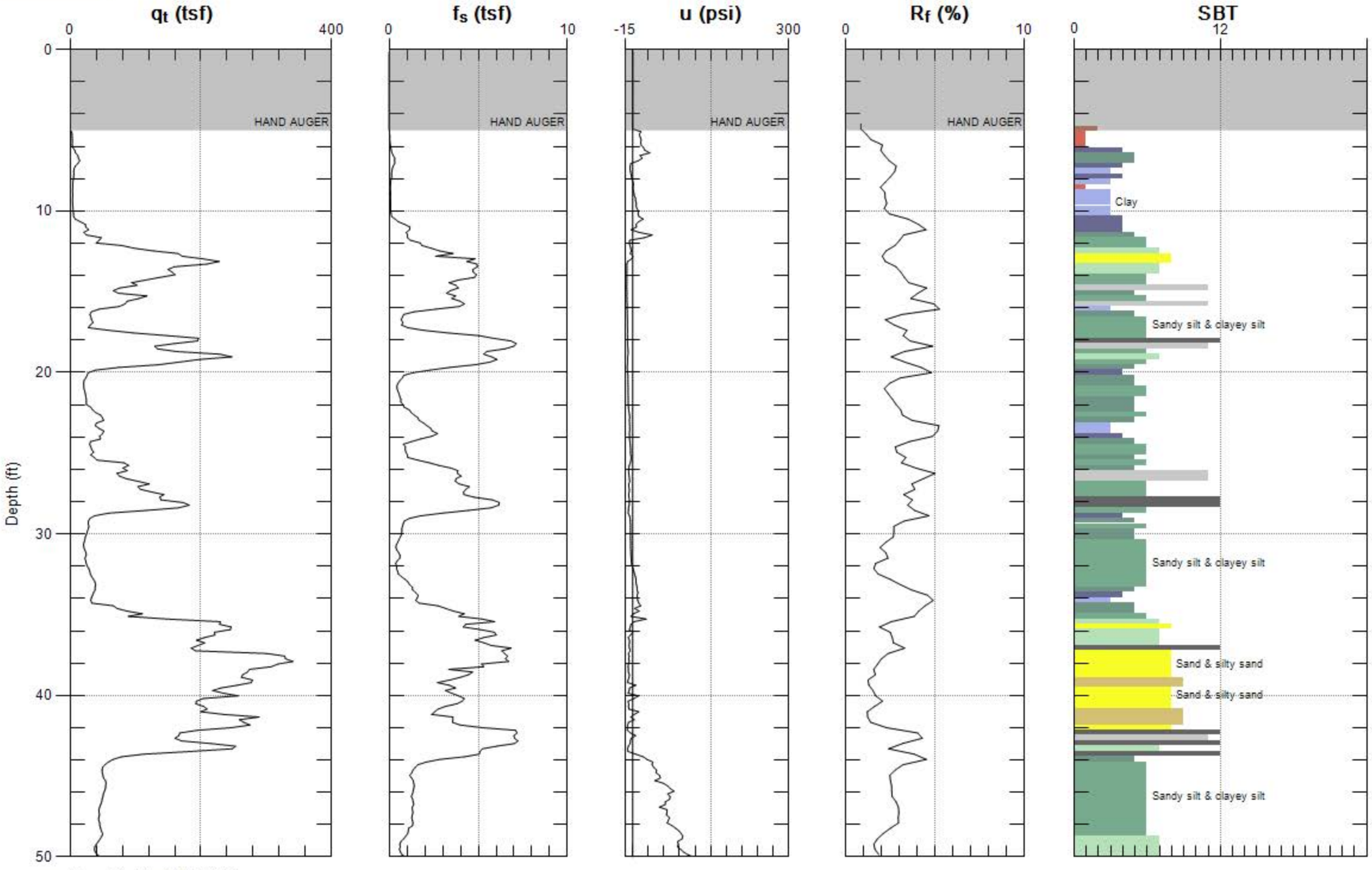
SBT: Soil Behavior Type (Robertson 1990)

GREGG

ENGEO

Site: SAN MATEO ANIMAL
Sounding: 1-CPT02

Engineer: I.MCCREERY
Date: 1/2/2015 10:41



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

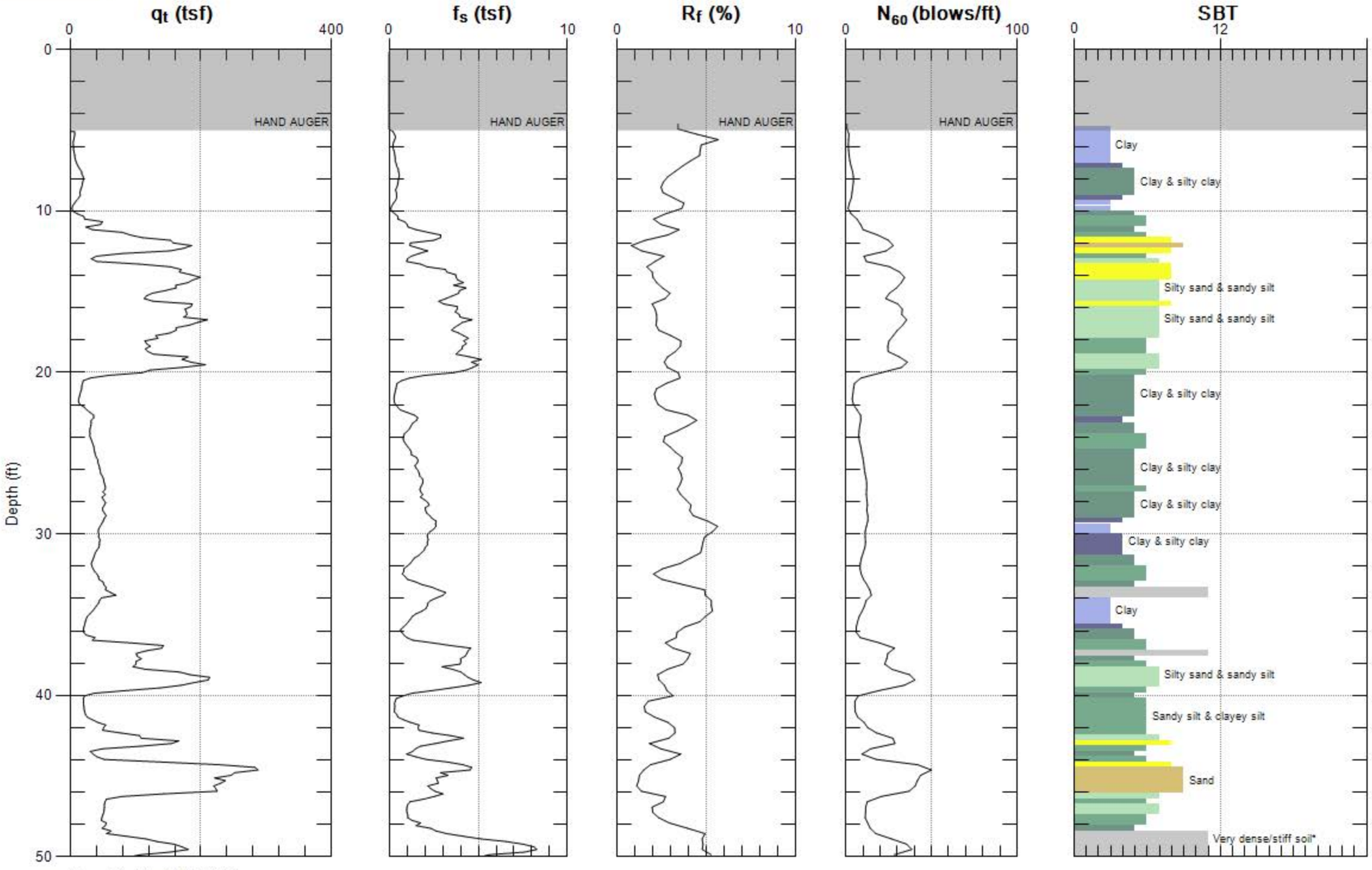
SBT: Soil Behavior Type (Robertson 1990)

GREGG

ENGEO

Site: SAN MATEO ANIMAL
Sounding: 1-CPT03

Engineer: I.MCCREERY
Date: 1/2/2015 07:30



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

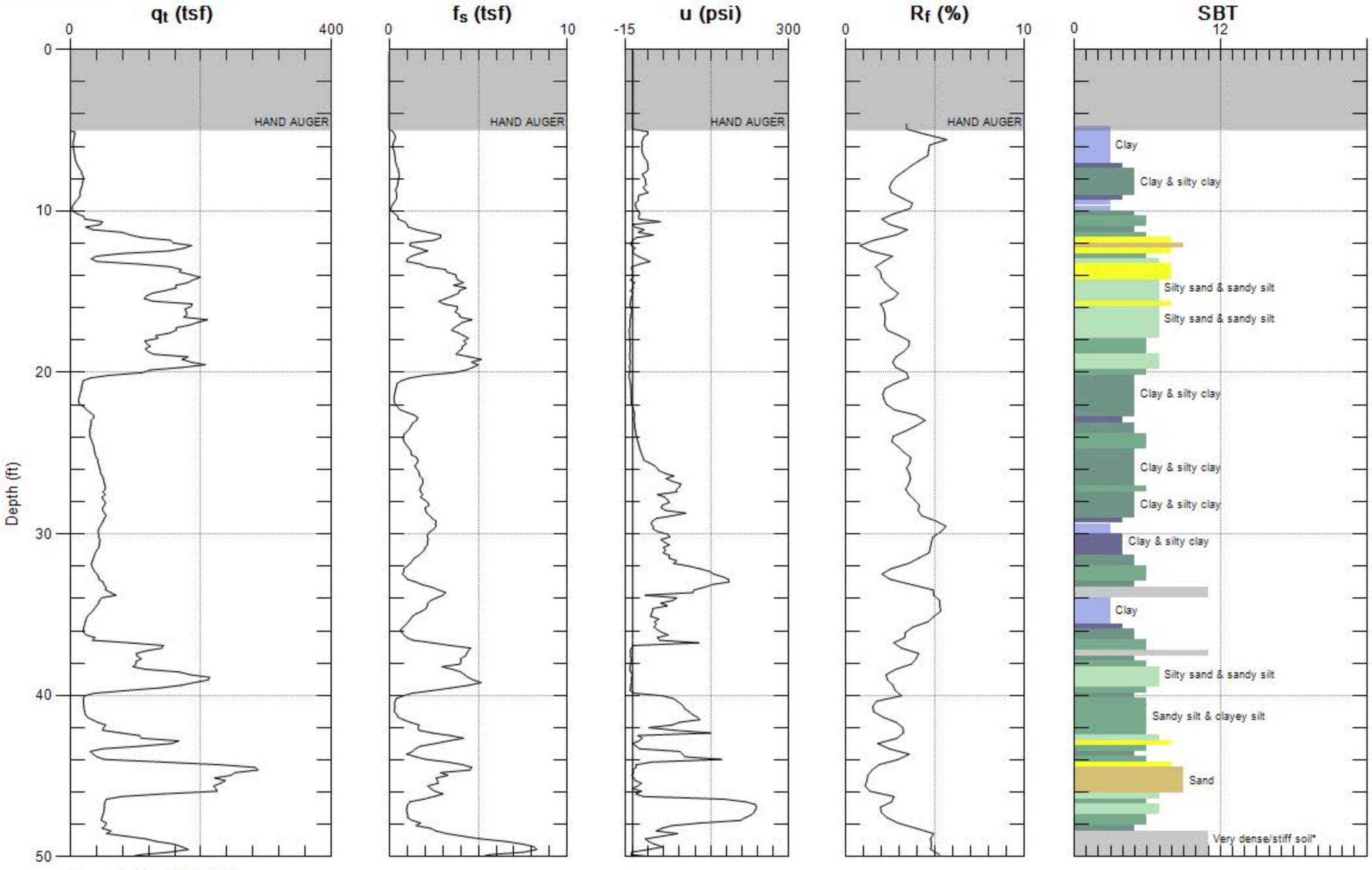
SBT: Soil Behavior Type (Robertson 1990)

GREGG

ENGEO

Site: SAN MATEO ANIMAL
Sounding: 1-CPT03

Engineer: I.MCCREERY
Date: 1/2/2015 07:30



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

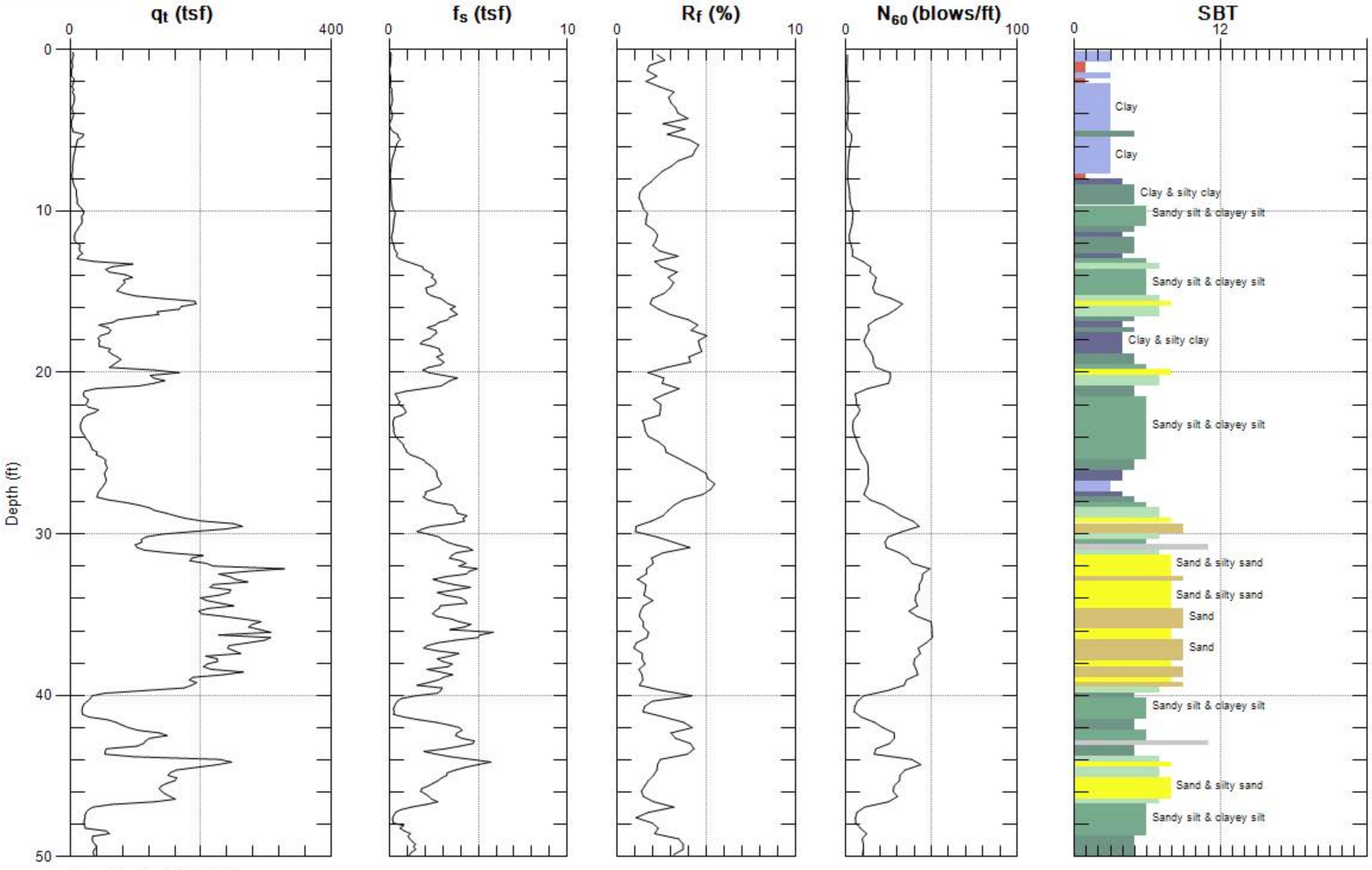
SBT: Soil Behavior Type (Robertson 1990)

GREGG

ENGEO

Site: SAN MATEO ANIMAL
Sounding: 1-CPT04

Engineer: I.MCCREERY
Date: 1/2/2015 01:22



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

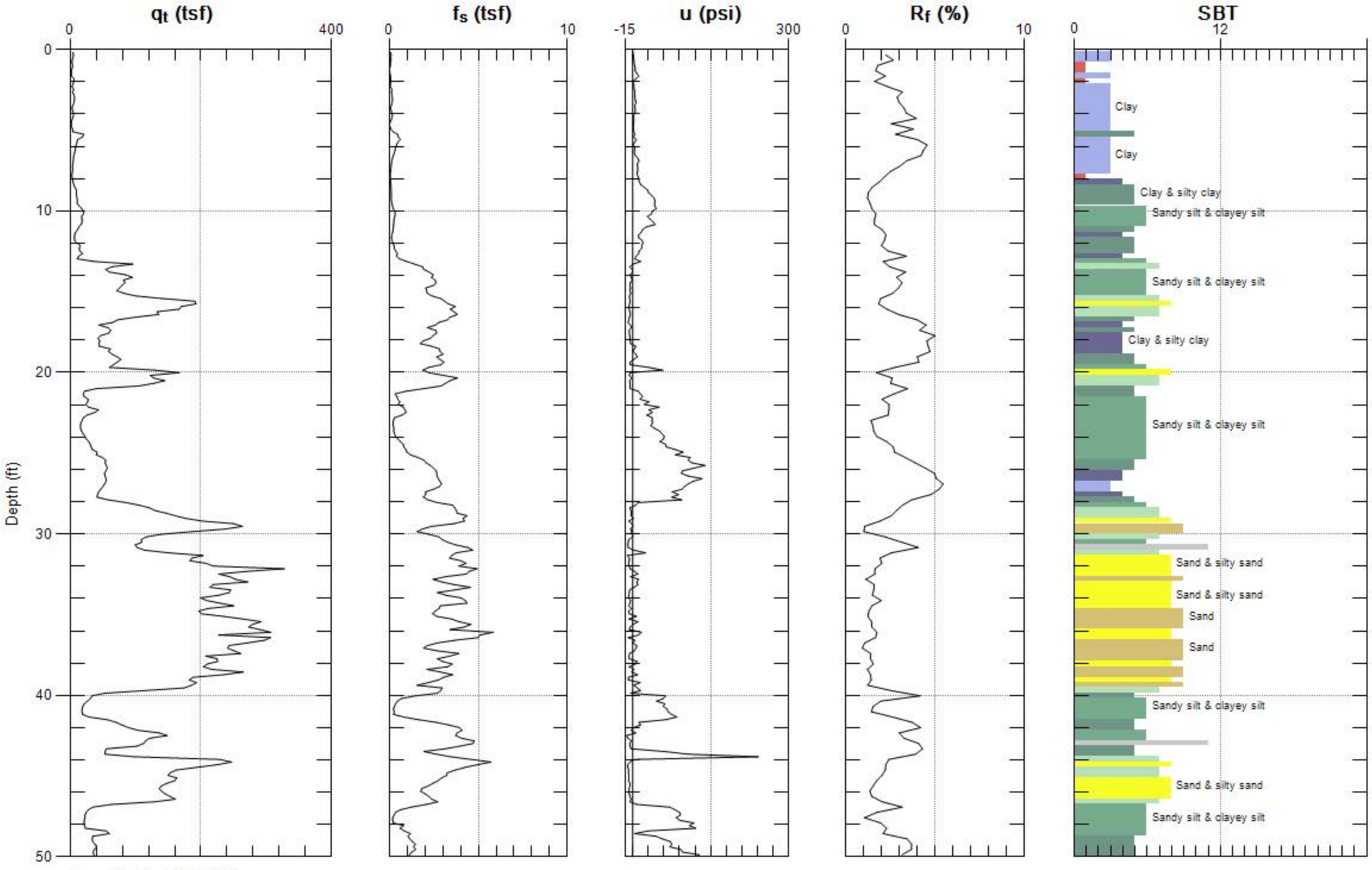
SBT: Soil Behavior Type (Robertson 1990)

GREGG

ENGEO

Site: SAN MATEO ANIMAL
Sounding: 1-CPT04

Engineer: I.MCCREERY
Date: 1/2/2015 01:22



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

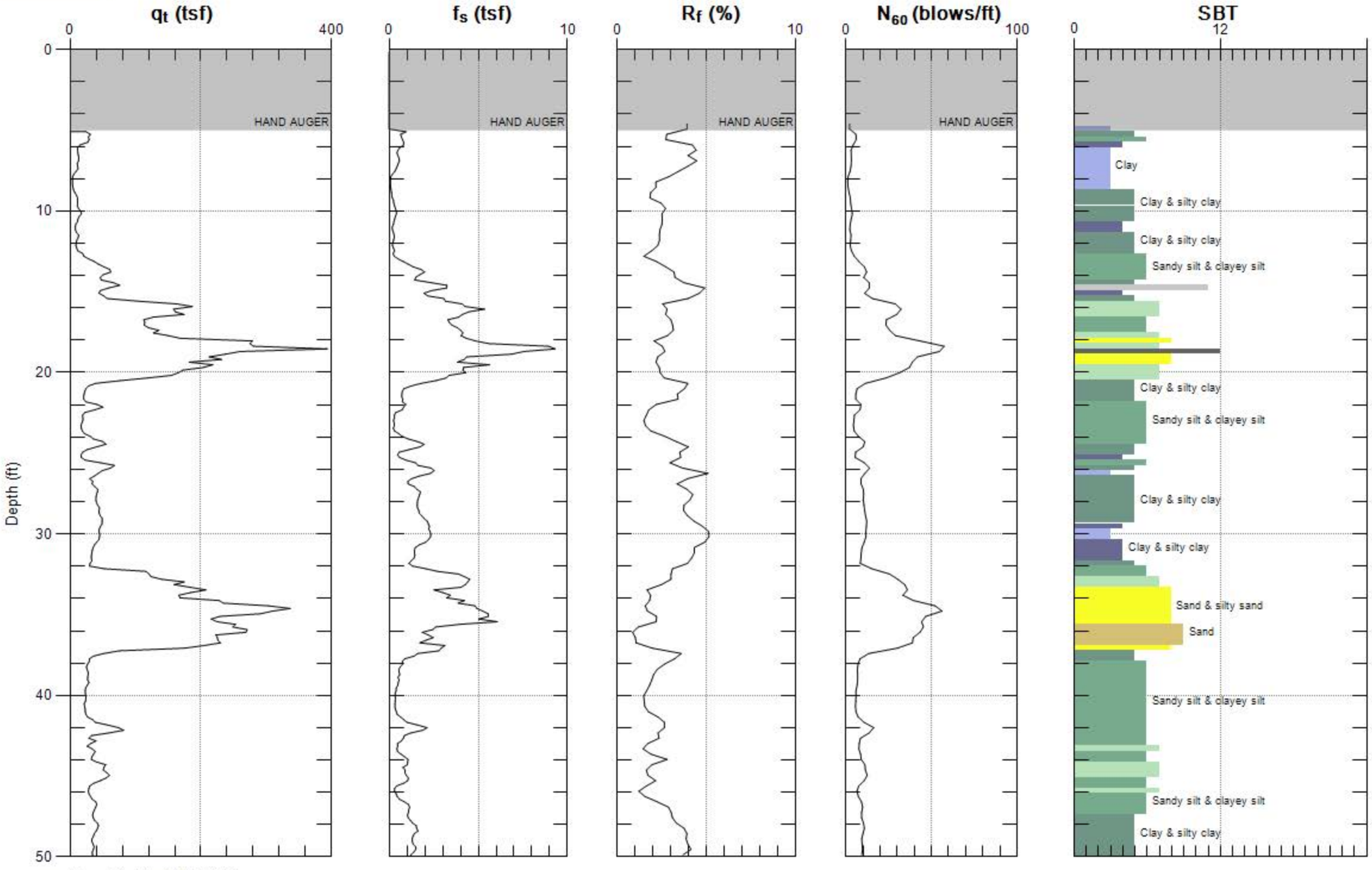
SBT: Soil Behavior Type (Robertson 1990)

GREGG

ENGEO

Site: SAN MATEO ANIMAL
Sounding: 1-CPT05

Engineer: I.MCCREERY
Date: 1/2/2015 09:26



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

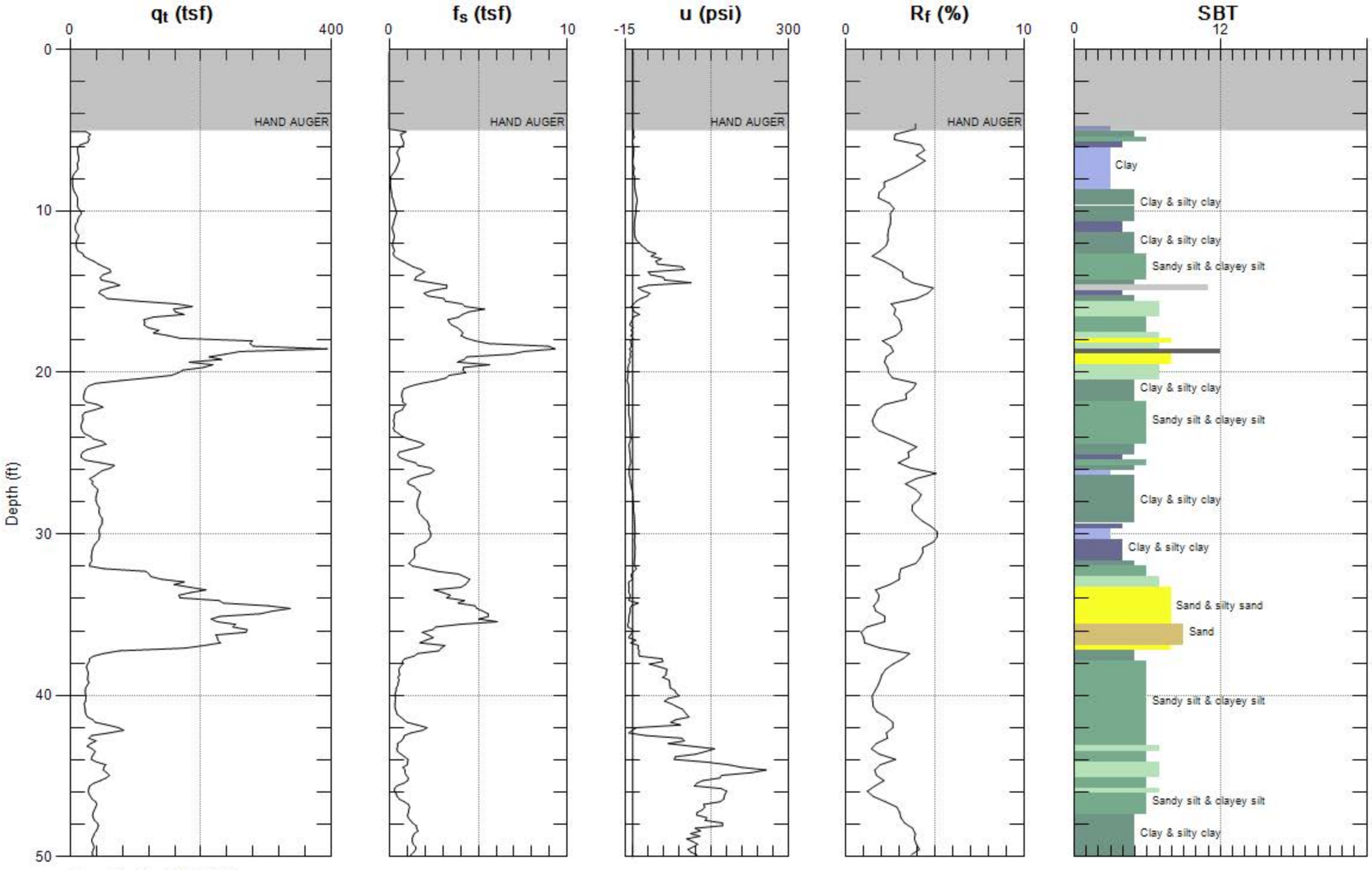
SBT: Soil Behavior Type (Robertson 1990)

GREGG

ENGEO

Site: SAN MATEO ANIMAL
Sounding: 1-CPT05

Engineer: I.MCCREERY
Date: 1/2/2015 09:26



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

APPENDIX C

Laboratory Test Data

APPENDIX C

MOISTURE-DENSITY DETERMINATION
ASTM D7263

BORING ID:	1-B1	1-B1	1-B1	1-B1	1-B2	1-B2	1-B2	1-B2
DEPTH (ft.):	14.5-15.5	29.5-30	45-46.5	50.5-51.5	11-12.5	21-21.5	24-25.5	29-29.5
%MOISTURE CONTENT:	16.4	13.6	32.3	21.3	19.9	20.8	16.7	25.0
DENSITY (lbs/ft^3):		127.3		104.5				102.2

BORING ID:	1-B2	1-B2	1-B2	1-B2				
DEPTH (ft.):	32-33.5	38.5-39.5	45-45.5	50-51.5				
%MOISTURE CONTENT:	20.2	14.1	20.0	22.1				
DENSITY (lbs/ft^3):								

Testing remarks: Bag sample 1-B1@14.5-15.5 was not suitable for density testing.

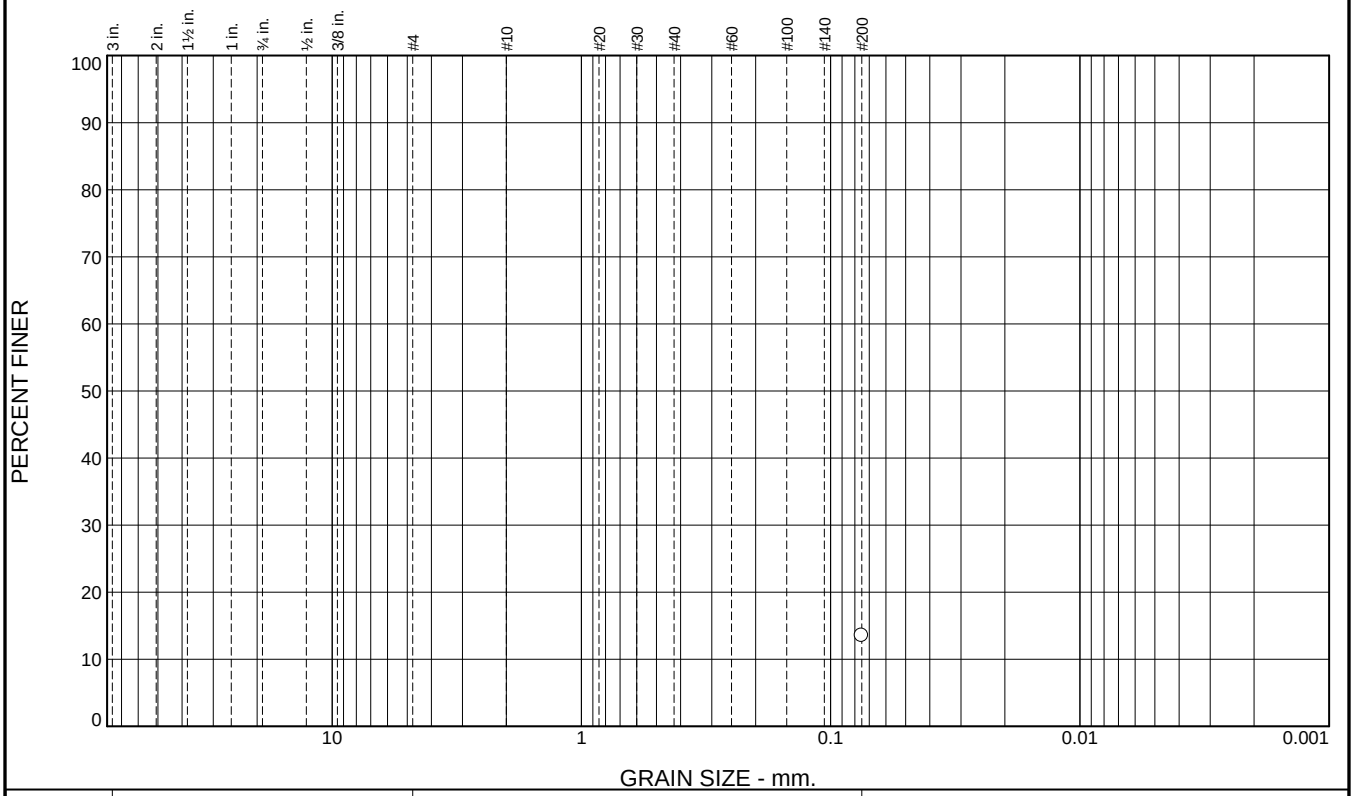
PROJECT NAME: Animal Care Center, 12 Airport Drive **DATE:** 02/10/15
PROJECT NUMBER: 11780.000.000
CLIENT: County of San Mateo
PHASE NUMBER: 001

ENGEO INCORPORATED

Tested by: G. Criste Reviewed by: D. Seibold

ENGEO Incorporated 2010 Crow Canyon Place Suite 250 San Ramon, CA 94583 Laboratory address: 3420 Fostoria Way Suite E San Ramon, CA 94583

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						13.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	13.5		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D1140

Sample Number: 1-B1 @ 30-30.5 **Depth:** 30.0-30.5 feet

Date: 02/11/15

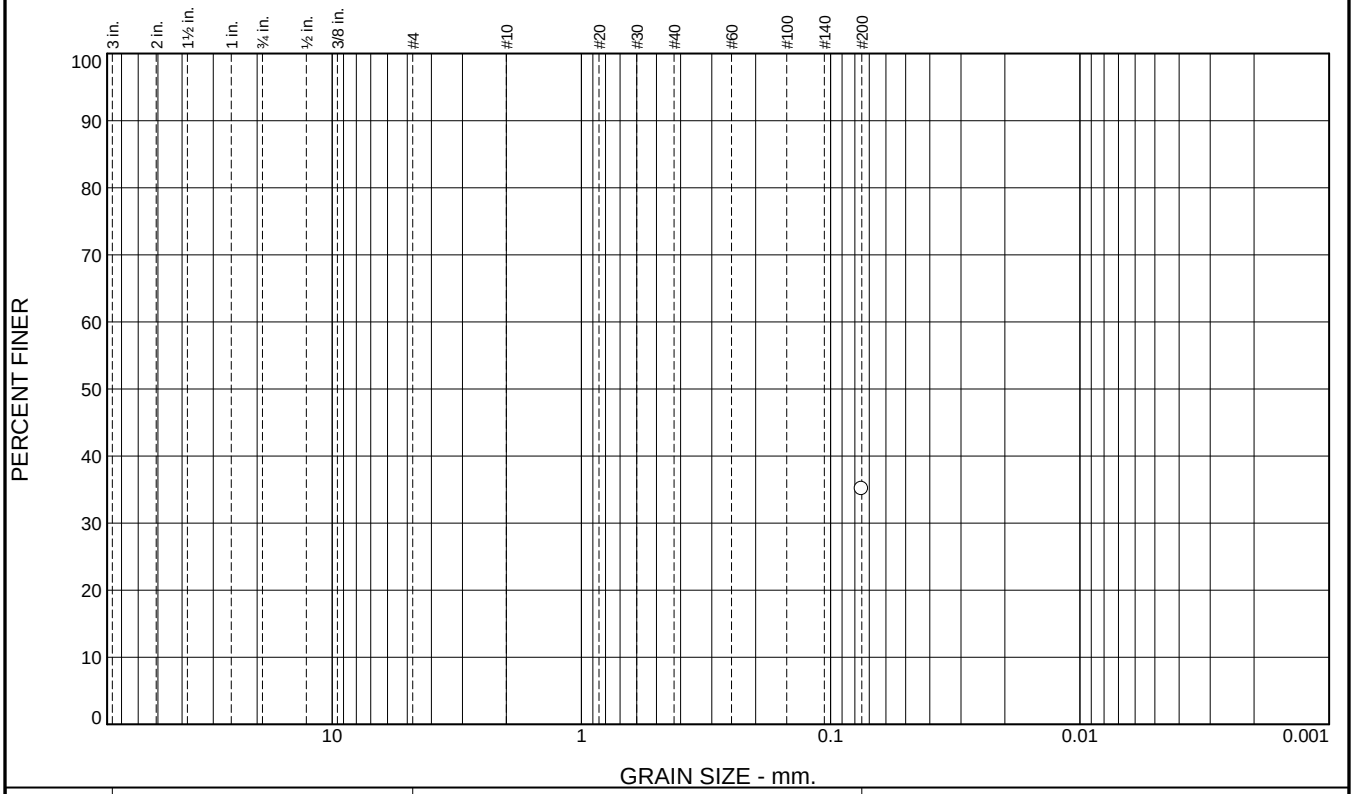
ENGEO INCORPORATED

Client: County of San Mateo
Project: Animal Care Center, 12 Airport Drive

Project No: 11780.000.000 PH001

Tested By: G. Criste

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						35.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	35.1		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL= 15 LL= 27 PI= 12

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D1140

Sample Number: 1-B2 @ 11-12.5 **Depth:** 11.0-12.5 feet

Date: 02/11/15

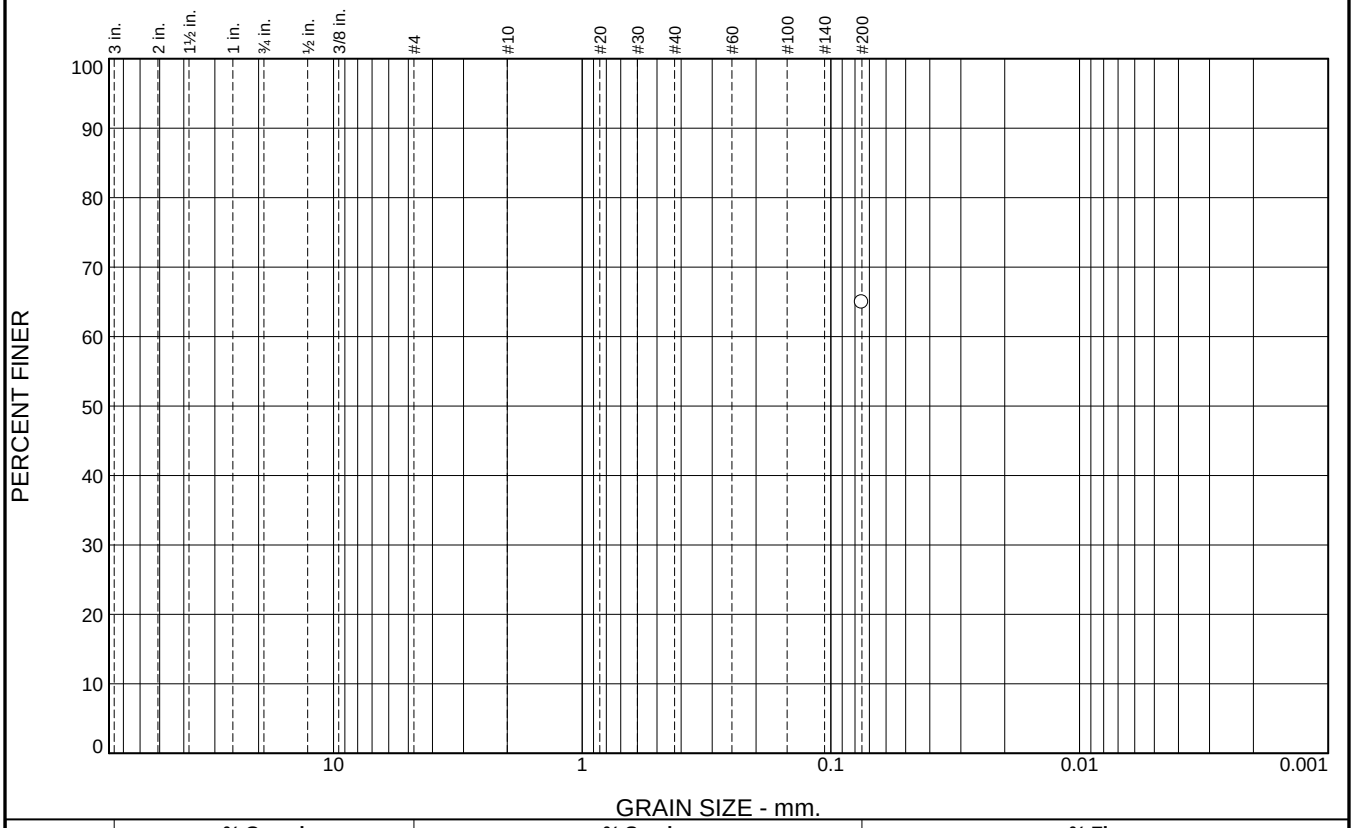
ENGEO INCORPORATED

Client: County of San Mateo
Project: Animal Care Center, 12 Airport Drive

Project No: 11780.000.000 PH001

Tested By: G. Criste

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	64.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL= 18 LL= 44 PI= 26

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D1140

Sample Number: 1-B2 @ 21-21.5 **Depth:** 21.0-21.5 feet

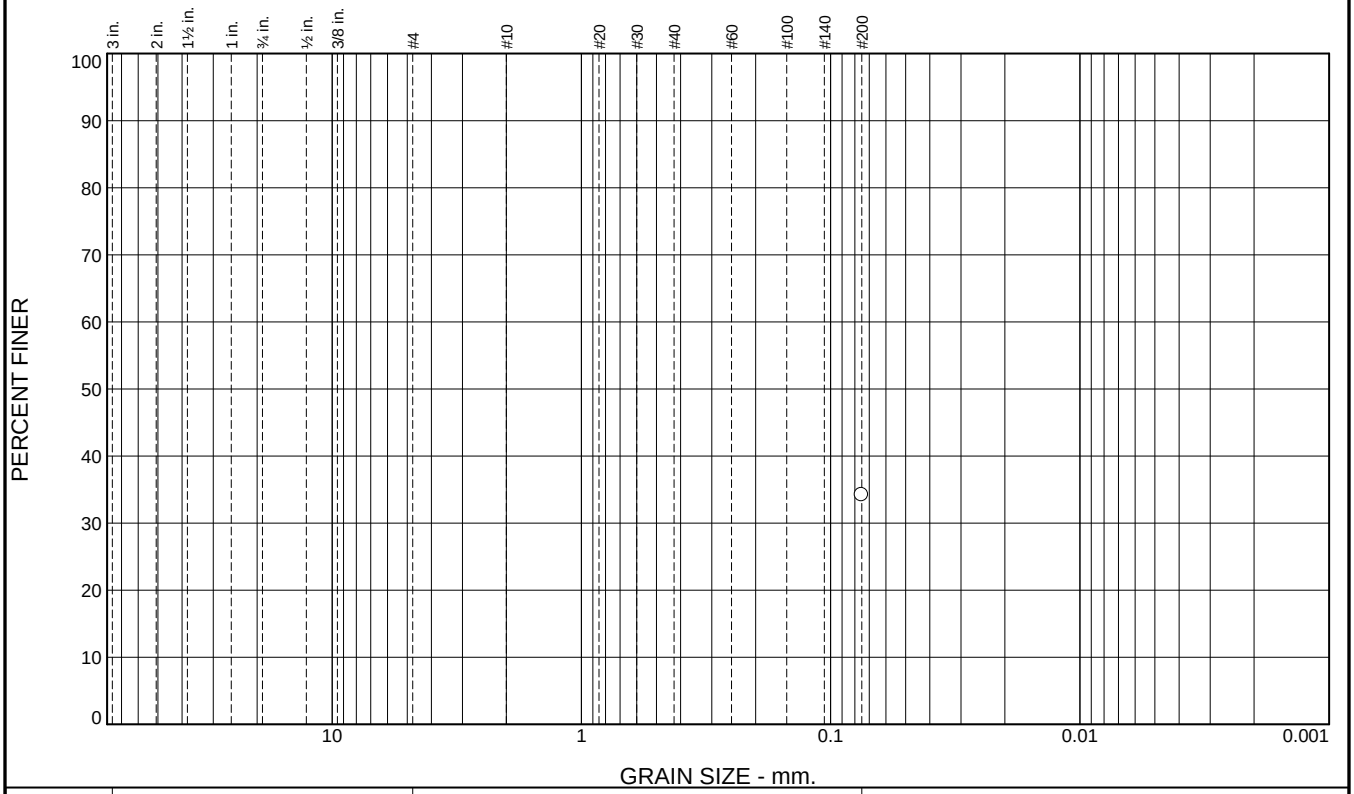
Date: 02/12/15

ENGEO INCORPORATED

Client: County of San Mateo
Project: Animal Care Center, 12 Airport Drive

Project No: 11780.000.000 PH001

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	34.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL= 16 LL= 30 PI= 14

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D1140

Sample Number: 1-B2 @ 24-25.5 **Depth:** 24.0-25.5 feet

Date: 02/11/15

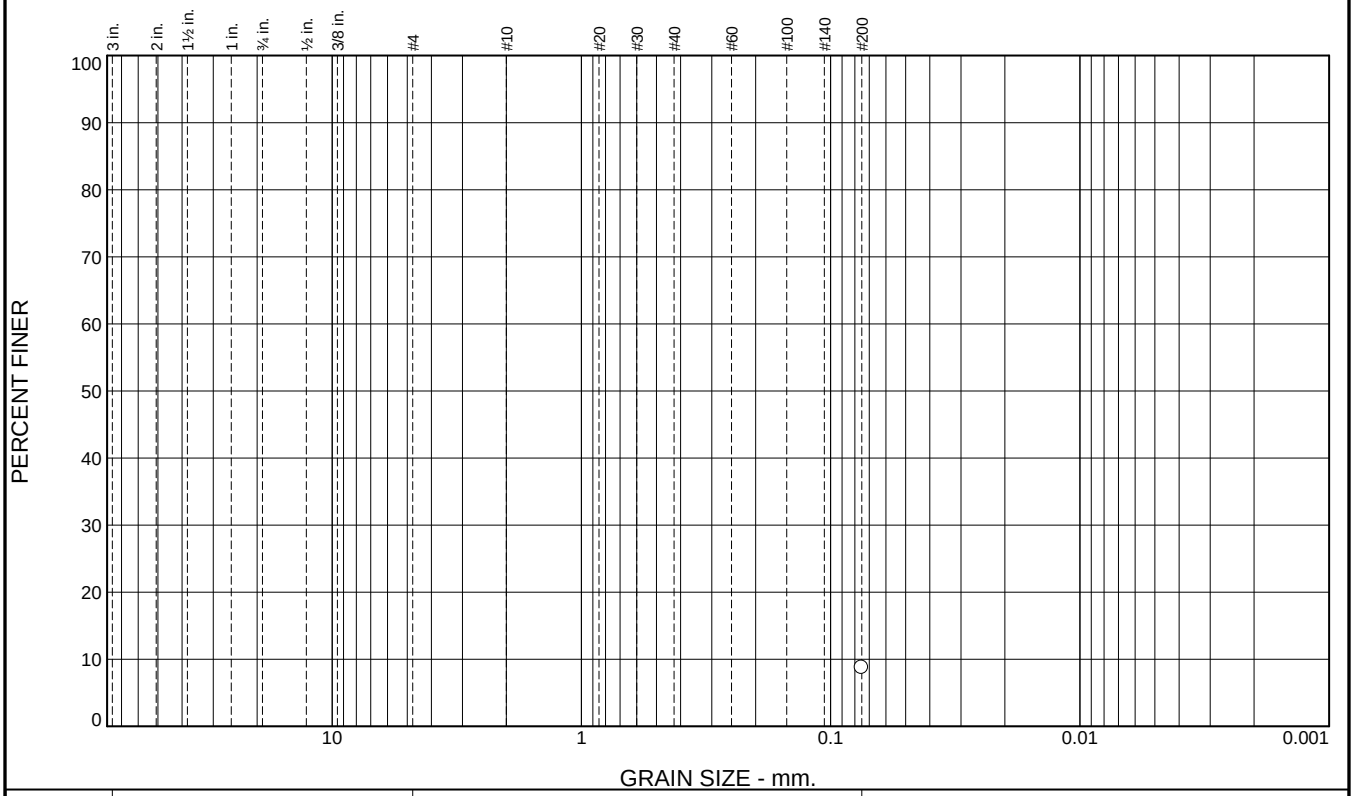
ENGEO INCORPORATED

Client: County of San Mateo
Project: Animal Care Center, 12 Airport Drive

Project No: 11780.000.000 PH001

Tested By: G. Criste

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						8.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	8.8		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D1140

Sample Number: 1-B2 @ 38.5-39.5 **Depth:** 38.5-39.5 feet

Date: 02/11/15

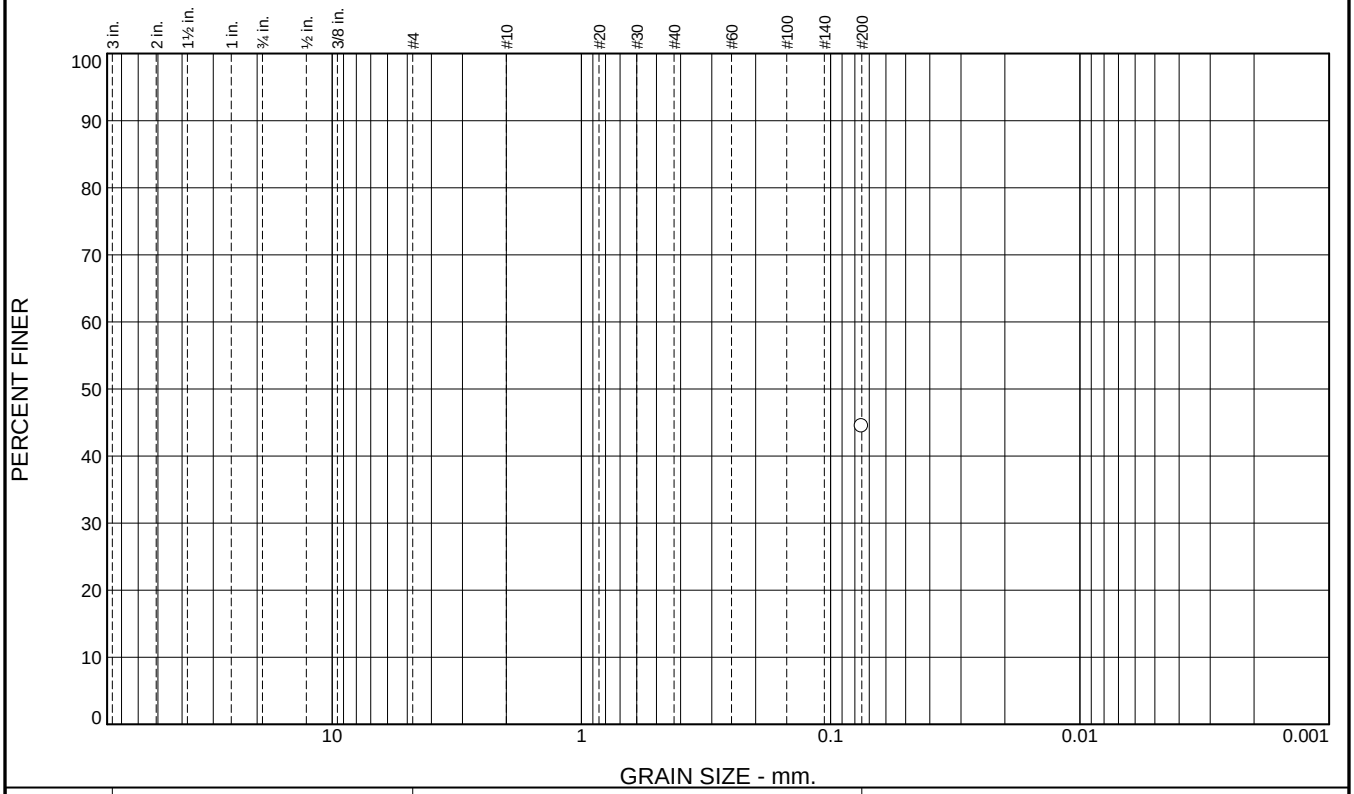
ENGEO INCORPORATED

Client: County of San Mateo
Project: Animal Care Center, 12 Airport Drive

Project No: 11780.000.000 PH001

Tested By: G. Criste

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						44.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	44.4		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL= 17 LL= 30 PI= 13

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

%200: ASTM D1140; PI: ASTM D4318

Sample Number: 1-B2 @ 50-51.5 **Depth:** 50.0-51.5 feet

Date: 02/11/15

ENGEO INCORPORATED

Client: County of San Mateo
Project: Animal Care Center, 12 Airport Drive

Project No: 11780.000.000 PH001

Tested By: G. Criste

Particle Size Distribution Report

% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.9	21.0	9.6	11.2	18.0	32.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1"	92.1		
3/4"	92.1		
1/2"	86.6		
3/8"	81.3		
#4	71.1		
#10	61.5		
#20	54.7		
#40	50.3		
#60	45.3		
#100	39.3		
#140	35.1		
#200	32.3		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL= 16 LL= 36 PI= 20

Coefficients

D_{90}= 15.3813 D_{85}= 11.6867 D_{60}= 1.6921
D_{50}= 0.4087 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-6(2)

Remarks

GS: ASTM 6913; PI: ASTM 4318; USCS: ASTM D2487

Sample Number: 1-B1 @ 1-2.5 **Depth:** 1.0-2.5 feet

Date: 02/19/15

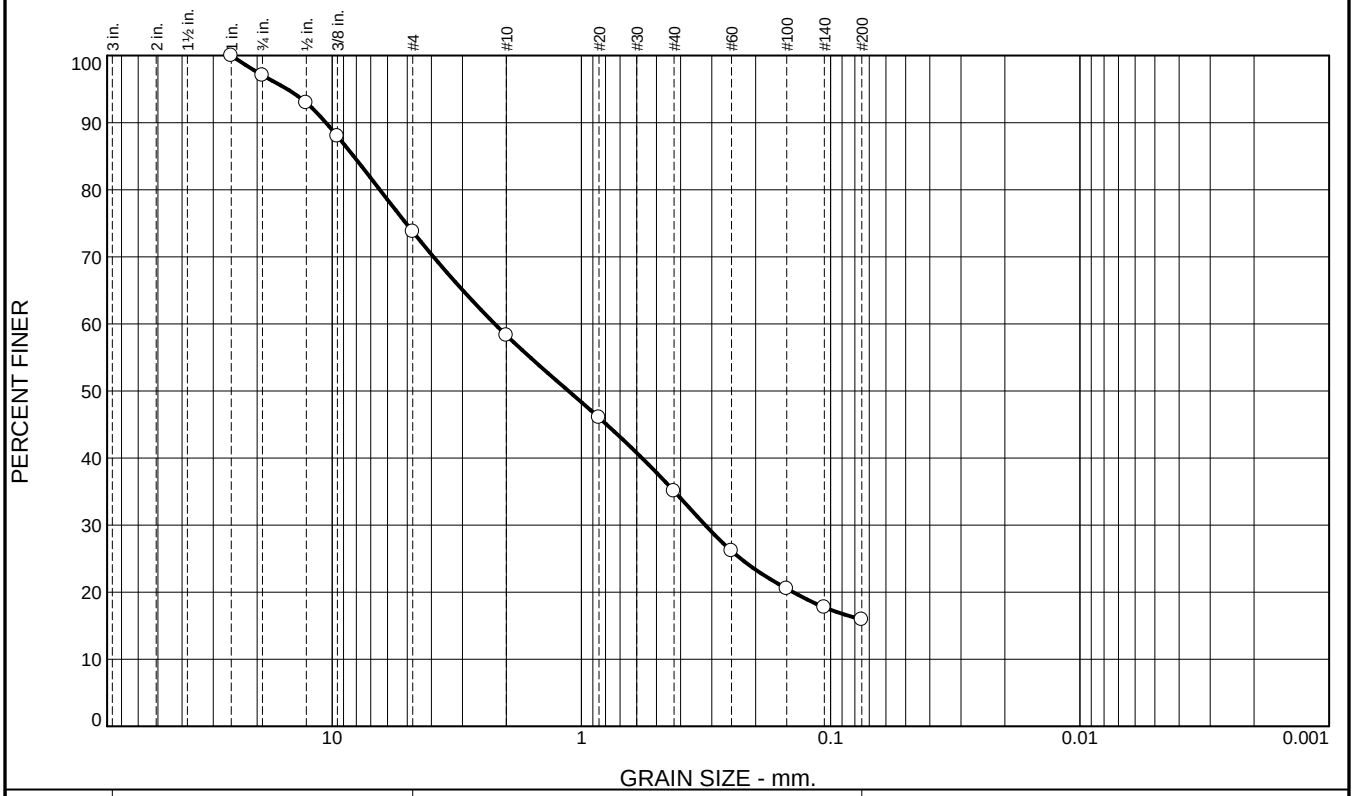
ENGEO INCORPORATED

Client: County of San Mateo
Project: Animal Care Center, 12 Airport Drive

Project No: 11780.000.000 PH001

Tested By: J Lawton **Checked By:** D Seibold

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.9	23.3	15.5	23.2	19.2	15.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
3/4	97.1		
1/2	93.0		
3/8	88.0		
#4	73.8		
#10	58.3		
#20	46.0		
#40	35.1		
#60	26.1		
#100	20.5		
#140	17.7		
#200	15.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 10.5937 D_{85}= 8.2059 D_{60}= 2.2278
D_{50}= 1.1266 D_{30}= 0.3187 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D6913

Sample Number: 1-B1 @ 14.5-15.5 **Depth:** 14.5-15.5 feet

Date: 02/11/15

ENGEO INCORPORATED

Client: County of San Mateo
Project: Animal Care Center, 12 Airport Drive

Project No: 11780.000.000 PH001

Tested By: J. Lawton **Checked By:** G. Criste

Particle Size Distribution Report

% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	25.4	23.4	30.2	10.8	10.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	95.1		
3/8	90.0		
#4	74.6		
#10	51.2		
#20	33.1		
#40	21.0		
#60	15.1		
#100	12.3		
#140	11.0		
#200	10.2		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.5292 D_{85}= 7.4420 D_{60}= 2.7798
D_{50}= 1.9015 D_{30}= 0.7221 D_{15}= 0.2473
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D6913

Sample Number: 1-B1 @ 34.5-35.5 **Depth:** 34.5-35.5 feet

Date: 02/12/15

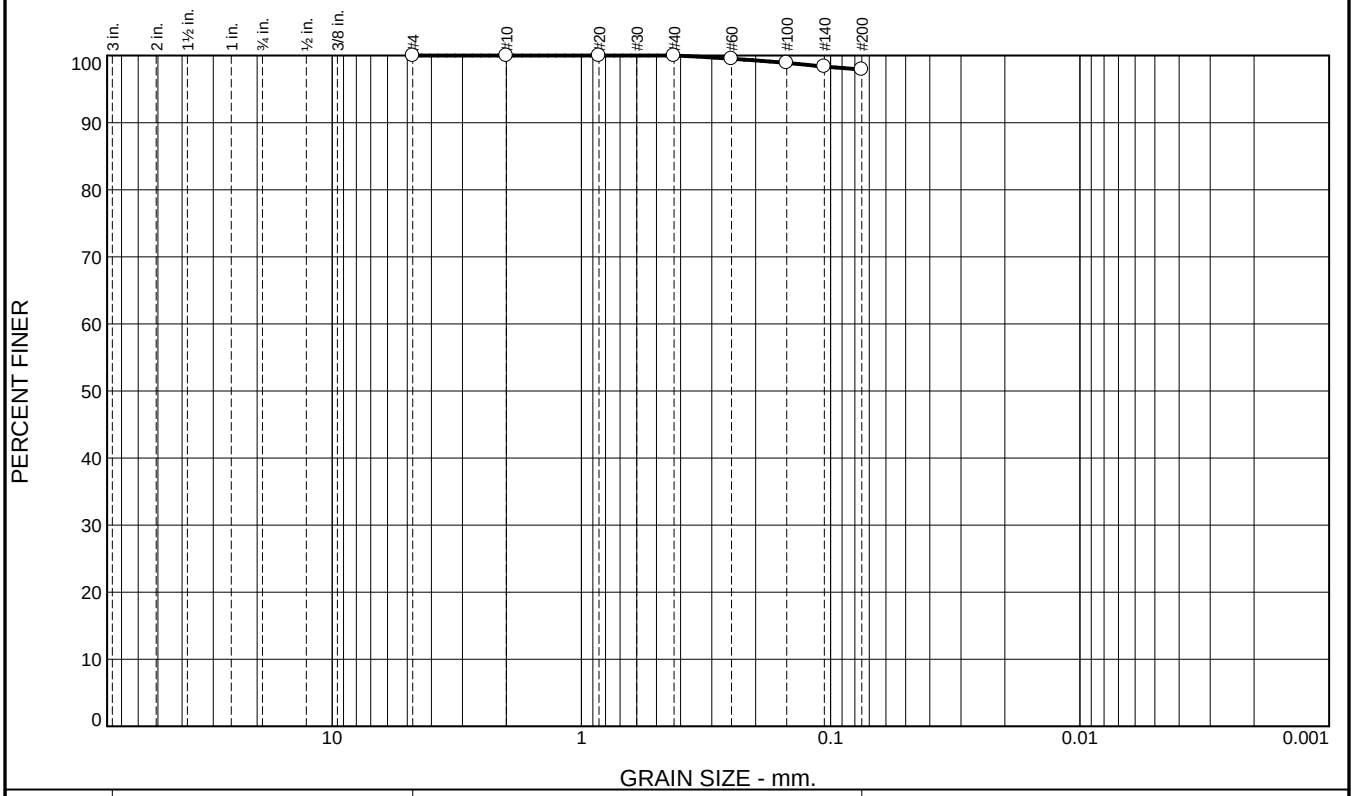
ENGEO INCORPORATED

Client: County of San Mateo
Project: Animal Care Center, 12 Airport Drive

Project No: 11780.000.000 PH001

Tested By: J Lawton **Checked By:** D Seibold

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	2.1	97.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#60	99.5		
#100	98.9		
#140	98.4		
#200	97.9		

* (no specification provided)

Soil Description

See exploration logs

Atterberg Limits

PL= 28 LL= 87 PI= 59

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(68)

Remarks

Grain-size: ASTM D6913; PI: ASTM D4318; USCS: ASTM D2487

Sample Number: 1-B2 @ 3.5-4 **Depth:** 3.5-4.0 feet

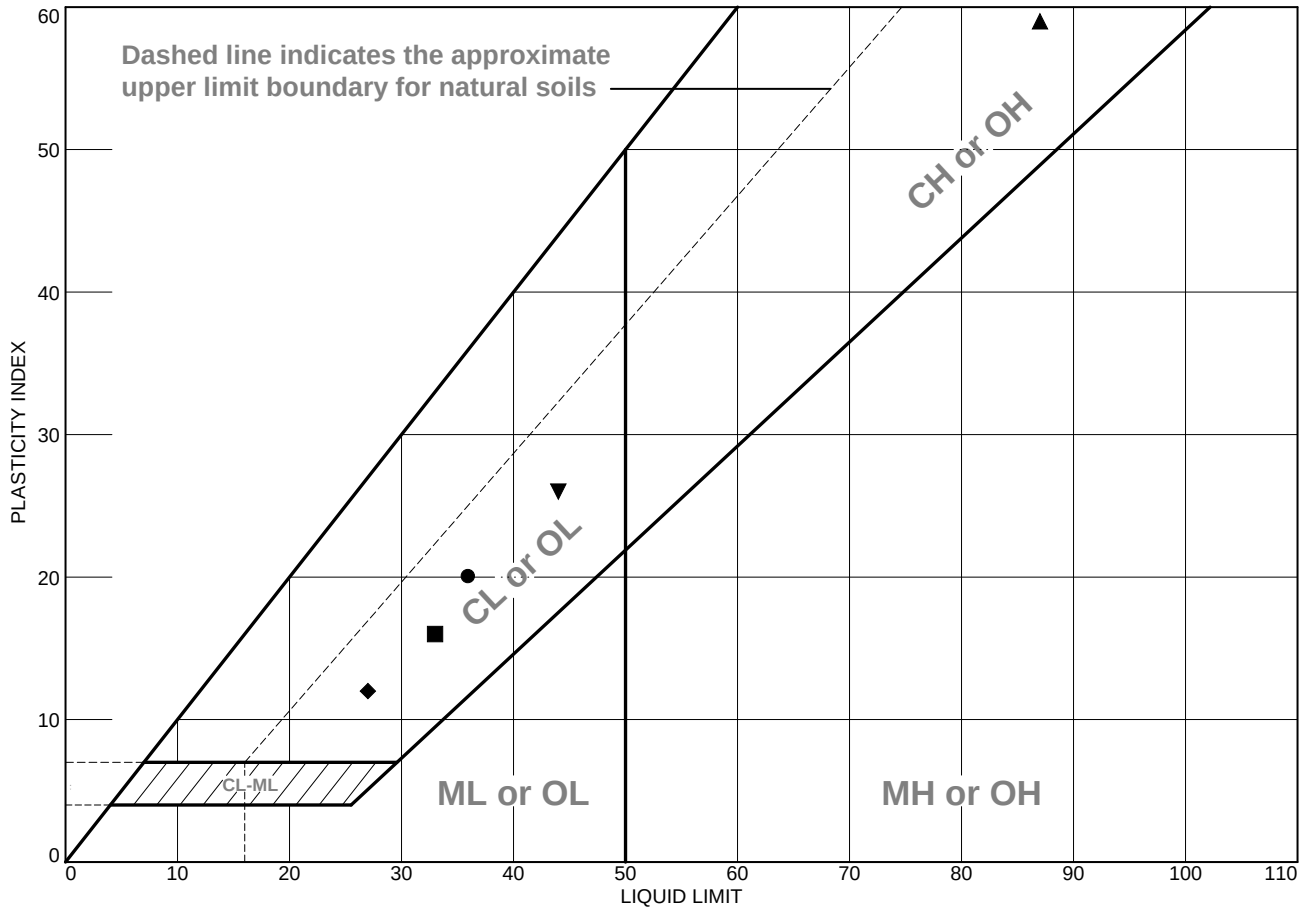
Date: 02/17/15

ENGEO INCORPORATED

Client: County of San Mateo
Project: Animal Care Center, 12 Airport Drive
Project No: 11780.000.000 PH001

Tested By: G. Criste **Checked By:** D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	See exploration logs	36	16	20			
■	See exploration logs	33	17	16			
▲	See exploration logs	87	28	59	100.0	97.9	CH
◆	See exploration logs	27	15	12		35.1	
▼	See exploration logs	44	18	26		64.9	

Project No. 11780.000.000 **Client:** County of San Mateo

Project: Animal Care Center, 12 Airport Drive

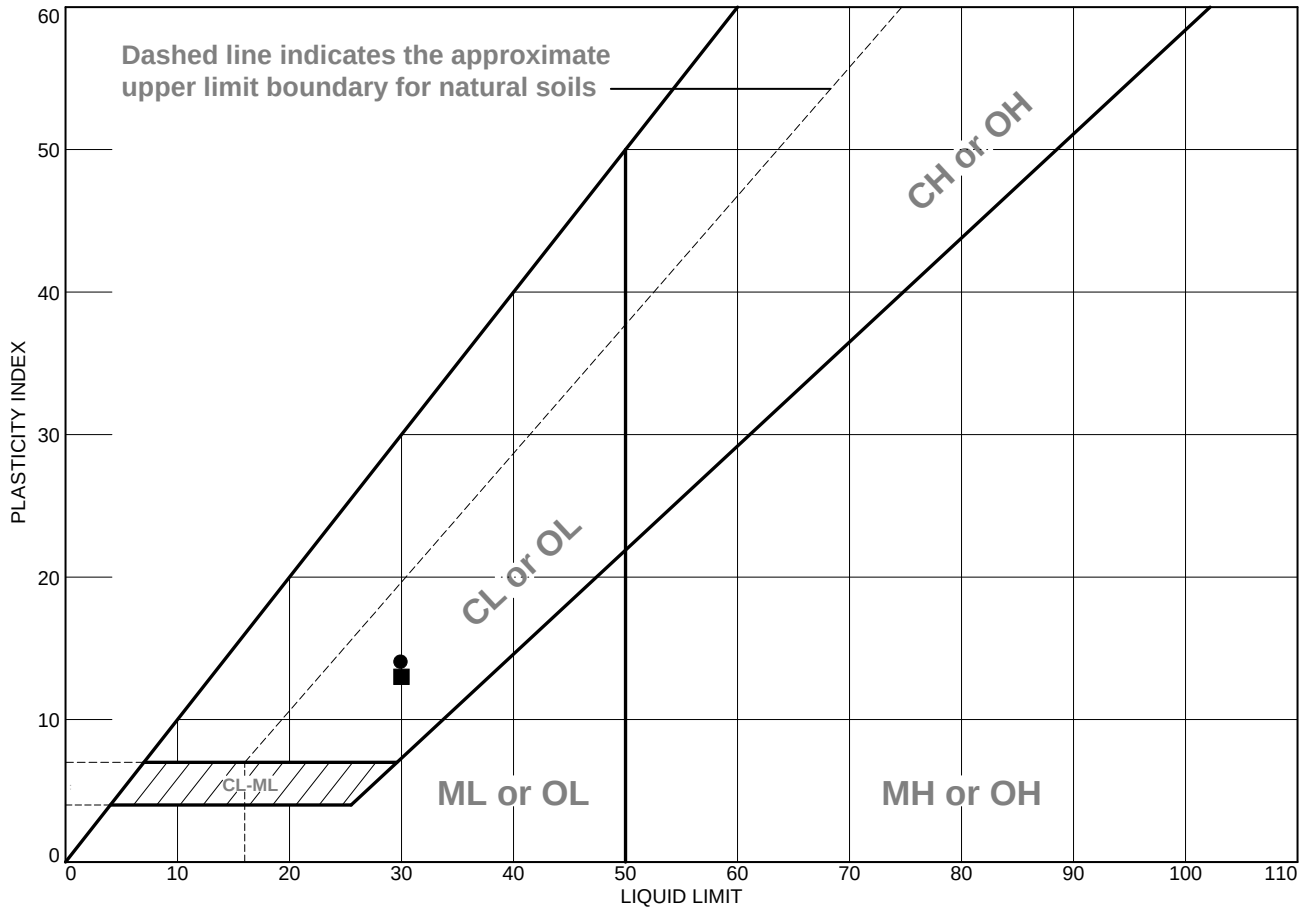
●**Depth:** 1.0-2.5 feet **Sample Number:** 1-B1 @ 1-2.5
■**Depth:** 8.0-11.0 feet **Sample Number:** 1-B1 @ 8-11
▲**Depth:** 3.5-4.0 feet **Sample Number:** 1-B2 @ 3.5-4
◆**Depth:** 11.0-12.5 feet **Sample Number:** 1-B2 @ 11-12.5
▼**Depth:** 21.0-21.5 feet **Sample Number:** 1-B2 @ 21-21.5

ENGEO INCORPORATED

Remarks:
●PI: ASTM D4318; Grain-size: ASTM D6913; USCS: ASTM D2487
■ASTM D4318
▲PI: ASTM D4318; Grain-size: ASTM D6913; USCS: ASTM D2487
◆PI: ASTM D4318; %200: ASTM D1140
▼PI: ASTM D4318; %200: ASTM

Tested By: ○ G. Criste □ J. Lawton △ G. Criste ◇ J. Lawton ▽ J. Lawton **Checked By:** D. Seibold

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	See exploration logs	30	16	14		34.2	
■	See exploration logs	30	17	13		44.4	

Project No. 11780.000.000 **Client:** County of San Mateo

Project: Animal Care Center, 12 Airport Drive

●**Depth:** 24.0-25.5 feet **Sample Number:** 1-B2 @ 24-25.5

■**Depth:** 50.0-51.5 feet **Sample Number:** 1-B2 @ 50-51.5

Remarks:

●PI: ASTM D4318; %200: ASTM D1140

■PI: ASTM D4318; %200: ASTM D1140

ENGEO INCORPORATED

Tested By: ○ J. Lawton ☐ J Lawton **Checked By:** G. Criste

ENGEO

Unconsolidated Undrained Triaxial Test (ASTM D2850)

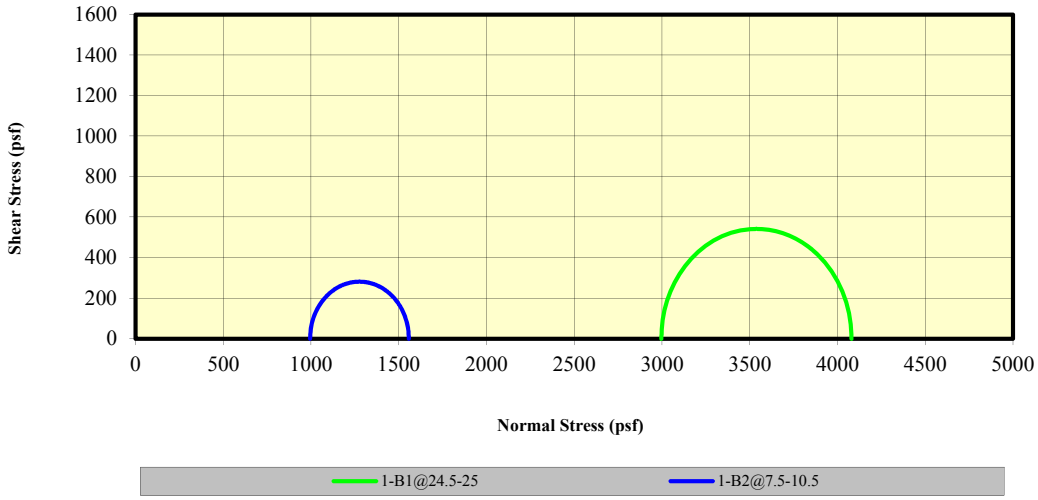
Date: 02/13/15

Checked by: D. Seibold

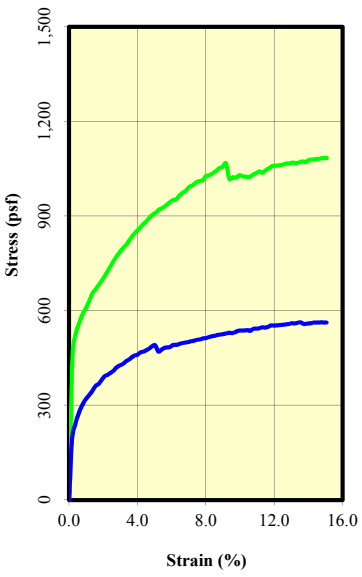
Date: 02/13/15

Tested by: G. Criste

Mohr Circles



Stress-Strain Curve



Before Test	Specimen 1-B1@24.5-25	1-B2@7.5-10.5		
Water Content (%)	17.42	21.99		
Dry Density (pcf)	114.14	107.24		
Saturation (%)	98.66	99.45		
Void Ratio	0.48	0.61		
Diameter (in)	2.414	2.857		
Height (in)	5.345	6.007		
Liquid Limit	-	-		
Plastic Limit	-	-		
Specific Gravity	2.700	2.770		
Height-to-Diam. Ratio	2.214	2.103		
After Test	**1-B1@24.5-25**	**1-B2@7.5-10.5**		
Water Content (%)	17.42	21.99		
Saturation (%)	98.66	99.45		
Strain Rate (in/min)	0.05	0.05		
Peak Deviator Stress (psf)	1084.3	563.2		
Axial Strain @ Failure (%)	15.034	14.767		
	Cell Pressure			
Cell (psf)	2995.2	993.6		
Back (psf)	n/a	n/a		
	Principle Stresses at Failure			
σ1 (psf)	4079.5	1556.8		
σ3 (psf)	2995.2	993.6		

Mohr-Coulomb Parameters with a Non-zero Friction Angle (Ø≠0)			Cohesion at Failure with a Zero Friction Angle (Ø=0)			
Cohesion, c (psf)	0.0		542.2	281.6		
Friction Angle Ø	0.00		n/a	n/a		

Project Information			
Project Name:	Animal Care Center, 12 Airport Drive		
Project Number:	11780.000.000 PH001	Job Number:	11780.000.000
Location:	San Mateo, California	Boring Number:	Multiple
Client:	County of San Mateo	Sample Number:	Multiple
Description:	See exploration logs		

LABORATORY MINIATURE VANE SHEAR

ASTM D4648

APPARATUS USED: Wykeham Farrance, Model 27-WF1730/4

Sample #	Sample ID	Remold? (Y/N)	Test depth (ft)	Spring number	Shear strength (psf)
1	1-B1@8-11	N	10.25-10.5	3	2780
2	1-B2@7.5-10.5	N	10.0-10.25	3	531

Testing remarks:

PROJECT NAME: **Animal Care Center, 12 Airport Drive** **DATE:** **02/10/15**

PROJECT NUMBER: **11780.000.000**

CLIENT: **County of San Mateo**

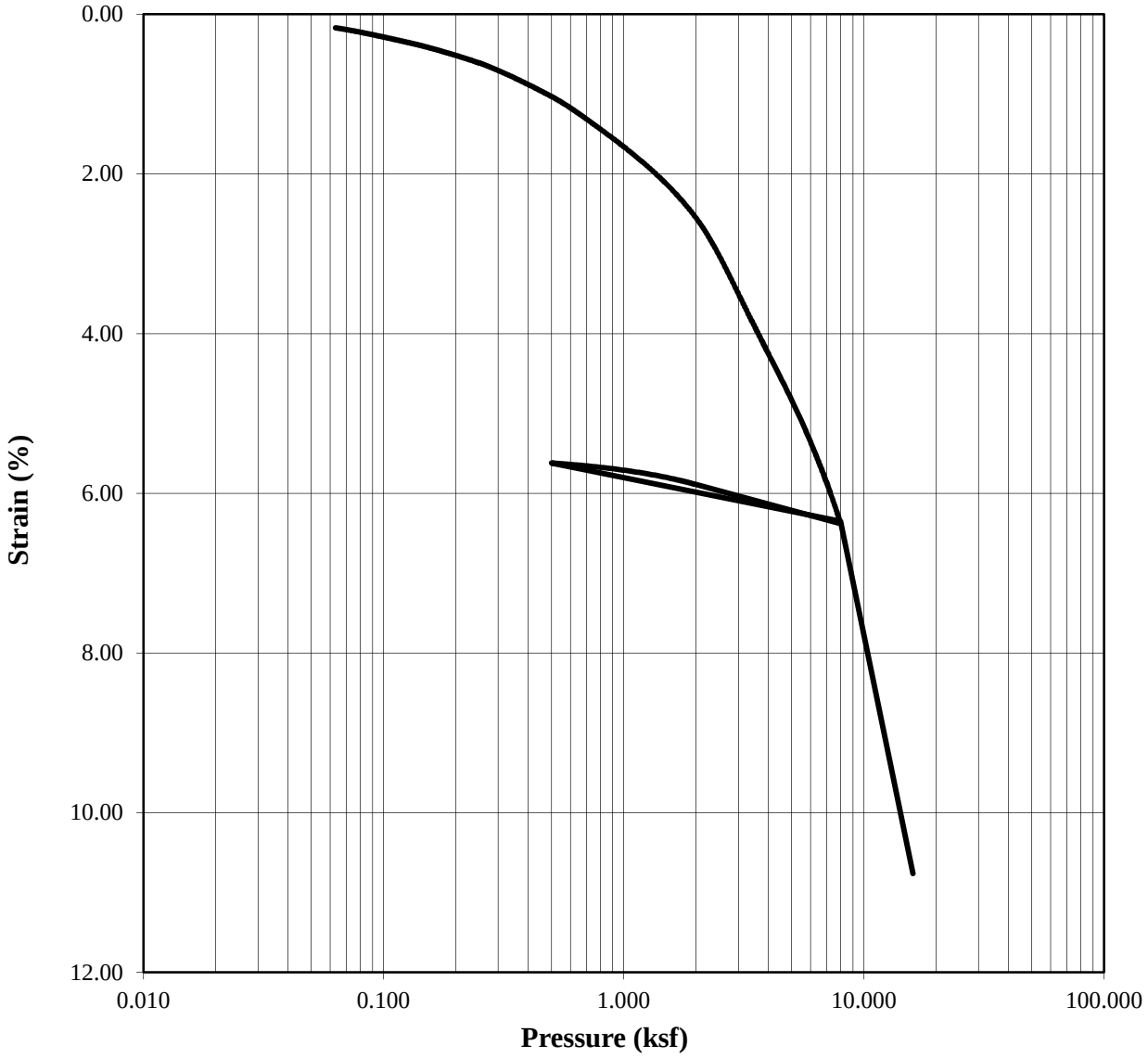
PHASE NUMBER: **001**

Tested by: J Lawton Reviewed by: G Criste

ENGEO Incorporated 2010 Crow Canyon Place Suite 250 San Ramon, CA 94583
Laboratory address: 3420-E Fostoria Way, San Ramon, CA 94583

EN GEO Incorporated

Incremental Consolidation
ASTM D2435



	Before	After			
Moisture (%):	21.48	17.81	**Liquid Limits:**	**Test Date:**	02/10/15
Dry Density (pcf):	105.91	115.79	**Plastic Limits:**		
Saturation (%):	94.68	100.88	**Plasticity Index (%):**		
Void Ratio:	0.6251	0.4502	**Specific Gravity:**	2.758	Measured (ASTM D854)

Sample Description: See exploration logs

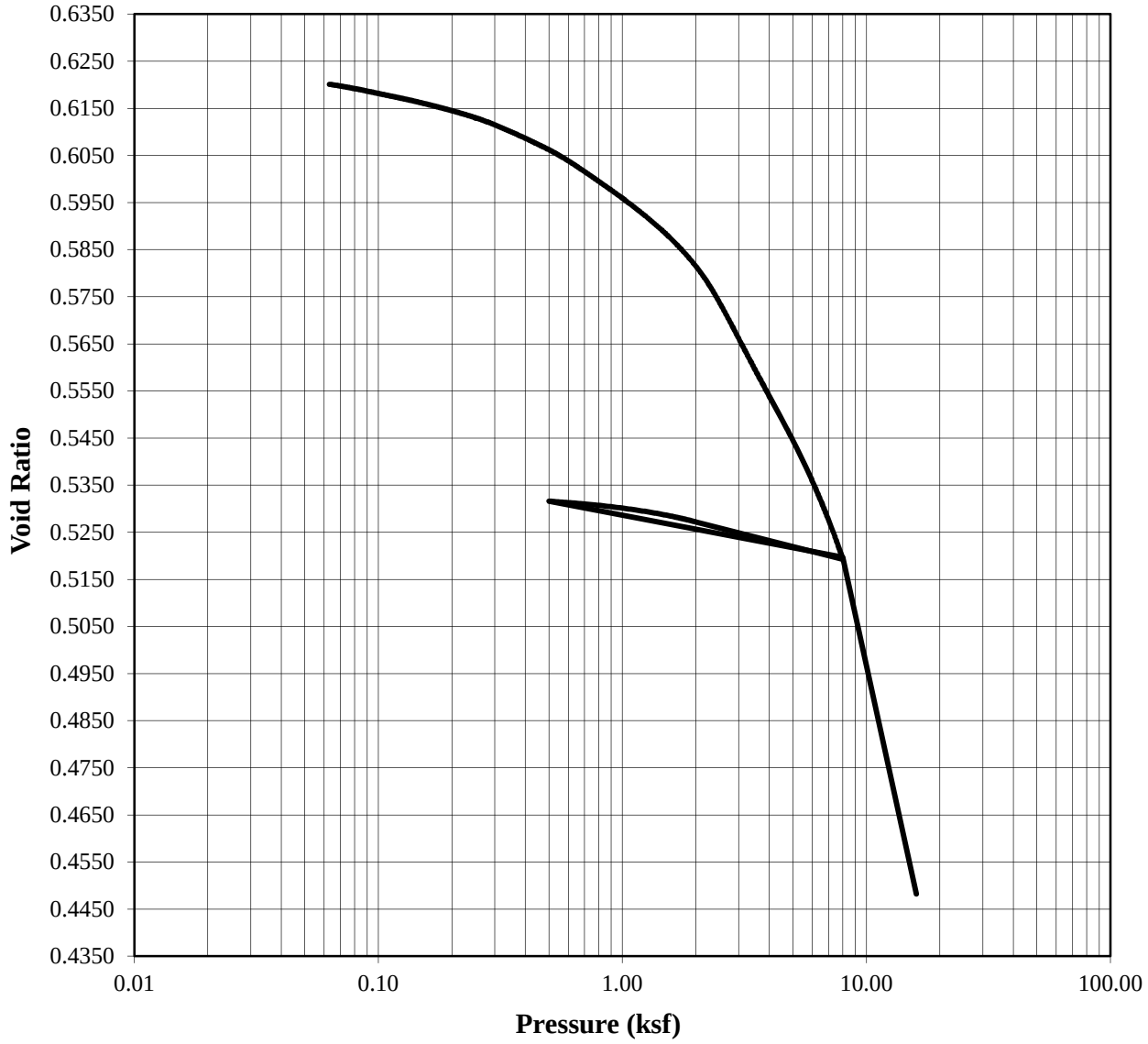
Project Number: 11780.000.000 PH001 **Depth:** 8.0-11.0 ft.
Sample Number: 1-B1@8-11 **Boring Number:** 1-B1

Project: Animal Care Center, 12 Airport Drive
Client: County of San Mateo
Location: San Mateo, California

Remarks:

EN GEO Incorporated

Incremental Consolidation
ASTM D2435

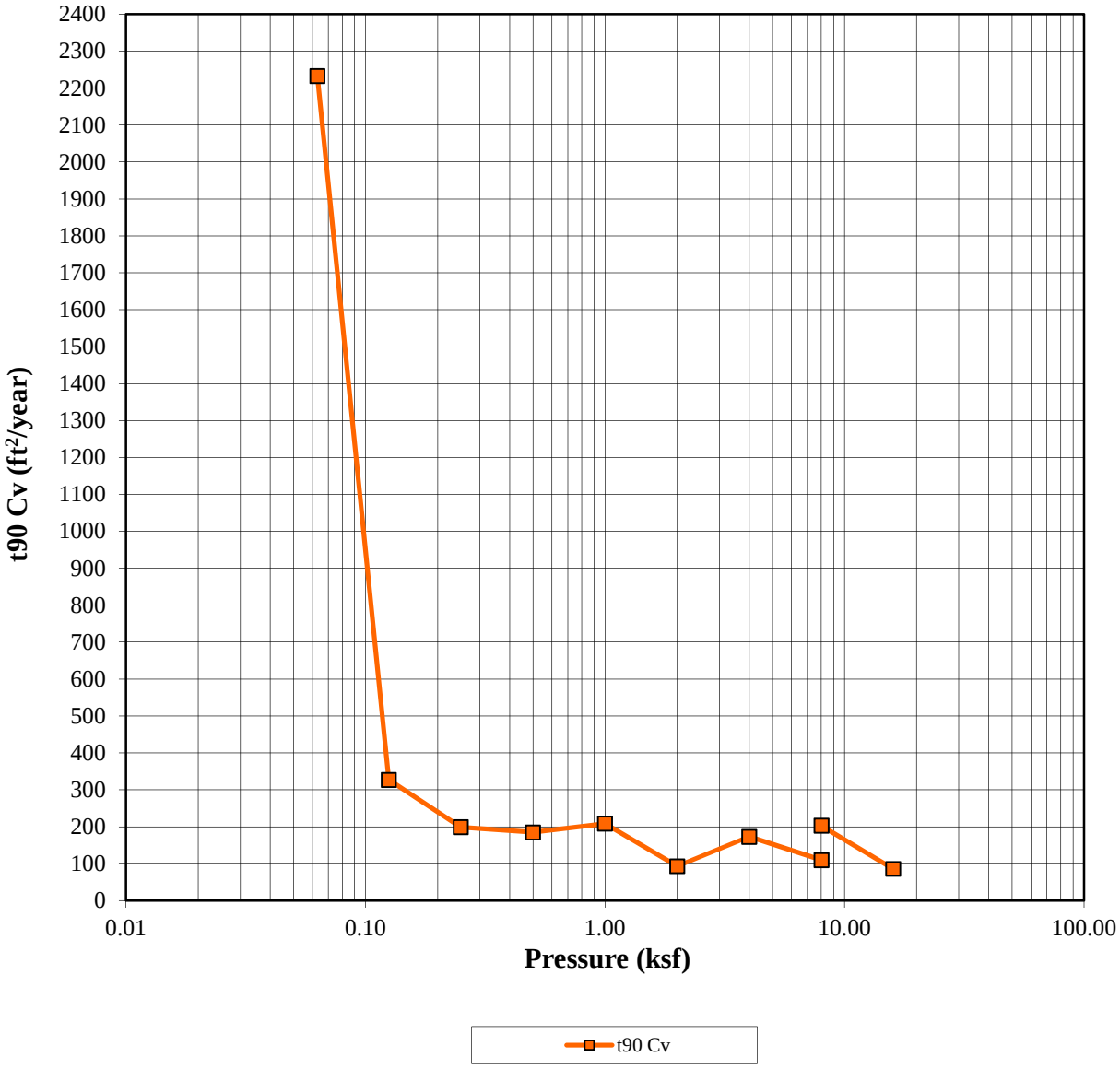


	Before	After			
Moisture (%):	21.48	17.81	**Liquid Limits:**		**Test Date:** 02/10/15
Dry Density (pcf):	105.91	115.79	**Plastic Limits:**		
Saturation (%):	94.68	100.88	**Plasticity Index (%):**		
Void Ratio:	0.6251	0.4502	**Specific Gravity:**	2.758	Measured (ASTM D854)

Soil Description:	See exploration logs		
Project Number:	11780.000.000 PH001	**Depth:** 8.0-11.0 ft.	**Remarks:**
Sample Number:	1-B1@8-11	**Boring Number:** 1-B1	
Project:	Animal Care Center, 12 Airport Drive		
Client:	County of San Mateo		
Location:	San Mateo, California		

EN GEO Incorporated

Incremental Consolidation
ASTM D2435

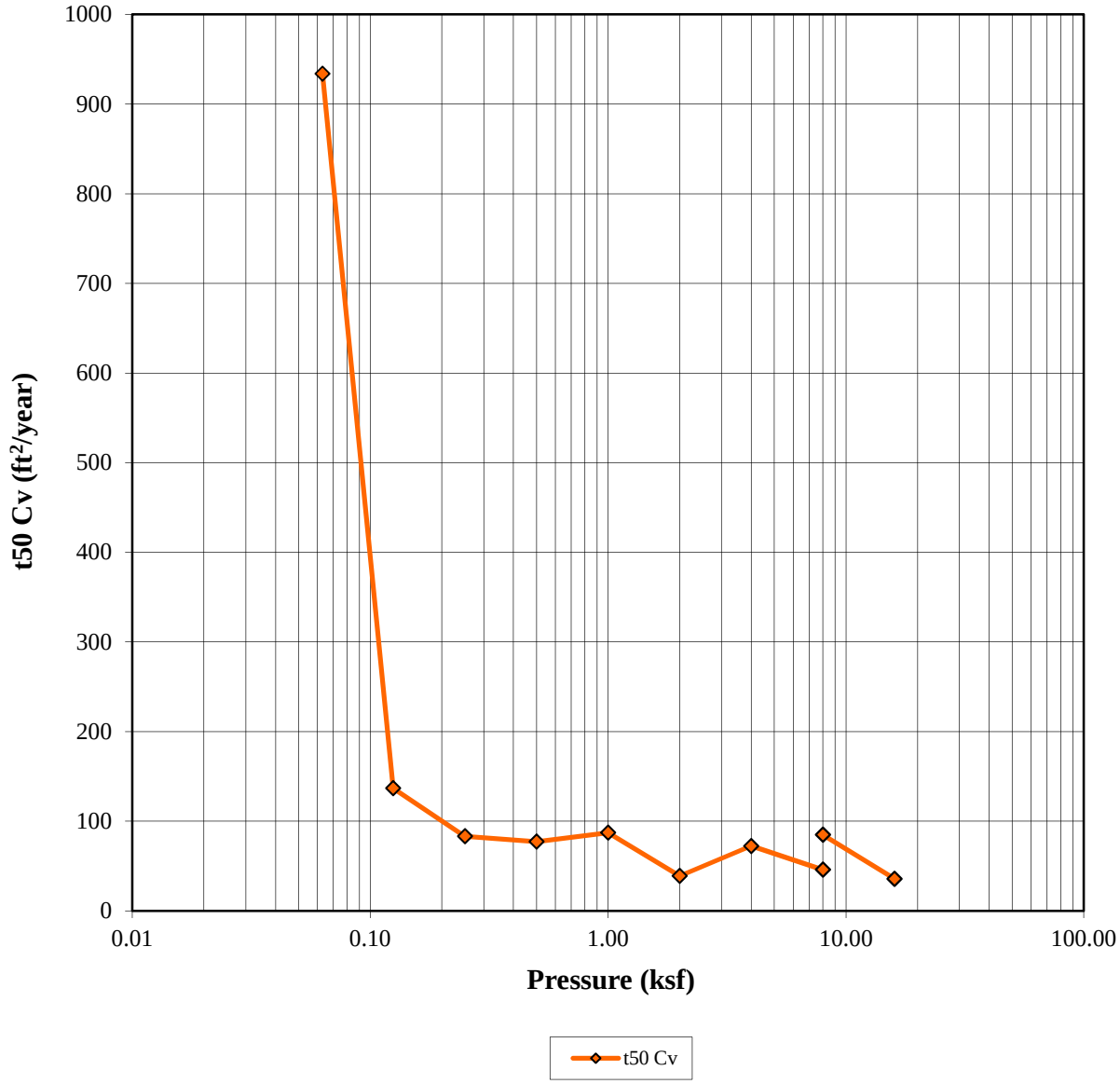


	Before	After			
Moisture (%):	21.48	17.81	**Liquid Limits:**	**Test Date:**	02/10/15
Dry Density (pcf):	105.91	115.79	**Plastic Limits:**		
Saturation (%):	94.68	100.88	**Plasticity Index (%):**		
Void Ratio:	0.6251	0.4502	**Specific Gravity:**	2.758	Measured (ASTM D854)

Soil Description:	See exploration logs		
Project Number:	11780.000.000 PH001	**Depth:** 8.0-11.0 ft.	**Remarks:**
Sample Number:	1-B1@8-11	**Boring Number:** 1-B1	
Project:	Animal Care Center, 12 Airport Drive		
Client:	County of San Mateo		
Location:	San Mateo, California		

EN GEO Incorporated

Incremental Consolidation
ASTM D2435

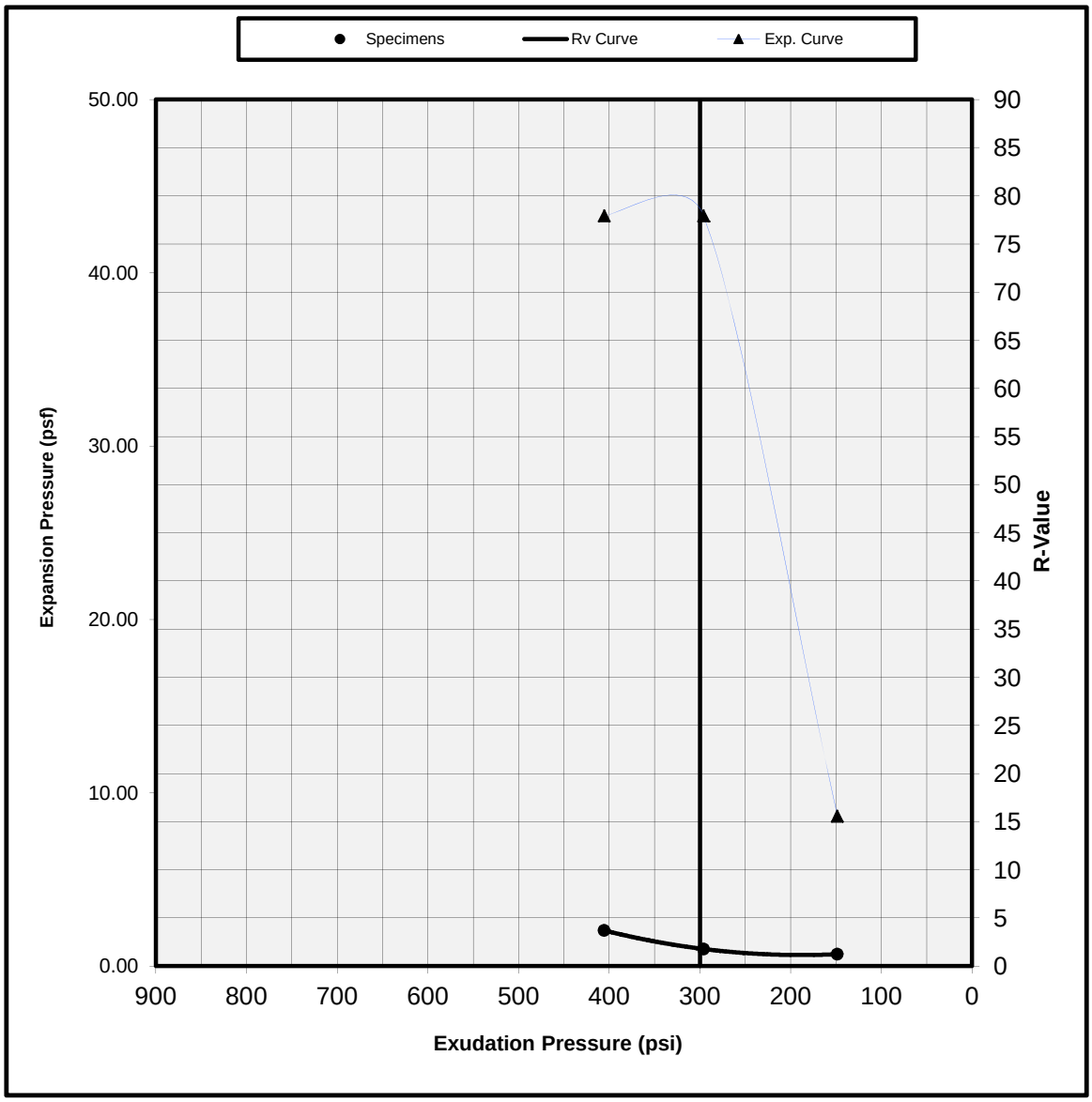


	Before	After			
Moisture (%):	21.48	17.81	**Liquid Limits:**	**Test Date:**	02/10/15
Dry Density (pcf):	105.91	115.79	**Plastic Limits:**		
Saturation (%):	94.68	100.88	**Plasticity Index (%):**		
Void Ratio:	0.6251	0.4502	**Specific Gravity:**	2.758	Measured (ASTM D854)

Soil Description:	See exploration logs		
Project Number:	11780.000.000 PH001	**Depth:** 8.0-11.0 ft.	**Remarks:**
Sample Number:	1-B1@8-11	**Boring Number:** 1-B1	
Project:	Animal Care Center, 12 Airport Drive		
Client:	County of San Mateo		
Location:	San Mateo, California		

ENGEO INCORPORATED

R VALUE TEST REPORT
CTM-301



Date: 02/24/15
Project Name: Animal Care Shelter 12 Airport Dr
Project Number: 11780.000.000
Sample Location: 1-HA1
Description: Dark yellowish brown clayey SAND
Test Performed By: J Lawton
Reviewed By: G Criste

Specimen	Specimen 1	Specimen 2	Specimen 3
Exudation Pressure (p.s.i.)	406	296	148
Expansion dial (0.0001")	10	10	2
Expansion Pressure (p.s.f.)	43	43	9
Resistance Value, "R"	4	2	1
% Moisture at Test	20.6	24.0	26.3
Dry Density at Test, p.c.f.	103.6	99.3	96.6
"R" Value at Exudation Pressure of 300 psi.	2		
Expansion Pressure (psf) at Exudation Pressure of 300 psi.	44		

Lab Address : 3420 Fostoria Way Suite E, San Ramon, CA 94583

APPENDIX D

Pore Pressure Dissipation Test Report

APPENDIX D

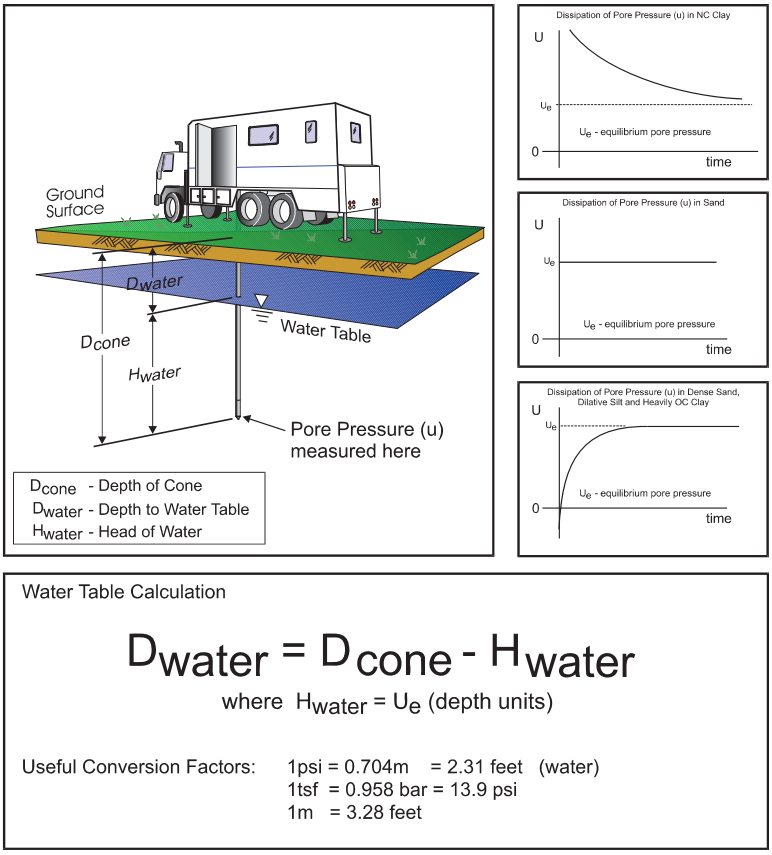
Pore Pressure Dissipation Tests (PPDT)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals measured hydrostatic water pressures and determined the approximate depth of the ground water table. A PPDT is conducted when the cone is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (*u)* with time is measured behind the tip of the cone and recorded by a computer system.
Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (c_h)
- In situ horizontal coefficient of permability (k_h)

In order to correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until such time as there is no variation in pore pressure with time, *Figure PPDT*. This time is commonly referred to as t_{100}, the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1991.



Water Table Calculation

$$D_{water} = D_{cone} - H_{water}$$

where $H_{water} = U_e$ (depth units)

Useful Conversion Factors: 1psi = 0.704m = 2.31 feet (water)
1tsf = 0.958 bar = 13.9 psi
1m = 3.28 feet

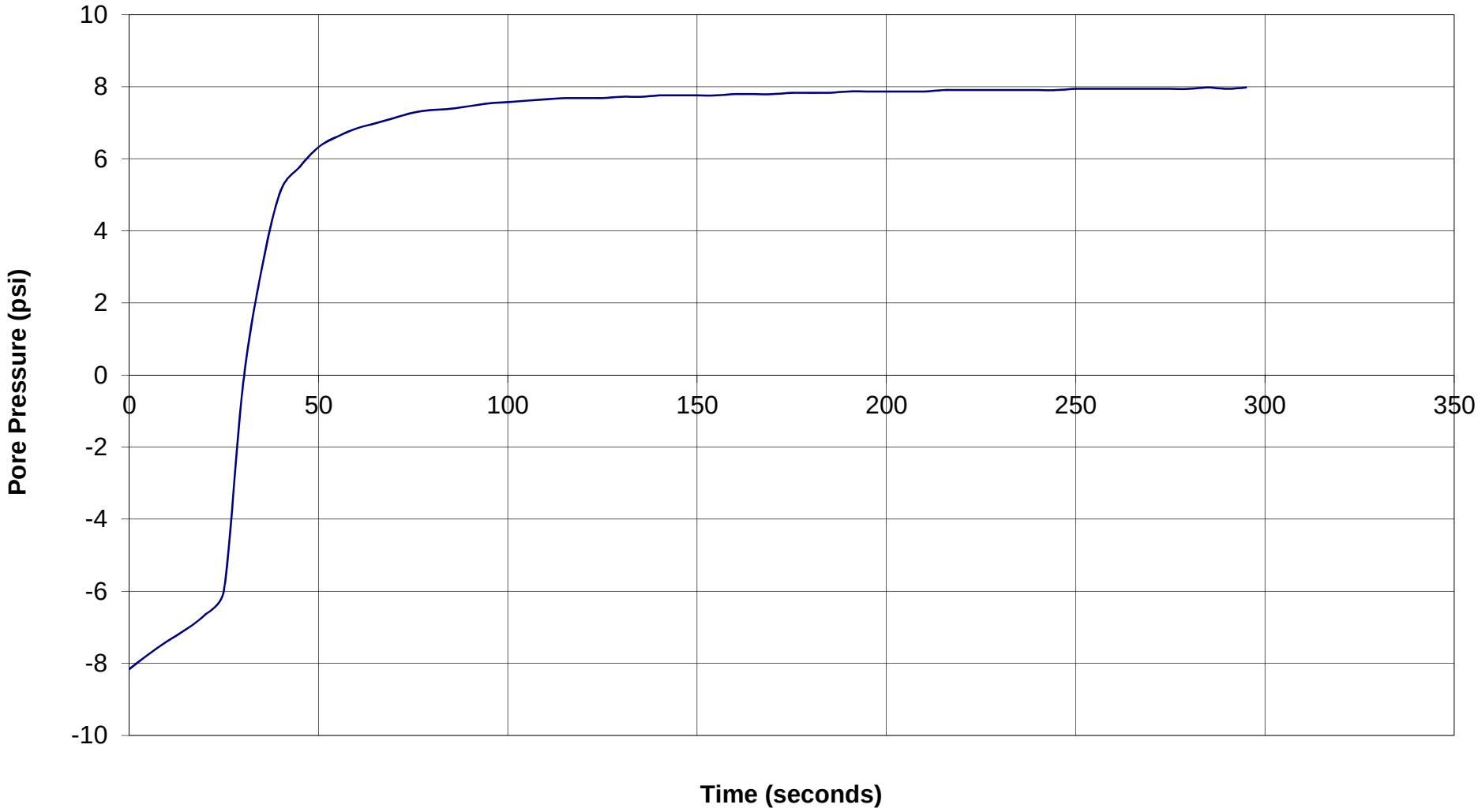
Figure PPDT

2726 Walnut Avenue · Signal Hill · California · 90755 · Phone: (562) 427-6899 · Fax: (562) 427-3314
Web Site: www.greggdrilling.com Email: info@greggdrilling.com
Additional locations in: Houston · Palo Alto · San Francisco

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

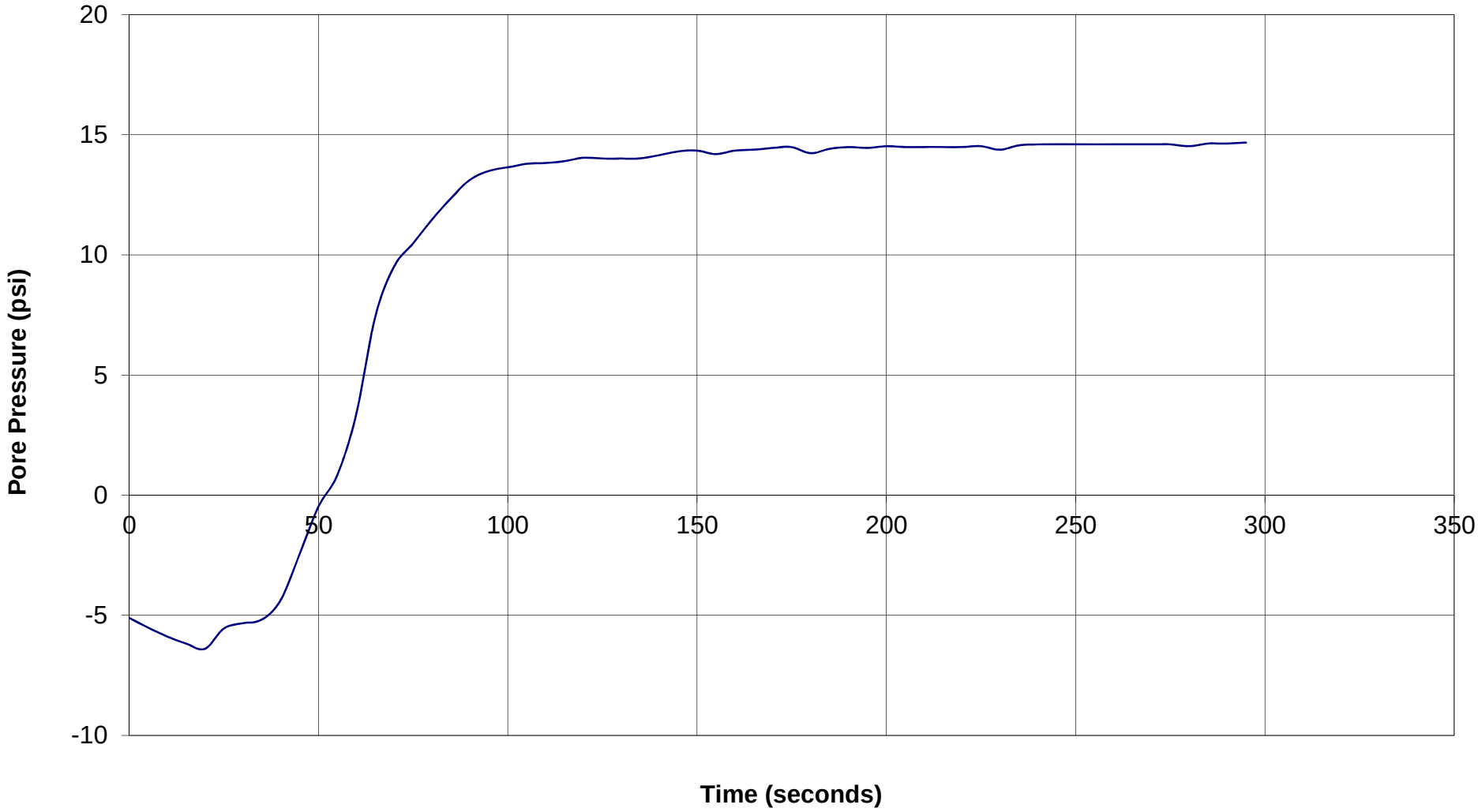
Sounding: 1-CPT01
Depth: 21.653478
Site: SAN MATEO ANIMAL SHELTER
Engineer: I.MCCREERY



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

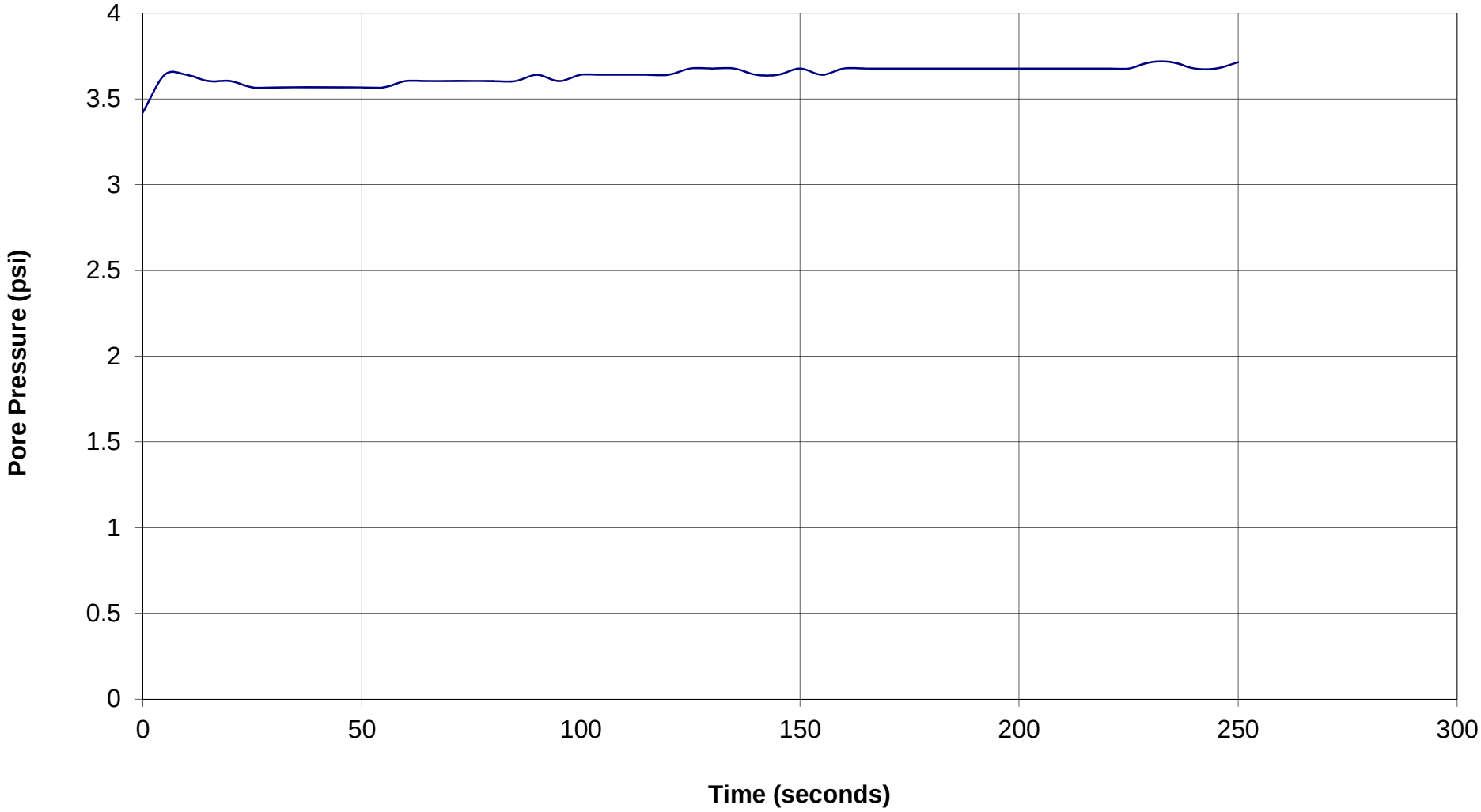
Sounding: 1-CPT02
Depth: 35.761047
Site: SAN MATEO ANIMAL SHELTER
Engineer: I.MCCREERY



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

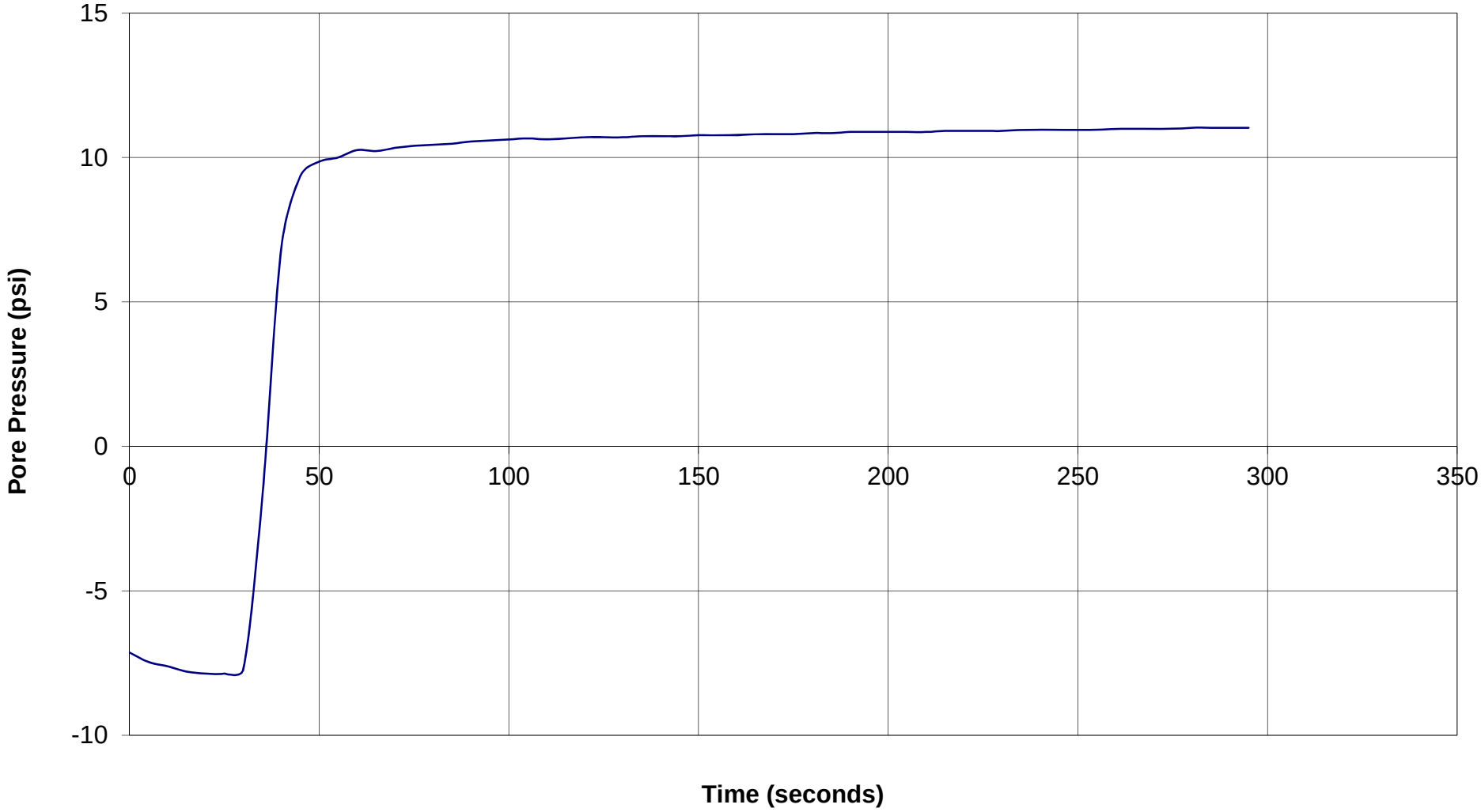
Sounding: 1-CPT03
Depth: 12.139071
Site: SAN MATEO ANIMAL SHELTER
Engineer: I.MCCREERY



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

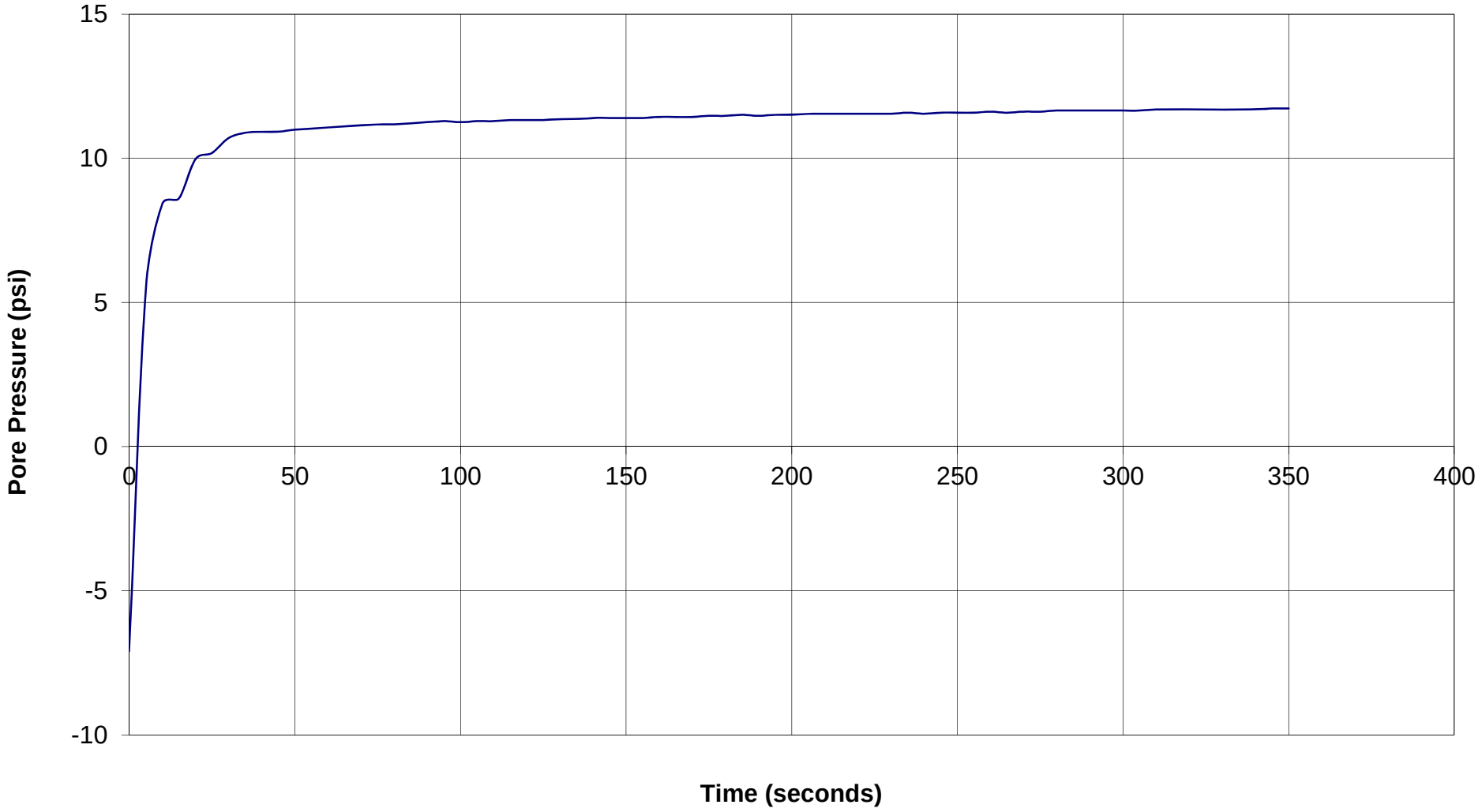
Sounding: 1-CPT04
Depth: 30.0195945
Site: SAN MATEO ANIMAL SHELTER
Engineer: I.MCCREERY



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: 1-CPT05
Depth: 33.6285075
Site: SAN MATEO ANIMAL SHELTER
Engineer: I.MCCREERY



APPENDIX E

Corrosivity Test Results

California State Certified Laboratory No. 2153

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

19 February, 2015

Job No. 1502053
Cust. No.11521

Mr. Andy Firmin
ENGEO Incorporated
6399 San Ignacio Avenue, Suite 150
San Jose, CA 95119

Subject: Project No.: 11780.000.000
Project Name: San Mateo County Animal Shelter
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Firmin:

Pursuant to your request, Cerco Analytical has analyzed the soil samples submitted on February 06, 2015. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Sample No.002 is classified as "severely corrosive" and Sample No.001 is classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations range from 150 to 1,200 mg/kg. Chloride ion concentrations greater than 300 mg/kg are considered corrosive to embedded reinforcing steel; and, as such, the concrete mix design shall be adjusted accordingly by a qualified corrosion engineer.

The sulfate ion concentrations range from 66 to 120 mg/kg and are determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The sulfide ion concentrations reflect none detected with a detection limit of 50 mg/kg.

The pH of the soils range from 6.26 to 7.10, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials range from 430 to 440-mV, which is indicative of aerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please *call JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: ENGEO Incorporated
Client's Project No.: 11780.000.000
Client's Project Name: San Mateo County Animal Shelter
Date Sampled: Not Indicated
Date Received: 6-Feb-15
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 19-Feb-2015

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
1502053-001	1-B1 @ 1	430	6.26	-	1,600	N.D.	150	66
1502053-002	1-B2 @ 16.5 - 17.5	440	7.10	-	170	N.D.	1,200	120

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	18-Feb-2015	18-Feb-2015	-	17-Feb-2015	13-Feb-2015	18-Feb-2015	18-Feb-2015

Cheryl McMillen
Laboratory Director

* Results Reported on "As Received" Basis
N.D. - None Detected

Quality Control Summary - **All laboratory quality control parameters were found to be within established limits**

1502053 ~~1069~~ 11521

CHAIN OF CUSTODY RECORD

PROJECT NUMBER:	PROJECT NAME:
11780.000.000	San Mateo County Animal Shelter

SAMPLED BY: (SIGNATURE/PRINT)

PROJECT MANAGER: Andy Firmin

ROUTING: E-MAIL afirmin@engeo.com Hard Copy Andy Firmin

SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE	Redox	pH	Sulfate	Resistivity	Sulfide											REMARKS REQUIRED DETECTION LIMITS
1-B1 @ 1							x	x	x	x	x											ASTM Test Methods w/ Brief Eval
1-B2 @ 16.5-17.5							x	x	x	x	x											ASTM Test Methods w/ Brief Eval

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
	2/6 1522			
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)		

REMARKS STANDARD 10 DAY TURNAROUND

DISTRIBUTION: ORIGINAL ACCOMPANIES SHIPMENT; COPY TO PROJECT FIELD FILES

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